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* TRANSPORTATION INFORMATION SYSTEM *
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USER'S MANUAL

Prepared for the:

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

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C H A P T E R 1

I N T R O D U C T I O N

The Transportation Information System (T.I.S) is a computer-based system whose purpose is the maintenance, retrieval, and reporting of roadway and railway data. The system consists of an integrated set of computer programs and data files.

The T.I.S. is equipped with the following capabilities:

- Generation of on-going reports.

  Example: Generation of annual reports of roadway mileage and of traffic accidents.

- General inquiry.

  Example: Answers varied requests such as "how many traffic accidents occurred in 1977 that involved ambulances?".

- Data management.

  Example: Able to update the contents of various data files.

The system is currently implemented with the following files:

- Roadlog file.

  Contains roadway environment data for all roadways in the state.

- Logpoint file.

  Contains descriptions of intersecting features along roadways.

- True mileage file.

  Contains information needed for locating features and occurrences along roadways.

- Coincident file.

  Identifies roadways that are coincident with each other (to avoid duplication of data).

- Traffic accident files.

  Contains information about traffic accidents that have occurred.

- Automatic Traffic Recorder files.

  Automatic traffic recorders gather hourly vehicle counts at selected locations around the state.

- Traffic file.

  Contains traffic volume counts.

- Intersection file.

  Contains information about intersections.

- Sections file.

  Contains section accident rate analysis information.

- Bridge file.

  Contains information about bridges.

- Railway file.

  Contains railway environment data.

- Railpoint file.

  Contains descriptions of point data along rail lines.

- Rail True Mileage file.

  Contains information needed for calculating distances along rail lines.

- Station file.

  Contains information about railway stations.

- Rail Grade Crossing file.

  Contains information about road/rail crossings at grade.

- Condition Rating file.

  Contains data describing the surfaces of trunk highways. Includes condition rating, surface rating, and present serviceability rating.

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- Roadway History file.

  Contains a complete construction and maintenance history for trunk highways. It gives a three-dimensional perspective on the roadway since it was first constructed up through the present.

- Sufficiency Rating file.

Contains a wide variety of data for trunk highways. It is used to evaluate roadways to find segments that have critical deficiencies in one or more areas.

- Tables.

Contains varying data, such as county and city names.

The T.I.S. has been implemented to include the following features:

-User-friendly.

The quality of a system depends to a large extent upon its acceptance by its users. T.I.S. helps the user via the following:

-A command structure is provided that allows many users to submit computer runs without help from computer specialists. Many users have access to off-site terminals that allow them to submit runs and obtain results at a location near their own offices.

-All data that is inputted to the system is thoroughly examined for coding errors. Many types of user errors are discovered BEFORE they could damage data stored in the files.

-When a user makes a mistake, he usually receives an error message written in the English language that readily allows correction of the error.

-Original raw data is stored whenever possible.

Raw data is preferred to data that has been manually massaged for the following reasons:

-There is less chance for input errors if manual data preparation is held to a minimum.

-There is added flexibility in the system because the data can still be massaged to obtain results needed by users. Massaged data often detracts from a system because it usually cannot be "unmassaged."

-The presence of raw data provides maximum usefulness for the maximum number of users. The data can be massaged in many different ways to satisfy varying needs.

-Data integrity.

Data integrity refers to the quality of data stored in a system. Data integrity in the T.I.S. is aided by the following:

-All data entered into the system is thoroughly examined for errors. Data that is in error is not accepted.

-Data duplication is held to a minimum. For example, the county in which a roadway is located is indicated in the roadlog file so that it need not be entered into most other files.

-Data security.

Data security refers to both (1) protection against accidental as well as malicious data destruction, and (2) protection against unauthorized access to sensitive data. Data security in the T.I.S. is aided by the following:

-All software thet is capable of modifying system data or of printing sensitive data is password-protected to prevent unauthorized use.

-Backup copies of all system data are periodically generated.

-Direct access to data.

Most T.I.S. data is disk-resident to allow rapid direct access to any piece of data. Disk storage is more expensive than tape storage, but provides the following advantages:

-Access to a given piece of data is more rapid.

-Several users can access a given piece of data simultaneously.

-Data management procedures such as file updates are simpler.

-Operator intervention is reduced (tapes do not need to be mounted and dismounted continually).

-Future conversion to an on-line system will be simplified.

-Maintainability.

Maintainability is an important consideration in a large system. The T.I.S. has been designed in a modular fashion that provides the following advantages:

-If one part of the system should fail, it is likely that other parts can be used while the failing part is being fixed.

-When a failure does occur, the error can be more easily (and quickly) isolated and repaired.

-Minor user-requested modifications can be easily installed

without disrupting the system.

-New files and new software can be added to the system without disrupting already-installed files or software.

-New data elements can be added to existing files with only minor software modifications, and the change can be completely installed and tested without affecting existing users.

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The Reference Posting Location Method

All of the T.I.S. data utilizes the reference position location method. The data stored in the files are "keyed" to this common method, and data from two or more files can be correlated via the common key.

The method utilized a set of numbered reference posts (also called "mile posts") that are physically placed along a roadway. The first post (post 0) is not usually placed along the roadway but is assumed to exist at the beginning of the route. The remaining posts are numbered consecutively and are usually placed one mile apart.

Any point along a roadway can be located by providing (1) a reference post number, (2) the distance from that reference post, and (3) an indication of the direction from the reference post. Examples:

200 + 00.000	A location exactly ar reference post 200.
350 + 00.500	A location half a mile from reference post 350. The location is half a mile BEYOND post 350 (towards the end of the route).
423 - 00.250	A location a quarter mile from reference post 423. The location is a quarter mile PRIOR TO post 423 (towards the beginning of the route).

The T.I.S. does not require the reference posts to be exactly one mile apart. Even though a roadway may be initially posted as such, a realignment of a portion of a roadway may cause the reference posts of the affected area to become either more of less than a mile apart.

A more detailed discussion of the reference posting method can be found in chapter 2 in the section entitled "The True Mileage File."

System Documentation

The T.I.S. system documentation consists of three manuals:

- User's manual.

  The user's manual (this volume) describes the use of the T.I.S. command facility and the use of report and summary software.

- Data coding manual.

  The data coding manual describes (1) how data is prepared for entry into the system files, and (2) how the data management software is used.

- Programming details manual.

  The programming details manual provides information on system design, implementation, and maintenance. This manual is intended for use by computer specialists.

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A computer-generated index to these manuals is available. If you do not have one at your disposal, one can be obtained by running the PRINT-INDEX program documented in this manual.

How to Use This Manual

If you are interested in learning about the facilities and capabilities of the T.I.S., chapters 1 and 2 may suffice. The remainder of the manual contains detailed information on using the command facility of the T.I.S.

If you intend to utilize the system but have others prepare your computer runs, you should look over chapters 3 through 7 to have some idea of how the runs are prepared and submitted. When requesting a computer run, you should look up the command options for the program being requested to ensure that all desired option are obtained. These are found in chapter 8.

If you intend to utilize the command structure yourself, you should read all of chapters 3 through 7 and be sure you understand the features you will be using. Chapter 8 contains the descriptions for each computer

program that is available, and is designed for reference rather than serial reading. Because the T.I.S. is continually growing, chapter 8 will expand as time goes on. The programs are documented roughly in order by functional grouping.

Chapter 9 is intended for use by persons involved in maintaining the system data.

Chapter 10 is intended for use by computer specialists involved in maintaining the Transportation Information System.

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C H A P T E R 2

T H E T I S F I L E S

Introduction

This chapter describes the various TIS files. Each TIS file is assigned a 3-character identifier (eg., the true mileage file is the TRM file). These 3-character file id's are used whenever a user needs to input a reference to a file (eg., when inputting selection criteria via the +SELECT command). Within the TIS, all application programs access the files via special access software that has been provided with the TIS.

In many cases, the access software reformats the data to make it more easily used by the applications programs and by TIS users. There are thus two aspects of each file: (1) the format of the file as viewed by application programs, and (2) the format of the file as actually stored. Most users need not be concerned with the latter, but when a file is used for an application outside TIS (such as an ASI-ST application) the user must deal with the actual formats.

The True Mileage File

The true mileage file (or TRM file)is the heart of the Transportation Information System. It allows roadway locations to be identified in terms of reference points without placing undue constraints on the location of reference posts. All trunk highways and some non-trunk roadways are physically reference posted (or mile posted). When a route is originally posted, an attempt is made to place the posts exactly one mile apart - reference post 1 is placed one mile after the beginning of the route, post 2 is placed one mile past post 1, etc. Some posts cannot be placed exactly one mile past the preceding posts (eg., if the exact location would be in the middle of an inter- section), and some posts wind up being a little less than a mile apart while others wind up being a little more than a mile apart. As time passes, roadway construction will change the lengths of portion of the route making more of the posts misplaced.

Non-trunk roadways that are not physically reference posted are assigned "paper reference posts" that are exactly one mile apart. Again, as time passes, roadway construction will eventually move the paper reference posts less than or more than one mile apart.

The true mileage file allows the reference posts to be used for locating points along roadways. It contains one record for each reference post in the system, and provides the distance from the beginning of the route to the reference post.

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The following diagram shows a U.S. highway:

0 1 2 3 4

```
|         |         |       |          |
|   1.0   |   1.0   |  0.8  |    1.1   |  0.5
-----------------------------------------------
```

The true mileage for this route contains the following records:

Route System	Route Number	Reference Post	True Mileage
USTH	999	000	000.000
USTH	999	001	001.000
USTH	999	002	002.000
USTH	999	003	002.800
USTH	999	004	003.900

Reference post 000 is not physically placed along the roadway, but is assumed to exist and to be located at the beginning of the route.

To identify a point along a roadway, a referemce post number and a distance from that reference post are specified. The distance can be positive (the point is farther from the beginning of the route than the reference post) or negative (closer to the beginning of the route than the reference post). Examples:

```
002 + 00.500
003 - 00.300
001 + 01.500
004 - 01.400
000 + 02.500
```

The first reference point: 002 + 00.500, is said to be "normalized" because the reference post specified is the nearest one that can be specified while retaining a positive distance.

The following reference points all identify a point exactly at reference post 3:

```
003 + 00.000
004 - 01.100
002 + 00.800
001 + 01.800
000 + 02.800
003 - 00.000
```

Of these, only 003 + 00.000 is normalized. All others are unnormalized.

Within the TIS files, reference points are stored in the normalized format whenever possible.

The true mileage file allows the distance between two reference points to be computed. For example, if the following reference points (on the same route) are given:

245 + 00.300
258 + 00.800

There is no way to determine the distance between these points unless the relative locations of posts 245 and 258 are known. The true mileage file provides this information. If the true mileage file contains the following entries for these posts:

245 246.200
258 257.100

The distance between the two POSTS is 257.100 - 246.20, or 10.9 miles. The distance between the two POINTS is 10.9 + .8 - .3, or 11.4 miles.

A "milepoint" is defined as the distance from the beginning of a route to a reference point. Hence, the milepoint that corresponds to reference point 245 + 00.300 is 246.200 + .300, or 246.500. The milepoint that corresponds to reference point 258 + 00.800 is 257.100 + .800, or 257.900. The distance between two reference points is usually computed by (1) computing the milepoints, and (2) subtracting the smaller milepoint from the larger. Hence, the distance between 245 + 00.300 and 258 + 00.800 is 257.900 - 246.500, or 11.4 miles.

Summary of definitions:

-Reference post

Physical or paper markers numbered from 0 through 999 used to identify roadway locations.

-Reference point

A location identifier consisting of (1) a reference post number and (2) a positive or negative distance from that reference post.

-Normalized reference point

The reference point with the smallest non-negative distance.

-Milepoint

The distance from the beginning of the route to a reference point on that route.

The Roadlog and Logpoint Files

These files contain an inventory of Minnesota's roadways. The roadlog file contains complete descriptions of all roadways, including physical characteristics (such as surface width) and jurisdictional information (such as county number). The logpoint file contains positional verbal descriptions of various intersecting features.

Within TIS, the application view of the roadlog (RLG) and logpoint (LPT) files is a single merged file (RLG/LPT).

Each record in the files contains a "key" field. The key consists of the location based on the reference point system, and includes:

-Route system (interstate, U.S. highway, etc.)
-Route number
-Reference post number
-Distance in miles from reference post

All reference points (reference post and distance) are normalized. See "The True Mileage File" for a description of the reference point location method.

Two types of records are stored in the files:

-Mileage records (describe sections of roadways)
-Descriptor records (contain additional verbal descriptions)

A remark code stored in each record identifies the record as either a mileage record or a descriptor record. The following remark codes are used:

-Mileage records (describe sections of roadways)

' ' (2 blanks) Record describes a section of roadway open for traffic

'NE' Record describes a non-existent section

-Descriptor records:

'EN' Record identifies the end of the route
'CO' Record identifies the beginning of a coincident section
'GP' Record identifies the beginning of a gap
'DS' Record identifies an intersection feature

Records with 'DS' remark codes are stored in the logpoint file. All others are stored in the roadlog file.

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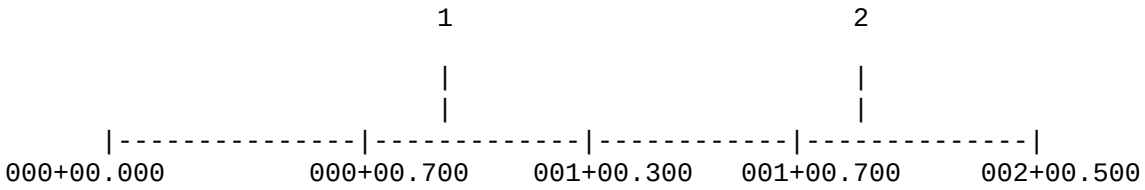
A "roadlog section" is a continuous stretch of roadway falling entirely within a single jurisdictional area in which all physical attributes are constant. Each mileage record describes one roadlog section. The group of mileage records for one route describe all of the roadlog sections of that route. The key field of a mileage record identifies the reference point at the beginning of the section.

A "roadlog section break" occurs at the beginning and ending points of each roadlog section. In the case of two contiguous sections, the section break at the end of the first section coincides with the section break at the beginning of the next section. One record is stored in the roadlog file at each section break.

To illustrate the concepts of the roadlog and logpoint files, consider a simplified roadlog file in which only the following data elements are stored:

-Key
-County number
-Year built
-Surface width
-Remark code

The following diagram illustrates a short hypothetical U.S. highway:



The roadlog file contains the following records:

Key	County	Year	Width	Remark
02 0000999 000 + 00.000	06	1948	24	
02 0000999 000 + 00.700	06	1948	28	
02 0000999 001 + 00.300	06	1956	28	
02 0000999 001 + 00.700	14	1956	28	
02 0000999 002 + 00.500				EN

Note the following:

-The record at 000 + 00.000 describes the section that begins at 000 + 00.000 and ends at 000 + 00.700. This entire section (1) is located in county 06, (2) was built in 1948, and (3) is 24 feet wide.

-Each mileage record (blanks in remark) describes a section of highway that begins at the reference point stored in the record and ends at the reference point stored in the following record.

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-The EN record at 002 + 00.500 simply identifies the reference point at the end of the route. No roadway data is stored in the record because all of the roadway sections have been described in the preceding mileage records.

-To determine the roadway characteristics at an arbitrary point for which no roadlog record is stored, the record with the next lower reference point must be examined. For example, to determine the surface width at reference point 000 + 00.400, it is necessary to examine the record at 000 + 00.000 rather than the record at 000 + 00.700. The record at 000 + 00.000 is called the "keylow" record for reference point 000 + 00.400.

-To determine the roadway characteristics for which a point or which a roadlog record is stored, two values may be correct. For

example, at exactly 000 + 00.700 the widths 24 and 28 are equally correct (at 000 + 00.699, the width is 24 and at 000 + 00.701 the width is 28). The TIS software uses the following method to determime which value is correct:

If the reference point corresponds to a roadlog mileage record, the key-equal record is used (eg., the width at 000 + 00.700 is 28).

If the reference point corresponds to a roadlog descriptor record, the key-low record is used (eg., the width at 002 + 00.500 is 28).

-> At 000 + 00.000 there is a key-equal record but no key-low record.
-> At 000 + 00.400 there is a key-low record but no key-equal record.
-> At 000 + 00.700 there is a key-low record and a key-equal record.

A non-existent section is a section that is either under construction or planned for construction and that is not yet open to traffic. Records that describe non-existent sections contain NE in the remark code. Jurisdictional information (such as county number) is stored in the record, but physical information (such as surface width) is not.

A gap is a section that is not open to traffic and for which no construction is planned. Records for gaps contain only (1) the key, (2) a remark code of GP, and (3) a verbal description. No physical or jurisdictional information is stored. Gaps are most frequently used when routes begin at some reference point other than 000 + 00.000. For example, suppose that a route begins at 003 + 00.200. The roadlog file contains:

Key	County	Year	Width	Remark
02 0000999 000 + 00.000				GP
02 0000999 003 + 00.200	06	1948	24	

The GP record simply serves to indicate that the route actually begins at 003 + 00.200 so that users know that records have not been omitted from the file accidently.

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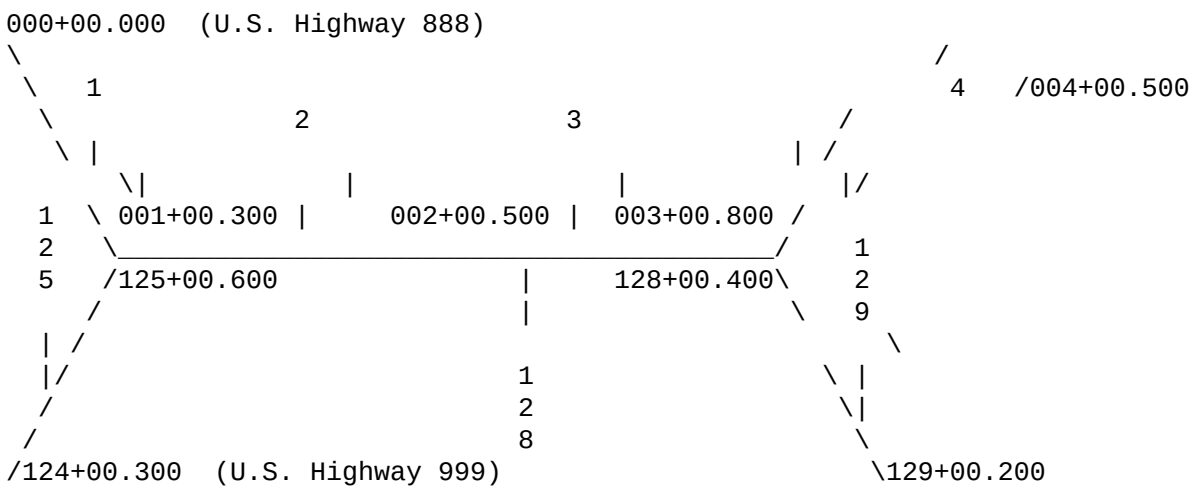
Gaps can occur within a route. For example, if there is a gap between reference points 002 + 00.100 and 005 + 00.300, The file contains:

Key	County	Year	Width	Remark

```
----------------------    ------  ----   -----   ------
02 0000999 000 + 00.000      06    1948     24
02 0000999 002 + 00.100                              GP
02 0000999 005 + 00.300      06    1948     24
```

Without the GP record, the first section would extend to 005 + 00.300.

When two routes are coincident, a cross-referencing scheme is used to avoid duplicating data in the file. The following diagram illustrates two hypothetical coincident routes:



One of the routes (in this example, U.S. 888) is chosen as the "base route". The reference posts physically placed along the roadway are for the base route. The base route is stored in the usual manner with no indication of coincidence:

```
         Key                 County   Year  Width   Remark
----------------------      ------   ----  -----   ------
02 0000888 000 + 00.000       06     1948   28
02 0000888 001 + 00.300       06     1948   28
02 0000888 002 + 00.500       06     1948   24
02 0000888 003 + 00.800       06     1948   24
02 0000888 004 + 00.500       06     1952   28
       .
       .
       .
```

The only difference from normal coding is that section breaks are forced at the beginning and end of the coincident stretch even though no data elements changed.

The route(s) coincident to the base route are termed the "coincident routes." A CO record is stored in the file to indicate coincidence:

Key	County	Year	Width	Remark
.				
.				
.				
02 0000999 124 + 00.300	06	1962	32	
02 0000999 125 + 00.600				CO
02 0000999 128 + 00.400	06	1958	24	
.				
.				
.				

Note that the reference post 128 is theoretical and does not exist along the roadway.

The coincident file is used together with the roadlog file when CO records are found. The coincident file identifies the route that is the base route for the coincident section, and provides the starting and ending reference points on the base route.

Note that only one CO record is stored even though the coincident section spans one or more roadlog sections.

DS records are used to provide additional verbal descriptions of intersection features. A DS record can be stored at any reference point that (1) does not correspond exactly to a roadlog record and (2) that falls within a section described by a roadlog mileage record. Example:

Key	County	Year	Width	Remark
02 0000999 000 + 00.000	06	1948	24	
02 0000999 000 + 00.213				DS
02 0000999 000 + 00.217				DS
02 0000999 000 + 00.440				DS
02 0000999 000 + 00.700	06	1948	28	
02 0000999 000 + 00.800				CO
02 0000999 001 + 00.503	06	1948	32	
02 0000999 002 + 00.003				DS
02 0000999 002 + 00.500				EN

DS records are not allowed (1) at 000 + 00.000, 000 + 00.700, 000 +

00.800, 001 + 00.500, or 002 + 00.500, (2) between 000 + 00.800 and 001 + 00.500, or (3) after 002 + 00.500.

The DS records do not affect the physical and jurisdictional description provided by the roadlog file. For example, the width at 000 + 00.600 is still 24.

The applications view of the RLG and LPT files is a single file as shown in the above diagram. The records appear merged by key, and blanks fields are provides in the unused fields (such as county, year and width).

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In actual disk storage, the two files are separate. The logpoint file has a smaller record length because fields such as county, year, and width are not stored. The files are hence stored as:

RLG

Key	County	Year	Width	Remark
02 0000999 000 + 00.000	06	194824		
02 0000999 000 + 00.700	06	1948	28	
02 0000999 000 + 00.800				CO
02 0000999 001 + 00.500	06	1948	32	
02 0000999 002 + 00.500				EN

LPT

Key	Remark
02 0000999 000 + 00.213	DS
02 0000999 000 + 00.217	DS
02 0000999 000 + 00.440	DS
02 0000999 002 + 00.003	DS

Roadlog mileage records can describe either one or two roadways. The divided and one-way code field identifies how many roadways are described:

'D' Divided roadway
'O' One-way couplet
'U' Undivided 2-way roadway
'X' 1-way roadway carrying traffic towards decreasing reference posts

'Z' 1-way roadway carrying traffic towards increasing reference posts

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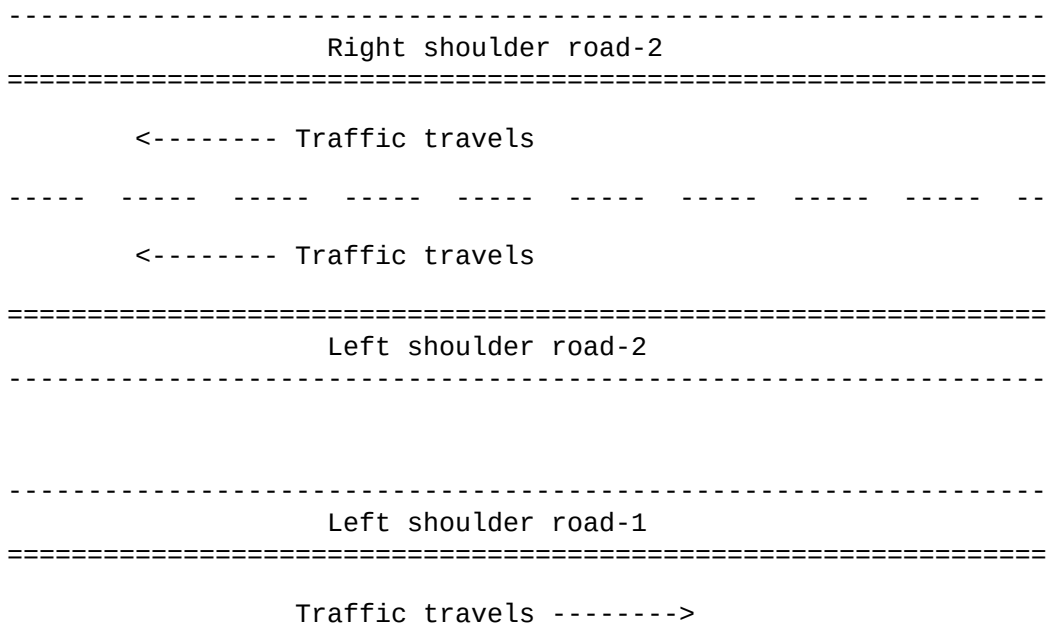
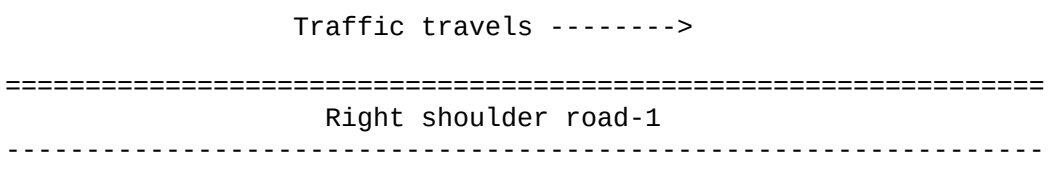
Divided roadways and one-way couplets each have two roadways to describe as shown in the following diagram:





Road-2 is the roadway that carries traffic traveling toward decreasing reference posts.

Road-1 is the roadway that carries traffic traveling towards increasing reference posts.

On each roadway, left and right are as seen by traffic traveling on the roadway.

One-way roadways are treated as half of a divided roadway. Hence, for roadway type 'X', there is a road-2 but no road-1. For roadway type 'Z', there is a road-1 but no road-2.

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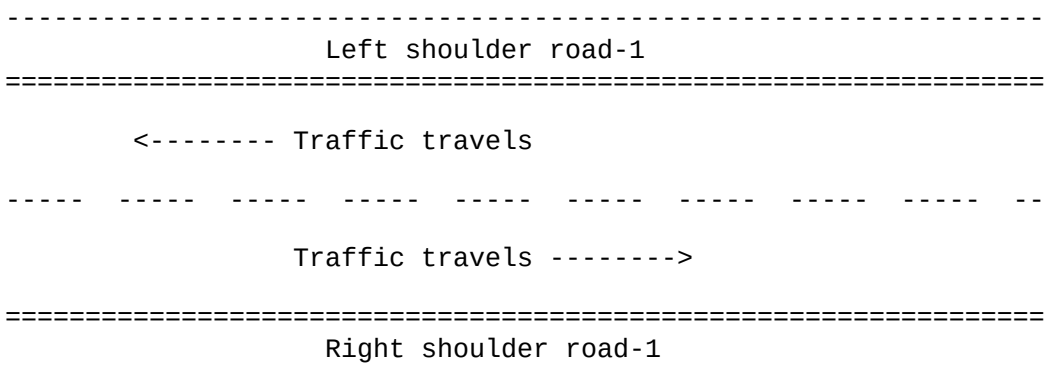
For undivided 2-way roadways, there is a road-1 but no road-2. The following diagram shows an undivided 2-way roadway:



REFERENCE POSTS -------->

Left and right are as seen by traffic travelling towards increasing reference posts.

The Coincident File

The coincident file (COF) relates coincident routes to their corresponding base routes (see page 2-7).

One record is stored in the coincident file for each CO record in the roadlog file. The coincident record contains:

- For the coincident route:
  - Route system
  - Route number
  - Reference point at beginning of coincidence
  - Reference point at end of coincidence
- For the base route:
  - Route system
  - Route number
  - Reference point at beginning of coincidence
  - Reference point at end of coincidence
- An indicator of whether or not the routes are mileposted in the same direction.

For the CO record shown on page 2-7, the following record will be stored in the coincident file:

```
Coincident:   02 0000999 125 + 00.600 128 + 00.400
      Base:   02 0000888 001 + 00.300 003 + 00.800
 Direction:   Same direction
```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The Street Name File

The street name file (XST) contains street names for routes within cities. It is used for two purposes:

- The logpoint listing program obtains street names for print-out

in the logpoint listings.

-A listing of the file sorted by street name allows users to determine the route system and route number of particular streets.

Each record in the file contains the following data elements:

-Route system and route number.
-Reference point at which street name begins.
-Reference point at which street name ends.
-City number.
-County number.
-Street name.

The Township Name File

The township name file (TWN) contains township names for the various townships. Each record in the file contains:

-County number (township numbers are unique within a county)
-Township number
-Township name

The City Table

The city table (CIT) contains city numbers and names. One or more records are stored for each incorporated city (one record per county in which the city is located). Each record contains:

-City number
-County number
-City name
-Population (total population plus population within this county)
-Year of census
-Urban area number (no longer used within TIS)
-Construction district number

The County Table

The county table (CNT) contains county numbers and names. One record is stored for each county with the following information:

- -County number and name
- -Construction district
- -Regional Development Commision

The Intersection/Interchange Files

The intersection/interchange (II) files contain information pertaining to various intersections and interchanges for which accident analysis reports are desired. They do not contain a complete inventory of Minnesota's intersection and interchanges.

The II files are physically stored as two separate files: (1) the INT file (intersection details) and (2) the INX file (cross-reference file). The INT file contains one record per intersection. The INX file contains one or more records per intersection.

The records stored in the INT file are variable-length records. Each record consists of one INT segment (intersecton details) and 1-9 INL segments (leg details). One record is stored in the INX file for each INL segment stored in the INT file.

Application programs view the II files as three separate files: (1) the INT file (details), (2) the INL file (leg information), and (3) the INX file. The INT and INX files are seen as fixed-length records. The INL file is seen as an array containing 1-9 fixed-length records.

The INT file (as seen by application programs) contains data elements that apply to individual intersections as a whole. Examples of data elements in this file are:

- -Key of intersection(route system, route number, and reference point of one of the intersecting routes).
- -Intersection type (eg., interchange or railroad crossing).
- -Traffic control devices installed at the intersection.

The INL file (as seen by application programs) contain 1-9 records for each INT record. Each record describes one intersecting route, and can describe either 2 legs (the route continues through the intersection) or 1 leg (the route begins or ends at the intersection). Examples of data elements in this file are:

-Key of intersecting route (route system, route number, and
  reference point)
-ADT on each leg.
-Number of lanes on each leg.

The INX file (as seen by application programs) contains one record for each INL record. It allows access to the INT record via the key of any interesecting route of an intersection. The data elements in the INX file include:

-Key of intersecting route.
-Key of intersection.
-Construction district, maintenance area, patrol station.
-City number and county number.

The Accident File

The accident file contains data translated from the Department of Public Safety accident records database. The TIS file does not include any "sensitive" data from the accident record. Each record in the file contains:

ACD - Accident details segment (exactly one)
ACP - Accident person segment (0-99), one per person involved
ACV - Accident vehicle segment (0-99), one per vehicle involved
ACJ - Accident person/vehicle segment (0-99), one per person

The file contains data for accidents that occurred for the past five whole years plus the current year (maximum of 6 years). Accidents that could not be exactly located by reference point location are termed "NON-GEOCODED". These accidents contain route system and route number location information only.

An archive file is available on tape that contains accident history for years prior to the current period (back to 1978). This file is available as an option with most reporting programs.

The Traffic File

The traffic file contains traffic volume information. Each record in the file contains volumes at one particular location. Up to 40 volumes can be stored in each volume record. The volumes are stores as annual average daily traffic volumes for particular years. For example, one record might contain three volumes - one for 1977, one for 1978, and one for 1979. Descriptor records are also stored in the file which contain no volumes. These ar "GP" and "EN" records which correspond to those stored in the roadlog file.

In designing the traffic file, it was recognized that some users might like to obtain reports using various user-prepared volumes in order to see how different traffic data might affect certain results. With this in mind, the file was implemented in such a way that each user can input values of his own into the file. When he inputs values, he identifies them with a user code that has been assigned to him. When he runs his report, he can either request the "standard" volumes be used or that the volumes of his user code by substituted.

The Cross-Reference Files

Five cross-reference files are implemented that allow access to data by means other than reference point. These files are:

- -XCN Access by county

-XCI Access by city
-XCD Access by construction district
-XMN Access by maintenance area
-XPT Access by patrol station

Each file contains one record per segment of roadway that falls within one applicable region (eg., county for XCN). The record contains the region identifier (eg., county number), plus the route system, route number, and starting reference point. So by reading the XCN file sequentially, it is possible to first find all of the segments in county 02, etc.

The Sections File
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The sections file contains information used to define sections of roadway for accident analysis reports. The file is maintained by individual construction districts for their own analysis purposes, and is not a complete inventory of the state's roadways. The information pertaining to each section is not at the level of detail as that which would be found in the roadlog file. Data elements include:

-Codes describing general design and environment.
-Speed limit.
-Categorization codes.
-Verbal description.

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The Bridge File
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The bridge file is an inventory of bridges (including culverts, pedestrian bridges, etc.) in the state. The file is linked to the other T.I.S. files through reference point location. Bridge file data elements include:

-Administrative and jurisdictional.
-Span types, construction, and lengths.
-Clearances.
-Roadway and sidewalk widths.
-Condition ratings and appraisals.
-Defense requirements.
-Proposed improvements.
-Numerous miscellaneous items.

The Railway File
****

The railway file contains all segment data for the rail planning subsystem. This includes:

- -Jurisdictional data.
- -Physical data.
- -Operational data.

The Station File
****

The station file contains information relating to an individual station. The file is keyed by FSAC number, and records are actually located by railpoint records. Data includes:

- -Siding length.
- -Interchanges with other railroads.
- -Loading facilities.

The Rail True Mileage File
****

The reference pointing system used for rail planning is similar in design to the roadway files. The rail true mileage file provides exact distances for the other files. One record is stored for each "post". Any raillines with no true mileage data are presumed to have "paper" mileposts exactly one mile apart.

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The Railpoint File 4
****

Each record in the railpoint file indicates the exact reference point location of a feature. Through the other file keys, such as station number or bridge number, the data for the feature can be accessed. Features indicated are:

-Bridges (connected to TIS bridge file).
-Stations (connected to Station file).
-Crossings (connected to TIS rail grade crossing file).
-Verbal descriptions of other types of features.

The Rail Grade Crossing File

The rail grade crossing record contains information about at-grade railroad/roadway intersections. The information includes:

-Types of protection and warning signs.
-Traffic data for railroad and roadway.
-Physical characteristics (such as number of tracks).
-Location information.

The Condition Rating File

The condition rating record contains information about the surfaces of roadways. The information is historical, dating back to 1967, and includes:

-Surface rating.
-Present servicability rating.
-Condition rating.
-Percentage defects.

The Automatic Traffic Recorder Files

The automatic traffic recorder (ATR) files contain vehicle counts by hour for selected locations in the state. Data is available in an active file for the previous calendar year, and on inactive tape files for many previous years.

The Roadway History File

A roadway history file is being coded at the time of this writing and is partially complete. It includes construction and maintenance data for trunk highways:

- Contract number and dates.
- Layers of work:
  - roadway (undivided, road-1 or road-2).
  - layer position.
  - layer material.
  - layer width.
  - layer depth.

The Sufficiency Rating File

The trunk highway sufficiency rating system has been merged into TIS. Data includes:

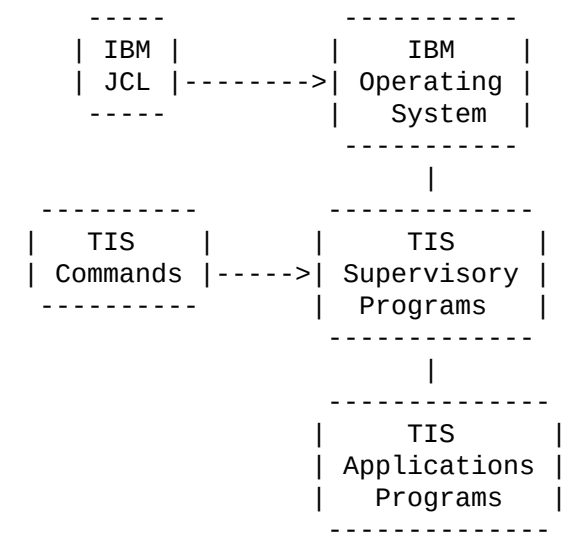
- Jurisdictional information.
- Physical data (surface width & type, shoulder width & type).
- Traffic data (ADT, projected ADT, %commercial, %30th hour).
- Condition rating data.
- Design data.
- Hazards data (bridges, curves, crossing, no passing zones, sight distance restrictions).
- Sufficiency rating points.

C H A P T E R 3

O V E R V I E W O F T I S U S A G E

The computer programs that comprise the T.I.S. application software are integrated via a set of "supervisory" programs. The user prepares "commands" that are read and interpreted by the supervisory programs. The supervisory programs direct the applications programs to carry out the user's request. The supervisory programs are in turn controlled by IBM's Operation System programs.

The following diagram illustrates the flow of control within the system:



This diagram distinguishes between three types of computer programs:

-IBM Operating System

The Operating System is a set of computer programs provided by IBM that control the operation of the entire computer. Whenever a user wishes to run a computer program (whether or not the program is a part of the T.I.S.), some control cards

must be prepared to instruct the Operating System to run that program. These control cards are called JCL cards (Job Control Language).

JCL cannot be considered a user-oriented language because a great deal of knowledge is need to prepare JCL statements effectively. Within the T.I.S., JCL usage is held to an absolute minimum.

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-T.I.S. Supervisory Programs

The supervisory programs are included to provide an alternate to IBM JCL. The programs allow users to prepare easily understood commands for specifying computer runs.

-T.I.S. Application Programs

The application programs are those programs that actually carry out the user's requests.

As shown in the diagram, the user must provide two types of input in order to submit a computer run:

-IBM JCL statements

The Operating System MUST be instructed to run the Transportation Information System, and the only way this can be done is via JCL statements. As stated earlier, JCL is not user-oriented and its use is kept to a minimum.

-TIS commands

The user describes most of his needs via easy-to-understand command cards rather than via JCL.

The remainder of this chapter introduces JCL and commands as used within the T.I.S. Chapters 5 through 7 provide detailed information on some of the subcommands used with many T.I.S. commands. Chapter 8 provides detailed imformation on each T.I.S. command that provides summaries and reports of T.I.S. data. Appendix B contains a summary of JCL for those users that require more knowledge for specific applications.

IBM Job Control Language

JCL is not oriented to use by non-computer professionals, but its use cannot be eliminated in any system implemented on an IBM computer. Within the T.I.S., JCL usage is minimized.

The Operating System is an enormously complex set of computer programs provided by IBM. It is responsible for controlling the operation of the entire computer system in as efficient way as possible. All requests by users for computer usage are submitted via JCL.

The Operating System maintains accounting information for billing purposes. You must have an account number before you can utilize the system. Account numbers are obtained from ISB.

The Operating System allows a number of programs to run simultaneously on the computer. In order to do this, it must be provided with information on the resources required by each program (eg., the number of tape drives that will be used). This information allows it to schedule runs so that they do not conflict with each other.

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JCL control statements can be entered into the system in either of two ways:

- Punched cards

  The JCL statements can be punched onto IBM cards and submitted from either a Remote Job Entry (RJE) station or the ISB central facility.

- TSO terminals.

  The JCL statements can be typed into the system from a TSO terminal (Time-Sharing Option). A TSO terminal consists of a keyboard similar to a typewriter plus either a low-speed printing device or a television tube.

JCL cards that are needed for T.I.S. runs include:

- JOB card.

  Provides accounting information and indicates some of the resources that are required for the run.

-JOBPARM card.

Indicates additional resources that are required for the run.

-ROUTE card.

Indicates whether printed output is to be directed to the printers at the ISB central facility or to a printer at an RJE terminal.

-EXEC card.

Instructs the Operating System to run the T.I.S. and indicates additional resources required for the run.

-DD card.

Provides data retrieval resource information.

The T.I.S. is currently implemented under the MVS version of the OS/VS2 Operating System with JES2. (The JOBPARM and ROUTE cards are actually JES2 control statements rather than JCL). The remainder of this section deals with this Operating System specifically, although most of it is applicable to other systems (such as the SVS version of OS/VS2 or OS/VS1). The JOBPARM and ROUTE cards do not apply to systems installed with either JES1 or JES3 instead of JES2.

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The JOB Card

The JOB card provides accountng information and also indicates some of the resources the run will utilize. A JOB card MUST be provided with each run.

The basic format of the JOB statement is:

```
//jobname JOB account,name,CLASS=class
```

"jobname" is a name assigned by you to your run. It allows the operator to communicate with the run when necessary (eg., when he must mount a

tape). ISB has established conventions for jobnames that allow more efficient computer operation. It is best to obtain these conventions and follow them.

However, when submitting a run from a TSO terminal, jobname should consist of your TSO user identifier followed by one character (otherwise, you cannot obtain results at your terminal and cannot cancel the run should it become necessary). The jobname consistsof 1-8 alphabetics or numbers, the first character of which must be alphabetic.

"account"will be assigned to you by ISB. It is in the format (nnnnnn, mm) where "nnnnnn"is your account number and "mm" is your account type. "name" is your name. If no special characters or blanks are used, simply code the name (eg., SMITH). If special characters or blanks are used, enclose the name in single quotes (eg., 'JOHN SMITH').

"class" is a 1-character code that indicates approximate disk space needed, number of tape drives needed, etc. The codes are assigned by ISB and are subject to change at any time. The following codes will be the most common ones used for T.I.S. runs:

C No tape drives are needed
D One or two tape drives are needed
E Three tape drives are needed
U Job must run on system "B" (other classes run on either "B" or "A").

Users that submit runs for TSO terminals should include the following parameters on their JOB statement:

-MSGCLASS=2
The JCL listing is routed to your TSO terminal. If you do not include this parameter, (1) the JCL listing is produced at an ISD or RJE line printer, and (2) you cannot obtain any results at your TSO terminal for the run.

-MSGCLASS=(2,0)
This parameter requests a simplified JCL listing rather than the several-page JCL listing that is normally printed.

-NOTIFY=user-id
Replace "user-id" with your TSO user identifier. YOu will be notified by the computer at your TSO terminal when the run has completed.

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The JOBPARM Card

The JOBPARM is optional with all runs. If used, it should be placed immediatedly following the JOB card. The JOBPARM card should be coded in one of the following formats:

```
 /*JOBPARM ROOM=3
 /*JOBPARM LINES=n
 /*JOBPARM ROOM=3,LINES=n
```

ROOM=3 simply instructs the computer to identify all printed output as belonging to room 3 (DOT's RJE terminal). If this is included, all printed output produced at an ISB printer will be sent by courier to DOT's RJE room.

LINES=n specifies the estimated amount of printed output in thousands of lines. LINES=5 is the default. If the run produces more than the estimated number of print lines, the operator is notified and he may cancel the run.

/*JOBPARM must be coded in columns 1-9. One space should be left between this and the first parameter.

The ROUTE Card

The ROUTE card is optional with all runs, and indicates whether printed output is to be directed to one of ISB's printers or to an RJE terminal. If no ROUTE card is included, the printed output is sent as follows:

- If the run is submitted at an RJE terminal, the printed output is returned to that terminal.
- Otherwise, the printed output is produced on an ISB line printer.

The format of the ROUTE card is:

```
                 REDUCE    Print at ISB, reduced format.
/*ROUTE  PRINT   R0        Print at ISB, default or specify FORM.
                 R3        Print at R3 (DOT's RJE terminal).
```

/*ROUTE must appear in columns 1-7. TWO blanks appear between ROUTE and PRINT. One blank appears between PRINT and R0, R3, or REDUCE.

Output directed to an RJE terminal must specify FORM=A. Only jobs with less than 5000 lines (one inch of paper) should go to R3. To use special print forms, specify R0 and code the FORM parameter.

REDUCE will print 8 lines per inch on 8-1/2 x 11 paper. This is

recommended for jobs producing more than 200 pages of output that do not require special forms.

The EXEC Card

The EXEC card instructs the IBM Operating System to run the R.I.S., and identifies resources needed for the run. The basic format for the EXEC statement for T.I.S. runs is:

```
// EXEC proc,REGION=nnnK,TIME=m,SCRSIZE=s
```

"proc" is one of the following:

DTRIB	Run submitted from punched cards (at ISB or RJE).
DTRIT	Run submitted from TSO terminal.

NOTE: Use DTRIBA instead of DTRIB, or DTRITA instead of DTRIT when access to the A.R.S. accident files is needed.

"nnnK" is an indication of the size of the program. The documentation with each individual T.I.S. command indicates the minimum value that should be specified.

"m" is the estimated CPU time in minutes for the job to run. CPU time is the primary source of the cost of the run. It will vary from about $10 per minute to about $3.35 per minute, depending on which machine is used (the more expensive machine is three times faster).

"s" is the amount of space required for scratch files used by the programs.

"m"is an estimate of the computer time needed for the run. If the run exceeds this estimate, it is automatically terminated by the Operating System. Be sure to include a sufficient value. The documentation of each individual T.I.S. command indicates the minimum value that should be specified. When in doubt, specify a value larger than you think you need.

"s" is an indication of the amount of scratch disk space that will be needed. The documentation of each individual T.I.S. command provides a suggested value.

Some users will find it necessary to add the following parameters to the EXEC statement:

-PRINTDD=ddname
This parameter specifies the name of the DD statement used for TIS printed output. When using DTRIB, this defaults to PRINTDD=PRINTER. When using DTRIT, this defaults to PRINTDD=TSO.

When using DTRIT, specify PRINTDD=PRINTER if (1) you wish the TIS printed output directed to a line printer, and (2) you do not wish a copy to be sent to your TSO terminal. If the output is being sent to an RJE terminal, include FORM=A as well.

-OUTFILE=ddname
This parameter requests that a second copy of the TIS printed output be written to the indicated DD statement.

When using DTRIT, specify OUTFILE=PRINTER if (1) you wish the TIS printed output directed to a line printer, and (2) you wish a second copy be sent to your TSO terminal. If the output is being sent to an RJE terminal, include FORM=A as well.

When an OUTFILE parameter is included, be sure to double your estimate of print lines (see the JOBPARM card).

-FORM=class

FORM allows special print forms to be requested. Its format can be either FORM=class or FORM='(class,,form-#)'. FORM=A requests standard paper, and should be included whenever output is directed to an RJE terminal. FORM=2 requests output to your TSO terminal, and should be specified only when submitting a job from a TSO terminal with the DTRIB procedure. Output classes and form numbers are controlled by ISD, and may be subject to change at any time. Some common values in use at this time include:

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(S,,710) 1-part 11x14 (6 lines per inch)
(S,,730) 1-part 8 1/2x14 (8 lines per inch)
(S,,755) 1-part 11x14 white (6 lines per inch)

Note: FORM=A may be printed on either 710 or 730

(B,,716) 2-part 11x14 (6 lines per inch)
(C,,713) 3-part 11x14 (6 lines per inch)
(D,,712) 4-part 11x14 (6 lines per inch)
(E,,709) 5-part 11x14 (6 lines per inch)

(F,,688) 1-part 8 1/2x14 (6 lines per inch)
(G,,690) 2-part 8 1/2x14 (6 lines per inch)
(H,,691) 3-part 8 1/2x14 (6 lines per inch)
(I,,695) 4-part 8 1/2x14 (6 lines per inch)

(J,,615) 1-part 8 1/2x14 (6 lines per inch)
(K,,630) 2-part 8 1/2x14 (6 lines per inch)
(L,,640) 3-part 8 1/2x14 (6 lines per inch)
(M,,650) 4-part 8 1/2x14 (6 lines per inch)

(R,,760) Clearprint 11x14 (6 lines per inch)

(S,,nnn) All other forms

-DISPxxx=OLD
    xxx is a 3-character file identifier (eg., RLG = roadlog file).
    DISPxxx=OLD requests exclusive control of the indicated file
    and is used with runs that modify the contents of a file.

-SYSIN=ddname
    This parameter specifies the name of the DD statement used to
    enter TIS commands. If defaults to SYSIN.

-S=loadmod
    This parameter is useful only to computer specialists involved
    in maintaining the T.I.S. software. It is used to enter the
    load module name of the T.I.S. supervisor.

-D=loadmod
    This parameter is useful only to computer specialists involved
    in maintaining the T.I.S. software. It is used to enter the
    load module name of the T.I.S. command decoder.

-DUMP=loadmod
    This parameter is useful only to computer specialist involved
    in maintaining the T.I.S. software. It is used to request an
    ABEND dump after the T.I.S. supervisor has executed the speci-
    fied load module.

-COPIES=n
    Requests n copies of the normal T.I.S. printed output. Use
    multi-part forms instead of this parameter if possible.

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The DD Cards

DD cards allow the Operating System to locate the various T.I.S. files, and indicate how user input and output is handled. A large number of DD cards is needed for each T.I.S. run. However, most of the DD cards are stored in a cataloged procedure (DTRIB or DTRIT) and need not be prepared by users. Most job setups will require the user to enter just one DD statement (the SYSIN DD statement that is used to enter the T.I.S. commands).

The complete job setup for most TIS runs is:

```
//jobname JOB account,name,CLASS=class
//EXEC DTRIB,REGION=nnnK,TIME=n,SCRSIZE=n
//SYSIN DD *
     Command(s) go here
 /*
```

The statement "//SYSIN DD *" tells the Operating System that your input follows the SYSIN DD statement in the job setup. The "/*" statement indicates the end of your input. Any number of T.I.S. commands and subcommands can appear between these two statements.

It is possible to catalog commands into the system rather than entering them each time as shown above. Appendix B contains information on doing this.

T.I.S. Commands

Commands are prepared by users to define requirements for computer runs. The command language has been designed to be easily used.

The basic format of a T.I.S. command is:

```
:program-name
```

-The ":" identifies the card as a T.I.S. command.

-"Program-name" is the name of an application program that the user wishes to run.

The command card is combined with JCL statements to form a complete job setup such as:

```
//DTRI0947  JOB (123456,11),JONES,CLASS=C
// EXEC DTRIB,REGION=200K,TIME=1,SCRSIZE=1
//SYSIN DD *
:LIST-CITY-TABLE
/*
```

This job setup requests a listing of the T.I.S. city table file, which contains the city names and census numbers of Minnesota's cities.

Most commands provide one or more run options that the user must choose between. Three methods are used for entering run options: (1) optionword parameters, (2) keyword parameters, and (3) subcommands.

Optionword parameters consist of two or more items which the user chooses between. He can either code one of them on his command or leave them all off the command (in the latter case, a default choice is assumed by the program).

As an example, the documentation for the LIST-CITY-TABLE command indicates the following option:

```
     LIST-BY-NAME     Print the listing in order by city name
     LIST-BY-COUNTY   Print the listing in order by county number
     LIST-BY-CENSUS   Print the listing in order by census number
     --------------
```

The underlined item is the default value. The job setup shown above will print a listing in order by census number. To obtain a listing by county number, the command card is changed to:

```
     :LIST-CITY-TABLE,LIST-BY-COUNTY
```

A keyword parameter consists of a keyword name followed by an equal sign and an item filled in by the user. An example of a keyword parameter is:

```
     PAGESIZE=46
```

which indicates that 46 lines are to be printed on each page of output.

Subcommands are used for lengthy options that cannot be easily included on a command. An example of a subcommand is the TITLES subcommand that allows users to enter form 1 to 5 lines of information that will be used as page headings on each page of printed output. Subcommands contain a "+" instead of a ":" in column 1, and may be followed by some additional input cards.

Command cards always begin with a ":" in column 1 and continue through column 72. It is sometimes necessary to use two or more cards to prepare a complete command. To continue a card, place the usual comma after a complete parameter and leave the remainder of the card blank through column 72. Begin a new card with a ":" and leave one or more blanks before continuing the command.

Examples:

```
:LIST-CITY-TABLE,LIST-BY-COUNTY,
:  PAGESIZE=46

:LIST-CITY-TABLE,
:  PAGESIZE=46,LIST-BY-COUNTY

:LIST-CITY-TABLE,
:  LIST-BY-COUNTY,
:  PAGESIZE=46
```

Comment cards can be included before or after any complete command (with its subcommands). Comment cards contain a "greater than" sign in column 1.

T.I.S. Subcommands

There are two types of subcommands:

- Job subcommands

  Job subcommands indicate run options that are in effect for all commmands in a run. Job subcommands must be placed before the first command.

- Command subcommands

  Command subcommands apply to a specific command. They must be placed immediately following the command to which they apply.

Job Subcommands

The job subcommands are:

DIAGNOSTIC-LEVEL
TERMINATION-LEVEL
TEST
DUMP-LEVEL
PROGTBL
EQUIV
PASSPARM
KEYWORD

OPTWORD
CHAR-UNIQUE
KEYREQD
DD-REQD

Of these, only DIAGNOSTIC-LEVEL and TERMINATION-LEVEL are useful to most users.

Each line of printed output form the T.I.S. carries a message level as shown in the following table:

0 Normal message
1 Program informatory message
2 Data error - warning level
3 Data error - severe level
7 Program error - warning lever
8 Program error - severe level
9 Program error - termination level

DIAGNOSTIC-LEVEL allows the user to control which messages are printed in the diagnostic print file. The format of the subcommand is:

+DIAGNOSTIC-LEVEL,n (n = 0-9)

All messages at level n or higher are printed in the diagnostic file (as well as printed in the normal output file). The default is 7. A value of zero requests a second complete copy of the normal printed output.

TERMINATION-LEVEL applies only when two or more commands are included in a single T.I.S. run. The format of the subcommand is:

+TERMINATION-LEVEL,n (n = 0-9)

If any command prints a message at level n or higher, any remaining commands included with the job are not run. The default is 8. A value of zero indicates that all commands are to be run regardless of messages printed by preceding programs.

The DUMP-LEVEL subcommand is useful only to computer specialists involved in T.I.S. maintenance. It requests that an ABEND dump be issued if a message is printed at a specified level or higher. The format of the subcommand is:

```
     +DUMP-LEVEL,n    (n = 0-9)
```

The default is 0, which specifies that dumps are not to be produced.

The TEST subcommand requests that test versions of all programs in the run be executed in place of the installed version. This subcommand is useful only to computer specialist involved in T.I.S. maintenance.

The remaining job subcommands are used for maintaining information in the T.I.S. system tables, and are documented in the programming details manual.

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Command Subcommands

The command subcommands are:

```
     PASSWORD
     TITLES
     ROUTES
     SELECT
     CATEGORIES
     TEST
```

PASSWORD is used to enter passwords for password-protected programs. Its format is:

```
     +PASSWORD,password
```

In the command listing, the password is replaced by 8 asterisks.

The TITLES subcommand can be used to enter form 1 to 5 lines that are to be printed as page headings on each page printed by the command. Its format is:

```
     +TITLES
     page heading 1
     page heading 2
```

```
.             (enter 1-5 page heading lines)
.
.
```

If two or more commands are to utilize the same user page headings, a second format of TITLES can be used:

```
+TITLES,n
```

which specifies that the program is to utilize the headings supplied with command number n. Example:

```
:LIST-CITY-TABLE
+TITLES,2
:LIST-CITY-TABLE,LIST-BY-COUNTY
+TITLES
REQUESTED BY JOE DOE 4/28/82
```

n can refer either forward or backwards. The above example is a forward reference. An example of a backwards reference is:

```
:LIST-CITY-TABLE
+TITLES
REQUESTED BY JOHN DOE 4/28/82
:LIST-CITY-TABLE,LIST-BY-COUNTY
+TITLES,1
```

The ROUTES, SELECT, and CATEGORIES subcommands are more complex. Chapters 5, 6, and 7 are dedicated to these subcommands.

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The TEST subcommand is useful only to computer specialists involved in T.I.S. maintenance. It requests that a test version of the program be run in place of the installed version. At the start of a run, it applies to all commands. Include it immediately after a command to apply to that one only.

TSO Procedures

Two TSO procedures are available for those users that have access to TSO terminals. These procedures prepare T.I.S. job setups by prompting the user for information needed in the job setups.

The two procedures are:

-TIS
    TIS is designed for persons that have little familiarity with the system.

-TISX
    TISX is designed for persons that have more familiarity with the system. Fewer prompts are utilized the with TIS.

The TIS Procedure

In the following examples, a # indicates a carriage return entered by you at the terminal.

To execute TIS, wait for TSO to respond with READY and then enter "tis". The computer will begin prompting you for information. Each prompt message indicates whether you must respond (REQ), you may respond (OPT), or if a default value is assumed if you do not respond (DEF=default).

```
READY     (capitialized items are printed by the terminal,
          uncapitalized items are entered by you).
tis#
TIS PROCEDURE 31478  04:05:28    (date and time of day)
ENTER 1-CHAR JOBNAME--------------------------REQ---d#
```

Enter an alphabetic or number. The character you enter is appended to your TSO user identifier to form the jobname of the T.I.S. run.

```
ENTER ACCOUNT NUMBER - (NNNNNN,NN) -----------REQ---(123456,11)#
```

The account number must be obtained through ISB.

```
ENTER YOUR NAME IN QUOTES - 'M HOBAUGH' ------REQ---'melissa'#
```

If no special characters or blanks are used, you need not enter the quotes (eg., hobaugh).

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```
ENTER 1-CHAR JOB CLASS ----------------------DEF=C--#
```

Simply hit carriage return to use the default. If tapes will be used (or under certian other conditions), you must enter the 1-character job class. Refer to "The JOB Card" above.

ENTER ESTIMATED PRINT LINES IN 1000's -------DEF=5--#

This value is used to fill in the LINES parameter of the JOBPARM statement.

ENTER "X" TO SEND OUTPUT TO A LINE PRINTER ----OPT---x#

Hit carriage return if all output is to come to your TSO terminal. Enter an x is some or all output is to be directed to a line printer either at ISD or at an RJE station.

ENTER "R3" TO SEND TO DOT'S RJE TERMINAL ------OPT---r3#

This prompt appears only if you answer x to the previous prompt. Enter r3 to send to DOT's RJE station or hit carriage return to print at ISD.

ENTER NUMBER OF COPIES ----------------------DEF=1---#

This prompt is sent only if you requested output to a line printer, and applies only to the T.I.S. normal output. If you need more than one copy, enter the number of copies. The output will be printed n times, where n is the number you specify. If possible, use multi-part forms instead of requesting copies via this prompt.

ENTER (SYSOUT,,FORM) --------------------DEF=(S,,710)--(j,,615)#

This prompt is given only if output is being directed to an ISD printer. Enter any special output class and form number you need (see the FORM parameter of the EXEC statement).

ENTER "X" TO GET A COPY AT YOUR TSO TERMINAL ----OPT-----x#

This prompt is sent if you requested output to a line printer. Enter an x if you wish a second copy to be made available to you at your TSO terminal.

ENTER TIME IN MINUTES ------------------------DEF=1----#

The value you enter isused in the TIME parameter of the EXEC statement.

ENTER REGION ---------------------------------DEF=200K--400k#

The value you enter isused in the REGION parameter of the EXEC statement.

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```
ENTER SCRSIZE ---------------------------------DEF=1----#
```

The value you enter isused in the SCRSIZE parameter of the EXEC statement.

```
ENTER "Y" IF ACCIDENT FILES ARE NEEDED --------OPT----y#
```

Enter a "y" if your run must access the accident files.

```
ENTER 3-CHAR FILE ID IF DISP=OLD IS NEEDED ----OPT----rlg#
```

Enter the three character file identifier code is exclusive control of the file is needed (ie., if the file is being updated or modified).

```
ENTER"X" IF YOU NEED TO ENTER DD STATEMENTS ---OPT----#
```

If you enter an x, the computer will prompt you for DD statements that will be placed prior to the SYSIN DD statement in the job setup.

```
ENTER TIS COMMANDS
00510 :list-city-table#
00520 :list-city-table,list-by-county#
00530 #
```

The computer types the number at the left. Enter as many lines as necessary. Hit carriage return when prompted after the last line you enter.

```
ENTER L TO LIST THE JOB SETUP ---------------OPT----1#
```

If you enter an 1, the computer will print the job setup that has been created.

```
ENTER E TO EDIT THE JOB SETUP ---------------OPT----e#
```

If you enter an e, the computer will unlock your terminal and you will be in EDIT. Any of the TSO EDIT subcommands can be entered. Enter "quit" when you finished editing.

```
ENTER NAME TO SAVE JOB SETUP-----------------OPT----xyz#
```

If you wish to save the job setup for future use, enter a 1-8 character name. The job setup will be saved under the name tso.name.CNTL where tso is you TSO user identifier and name is the name you enter.

```
          ENTER S TO SUBMIT THE JOB -------------------OPT---s#
               JOB xxxxxxxx SUBMITTED
               JOB xxxxxxxx WAITING FOR EXECUTION
               READY

                    If you enter an s, the job is submitted and a status
                    report is printed.  The procedure then terminates.  If
                    you hit carriage return instead of entering an s, the
                    procedure terminates without submitting the job.
 PAGE 3-15
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PAGE 55

        The job setup produced by TIS always contains the following:

             -JOB card

                 NOTIFY=tso    (tso is your TSO user identifier)

                 MSGCLASS=2

                 MSGLEVEL-(2,0)

             -JOBPARM card

                 ROOM=3

        If you wish to delete or alter any of these, you must do it while in
        EDIT.

        The TISX Procedure
        ------------------

        TISX is somewhat faster than TIS because several prompts are grouped
        together.  All defaults are the same as with TIS.

             READY
             tisx#
             TISX PROCEDURE 4/17/79  05:07:22
             ENTER JOBNAME,ACCOUNT,NAME,CLASS,LINES -----c,(111111,11),'g shaw'#

                  JOBNAME, ACCOUNT, and NAME must be entered.

                  CLASS default is C.

                  LINES default is 5.

             ENTER DEST,COPIES,(SYSOUT,,FORM),TSOCOPY -----------#

                  Hit carriage return if all output is to come to your TSO
```

terminal.

If output is to go to an ISB printer, enter (1) R0 for DEST, (2) optionally, a copies value, (3) optionally, a (sysout,, form) value, and (4) optionally, an x to obtain a copy at your TSO terminal. Note: COPIES default is 1, (SYSOUT,,FORM) default is (S,,710).

If output is to go to DOT's RJE terminal, enter R3 for DEST. Optionally, enter a COPIES value (default = 1) or an x to obtain a copy at your TSO terminal. Do not enter a (SYSOUT,, FORM) value (it will be ignored).

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ENTER TIME,REGION,SCRSIZE,ACC,DISP,DD ------------#

TIME default is 1.

REGION default is 200K.

SCRSIZE default is 1.

Enter any non-blank for ACC if accident files are needed.

Enter 3-character file identifier for DISP to set DISP=OLD.

Enter any non-blank for DD to get prompted for DD statement.

ENTER TIS COMMANDS
00500 :list-city-table#
00510 #

From this point on, the procedure continues exactly like TIS.

When you need to enter a value for one item but not for one or more preceding items, enter a comma for each item bypassed. Example:

ENTER TIME,REGION,SCRSIZE,ACC,DISP,DD --------,400K,,y,rlg

Values have been entered for REGION, ACC, and DISP.

C H A P T E R 4

P R I N T E D O U T P U T

This chapter explains the various types of printed output that can result from T.I.S. runs. It also explains the various options the users have at their disposal for controlling and formatting printed output.

Types of Printed Output

The following list shows all of the print files used within the T.I.S.:

- Printed output from IBM software:
  - JCL listing.
  - Core dumps.

-Sort messages.

-PL/I diagnostic messages.

-PL/I storage reports and core dumps.

-Printed output from T.I.S.

-T.I.S. diagnostics.

-T.I.S. primary output.

-T.I.S. secondary output.

The JCL listing is a listing of the input JCL and of resources used in the run. The JCL listing is the only type of printed output for which no DD statement is needed. The user has some control over routing and formatting of the JCL listing via the MSGCLASS and MSGLEVEL parameters of the JOB card (see chapter 3).

Core dumps are printed in the event of an abnormal termination of a run. The Operating System prints an ABEND code in the JCL listing when a abnormal termination occurs. If a dump DD statement is included with the run, the Operating System also prints a core dump. The dump DD statements are:

SYSABEND	Full dump including Operating System
SYSUDUMP	Full dump of failing program area only
MINIDUMP	Partial dump with additional formatting

A MINIDUMP DD statement is included in all of the T.I.S. cataloged procedures (DTRIB, DTRIBA, DTRIT, DTRITA). Core dumps are generally useful only to computer specialists. If you happen to obtain a core dump from a run you submit, seek a T.I.S. system maintenance programmer for help.

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Many of the T.I.S. programs perform sorts as part of their operation. All sorts are performed by IBM's sort program (or by an equivalent sort program supplied by another vendor). The sort program prints a several-line summary each time a sort is performed. This summary is written to DD statement SYSOUT.

Many of the T.I.S. programs are written in the PL/I language. PL/I is implemented with a considerable amount of error detection software, and utilizes two print files for indicating errors. The first of these files is the PL/I diagnostic messages file (DD statement SYSPRINT), in

which all error messages are printed. The second is the PL/I storage report and core dump file (DD statement PLIDUMP), in which various reports useful to system maintenance personnel are printed.

The T.I.S. printed output includes:

-Diagnostics: Error messages originated from T.I.S. software are printed in this file as well as in the primary file. The DIAGNOSTIC-LEVEL subcommand (see chapter 2) gives the user control over which messages are written to this file.

-Primary: All messages originating from T.I.S. software are sent to the primary print file.

-Secondary: The secondary print file is optional. When used, it is a second identical copy of the primary print file.

Most users will be concerned only with the T.I.S. printed output (and perhaps the JCL listing).

The following is a summary of the print files and corresponding DD statements:

DD stmnt	Print File
none	JCL listing (IBM)
SYSPRINT	PL/I diagnostics file
DIAGNOST	T.I.S. diagnostics file
anyname1	T.I.S. primary file
anyname2	T.I.S. secondary file -- optional
SYSOUT	Sort messages
PLIDUMP	PL/I storage reports and core dumps
MINIDUMP	Core dumps

For DTRIB/DTRIBA: anyname1 defaults to PRINTER.
For DTRIT/DTRITA: anyname1 defaults to TSO.

For all procedures: Secondary file defaults to none.

The order shown in the above list is the order the output appears when printed.

Controlling Printed Output

Each print file (other than JCL listings) is associated with a DD statement in the T.I.S. cataloged procedures. One method of controlling printed output is by overriding particular DD statements.

The DD statements in each of the procedures are:

- DTRIB and DTRIBA:

```
//SYSPRINT DD SYSOUT=A
//DIAGNOST DD SYSOUT=A,DCB=(RECFM=FBA,LRECL=132,BLKSIZE=1320)
//PRINTER  DD SYSOUT=A,DCB=(RECFM=FBA,LRECL=132,BLKSIZE=1320),
//            COPIES=1
//SYSOUT   DD DUMMY
//PLIDUMP  DD SYSOUT=A
//MINIDUMP DD SYSOUT=A
```

SYSOUT=A = Route to line printer and use standard form.

DUMMY = Do not print.

DCB=(...) = Record length information.

COPIES=1 = Number of copies to be printed.

- DTRIT and DTRITA:

```
//SYSPRINT DD SYSOUT=*
//DIAGNOST DD SYSOUT=*,DCB=(RECFM=FBA,LRECL=132,BLKSIZE=1320)
//PRINTER  DD SYSOUT=(S,,710),DCB=(RECFM=FBA,LRECL=133,
//            blksize=1330),COPIES=1
//TSO      DD SYSOUT=2,DCB=(RECFM=FBA,LRECL=132,BLKSIZE=1320)
//SYSOUT   DD DUMMY
//PLIDUMP  DD SYSOUT=*
//MINIDUMP DD SYSOUT=*
```

SYSOUT=2 = Route to TSO terminal.

SYSOUT=* = Route to same destination as JCL listing.

DUMMY = Do not print.

SYSOUT=(S,,710) = Route to line printer and use form 710.

PRINTER DD statement is not utilized unless PRINTDD=PRINTER or OUTFILE=PRINTER is specified on EXEC statement.

A DD statement can be overridden by coding a DD statement with the same name and including it in the job setup between the EXEC statement and the SYSIN DD statement. When two or more DD statements are overridden, they must be entered in the same order they are stored in the procedure. Example:

```
//DTRI9999 JOB (999999,11),JOHNSON,CLASS=C
// EXEC DTRIB,REGION=200K,TIME=1,SCRIZE=1
//DIAGNOST DD SYSOUT=(S,,730)
//PRINTER DD SYSOUT=(S,,730)
//SYSIN DD *
:LIST-CITY-TABLE
/*
```

Then overriding a DD statement, you do not need to prepare the complete DD statement as shown above. Simply include any parameters you need to override or add to the DD statement.

The useful parameters are:

SYSOUT=(class,,form)

Used to specify special print forms. See chapter 3 for details (FORM parameter of EXEC card). Usually, the FORM parameter is used for altering these values instead of over-ridding DD statements.

COPIES=n

Used to request multiple copies. This parameter can be added to any of the DD statements by overriding them. The COPIES parameter of the EXEC card can be used to alter the COPIES parameter of the PRINTER DD statement.

DEST=R3

Causes the print file to be routed to RJE terminal 3 (DOT's RJE terminal). This parameter can be used when some of the print files are to be routed to the RJE terminal while others are routed to ISB's printers. Make sure that SYSOUT=A is specified whenever DEST=R3 is included.

DEST=R0

Causes the print file to be routed to an ISB printer. Special forms can be requested.

OUTLIM=n

Places a limit on the number of output records that can be written to this file. If more records are written than the specified number, the computer operator will cancel the job.

Example: OUTLIM=20000

The output limit to this DD statement is 20000 lines.

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Example:

```
//DTRI1234 JOB 9555888,11),'MY NAME',CLASS=C
/*JOBPARM ROOM=3,LINES=40
/*ROUTE PRINT R3
// EXEC DTRIB,REGION=200K,TIME=1,SCRSIZE=1
//MINIDUMP DD DEST=R0
//SYSIN DD *              The MINIDUMP DD statement ensures that
:LIST-CITY-TABLE          if a dump is printed, it is sent to an
/*                        ISB printer instead of DOT's RJE
                          terminal.
```

Most users find that the inclusion of overriding DD statements is rather cumbersome, and a number of alternate methods for controlling printed output are included with the system.

Several parameters are available that are coded on EXEC statements (see chapter 3). Briefly, these are:

-FORM='(class,,form)' or FORM=class

This parameter enters a value into the SYSOUT field of the PRINTER DD statement.

-PRINTDD=ddname

Allows the user to specify that the T.I.S. primary output be directed to a DD statement other than the default (PRINTER or TSO).

For TSO users (DTRIT/DTRITA), PRINTDD=PRINTER routes the primary file to a line printer instead of to the TSO terminal.

For all users, an additional DD statement can be provided for routing the primary print file to a tape or disk file instead of to a printer or terminal.

-OUTFILE=ddname

Allows the user to request a secondary T.I.S. print file.

For TSO users (DTRIT/DTRITA), PRINTDD=PRINTER routes the secondary print file to a line printer so that tha primary file can be examined from the TSO terminal.

For all users, an additional DD statement can be provided for routing the secondary print file to a tape or disk file instead of to a printer or terminal.

-COPIES=n

Enters a value into the COPIES parameter of the PRINTER DD statement.

The /*ROUTE statement (see chapter3) can be used to route all line printer output to either an ISB printer or to an RJE station.

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A number of parameters are available for T.I.S. commands for controlling printed output in the primary and secondary print files. These include:

PAGESIZE	Controls number of the lines printed per page
PAGE-NUMBER	Controls page numbering
PAGE-POSITION	Controls location of page numbers
EVEN-PAGE-POSITION	Controls location of page numbers
ODD-PAGE-POSITION	Controls location of page numbers
PAGE-INCREMENT	Controls increment value for page numbering
TOP-MARGIN	Controls top margins
MAX-HEADING-PAGES	Limits pages printed with headings

Number of Lines Per Page

The PAGESIZE parameter can be used to specify the number of lines that are printed on each page. The format is PAGESIZE=n where n is the number of lines to be printed per page. Example:

```
:LIST-CITY-TABLE,PAGESIZE=45
```

The default value for PAGESIZE is 60.

You will need to use PAGESIZE parameter when using forms that are shorter than 11 inches (except when using form 730).

Page Numbering

The following parameters are used to control page numbering:

```
PAGE-NUMBER=n
PAGE-NUMBER=$+n
PAGE-NUMBER=$-n
PAGE-NUMBER=STOP

PAGE-INCREMENT=n

PAGE-POSITION=n
EVEN-PAGE-POSITION=n
ODD-PAGE-POSITION=n
```

PAGE-NUMBER controls the starting page number for the command. PAGE-NUMBER=n specifies that the first page printed for the command will be page number n. PAGE-NUMBER=$+n specifies that the first page printed will be n higher than it would have been otherwise. PAGE-NUMBER=$-n specifies that the first page printed will be n lower than it would have been otherwise. PAGE-NUMBER=STOP specifies that no page numbers are to be printed.

When PAGE-NUMBER is not used, the output for the first or only command begins with page 1. Successive commands continue page numbers from the preceding command (eg., if the first command prints 40 pages, the second command begins with page 41).

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PAGE-INCREMENT specifies the value by which the page number is increased for each page. The default value is 1. For example, if PAGE-NUMBER=1, PAGE-INCREMENT=2 is specified, the pages are numbered 1,3,5,...

PAGE-POSITION specifies the printer column number in which the page numbers are printed. When using forms that are narrower than standard paper, it may be necessary to move the page numbers to the left so that they don't run off the page. EVEN-PAGE-POSITION and ODD-PAGE-POSITION allow different values to be entered for even page numbers and odd page

numbers. The default for all parameters is 120.

Top Margins

The TOP-MARGIN parameter can be used to leave a top margin of a specified number of blank lines. Example:

```
:LIST-CITY-TABLE,TOP-MARGIN=10
```

Then blank lines are printed at the top of each page printed by LIST-CITY-TABLE. These ten lines are counted as print lines, so that only 50 lines are printed on each page instead of the usual 60 (see PAGE-SIZE).

Table Numbering

The MAX-HEADING-PAGES parameter can be used to limit the number of pages printed with headings. This is useful when the printed output is to be downloaded to a spreadsheet or other file. Page headings stop on page "NN" where "NN" is specified in this parameter. Option lists or codelist are counted, so 2 or 3 is typically specified. If this parameter is omitted, headings print on every page. table numbering. Example:

```
:command-1,MAX-HEAING-PAGES=2    Headings stop after page 1
```

The SET-DEFAULTS Command

The SET-DEFAULTS command can be used to set default values for PAGESIZE, PAGE-INCREMENT, PAGE-POSITION, EVEN-PAGE-POSITION, ODD-PAGE-POSITION, and/or TOP-MARGIN. Example:

```
:SET-DEFAULTS,PAGESIZE=46,PAGE-POSITION=80
:command-1
:command-2
```

All output printed by command-1 and command-2 is printed using a pagesize of 46 and a page position of 80.

THE ROUTES SUBCOMMAND

The ROUTES subcommand is a highly flexible means of identifying the roadways that are to be included in a run. It provides the following capabilities:

- Processing all or a portion of a route.
- Processing all or a portion of a route system.
- Processing several route systems.
- Processing by construction district, maintenance area, patrol station, city and county.
- Combining data into various summaries with subtotalling and totalling.

The subcommand is used in conjunction with a T.I.S. command as shown in the following example:

```
//DTRI8888 JOB (778332,11),KRUGER,CLASS=C
// EXEC DTRIB,TIME=1,REGION=200K,SCRSIZE=1
//SYSIN DD *
:LIST-ROADLOG-FILE,LIST-FORMAT=A
+ROUTES
ROUTE-SYS=ISTH,ROUTE-NUM=35
ROUTE-SYS=ISTH,ROUTE-NUM=90
/*
```

The subcommand can be used with the refer-back option (either with forward or backward references). See the TITLES subcommand in chapter 3 for an example of the refer-back option.

Syntax of ROUTES Control Cards

Each ROUTES control card consists of one or more keyword or optionword parameters separated by commas. Each card begins with a non-blank in column 1 and can continue through column 72.

When necessary, one continuation card can be included. Place the usual comma after a complete parameter and begin the second card with one or more blanks.

Examples:

```
ROUTE-SYS=01

ROUTE-SYS=01,ROUTE-NUM=35E,START-REF=475+00.000,
  END-REF=583+00.000
```

ZERO-USER-TOTALS

If a continuation card is used, the maximum allowable total length of the control card is 120 characters (excluding blanks).

Types of ROUTES Control Cards

There are two types of ROUTES control cards:

- Data selection.

  Specifies one or more roadways for processing.

- Summary selection.

  Controls subtotalling and totalling facilities.

Command Classifications

Each application that utilizes the ROUTES subcommand is assigned one of the following classifications:

- LIST

  The command prints a listing of data. Summary selection control cards have no effect.

- SUM

  The command prints one or more summaries of data. Summary selection control cards can be used to obtain summaries of totals and subtotals as explained later.

- LIST-&-SUM

  The command prints one or more listings. After each listing, a summary is printed. The summary selection control cards affect only the summaries and not the listings.

- GEN

  The command generates some sort of scratch file. Summary selection control cards have no effect. Data selection control

cards can specify only the parameters ROUTE-SYS, ROUTE-NUM, START-REF, and/or END-REF.

The ROUTE-SYS Parameter

The ROUTE-SYS parameter is used on data selection control cards to indicate one or more route systems for processing. The route systems are:

Number	Abbr	Route System
01	ISTH	Interstate trunk highways
02	USTH	U.S. trunk highways
03	MNTH	Minnesota trunk highways
04	CSAH	County state-aid highways
05	MSAS	Municipal state-aid streets
07	CNTY	County roads
08	TWNS	Township roads
09	UTWN	Unorganized township roads
10	MUN	Municipal streets
11	NATP	National park roads
12	NFD	National forest development roads
13	IND	Indian reservation roads
14	SFR	State forest roads
15	SPRK	State park roads
16	MIL	Military roads
17	NATM	National monument roads
18	NATW	National wildlife refuge roads
19	FRNT	Frontage roads
20	SGAM	State game preserve roads
23	PRIV	Private jurisdiction roads
01-03	EACH-TRUNK	
01-23	EACH	

To identify a single route system, specify either the number or the abbreviation. Example:

```
ROUTE-SYS=04
```

```
     ROUTE-SYS=CSAH
```

To specify multiple route systems, either use the names EACH-TRUNK or specify the number codes. Examples:

```
     ROUTE-SYS=EACH-TRUNK
     ROUTE-SYS=04-08
     ROUTE-SYS=(01,05-07,10)
```

When a parenthesized list is used, the list can contain up to 5 values or ranges (ie., up to 4 commas can be used). Abbreviations can be used when a single value is used, but the numeric codes must be used to indicate ranges. Example:

```
     ROUTE-SYS=(ISTH,05-07,MUN)          (valid)
     ROUTE-SYS=(ISTH,MSAS-CNTY,MUN)      (not valid)
```


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The ROUTE-NUM Parameter

ROUTE-NUM is used in conjunction with the ROUTE-SYS parameter to identify one or more routes. The ROUTE-SYS parameter must specify a single route system either by number or by abbreviation. Examples:

```
     ROUTE-SYS=ISTH,ROUTE-NUM=94
     ROUTE-SYS=02,ROUTE-NUM=12-15
     ROUTE-SYS=05,ROUTE-NUM=11115003
     ROUTE-SYS=CSAH,ROUTE-NUM=66000001-66000099
```

The route number formats for the various route systems are:

```
     Systems 01-03:  A 1-, 2-, or 3-digit number optionally followed
                     by an alphabetic code (eg., 307, 35W, 3).

     Systems 05,10:  "ccccnnnn" where "cccc" is the city's census
                     number and "nnnn" is either a 4-digit number or
                     a 3-digit number followed by an alphabetic code
                     (eg., 2585003B).
```

Other systems: "cc00nnxx" where "cc" is the county number and "nnxx" is 0001-9999, or 000A-999Z. For counties 20 and 87, "00xx", where "xx" is A1-Z9 is also possible.

The ROUTE-SYS-&-NUM Parameter

ROUTE-SYS-&-NUM can be used instead of ROUTE-SYS and ROUTE-NUM to identify a route or group of routes. If a range of routes is specified, the route system must be identical in the starting and ending value. The route number must be coded with 8 characters (for trunk highways, use leading zeroes).

Examples:

ROUTE-SYS-&-NUM=010000035E (system 01 route 35E)

ROUTE-SYS-&-NUM=0466000081-0466000089 (system 04)

The START-REF and END-REF Parameters

START-REF and/or END-REF are used in conjunction with either ROUTE-SYS and ROUTE-NUM or with ROUTE-SYS-&-NUM to process a portion of a route. ROUTE-SYS must specify a single system and ROUTE-NUM must specify a single route number (or ROUTE-SYS-&-NUM must specify a single route).

Reference points are specified in the format nnn+nn.nnn where nnn is the reference post number and +nn.nnn is the distance from the reference post. All values entered must be normalized to obtain correct results (see The True Mileage File in chapter 2).

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The distances can be entered in either miles or kilometers. If the value is in miles, simply code the reference point (optionally, include (MILES) after the reference point). If the value is in kilometers, code as nnn+nn.nnn(KM). Leading zeroes in each subfield can be omitted, as can trailing zeroes after the decimal point. +nn can be omitted if equal to +00. Examples:

ROUTE-SYS=USTH,ROUTE-NUM=10,START-REF=20,END-REF=50.3
ROUTE-SYS=01,ROUTE-NUM=35W,END-REF=215+0.356
ROUTE-SYS-&-NUM=1033350001,START-REF=10+.5(KM)

The RAIL-SYS Parameter

The RAIL-SYS parameter is used for commands accessing the railway, railpoint, rail true mileage and station files ONLY. Each railroad company is a different rail system. The rail system codes are:

Code	Abbr	Railroad Company
01	BNSF	BURLINGTON NORTHERN SANTA FE
02	UP	UNION PACIFIC RAILROAD
05	CPR	CANADIAN PACIFIC RAILWAY
06	DMIR	DULUTH, MISSABE & IRON RANGE
07	CEDR	CEDAR RIVER RAILROAD
08	CN	CANADIAN NATIONAL RAILWAYS
09	DWP	DULUTH, WINNIPEG & PACIFIC
10	DNE	DULUTH & NORTHEASTERN
12	MDW	MINN., DAKOTA AND WESTERN
13	MC	MINNESOTA COMMERCIAL RWY.
14	LTVS	LTV STEEL MINING CO.
15	NSM	NORTHSHORE MINING CO.
17	MNCR	MINNESOTA CENTRAL RAILROAD
18	LQPR	LAC QUI PARLE REGIONAL
19	DAKR	DAKOTA RAIL, INC.
20	DME	DAKOTA, MINN & EASTERN
23	BNCP	BURLINGTON NORTHERN SF / CPR
27	UPCP	UNION PACIFIC / CAN. PACIFIC
30	CPCR	CAN. PACIFIC / CEDAR RIVER
31	CPMC	CAN. PACIFIC / MINN. COMM.
32	CPDM	CAN. PAC. / DAK., MN & EAST.
41	MNTM	MINNESOTA TRNSPTN. MUSEUM
42	OTVR	OTTER TAIL VALLEY RAILROAD
43	WC	WISCONSIN CENTRAL LTD.
44	RRVW	RED RIVER VALLEY & WESTERN
45	NRR	NOBLES ROCK RAILROAD
51	BNNR	BURL. NORTH. SF / NOBLES ROCK
52	SLLC	ST. LOUIS & LAKE COS. REGIONAL
53	TCWR	TWIN CITIES & WESTERN RAILROAD
55	COD	CITY OF DULUTH
56	MZL	MINNESOTA ZEPHYR, LTD.
57	HCRR	HENNEPIN CO REGIONAL RAIL AUTH
58	MNN	MINNESOTA NORTHERN RAILROAD
59	NPR	NORTHERN PLAINS RAILROAD
60	IMRL	I & M RAIL LINK, LLD
61	SCXY	ST. CROIX VALLEY RAILROAD
01-99	each	

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To identify a single rail system, specify either the number or the abbreviation. Example:

```
RAIL-SYS=01
RAIL-SYS=BN
```

To specify multiple rail systems, either use the name EACH or use the number codes. Examples:

```
RAIL-SYS=EACH
RAIL-SYS=05-08
RAIL-SYS=(01,09,12)
```

When a parenthesized list is used, the list can contain up to 5 values or ranges (ie., up to 4 commas can be used). Abbreviations can be used when a single value is used, but the numbers must be used to indicate ranges. Examples:

```
RAIL-SYS=(BN,05-06,CN)    (valid)
RAIL-SYS=(BN,SOO-DMIR,CN) (NOT VALID)
```

The RAIL-LINE Parameter

RAIL-LINE is used in conjunction with the RAIL-SYS parameter to identify one or more rail lines. A "rail line" is defined as a segment of railway that is assigned to one rail system (company) with consecutively numbered milepoints. The rail lines within a rail system are numbered for 01 to 99. Examples:

```
RAIL-SYS=BN,RAIL-LINE=12
RAIL-SYS=07,RAIL-LINE=01-05
```

If the RAIL-LINE parameter is not included, the default is all lines for the specified systems (01-99).

The RAIL-START-REF and RAIL-END-REF Parameters

RAIL-START-REF and/or RAIL-END-REF are used in conjuction with RAIL-SYS and RAIL-LINE to process a portion of a rail line. RAIL-SYS must specify a single system and RAIL-LINE must specify a single line.

Rail reference points are in the format nnn+n.nn, where nnn is the reference post number and +n.nn is the distance from the post.

Leading zeroes in each subfield can be omitted, as can trailing zeroes after the decimal point. +n can be omitted if equal to +0. Examples:

```
     RAIL-SYS=BN,RAIL-LINE=12,RAIL-START-REF=10,RAIL-END-REF=16.5
     RAIL-SYS=01,RAIL-LINE=1,RAIL-END-REF=55+0.99



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```

The CONSTR-DIST Parameter

CONSTR-DIST is used to process by construction district. Examples:

```
     CONSTR-DIST=3        Processes construction district 3

     CONSTR-DIST=5-7      Processes districts 5 through 7

     CONSTR-DIST=EACH     Processes all construction districts
```

Within each district, the roadways are processed in order by route system, route number, and reference point.

ROUTE-SYS and ROUTE-NUM (or ROUTE-SYS-&-NUM) can be included to indicate which roadways in each district are to be processed. If these are omitted, only trunk highways are processed. Examples:

```
     CONSTR-DIST=5,ROUTE-SYS-USTH,ROUTE-NUM=10-14

     CONSTR-DIST=EACH,ROUTE-SYS=02-03
```

(BY-CITY) and (BY-COUNTY) can be added to process by city or by county within the districts. Examples:

```
     CONSTR-DIST=1(BY-COUNTY)

     CONSTR-DIST=EACH(BY-CITY),ROUTE-SYS=USTH
```

The MAINT-AREA Parameter

MAINT-AREA is used to process by maintenance area. Its use is identical to that of CONSTR-DIST above with the following exceptions:

- MAINT-AREA can be used only for trunk highways.
- (BY-CITY) and (BY-COUNTY) are not available.

Examples:

MAINT-AREA=4B

MAINT-AREA=6A-6B,ROUTE-SYS=USTH

MAINT-AREA=EACH,ROUTE-SYS=02-03

The PATROL-STATION Parameter

PATROL-STATION is used to process by patrol station. Its use is identical to that of CONSTR-DIST above, except that it can be used only for trunk highways. Examples:

PATROL-STATION=2110

PATROL-STATION=2110-3550(BY-COUNTY),ROUTE-SYS=MNTH

PATROL-STATION=EACH(BY-CITY)

The COUNTY Parameter

COUNTY is used to process by county. Its use is similar to CONSTR-DIST above with the following exceptions:

- (BY-COUNTY) cannot be used.
- When a single county is specified, it can be specified by name instead of by number.
- COUNTY=METRO can be used to specify the 7-county metro area (see Table 1 for list of metro counties).

Examples:

COUNTY=LAKE-OF-THE-WOODS,ROUTE-SYS=MNTH

COUNTY=21-25(BY-CITY)

COUNTY=43,ROUTE-SYS=(05,10)

```
     COUNTY=EACH,ROUTE-SYS=ISTH
```

Table 1 provides a list of the county names and numbers.

The CITY Parameter

CITY is used to process by city. Its use is similar to CONSTR-DIST above with the following exceptions:

- (BY-COUNTY) and (BY-CITY) cannot be used.
- When a single city is specified, it can be specified by name instead of by number.

Examples:

```
     CITY=ST-CLOUD,ROUTE-SYS=USTH,ROUTE-NUM=1-50

     CITY=0088

     CITY=EACH,ROUTE-SYS=MSAS
```


Table 2 provides a list of the city names and numbers of all cities over 5000 population. A complete list of city names and numbers can be found in Appendix C.

Two cities in the state are named FRANKLIN and two cities are named ST-ANTHONY. These cities must be requested by number rather than by name.

The LOWER-POP and UPPER-POP parameters

When processing a range of cities (either with a CITY parameter or with a (BY-CITY) option in a CONSTR-DIST, PATROL-STATION, or COUNTY parameter), these parameters allow selection of cities by population. Examples:

```
     CITY=EACH,LOWER-POP=20000,UPPER-POP=30000

     CONSTR-DIST=3(BY-CITY),LOWER-POP=5000

     COUNTY=EACH(BY-CITY),UPPER-POP=10000
```

TABLE 1.

COUNTY NAMES AND NUMBERS.

01	AITKIN	30	ISANTI	59	PIPESTONE
* 02	ANOKA	31	ITASCA	60	POLK
03	BECKER	32	JACKSON	61	POPE
04	BELTRAMI	33	KANABEC	* 62	RAMSEY
05	BENTON	34	KANDIYOHI	63	RED-LAKE
06	BIG-STONE	35	KITTSON	64	REDWOOD
07	BLUE-EARTH	36	KOOCHICHING	65	RENVILLE
08	BROWN	37	LAC-QUI-PARLE	66	RICE
09	CARLTON	38	LAKE	67	ROCK
* 10	CARVER	39	LAKE-OF-THE-WOODS	68	ROSEAU
11	CASS	40	LE-SUEUR	69	ST-LOUIS
12	CHIPPEWA	41	LINCOLN	* 70	SCOTT
13	CHISAGO	42	LYON	71	SHERBURNE
14	CLAY	43	MCLEOD	72	SIBLEY
15	CLEARWATER	44	MAHNOMEN	73	STEARNS
16	COOK	45	MARSHALL	74	STEELE
17	COTTONWOOD	46	MARTIN	75	STEVENS
18	CROW-WING	47	MEEKER	76	SWIFT
* 19	DAKOTA	48	MILLE-LACS	77	TODD
20	DODGE	49	MORRISON	78	TRAVERSE
21	DOUGLAS	50	MOWER	79	WABASHA
22	FARIBAULT	51	MURRAY	80	WADENA
23	FILLMORE	52	NICOLLET	81	WASECA
24	FREEBORN	53	NOBLES	* 82	WASHINGTON
25	GOODHUE	54	NORMAN	83	WATONWAN
26	GRANT	55	OLMSTED	84	WILKIN
* 27	HENNEPIN	56	OTTER-TAIL	85	WINONA
28	HOUSTON	57	PENNINGTON	86	WRIGHT
29	HUBBARD	58	PINE	87	YELLOW-MEDICINE

* Seven county metro area.

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TABLE 2. CITY NAMES AND NUMBERS.

This table contains a partial listing of the city names and numbers.
A complete listing can be found in Appendix C.

0045	ALBERT-LEA	2455	MAPLEWOOD
0065	ALEXANDRIA	2475	MARSHALL
0088	ANDOVER	2535	MENDOTA-HEIGHTS
0095	ANOKA	2585	MINNEAPOLIS
0102	APPLE-VALLEY	2610	MINNETONKA

0110	ARDEN-HILL	2625	MONTEVIDEO
0150	AUSTIN	2645	MOORHEAD
0290	BEMIDJI	2670	MORRIS
0370	BLAINE	2693	MOUND
0385	BLOOMINGTON	2695	MOUNDS-VIEW
0435	BRAINERD	2755	NEW-BRIGHTON
0460	BROOKLYN-CENTER	2770	NEW-HOPE
0465	BROOKLYN-PARK	2810	NEW-ULM
0537	BURNSVILLE	2850	NORTHFIELD
0630	CHAMPLIN	2855	NORTH-MANKATO
0640	CHANHASSEN	2880	NORTH-ST-PAUL
0645	CHASKA	2888	OAKDALE
0665	CHISHOLM	2940	ORONO
0750	CLOQUET	2980	OWATONNA
0790	COLUMBIA-HEIGHTS	3080	PIPESTONE
0820	COON-RAPIDS	3105	PLYMOUTH
0837	COTTAGE-GROVE	3130	PRIOR-LAKE
0855	CROOKSTON	3148	RAMSEY
0870	CRYSTAL	3175	RED-WING
0995	DETROIT-LAKE	3210	RICHFIELD
1040	DULUTH	3230	ROBBINSDALE
1063	EAGAN	3235	ROCHESTER
1075	EAST-GRAND-FORKS	3290	ROSEVILLE
1094	EDEN-PRAIRIE	3360	ST-ANTHONY
1105	EDINA	3380	ST-CLOUD
1180	ELY	3405	ST-LOUIS-PARK
1240	FAIRMONT	3425	ST-PAUL
1245	FALCON-HEIGHTS	3430	ST-PAUL-PARK
1250	FARIBAULT	3435	ST-PETER
1275	FERGUS-FALLS	3480	SAUK-RAPIDS
1385	FRIDLEY	3515	SHAKOPEE
1495	GOLDEN-VALLEY	3535	SHOREVIEW
1545	GRAND-RAPIDS	3595	SOUTH-ST-PAUL
1633	HAM-LAKE	3620	SPRING-LAKE-PARK
1686	HASTINGS	3675	STILLWATER
1752	HERMANTOWN	3760	THIEF-RIVER-FALLS
1765	HIBBING	3915	VIRGINIA
1835	HOPKINS	4000	WASECA
1865	HUTCHINSON	4070	WEST-ST-PAUL
1880	INTERNATIONAL-FALLS	4090	WHITE-BEAR-LAKE
1886	INVER-GROVE-HEIGHTS	4110	WILLMAR
2150	LAKEVILLE	4145	WINONA
2275	LITCHFIELD	4173	WOODBURY
2280	LITTLE-CANADA	4190	WORTHINGTON
2285	LITTLE-FALLS		
2420	MANKATO		
2430	MAPLE-GROVE		

Modes of ROUTES Operation

The ROUTES subcommand can operate in any of 5 distinct modes. The modes are handled differently for each program class (LIST, SUM, LIST-&-SUM, GEN). Note that RAIL-SYS operates the same as ROUTE-SYS, RAIL-LINE is similar to ROUTE-NUM, and RAIL-START-REF and RAIL-END-REF are like START-REF and END-REF. The modes of operation are:

-Route system mode.

Route system mode is distinguished by (1) the presence of ROUTE-SYS or ROUTE-SYS-&-NUM and (2) the absence of CONSTR-DIST, MAINT-AREA, PARTOL-STATION, COUNTY, and CITY.

Examples:

```
ROUTE-SYS=EACH

ROUTE-SYS=03,ROUTE-NUM=40
```

All GEN programs can operate in route system mode only.

For LIST and LIST-&-SUM programs, one summary is produced.

For SUM and LIST-&-SUM programs, one summary is produced.

-Single region mode.

Single region mode is distinguished by (1) the presence of CONSTR-DIST, MAINT-AREA, PATROL-STATION, COUNTY, or CITY with one region specified, and (2) the absence of (BY-CITY) and (BY-COUNTY). Examples:

```
CONSTR-DIST=1

CONSTR=ANOKA,ROUTE-SYS=(01,10)
```

For LIST and LIST-&-SUM programs, one listing is produced.

For SUM and LIST-&-SUM programs, one summary is produced.

-Multiple region mode.

Multiple region mode is distinguished by (1) the presence of CONSTR-DIST, MAINT-AREA, PATROL-STATION, or CITY with two or more regions specified, and (2) the absence of (BY-CITY) and (BY-COUNTY). Examples:

```
MAINT-AREA=6A-6B
```

CITY=EACH,ROUTE-SYS=01

For LIST and LIST-&-SUM programs, one listing is produced for each region specified.

For SUM and LIST-&-SUM programs, one "individual" summary is produced for each region specified and one "subtotal" summary is produced that shows combined totals for the specified regions.

-Single region within region mode.

Single region within region is distinguished by (1) the presence of CONSTR-DIST, MAINT-AREA, PATROL-STATION, COUNTY, or CITY with one region indicated, and (2) the presence of (BY-CITY) or (BY-COUNTY). Examples:

CONSTR-DIST=1(BY-COUNTY),ROUTE-SYS=10
PATROL-STATION=2110(BY-CITY)

For LIST and LIST-&-SUM programs, one listing is produced for each county/city in the region.

For SUM and LIST-&-SUM programs, one "individual" summary is printed for each county/city in the region and one "subtotal" summary is printed for the combined totals of all the counties/cities.

-Multiple region within region mode.

Multiple region within region mode is distinguished by (1) the presence of CONSTR-DIST, MAINT-AREA, PATROL-STATION, COUNTY, or CITY with two or more regions indicated, and (2) the presence of (BY-CITY) or (BY-COUNTY). Examples:

PATROL-STATION=EACH(BY-COUNTY)
COUNTY=01-05(BY-CITY)

For LIST and LIST-&-SUM programs, one listing is produced for each county/city within each region.

For SUM and LIST-&-SUM programs, the following summaries are printed:

-One "individual" summary for each county/city within each region.

-One "subtotal" summary for each region showing all of the counties/cities in that region.

-One "total" summary showing the regions combined.

Individual Summary Selection

The user can elect to print or not print individual summaries (this applies only to SUM and LIST-&-SUM programs). Use the START-INDIVIDUAL and STOP-INDIVIDUAL summary-selection statements.

Example:

```
STOP-INDIVIDUAL

PATROL-STATION=EACH
```

The program will print just one summary (the subtotal summary showing the patrol stations combined).

START-INDIVIDUAL is in effect at the beginning of the run. You may stop and start individual summaries as often as needed. Examples:

```
STOP-INDIVIDUAL
PATROL-STATION=EACH
START-INDIVIDUAL
CONSTR-DIST=EACH
```

If individual summaries are stopped for modes that print only one summary, no summaries are printed. Examples:

```
STOP-INDIVIDUAL
ROUTE-SYS=ISTH
```

This type of request should be used only in conjunction with user totalling or subtotalling (see the following sections).

Subtotal Summary Selection

Subtotals can be used in automatic control or in manual control, or can be disabled entirely.

When used in automatic control, subtotals apply only to (1) multiple region mode, (2) single region within region mode, and (3) multiple region within region mode (see above, "Modes of ROUTES Operation").

To disable subtotals, use the summary selection statement:

```
STOP-SUBTOTALS
```

To enable automatic subtotals, use the statement:

```
START-STANDARD-SUBTOTALS
```

Note: Any manual subtotals in use are cancelled by this statement.

Manual control is performed with the two statements:

```
ZERO-USER-SUBTOTALS
PRINT-USER-SUBTOTALS
```

Examples:

```
STOP-SUBTOTALS
PATROL-STATION=EACH

     Only the individual summaries are printed.

ZERO-USER-SUBTOTALS   (cancels automatic subtotals and begins user
                       subtotals).
ROUTE-SYS=ISTH
ROUTE-SYS=USTH
PRINT-USER-SUBTOTALS  (ISTH and USTH combined totals are printed).
```

Total Summary Selection

The total summary selection control is identical to the subtotal summary selection control. The commands are:

```
STOP-TOTALS
START-STANDARD-TOTALS
ZERO-USER-TOTALS
PRINT-USER-TOTALS
```

Automatic totals apply only to multiple region within region mode.

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C H A P T E R 6

T H E S E L E C T S U B C O M M A N D

The SELECT subcommand provides a flexible means of selecting input data for inclusion in listings, reports, and summaries. Its use does not affect the print formats of the application programs--it only affects the method by which the program chooses data for inclusion in reports.

The SELECT subcommand is one of several input controls that can be used to select input data. For example, consider the following sample job

setup:

```
//DTRI8888 JOB (999999,11),JOHNSTONE,CLASS=C
// EXEC DTRIBA,TIME=5,REGION=300K,SCRSIZE=1
//SYSIN DD *
:LIST-ACCIDENTS-BY-REF-POINT,START-DATE=01/01/78,
:  END-DATE=12/31/78
+ROUTES
ROUTE-SYS=ISTH
+SELECT
INCLUDE ACCIDENTS IF:
  ACD.FIXED-OBJECT *EQ* 11
/*
```

In this job setup, the following selection criteria have been specified:

-START-DATE=01/01/78
 END-DATE=12/31/78

These two parameters indicate that only 1978 accidents are to be printed.

-ROUTE-SYS=ISTH

This parameter specifies that only those accidents that occurred on Interstate trunk highways are to be printed.

-INCLUDE ACCIDENTS IF:
ACD.FIXED-OBJECT *EQ* 11

This parameter specifies that only those accidents that contain a code of 11 in the fixed object struck field are to be printed.

Data elements that are frequently used for selection criteria (such as date occurred) generally have selection controls built right into the T.I.S. commands and subcommands. The SELECT subcommand allows more extensive control over the selection process.

Data Element Names

The +SELECT subcommand provides the capability of selecting input data based on the contents of nearly any stored data element. The user must identify which data element(s) he wishes the program to utilize in selecting the data. The data element(s) are identified by specifying the name of the data element(s).

Each data element name consists of (1) a file identifier and (2) the name of a data element stored in that file. The two fields are separated by a period.

Examples of data element names:

RLG.YEAR-BUILT-RD1

Roadlog file--Year built of roadway 1.

ACD.FIXED-OBJECT

Accident details file--Fixed object struck.

Data Element Attributes

Each data element carries an associated set of data element attributes. The user must be aware of the attributes of a particular data element in order to use that data element for selection of data. The attributes of individual data elements are given in Appendix E.

The three types of attributes are:

- Format:
  - Character format--any characters can appear.
  - Numeric format--only digits, signs, and decimal points can appear.
  - Date format--mm/dd/yy where "mm" is the month, "dd" is the day and "yy" is the year.
- Length:
  - Character format--Number of characters in the field.
  - Numeric format--Number of digits in the field (signs and decimal points are not counted).
  - Date format--Length is 6 (the slashes are not counted).
- Decimal digits (applies to numeric fields only):
  - Number of digits that lie to the right of the decimal point.

Within this documentation,the data elements attributes are specified in the following notation:

-CHAR(n) Character format with length n.

-NUM(n) Numeric format with n digits (decimal point not allowed).

-NUM(n,m) Numeric format with n digits, m of which lie to the right of the decimal point.

-DATE Date format.

Examples of data element attributes:

RLG.FED-AID-SYS is a 1-character data element. Its attributes are CHAR(1).

RLG.DESIGN-SPEED is a 2-digit numeric data element with no decimal point. Its attributes are NUM(2) (or NUM(2,0)).

BIK.SECTN-LENGTH is a 7-digit numeric field with 3 digits to the right of the decimal point (0.000 through 9999.999). Its attributes are NUM(7,3).

RLG.EFFECTIVE-DATE is a date field. Its attributes are DATE.

Substring Notation

Substring notation is available for CHARACTER-FORMAT DATA ELEMENTS ONLY. It allows selection based on a portion of the field.

The substring notation is defined as one of the following:

name/i/ ith character of the data element.

name/i-j/ characters i-j of the data element.

i must be between 1 and n inclusive, where n is the length of the data element.

j must be between i and n inclusive.

Examples of substring notation:

RLG.DESCRIPTION is a CHAR(51) data element.

(valid) RLG.DESCRIPTION/23/ Attributes: CHAR(1)

(valid) RLG.DESCRIPTION/4-8/ Attributes: CHAR(5)

(not valid) RLG.DESCRIPTION/52/ Outside data element

(not valid) RLG.DESCRIPTION/30-52/ Outside data element

(not valid) RLG.DESCRIPTION/8-4/ j less than i

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RLG.DESIGN-SPEED is a NUM (2) data element.

(not valid) RLG.DESIGN-SPEED/1/ Substring can be used only with character-format data elements

Comparison Symbols

Selection criteria are specified by indicating (1) a data element name, (2) a comparison symbol, and (3) a constant or data element name being compared.

The comparison symbols are:

Symbol	Available For	Meaning
EQ	CHAR,NUM,DATE	Equal to
NE	CHAR,NUM,DATE	Not equal to
LE	CHAR,NUM,DATE	Less than or equal to
LT	CHAR,NUM,DATE	Less than
GT	CHAR,NUM,DATE	Greater than
GE	CHAR,NUM,DATE	Greater than or equal to
HAS	CHAR	Contains
HASNT	CHAR	Does not contain

Examples of comparison symbols:

RLG.YEAR-BUILT-RD1 *GE* 70

True for roadlog records in which the year built of roadway 1 contains 70 or larger.

RLG.DESCRIPTION *HAS* 'BR-473'

True for roadlog records in which the CHAR (51) description

field contains the string BR-473 anywhere in the field.

Constants

Selection criteria are often specified by indicating a comparison between a data element and a constant. The format in which the constant is written depends upon the format attribute of the data element being compared:

- Character format:

  - The constant is written as a character string enclosed in single quotes, as in 'G2'. The number of characters within the quotes must be equal to the length of the data element (for *HAS* and *HASNT*, the number of characters must be less than or equal to the length of the data element).

  - Examples: 'TR-43' Attributes: CHAR(5).
    '02' Attributes: CHAR(2).
    'WASN'T' Not valid: String cannot contain quotes.

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- Numeric format:

  - The constant is written as a series of digits, optionally preceded by a plus/minus sign, and optionally containing one decimal point.

  - Examples: 4 Attributes: NUM(1,0).
    +4 Attributes: NUM(1,0).
    03.6 Attributes: NUM(2,1). (Leading zero not counted).
    -.9 Attributes: NUM(1,1).

- Date format:

  - Written as month/day/year where each subfield is two digits in length.

  - Examples: 01/01/78 Attributes: DATE
    12/31/79 Attributes: DATE
    01/32/77 Invalid

Element-Constant Relationships

An element-constant relationship is a complete comparison between a data element and a constant. It consists of (1) a data element name, (2) a comparison symbol, and (3) a constant specified in the proper format and length for the indicated data element.

The following rules must be observed:

- Character-format data element:
  - A character-format constant ('string') must be specified.
  - The length of the string must be identical to the length of the data element (for *HAS*/*HASNT*, the length of the string must be less than or equal to the length of the data element).
- Numeric-format data element:
  - A numeric-format constant must be specified.
  - The length and number of decimal digits do not need to agree with the data element.
- Date-format data element:
  - A date-format constant (month/day/year) must be specified.

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Examples of element-constant relationships:

RLG.REMARK-CODE *EQ* ' '

True if the CHAR(2) remark code field contains two blanks.

RLG.YEAR-BUILT-RD1 *LE* 65

True if the NUM(2) year built roadway 1 field contains 65 or smaller.

RLG.DATE-OR-UPDATE *GE* 01/01/78

True if the DATE date of update is Jan. 1, 1978 or more recent.

RLG.DESCRIPTION/3-12/ *HAS* 'ISTH'

True if characters 3-12 if the CHAR(51) description field contain the character string ISTH.

Element-Element Relationships

An element-element relationship is a complete comparison between two data elements. It consists of (1) a data element name, (2) a comparison symbol, and (3) another data element name.

Examples of element-element relationships:

RLG.NUM-LANES-DM *EQ* RLG.NUM-LAMES-IM

True if the number of lanes d.m. field is equal to the number of lanes i.m. field.

RLG.DESCRIPTION *HAS* RLG.SURF-WIDTH-RD1

True if the CHAR(51) description field contains the CHAR(2) surface width road-1 field.

The following rules must be observed:

-First data element is character-format:

-The second data element must also be character-format.

-The two data elements must be the same length (for *HAS*/ *HASNT*, the second data element must be shorter or of the same length as the first).

-First data element is numeric-format:

-The second data element must also be numeric-format.

-The two data elements may have different length attributes but must have the same decimal-digits attributes.

-First data element is date-format:

-The second data element must also be date-format.

AND And *OR* Connectors

It is often necessary to specify more than one comparison in a select statement. When this is done, the connectors *AND* and *OR* are used to separate the relationships.

Examples of *AND* and *OR* connectors:

```
RLG.CONTROL-OF-ACCESS *EQ* 1 *AND* RLG.DATE-OF-UPDATE *GE* 01/01/78

RLG.CONTROL-OF-ACCESS *EQ* 1 *OR* RLG.DATE-OF-UPDATE *GE* 01/01/78
```

The functions of *AND* and *OR* are best described by a "truth table:"

Comparison-1	Comparison-2	*OR*	*AND*
False	False	False	False
False	True	True	False
True	False	True	False
True	True	True	True

The truth table is equivalent to the following statements:

OR The result is true if either comparison is true.

AND The result is true if both comparisons are true.

Example of Truth Table Analysis:

```
RLG.CONTROL-OF-ACESS *EQ* 1 *AND* RLG.DATE-OF-UPDATE *GE* 01/01/78

RLG.CONTROL-OF-ACESS *EQ* 1 *OR*  RLG.DATE-OF-UPDATE *GE* 01/01/78
```

Control of Access	Date of Update	*AND*	*OR*
1	02/12/78	True	True
1	01/02/77	False	True
3	02/12/78	False	True
3	01/01/77	False	False

When more than two relationships are needed, the select statements become more complicated. It is suggested that truth tables be constructed before attempting to code complicated select statements (see the following sections for examples). Keep the following rules in mind:

- *AND* connectors are evaluated before *OR* connectors in the absence of parenthesis.

- Parenthesis can be used to alter the order of evaluation (innermost expressions are evaluated first).

-Equivalent connectors (such as two *AND*'s) are evaluated left-to-right.

Examples of complex select statements:

```
RLG.CONTROL-OR-ACCESS *EQ* 1 *AND* RLG.DATE-OF-UPDATE *GE* 01/01/78
*OR* RLG.YEAR-BUILT-RD1 *LT* 50
```

AND is evaluated prior to *OR*

```
RLG.CONTROL-OF-ACCESS *EQ* 1 *AND* (RLG.DATE-OF-UPDATE *GE*
01/01/78 *OR* RLG.YEAR-BUILT-RD1 *LT* 50)
```

OR is evaluated prior to *AND*

Writing a Complex Select Statement

When a select statement is prepared that contains more than two or three relationships, a great deal of care must be taken to ensure that the correct logic is specified.

Suppose, for example, that we wish to list records in the roadlog file for sections that either were built prior to 1945, that have more than 2 lanes in one direction, or that are divided.

First, compile a list of all of the necessary relationships:

-The remark code must be blank (this ensures that gaps, non-existent sections, coincident sections, and end-of-route records are ignored).

-Either the year built of roadway 1 or the year built or roadway 2 must contain a non-zero value smaller than 45.

-Either the number of lanes towards increasing reference posts or the number of lanes towards decreasing reference posts must contain a value larger than 2.

-The divided and one-way code must contain a D (divided roadway) or an O (one-way couplet).

We can assign the letters A, B, C, and D to these four criteria. As a first step, we can easily see that the select statement will need to be in the following format:

```
A *AND* (B *OR* C *OR* D)
```

A must be true in order to select a record.

At least one of the relationships B, C, or D must be true in order to select a record.

A consists of a single relationship:

```
RLG.REMARK-CODE *EQ* '  '
```


B consists of four relationships:

```
((RLG.YEAR-BUILT-RD1 *GT* 0 *AND* RLG.YEAR-BUILT-RD1 *LT* 45) *OR*
 (RLG.YEAR-BUILT-RD2 *GT* 0 *AND* RLG.YEAR-BUILT-RD2 *LT* 45))
```

C consists of two relationships:

```
(RLG.NUM-LANES-IM *GT* 2 *OR* RLG.NUM-LANES-DM *GT* 2)
```

D consists of two relationships:

```
(RLG.DIVIDED-&-ONE-WAY *EQ* 'D' *OR* RLG.DIVIDED-&-ONE-WAY *EQ*
 'O')
```

The complete select statement is:

```
RLG.REMARK-CODE *EQ* '  ' *AND*
(((RLG.YEAR-BUILT-RD1 *GT* 0 *AND* RLG.YEAR-BUILT-RD1 *LT* 45) *OR*
  (RLG.YEAR-BUILT-RD2 *GT* 0 *AND* RLG.YEAR-BUILT-RD2 *LT* 45))
   *OR*
 (RLG.NUM-LANES-IM *GT* 2 *OR* RLG.NUM-LANES-DM *GT* 2)   *OR*
 (RLG.DIVIDED-&-ONE-WAY *EQ* 'D' *OR* RLG.DIVIDED-&-ONE-WAY *EQ*
  'O'))
```

If a select statement is too long an error message will be printed. Add the keyword "SELECT-SIZE=2" to the command and resubmit it.

Analyzing Select Statements Using Truth Tables

Complicated select statements can be analyzed by using truth tables and a simplification method. This section shows how a select statement can be analyzed.

Consider the following select statement:

```
RLG.YEAR-BUILT-RD1 *EQ* 76 *OR*
```

```
     ((RLG.REMARK-CODE *EQ* 'NE' *OR* RLG.REMARK-CODE *EQ* 'GP')  *OR*

     RLG.BREAK-CODE *LE* 5 *AND* RLG.NUM-LANES-IM *EQ* 2)
```

To analyze this statement, first simplify the statement by replacing the lengthy comparisons with shorter abbreviations, as in:

```
     A *OR* ((B *OR* C) *OR* D  *AND* E)

          A = (RLG.YEAR-BUILT-RD1 *EQ* 76)

          B = (RLG.REMARK-CODE *EQ* 'NE')

          C = (RLG.REMARK-CODE *EQ* 'GP')

          D = (RLG.BREAK-CODE *LE* 5)

          E = (RLG.NUM-LANES-IM *EQ* 2)
```


Simplify this further by replacing the first-evaluated expression with another abbreviation:

```
     A *OR* (F *OR* D *AND* E)

          F = (B *OR* C)
```

This process can be continued until a single abbreviation is left:

```
     A *OR* (F *OR* D *AND* E)

          G = (D *AND* E)

     A *OR* H

          H = (F *OR* G)

     FINAL

          FINAL = (A *OR* H)
```

At this point, the first truth table is constructed:

Result(A)	Result(H)	Result(FINAL)
False	False	False
False	True	True
True	False	True

True	True	True

This table is simply the truth table for *OR*. The truth table can be simplified a little bit:

Result(A)	Result(H)	Result(FINAL)
False	False	False
-	True	True
True	-	True

"-" means that this result doesn't matter.

A is a single relationship, so the analysis process is continued with H:

H = (F *OR* G)

Result(F)	Result(G)	Result(H)
False	False	False
-	True	True
True	-	True

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Combining this with the first truth table, we have:

Result(A)	Result(F)	Result(G)	Result(FINAL)
False	False	False	False
-	-	True	True
-	True	-	True
True	-	-	True

This process can be continued until a complete truth table has been constructed:

R = (B *OR* C)

Result(B)	Result(C)	Result(F)
False	False	False
-	True	True

```
  True          -          False

Result(A)   Result(B)   Result(C)   Result(G)   Result(FINAL)
---------   ---------   ---------   ---------   -------------
  False       False       False       False       False
    -           -           -         True        True
    -           -         True          -         True
    -         True          -           -         True
  True          -           -           -         True
```

```
G = (D *AND* E)

Result(D)   Result(E)   Result(G)
---------   ---------   ---------
  False         -         False
    -         False       False
  True        True        True
```

```
FINAL = A *OR* ((B *OR* C) *OR* D *AND* E)

    Res(A)   Res(B)   Res(C)   Res(D)   Res(E)   Result(FINAL)
    ------   ------   ------   ------   ------   -------------
    False    False    False    False      -      False
    False    False    False      -      False    False
      -        -        -      True     True     True
      -        -      True       -        -      True
      -      True       -        -        -      True
    True       -        -        -        -      True
```

```
A = (RLG.YEAR-BUILT-RD1 *EQ* 76)

B = (RLG.REMARK_CODE *EQ* 'NE')

C = (RLG.REMARK-CODE *EQ* 'GP')

D = (RLG.BREAK-CODE *LE* 5)

E = (RLG.NUM-LANES-IM *EQ* 2)
```


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Some results with sample data are:

```
Year                      Num
Built   Remark   Break   Lanes              Line IN
Road1    Code    Code     IM     Result   Truth Table
-----   ------   -----   -----   ------   -----------
 76     blanks     7       3     True          6
```

```
 00       NE       7       0     True          5
 00       GP       7       0     True          4
 43     blanks     7       2     False         1
 43     blanks     5       3     False         2
 43     blanks     7       3     False        1.2
 43     blanks     5       2     True          3
```

INCLUDE/EXCLUDE Clauses

The INCLUDE/EXCLUDE clause specifies the types of records being selected. Each command that allows the +SELECT subcommand is implemented with one or more names that can be specified in the INCLUDE/EXCLUDE clause. The documentation with the individual commands shows what names are allowed with each command.

Example of INCLUDE/EXCLUDE clauses:

```
INCLUDE ROADLOG-RECORDS IF:
   RLG.NUM-LANES-IM *GE* 3 *OR* RLG.NUM-LANES-DM *GE* 3
EXCLUDE ACCIDENTS IF:
   ACD.FIXED-OBJECT *EQ* 11
```

Roadlog records are included if either the number of lanes towards increasing reference posts or towards decreasing reference posts is 3 or larger.

Accidents are included UNLESS the fixed object field contains 11.

The rules for using INCLUDE/EXCLUDE clauses are:

- For commands implemented with exactly one INCLUDE/EXCLUDE name, the INCLUDE/EXCLUDE clause is optional. INCLUDE is the default.

- For commands implemented with two or more INCLUDE/EXCLUDE names, each select statement supplied with the run must be preceded by an INCLUDE/EXCLUDE clause.

- With any one command, only one INCLUDE/EXCLUDE clause can have any given name. In other words, the following is not valid:

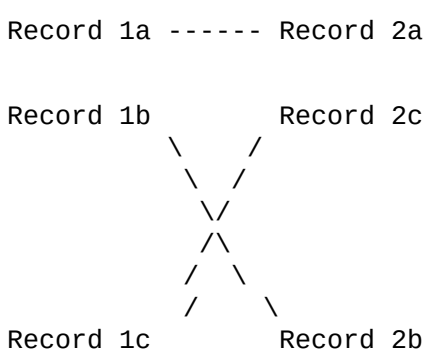
```
INCLUDE ROADLOG-RECORDS IF:
   RLG.NUM-LANES-IM *GE* 3
EXCLUDE ROADLOG-RECORDS IF:
   RLG.DIVIDED-&-ONE-WAY *NE* 'D'
```

Selecting From More Than One File

Many commands allow selection of data from more than one file. The selection can be based on a one-to-one, many-to-one, or one-to-many relationship between the files.

One-To-One Relationships

In a one-to-one relationship, two files (or more) contain records that are related to one record. For example, consider the files in the following diagram:



File 1 File 2

In this diagram, each file contains 3 records, and each record is file 1 is related to a record in file 2. The ordering of records in the two files is unimportant, as the relationship is based on some mechanism other than position within the file. Records 1a and 2a are related, as are 1b and 2b, and 1c and 2c.

An example of a one-to-one relationship in the Transportation Information System is the relationship between intersection cross-reference file and the intersection file (considering only those records in the cross- reference file in which the leg equals the intersection key). A diagram for these two files follows:

```
01 00000035 000+00.000<-------->01 0000035 000+00.000
01 00000035 023+00.468<-------->01 0000035 023+00.468
01 00000094 012+00.338<-------->01 0000094 012+00.338
02 00000012 002+00.400<-------->02 0000012 002+00.400
```

Intersection file Intersection xref file

When reading and listing data from the intersection file, the select software is capable of obtaining the corresponding data from the intersection xref file for use in selecting the data from the intersection file. A select statement that performs this type of operation follows:

```
INCLUDE INTERSECTIONS IF:
  INT.GEN-ENVIRON *EQ* 3 *AND* INX.COUNTY *EQ* 'RAMSEY'
```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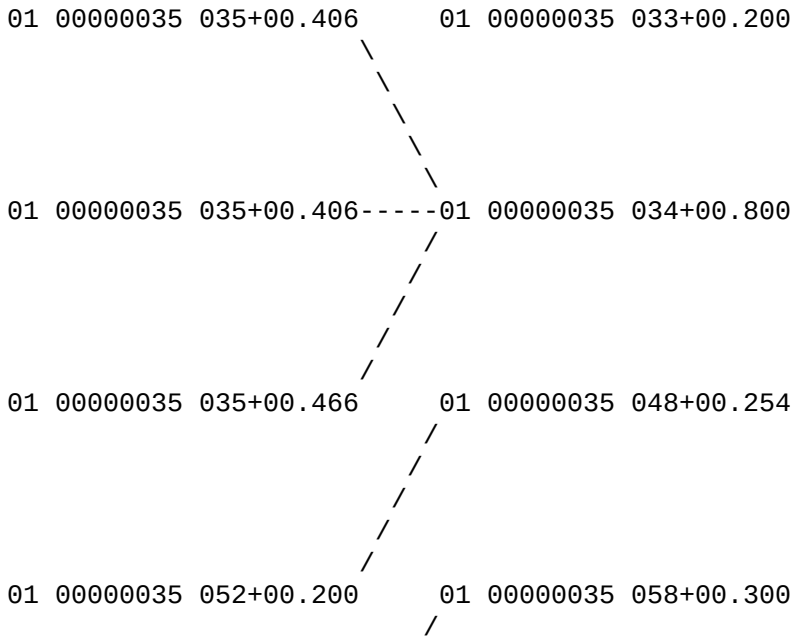
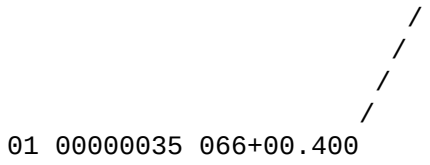
The selection is performed essentially like selection from only one file. Each record in the intersection file is read in turn. Each time a record is read, the corresponding record in the intersection cross-reference file is retrieved. The select statement is evaluated (true/false), and the intersection record is processed if the statement is true. After this has been done, the next record is read. The process continues until the entire file has been processed.

Many-To-One Relationships

In a many-to-one relationship, more than one record in the primary file can correspond to a single record in the secondary file. An example in the Transportation Information System is the relationship between the accident details file and the roadlog file:





Each record in the accident file contains one corresponding record in the roadlog file. However, two or more records in the accident file can correspond to the same record in the roadlog file. A roadlog record can have zero or more corresponding records in the accident file. When reading and listing the roadlog file, the select software cannot provide the capability of selecting based on accidents that occured in roadlog sections. However, when reading and listing accident data, the select software can provide selection based on roadlog data. A sample select statement might be:

```
INCLUDE ACCIDENTS IF:
   RLG.DIVIDED-&-ONE-WAY *EQ* 'U'
```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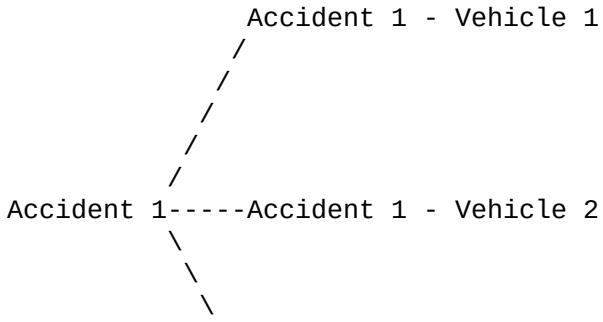
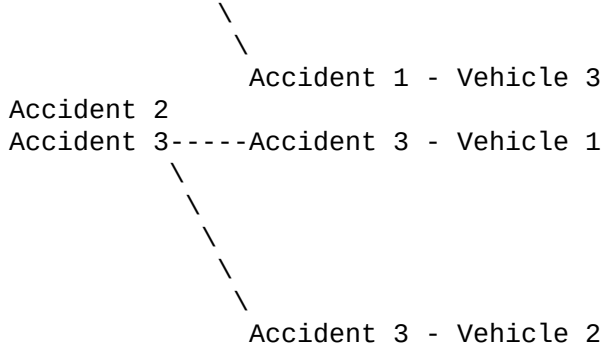
The select software reads each accident individually. For each accident, the corresponding roadlog record is retrieved and its divided and one way code is tested for U (undivided roadway). If it contains U, the accident is included. Otherwise, the accident is excluded.

One-To-Many Relationships

In a one-to-many relationship, each record in the primary file is related to zero or more records in the secondary file. An example is the relationship between the accident details file (one record per accident) and the accidnet vehicle file (one record per vehicle involved in an accident):





One-to-many relationships are selected via the multi-correlation facilities of the +SELECT subcommand.

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ANY and *ALL* Symbols (Multi-Correlation)

The multi-correlation facilities of the +SELECT subcommand are used for selecting in one-to-many file relationships.

The *ANY* symbol is used if an accident is to be selected if any one of the corresponding accident vehicle records meets certain selection criteria. The *ALL* symbol is used if an accident is to be selected only if all of the corresponding accident vehicle records meet certain selection criteria.

Example of the *ANY* symbol:

```
INCLUDE ACCIDENTS IF:
```

```
  *ANY* ACV.VEHICLE-TYPE *EQ* 30
```

Each accident that involved at least one motorcycle (vehicle type 30) is included. Accidents for which no records appear in the accident vehicle file are not selected.

Example of the *ALL* symbol:

```
INCLUDE ACCIDENTS IF:
  *ALL* ACV.VEHICLE-TYPE *EQ* 30
```

Each accident for which ALL of the corresponding records in the accident vehicle file indicate motorcycles are selected. Accidents for which no records appear in the accident vehicle file are not selected.

A multi-correlation "clause" can be built that specifies more than one relationship, all of which must be true for one record (*ANY*) or for all records (*ALL*). For example:

```
INCLUDE ACCIDENTS IF:
  *ANY* (ACV.VEHICLE-TYPE *EQ* 30 *AND* ACV.DRIVER-SEX *EQ* 'M')
```

Each accident that involved at least one motorcycle driven by a male is selected.

Note the difference between the preceding example and the following:

```
INCLUDE ACCIDENTS IF:
  *ANY* ACV.VEHICLE-TYPE *EQ* 30 *AND* *ANY* ACV.DRIVER-SEX *EQ*
  'M'
```

Each accident that involved at least one motorcycle and that involved at least one vehicle driven by a male (this vehicle may or may not be the motorcycle).

The rules for using the multi-correlation facilities are:

-The file used in multi-correlation clauses must represent a one-to-many relationship to the primary selection file.

-A multi-correlation clause consists of an *ANY*/*ALL* symbol followed by one or more element-constant or element-element relationships. If more than one relationship is used, they must be surrounded by parenthesis.

-The leftmost data element of the first relationship indentifies the multi-correlation file identifier of the clause.

Example: *ANY* (ACV.VEHICLE-TYPE *EQ* 30 *AND*
ACV.DRIVER-SEX *EQ* 'M')

ACV.VEHICLE-TYPE identifies the multi-correlation file identifier ACV.

-All additional relationships must have the same multi-correlation file identifier ACV.

Invalid: *ANY* (ACV.VEHICLE-TYPE *EQ* 30 *AND*
ACI.POSITION-IN-VEHIC *EQ* 07)

ACI cannot be used as the left-most data element in any relationships within the multi-correlation clause.

Valid: *ANY* ACV.VEHICLE-TYPE *EQ* 30 *AND* *ANY*
ACI.POSITION-IN-VEHIC *EQ* 07

These are two separate clauses. ACV is the file identifier of the first. ACI is the file identifier of the second.

-In element-element relationships within a multi-correlation clause, the second element must either be in the same file or within a single-correlation file.

Valid: *ANY* ACV.VEHICLE-TYPE *EQ* ACD.NUM-VEHICLES

ACD is a single-correlation file.

Valid: *ANY* ACV.VEHICLE-TYPE *EQ* ACV.ACTION

Invalid: *ANY* (ACV.DRIVER-SEX *EQ* ACI.SEX-OF-INJURED)

ACI is another multi-correlation file.

CHAPTER 7

THE CATEGORIES AND BREAKS SUBCOMMANDS

The CATEGORIES and BREAKS subcommands allow the user to classify records from TIS files by a subset of their data elements (or data elements from related records in other TIS files). This provides a means of grouping and sorting data by criteria other than route system, route number, and reference point, or by regional parameters such as county (which is done by the ROUTES subcommand).

The CATEGORIES Subcommand

The CATEGORIES subcommand is used by general-purpose "matrix summary" commands for specifying the type of summary being produced. It is also used with some of the accident analysis commands for categorizing intersections and roadway sections.

CATEGORIES Record Classification

The CATEGORIES subcommand is applied to records AFTER the ROUTES and SELECT subcommands have screened input. Records that are not selected by ROUTES or SELECT will be thrown out by any reports before CATEGORIES is invoked. Records passing data selection criteria will be included in the report, and if CATEGORIES is recognized by the program, it is applied to "classify" records into groups for the final output of the program.

The user lists one or more data elements from one or more files to be used to assign a category to each selected record. For example, if the data element is RLG.FUNCT-CLASS (functional classification), then all records in functional class 01 are in the same group, all in functional class 02 are in a group, etc.

If the user specified RLG.FUNCT-CLASS and RLG.FED-AID-SYS, for example, then records are grouped by the combination of functional classification code and federal aid system code. If the application program is the ROADLOG-MATRIX-SUMMARY command, the user's input would go something like:

```
:ROADLOG-MATRIX-SUMMARY
```

```
     +ROUTES
     ROUTE-SYS=01-03
     +CATEGORIES
     DATA-ELEMENT=RLG.FUNCT-CLASS
     DATA-ELEMENT=RLG.FED-AID-SYS
```


This command requests a mileage summary broken down by functional classification and federal aid system. The summary is printed in a format similar to:

RLG.FUNCT-CLASS	RLG.FED-AID-SYS	MILEAGE	SECTIONS
01 - ARTERIAL	I - INTERSTATE	20.050	12
01 - ARTERIAL	P - PRIMARY	112.080	53
01 - ARTERIAL	----SUBTOTAL---	132.130	65
02 - COLLECTOR	I - INTERSTATE	142.208	29
02 - COLLECTOR	P - PRIMARY	20.000	5
02 - COLLECTOR	S - SECONDARY	108.504	31
02 - COLLECTOR	----SUBTOTAL---	270.712	65
----------GRAND TOTAL----------		946.385	335

The CATEGORIES subcommand has provisions for grouping various codes of a data elements together. Suppose that in the above example, the user wishes to group the functional class codes 01 and 02 together, leaving the remaining codes unaltered. The CATEGORIES subcommand is changed to:

```
     +CATEGORIES
     DATA-ELEMENT=RLG.FUNCT-CLASS
     REDEFINES
     01 XX
     02 XX
     DATA-ELEMENT=RLG.FED-AID-SYS
```

Now, when the summary is printed the functional class codes 01 and 02 are grouped together and shown as XX. All other functional class codes are printed as usual.

The second method of grouping codes is illustrated below. Suppose the user wishes to group bridges by ranges of AADT. The above method could

be used, but would require an entry for every possible value of AADT, which is not practical. The solution is as follows:

```
+CATEGORIES
DATA-ELEMENT=BDG.ADT
GROUPS
000001 TO 001000
001001 TO 005000
005001 TO 010000
```

Now, when the summary is printed, the bridges are grouped into 3 groups by ranges of AADT: 1,000 or less, 1,001 to 5,000, and 5,001 to 10,000.

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CATEGORIES Subcommand Syntax

CATEGORIES recognizes the same names for data elements as the SELECT subcommand, ie., any valid SELECT name may be used with CATEGORIES (see appendix E for a complete list of SELECT names). Substring notation is also acceptable (with character-format fields only, see chapter 6).

The subcommand is initiated by "+CATEGORIES" after the command statement (lines with ":" in column 1). The subcommand is terminated by another line with "+" in the first column, another command (":"), or the end of the user's input ("/*"). The next line must be in the format "DATA-ELEMENT=xxxxxxxxxxx", where xxxxxxx is a valid select name. The characters "DATA-ELEMENT=" tell the software this is a data element name. Example:

```
DATA-ELEMENT=BDG.APPR-SURF-WID
DATA-ELEMENT=BDG.STRUCT-LEN
DATA-ELEMENT=RLG.TOTAL-THRU-LANES
```

The refer-back option (either forward or backward) can be used. Refer to the TITLES subcommand (chapter 3) for an example of this option.

CATEGORIES Code Redefinition

Some or all of the values of a data element may be "redefined" for the purpose of the report into a smaller set of codes. Values may be redefined to anything, as long as it is the same length as the data element.

To use the code redefinition facility, place a line with "REDEFINES" in columns 1-9 after the DATA-ELEMENT line to which it applies. Follow this line with "redefinition" lines. In the first n columns (n is the data element length), code the value being redefined. Follow this with a blank and the new value.

The redefinition facility can be used with any combination of the data elements specified. A maximum of 32 redefinitions can be specified for each data element. Example:

```
DATA-ELEMENT=RWY.CONGRESS-DIST
DATA-ELEMENT=RWY.POP-GROUP-FROM-CITY
REDEFINES
1 U
2 U
3 U
4 U
5 U
6 U
7 R
8 R
9 R
```


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CATEGORIES Data Grouping

The user may also group certain values of a data element into a group via the GROUPS function.

To use the grouping facility, place a line with "GROUPS" in columns 1-6 after the DATA-ELEMENT line to which it applies. Follow this line with "group" lines. In the first n columns (n is the data element length), code the value of the lower limit of the group. Follow this with " TO " and then the next n columns contain the upper limit of the group. Example:

```
DATA-ELEMENT=RGC.TOT-TRAINS
GROUPS
```

```
     00 TO 10
     11 TO 40
     41 TO 99
```

The grouping facility can be used with any combination of the data elements specified. A maximum of 32 groups can be specified for each data element.

The GROUPS function works under the following rules:

1) The record is assigned to the first group it fits.

2) All records not fitting into any group are classified as such (matrix summaries show them as "NOT IN ANY GROUP").

3) The limits for the group must be in the format xxx TO yyy, where "xxx" is the exact length of the data element (including leading blanks and zeroes). Decimal points should be ignored.

4) This will work with NUM or CHAR format data elements.

Use of the CATEGORIES Subcommand

The CATEGORIES subcommand is required with any matrix summary command. All selected data within each individual summary (see chapter 5 for definition of individual summary under ROUTES subcommand) is assigned to "categories" for the report. The CATEGORIES subcommand is also used by accident analysis commands to assign intersections or sections to categories for accident rate comparisons.

The CATEGORIES subcommand is limited to a maximum of 3 data element names ("DATA-ELEMENT="). The length of each data element is summed and the total must not exceed 18. If GROUPS is used, the data element being grouped counts double its length toward the total (eg., reference point cannot be grouped under CATEGORIES, since its length is 10 and 2 times 10 is greater than 18).

Any data element may be redefined or grouped. REDEFINES and GROUPS may not be mixed for a given DATA-ELEMENT.

The BREAKS Subcommand

The BREAKS subcommand is used by some commands that produce reports for

sections of roadway data. It allows the user to specify criteria for determining section breaks, ie., the user may choose to ignore some record locations, thus "aggregating" records into longer sections.

BREAKS Record Classification

The BREAKS subcommand is applied to records AFTER the ROUTES and SELECT subcommands have screened input. Records that are not selected by ROUTES or SELECT will be thrown out by any reports before BREAKS is invoked. Records passing data selection criteria will be included in the report, and if BREAKS is recognized by the program, it is applied to "classify" records to determine is a section break should occur.

The user lists one or more data elements from one or more files to be used as section break criteria. For example, if the data element is RLG.FUNCT-CLASS (functional classification), then a section break would occur only when functional classification changes.

If the user specified RLG.FUNCT-CLASS and RLG.FED-AID-SYS, for example, then a section break would occur whenever either (or both) of those data elements changed value.

The BREAKS subcommand has provisions for grouping various codes of a data elements together. Suppose that the user wishes to have section breaks occur only at municipal boundaries. The data element used is RLG.URBAN-MUNIC-CODE. From appendix E, the possible values are:

```
0  Not applicable
1  Nonmunicipal - rural
2  Nonmunicipal - urban
3  Municipal - rural
4  Municipal - urban
```

The user must instruct the command to ignore changes from rural to urban, yet break on changes from municipal to nonmunicipal. This is done as follows:

```
+BREAKS
RLG.URBAN-MUNIC-CODE
REDEFINES
1 2
3 4
```

Now, when the summary is printed, codes 1 and 2 are treated the same, as are 3 and 4, so breaks only occur when a change is encountered from 2 or less to 3 or more (or vice versa).

The second option of BREAKS is illustrated below. Suppose the user wishes to break sections every time a certain value of a data element is encountered, regardless of whether the value in the previous record was different or not. An example would be when a break is desired at trunk highway intersections. The data element required is RLG.INTERSECT-CATEGORY. From appendix E, the codes are:

```
00  No intersection
01  ISTH intersection       13  IND  intersection
02  USTH intersection       14  SFR  intersection
03  MNTH intersection       15  SPRK intersection
04  CSAH intersection       16  MIL  intersection
05  MSAS intersection       17  NATM intersection
07  CNTY intersection       18  NATW intersection
08  TWNS intersection       19  FRNT intersection
09  UTWN intersection       20  SGAM intersection
10  MUN  intersection       21  Leg  intersection
11  NATP intersection       22  Ramp intersection
12  NFD  intersection       23  Priv intersection
```

To break ONLY at trunk highway intersections, the subcommand would be:

```
+BREAKS
RLG.INTERSECT-CATEGORY
POINTS
01
02
03
```

Now, when the summary is printed, the section breaks occur at values of RLG.INTERSECT-CATEGORY os 01, 02, or 03. Note that two consecutive values of 01 would form a section.

BREAKS Subcommand Syntax

BREAKS recognizes the same names for data elements as the SELECT subcommand, ie., any valid SELECT name may be used with BREAKS (see appendix E for a complete list of SELECT names). Substring notation is also acceptable (with character-format fields only, see chapter 6).

The subcommand is initiated by "+BREAKS" after the command statement (lines with ":" in column 1). The subcommand is terminated by another

line with "+" in the first column, another command (":"), or the end of the user's input ("/*"). The next line must be in the format "xxxxxxxxxxx", where xxxxxxx is a valid select name. Example:

```
RLG.COUNTY              <-- break at county lines
RLG.TOTAL-THRU-LANES    <-- break when this changes
```

The refer-back option (either forward or backward) can be used. Refer to the TITLES subcommand (chapter 3) for an example of this option.

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BREAKS Code Redefinition

Some or all of the values of a data element may be "redefined" for the purpose of the report into a smaller set of codes. Values may be redefined to anything, as long as it is the same length as the data element.

To use the code redefinition facility, place a line with "REDEFINES" in columns 1-9 after the data element name to which it applies. Follow this line with "redefinition" lines. In the first n columns (n is the data element length), code the value being redefined. Follow this with a blank and the new value.

The redefinition facility can be used with any combination of the data elements specified. A maximum of 32 redefinitions can be specified for each data element. Example:

```
RLG.TOTAL-THRU-LANES
REDEFINES
01 2L   <-- 2-lane
03 ML   <-- multi-lane
05 ML
06 ML
07 ML
08 ML
```

BREAKS Point Values

Although the commands using the BREAKS subcommand are designed to produce summaries about sections of roadway, the user may sometimes wish

to cause section breaks based on data elements that describe points, rather than segments. This can be done by coding the data element name as with segment data elements. In order to break on the point data element whether it changes or not, the user must add the "POINTS" option.

Place a line with "POINTS" in columns 1-6 after the data element name to which it applies. Follow this line with "point" values. Each line is a value in columns 1-n (n is the data element length). Example:

```
RLG.INTERSECT-CATEGORY
POINTS
01
02
03
```

The points option can be used with any data element. A maximum of 32 points can be specified for each data element.

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Use of the BREAKS Subcommand

The BREAKS subcommand is currently only implemented with the accident section analysis commands and the SELECT-SECTIONS-LISTING command.

For example, to cause a section break at county lines, code:

```
+BREAKS
RLG.COUNTY
```

To cause a section break at a change from nonmunicipal to municipal, code:

```
+BREAKS
RLG.URBAN-MUNIC-CODE
REDEFINES
1 2
3 4
```

The effect is that no break occurs unless the code moves from a value of 1 or 2 (nonmunicipal) to a value of 3 or 4 (municipal) or from (3,4) to (1,2).

To cause a section break at point data, the POINTS option is used.
Example:

```
+BREAKS
RLG.INTERSECT-CATEGORY
POINTS
01
02
03
04
05
06
07
```

The effect will be a break every time one of the point values is found (01-07). Any other values will never cause a break.

The BREAKS subcommand is limited to a maximum of 20 data element names. The length of each data element is summed and the total must not exceed 90.

Any data element may be used with the REDEFINES or POINTS option. The options may not be mixed for a given data element.

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C H A P T E R 8

U S E R C O M M A N D S

Introduction

This chapter contains descriptions of the file listing, report generation, and summary generation application commands of the Transportation Information System. The following information is given for each application program:

-Function

    -A brief description of the command's usage.

-Description

    -A more detailed description of the command's output and
     processing options.

-Required Command Parameters

    -Shows the keyword parameters and subcommands that MUST be
     included whenever the command is run.

-Optional Command Parameters

     -Shows the optionword parameters, keyword parameters, and
      subcommands that can be included when needed but that can
      be omitted.

-TIME Parameter

     -Shows how to estimate computer time for a run.
     -If this section is omitted, use the TIME parameter shown in
      the sample job setup.

-REGION Parameter

     -Shows how to compute the estimated region size.
     -If this section is omitted, use the REGION parameter shown
      in the sample job setup.

-SCRSIZE Parameter

     -Shows how to estimate scratch space needed for a run.
     -If this section is omitted, use the SCRSIZE parameter shown
      in the sample job setup.

-Sample Job Setup

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The LIST-PDS-DIREC Command

Function: Prints the contents of a partitioned data set directory.

Description: All of the names of members stored in the library are listed. The names are printed alphabetically eight columns to a page (up to 320 names can be printed on one page). Alias names are identified as such.

The tables library can be printed by coding INPUT-DD=TABLES. The codelist library can be printed by coding INPUT-DD=CODELIST. To list member names of other libraries, a DD statement for the library must be included with the job setup and named in the INPUT-DD parameter.

Required Command Parameters:

INPUT-DD=name	Specify name of DD statement that defines the library.

Optional Command Parameters:

SUMMARIES=name	Only those member names beginning with "name" are printed.
SUMMARIES=name1-name2	Only those member names between "name1" and "name2" are printed.
TITLES subcommand	
Any of the print formatting parameters (see chapter 4).	

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//PROCLIB DD DISP=SHR,DSNAME=SYS1.PROCLIB
//SYSIN DD *
```

```
        :LIST-PDS-DIREC,INPUT-DD=PROCLIB,SUMMARIES=DTRI
        /*
```


The LIST-PDS-MEMBERS Command

Function: Prints the contents of members of a partitioned data set.

Desciption: Each member of the library is listed. The members are listed in alphabetical order. Following the member listing, all of the member names are listed in alphabetical order.

The tables library can be printed by coding INPUT-DD=TABLES. To list other libraries, include two DD statements per library. The ddname of the first DD statement must be 1-7 characters in length and must be named in the INPUT-DD parameter. The ddname of the second DD statement must be the same as that of the first with a D added at the end.

LIST-PDS-MEMBERS can list any library that contains fixed-length records. If the record length is larger than 132, only the first 132 characters of each record is printed.

Required Command Parameters:

INPUT-DD=ddname	Specify name of first DD statement that defines the library (the second has the same name plus a D).

Optional Command Parameters:

SUMMARIES=name	Only those members whose names begin with "name" are printed.
SUMMARIES=name1-name2	Only those members whose names fall between "name1" and "name2" are printed.

```
            LIST-72         The first 72 characters of each record is printed.
            LIST-80         The first 80 characters of each record is printed.
            LIST-132        The first 132 characters of each record is printed.
            LIST-RECSIZE    Up to 132 characters printed.
            ------------
```



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```

```
            TITLES subcommand

            Any of the print formatting parameters (see chapter 4).
```

```
        Sample Job Setup:
        -----------------

        //JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
        //             MSGCLASS=2,MSGLEVEL=(2,0)
        /*JOBPARM ROOM=R820,LINES=5
        /*ROUTE  PRINT R0
        //TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
        //    PRINTDD=TSO,OUTFILE=
        //PROCLIB DD DISP=SHR,DSNAME=SYS1.PROCLIB
        //PROCLIBD DD DISP=SHR,DSNAME=SYS1.PROCLIB
        //SYSIN DD *
        :LIST-PDS-MEMBERS,INPUT-DD=PROCLIB,SUMMARIES=DTRI
        /*
```

The LISTPDS Command
****

Function: Prints members of partitioned data sets and sequential files.

Description: LISTPDS can list (1) sequential files that have record
---
length 80, and (2) members of libraries that have record length 80. When listing members of libraries, the user provides a list of the members he wants to be printed.

The user provides a set of input records that describes to LISTPDS what files or members are to be listed. The types of input records are:

$PAGE-EJECT =	YES	Begin each new file/member on a new page.
	NO	Do not jump to a new page for each file/member.
	--	
$SEQNAME=ddname		Print sequential file defined by DD statement "ddname".
$LIBRARY=ddname		Prepare to list members from library defined by DD statement "ddname".

$MEMBER=member   Print member "member".

Member names can also be entered in this format:

Columns	Contents
1-8	Member name 1
9-16	Member name 2
17-24	Member name 3
25-32	Member name 4
33-40	Member name 5
41-48	Member name 6
49-56	Member name 7
57-64	Member name 8
65-72	Member name 9
73-80	Unused

To list members from the tables library, code $LIBRARY=TABLES. For other libraries, you must include a DD statement for the library and name this DD statement in the $LIBRARY statement.

Required Command Parameters: None

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Optional Command Parameters:

TITLES subcommand

Any of the print formatting parameters (see chapter 4).

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
```

```
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//PROCLIB DD DISP=SHR,DSNAME=SYS1.PROCLIB
//SYSIN DD *
:LISTPDS
/*
//LISTPDS DD *
$LIBRARY=PROCLIB
DTRIB   DTRIBA  DTRIT   DTRITA
/*
```


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The LOADPDS Command

Function: LOADPDS can load (1) sequential files that have record length 80, or (2) members of partitioned data sets that have record length 80.

The user provides a set of input records that describes to LOADPDS what files or members are being loaded and that includes the data for loading. The types of input records are:

$SEQ=	NO	Do not place sequence numbers in columns 73-80.
	YES	Place sequence numbers 10,20,...in columns 73-80.
$LIST=	NO	Do not print the input data.
	YES	Print the input data.
$EJECT		Skip printer to new page
$SEQNAME=ddname		Load sequential file defined by DD statement "ddname" (input data follows this statement).
$LIBRARY=ddname		Prepare library defined by DD statement "ddname" for loading ($MEMBER record(s) follow this statement).
$MEMBER=name		Load member "name" from data following this statement.
Data record:		Any record without a $ in column 1.

When adding a member to the tables library, simply specify $LIBRARY=TABLESO. When adding a member to other libraries, include a DD statement for the library and name this DD statement in the $LIBRARY statement.

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Required Command Parameters: None

Optional Command Parameters:

TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LOADPDS
/*
//LOADPDS DD *
$SEQ=NO
//TABLESO DD DSN=DT99A1B.TSOLIB.CNTL
$MEMBER=GEORGE
$MEMBER=GEORGE
/*
```

Note: Include DISPTBL=OLD on the EXEC record statement when loading members into the tables library.

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The UPDPDS Command

Function: Updates sequential files or members of partitioned data sets.

Description: UPDPDS can update (1) sequential files that have record length 80, or (2) members of libraries that have record length 80.

The user provides a set of input records that describes to UPDPDS what files or members are updated and that includes the data for updating. The types of input records are:

$SEQ =	NO	Do not place sequence numbers in columns 73-80.
	YES	Place sequence numbers 10,20,... in columns 73-80.
$LIST=	NO	Do not list the updated files/members.
	YES	List the updated files/members.

$EJECT — Skip to a new print page.

$SEQNAME=ddname — Update sequential file defined by DD statement "ddname".

$LIBRARY=ddname — Prepare library defined by DD statement "ddname" for updating.

$MEMBER=name — Prepare member "name" for updating.

++C n (or --C n) — Insert one or more records after record "n".

++C n,m (or --C n,m) — Delete records "n" through "m".

Data record: Any input record that (1) does not contain $ in column 1, and (2) does not contain ++ or -- in columns 1-2.

The update control cards (++C/ --C) are based on the PANVALET system. The record numbers referred to are relative record number rather than any stored sequence numbers. The listings produced by LISTPDS, LOADPDS,and UPDPDS all provide relative record numbers as part of the listing.

Required Command Parameters: None.

Optional Command Parameters:

TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:UPDPDS
/*
//UPDPDS DD *
$LIBRARY=TABLESO
$MEMBER=COUNTY
--C 0         (add one or more records at beginning of member)
record #1
record #2
--C 5           (add one or more records at beginning of member)
record #1
record #2
record #3
--C 10,10       (delete record 10)
--C 15,17       (delete record 15-17 and insert one or more records in
record #1       their place)
record #2
```

```
        record #3
        record #4
        --C 23
        record #1
        record #2
        #MEMBER=COUNTY
        ++C 22,22
        record #1
        record #2
        record #3
        ++C 36
        record #1
        ++C 38,45
        ++C 51,51
        record #1
        record #2
        record #3
        record #4
        record #5
        /*
        Notes:  -When updating the tables library, include DISPTBL=OLD on the
                 EXEC statement and specify $LIBRARY=TABLESO.

                -Within each file/member, specify all sequence number (in
                 ++C/ --C statements) in ascending order.
 PAGE 8-12
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```

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The MODPDS Command
****

Function: Deletes and renames members of partitioned data sets.

Description: MODPDS can delete and rename members of any library
------------ regardless of record length or format. The user provides
              a set of control records that define which members are
              being modified. The control records are:

     $LIBRARY=ddname   Prepare library defined by DD statement
                           "ddname" for modifications.

$RE oldname newname Rename member "oldname" to "newname" (oldname is in columns 5-12 and newname is in columns 14-21).

$MEMBER=name Delete member "name"

Alternate format for deleting members:

Columns	Length	Contents
1-8	8	Member name 1
9-16	8	Member name 2
17-24	8	Member name 3
25-32	8	Member name 4
33-40	8	Member name 5
41-48	8	Member name 6
49-56	8	Member name 7
57-64	8	Member name 8
65-72	8	Member name 9
73-80	8	Unused

When modifying the tables library or the codelist library, no DD statement needs to be included with the job setup. Include DISPTBL=OLD on the EXEC statement and specify $LIBRARY=TABLESO or $LIBRARY=CODELIST.

Required Command Parameters: None.

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Optional Command Parameters:

TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:MODPDS
/*
//MODPDS DD *
//TABLESO DD DSN=DT99A1B.TSOLIB.CNTL
$RE GEORGE  STGEORGE
$MEMBER=GEORGE
MEMBERA MEMBERB MEMBERC
/*
```

Member GEORGE is renamed to STGEORGE.
Members MARTHA, MEMBERA, MEMBERB, MEMBERC are deleted.

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The PRINT-JFCB Command

Function: Prints a Job File Control Block (DD statement).

Description: PRINT-JFCB prints a summary of information about a user indicated DD statement (plus some information provided by the Operating System). The informaiton printed includes:

- Data set name (DSNAME parameter or TYPE=SYSIN/SYSOUT).
- Indication of whether the data set is cataloged.
- Library: Member name if one is specified.
- Disposition specified (DISP parameter)
- File organization if known (sequential, partitioned, or ISAM).
- Block size, record length, and record format if known.
- Number of volumes and list of volumes (VOL=SER parameter) if known.

Any DD statement of the DTRIB/DTRIBA/DTRIT/DTRITA cataloged procedure or provided with the run can be requested.

Required Command Parameters:

INPUT-DD=ddname Specify name of DD statement

Optional Command Parameters:

TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
```

```
        /*JOBPARM ROOM=R820,LINES=5
        /*ROUTE  PRINT R0
        //TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
        //    PRINTDD=TSO,OUTFILE=
        //SYSIN DD *
        :PRINT-JFCB,INPUT-DD=ROADLOG
        /*
```


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The LIST-CITY-TABLE Command

Function: Prints a listing of the city name table.

Description: One line is printed for each record in the city name table. Each city that is located entirely within a single county has one record in the city name table. Each city that is located within two or more counties has one record per county.

The following data elements are printed on each line:

- County number.
- City number (census number).
- Urban area number (blanks are printed if the population is less than 5000).
- Construction district.
- City name.
- Year of census.

-Total population of the city.
-Population of the portion of the city located within this county.

The listing can be sorted by either (1) census number, (2) name, or (3) county number. The census numbers are assigned approximately in order by alphabetical name, so that the first two sorts are nearly identical.

The city name table is stored in order by census number, so that the program must perform a sort only when the listing is requested by name or by county number.

Required Command Parameters: None.

Optional Command Parameters:

LIST-BY-COUNTY	The listing will be printed in order by county number.
LIST-BY-NAME	The listing will be printed in order by city name.
LIST-BY-CENSUS	The listing will be printed in order by census number (default).

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SELECT subcommand

- SELECT can be applied to city table records. INCLUDE/EXCLUDE clause is OPTIONAL and has the following format:

  INCLUDE
  CITY-RECORDS IF:
  EXCLUDE

- CIT data elements can be referenced.

TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-CITY-TABLE
:LIST-CITY-TABLE,LIST-BY-COUNTY
/*
```


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The LIST-TOWNSHIP-NAMES Command
***

Function: Prints a listing of the township names file.

Description: The user can request a listing of the entire file or of just one specified county. The following information is printed for each township that is listed: (1) county number, (2) township number, and (3) township name.

When a specific county is requested, one listing is printed. The county name is displayed at the top of each page of the listing.

When a statewide listing is requested, one listing is printed for each county. The format of each listing is identical to corresponding individual county listing.

Within each listing, the records are printed in ascending order by township number.

Required Command Parameters: None.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST The user's command parameters are listed.

COUNTY= county-name Eg., COUNTY=ANOKA
county-number Eg., COUNTY=02

Note: Omit COUNTY to obtain a statewide listing.

TITLES subcommand

Print formatting parameters: see chapter 4.

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Sample Job Setup:

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-TOWNSHIP-NAMES,COUNTY=LAKE-OF-THE-WOODS
/*
```

The LIST-STREET-XREF Command

Function: Prints a listing of records in the street name file.

Description: One line is printed for each selected record. The user can request a listing in order by either route system, route number, and reference post or by alphabetical street name. The user can request a listing for a specific city or for all cities.

Each line printed includes the following information:

- Route system, route number, and starting and ending reference points.
- Street name.
- City name.
- County.

Required Command Parameters:

ROUTES subcommand -
- When processing BY-ROUTE, LIST-STREET-XREF operates as a standard LIST program.
- When processing BY-NAME, only one listing is produced that combines data from all of the inputted data selection control cards.

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	An option list of command parameters is printed for each listing.
BY-NAME	Records are printed in order by street name (sort is required).
BY-ROUTE	Records are printed in order by route and reference points.

TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-STREET-XREF,BY-NAME
+ROUTES
CITY=ST-PAUL,ROUTE-SYS=(05-06,10)
/*
```

The LIST-COINFILE Command
****

Function: One line is printed for each selected record. The data
--------- elements that are printed include:

- Coincident route:
  - Route system and route number.
  - Starting and ending reference points.
- Base route:
  - Route system and route number.
  - Starting and ending reference points.
- Direction indicator.
- Date record was updated.

Route systems and route numbers specified in the +ROUTES subcommand are for coincident routes rather than base routes.

Required Command Parameters:

ROUTES subcommand

- Operates under LIST classification.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST The user's command parameters are listed.

TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-COINFILE
+ROUTES
ROUTE-SYS=01-03
/*
```


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The LIST-TRUMILE-FILE Command
***

Function: Prints a listing of the true mileage file.

Description: The listing includes all of the data elements stored in
--- the file (route system and number, reference posts,
distance from beginning of route, existing/theoretical
code, and date of update). In addition, the following
items are printed:

- Distance between posts.
- Distance from beginning of route and distance between posts in kilometers.
- Flags to indicate the following conditions:
  - Gaps in reference post numbers.
  - Milepoints out of sequence.

-If requested, reference posts closer together than some
 specified distance.
-If requested, reference posts farther apart than some
 specified distance.

Required Command Parameters:

ROUTES subcommand

-Operates under LIST classification.
-Summary selection parameters (eg., ZERO-USER-TOTALS) have
 no effect.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A 1-page option list is printed.

-The option list is a listing of your command
 parameters.

LOWER-DISTANCE=nnn.nnn

-Reference posts closer together than this distance
 will be flagged.

UPPER-DISTANCE=nnn.nnn

-Reference post farther apart than this distance
 will be flagged.

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TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
```

```
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-TRUMILE-FILE
+ROUTES
ROUTE-SYS=ISTH,ROUTE-NUM=90
/*
```


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The LIST-XREF-FILE Command
****

Function: Lists any of the following cross-reference files:
--------- construction district, maintenance area, patrol station,
           county, or city.

Description: The listing consists of the following data elements:

- The region number (eg., construction district number).
- Starting key (route system, route number, and reference point).
- Ending key.
- City and/or county, if applicable.

Required Command Parameters:

ROUTES subcommand

- Operates under LIST classification.
- ROUTE-SYS, ROUTE-NUM, START-REF, and END-REF can be used.
- The applicable region parameter can be used (eg., COUNTY can be used if listing the county file).
- (BY-CITY), (BY-COUNTY), UPPER-POP, and LOWER-POP cannot be used.

FILE-NAME=	XCD	List the construction district file
	XMN	List the maintenance area file
	XPT	List the patrol station file
	XCN	List the county file
	XCI	List the city file

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A 1-page option list is printed.

- The option list is a listing of your command parameters.

TITLES subcommand

Print formatting parameters: see chapter 4.

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Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=3,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-XREF-FILE,FILE-NAME=XCN,NO-OPTLIST
+ROUTES
ROUTE-SYS=01
/*
```

The LIST-ROADLOG-FILE Command

Function: Prints a listing of records in the roadlog, logpoint and/or bridge files.

Description: Four formats are available for the listing. Each format prints one line per record. The formats differ in the data elements that are printed. The four formats are:

- List format A prints the following data elements:

Route system and route number	Divided and one-way code
Reference point	Urban-municipal code
County number	City number f.a.u.a.
City number	Control section number
Remark code	Functional classification
Break code	Maintenance area
Intersection category	Construction district
Description	Patrol station
Direction code	Federal aid system and route number
Control of access code	Federal aid system designated
Number of lanes d.m. and i.m.	Federal aid system regular

- List format B prints the following data elements:

Route system and route number	Sidewalks code
Reference point	Curbs road-1 & road-2
County number	Parking road-1 & road-2
City number	Right of way width
Surface and shoulder widths	Legislative route number
Surface and shoulder types	Township number
Median width and type	Storm sewers
Turning lanes d.m. and i.m.	State project number
Additional lanes road-1	Federal project number
Additional lanes road-2	Design speed

- List format C prints the following data elements:

Route system and route number	Effective date
Reference point	Date of update
County number	Section township and range
City number	Location codes and area name codes
Date of inventory	Special systems code

- List format D prints the follwing data elements:

Route system and route number	Surface thicknesses
Reference point	Surface type spec numbers
County number	Base spec numbers
City number	Base thicknesses
Years built and improved	Base widths

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Records stored in the logpoint and bridge files contain only data elements that are printed in format A. Hence, the other formats should not be used with the logpoint and bridge files.

Required Command Parameters:

ROUTES subcommand

- Operates under LIST classification.
- Summary selection parameters (eg., ZERO-USER-TOTALS) have no effect.

LIST-FORMAT=	A	Print using format A
	B	Print using format B
	C	Print using format C
	D	Print using format D
	ALL	Print four listings (one in each format)

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed.

- The option list is a listing of your command

parameters.

NO-CODELIST No codelist is printed.
CODELIST A several-page codelist is printed.

- The codelist is summary of codes used in the listing.

RLG-ONLY List the roadlog file only.
LPT-ONLY List the logpoint file only.
RLG-FILES= LPT-&-RLG List both files (same as RLG-&-LPT).
RLG-&-LPT List both files.

- When both files are listed, they are merged so that a single listing is produced.

BRIDGES Include bridge records.
NO-BRIDGES Do not include bridge records.

- Bridge records are processed into the same format as logpoint records.

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SELECT subcommand

- SELECT can be applied to roadlog and logpoint records. The only way to distinguish logpoint records is by the remark code "DS". The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

  INCLUDE
  ROADLOG-RECORDS IF:
  EXCLUDE

- RLG data elements can be referenced.

- IF the BRIDGES option is specified, SELECT can be used to choose bridges. The INCLUDE/EXCLUDE

clause is REQUIRED and has the following format:

```
  INCLUDE
           BRIDGE-RECORDS IF:
  EXCLUDE
```

- BDG and RLG data elements can be referenced.

TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=300K,SCRSIZE=5,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-ROADLOG-FILE,LIST-FORMAT=A,RLG-FILES=RLG-ONLY
+ROUTES
ROUTE-SYS=ISTH,ROUTE-NUM=90
/*
```

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The LIST-ROADLOG-IN-CARD-FORMAT Command
****

Function: Prints a merged listing of the roadlog, logpoint and/or

--------   bridge files.

Description: The listing is printed in the same format as the input
-----------   record formats used for updating the roadlog and logpoint
              files. One line is printed for each descriptor record
(remark codes CO, EN, GP, and DS). Four lines are printed for each
mileage record (remark codes blanks and NE). One blank line is printed
between each record. The date of update is printed on the first line
printed for each record.

The listing is not formatted for easy readability, but has the advantage
of printing all data for a given record in one place. The input record
formats are documented in the TIS Data Coding Manual.

Required Command Parameters:

     ROUTES subcommand

         - Operates under LIST classification.
         - Summary selection parameters (eg., ZERO-USER-TOTALS) have no
           effect.

Optional Command Parameters:

      BRIDGES   Include bridge records.
      NO-BRIDGES   Do not include bridge records (default).

      NO-OPTLIST   No option list is printed.
      OPTLIST   A one-page option list is printed (default).

SELECT subcommand

- SELECT can be applied to roadlog and logpoint records. The only way to distinguish logpoint records is by the remark code "DS". The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

  INCLUDE
  ROADLOG-RECORDS IF:
  EXCLUDE

- RLG data elements can be referenced.

- IF the BRIDGES option is specified, SELECT can be used to choose bridges. The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

  INCLUDE
  BRIDGE-RECORDS IF:
  EXCLUDE

- BDG and RLG data elements can be referenced.

TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=2,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-ROADLOG-IN-CARD-FORMAT
+ROUTES
COUNTY=ANOKA,ROUTE-SYS=CSAH
/*
```

The ROADLOG-DOWN-LOAD Command

Function: Creates a single file with merged data from the roadlog, logpoint, bridge, and crossings files.

Description: The ROADLOG-DOWN-LOAD command will write selected fields from the roadlog/logpoint (RLG/LPT) files, the bridge (BDG) file, and the crossings (RGC) file to a single file.

The selected fields which are written to the output file are:

- Route-system
- Route-number
- Reference-point
- Milepoint
- Description
- Remark
- Section-township-range
- Direction
- Town/city name
- Street name

The selected fields are written to an external, output file which must be defined in a DD statement named DOWNLOAD. See the Sample Job Setup for an example of the DOWNLOAD DD statement.

Required Command Parameters:

ROUTES subcommand

- Operates under LIST classification.
- Summary selection parameters (eg., ZERO-USER-TOTALS) have no effect.

Optional Command Parameters:

TITLES subcommand

Print formatting parameters: see chapter 4.

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Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//    MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=3,LINES=5                                          00000030
/*ROUTE PRINT  R3
//TIS EXEC DTRIT,TIME=2,REGION=300K,SCRSIZE=5,PRINTDD=TSO,
//    OUTFILE=
//DOWNLOAD DD DSN=USER-ID.RLGDWN.DATA,DISP=(NEW,CATLG),UNIT=SYSDA,
//            SPACE=(TRK,(15,1))
//SYSIN DD *
:ROADLOG-DOWN-LOAD
+ROUTES
COUNTY=WASHINGTON,ROUTE-SYS=03
/*
```

The TRUNK-LOGPOINT-LISTING Command

Function: Prints the trunk roads logpoint listings.

Description: One line is printed for roadlog or logpoint record that contains the proper break codes indicating inclusion in logpoint listings. The bridge file is also accessed and logpoint records are simulated by computing reference points for bridges over 50 feet in length. Bridges less than 50 feet are indicated by a single DS record. Use of TRUNK-LOGPOINT-LISTING is not restricted to trunk highways, but some columns will be blank for non-trunk roadways.

Two print formats are available:

- NO-LENGTHS format includes the following data elements:

Route system and route number	Maintenance area
Reference point	Control section number
Verbal description	Patrol station number

Construction district City number

- LENGTHS format includes the following data elements:

Route system and route number	Maintenance area
Reference point	Control section number
Verbal description	Accumulated mileage
Construction district	City number

Note: The first two digits of the control section number is the county number.

Both formats use less than 104 print columns to allow printing on 8-1/2 x 11 forms.

Required Command Parameters:

ROUTES subcommand

- Operates under LIST classification.
- Summary selection parameters have no effect.

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A 1-page option list is printed.

- The option list shows command parameters used.

REL-LENGTHS	Accumulated mileage (from first mileage record) is printed.
LENGTHS	Accumulated mileage (from 000+00.000) is printed.
NO-LENGTHS	Do not print accumulated mileage.

KILOMETERS	Milepoint is in kilometers (if printed).
MILES	Milepoint is in miles (if printed).

ADT	ADT is printed.
NO-ADT	ADT is not printed.

COIN-EXPAND	Expand coincident section (print base routes).
NO-COIN-EXPAND	Do not expand coincident sections.

START-DATE=mm/dd/yyyy
END-DATE=mm/dd/yyyy

- If ADT is specified, START-DATE and END-DATE are required to indicate the time period for computing the ADT's.

SELECT subcommand

- SELECT can be applied to roadlog and logpoint records. The only way to distinguish logpoint records is by the remark code "DS". The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

  INCLUDE
  ROADLOG-RECORDS IF:
  EXCLUDE

- RLG data elements can be referenced.

- SELECT can also be used to choose bridges. The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

  INCLUDE
  BRIDGE-RECORDS IF:
  EXCLUDE

- BDG and RLG data elements can be referenced.

TITLES subcommand

Any of the print formatting parameters (see chapter 4).

TIME Parameter: Compute time as:

```
              num-rec
       time = -------  +  3
                5,000
```

num-rec is the number of roadlog and logpoint records included by the ROUTES subcommand. See Appendix A of the Data Coding Manual for approximate numbers of records stored.

Sample Job Setup

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=6,REGION=500K,SCRSIZE=5,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:TRUNK-LOGPOINT-LISTING,LENGTHS,COIN-EXPAND
+ROUTES
ROUTE-SYS=ISTH
/*
```

The LOCAL-LOGPOINT-LISTING Command

Function: Prints the local roads logpoint listings.

Description: One line is printed for roadlog or logpoint record that contains the proper break codes indicating inclusion in logpoint listings. The bridge file is also accessed and logpoint records are simulated by computing reference points for bridges over 50 feet in length. Bridges less than 50 feet are indicated by a single DS record. Use of LOCAL-LOGPOINT-LISTING is not restricted to local roads, but the TRUNK-LOGPOINT-LISTING prints additional data elements applicable only to trunk highways.

The following data elements are printed:

- Route system and route number
- Reference point
- County number
- City number
- Verbal description

- Township names (from the township name file) - Optional
- Municipal street names (from the street name file) - Optional
- Accumulated mileage (milepoint) - Optional

The listing uses less than 104 print columns to allow printing on 8-1/2 x 11 forms.

Required Command Parameters:

ROUTES subcommand

- Operates under LIST classification.
- Summary selection parameters have no effect.

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A 1-page option list is printed.

- The option list shows command parameters used.

NO-STREETS	Street names are not printed.
STREETS	Street names are printed.

NO-TOWNSHIPS	Township names are not printed.
TOWNSHIPS	Township names are printed.

LENGTHS	Accumulated mileage (from 000+00.000) is printed.
REL-LENGTHS	Accumulated mileage (from first mileage record) is printed.
NO-LENGTHS	Do not print accumulated mileage.

KILOMETERS	Milepoint is in kilometers (if printed).
MILES	Milepoint is in miles (if printed).

SELECT subcommand

- SELECT can be applied to roadlog and logpoint records. The only way to distinguish logpoint records is by the remark code "DS". The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

  INCLUDE
  ROADLOG-RECORDS IF:
  EXCLUDE

- RLG data elements can be referenced.

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- SELECT can also be used to choose bridges. The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

```
INCLUDE
         BRIDGE-RECORDS IF:
EXCLUDE
```

- BDG and RLG data elements can be referenced.

TITLES subcommand

Any of the print formatting parameters (see chapter 4).

Sample Job Setup

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=20,REGION=500K,SCRSIZE=5,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LOCAL-LOGPOINT-LISTING
+ROUTES
COUNTY=01-87,ROUTE-SYS=ISTH
/*
```

The ROADLOG-REPORT-LISTING Command

Function: Prints a section-by-section report of roadlog, logpoint, and bridge data.

Description: Three lines are printed for each roadlog section. The data elements that are printed include:

- Line 1:

  Route system and route number
  Reference point
  Accumulated distance (from start of route to beginning of section)
  Verbal description
  Patrol station number
  City number
  Rural-municipal-urban indicator
  Functional classification
  Federal aid system and route number

Location codes

- Line 2:

  Divided and one-way code
  Surface and shoulder widths and types for road-1
  Years built and improved for road-1
  Surface and base thicknesses and specification numbers for road-1
  Base width for road-1
  Parking code for road-1
  Curbs code for road-1
  Additional lanes on road-1
  Number of lanes and turning lanes i.m. (towards increasing milepoints)
  Sidewalks code
  State project number
  Control section number
  Effective date

- Line 3:

  Median type and width
  Characteristics of road-2 (same as those printed on line 2 for road-1)
  Number of lanes and turning lanes d.m. (towards decreasing milepoints)
  Direction
  Design speed
  Federal project number
  City number f.a.u.a.
  Intersection category

- One line is printed for each logpoint or bridge record. The data elements printed include:

  Route system and route number
  Reference point
  Accumulated distance
  Verbal description

The report makes use of all 132 print columns. Narrow forms cannot be used.

Required Command Parameters:

ROUTES subcommand - Operates under LIST classification.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed.

- The option list is a listing of your command parameters.

NO-CODELIST No codelist is printed.
CODELIST A several-page codelist is printed.

- The codelist is summary of codes used in the listing.

KILOMETERS Distances are printed in kilometers.
MILES Distances are printed in miles.

EXCLUDE-COIN Coincident mileage is not included.
INCLUDE-COIN Coincident mileage is included.

SELECT subcommand

- SELECT can be applied to roadlog and logpoint records. The only way to distinguish logpoint records is by the remark code "DS". The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

```
                              ROADLOG-RECORDS IF:
                          EXCLUDE

                      - RLG data elements can be referenced.

                      - Selection on bridges can also be done.  The
                        INCLUDE/EXCLUDE clause is REQUIRED and has the
                        following format:

                          INCLUDE
                              BRIDGE-RECORDS IF:
                          EXCLUDE

                      - BDG and RLG data elements can be referenced.


     TITLES subcommand

     Print formatting parameters:  see chapter 4.


Sample Job Setup:
-----------------

//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:ROADLOG-REPORT-LISTING
+ROUTES
ROUTE-SYS=ISTH,ROUTE-NUM=90
+TITLES
REQUESTED BY:  JOHN DOE -- JANUARY 31, 1980
/*
```

The ROADLOG-SUM-BY-COUNTY Command

Function: Prints one or more summaries of roadlog mileage by county.

Description: Five summaries are available:

- -Summary A: By county, route system, and municipal/non-municipal.
- -Summary B: By county, route system, and rural/urban.
- -Summary C: By county, surface type, and municipal/non-municipal.
- -Summary D: By county, surface type, and rural/urban.
- -Summary E: By county and federal aid system.

Any combination of these summaries can be obtained in any one run.
Non-existent mileage can be included or excluded.

Required Command Parameters:

ROUTES subcommand

-Operates under SUM classification.

Optional Command Parameters:

SUMMARIES=ABCDE

-Specify the codes for the desired summaries
(eg., SUMMARIES=BDE for summaries B, D, and E).
-The default is ABCDE.

NO-OPTLIST No option list is printed.
OPTLIST A 1-page option list is printed.

-The option list is a listing of your command parameters.

KILOMETERS Values are printed in kilometers.

MILES Values are printed in miles.

INCLUDE-NE Non-existent mileage is included.
EXCLUDE-NE Non-existent mileage is excluded.

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SELECT subcommand

-The INCLUDE/EXCLUDE clause is optional and has the following format:

INCLUDE ROADLOG-RECORD IF:
EXCLUDE

-RLG data elements can be referenced.

TITLES subcommand

Print formatting parameters: see chapter 4.

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Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=15,REGION=350K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:ROADLOG-SUM-BY-COUNTY
+ROUTES
CONSTR-DIST=1-9,ROUTE-SYS=ISTH,ROUTE-NUM=90
/*
```

50 summaries will be printed:

Summaries A, B, C, D, and E for district 1.
Summaries A, B, C, D, and E for district 2.
.
.
.
Summaries A, B, C, D, and E for district 9.
Summaries A, B, C, D, and E for all districts combined.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
```

```
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=2,REGION=350K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:ROADLOG-SUM-BY-COUNTY,SUMMARIES=CD,TABLE-NUMBER=1
+ROUTES
ROUTE-SYS=ISTH,ROUTE-NUM=90
/*
```

2 summaries will be printed: summary C and summary D. Summary C will be identified as table 1. Summary D will be identified as table 2.

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The FED-AID-BY-COUNTY Command

Function: Prints a summary by federal aid system, county, and federal aid route number.

Description: A separate summary is printed for each federal aid system. Each summary is printed by county and federal aid route number.

Required Command Parameters:

ROUTES subcommand

- Operates as LIST classification.
- One set of summaries (one per federal aid system) is printed

regardless of the data selection control cards used. If the following are specified:

```
+ROUTES
COUNTY=01-03,ROUTE-SYS+01-03
COUNTY=08-10,ROUTE-SYS=01-03
```

only one set of summaries is printed and includes data for counties 1-3 abd 8-10.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A 1-page option list is printed.

KILOMETERS Values are printed in kilometers.
MILES Values are printed in miles.

SELECT subcommand

-The INCLUDE/EXCLUDE clause is optional and has the following format:

```
INCLUDE   ROADLOG-RECORDS IF:
EXCLUDE
```

-RLG data elements can be referenced.

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TITLES subcommand

Print formatting parameters: see chapter 4.

Sample job setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
```

```
        /*ROUTE  PRINT R0
        //TIS EXEC DTRIT,TIME=2,REGION=350K,SCRSIZE=3,FORM='(2)',
        //    PRINTDD=TSO,OUTFILE=
        //SYSIN DD *
        :FED-AID-BY-COUNTY,TABLE-NUMBER=6
        +ROUTES
        ROUTE-SYS=01-03
        /*
```


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The FED-AID-BY-URBAN-AREA Command
****

Function: Prints a summary of federal aid urban mileage by urban area

--------- and federal aid route number.

Description: One summary is printed for each FED-AID-BY-URBAN-AREA
------------ command. Only federal aid urban mileage is included.

Required Command Parameters:

ROUTES subcommand

-Operates under LIST classification.
-One summary is printed regardless of the data selection
 control cards used. If the following are specified:

```
+ROUTES
COUNTY=01-03,ROUTE-SYS=02-03
COUNTY=08-10,ROUTE-SYS=02-03
```

one summary is printed and includes data for counties 1-3 and
8-10.

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A 1-page option list is printed.

-The option list is a listing of your command
 parameters.

KILOMETERS	Values ae printed in kilometers.
MILES	Values are printed in miles.

SELECT subcommand

-The INCLUDE/EXCLUDE clause is optional and has the
 following format:

```
INCLUDE    ROADLOG-RECORDS IF:
EXCLUDE
```

-RLG data elements can be referenced.

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TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=2,REGION=350K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:FED-AID-BY-URBAN-AREA,TABLE-NUMBER=10
+ROUTES
ROUTE-SYS=02-03
/*
```

The ROADLOG-MATRIX-SUMMARY Command

Function: Produces general-purpose mileage summaries.

Description: Summaries can be printed broken down by one, two, or three data elements form the roadlog file. Gap and coincident mileage is not included in the summaries. Non-existent mileage is optionally included. Distances are shown in terms of both miles and kilometers. The number of roadlog sections is also displayed.

When summarizing on one data element, the output format is similar to:

RLG.DIVIDED-&-ONE-WAY	MILES	KILOMETERS	SECTIONS	LANE-MILES
D - DIVIDED	nnn.nnn	nnn.nnn	nn	nnn.nnn
O - ONE-WAY COUPLET	nnn.nnn	nnn.nnn	nn	nnn.nnn
U - UNDIVIDED	nnn.nnn	nnn.nnn	nn	nnn.nnn
---GRAND TOTAL---	nnn.nnn	nnn.nnn	nn	nnn.nnn

When summarizing on two data elements, the output format is similar to:

RLG.COUNTY-NUM	RLG.DIVIDED-&-ONE-WAY	MILES	KILOMETERS	SECTIONS
01 - AITKIN	D - DIVIDED	nnn.nnn	nnn.nnn	nn
01 - AITKIN	U - UNDIVIDED	nnn.nnn	nnn.nnn	nn
01 - AITKIN	---SUBTOTAL---	nnn.nnn	nnn.nnn	nn
02 - ANOKA	D - DIVIDED	nnn.nnn	nnn.nnn	nn
02 - ANOKA	O - ONE-WAY COUPLET	nnn.nnn	nnn.nnn	nn
02 - ANOKA	U - UNDIVIDED	nnn.nnn	nnn.nnn	nn
02 - ANOKA	---SUBTOTAL---	nnn.nnn	nnn.nnn	nn
----------GRAND TOTAL----------		nnn.nnn	nnn.nnn	nn

When summarizing on three data elements, the output format is identical to that for two data elements except that one summary is printed for

each value of the additional data elements.

Required Command Parameters:

ROUTES subcommand

-Operates under SUM classification.

CATEGORIES subcommand

-RLG data elements can be referenced.
-The REDEFINES and GROUPS options can be used for

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A 1-page option list is printed (default).

- The option list shows command parameters used.

LANE-MILES Lane miles are shown (total thru lanes X length).
NO-LANE-MILES Lane miles are not shown (default).

START-DATE=mm/dd/yy Specifies starting date for traffic volume calculations.

END-DATE=mm/dd/yy Specifies ending date for traffic volume calculations. Average daily volume will be computed for the time between start and end dates. The SELECT subcommand may be used to choose only certain time intervals from the period (INCLUDE TIME IF:).

- START-DATE and END-DATE are only needed when ADT data elements will be referenced in the SELECT subcommand.

SELECT subcommand

Select criteria may be applied to elements stored in the roadlog file, to the traffic file, and also to time intervals (when traffic is also selected).

- To select on time intervals:

  May be used to choose only certain hours or dates for computing traffic volume.

  INCLUDE
  EXCLUDE TIME IF:

  - TIM data elements can be referenced.
  - Time is the period between the START-DATE and END-DATE. Select only applies within that range.
  - For more on traffic volume options, see "Introduction to Volume Models" and "Time Intervals".

- To select on roadlog data elements:

  INCLUDE
  EXCLUDE ROADLOG-RECORDS IF:

  - RLG data elements can be referenced.

- To select on traffic data elements:

  INCLUDE
  EXCLUDE ADT-RECORDS IF:

  - ADT data elements can be referenced.

- Note that ADT selection is done once for each roadlog record, ie., a weighted value may be used when the roadlog record length is greater than traffic record lengths for the

same location.

- Note also that ADT selection requires the presence of START-DATE and END-DATE parameters on the command to define the time period for computing traffic volume.

TITLES subcommand

Any of the print formatting parameters (see chapter 4).

Sample Job Setups:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=350K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:ROADLOG-MATRIX-SUMMARY
+ROUTES
ROUTE-SYS=01-03
+CATEGORIES
DATA-ELEMENT=RLG.DIVIDED-&-ONE-WAY
/*
```

The above job setup prints a summary similar to the first example shown above.

The above setup can be copied from DT99A1B.TSOLIB.CNTL(RLGMAT1).

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```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=350K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:ROADLOG-MATRIX-SUMMARY,NO-OPTLIST
+ROUTES
ROUTE-SYS=02
+CATEGORIES
```

```
DATA-ELEMENT=RLG.COUNTY-NUM
DATA-ELEMENT=RLG.DIVIDED-&-ONE-WAY
/*
```

The above job setup prints a summary similar to the second example shown above.

The above setup can be copied from DT99A1B.TSOLIB.CNTL(RLGMAT2).

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=350K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:ROADLOG-MATRIX-SUMMARY
+ROUTES
ROUTE-SYS=01-03
+CATEGORIES
DATA-ELEMENT=RLG.ROUTE-SYSTEM
DATA-ELEMENT=RLG.COUNTY-NUM
DATA-ELEMENT=RLG.DIVIDED-&-ONE-WAY
REDEFINES
O A
D A
X B
Z B
/*
```

The above job setup prints a summary similar to the second example shown above except that one summary is printed for each value of the route system. The divided & one-way codes O and D will be grouped together and printed as A. The codes X and Z will be grouped together and printed as B.

The above setup can be copied from DT99A1B.TSOLIB.CNTL(RLGMAT3).

****

Function: Searches the roadlog file for sections of roadway meeting
--------- user-specified criteria.

Description: The user enters criteria via the SELECT subcommand. The
------------ program searches the roadlog file for sections that meet these criteria. Whenever a section is found that meets the criteria, the program continues searching until a section is found that does not meet the criteria. It then prints the following information:

- Reference point at which the roadway first meets the criteria.
- Reference point at which the roadway no longer meets the criteria.
- Verbal descriptions at both points.
- Length in both miles and kilometers of the selected section.

Sections normally begin when SELECT becomes "yes" and end when SELECT becomes "no". The BREAKS subcommand can optionally be coded to cause additional breaks with selected sections.

At the end of each route, the following summary is printed:

		Length (Miles)	Length (Kilom)	
Subtotal:	Selected	nnn.nnn	nnn.nnn	nnn.nn%
Subtotal:	Not selected	nnn.nnn	nnn.nnn	nnn.nn%
Total:		nnn.nnn	nnn.nnn	

Normally this summary is printed only for routes containing sections that were selected. The user can request this summary for all routes processed.

Non-existent mileage can be either included or excluded. Gap and coincident mileage is always excluded.

Required Command Parameters:

ROUTES subcommand

- Operates under LIST-&-SUM classification.

SELECT subcommand

Select criteria may be applied to elements stored in the roadlog file, to the traffic file, and also to time intervals (if traffic accessed for ADT selection).

- To select on time intervals:

  May be used to choose only certain hours or dates for computing traffic volumes.

  INCLUDE
  EXCLUDE TIME IF:

  - TIM data elements can be referenced.
  - Time is the period between the START-DATE and END-DATE. Select only applies within that range.
  - For more on traffic volume options, see "Introduction to Volume Models" and "Time Intervals".

- To select on roadlog data elements:

  INCLUDE
  EXCLUDE ROADLOG-RECORDS IF:

  - RLG data elements can be referenced.

-To select on traffic data elements:

  INCLUDE

EXCLUDE ADT-RECORDS IF:

- ADT data elements can be referenced.

- Note that ADT selection is done once for each roadlog record, i.e., a weighted value may be used when the roadlog record length is greater than traffic record lengths for the same location.

- Note also that ADT selection requires the presence of START-DATE and END-DATE on the command to define the time period for computing traffic volume.

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Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A 1-page option list is printed (default).

-The option list is a listing of your command parameters.

NO-LIST	No listing produced (useful with LINK option).
LIST-ALL-ROUTES	Prints an end-of-route summary for each route.
LIST-SEL-ROUTES	Prints an end-of-route summary for each selected route (default).

-A selected route is one with at least one selected section.

INCLUDE-NE	Non-existent mileage is included.
EXCLUDE-NE	Non-existent mileage is excluded (default).

LINK-CLOSED	Generate ROUTES subcommand for next command (closed intervals).
LINK-OPEN	Generate ROUTES subcommand for next command (open intervals).
NO-LINK	No linkage is done (default).

- The LINK option will cause SELECT-SECTIONS-LISTING to produce ROUTES subcommands describing each selected section which can be used by ANY other command which has been placed immediately following SELECT-SECTIONS-LISTING and recognizes

the ROUTES subcommand. Specify "+ROUTES,n" where"n" is the number of the command receiving the linkage.

- LINK-CLOSED will result in subcommands of the format ROUTE-SYS=nn,ROUTE-NUMBER=nnnnnnnx, START-REF=sss+ss.sss, END-REF=eee+ee.eee for each selected section.

- LINK-OPEN is the same except eee+ee.eee minus 0.001 is substituted for END-REF, thereby excluding the ending point from the specified interval.

START-DATE=mm/dd/yyyy Specifies starting date for traffic volume calculations.

END-DATE=mm/dd/yyyy Specifies ending date for traffic volume calculations. Average daily volume will be computed for the time between start and end dates. The SELECT subcommand may be used to choose only certain time intervals from the period (INCLUDE TIME IF:).

- START-DATE and END-DATE are required when ADT data elements will be referenced in the SELECT subcommand.

BREAKS subcommand

Allows the user to specify additional section breaks.

- RLG data elements can be referenced.
- Up to 20 data elements can be chosen.
- The total length of the data elements must be less than 90.
- The REDEFINES option can be used to form groups of

values for a particular data element. Breaks will then only occur when the value moves from one group to another.

- The POINTS option can be used to isolate certain values of a data element. Specified values will always cause breaks (even if the value does not change from the previous record).

Only selected sections are affected by the BREAKS criteria.

For further explanation, see chapter 7.

TITLES subcommand

Print formatting parameters: see chapter 4.

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Sample Job Setups:

Lists sections of divided roadway for Minnesota trunk highways in maintenance areas 2A to 4A:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=300K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:SELECT-SECTIONS-LISTING
+ROUTES
```

```
MAINT-AREA=2A-4A,ROUTE-SYS=MNTH
+SELECT
 INCLUDE ROADLOG-RECORDS IF:
 RLG.DIVIDED-&-ONE-WAY *EQ* 'D'
/*
```

The above job setup may be copied from DT99A1B.TSOLIB.CNTL(RLGSS1).

Command used as a preprocessor for COMPUTE-ACCIDENT-RATES. It selects sections of interstate highways that are not divided and have a 1979 AADT of greater than 5,000. The subsequent command will then be provided with +ROUTES subcommand specifying those sections:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRITA,TIME=1,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:SELECT-SECTIONS-LISTING,LINK-CLOSED,LIST-ALL-ROUTES,
:  START-DATE=01/01/1979,END-DATE=12/31/1979
+ROUTES
ROUTE-SYS=ISTH
+SELECT
 INCLUDE ADT-RECORDS IF:
      ADT.ADT *GT* 5000
 INCLUDE ROADLOG-RECORDS IF:
      RLG.DIVIDED-&-ONE-WAY *NE* 'D'
:COMPUTE-ACCIDENT-RATES,START-DATE=01/01/1979,END-DATE=12/31/1979
+ROUTES,2
/*
```

The above job setup may be copied from DT99A1B.TSOLIB.CNTL(RLGSS2).

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Selects trunk highways in district 9, showing sections that break wherever number of lanes changes:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
```

```
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=300K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:SELECT-SECTIONS-LISTING,LIST-SEL-ROUTES
+ROUTES
ROUTE-SYS=01-03
+SELECT
 INCLUDE ROADLOG-RECORDS IF:
 RLG.CONSTR-DIST *EQ* 9
+BREAKS
RLG.TOTAL-THRU-LANES
/*
```

The above job setup may be copied from DT99A1B.TSOLIB.CNTL(RLGSS3).

The CREATE-CONTROL-SECTN-XREF Command

Function: Creates a temporary control section cross-reference file.

Description: The file produced by this command is needed by the programs LIST-CONTROL-SECTN-XREF and CONTROL-SECTN-RECORD. It is a temporary file that is deleted at the end of the job step, so that the commands for LIST-CONTROL-SECTN-XREF and/or CONTROL-SECTN-RECORD must be placed in the same job setup as the CREATE-CONTROL-SECTN-XREF command.

The control section cross-reference file contains the following data elements:

- Route system and route number
- Starting reference point and ending reference point
- Control section number

It is sorted by (1) control section number, and (2) route system, route number, and starting reference point.

The program operates in two passes:

- The roadlog file is read and the starting and ending reference points established. A scratch file (sorted on route system, route number, and starting reference point) is writted to DD statement SORTIN.

- The scratch file is sorted by control section number, and the resultant file is written to DD statement SORTOUT.

A listing of the file can be obtained as it is created. The listing is produced during the first pass, so that the listing is sorted by route system, route number, and starting reference point rather than by control section number (LIST-CONTROL-SECTN-XREF can be used to obtain a listing by control section number). A sample listing looks like:

Route	Start	End	Cntl	Remark	Written
01 35W	000+00.000	004+00.282	1981		YES
01 35W	004+00.282	017+00.253	2782		YES
01 35W	017+00.253	021+00.789	2783		YES
01 35W	021+00.789	034+00.697	6284		YES
01 35W	030+00.697	041+00.743	0280		YES
01 35W	041+00.743			EN	5 WRITTEN

-The first four columns are the data elements stored in the file.
-The remark code is printed.
-YES is printed by each record written. Records are written if (1) the remark code is blank, and (2) the control section number is non-zero.
-When the EN reference point is printed, the number of records written for that route is printed.
-The first two digits of the control section number are the county number.

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Required Command Parameters:

ROUTES subcommand

- Operates under LIST classification.

Optional Command Parameters:

LIST	The file is listed as it is created.
NOLIST	The file is not listed (default).
NOWRITE	The file is not written.
WRITE	The file is written (default).

- If NOWRITE is specified, only the first pass is run and no scratch files are produced. This parameter is useful in conjunction with LIST when performing program testing.

TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
```

```
        //SYSIN DD *
        :CREATE-CONTROL-SECTN-XREF
        +ROUTES
        ROUTE-SYS=01-03
        command(s) for CONTROL-SECTN-RECORD and/or LIST-CONTROL-SECTN-XREF
        /*

           The above job setup can be copied from DT99A1B.TSOLIB.CNTL(XSCCR).
```



```
        The CONTROL-SECTN-RECORD Command
        ********************************

        Function:  Prints the control section record report.
        ---------

        Description: The control section record report consists of a descriptive
        ------------ listing for each control section in the state.  If there is
                     an entry in the control section notes file, that is printed
        also.  For each major breakpoint within the control section, the
        following information is printed:

             - Construction district.
             - Maintenance area.
             - Route number.
             - Legislative route number.
             - Rural/urban indicator.
             - Federal aid route system and route number.
             - Distance to next major breakpoint.
             - Verbal description.

        The report is printed in order by control section number.

        CONTROL-SECTN-RECORD utilizes the control section cross-reference file.
        This file is a temporary file that the user creates by preceding the
        CONTROL-SECTN-RECORD command with a CREATE-CONTROL-SECTN-XREF command.
```

Required Command Parameters: None.

Optional Command Parameters:

YEAR=nnnn - If this parameter is included, the following page heading is printed on each page:

nnnn TRUNK HIGHWAY CONTROL SECTION RECORD

- If this parameter is not included, the page heading does not include a year.

NO-OPTLIST No option list is printed
OPTLIST A 1-page option list is printed.

- The option list is a listing of your command parameters.

KILOMETERS All distances are printed in kilometers
MILES All distances are printed in miles.

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TITLES subcommand

Print formatting parameters: see chapter 4.

TIME Parameter: TIME=1 should be sufficient for a job with this program and CREATE-CONTROL-SECTN-XREF.

Sample Job Setups:

The DTRIC catalogued procedure must be used for the CONTROL-SECTION-RECORD program.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
```

```
//TIS EXEC DTRIC,FORM='(A)',
//    PRINTDD=PRINTER,OUTFILE=,COPIES=1
//PRINTER DD SYSOUT=(T,,685),DEST=NIP,COPIES=1,CHARS=TN12,
//   FCB=118,BURST=Y
//SYSIN DD *
:CONTROL-SECTN-RECORD,YEAR=1993,PAGESIZE=80
/*
```

The above job setup prints the complete Control Section Report on 8 1/2 x 11 white paper. The JCL is returned to the terminal.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIC
//SYSIN DD *
:CONTROL-SECTN-RECORD,YEAR=1993
/*
```

The above job setup only prints county 01. Output is returned to the terminal.

When setting up jobs, it is advisable to remember that +ROUTES is available for the control sections themselves, but not for the accompanying notes. The notes will be printed beginning with the first selected control section and ending with the last selected control section. Therefore, if COUNTY=03,07 is specified, control sections will only be printed for counties 03 and 07, but notes will be printed for counties 03, 04, 05, 06, and 07. It is therefore not advisable to run reports with "gaps" in them.

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+

LIST-NOTES-IN-CARD-FORMAT Command

Function: Prints the contents of the control section notes file.

Description: The entire control section notes file is listed in order

------------ by control section number. The listing is printed in the
              same format used for updating the file.

Required Command Parameters: None

Optional Command Parameters: None

TIME Parameter: One minute should be adequate for all runs.

Sample Job Setup:

The DTRIC catalogued procedure must be used for the
LIST-NOTES-IN-CARD-FORMAT command.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIC,TIME=1,REGION=400K,SCRSIZE=3,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=,COPIES=1
//SYSIN DD *
:LIST-NOTES-IN-CARD-FORMAT
/*
```

The LIST-CONTROL-SECTN-XREF Command

Function: Prints the contents of the control section cross-reference file.

Description: The entire control section cross-reference file is listed in order by section number.

The sample listing shown with the CREATE-CONTROL-SECTN-XREF command appears as follows when listed by LIST-CONTROL-SECTN-XREF:

Cntrl Sectn	Route Sys-&-Num	Starting Refpoint	Ending Refpoint	Description at End of Section
0280	ISTH 35W	030+00.697	041+00.743	RADIUS NE RT JCT TH-35E
1981	ISTH 35W	000+00.000	004+00.282	S END BR-5983 RTE I-35
2782	ISTH 35W	004+00.282	017+00.253	ROAD SURFACE NARROWS
2783	ISTH 35W	017+00.253	021+00.789	HENNEPIN-PAMSEY COUNTY
6284	ISTH 35W	021+00.789	030+00.697	N CO LINE (BR# 9606)

Required Command Parameters: None.

Optional Command Parameters:

TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIC
//SYSIN DD *
:LIST-CONTROL-SECTN-XREF
/*
```

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The CREATE-FEDERAL-MILEAGE-TAPE Command

Function: Creates the Federal Aid Mileage Tape.

Description: The Federal Aid Mileage Tape is a tape file of roadlog and traffic data that is created annually for the Federal Government.

When creating the tape, you must include a DD statement for the tape. The parameter

```
DCB=(BLKSIZE=blksize,LRECL=80,RECFM=FB)
```

must be included in the DD statement. "blksize" can be any multiple of 80, but must be 1600 for any tape sent to the Federal Government.

As a program option, the tape can be listed as it is created. Another option allows you to obtain the listing without creating a tape (in this case, the DD statement can be omitted).

Required Command Parameters:

ROUTES subcommand	-Operates under GEN classification.
OUTPUT-DD=ddname	-Specify the name of the DD statement you have supplied for the tape. -OUTPUT-DD can be omitted if NOWRITE.
YEAR=nnnn	-Specify the year for which the run applies.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

NO-CODELIST No codelist is printed.
CODELIST A several-page codelist is printed (default).

-The codelist is a summary of codes used in the listing.
-The codelist is printed only if LIST is in effect.

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NOLIST No listing is produced.
LIST A listing is produced (default).

NOWRITE The file is not written.
WRITE The file is written.

-If NOWRITE is specified, only the first pass is run and no scratch files are produced. This parameter is useful in conjunction with LIST when performing program testing.

TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//MILETAPE DD UNIT=TAPE,...,DCB=(BLKSIZE=1600,LRECL=80,RECFM=FB)
```

```
//SYSIN DD *
:CREATE-FEDERAL-MILEAGE-TAPE,OUTPUT-DD=MILETAPE,NOLIST,YEAR=1980
+ROUTES
ROUTE-SYS=01-04
/*
```


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The LIST-INTSECT-FILE Command
****

Function: Prints a listing of the II (Intersection-Interchange) files.

Description: Three print formats are available:

-ABBREV-FORMAT

-All data elements stored in the files are printed.
-Internal codes are printed for the data elements.
-3 + n lines are printed for each intersection(n=number of intersecting routes).

-PAGE-FORMAT

-All data elements stored in the files are printed.
-Internal codes as well as English language equvalents are printed.

-Approximately one page is printed for each intersection (more than one page is needed for intersections that involve more than two routes).

-CARD-FORMAT

-Lists data in input card format.

With any format, the program can list via either the intersection file or via the intersecton cross-reference file.

-When listing via the intersection file, each intersection is printed just once under the intersection's key.

-When listing via the cross-reference file, each intersection can be printed more than once -- once for the key of each intersecting route.

For example, consider an intersection that involves an interstate trunk highway and a U.S. trunk highway. The intersection's key is that of the interstate trunk highway.

-If ROUTE-SYS=ISTH is specified in +ROUTES, the intersection is printed exactly once (under the ISTH key) regardless of the method used.

-If ROUTE-SYS=USTH is specified, the intersection is not printed if listing via the intersection file (the intersection's key is an ISTH key). The intersection is printed under the USTH key is listing via the cross-reference file.

-If ROUTE-SYS=01-02 is specified in +ROUTES,the intersection is printed once (under the ISTH key) if listing via the intersection file. The intersection is printed twice (once under each key) if listing via the cross-reference file.

Optionally, the program can display regional information (county, municipality, urban area, construction district, maintenance area, and patrol station). When listing by the intersection file, this option requires additional execution time because the cross-reference file has to be accessed.

Required Command Parameters:

ROUTES subcommand

- Operates under LIST classification.

- If VIA-XREF is specified (to list via the cross-reference file), the parameters CONSTR-DIST, MAINT-AREA, PATROL-STATION, CITY, and COUNTY cannot be used because some intersections could be assigned to the wrong areas. Use the LIST-INTSECT-FILE-BY-REGION command if these parameters are needed.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed.

-The option list is a listing of your command parameters.

NO-CODELIST No codelist is printed.
CODELIST A several-page codelist is printed.

-The codelist summarizes the codes appearing in the listing.
-The codelist applies only to ABBREV-FORMAT. NO-CODELIST should be specified when PAGE-FORMAT is used.

CARD-FORMAT Lists data in input card format.
PAGE-FORMAT The PAGE-FORMAT listing format is used.
ABBREV-FORMAT The ABBREV-FORMAT listing format is used.

-NO-CODELIST should also be specified when PAGE-FORMAT is used.

VIA-XREF The listing is produced via the cross-reference file.
VIA-INTSECT The listing is produced via the intersection file.

REGIONS Regions (eg., county and municipality) are displayed.
NO-REGIONS Regions are not displayed.

-If VIA-XREF is used, the default is REGIONS. No additional computer time is required for REGIONS as compared to NO-REGIONS.
-If VIA-INTSECT is used, the default is NO-REGIONS. Additional computer time is required for REGIONS because the cross-reference file must be accessed.

MAX-NUM-ENTRIES=n

-If coded, listing in card format will show up to "n" years of ADT for each leg (default is only the latest year).

SELECT subcommand

-The INCLUDE/EXDLUDE clause is optional and has this format:

INCLUDE INTERSECTIONS IF:
EXCLUDE

-INT, INL, INX and RLG data elements can be referenced.
-INL data elements can only be referenced via the multi-correlation facility (*AND*/*ALL*).
-RLG references require access to the roadlog file and therefore raise execution costs.
-INX references require access to the cross-reference file. Execution costs are higher unless the cross-reference file is being accessed anyway (ie., either VIA-XREF or REGIONS is specified).

TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=4,REGION=300K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
```

```
        //SYSIN DD *
        :LIST-INTSECT-FILE,PAGE-FORMAT,NO-CODELIST,VIA-XREF
        +ROUTES
        ROUTE-SYS=ISTH,ROUTE-NUM=90
        /*
 PAGE 8-73
1
+
PAGE 182
```

The LIST-INTSECT-FILE-BY-REGION Command
****

Function: Prints a listing of the II (intersection-interchange) files.

Description: The output formats (both ABBREV-FORMAT and PAGE-FORMAT)
---
are identical to the output formats of LIST-INTSECT-FILE. The two commands differ in that LIST-INTSECT-FILE-BY-REGION performs a sort that correctly assigns each intersection to its proper region when listing via the cross-reference file by region.

The VIA-XREF and REGION parameters of LIST-INTSECT-FILE are automatically in effect for LIST-INTSECT-FILE-BY-REGION and cannot be disabled.

Required Command Parameters:
****

ROUTES subcommand

- Operates under LIST classification.
- Only the ROUTE-SYS, ROUTE-NUM, START-REF, and END-REF parameters are allowed on data selection control cards.

INTSECT-SORT=

DIST	Sort by district
DIST-&-CNTY	Sort by county within district
DIST-&-CITY	Sort by city within district
DIST-&-CNTY-&-CITY	Sort by city in county in district
AREA	Sort by maintenance area
AREA-&-CNTY	Sort by county within area
AREA-&-CITY	Sort by city within area
AREA-&-CNTY-&-CITY	Sort by city in county area
STA	Sort by patrol station
STA-&-CNTY	Sort by city in county in station

STA-&-CITY	Sort by city within station
STA-&-CNTY-&-CITY	Sort by city in county in station
PDIST	Sort by patrol district
PDIST-&-CNTY	Sort by county within patrol district
PDIST-&-CITY	Sort by city within patrol district
PDIST-&-CNTY-&-CITY	Sort by city in county in patrol district
CNTY	Sort by county
CNTY-&-CITY	Sort by city within county
CITY	Sort by city

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+

-When sorting on DIST, the district is determined from the roadlog file. If not specified, the district is determined from the county number stored in the roadlog file.
-When sorting on AREA/STA/PDIST, the area/station/district is determined form the roadlog file. If blanks are stored for a given intersection, that intersection is not listed.
-When sorting on CNTY, the county number is determined from the roadlog file.
-When sorting on CITY, the city number is determined from the roadlog file. Only municipal intersections are listed.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed.

-The option list is a listing of your command parameters.

NO-CODELIST No codelist is printed.
CODELIST A several-page codelist is printed.

-The codelist is a summary of codes used in listing.
-The codelist applies only to ABBREV-FORMAT.

NO-CODELIST should be specified when PAGE-FORMAT is used.

PAGE-FORMAT The PAGE-FORMAT listing format is used.
ABBREV-FORMAT The ABBREV-FORMAT listing format is used.

SELECT subcommand

-The program operates in three passes: (1) the intersection cross-reference file is read and a scratch file is built, (2) the scratch file is sorted, and (3) the scratch file is read, the intersections are retrieved, and the listing is printed. You may select during either or both of passes (1) and (3).

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-To select during passes (1), use the following required INCLUDE/EXCLUDE clause:

INCLUDE INT-XREF-RECORDS IF:
EXCLUDE

INX data elements can be referended. Use pass (1) selection to select based on region (eg., when sorting on DIST and only districts 3-5 are to be listed).

-To select during pass (2), use the following required INCLUDE/EXCLUDE clause:

INCLUDE INTERSECTIONS IF:
EXCLUDE

INT, INL, and RLG data elements can be referenced. INL data elements must be referenced via the multi-correlation

facilities (*ANY*/*ALL*) RLG references will raise execution
costs because the roadlog file must be accessed.

-Either or both of the above INCLUDE/EXCLUDE clauses can be
included with a single command.

TITLES subcommand

Print formatting parameters: see chapter 4.

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Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=20
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=15,REGION=400K,SCRSIZE=10,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-INTSECT-FILE-BY-REGION,INTSECT-SORT=STA-&-CNTY,
:  ABBREV-FORMAT
+ROUTES
```

```
ROUTE-SYS=ISTH,ROUTE-NUM=90
+SELECT
INCLUDE INT-XREF-RECORDS IF:
 INX.COUNTY *EQ* 'ANOKA' *OR* INX.INTSECT-TYPE *EQ* 'LAKE-OF-THE-
  WOODS'
INCLUDE INTERSECTIONS IF:
  INT.INTSECT-TYPE *EQ* 01 *OR* INT.INTSECT-TYPE *EQ* 03
+TITLES
REQUESTED BY:  JOHN DOE -- APRIL 15, 1979
/*
```


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The LIST-INTSECT-XREF-FILE Command

****

Function: Prints a listing of the intersection cross-reference file.

Description: The following data elements are printed:

-Leg key (route system, route number, and reference point)
-Intersection key (route system, route number, reference point, and interchange element)
-Construction district
-Maintenance area
-Patrol station
-County
-City
-Urban area

Required Command Parameters:

ROUTES subcommand

-Operates under LIST classification.

Optional Command Parameters:

TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-INTSECT-XREF-FILE
+ROUTES
ROUTE-SYS=ISTH,ROUTE-NUM=90
/*
```

The LIST-ACCIDENTS-BY-REF-POINT Command

Function: Prints a listing of geocoded accidents. Optionally writes records to an output file that can be used as input for Intersection Magic.

Description: Only geocoded accidents can be listed. Use LIST-LOCAL-ROADS-ACCIDENTS to list non-geocoded accidents.

The listing is printed under control of the +ROUTES subcommand, which groups accidents into "individual" summaries (see chapter 5). The accidents are then subjected to +SELECT criteria, if any. The order in which accidents are listed within an individual summary may be controlled via the +CATEGORIES subcommand.

The following data elements are printed for each accident listed:

- Route system and route number
- Reference point
- Interchange element code
- Location reliability
- Investigating agency
- Construction district (optional)
- County number
- Municipality or township number
- Date and time occurred
- Accident severity
- Number of vehicles involved
- Relationship to junction
- Posted speed limit
- Accident type
- Accident diagram code
- Location of first harmful event
- Traffic control devices
- Light conditions
- Weather conditions
- Road surface conditions
- Work zone
- Roadway characteristics
- Roadway design
- Accident number
- Vehicle data (optional):
  - Direction each vehicle was traveling
  - Pre-accident actions
  - Apparent contributing factors

Apparent physical condition of driver

Required Command Parameters:

ROUTES subcommand

-Operates under LIST classification

START-DATE=month/day/year Eg., START-DATE=01/01/1977
END-DATE=month/day/year Eg., END-DATE=12/31/1977

-Accidents that occurred between these two dates are printed.

Optional Command Parameters:

ONE-OPTLIST	1 option list is printed at the beginning of the report.
NO-OPTLIST	No option list is printed.
OPTLIST	An option list is printed at the beginning of each individual summary (default).

-The option list is a listing of the command parameters.

NO-CODELIST	No codelist is printed.
CODELIST	A codelist is printed with each individual summary.
ONE-CODELIST	1 codelist is printed at the beginning of the report (default).

-The codelist is a summary of codes used in the report.

KILOMETERS	Reference points are printed in kilometers.
MILES	Reference points are printed in miles

(default).

VEHIC-DATA — Vehicle data elements are printed.
NO-VEHIC-DATA — Vehicle data elements are not printed (default).

RLG-DATA — Roadlog data is printed (construction district).
NO-RLG-DATA — Roadlog data is not printed (default).

NOTE: RLG-DATA must be specified in order to refer to RLG data elements in the +CATEGORIES subcommand.

FORMATB — This report format option includes a location narrative and city abbreviation.
NO-FORMATB — The default is the original format.

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ACC-INT-LOCN =

INTSECT — Only intersection accidents are printed.
NON-INTSECT — Only non-intersection accidents are printed.
ALL — Both types of accidents are printed (default).

-Intersection accidents are those with the following codes in the relationship to junction data element:

'02'	T-INTERSECTION
'03'	Y-INTERSECTION
'04'	4-LEGGED INTERSECTION
'05'	5 OR MORE LEG INTERSECT
'06'	TRF CIRCLE OR ROUNDABOUT
'07'	INTERSECTION-RELATED
'20'	INTERCHANGE ON RAMP
'21'	INTERCHANGE OFF RAMP
'22'	INTERCHANGE OTHER AREA

```
                              1  Print accidents with reliability '1'.
                  ACC-RELIABILITY  = 2  Print accidents with reliability '2'
                                       or 1.
                              3  Print accidents with reliability '3',
                                   '2', or '1' (default).

                             -This parameter selects accidents based on
                              reliability of location information:

                                     '1' No location error expected
                                     '2' Possible location error
                                     '3' Probable location error

        SELECT subcommand

                        -The INCLUDE/EXCLUDE clause is optional and has the
                         following format:

                                    INCLUDE
                                                 ACCIDENTS IF:
```

-ACD, ACV, ACP, ACJ, and RLG data elements can be referenced.
-ACV, ACP, and ACJ data elements must be referenced via the multi-correlation facility (*ANY*/*ALL*).
-RLG references require access to the roadlog file.

CATEGORIES subcommand

Used here to specify a sorting of accident records before they are listed. If present, the accidents will be sorted by category and then by route system, route number, and reference point within individual summaries.

-ACD and RLG data elements can be referenced.
-RLG references will increase computer time because the roadlog file has to be accessed. The "RLG-DATA" option MUST be included to allow sorting by roadlog data elements.
-The REDEFINES control card can be used for grouping various codes together.

TITLES subcommand

Print formatting parameters: see chapter 4.

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Sample Job Setups:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
//TIS EXEC DTRITA,TIME=2,SCRSIZE=1,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-ACCIDENTS-BY-REF-POINT,START-DATE=01/01/1988,END-DATE=12/31/1988
+ROUTES
```

```
        ROUTE-SYS=ISTH,ROUTE-NUM=90
        +TITLES
        REQUESTED BY:  JOHN DOE -- APRIL 1, 1989
        /*

           The above job setup may be copied from TRN.RI00SYSE(ACCLS).
```



```
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PAGE 192
```


****

Function: Prints a listing of accident data.

Description: LIST-LOCAL-ROADS-ACCIDENTS is normally used to list
------------ non-geocoded accidents only. It can, however, list
geocoded accidents as well. In a single run, the user
can request the accidents to be listed statewide or to be listed by
city, county, or construction district. The if only one group is
required, the user may have the selected accidents sorted in order by
any data element in the accident details record.

The following data elements are printed for each accident listed:

- Verbal location description
  - For non-geocoded accidents, the 15-character location narrative plus the route system and route number fields are printed.
  - For geocoded accidents, the route system, route number, and reference point are printed.
- Location reliability
- Investigating agency
- County number
- Municipality or township number
- Date and time occurred
- Accident severity
- Number of vehicles involved
- Relationship to junction
- Posted speed limit
- Accident type
- Accident diagram code
- Location of first harmful event
- Fixed object struck
- Traffic control devices
- Light conditions
- Weather conditions
- Road surface conditions
- Road work being performed
- Roadway characteristics
- Roadway design
- Accident number
- (Optional) Vehicle data:
  - Direction each vehicle was travelling
  - Pre-accident actions
  - Apparent contributing factors
  - Apparent physical condition of driver

Required Command Parameters:

START-DATE=month/day/year Eg., START-DATE=01/01/1989
END-DATE=month/day/year Eg., END-DATE=12/31/1989

-Only those accidents that occurred between the two specified dates (inclusive) are printed.

Optional Command Parameters:

NO-OPTLIST	No option lists are printed.
ONE-OPTLIST	One 1-page option list is printed.
OPTLIST	A 1-page option list is printed prior to each listing (if LOCAL-SORT used).

- The option list is a listing of the command parameters.

NO-CODELIST	No codelist is printed.
ONE-CODELIST	One several-page codelist is printed.
CODELIST	A several-page codelist is printed prior to each listing (if LOCAL-SORT is used).

- The codelist is a summary of the codes appearing in the listings.

GEOCODED	Only geocoded accidents are printed.
GEO-&-NON-GEO	Geocoded and non-geocoded accidents are printed.
NON-GEOCODED	Only non-geocoded accidents are printed.

LOCAL-SORT=	BY-DATE	Sort by date occurred (statewide)
	BY-COUNTY	Sort by county
	BY-CITY	Sort by city
	BY-COUNTY-&-CITY	Sort by city within county
	BY-DIST-&-COUNTY	Sort by county within district
	BY-DIST-&-CITY	Sort by city witnin district
	BY-DIST	Sort by district

- If LOCAL-SORT is not coded, and +CATEGORIES is not present, the default sort is LOCAL-SORT=BY-DATE.

- When BY-DATE is specified, one listing is printed and is sorted by (1) date occurred, (2) time occurred, and (3) accident number.

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+

- When any other option is specified, several listings are printed (one per region). For example, if BY-COUNTY is specified, one listing is printed for each county. Within each listing the accidents are printed by (1) date occurred, (2) time occurred, and (3) accident number.

- When BY-DIST, BY-DIST-&-COUNTY, or BY-DIST-&-CITY is specified, the construction district is determined from the county number.

- When BY-CITY, BY-COUNTY-&-CITY,or BY-DIST-&-CITY is specified, rural accidents are printed as city number 0000. If rural accidents are not wanted, use +SELECT to exclude them.

CATEGORIES subcommand

Used here to specify a sorting of accident records before they are listed. If present, the accidents will be sorted by category.

Must NOT be coded when LOCAL-SORT is coded.

- ACD data elements can be referenced.
- The REDEFINES control card can be used for grouping various codes together.

VEHIC-DATA	Vehicle data elements are printed.
NO-VEHIC-DATA	Vehicle data elements are not printed

	INTSECT	Only intersection accidents are printed.
ACC-INT-LOCN =	NON-INTSECT	Only non-intersection accidents are printed.
	ALL	Intersection and non-intersection accidents are printed.

- Intersection accidents are those with codes '01' (interchange area), '02' (intersection), or '03' (intersection-related) in the relationship to junction data element.

ACC-TAPE=YES Use the accident archive tape file.

- The accident archive data tape contains accidents prior to the active file (the active file contains accidents for the previous five years plus the current year). The archive dates back through 1977.

Use of the tape is also limited as follows:

1) The START-DATE and END-DATE must specify a time period within the period of data stored on the tape. If the dates go outside the tape data period, the report will print an error message and not execute.

2) Accidents must be processed in order by increasing route system, route number, and reference point. Each accident can be processed only once per command.

3) The job setup requires minor changes (see examples).

	county-name	Eg., COUNTY=ANOKA
COUNTY =		
	county-number	Eg., COUNTY=02

- When COUNTY is included, only accidents
  that occurred in the specified county
  are printed.
- When is is necessary to list two or more
  counties, use +SELECT.

city-name Eg., CITY=ST-PAUL
CITY =
city-number Eg,. CITY=3425

- When CITY is included, only accidents that
  occurred in the specified city are printed.
- When it is necessary to list two or more
  cities, use +SELECT.

SELECT subcommand

-The INCLUDE/EXCLUDE clause is optional and has the
 following format:

  INCLUDE
            ACCIDENTS IF:
  EXCLUDE

-ACD, ACV, ACP, and ACJ data elements can be
 referenced.
-ACV, ACP, and ACJ data elements must be referenced
 via the multi-correlation facility (*ANY*/*ALL*).

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TITLES subcommand

Print formatting parameters: see chapter 4.

Sample Job Setups:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=20
/*ROUTE PRINT R0
//TIS EXEC DTRITA,TIME=2,SCRSIZE=6,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
```

```
:LIST-LOCAL-ROADS-ACCIDENTS,START-DATE=01/01/1989,END-DATE=03/01/1989
:  LOCAL-SORT-BY-COUNTY
/*
```

The following example illustrates the use of the accident tape.
Note the following:

1) The job class on the first line has been changed to CLASS=D.

2) The addition of the line specifying the tape:

```
//ACCTAPE DD DISP=OLD,DSN=TRN.RI16ACC2(0),UNIT=TAPE
```

3) The additonal TIS command parameter "ACC-TAPE=YES".

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=D,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=20
/*ROUTE PRINT R0
//TIS EXEC DTRITA,TIME=2,SCRSIZE=6,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=
//ACCTAPE DD DISP=OLD,DSN=TRN.RI16ACC2(0),UNIT=TAPE
//SYSIN DD *
:LIST-LOCAL-ROADS-ACCIDENTS,START-DATE=04/01/1981,END-DATE=09/30/1984,
:  NO-CODELIST,NO-OPTLIST,GEO-&-NON-GEO,ACC-TAPE=YES,
:  NO-VEHIC-DATA
+CATEGORIES
DATA-ELEMENT=ACD.YEAR-OCCURRED
/*
```

The above job setup may be copied from TRN.RI00SYSE(ACCLL2).

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The FIND-ACCIDENT-CLUSTERS Command

Function: Locates "clusters" of accidents along roadways.

Description: A cluster of accidents is defined as a grouping of n or more accidents that occurred during a user-specified period within a section of roadway of length m, where n and m are user-specified values.

Three principle input controls are provided by the user:

- -The number of accidents within a section that triggers a cluster.
- -The length of a section.
- -The time period under consideration.

The clusters are located under a "sliding section" concept. From the beginning to the end of each route under consideration, the program slides along looking for at least n accidents grouped within the specified distance. Some clusters may overlap each other.

As an example, consider the following diagram in which an x indicates the occurrence of an accident:

```
     x   xxxx  x
  --------------------
```

Suppose the user has indicated that a cluster consists of at least four accidents within a mile, and suppose further that the first x and the last x are 1.1 miles apart. The program will find one cluster, and it will be 1.1 miles long, i.e., the cluster continues until the conditions are no longer met (accidents per length).

When a cluster is found, the following information is printed:

- -Route system and route number.
- -Beginning and ending reference points.
- -Number of accidents in the cluster.
- -Summary by relationship to junction of these accidents.
- -An indication of how many of these accidents were included in the preceding cluster.
- -(optional) A listing of the accidents in the cluster.

Required Command Parameters:
****

ROUTES subcommand

-Operates under LIST classification.

LENGTH=nnn.nnn

-Specifies length of section.
-If KILOMETERS is specified, the length is treated as a length in kilometers. Otherwise, the value is treated as a length in miles.

NUM-ACCIDENTS=nnn
-Specifies the number of accidents that triggers a cluster.

START-DATE=month/day/year Eg., START-DATE=01/01/1990
END-DATE=month/day/year Eg., END-DATE=12/31/1990

-These two parameters specify the time period involved. Accidents between these two dates inclusive are considered.

Optional Command Parameters:
****

NO-OPTLIST No option list is printed.
OPTLIST A 1-page option list is printed.

-The option list is a listing of your command parameters.

NO-CODELIST No codelist is printed.
CODELIST A several-page codelist is printed.

-The codelist is a summary of the codes used in the listing.

KILOMETERS Distances are printed in kilometers.
MILES Distances are printed in miles.

-When KILOMETERS is specified, the value in the LENGTH parameter is treated as kilometers.

```
            NO-LIST   Accidents are not listed in the cluster print-outs.
            LIST      Accidents are listed in the cluster print-outs.
            ----
                           -If you specify NO-LIST, specify NO-CODELIST.  The
                            codelist applies only to the accident listing.

            VEHIC-DATA      Vehicle data is printed.
            NO-VEHIC-DATA   No vehicle data is printed.
            -------------
                           -The vehicle data printed by this option consists
                            only of the directions the vehicles were
                            traveling.
                           -If NO-VEHIC-DATA is specified or defaulted,
                            blanks are printed in these fields.


                    INTSECT      Consider intersection accidents only.
        ACC-INT-LOCN=  NON-INTSECT  Consider non-intersection accidents only.
                    ALL          Consider accidents regardless of
                                 relationship to intersection (default).

                       -Intersection accidents are those with relationship
                        to junction values:

                                  '02'  T-INTERSECTION
                                  '03'  Y-INTERSECTION
                                  '04'  4-LEGGED INTERSECTION
                                  '05'  5 OR MORE LEG INTERSECT
                                  '06'  TRF CIRCLE OR ROUNDABOUT
                                  '07'  INTERSECTION-RELATED
                                  '20'  INTERCHANGE ON RAMP
                                  '21'  INTERCHANGE OFF RAMP
                                  '22'  INTERCHANGE OTHER AREA


                        1       Consider reliability '1' only.
        ACC-RELIABILITY=   2       Consider reliabilities '1' and '2'.
```

3 Consider accidents regardless of reliability (default).

-This parameter selects accidents based on the reliability code stored. The codes are:

'1' No location error expected
'2' Possibile location error
'3' Probable location error

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+

SELECT subcommand

-The INCLUDE/EXCLUDE clause is optional and has the following format:

INCLUDE ACCIDENTS IF:
EXCLUDE

-ACD, ACV, ACP, and ACJ data elements can be referenced.
-ACV, ACP, and ACJ data elements must be referenced via the multi-correlation facility (*ANY*/*ALL*).
-RLG references require access to the roadlog file.

TITLES subcommand

Print formatting parameters: see chapter 4

Sample Job Setups:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
//TIS EXEC DTRITA,TIME=3,SCRSIZE=1,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=
```

```
//SYSIN DD *
:FIND-ACCIDENT-CLUSTERS,LENGTH=0.75,NUM-ACCIDENTS=8,
:  START-DATE=01/01/1987,END-DATE=12/31/1988,
:  ACC-INT-LOCN=NON-INTSECT
+ROUTES
ROUTE-SYS=USTH
/*
```


The ACCIDENT-MATRIX-SUMMARY Command
****

Function: Produces general-purpose summaries of accident data.

Description: The output formats of ACCIDENT-MATRIX-SUMMARY are
---
identical to those of ACC-GEOCODED-MATRIX-SUMMARY. The two programs differ in that (1) non-geocoded as well as geocoded accidents can be summarized, and (2) data elements from the roadlog file cannot be used in +SELECT and +CATEGORIES.

Required Command Parameters:

START-DATE=month/day/year Eg., START-DATE=01/01/78
END-DATE=month/day/year Eg., END-DATE=12/31/78

-Only those accidents that occurred between these two dates inclusive are shown in the summaries.

CATEGORIES subcommand

-ACD data elements can be referenced.
-The REDEFINES control card can be used for grouping various codes together in the summaries.

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A 1-page option list is printed.

-The option list is a listing of your command parameters.

INJURIES	Persons injured are broken down by severity.
NO-INJURIES	Injuries are not broken down by severity.

-INJURIES increases computer time because the accident injury file has to be accessed.

GEOCODED	Only geocoded accidents are included.
NON-GEOCODED	Only non-geocoded accidents are included.
GEO-&-NON-GEO	Both geocoded and non-geocoded accidents are included.

ACC-INT-LOCN=	INTSECT	Only intersection accidents are included.
	NON-INTSECT	Only non-intersection accidents are included.
	ALL	Intersection and non-intersection accidents are included.

-Intersection accidents are those with the following codes in the relationship to junction data element:

```
                        1       Interchange area
                        2       Intersection area
                        3       Intersection-related


          county-name       Eg., COUNTY=LAKE-OF-THE-WOODS
COUNTY=
          county-number     Eg., COUNTY=39


                 -Only accidents that occurred in the specified
                  county are included.
                 -To include accidents for two or more counties,
                  use +SELECT.


         city-name       Eg., CITY=ST-PAUL
CITY=
         city-number     Eg., CITY=3425


                 -Only accidents that occurred in the specified
                  city are included.
                 -To include accidents for two or more cities,
                  use +SELECT.


SELECT subcommand

                 -The INCLUDE/EXCLUDE clause is optional and has
                  the following format:


                    INCLUDE    ACCIDENTS IF: (continued on next
                    EXCLUDE                   page)
```



```
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+
```



```
                 -ACD, ACV, ACI and ACJ data elements can be
                  referenced.
                 -ACV and ACJ references require access to the
```

```
                      accident vehicle file and hence raise execution
                      time.
                     -ACI and ACJ references require access to the
                      accident injury file and hence raise execution
                      time.
                     -ACI, ACJ, and ACV data elements must be referenced
                      via the multi-correlation facility (*ANY*/*ALL*).

     TITLES subcommand

     Print formatting parameters:  see chapter 4


Sample Job Setup:
-----------------

//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRITA,TIME=20,REGION=400K,SCRSIZE=5,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:ACCIDENT-MATRIX-SUMMARY,START-DATE=01/01/77,END-DATE=12/31/78,
:  NON-GEOCODED,ACC-INT-LOCN=INTSECT
+CATEGORIES
DATA-ELEMENT=ACD.ACC-TYPE
/*
```

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TRAFFIC REPORTS

Introduction to the Traffic File

The traffic file contains average annual daily traffic (AADT) volumes at locations along roadways. At any particular location there may be volumes stored for several different years. This is possible because each record in the file may contain a variable number of volume fields, which are all valid beginning at the location specified in the route system, route number, and reference point of the record. The data is valid until either 1) the location of the next traffic record along the route, or 2) the location of a non-mileage record in the roadlog file (remark code NE, GP, CO, or EN).

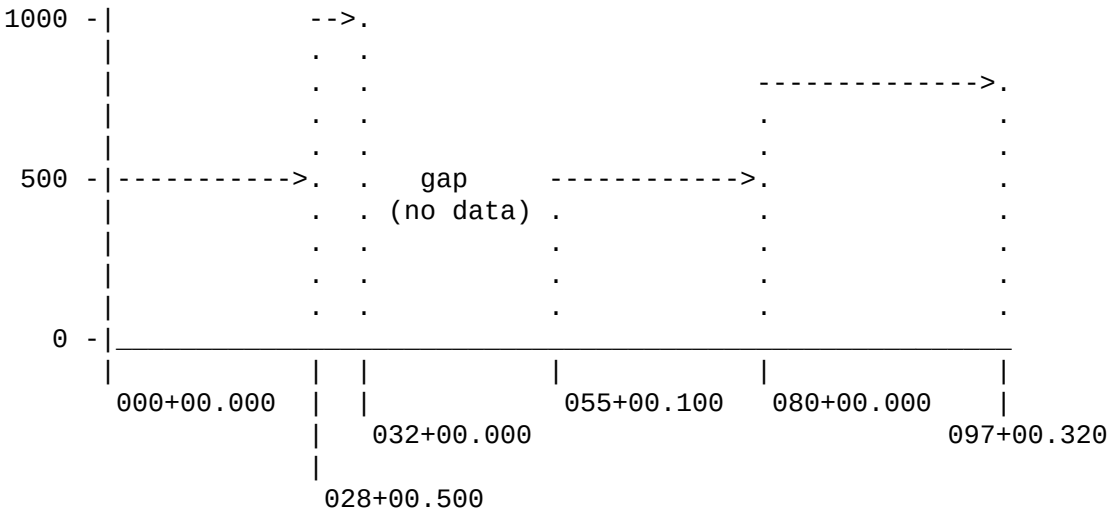
A record contains from one to as many as 30 volume fields. Records are not required to have keys equal to roadlog or logpoint records.

Consider the following example of a single route for a single year:

Reference Point	AADT	Comments
000+00.000	500	start of roadway
028+00.500	1000	
032+00.000		gap in roadway (according to roadlog)
055+00.100	500	roadway resumes
080+00.000	800	
097+00.320		end of route (according to roadlog)

Table 1. Traffic File Example

Each volume record contains one volume. There is a gap in the route from 032+00.000 to 055+01.000 and therefore no volume data. The diagram below shows how the computer would interpret the traffic records shown in Table 1:



Note the volumes are considered constant along a roadway until the next record in the file. The fewer changes in AADT for a route, the fewer records needed in the traffic file.

Non-mileage sections (gap, coincident, non-existent sections and end-of-route) will be determined from the roadlog file -- there are no records stored in the traffic file at these reference points. This requires that the traffic file is always accessed in conjunction with the roadlog file.

Introduction to Volume Models

The traffic volumes stored in the file are always "average annual daily traffic" (AADT). Many TIS reports access the traffic file for volume

information, specifying location and time. A recent enhancement to volume data is the use of models to reflect variations in location and time other than reference point and calendar year. Three choices for modelling traffic volume are available:

1). NONE No model adjustment. Volumes will be simple AADT for each year or portion of year. Volumes ARE weighted over a span of years (e.g., the volume for 1981 through 1982 is the average of the numbers for each of the two years).

2). NON-GROUP Volumes are adjusted for month, day-of-week, and hour. Requests spanning more than one of these time periods are weighted accordingly.

3). GROUP Volumes are adjusted for month, day-of-week, and hour. Sections with similar daily or seasonal variations are assigned to groups, and an additional "group" factor is used with this model.

1
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The intent of modelling volumes is to show the hourly and daily variations in traffic throughout the year, rather than just using a constant value for the whole year. This means requests for volumes at the same place (same AADT) for different portions of a year may get different answers from the volume models.

The two options for models were chosen through a study of accuracy and efficiency. The NON-GROUP model is simpler, and is used whenever a traffic record does not indicate what group the section is in (this will probably always be the case for non-trunk highways). The GROUP model was chosen from the study of models as the most accurate while still holding the number of factor adjustment calculations to an acceptable level.

Adjustment factors are developed from automatic traffic recorder (ATR) data.

Volume Modelling Options

The traffic volume report software allows 3 choices for modelling

volumes. The desired model is specified by using the MODEL keyword on the command. ANY TIS COMMAND ACCESSING THE TRAFFIC FILE FOR VOLUMES WILL ACCEPT THE FOLLOWING OPTIONS:

MODEL=NONE	No model. Numbers will all be AADT.
MODEL=NON-GROUP	Use model that adjusts volumes for month, day-of-week, and hour.
MODEL=GROUP	Use model that adjusts volumes for month, day-of-week, hour, and group by daily or seasonal variation (e.g., commuter, recreational).

Initially, the default will be no model. This will provide volumes the same as with the old system for all users except those doing testing. Those who desire to test models can use the MODEL keyword to run tests. Eventually, the default will be changed to MODEL=GROUP, so all users will get volumes by the GROUP model unless they choose otherwise. There may be cases where someone will choose not to model volumes, and they will always be able to do so by coding MODEL=NONE.

Heavy Commercial ADT (HCADT) is also stored, similar to the AADT (daily average volume for all vehicles). HCADT is never modelled, it is always a constant value for the year.

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Time Intervals
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Any command using traffic volumes must specify locations and times for data. The locations are specified as before (+ROUTES and +SELECT) and do not affect models. The times are specified as follows:

1) START-DATE and END-DATE keywords. These are currently always required on any command using traffic volume, and will continue to be so. They specify the outside limits of time, subject to +SELECT criteria, i.e., +SELECT cannot even consider times outside of START-DATE and END-DATE. START-DATE and END-DATE are

sometimes narrowed by effective dates in certain cases.

2) +SELECT on time data elements. The user may now choose certain "times" (years, months, days, or hours) within the interval of START-DATE and END-DATE. The traffic volume then applies only to the days selected of that year. If hours are selected, then the volume is computed for the selected hours of the selected days.

Any command accessing the traffic file for volumes may SELECT time(s) as follows:

```
INCLUDE
EXCLUDE  TIME IF:  (TIM data elements may be referenced)
```

The volume(s) computed from the traffic file will then reflect only the selected time periods. TIME SELECTION APPLIES ONLY TO TRAFFIC VOLUME DATA, other time-variables (such as accident records) are not affected by this option.

Graphics Capabilities

The matrix commands for the traffic file will optionally feed data into the IBM graphics utility (Presentation Graphics Feature), USER menu option 8.1. After such a command has finished, the user may expect the data from the report to be found in a specified member of the ADMCDATA library. No form is produced, this is left up to the user. It is easy to set up a form and save it separately from the data. Once a few typical forms have been constructed, they may be reused with the data from many TIS commands. Bar or pie charts go nicely with matrix reports categorizing on data elements such as county, surface type, etc., where the number of categories is small. Line charts can be used with data elements reflecting time, such as days. Histograms are applicable with the new data element MILEPOINT, allowing graphs of volume or vehicle miles along a route.

The commands produce paired data (up to 998 pairs) with X values and 1 or 2 Y values. Labels are attempted and will be produced in simple

reports, also limited by storage. X values will be sequential (in the same order as the matrix output) generally. A heading will be produced showing the command name and data-element used. Output is deliberately kept to a minimum beyond the raw results. The users may then customize the graph to their particular needs.

The printed report will usually be "throw-away" after being used to verify contents of the graphics output. It should be routed to the terminal for this reason.

Users who are familiar with the PGF will appreciate the savings in time by not having to manually enter data for graphs. Users who are also sophisticated in the use of TIS SELECT and CATEGORIES subcommands will be able to produce intricate graphs with little more effort than it takes to set up the TIS commands.

Please take the time to try this new feature. A picture is worth a thousand pages of printed output.

Introduction to Traffic Report Commands

LIST-TRAFFIC-FILE	may be used to see what is stored in the file for specified sections of roadway. No modelling or computations of any kind are done. The command shows AADT by year.
TRAFFIC-MATRIX-SUMMARY	computes vehicle miles (volume x length x time) for specified sections of roadway and times. Optionally computes averages or totals, for all vehicles or heavy commercial only. Sums can be broken down by roadlog characteristics.
TRAFFIC-TIME-MATRIX	computes vehicle miles (volume x length x time). Identical to TRAFFIC-MATRIX-SUMMARY except that time periods MUST be used to define groupings (roadlog is optional).

The LIST-TRAFFIC-FILE Command

Function: Prints a listing of the traffic file.

Description: Each record in the traffic file contains from zero to thirty volumes for various years. The volumes include AADT (annual average daily traffic), HCADT (heavy commercial annual average daily traffic), volume type (actual or estimated), and group.

Four list formats are available:

LIST-FORMAT A, similar to: (up to 14 years of data printed)

RTE SYS	RTE NUM	REFERENCE POINT	1983 AADT	1982 AADT	1981 AADT	1980 AADT	1979 AADT	1978 AADT	.....
ISTH	35	002+00.503	8853	8100	7000	5900	6350	6800	
ISTH	35	005+00.276	9236	8450	7325	6200	6600	7000	

LIST-FORMAT B, similar to: (up to 7 years of data printed)

RTE SYS	RTE NUM	REFERENCE POINT	1983 AADT	1983 HCADT	1982 AADT	1982 HCADT	1981 AADT	1981 HCADT	.....
ISTH	35	002+00.503	8853	1810	8100	1810	7000	1360	
ISTH	35	005+00.276	9236	1810	8450	1810	7325	1360	

LIST-FORMAT C, similar to: (up to 4 years of data printed)

RTE SYS	RTE NUM	REFERENCE POINT	VOLUMES FUL	VOLUMES BLK	1983 AADT	1983 GP	1983 T	1983 HCADT	DATE UPDATE	SEQ NUMBER
ISTH	35	002+00.503	8	1	8853	02	C	1810	10/10/1984	1657
ISTH	35	005+00.276	8	1	9236	08	C	1810	9/23/1984	1657

LIST-FORMAT=INPUT will produce a listing of data in the "input" format. See the chapter 8 of the TIS coding Manual for a description.

Significant roadlog records may optionally be printed, which indicate

gaps, coincident, non-existent, or end-of-route locations.

Use of Command Parameters:

Defining locations: Use ROUTES to specify route system, route number, reference point, or region. Use SELECT if necessary to eliminate sections based on other criteria.

Defining times: Use START-YEAR and END-YEAR to choose years to be printed. Only years between these (inclusive) will be considered by SELECT. If omitted all years are included. Select may be used to choose years also.

Defining summary: Use LIST-FORMAT keyword to choose output format.

Required Command Parameters:

ROUTES subcommand

-Operates under LIST classification.

LIST-FORMAT=
- A — Up to 14 years per line, AADT only.
- B — Up to 7 years per line, AADT and HCADT only.
- C — Up to 4 years per line, all volume items shown.
- INPUT — Lists data in input record format.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A 1-page option list is printed (default).

-The option list is a listing of your command parameters (input controls).

NO-CODELIST No codelist is printed.
CODELIST A several-page codelist is printed (default).

-The codelist is a summary of codes used in the listing.

YES-RLG Print signifigant roadlog records.
NO-RLG Do not print roadlog records (default).

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START-YEAR=yyyy Include only volumes for years equal to or greater than yyyy.

END-YEAR=zzzz Include only volumes for years equal to or less than zzzz.

SELECT subcommand

Select criteria can be applied to data elements in the traffic record.

There are two levels of data selection: selection of volumes and selection of records. Volume selection is done first, and any volumes not selected are removed from the record before further processing. After volume selection (if requested) is performed, record selection is done (if requested).

The user can select VOLUMES as shown below:

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE TRAFFIC-VOLUMES IF:

- TRV data elements can be referenced.

If no SELECT TRAFFIC-VOLUMES statement is coded, all volumes in the record between START-YEAR and END-YEAR are considered selected.

The user can select RECORDS as shown below:

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE TRAFFIC-RECORDS IF:

- TRF and TRV data elements can be referenced.

- TRV data elements can only be referenced by the multi-correlation facility (*ANY*/*ALL*).

The traffic data elements are grouped by 3-character prefix as follows:

TRF Root data elements of record (non-historical).

TRV Yearly data elements (up to 30 per record).

TITLES subcommand

Print formatting parameters: see chapter 4.

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Sample Job Setup: The following sample produces output at the TSO terminal and also at the default line printer at ISB. To change printed output destinations, see chapter 4.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=3,SCRSIZE=1,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//SYSIN DD *
:LIST-TRAFFIC-FILE,START-YEAR=1980,LIST-FORMAT=B,YES-RLG
+ROUTES
ROUTE-SYS=01-03,COUNTY=01
+TITLES
AITKEN COUNTY TRUNK HIGHWAY TRAFFIC
```

```
1980 AND LATER
/*

   The above sample may be copied from DT99A1B.TSOLIB.CNTL(TRFLS1).

   See chapters 3 and 4 of the TIS User's Manual for further explanation
   of TIS job setups.
```


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The TRAFFIC-MATRIX-SUMMARY Command

Function: Produces general-purpose volume or vehicle-mileage summaries.

Description: Summaries can be printed broken down by one, two, or three data elements from the roadlog or traffic files. Non-existent, gap, and coincident mileage is not included

in the summaries. Distances are shown in miles. Distances are included for sections of roadway missing traffic data.

When summarizing on one data element, the output format is similar to:

```
     RLG.DIVIDED-&-ONE-WAY   VEHICLE-MILES      MILES

     D - DIVIDED              nnn,nnn,nnn      nnn.nnn
     O - ONE-WAY COUPLET      nnn,nnn,nnn      nnn.nnn
     U - UNDIVIDED            nnn,nnn,nnn      nnn.nnn

     ---- GRAND TOTAL---      nnn,nnn,nnn      nnn.nnn
```

When summarizing on two data elements, the output format is similar to:

```
     RLG.COUNTY-NUM   RLG.DIVIDED-&-ONE-WAY   VEHICLE-MILES    MILES

     01 - AITKIN      D - DIVIDED              nnn,nnn,nnn    nnn.nnn
     01 - AITKIN      U - UNDIVIDED            nnn,nnn,nnn    nnn.nnn
     01 - AITKIN      ---- SUBTOTAL ----       nnn,nnn,nnn    nnn.nnn

     02 - ANOKA       D - DIVIDED              nnn,nnn,nnn    nnn.nnn
     02 - ANOKA       O - ONE-WAY COUPLET      nnn,nnn,nnn    nnn.nnn
     02 - ANOKA       D - UNDIVIDED            nnn,nnn,nnn    nnn.nnn
     02 - ANOKA       ---- SUBTOTAL ----       nnn,nnn,nnn    nnn.nnn

     ------------GRAND TOTAL -----------       nnn,nnn,nnn    nnn.nnn
```

When summarizing on three data elements, the output format is identical to that for two data elements, except that one summary is printed for each value of the additional data element.

There are several options controlling what is summarized:

(TOTAL or AVERAGE or AVG-&-TOTAL)

This option indicates how data within each "category" is summarized over the time and length in the category.

TOTAL - Print total for all selected time. Vehicle miles for the total time period (may be more than 1 year) between the start and end dates. The SELECT subcommand may exclude certain times. If the start and end dates specify a calendar year, and no times are excluded by SELECT, this is "annual" vehicle miles.

AVERAGE - Divide the above total by the number of days. Data is averaged by day over the selected time period. Average will always be the total divided by the total number of selected days. If no hours are excluded by SELECT, this is "daily" vehicle miles, or "daily" volume.

AVG-&-TOTAL - Print both average and total vehicle miles.

(VEHICLE-MILES or VOLUME)

This option indicates a choice of computing vehicle miles or volume for each category.

VEHICLE-MILES - Compute vehicle miles (average and/or total).
VOLUME - Compute volume (average only).

(ALL-VEHICLES or HEAVY-COMM or ALL-&-HC)

This option indicates which volumes are accumulated (the traffic file contains volume for all vehicles, and a parallel number for heavy commercial vehicles only).

ALL-VEHICLES - Compute data for all vehicles only.
HEAVY-COMM - Compute data for heavy commercial vehicles only.
ALL-&-HC - Compute one column for all vehicles, and another column for heavy commercial vehicles only.

Mileage is always totalled by category. Allowable combinations for a report are:

```
AVERAGE,     VEHICLE-MILES, ALL-VEHICLES
TOTAL,       VEHICLE-MILES, ALL-VEHICLES
AVG-&-TOTAL, VEHICLE-MILES, ALL-VEHICLES

AVERAGE,     VEHICLE-MILES, HEAVY-COMM
TOTAL,       VEHICLE-MILES, HEAVY-COMM
AVG-&-TOTAL, VEHICLE-MILES, HEAVY-COMM

AVERAGE,     VEHICLE-MILES, ALL-&-HC
TOTAL,       VEHICLE-MILES, ALL-&-HC

AVERAGE,     VOLUME,        ALL-VEHICLES
AVERAGE,     VOLUME,        HEAVY-COMM
AVERAGE,     VOLUME,        ALL-&-HC
```

Use of Command Parameters:

Defining locations: Use ROUTES to specify route system, route number, reference point, or region. Use SELECT if necessary to eliminate sections based on other criteria.

Defining times: Use START-DATE and END-DATE to specify time period. Use SELECT if necessary to choose desired intervals within the time period.

Defining groups: The CATEGORIES subcommand is used to define groupings for computations. Its operation is similar to other matrix summaries: 1 to 3 data elements can be specified for use as a sort field in summarizing and averaging results. The last data element always varies most rapidly. The first data element varies the slowest. Data elements may be chosen from the RLG or ADT record.

Defining summary: Use AVERAGE/TOTAL, ALL-VEHICLES/HEAVY-COMM and VEHICLE-MILES/VOLUME options to choose what will be computed.

Types of output: Results may be listed (in matrix-summary format
---------- shown previously), and optionally fed into the IBM
graphics package libraries. By feeding the data
into the ADMCDATA graphics library, the user can later log on to TSO
and combine the data with graph forms to produce graphs with the
Interactive Chart Utility.

The CATEGORIES subcommand specifies how the data will be graphed:

1) The last data element always determines the X-axis (independent variable) of the graphics data.

2) If multiple data elements are used, the first one will separate graphs, i.e., a separate graph is produced for each value of the first data element.

3) The second data element (when three data elements are used), causes multiple groups of data per graph, i.e., a separate line for each value.

The ADMC-MEMBER and GRAPH keywords instruct the command to feed the data into the user's graphics libraries (Presentation Graphics Feature, USER menu option 8.1).

Required Command Parameters:

START-DATE=mm/dd/yyyy Starting date for accumulating data.

END-DATE=mm/dd/yyyy Ending date for accumulating data.

- START-DATE and END-DATE define the outside limits for the desired time period. Within these dates, the SELECT subcommand can be used to choose only certain periods of time.

ROUTES subcommand - Operates under SUM classification

CATEGORIES subcommand

- RLG and ADT data elements can be referenced.
- The REDEFINES and GROUPS control cards can be used for grouping various codes together.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

--> The option list is a listing of your command parameters.

NO-MESSAGES Do not print an error message for sections missing traffic data.
MESSAGES Print an error message when no data is found in the traffic file (default).

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TOTAL Compute totals only.
AVERAGE Compute averages only.
AVG-&-TOTAL Compute average and total (default).

HEAVY-COMM Heavy commercial volumes only.
ALL-&-HC All vehicles, separate heavy commercial.
ALL-VEHICLES All vehicles (default).

NOTE: The combination AVG-&-TOTAL with ALL-&-HC is invalid.

FIVE-AXLE Compute five-axle traffic.
NO-FIVE-AXLE Do not compute five-axle traffic (default).

- Five axle traffic is computed from the heavy commercial traffic as:
  FIVE-AXLE = HCADT x LN(HCADT) x 0.09084
  ("LN" is the natural logarithm).

VOLUME Compute average volume.

VEHICLE-MILES Compute average and/or total vehicle miles (default).

NOTE: The combination VOLUME with TOTAL or AVG-&-TOTAL is invalid.

ADMC-MEMBER=member "member" is the member name in the IBM user graphics libraries ("user-id.ADMCDATA.DATA") to receive data computed by this command.

- MUST be coded if "GRAPH" is specified.
- The first character must be A-Z. Maximum length is 6 characters.
- If only one data element is specified under the CATEGORIES subcommand, one member will be added to the graphics data library with name "member".
- If multiple data elements are specified under the CATEGORIES subcommand, one member will be added to the graphics data library for each value of the FIRST data element. Member names will be formed using "member" as a prefix and appending the value of the data element to form a unique name. For example, if the first data element is RLG.COUNTY, and ADMC-MEMBER=COUNTY, then graphics member names will be "COUNTY01", "COUNTY02", etc.

GRAPH=
VOLUME Graph data will be volume (vehicle-miles/miles).
VEH-MILES Graph data will be vehicle-miles.

- MUST BE CODED TO PRODUCE GRAPH DATA OUTPUT.
- One variable is produced, it will be the variable corresponding to the left (or only) column of volume or vehicle miles on the printed output:

  AVERAGE is always printed to the left of TOTAL, and ALL-VEHICLES is always printed to the left of

HEAVY-COMM.

For example, to get graph data for total vehicle miles, all vehicles, the report must be run with options TOTAL and VEHICLE-MILES.

MATRIX-SORT=

UP Sort lowest to highest.

DOWN Sort highest to lowest.

Matrix summaries normally use the "category" as a sort field before printing the summary. If MATRIX-SORT is included, the data value is used to order the report.

- The rules for which column of results is used as a sort field are the same as for graph, i.e., the left or only column is used.
- A typical use might be to rank counties by total vehicle miles -- the county with the highest value would be listed first.

SELECT subcommand

Select criteria may refer to elements in the roadlog file, the traffic file, or to time intervals.

- To select on roadlog data elements:

  INCLUDE
  EXCLUDE ROADLOG-RECORDS IF:

  - RLG data elements can be referenced.

- To select on traffic data elements:

  INCLUDE
  EXCLUDE ADT-RECORDS IF:

  - ADT data elements (except ADT.GROUP) can be referenced.

- To select on time intervals:

  INCLUDE

EXCLUDE TIME IF:

- TIM data elements can be referenced.
- Time is the period between the START-DATE and END-DATE. Select only applies within that range.
- For more on traffic volume options, see "Introduction to Volume Models" and "Time Intervals".

TITLES subcommand

Print formatting parameters: see chapter 4

Sample Job Setup: The following samples produce output at the TSO terminal and also at the default line printer at ISB. To change printed output destinations, see chapter 4.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=3,SCRSIZE=1,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//SYSIN DD *
:TRAFFIC-MATRIX-SUMMARY,MESSAGES,AVG-&-TOTAL,ALL-VEHICLES,
:   START-DATE=01/01/1983,END-DATE=12/31/1983
+ROUTES
ROUTE-SYS=ISTH
+CATEGORIES
DATA-ELEMENT=RLG.ROUTE-NUMBER
+TITLES
1983 INTERSTATE VEHICLE MILES BY ROUTE NUMBER
/*
```

The above sample may be copied from DT99A1B.TSOLIB.CNTL(TRFMAT1).

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=3,SCRSIZE=1,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//SYSIN DD *
:TRAFFIC-MATRIX-SUMMARY,MESSAGES,AVERAGE,HEAVY-COMM,VOLUME,
:   OPTLIST,START-DATE=06/01/1983,END-DATE=08/31/1983
+ROUTES
ROUTE-SYS=ISTH
+CATEGORIES
DATA-ELEMENT=RLG.COUNTY
+SELECT
  INCLUDE TIME IF:  TIM.DAY *GE* '3'
+TITLES
1983 INTERSTATE SUMMER WEEKDAY VOLUME
(JUNE-AUGUST), (MONDAY-FRIDAY)
/*
```

The above sample may be copied from DT99A1B.TSOLIB.CNTL(TRFMAT2).

The next sample shows how to use the command to put data in the graphics libraries. The intent is to produce a graph of the variation in volume along interstate 90. After the command has run, a member of the graphics library ADMCDATA will have records showing the milepoints where traffic volume changes (actually, where traffic record keys are found. Traffic volume does not necessarily have to change whenever a traffic record break occurs). When used with the PGF (Presentation Graphics Feature) to produce a histogram, the desired picture can be produced with minimum effort.

The printed numbers from this command will be misleading, since ONLY sections beginning at traffic breaks were included.

Note the "EXEC DTRIPGF" and two ADMC DD statements must be included as shown in this case. Note also that the region must be increased to 1000K and job CLASS changed to H when graphics is done.

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```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIT,TIME=1,SCRSIZE=1,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=
//ADMCDATA DD DISP=OLD,DSN=USER-ID.ADMCDATA.DATA
//ADMCFORM DD DISP=OLD,DSN=USER-ID.ADMCFORM.DATA
//SYSIN DD *
:TRAFFIC-MATRIX-SUMMARY,MESSAGES,AVERAGE,ALL-VEHICLES,VOLUME,
:   NO-OPTLIST,START-DATE=01/01/1983,END-DATE=12/31/1983,
:   ADMC-MEMBER=ISTH90,GRAPH=VOLUME
+ROUTES
ROUTE-SYS=01,ROUTE-NUM=90
+CATEGORIES
DATA-ELEMENT=ADT.MILEPOINT
+SELECT
  INCLUDE ADT-RECORDS IF: ADT.TRAFFIC-BREAK *EQ* 'Y'
+TITLES
GRAPHIC OUTPUT FOR ISTH90 1983 VOLUMES SHOWING TRAFFIC BREAKS ONLY
*** NOTE:  MILEAGE AND VOLUME WILL BE WRONG ON REPORT
           SINCE SELECTING ON TRAFFIC BREAKS
/*
```

The above sample may be copied from DT99A1B.TSOLIB.CNTL(TRFMAT3).

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

The TRAFFIC-TIME-MATRIX Command

Function: Produces general-purpose volume or vehicle-mileage summaries.

Description: Summaries can be printed broken down by time intervals, and/or by data elements from the roadlog or traffic files. Non-existent, gap, and coincident mileage is not included in the summaries. Distances are shown in miles. Distances are included for sections of roadway missing traffic data.

When summarizing on one data element, the output format is similar to:

TIM.MONTH	VEHICLE MILES	MILES
01 - JANUARY	nnn,nnn,nnn	nnn.nnn
02 - FEBRUARY	nnn,nnn,nnn	nnn.nnn
03 - MARCH	nnn,nnn,nnn	nnn.nnn
04 - APRIL	nnn,nnn,nnn	nnn.nnn
05 - MAY	nnn,nnn,nnn	nnn.nnn
06 - JUNE	nnn,nnn,nnn	nnn.nnn
07 - JULY	nnn,nnn,nnn	nnn.nnn
08 - AUGUST	nnn,nnn,nnn	nnn.nnn
09 - SEPTEMBER	nnn,nnn,nnn	nnn.nnn
10 - OCTOBER	nnn,nnn,nnn	nnn.nnn
11 - NOVEMBER	nnn,nnn,nnn	nnn.nnn
12 - DECEMBER	nnn,nnn,nnn	nnn.nnn

When summarizing on two data elements, the output format is similar to:

RLG.COUNTY-NUM	TIM.YEAR	VEHICLE MILES	MILES
01 - AITKIN	1982	nnn,nnn,nnn	nnn.nnn
01 - AITKIN	1983	nnn,nnn,nnn	nnn.nnn
02 - ANOKA	1982	nnn,nnn,nnn	nnn.nnn
02 - ANOKA	1983	nnn,nnn,nnn	nnn.nnn
02 - ANOKA	1984	nnn,nnn,nnn	nnn.nnn

When summarizing on three data elements, the output format is identical to that for two data elements, except that one summary is printed for each value of the additional data element.

A maximum of three data elements can be specified, using any combination of roadlog, traffic, or time names. Note that MILEAGE IS REPEATED for time intervals since SELECTED mileage may vary with time. Note also that COLUMNS ARE NOT TOTALLED, since this may give misleading results when time intervals are involved. It is still possible to effectively get desired totals by using the CATEGORIES subcommand to group data as desired.

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There are several options controlling what is summarized:

(TOTAL or AVERAGE or AVG-&-TOTAL)

This option indicates how data within each "category" is summarized over the time and length in the category.

TOTAL - Print total for all selected time. Vehicle miles for the total time period (may be more than 1 year) in the category. The SELECT subcommand may exclude certain times. If the category defines a calendar year, and no times are excluded by SELECT, this is "annual" vehicle miles.

AVERAGE - Divide the above total by the number of days. Data is averaged by day over the selected time period. Average will always be the total divided by the total number of selected days in the category. If no hours are excluded by SELECT,

this is "daily" vehicle miles, or "daily" volume.

AVG-&-TOTAL - Print both average and total vehicle miles.

(VEHICLE-MILES or VOLUME)

This option indicates a choice of computing vehicle miles or volume for each category.

VEHICLE-MILES - Compute vehicle miles (average and/or total).
VOLUME - Compute volume (average only).

(ALL-VEHICLES or HEAVY-COMM or ALL-&-HC)

This option indicates which volumes are accumulated (the traffic file contains volume for all vehicles, and a parallel number for heavy commercial vehicles only).

ALL-VEHICLES - Compute data for all vehicles only.
HEAVY-COMM - Compute data for heavy commercial vehicles only.
ALL-&-HC - Compute one column for all vehicles, and another column for heavy commercial vehicles only.

Mileage is always totalled by category. Allowable combinations for a report are:

AVERAGE, VEHICLE-MILES, ALL-VEHICLES
TOTAL, VEHICLE-MILES, ALL-VEHICLES
AVG-&-TOTAL, VEHICLE-MILES, ALL-VEHICLES

AVERAGE, VEHICLE-MILES, HEAVY-COMM
TOTAL, VEHICLE-MILES, HEAVY-COMM
AVG-&-TOTAL, VEHICLE-MILES, HEAVY-COMM

```
          AVERAGE,     VEHICLE-MILES, ALL-&-HC
          TOTAL,       VEHICLE-MILES, ALL-&-HC

          AVERAGE,     VOLUME,        ALL-VEHICLES
          AVERAGE,     VOLUME,        HEAVY-COMM
          AVERAGE,     VOLUME,        ALL-&-HC
```

Use of Command Parameters

Defining locations: Use ROUTES to specify route system, route number, reference point, or region. Use SELECT if necessary to eliminate sections based on other criteria.

Defining times: Use START-DATE and END-DATE to specify time period. Use SELECT if necessary to choose desired intervals within the time period.

Defining groups: The CATEGORIES subcommand is used to define groupings for computations. Its operation is similar to other matrix summaries: 1 to 3 data elements can be specified for use as a sort field in summarizing and averaging results. The last data element always varies most rapidly. The first data element varies the slowest. Data elements may be chosen from the TIM, RLG, or ADT record.

Defining summary: Use AVERAGE/TOTAL, ALL-VEHICLES/HEAVY-COMM and VEHICLE-MILES/VOLUME options to choose what will be computed.

Types of output: Results may be listed (in matrix-summary format

---------- shown previously), and optionally fed into the IBM graphics package libraries. By feeding the data into the ADMCDATA graphics library, the user can later log on to TSO and combine the data with graph forms to produce graphs with the Interactive Chart Utility.

The CATEGORIES subcommand specifies how the data will be graphed:

1) The last data element always determines the X-axis (independent variable) of the graphics data.

2) If multiple data elements are used, the first one will separate graphs, i.e., a separate graph is produced for each value of the first data element.

3) The second data element (when three data elements are used), causes multiple groups of data per graph, i.e., a separate line for each value.

The ADMC-MEMBER and GRAPH keywords instruct the command to feed the data into the user's graphics libraries (Presentation Graphics Feature, USER menu option 8.1).

Required Command Parameters:

START-DATE=mm/dd/yyyy Starting date for accumulating data.

END-DATE=mm/dd/yyyy Ending date for accumulating data.

- START-DATE and END-DATE define the outside limits for the desired time period. Within these dates, the SELECT subcommand can be used to choose only certain periods of time.

ROUTES subcommand - Operates under SUM classification

CATEGORIES subcommand

- At least one TIM data element MUST be referenced (if not necessary to do so, use the TRAFFIC-MATRIX-SUMMARY command).
- Programming restrictions require that no more than 2196 categories are used when computing averages. See "Program Limitations" in the following pages.
- RLG and ADT data elements may also be referenced.
- The REDEFINES and GROUPS control cards can be used for grouping various codes together.

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Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

--> The option list is a listing of your command parameters.

NO-MESSAGES Do not print an error message for sections missing traffic data.
MESSAGES Print an error message when no data is found in the traffic file (default).

TOTAL Compute totals only.
AVERAGE Compute averages only.
AVG-&-TOTAL Compute average and total (default).

HEAVY-COMM Heavy commercial volumes only.
ALL-&-HC All vehicles, separate heavy commercial.
ALL-VEHICLES All vehicles (default).

NOTE: The combination AVG-&-TOTAL with ALL-&-HC is invalid.

VOLUME Compute average volume.
VEHICLE-MILES Compute average and/or total vehicle miles (default).

NOTE: The combination VOLUME with TOTAL or AVG-&-TOTAL is invalid.

ADMC-MEMBER=member "member" is the member name in the IBM user graphics libraries ("user-id.ADMCDATA.DATA") to receive data computed by this command.

- MUST be coded if "GRAPH" is specified.

- The first character must be A-Z. Maximum length is 6 characters.

- If only one data element is specified under the CATEGORIES subcommand, one member will be added to the graphics data library with name "member".

- If multiple data elements are specified under the CATEGORIES subcommand, one member will be added to the graphics data library for each value of the FIRST data element. Member names will be formed using "member" as a prefix and appending the value of the data element to form a unique name. For example, if the first data element is TIM.YEAR, and ADMC-MEMBER=YEAR, then graphics member names will be "YEAR82", "YEAR83", etc.

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VOLUME Graph data will be volume (vehicle-miles/miles).

GRAPH=

VEH-MILES Graph data will be vehicle-miles.

- MUST BE CODED TO PRODUCE GRAPH DATA OUTPUT.
- One variable is produced, it will be the variable corresponding to the left (or only) column of volume or vehicle miles on the printed output:

  AVERAGE is always printed to the left of TOTAL, and ALL-VEHICLES is always printed to the left of HEAVY-COMM.

  For example, to get graph data for total vehicle miles, all vehicles, the report must be run with options TOTAL and VEHICLE-MILES.

UP Sort lowest to highest.

MATRIX-SORT=

DOWN Sort highest to lowest.

Matrix summaries normally use the "category" as a sort field before printing the summary. If MATRIX-SORT is included, the data value is used to order the report.

- The rules for which column of results is used as a sort field are the same as for graph, i.e., the left or only column is used.
- A typical use might be to rank hours by average

volume -- the hour with the highest value would be listed first.

SELECT subcommand

Select criteria may refer to elements in the roadlog file, the traffic file, or to time intervals.

- To select on roadlog data elements:

  INCLUDE
  EXCLUDE ROADLOG-RECORDS IF:

  - RLG data elements can be referenced.

- To select on traffic data elements:

  INCLUDE
  EXCLUDE ADT-RECORDS IF:

  - ADT data elements can be referenced.

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- To select on time intervals:

  INCLUDE
  EXCLUDE TIME IF:

  - TIM data elements can be referenced.
  - Time is the period between the START-DATE and END-DATE. Select only applies within that range.
  - Programming restrictions require that no more than 2196 time intervals are selected for the report. An "interval" is a continuous span of SELECTED time. See "Program Limitations" below.
  - For more on traffic volume options, see "Introduction to Volume Models" and "Time Intervals".

TITLES subcommand

Print formatting parameters: see chapter 4

Program Limitations

The "TIME" matrix adds another dimension of complexity to required number of computations for this report. Ordinarily, the time period(s) remain constant as location varies, but here both time and location may vary together. Consider an example of just one year: categorizing on month requires computing 12 numbers per section. Categorizing on hour requires computing 24 (hours/day) X 365 (days/year) = 8760 numbers per section. A typical report may include thousands of sections, which would make the cost of running it prohibitive.

To make computer times and costs reasonable for the majority of requests, certain shortcuts have been programmed which also limit the possible number of categories. Currently the subcommands may not exceed:

1) 2196 selected categories (2196 = 366x6).
2) 2196 selected time intervals (2196 = 366x6).

Time intervals are determined by the shortest interval referred to by CATEGORIES, subtracting those excluded by SELECT.

Some examples that illustrate these limits:

All of 1983, categorizing on hour means 8760 time intervals (the number of hours in a year), which is too much. The command must choose no more than 2196 hours -- no more than 6 hours a day for 366 days (2196 = 6 x 366), varying up to 24 hours a day for 91 days.

The limit of 2196 selected categories only applies when an "average" is requested. 2196 = 6 x 366, meaning no more than 6 categories per day if a full year is selected.

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Some other examples:

```
    +CATEGORIES                categories = 12x7 = 84 per year
    DATA-ELEMENT=TIM.MONTH     intervals = 366 per year -- 6 years max.
    DATA-ELEMENT=TIM.DAY


    +CATEGORIES                categories = 12 (hours 00 through 11).
    DATA-ELEMENT=TIM.HOUR      intervals = 12 per day, so can select a
    +SELECT                          maximum of 183 days (183x12=2196).
    INCLUDE TIME IF:
     TIM.HOUR *LT* '12'
```

The presence of these limitations may mean running the command a couple of times and manually merging the results, but hopefully only in rare cases.

Sample Job Setups: The following samples produce output at the TSO terminal and also at the default line printer at ISB. To change printed output destinations, see chapter 4.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,SCRSIZE=1,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//SYSIN DD *
:TRAFFIC-TIME-MATRIX,MESSAGES,AVG-&-TOTAL,ALL-VEHICLES,
:   OPTLIST,START-DATE=01/01/1983,END-DATE=12/31/1983,VEHICLE-MILES
+ROUTES
ROUTE-SYS=ISTH
+CATEGORIES
DATA-ELEMENT=TIM.MONTH
+SELECT
 INCLUDE TIME IF:  TIM.DAY *GE* '3'
+TITLES
1983 INTERSTATE VEHICLE MILES BY MONTH
WEEKDAY (MONDAY - FRIDAY)
/*
```

In this example,

number of categories = 1 category * 12 months = 12.
----
month

number of intervals = 1 interval * 52 weeks = 52.
----
week

The above sample may be copied from DT99A1B.TSOLIB.CNTL(TRFTMX1).

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//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,

```
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,SCRSIZE=1,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//SYSIN DD *
:TRAFFIC-TIME-MATRIX,MESSAGES,AVERAGE,ALL-VEHICLES,
:   OPTLIST,START-DATE=01/01/1980,END-DATE=12/31/1982,VOLUME
+ROUTES
ROUTE-SYS=ISTH
+CATEGORIES
DATA-ELEMENT=TIM.YEAR
DATA-ELEMENT=TIM.HOUR
REDEFINES
06 AM
07 AM
08 AM
15 PM
16 PM
17 PM
+SELECT
  INCLUDE TIME IF:  (TIM.HOUR *GE* '06' *AND* TIM.HOUR *LT* '09')
  *OR* (TIM.HOUR *GE* '15' *AND* TIM.HOUR *LT* '18')
+TITLES
INTERSTATE VOLUME BY YEAR (1980-1982)
PEAK HOUR - 6AM-9AM AND 3PM-6PM
/*
```

In this example,

number of categories = 2 categories * 2 years = 4.
(2 categories: hour)

number of intervals = 2 intervals * 366 days * 3 years = 2196.
(2 intervals: day; 366 days * 3 years: year)

The above sample may be copied from DT99A1B.TSOLIB.CNTL(TRFTMX2).

The next sample shows how to use the command to put data in the graphics libraries. The intent is to produce a graph of the variation in volume with time. After the command has run, a member of the graphics library ADMCDATA will have records showing the volume by day. When used with the PGF (Presentation Graphics Feature - USER menu option 8.1) to produce a line graph, the desired picture can be produced with minimum effort.

The "X" values of the graphics data will be sequential numbers 1-nnn where nnn is the number of days. Labels will be the "TIME" record values ("YYMMDD"), but these will not make much sense on the graph.

Note the "EXEC DTRIPGF" and two ADMC DD statements must be included as shown in this case. Note also that graphics requires changing job CLASS to H and REGION to 1200K.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIT,TIME=10,SCRSIZE=1,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=
//ADMCDATA DD DISP=OLD,DSN=USER-ID.ADMCDATA.DATA
//ADMCFORM DD DISP=OLD,DSN=USER-ID.ADMCFORM.DATA
//SYSIN DD *
:TRAFFIC-TIME-MATRIX,MESSAGES,AVERAGE,ALL-VEHICLES,
:   OPTLIST,START-DATE=06/01/1983,END-DATE=08/31/1983,VEHICLE-MILES,
:   ADMC-MEMBER=SUMMER,GRAPH=VEH-MILES
+ROUTES
ROUTE-SYS=01
+CATEGORIES
DATA-ELEMENT=TIM.YYMMDD
+TITLES
INTERSTATE SUMMER 1983 VEHICLE MILES BY DAY
/*
```

In this example,

number of categories = 1 category * 92 days = 92.
----
day

number of intervals = 1 interval * 92 days = 92.
----
day

The above sample may be copied from DT99A1B.TSOLIB.CNTL(TRFTMX3).

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Intersection Accident Analysis Capabilities

The Intersection/Interchange (I/I) accident analysis software is intended as an aid in analyzing accidents that occurred at various types of intersections and interchanges. A great deal of flexibility is provided in the software for performing many different types of analysis. As a result, a large number of user-specified parameters are available and use of the software is fairly complicated.

The I/I accident analysis capabilities are implemented in three separate TIS user commands:

- CREATE-I/I-ACC-ANAL-FILE creates a report file that is needed for detailed analysis.
- PRINT-I/I-ACC-ANAL-REPORT prints analysis reports using as input a report file previously created by CREATE-I/I-ACC-ANAL-FILE.
- SORT-I/I-ACC-ANAL-FILE allows an existing report file to be resorted for producing additional reports.

When a user wishes to obtain analysis reports, he always utilizes both CREATE-I/I-ACC-ANAL-FILE and PRINT-I/I-ACC-ANAL-REPORT. SORT-I/I-ACC-ANAL-FILE is needed much less frequently.

Types of Reports Available

Three major types of reports can be obtained from the I/I accident analysis software:

- S-I report: Shows data that pertains to a single intersection.

- S-RL report: Shows data that pertains to a group of intersections.

- S-RH report: Shows data that pertains to several groups of intersections.

An S-I report consists of any combination of the following four reports:

- AA-4A Formatted listing of intersection characteristics.

- AA-4B Formatted listing of accidents that occurred at the intersection.

- AA-4C Summary of accidents that occurred at the intersection. Accidents are summarized by accident type and accident severity.

- AA-4E Summary of accidents that occurred at the intersection. Accidents are summarized by road surface conditions and accident severity. Two summaries are included: one for all of the accidents at the intersection, and one limited to accidents that occurred between May 1 and October 31.

The AA-4A report is identical to the PAGE-FORMAT listings that can be obtained from LIST-INTSECT-FILE and LIST-INTSECT-FILE-BY-REGION. An AA-4A report generally requires one printed page, but two pages are needed for intersections that involve more than four legs.

The AA-4B report is identical in format to the listings that can be

obtained from LIST-ACCIDENTS-BY-REF-POINT. One line is printed for each accident that occurred at the intersection.

The AA-4C report requires one printed page, and is printed in approximately the following format:

		INJURY					
DIAGRAM CODE	FAT	A	B	C	TOT	DAMAGE	TOTAL
REAR END	0	0	0	0	0	2	2
LEFT TURN	0	0	0	0	0	4	4
.							
.							
.							
TOTAL	0	0	1	1	2	8	10

The AA-4A report requires one printed page, and comsists of two summaries printed in approximately the following format:

ROAD SURFACE		INJURY				PROPERTY	
CONDITION	FAT	A	B	C	TOT	DAMAGE	TOTAL
DRY	0	0	0	1	1	3	4
WET	0	0	0	0	0	2	2
.							
.							
.							
TOTAL	0	0	1	1	2	8	10

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WT% = (WET/TOTAL) * 100 = 20.0%
WWD% = (WET/(WET+DRY)) * 100 = 33.3%

An S-RL report consists of any combination of the following three reports:

- AA-4D Formatted listing of intersections in group.
- AA-4C Identical to AA-4C of S-I report.
- AA-4E Identical to AA-4E of S-I report.

The AA-4D report summarizes the characteristics of the intersections in the group. One line is printed for each intersection, showing the

intersection's key, its accident statistics (eg., number of accidents, accident rate), and its approach volume.

An S-RH report is similar to an S-RL report except that the AA-4D report cannot be obtained.

Intersection Groupings

In the simplest types of analysis, the user does not attempt to segregate intersections into groups. In effect, there is a single group of intersections. The analysis report in this case consists of a series of S-I reports followed by a single S-RL report:

```
S-I for first intersection
S-I for second interesection
    .
    .
    .
S-I for last intersection
S-RL for group
```

This type of report -- several S-I reports followed by an S-RL report --is called an S-G group report.

Frequently, the user will wish to segregate intersections into regional groupings. For example, he may wish to group the intersections based on construction district in order to obtain a separate report for each district. When this is done, nine S-G reports (one for each district) are printed, and a single S-RH report showing the intersections from all districts is printed after the last S-G report.

Regional grouping is available for the following data elements:

Construction district	County
Maintenance area	Municipality
Patrol district	Urban area
Patrol station	

Region within region grouping such as county within district is available. For example, if county within district grouping is chosen, the printed output consists of:

District 1: One S-G report for each county in district 1, plus
one S-RH report for the entire district.

District 2: One S-G report for each county in district 2, plus
one S-RH report for the entire district.

.
.
.

One S-RH for all nine districts combined.

Finally, region within region within region is available. For example, intersections can be grouped by municipality within county within district.

Sometimes the user will wish to divide intersections into groupings based on intersection characteristics rather than location. For example, the user may wish to group intersections based on type of intersection. This type of grouping is called categorizational grouping.

Each intersection stored in the I/I files carries a 5-digit "standard category" code that may be used for categorizational grouping. The standard category consists of:

Intersection type (INT.INTSECT-TYPE)
Intersection description (INT.INTSECT-DESCR)
Traffic control devices (INT.TRAF-CNTRL-DEV)
General environment (INL.ROAD-DESCR)

When standard categorization is used, the printed report consists of:

S-G report for first category
S-G report for second category

.
.
.

S-G report for last category
S-RH report for all categories combined

Besides standard categorization, a "user categorization" facility allows users to choose their own groupings. The user identifies one, two, or three data elements to comprise a category control field.

For example, suppose the user wants to group intersections based solely on the intersection type (INT.INTSECT-TYPE). INT.INTSECT-TYPE is a l-digit field that contains one of the codes 1-6. By specifying INT.

INTSECT-TYPE as the category control field, six groups of intersections are established.

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When two or three data elements are used for category control, the data elements are simply joined together to form a single control field. If the user indicates INT.INTSECT-TYPE and INT.GEN-ENVIRON for category control and if a particular type 3 intersection has a general environment code of 2, that intersection's category code is 32.

Regional grouping can be combined with categorizational grouping to allow a grouping such as "category within county" or "category within municipality within county within district." When the two types of groupings are used together, the categorizational grouping is always the lowest level of grouping. A grouping of "category within county" is possible but a grouping of "county within category" is not.

The I/I Accident Analysis Report File

When a user wishes to obtain I/I accident analysis reports, he first must create an I/I accident analysis report file via the CREATE-I/I-ACC-ANAL-FILE command. The report file contains one record for each intersection being analyzed. Each record consists of seven segments:

- Region segment.
- Category segment.
- Accident segment.
- Significance segment.
- Volume segment.
- Intersection segment.
- Search segment.

The region segment contains the data elements used for regional groupings, such as construction district number and county number.

The category segment contains the data elements used for categorizational groupings, including a standard category field and a user category field.

The accident segment contains accident statistics for the intersection, including:

- Total number of accidents.
- Number of fatal accidents.
- Number of severity A injury accidents.
- Number of severity B injury accidents.
- Number of severity C injury accidents (includes severity U).

Number of property damage accidents.
Accident rate.
Severity rate.
Number of accidents that occurred on wet pavement.
Number of accidents that occurred on dry pavement.
Wet:Wet+Dry percentage.
Wet:Total percentage.
Number of days for which accident statistics were gathered.

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The significance segment contains statistical elements for comparing intersections within a group:

Lower and upper significance limits.
Amount out of significance.
Ratio out of significance.
Average accident rate used in computing significance limits.

The volume segment contains the total approach volume of the intersection.

The intersection segment contains intersection characteristics obtained from the I/I files.

The search segment contains a list of search keys used for finding accidents that occurred within the intersection.

Computations Used When Creating Report File

In creating the I/I accident analysis report file, a number of computations are performed by the software.

In the I/I files, the 2-Way ADT for each leg of each intersection is stored for each of up to 5 different years. The approach volume of an intersection is computed as:

For each year within the user-defined time period, a volume is chosen for each leg. The volume is the one for the latest year not greater than the year required. If all years of volume data are later, it is the earliest year available. Thus the record does not require a year of volume for the same year as the analysis is being done. In fact, to satisfy all requests, the minimum is one year of volume data for

any year.

The volumes chosen are weighted according to time to arrive at a value for each leg. The volume for the intersection is then computed:

Approach Volume = (x(1) + x(2) + ... + x(n)) / 2

x(i) = 2-way ADT on leg (i)

n = number of legs

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When computing rates, the software must know the number of days for which an intersection is being analyzed. The user provides a starting date and an ending date for searching the accident files. Each intersection also carries an effective date that indicates from what date accident data is available.

If an intersection's effective date is more recent than the user's indicated ending date, that intersection is not included in the report file.

If an intersection's effective date is more recent than the user's indicated starting date (but not more recent than the ending data), the time period is computed from the intersection's effective date to the user's ending date.

If an intersection's effective date is prior to the user's starting date, the time period is computed from the starting date to the ending date.

The accident rate for an intersection is computed as:

$$\text{Accident Rate} = \frac{1{,}000{,}000 \times (\text{TOT})}{\text{TP} \times \text{AV}}$$

TOT = Total number of accidents at intersection
TP = Number of injury accidents
AV = number of property damage accidents

Because TP x AV equals the total number of vehicles that entered the intersection during the time period under consideration, the accident rate can be shown as:

$$\text{Accident Rate} = \frac{TOT}{MV}$$

TOT = Total number of accidents at intersection
MV = Millions of vehicles entering intersection

The severity rate is computed exactly like the accident rate except that accidents are weighted by severity:

$$SV = 10xF + 4xI + P$$

F = Number of fatal accidents
I = Number of injury accidents
P = number of property damage accidents

$$\text{Severity Rate} = \frac{SV}{TOT}$$

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Accident rates and severity rates do not provide enough information in themselves to adequately compare two intersections. If two intersections both have an accident rate of 10.0, but the first intersection has an approach volume of 10,000 and the second has an approach volume of only 1,000, the first intersection represents a more severe case. Significance limits computations are intended to more accurately compare intersections.

In computing significance limits, a factor K is used. The value of K determines how many intersections will be identified as out of significance. Several commonly used values are:

2.326 Approximately 1% of the intersections are identified as significantly above average and approximately 1% of the

intersections are identified as significantly below average.

1.645 Approximately 5% of the intersections are identified as significantly above average and approximately 5 are identified as significantly below average.

1.281 Approximately 10% are identified as significantly above average and approximately 10% are identified as significantly below average.

The software normally uses K = 1.645, but the user is allowed to specify an overriding value.

To compute significance limits, the software must first examine all of the intersections in the group in order to compute an average accident rate for the group:

$$\text{Average Accident Rate} = \frac{TOT}{MV}$$

TOT = Total accident at all intersections
MV = Million vehicles entering all intersections

$$TOT = TOT(1) + TOT(2) + \ldots + TOT(n)$$

$$MV = MV(1) + MV(2) + \ldots + MV(n)$$

An upper limit and a lower limit can then be computed for each intersection in the group:

$$\text{Upper Limit} = AAR + K*SQRT(AAR/MV) + 1/(2*MV)$$

$$\text{Lower Limit} = AAR - K*SQRT(AAR/MV) - 1/(2*MV)$$

AAR = Average accident rate for group
MV = Millions of vehicles entering this intersection

After the significance limits are computed, the accident rate of the intersection is compared to the limits to compute the amount out of significance and the ratio out of significance.

The amount out of significance AOS is computed as:

If AR < LL	AOS = AR - LL	(negative)
If LL <= AR <= UL	AOS = 0	(in significance)
If AR > UL	AOS = AR - UL	(positive)

AR = accident rate for intersection
LL = lower limit
UL = upper limit

Hence, the amount out of significance has these properties:

If 0, the accident rate is within significance
If negative, the accident rate is significantly below average.
If positive, the accident rate is significantly above average.

The amount out of significance provides an easy determination as to whether an intersection is in or out of significance, but is still not a good factor for comparison. For example, if one intersection has an out of significance value of 3.6 and another has a value of 3.5, the first is not necessarily "worse" than the second. The ratio out of significance is better for such comparisons.

The ratio out of significance RAT is computed as:

$$RAT = \frac{AR - AAR}{UL - AAR} \quad \text{If } AR \Rightarrow AAR$$

$$RAT = \frac{AR - AAR}{AAR - LL} \quad \text{If } AR < AAR$$

AR = Accident rate at intersection
AAR = Average accident rate of group
UL = Upper limit
LL = Lower limit

The ratio out of significance has the following characteristics:

If RAT > 1.0, AR is significantly above average.
If RAT = 1.0, AR = UL
If 0.0 < RAT < 1.0, AR > AAR but is within significance.
If RAT = 0.0, AR = AAR.
If -1.0 < RAT < 0.0, AR < AAR but is within significance.
If RAT = -1.0, AR = LL.
If RAT < -1.0, AR is significantly below average.

Intersection Selection

A great deal of the flexibility of the I/I accident analysis software is due to the user's ability to choose what data is printed.

When an I/I report file is initially created, the user may use selection criteria to indicate which intersections are to be placed in the file. When selection is performed at this point, any PRINT-I/I-ACC-ANAL-REPORT commands that are run against the created file can show only the selected intersections.

Alternatively, the user can delay specifying selection criteria until the PRINT-I/I-ACC-ANAL-REPORT command is run. The report file contains all of the intersections, and the user simply tells PRINT-I/I-ACC-ANAL-REPORT which of the intersections in the report file are to be used.

The +SELECT subcommand of CREATE-I/I-ACC-ANAL-FILE provides two methods of selecting intersections:

INCLUDE INTERSECTIONS IF:
: Provides input selection based on information from the permanent I/I files.

INCLUDE I/I-ACC-ANAL-RECS IF:
: Provides output selection based on information in the created report file.

When INCLUDE INTERSECTIONS IF: is used, only data elements actually stored in the I/I files (and the TIS roadlog file) can be used for selection. For example, INCLUDE INTERSECTIONS IF: allows selection based on section type or general environment but does not allow selection based on number of accidents that occurred at the intersection or accident rate at the intersection.

When INCLUDE I/I-ACC-ANAL-RECS IF: is used, each intersection is fully processed and an output record is produced. Just prior to writing the record to the report file, it is compared to the selection criteria specified. If the test is false, the record is not written to the file. The advantage of I/I-ACC-ANAL-RECS is that accident data is available for selection, so that the user can request selection such as "include only those intersections that had 10 or more accidents" or "include only those intersections that had an accident rate of at least 8.0."

Both INTERSECTIONS an I/I-ACC-ANAL-RECS may be selected on in a single CREATE-I/I-ACC-ANAL-FILE command. For example, INTERSECTIONS could be used to initially restrict the chosen intersections to those of type 3 with general environment 2, and I/I-ACC-ANAL-RECS could be used to further restrict the intersections with those of a severity rate of at least 4.0.

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The +SELECT subcommand of PRINT-I/I-ACC-ANAL-REPORT allows input selection based on I/I-ACC-ANAL-RECS used with CREATE-I/I-ACC-ANAL-FILE. It is up to the user to decide with which command he wished to place the I/I-ACC-ANAL-RECS selection:

- If the selection is performed with CREATE-I/I-ACC-ANAL-FILE, the report file will be smaller and require less storage space, but the excluded intersections cannot be made available to PRINT-I/I-ACC-ANAL-FIEL without craeting a new report file.

- If the selection is performed with PRINT-I/I-ACC-ANAL-REPORT, the user has the added flexibility of modifying his selection criteria later and having the exclude intersections available without creating a new report file. However, the file will be larger and will require more storage space.

I/I-ACC-ANAL-RECS selection can be specified with either CTEATE-I/I-ACC-ANAL-FILE or with PRINT-I/I-ACC-ANAL-REPORT, but cannot be specified with both.

Accident Selection
****

The ability to select accidents adds additional flexibility to the I/I accident analysis software. For example, a user can compare accident histories among intersections considering only those accidents that involved drivers that had been drinking.

The user always selects accidents based on data of occurrence. He does this by entering a START-DATE and an END-DATE. Only those accidents that occurred between these dates are considered.

Each accident carries a location reliability code that serves to indicate how well the coder thought the accident was located:

1 No location error expected
2 Possible location error
3 Probable location error

The ACC-RELIABILITY parameter allows the user to easily exclude those with poor reliability.

Each accident carries a code that indicates whether it was an intersection/intersection-related accident or a non-intersection accident. The ACC-INT-LOCN parameter makes it easy to select accidents based on this field.

Finally, +SELECT is implemented with an INCLUDE ACCIDENTS IF: option that allows the user to select accidents based on virtually any characteristic or combination of characteristics.

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Finding the Worst Intersections

In many cases, a user will be interested in finding the worst intersections of a group of intersections, where worst can be defined as having the largest number of accidents, the highest accident rate, the largest ratio out of significance, etc.

As an example, let us suppose that a user wishes to locate the 10 intersections in a group that have the highest accident rates. To save printing an excessive amount of paper, he could select only those inter-sections with a rate of 10.0 or higher. However, he probably will not know in advance how many intersections will qualify. He could get 100 intersections printed, or only 5 intersections printed. He might not get any at all.

Two parameters, MAX-NUMBER-I and MAX-NUMBER-RL , allow requests such as "print the 10 worst intersections based on accident rate." MAX-NUMBER I applies to S-I reports, so that in this example 10 S-I reports are printed for each intersection group. MAX-NUMBER-RL applies to the AA-4D report of S-RL reports, so that in this example 10 intersections are printed.

MAX-NUMBER-I and MAX-NUMBER-RL can be given different values, so that a

complete S-I report can be printed for each of the 10 worst intersections but the AA-4D summary can print the worst 20 intersections.

MAX-NUMBER-I and MAX-NUMBER-RL can also be used to print the n best intersections rather than the n worst intersections.

The data elements that can be used for worst/best searches include:

- Total number of accidents at intersection.
- Accident rate.
- Severity rate.
- Wet:wet+dry percentage.
- Wet:total percentage.
- Amount out of significance.
- Ratio out of significance.

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Guide to Command Parameters
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--> To identify which printed reports are to be produced.

Use the SUMMARIES parameter of the PRINT-I/I-ACC-ANAL-REPORT command. Can be used to print or not print S-I, S-RL, and S-RH reports, as well as to choose which subreports such as AA-4A are to be included.

--> To identify how intersections are to be grouped.

The +SORT subcommand of CREATE-I/I-ACC-ANAL-FILE is used to identify how the intersections are grouped.

The intersections cannot be grouped differently by PRINT-I/I-ACC-ANAL-REPORT:

The grouping can be modified by running SORT-I/I-ACC-ANAL-FILE and identifying the new grouping in the +SORT subcommand.

-->Grouping intersections by user categories.

When user categorizational grouping is used, a +CATEGORIES subcommand is included with CREAT-I/I-ACC-ANAL-FILE to identify which data element(s) form the category control field.

--> Grouping intersections for significance limits computations.

Significance limits computations can be performed by CREATE-I/I-ACC-ANAL-FILE or they can be deferred until PRINT-I/I- ACC-ANAL-REPORT.

When performed by CREATE-I/I-ACC-ANAL-REPORT, THE significance limits groupings are identical to the groupings identified in +SORT. For example, if +SORT indicates grouping by district, then one average accident rate is computed for each district so that the intersections of one district are never compared with the intersections of another district.

If the file is subsequently resorted by SORT-I/I-ACC-ANAL-FILE, the significance limits computations are not repeated. For example, if the file just described is resorted by category within district, the intersections are still compared district-wide.

When significance limits computations are deferred until PRINT-I/I-ACC-ANAL-REPORT, the signigicance limits groupings are the lowest level grouping of the input file. For example, if a file is created by district without significance limits computations, and then resorted by SORT-I/I-ACC-ANAL-FILE by category within district, and the resorted file used for PRINT PRINT-I/I-ACC-ANAL-REPORT, significance limits groupings will be category within district.

--> Order of intersections within a group.

The +SORT subcommand of CREATE-I/I-ACC-ANAL-FILE and SORT-I/I-ACC-ANAL-FILE can, in addition to defining how

intersections are grouped, specify the order in which intersections appear within a group

Unless specified otherwise, the intersections will appear in order be key (route system, route number, reference point, and interchange element number).

If CREATE-I/I-ACC-ANAL-FILE is instructed to include accident or significance limits computations, +SORT can be used to specify any of the following orders:

If accident data included:

- Total number of accidents
- Accident rate
- Severity rate
- Wet:wet+dry percent
- Wet:total percent

If significance limits computations included:

- Amount out of significance
- Ratio out of significance

The +SORT subcommand of CREAT-I/I-ACC-ANAL-FILE and SORT-I/I-ACC-ANAL-FILE identifies the order intersections will appear in S-I reports and provides a default order for intersections in AA-4D reports. For example, if +SORT specifies an order by total number of accidents, subsequent S-G reports look like:

S-I report for intersection with most accidents
S-I report for intersection with second most accidents

.
.
.

S-I report for intersection with fewest accidents
S-I report (AA-4D list intersection in order from most accidents to fewest accidents)

A +SORT subcommand is available with PRINT-I/I-ACC-ANAL-REPORT that can specify a different order for AA-4D reports only. For example, if +SORT of PRINT-I/I-ACC-ANAL-REPORT specifies accident rate, the S-I reports are printed in the same order as shown above but the AA-4D report lists intersections in order from the highest accident rate to the lowest accident rate.

--> Specifying when accident and significance limits computations are performed.

Accident and significance limits data elements can be computed by CREATE-I/I-ACC-ANAL-FILE and placed into the report file. Alternatively, these data elements can be left zero in the report file and computed by PRINT-I/I-ACC-ANAL-FILE.

The user chooses the method to be used via the following command option of CREATE-I/I-ACC-ANAL-FILE:

NO-ACCIDENTS	Defer both data types
ACCIDENTS	Include accident but defer sig-limits
SIG-LIMITS	Include both accident and sig-limits

NO-ACCIDENTS makes the creation cheaper because the accident files do not need to be accessed. However, it also places some limitations on the types of analysis that can be performed with the report file.

ACCIDENTS increases the creation cost because accident data is obtained from the accident files.

SIG-LIMITS further increases the creation cost because the software must perform an additional pass through the file to compute average accident rates for the intersection groupings.

When NO-ACCIDENTS is used, the following limitations will apply:

--> The only ordering available for intersections within a group will be by key.

--> Best/worst searches will not be available.

--> +SELECT cannot be used to select intersections based on accident history (eg., to select only those intersections with more than 5 accidents).

--> Significance limits grouping will be restricted to the intersection grouping presented to PRINT-I/I-ACC-ANAL-REPORT.

ACCIDENTS reduces these limitations to some extent. Although

the fourth limitation is not affected, the first three are eliminated except that ordering, best/worst, and +SELECT will not be available for amount out of significance or ratio out of significance.

SIG-LIMITS eliminates all of the limitations listed above.

As an example of the fourth limitation, a user might wish to print a report in which intersections are grouped by category within district, but to have the intersections grouped only by district for the purposes of significance limits comparisons. He first runs CREATE-I/I-ACC-ANAL-FILE grouping by district with SIG-LIMITS. He then runs SORT-I/I-ACC-ANAL-FILE to group by category within district (without affecting the already computed significance limits data elements). He then runs PRINT-I/I-ACC-ANAL-FILE using the resorted file.

--> Selecting intersections.

The INCLUDE INTERSECTIONS option of +SELECT allows selection of intersections with CREATE-I/I-ACC-ANAL-FILE. Selection can be based on any of the data elements of the INT, INL, INX, RGC and RLG files. Selection cannot be based on computed data elements such as number of accidents at the intersection.

When INCLUDE INTERSECTIONS and SIG-LIMITS are both used, the user may request that excluded intersections be ignored completely. Alternatively, he may request that they be included in significance limits computations even though they will not appear in the final file. The choice is specified in the SIG-ALL/SIG-SELECTED parameter of CREATE-I/I-ACC-ANAL-FILE.

The INCLUDE I/I-ACC-ANAL-RECS option of +SELECT allows selection of intersections based on data elements in the report file being produced (INA).

When INCLUDE I/I-ACC-ANAL-RECS is used with CREAT-I/I-ACC-ANAL-FILE, it cannot also be used with PRINT-I/I-ACC-ANAL-REPORT.

If ACCIDENTS is specified with CTEATE-I/I-ACC-ANAL-FILE, INCLUDE I/I-ACC-ANAL-RECS can be used to select based on accident history (eg., include those intersections with more than 5 accidents or with an accident rate of 3.5 or higher).

If SIG-LIMITS is specified with CREATE-I/I-ACC-ANAL-FILE, INCLUDE I/I-ACC-ANAL-RECS can be used to select based on significance limits (eg., include only those intersections that are out of significance).

--> Selecting accidents.

Accidents are selected via the following parameters:

START-DATE (required)
END-DATE (required)
ACC-INT-LOCN
ACC-RELIABILITY
+SELECT (INCLUDE ACCIDENTS option)

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When ACCIDENTS or SIG-LIMITS is used with CREATE-I/I-ACC-ANAL-FILE, all accident seleciton criteria must be included with the create run. It is not possible to later override the criteria with PRINT-I/I-ACC-ANAL-REPORT.

When NO-ACCIDENTS is used with CREATE-I/I-ACC-ANAL-FILE, the accident selection criteria is not specified until PRINT-I/I-ACC-ANAL-REPORT.

When used with INCLUDE I/I-ACC-ANAL-RECS of +SELECT, accident selection can indirectly select intersections. For example, if accidents are limited to head on accidents and intersections are limited to those with 5 or more accidents, only those intersections having 5 or more head on accidents are included.

--> Significance limits computations.

The constant K in the upper and lower limits computations is normally 1.645. The SIG-CONST parameter of CREATE-I/I-ACC-ANAL-FILE (if SIG-LIMITS used) or PRINT-I/I-ACC-ANAL-REPORT can be used to enter an overriding value.

The average accident rate xx for a group of intersections is normally computed by the software, requiring additional overhead. The AVG-ACC-RATE parameter of CREATE-I/I-ACC-ANAL-FILE allows the user to enter a value of his own, thus saving the additional overhead costs. However, errors may be introduced when an incorrect value is entered. If a value is entered, it applies to all of the intersection groups.

--> Best/worst searches.

The software allows such requests as "find the 20 intersections having the highest accident rates."

To perform a best/worst search, the user must first choose which data element is to be used to define "best" or "worst" from the following list:

Total number of accidents
Accident rate
Severity rate
Wet:wet+dry percentage
Wet:total percentage

Amount out of significance
Ratio out of significance

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If one of the first 5 is chosen either ACCIDENTS or SIG-LIMITS must be specified with CREATE-I/I-ACC-ANAL-FILE. If one of the last 2 is chosen, SIG-LIMITS must be specified.

The chosen data element must be indicated in +SORT of CREATE-I/I-ACC-ANAL-FILE to define the ordering within groups. Use the default sort of DOWN for worst searches or the sort of UP for best searches.

Finally, use the parameters MAX-NUMBER-I and/or MAX-NUMBER-RL of PRINT-I/I-ACC-ANAL-REPORT to indicate how many intersections are to be printed. Note: When either of these parameters is used, +SORT cannot be used with

PRINT-I/I-ACC-ANAL-REPORT to reorder intersections in the AA-4D report.

In the case of ties, more than the indicated number may be printed. For example, if the user requests 20 intersections, and if the 20th, 21st, and 22nd intersections have identical values, 22 intersections are printed.

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The CREATE-I/I-ACC-ANAL-FILE Command

Function: Creates a report file for later use by PRINT-I/I-ACC-ANAL-REPORT.

Description: Before attempting to use CTEATE-I/I-ACC-ANAL-FILE, read
------------ the preceding section "Intersection Accident Analysis
              Capabilities." This seciton describes the capabilities of
the I/I accident analysis software to help in deciding which command
options are needed.

The file produced by CREATE-I/I-ACC-ANAL-FILE is a sequential file that
can be placed on either disk or tape. It contains information gathered
from a number of TIS files, including the I/I files and the accident
files. It can be considered as a "snapshot" of these files at the time
it is created. As time goes on, it will become out of date with the TIS
files because it is not updated as the other files change. It is
produced as a step in producing I/I accident analysis reports, and can
be destroyed after the needed reports are obtained.

The printed output from CREATE-I/I-ACC-ANAL-FILE includes:

    --> Option list (listing of command parameters).
    --> Optional listing of intersection data.
    --> Termination message.

The option list can be eliminated by specifying the NO-OPTLIST option.

The parameter LIST/NO-LIST indicates whether the optional listing is
desrired. When LIST is specified, either one or two listings are
printed:

    --> If SIG-LIMITS is specified and AVG-ACC-RATE is omitted, the
        program must compute an average accident rate for each group of
        intersections. The LISTING OF AVERAGE ACCIDENT RATES FOR
        SIG-LIMITS listing shows the computed rates, together with the
        total number of accidents and total number of vehicles entering
        intersections that are used for computing the rates. For
        example, if intersections are grouped by district the listing
        would appear as:

CONSTR DIST	GROUP	NUM INTSECT	TOT ACC	MILLION VEHICLES	AVG RATE
1	1	8	54	29.254020	1.8
2	2	2	0	3.905500	0.0
.					
.					
.					
TOTAL		16	82	46.067015	1.7

The GROUP column simply numbers the groups from 1 to n so that intersections in the second listing can easily be related to their groups. NUM-INTSECT provides the number of intersections in the group.

--> The second listing shows the intersections that were included in report file. One line is printed for each intersection, and the intersections are printed in the order specified in the +SORT command.

The data elements printed in the listing include:

- Key (route system, route number, reference point, and interchange element number).
- Group number (for relating to first listing).
- Regional data elements (county, district, etc.).
- Standard category.
- Number of days being analyzed.
- Approach volume.
- Total number of accidents.
- Severity rate and accident rate.
- Average accident rate for group.
- Upper and lower significance limits.
- Amount out of significance.
- Ratio out of significance.

Because accident and sig-limits computations are optional, some of the fields listed above may be shown as blanks.

JCL For Report File: Because the report file is a user-controlled file outside of the permanent TIS file system the user must provide JCL that defines the location of the file. Four options are available to the user:

--> The file may be a scratch file
--> The file may be a temporary file on disk.
--> The file may be a permanent file on disk.
--> The file may be a temporary or permanent file on tape.

If a scratch file is used, it is simplest to use a disk file. The file will be in existence only for the duration of the TIS job step, and is deleted immediately upon completion of the run. The advantages of using a scratch file are:

--> No permanent storage space is retained.
--> JCL is simplest for scratch files.

--> There is no danger of confusing several existing files and
    getting the wrong one.

The disadvantages of using a scratch file are:

--> The scratch file is deleted immediately upon completion so that
    the run cannot be restarted later without performing the complete
    run over.
--> If the user later wishes to change some options of
    PRINT-I/I-ACC-ANAL-REPORT, he will have to recreate the report
    file.

If a temporary file is used, it is retained for a one-week period and is then automatically deleted. When a temporary disk file is used, restart is possible when CREATE-I/I-ACC-ANAL-FILE completes but PRINT-I/-ACC-ANAL-REPORT fails for some reason without the need for recreating the file. The user is responsible for assigning a unique name to the file so that it can be located at a later time. If the CREATE step is repeated with a temporary file, use DISP=OLD or a second file will be allocated. If this happens, the PRINT command will see the first file (since it was cataloged).

A permanent disk file -- one that is to be retained for longer than one week -- requires the user to make a request for disk space from ISB. The JCL for creating a permanent disk file is similar to that for a temporary disk file, except that ISB provides a volume serial number to you that must be included in the JCL.

A tape file can be retained for any length of time without permission from ISB. The disadvantage to using tape is that occasionally the job may be delayed while waiting for a tape drive to become available. However, tape is probably the best storage device for permanent files.

The JCL for the report file consists of a single DD statement. The user may choose any name for this DD statement, and informs CREATE-I/I-ACC-ANAL-FILE of the chosen name via the OUTPUT-DD parameter. A suggested name for this DD statement is INA.

Required Command Parameters:

OUTPUT-DD=ddname

--> Use this parameter to indicate the name you have coded
    on the DD statement for the report file.

ROUTES subcommand

--> Use this subcommand to indicate what routes are to be
searched for intersections.
--> Any intersection that has at least one leg on the
indicated route(s) will be included in the report file
unless rejected by selection criteria indicated in the
SELECT subcommand.
--> This program operates under the LIST classification.

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S1ART-DATE=mm/dd/yyyy
END-DATE=mm/dd/yyyy Note: 8 year limit

--> Note: Start-date and End-date may include a maximum of
eight years.

Example: Start-date=01/01/1976
End-date=01/01/1983
or
Start-date=01/01/1977
End-date=01/01/1984

--> Use to indicate the time period of the analysis report.
--> Include these parameters if either ACCIDENTS or SIG-LIMITS
is used.
--> Omit these parameters if NO-ACCIDENTS is used.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

--> The option list is a listing of your command
parameters.

```
SIG-LIMITS     Include accident and sig-limits data elements.
ACCIDENTS      Include accident but not sig-limits data elements.
NO-ACCIDENTS   Do not include accident and sig-limits data
                 elements (default).

     --> If NO-ACCIDENTS is used, all accident an sig-limits data
            elements of the report file will contain zeroes.
     --> If ACCIDENTS is used, accident data is retrieved and
            added to the report ifle.  Sig-limits elements will
            contain zeroes.
     --> If SIG-LIMITS is used, accident elements as well as
            sig-limits elements will be included in the report
            file.
```


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```
                INTSECT      Include intersection accidents only.
ACC-INT-LOCN=   NON-INTSECT  Include non-intersection accidents only
                ALL          Include all accidents (default).

     --> "INTSECT" accidents are those with ACD.INTSECT-RELATION =
                          02 - T-INTERSECTION
                          03 - Y-INTERSECTION
                          04 - 4-LEGGED INTERSECTION
                          05 - 5 OR MORE LEG INTERSECT
                          06 - TRF CIRCLE OR ROUNDABOUT
                          07 - INTERSECTION-RELATED
                          20 - INTERCHANGE ON RAMP
                          21 - INTERCHANGE OFF RAMP
                          22 - INTERCHANGE OTHER AREA

     --> Do not use ACC-INT-LOCN when NO-ACCIDENTS is used.
```

```
                      1    Include reliability 1 only.
 ACC-RELIABILITY=     2    Include reliabilities 1 and 2.
                      3    Include reliabilities 1-3 (default).


      --> Use to select accidents based on location reliability.
      --> Do not use ACC-RELIABILITY when NO-ACCIDENTS is used.


 ACC-SCAN=nnnn    0001 - 9999 (in feet).

             -->  This parameter can be used to override the
                  reference point limits stored in intersection
                  records.  If a non-zero value is coded, it will be
                  subtracted and added to INL leg reference points
                  when searching for accidents.  These limits are
                  stored in the INA record and cannot be changed by
                  the PRINT-I/I-ACC-ANAL-REPORT command.

SIG-CONST=nn.nnn

   --> This parameter can be used to enter an overriding value for
       the constant in the significance limits formulas.  In its
       absence a value of 1.645 is used.
   --> Do not code this parameter unless SIG-LIMITS is used.


AVG-ACC-RATE=nn.n

   --> This parameter can be used to enter an average accident rate
       for significance limits computations.
   --> When used, this parameter reduces overhead.
   --> This parameter can introduce errors when an incorrect value
       is entered.
   --> Do not code this parameter unless SIG-LIMITS is used.
```



```
SIG-ALL       Include non-selected intersections for sig-limits.
SIG-SELECTED  Include only selected intersections for sig-limits
              (default).

   --> This parameter is applicable only when both SIG-LIMITS is
       used and +SELECT is used with the INCLUDE INTERSECTIONS
```

option.
--> SIG-SELECTED indicates that only those intersections that are selected should be used for computing average accident rates.
--> SIG-ALL indicates that non-selected as well as selected intersections should be used for computing average accident rates.
--> SIG-ALL will increase the cost of the run because accident data must be retrieved for non-selected intersections.
--> Do not specify SIG-ALL when AVG-ACC-RATE is coded.

NO-MESSAGES Do not print error message A7-020.
MESSAGES Print error message A7-020 (default).

NO-LIST Do not print intersection listings.
LIST Print intersection listings (default).

--> LIST requests a listing showing the intersections included in the report file.
--> When SIG-LIMITS is used without AVG-ACC-RATE, LIST also requests a listing of the computed average accident rates.

NO-VERBAL Do not print the verbal description with the intersection.
VERBAL Print the verbal description with each intersection (default).

--> If requested, the verbal description will be printed along with each intersection included in the report file.
--> VERBAL and NO-LIST is an invalid combination -- NO-LIST implies NO-VERBAL.

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IGNORE-EFF-DATE Ignore intersection's effective date.
USE-EFF-DATE Use intersection's effective date (default).

--> USE-EFF-DATE: If an intersection's effective date is later than the report END-DATE, the intersection WILL NOT be selected.

Any accidents that occurred prior to the effective date ARE NOT selected. Accident rates are adjusted if the effective date falls within the report period.

--> IGNORE-EFF-DATE: An intersection WILL BE selected even if its effective date is later than the report END-DATE.

Any accidents that occurred prior to the effective date WILL BE selected.

CATEGORIES subcommand

--> Use CATEGORIES when user-defined categories are needed for the purpose of grouping intersections.
--> Indicate one, two, or three INT/INX/RLG data elements whose combined lengths do not exceed 18 characters.
--> The REDEFINES and GROUPS capability of CATEGORIES can be used to combine several categories into one.
--> When RLG data elements are used, the data elements are taken from the roadlog record that corresponds to the intersection's principal key.

SORT subcommand

--> Use SORT to indicate (1) how intersections are grouped and (2) how intersections are to be ordered within groups.
--> If SORT is omitted, there will be just one statewide group and the intersections will be ordered by key.
--> The data elements that can be used in SORT are:

Class A-1:	INA.CONSTR-DIST	Construction district
	INA.MAINT-AREA	Maintenance area
	INA.PTRL-STATION	Patrol station
	INA.PTRL-DIST	Patrol district
Class A-2:	INA.COUNTY	County
Class A-3:	INA.CITY	Municipality

```
                          INA.URB-AREA       Urban area

                Class A-4:  INA.CATEGORY       Category (standard)
                            INA.USER-CATEGORY  Category (user-defined)
```


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```
            Class B:    INA.TOT-NUM-ACC         Total number of accidents
                        INA.ACC-RATE            Accident rate
                        INA.SEV-RATE            Severity rate
                        INA.WET-DRY-PERCENT     Wet:wet+dry percentage
                        INA.WET-TOTAL-PERCENT   Wet:total percentage
                        INA.AMT-OUT-OF-SIG      Amount out of significance
                        INA.RATIO-OUT-OF-SIG    Ratio out of significance

          --> Either zero or one data element can be chosen from each class.
          --> Under no circumstances can two data elements be chosen from
              each class.
          --> The class A data elements define the groupings of
              intersections.  These data elements default to UP (sorted
              smallest to largest).

              Example 1.  Group intersections by county.

                 +SORT
                 INA.COUNTY

              Example 2.  Group intersections by urban area within district.

                 +SORT
                 INA.CONSTR-DIST
                 INA.URB-AREA

           --> The class B data elements define the order of intersections
               within groups.  These data elements default to DOWN (sorted
               largest to smallest).

              Example 3.  Leave intersections in statewide grouping but
                          sort based on accident rate.

                 +SORT
                 INA.ACC-RATE

              Example 4.  Group intersections by county and sort by
                          number of accidents, smallest to largest.
```

```
                  +SORT
                  INA.COUNTY
                  INA.TOT-NUM-ACC,UP

          --> Of the class B data elements, INA.AMT-OUT-OF-SIG and
              INA.RATIO-OUT-OF-SIG can be specified only if SIG-LIMITS is used.
              The remaining class B data elements can be specified only if
              either ACCIDENTS or SIG-LIMITS is used.
          --> The class A-4 data element INA.USER-CATEGORY can be specified
              only if a CATEGORIES subcommand is included.




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        SELECT subcommand

          --> Three options are available:  INCLUDE INTERSECTIONS, INCLUDE
              I/I-ACC-ANAL-RECS, and INCLUDE ACCIDENTS.

          --> INCLUDE INTERSECTIONS can be used to select intersections based
              on criteria stored in the permanent TIS files.

                 --> INT, INL, INX, and RLG data elements can be used in
                     the select statement.
                 --> When RLG data elements are used, the roadlog record
                     corresponding to the principal key of the intersection is
                     used for the comparisons.
                 --> INL data elements must be referenced via the
                     multi-correlation facility (*ANY*/*ALL*).
                 --> If SIG-LIMITS is used, the SIG-ALL/SIG-SELECTED parameter
                     applies.

          --> INCLUDE I/I-ACC-ANAL-RECS can be used to select output records
              being written to the report file, excluding from the file those
              that do not meet the selection criteria.

                 --> INA data elements can be used to select statement.
                 --> Accident data elements can be referenced only if ACCIDENTS
                     or SIG-LIMITS is used.
                 --> Sig-limits data elements can be referenced only is
                     SIG-LIMITS is used.
                 --> If INCLUDE I/I-ACC-ANAL-RECS is used with
                     CREATE-I/I-ACC-ANAL-FILE, it cannot also be used with
```

PRINT-I/I-ACC-ANAL-REPORT.

--> INCLUDE ACCIDENTS can be used to select accidents.

--> ACD, ACV, ACP, and ACJ data elements can be used in the select statement.
--> ACV, ACP, and ACJ data elements must be referenced via the multi-correlation facility (*ANY*/*ALL*).
--> ACCIDENTS selection can be used only if ACCIDENTS or SIG-LIMITS is used. Otherwise, defer accident selection to PRINT-I/I-ACC-ANAL-REPORT.

TITLES subcommand

Can be used to enter user headings (eg., to indicate who requested the run or the date requested).

Any of the print formatting parameters -- see chapter 4.

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Sample Job Setup: The following sample is a job that will create an analysis file on tmporary disk storage, retained 7 days. The file consists of US trunk highway intersections, with accidents for two years of accident data.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
//TIS EXEC DTRITA,TIME=10,SCRSIZE=10,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//INA      DD UNIT=SYSDA,SPACE=(CYL,9),
//            DSN=USER-ID.INA,DISP=(,CATLG)
//SYSIN DD *
:CREATE-I/I-ACC-ANAL-FILE,SIG-LIMITS,OUTPUT-DD=INA,
:  START-DATE=01/01/1998,END-DATE=12/31/1999
+ROUTES
ROUTE-SYS=ISTH,ROUTE-NUM=90
+CATEGORIES
DATA-ELEMENT=INT,CATEGORY-DIST
+SORT
INA.CONSTR-DIST
```

```
        INA.USER-CATEGORY
        INA.ACC-RATE
        /*
```



```
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        The PRINT-I/I-ACC-ANAL-REPORT Command
        *************************************

        Function:  Print I/I accident analysis reports.
        ---------

        Description:  Before attempting to use PRINT-I/I-ACC-ANAL-REPORT, read
        ------------  the preceding sections entitled "Intersection Accident
                      Analysis Capabilitites" and "The CREATE-I/I-ACC-ANAL-FILE
        Command."  Before PRINT-I/I-ACC-ANAL-REPORT can be used to print I/I
        accident analysis reports, CREATE-I/I-asACC-ANAL-FILE must be used to
        create an I/I accident analysis report file.
```

The printed output from PRINT-I/I-ACC-ANAL-REPORT consists of one or more S-G reports plus zero or more S-RH reports. Each S-G report is a report for a group of intersections as defined by the report file produced by CREATE-I/I-ACC-ANAL-FILE. Each S-RH report summarizes two or more groups.

An S-G report consist of:

- Option list (listing of command parameters).
- Code list (listing of codes used in report).
- One S-I report for each intersection in the group.
- One S-RL report for the group.

S-I, S-RL, and S-RH reports are described in the section "Intersection Accident Analysis Capabilities."

JCL For Report File: Because the I/I accident analysis report file is a user-controlled file outside of the permanent TIS system, The user must provide JCL that defines the location of the file. The JCL of CREATE-I/I-ACC-ANAL-FILE command defined where the file was placed. The JCL of the PRINT-I/I-ACC-ANAL-REPORT command defines where the file can be found for retrieval.

When the PRINT-I/I-ACC-ANAL-REPORT command is placed in the same job step as the CREATE-I/I-ACC-ANAL-FILE command, you do not need to include a DD statement in addition to the one used with CREATE-I/I-ACC-ANAL-FILE. Simply code INPUT-DD=ddname where ddname is the same name coded in the OUTPUT-DD parameter of CREATE-I/I-ACC-ANAL-FILE.

If PRINT-I/-ACC-ANAL-FILE is used in a job step separate from the CREATE-I/I-ACC-ANAL-REPORT, include the following DD statement with the PRINT-I/I-ACC-ANAL-REPORT command:

```
//ddname DD DISP=SHR,DSNAME=userid.xxxxxx
```

This format is used whether the report file was stored in a temporary disk file, a permanent disk file, or a tape file.

Required Command Parameters:

INPUT-DD=ddname

--> Use this parameter to indicate the name of the DD
statement you have included for the report file.

START-DATE=mm/dd/yyyy
END-DATE=mm/dd/yyyy

--> Use to indicate the time period of the analysis report.
--> Include these parameters only if NO-ACCIDENTS was used
with the CREATE-I/I-ACC-ANAL-FILE command.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

--> The option list is a listing of the
CREATE-I/I-ACC-ANAL-FILE and
PRINT-I/I-ACC-ANAL-REPORT command parameters.

NO-CODELIST Do not print code lists.
CODELIST Print one code list with each S-G report (default).

--> The codelist is a several-page report that explains
headings and codes appearing in the report.

NO-MESSAGES Do not print error message A7-020.
MESSAGES Print error message A7-020 (default).

```
                  INTSECT      Include intersection accidents only.
ACC-INT-LOCN=     NON-INTSECT  Include non-intersection accidents only
                  ALL          Include all accidents (default).
```

--> "INTSECT" accidents are those with ACD.INTSECT-RELATION =
02 - T-INTERSECTION
03 - Y-INTERSECTION
04 - 4-LEGGED INTERSECTION
05 - 5 OR MORE LEG INTERSECT
06 - TRF CIRCLE OR ROUNDABOUT
07 - INTERSECTION-RELATED
20 - INTERCHANGE ON RAMP
21 - INTERCHANGE OFF RAMP
22 - INTERCHANGE OTHER AREA

--> Can be used only if NO-ACCIDENTS was used with CREATE-I/I-ACC-ANAL-FILE.

```
                     1    Include reliability 1 only.
ACC-RELIABILITY=     2    Include reliabilities 1 and 2.
                     3    Include reliabilities 1-3 (default).
```

--> Use to select accidents based on location reliability.
--> Can be used only if NO-ACCIDENTS was used with CREATE-I/I-ACC-ANAL-FILE.

```
                 ABCE      CDE       CE
SUMMARIES=(I=      ,RL=      ,RH=      )
                 NONE      NONE      NONE
```

--> Use this parameter to indicate which reports are to be printed.
--> Default is SUMMARIES=(I=ABCE,RL=CDE,RH=CE).
--> I subparameter indicates which of the summaries AA-4A, AA-4B, AA-4C, and AA-4E comprise S-RL reports.
--> RL subparameter indicates which of the summaries AA-4C, AA-4D, and AA-4E comprise S-RL reports.
--> RH subparameter indicates which of the summaries AA-4C and AA-4E comprise S-RH reports.

Example: SUMMARIES=(I=CE,RH=NONE)

S-I reports consist only of AA-4C and AA-4E.
S-RL reports default to AA-4C, AA-4D, and AA-4E.
S-RH reports are not printed.

MAX-NUMBER-I= nnn Maximum number of intersections in each group.
0 Not using best/worst search (default).

MAX-NUMBER-RL= nnn Maximum number of intersections in each group.
0 Not using best/worst search (default).

--> These two parameters are used to request best/worst reports.
--> MAX-NUMBER-I indicates the maximum number of S-I reports to be printed in each S-G report.
--> MAX-NUMBER-RL indicates the maximum number of intersections to be printed in each AA-4D report of S-RL.
--> MAX-NUMBER-I defaults to zero (no best/worst search).
--> If MAX-NUMBER-I is omitted, MAX-NUMBER-RL defaults to zero.
--> If MAX-NUMBER-I is included, MAX-NUMBER-RL defaults to the value specified in MAX-NUMBER-I.

SIG-CONST=nn.nnn

--> Use this parameter to enter value for constant K in significance limits formulas.
--> Can be used only when SIG-LIMITS was not included with CREATE-I/I-ACC-ANAL-REPORT.

NO-VERBAL Do not print the verbal description with the intersection.
VERBAL Print the verbal description with each intersection (default).

--> This option applies to the AA-4D report and results in the

verbal description for each intersection being printed on a separate line.

IGNORE-EFF-DATE Ignore intersection's effective date.
USE-EFF-DATE Use intersection's effective date (default).

--> USE-EFF-DATE: If an intersection's effective date is later than the report END-DATE, the intersection WILL NOT be selected.

Any accidents that occurred prior to the effective date ARE NOT selected. Accident rates are adjusted if the effective date falls within the report period.

--> IGNORE-EFF-DATE: An intersection WILL BE selected even if its effective date is later than the report END-DATE.

Any accidents that occurred prior to the effective date WILL BE selected.

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SORT subcommand

--> Use SORT to indicate the order in which intersections are printed in AA-4D reports.
--> If SORT is omitted, intersections appear in the order defined by the SORT subcommand of CREATE-I/I-ACC-ANAL-FILE.
--> The data elements that can be used in SORT are:

INA.TOT-NUM-ACC	Total number of accidents
INA.ACC-RATE	Accident rate
INA.SEV-RATE	Severity rate
INA.WET-DRY-PERCENT	Wet:wet+dry percentage
INA.WET-TOTAL-PERCENT	Wet:total percentage
INA.AMT-OUT-OF-SIG	Amount out of significance
INA.RATIO-OUT-OF-SIG	Ratio out of significance

--> Any of these data elements may be used regardless of whether NO-ACCIDENTS, ACCIDENTS, or SIG-LIMITS was used with CREATE-I/I-ACC-ANAL-FILE.
--> SORT cannot be used if either MAX-NUMBER-I or MAX-NUMBER-RL is used.

SELECT subcommand

--> Two options are available: INCLUDE ACCIDENTS and INCLUDE I/I-ACC-ANAL-RECS.

--> INCLUDE ACCIDENTS can be used to select accidents. It cannot be used unless NO-ACCIDENTS was used with CREATE-I/I-ACC-ANAL-FILE. ACD, ACV, ACP, and ACJ data elements can be referenced. ACV, ACP, and ACJ data elements must be referenced via the multicorrelation facility (*ANY*/*ALL*).

--> INCLUDE I/I-ACC-ANAL-RECS can be used to select I/I accident analysis report file records. It cannot be used if INCLUDE I/I-ACC-ANAL-RECS was used with CREATE-I/I-ACC-ANAL-FILE. INA data elements can be referenced. Sig-limits data elements can be referenced only if SIG-LIMITS was used with CREATE-I/I-ACC-ANAL-FILE. Accident data elements cannot be referenced if NO-ACCIDENTS was used with CTEATE-I/I-ACC-ANAL-FILE.

TITLES subcommand

Any of the print formatting parameters -- see chapter 4

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CLASS Parameter: If the report file is on tape, use CLASS=D on the JOB card. Otherwise, use CLASS=C.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
//TIS EXEC DTRITA,TIME=10,SCRSIZE=10,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//INA DD DISP=SHR,DSNAME=USER-ID.INA
//SYSIN DD *
```

```
:PRINT-I/I-ACC-ANAL-REPORT,INPUT-DD=INA,
:  MAX-NUMBER-I=20,SUMMARIES=(I=B,RL=D,RH=NONE)
/*
```


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The SORT-I/I-ACC-ANAL-FILE Command
****

Function: Sorts an I/I accident analysis report file.

Description: This program can be used to sort a report file produced
---- by CREATE-I/I-ACC-ANAL-FILE. The sort allows (1) the
intersection groupings to be redefined and (2) the order

of intersections within groups to be redefined.

Required Command Parameters:

INPUT-DD=ddname

Use this parameter to identify the DD statement that defines the input report file.

OUTPUT-DD=ddname

Use this parameter to identify the DD statement that defines the output report file.

Optional Command Parameters:

SORT subcommand

Used exactly like SORT subcommand of CREATE-I/I-ACC-ANAL-FILE. If omitted, intersections are sorted by key (route system, route number, reference point, interchange element number).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=400K,SCRSIZE=10,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//INAIN  DD DISP=SHR,DSNAME=DT99A1B.INAV01
//INAOUT DD DISP=(NEW,CATLG),DSNAME=DT99A1B.INAV02,
//       UNIT=TAPE,LABEL=RETPD=30
//SYSIN DD *
:SORT-I/I-ACC-ANAL-FILE,INPUT-DD=INAIN,OUTPUT-DD=INAOUT
+SORT
INA.COUNTY
INA.CATEGORY
/*
```


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The LIST-ACCIDENTS-BY-ACC-NUM Command

Function: Lists accident records specified by accident number.

Description: LIST-ACCIDENTS-BY-ACC-NUM can be used to display every data element in individual accident records. Several lines are printed for each accident. The user must include DD statement ACCNUM followed by a list of 9-character accident numbers.

Required Command Parameters: None.

Optional Command Parameters:

LIST-FORMAT = LOCATION | ALL

- LOCATION displays only the following fields:

  ACD.ACC-NUM
  ACD.ACC-SEVERITY
  ACD.CITY
  ACD.COUNTY
  ACD.INTCHANGE-ELEM
  ACD.LOCN-RELIA-DPS
  ACD.LOCN-RELIABILITY
  ACD.REF-POINT
  ACD.ROUTE-NUMBER
  ACD.ROUTE-SYSTEM
  ACD.TOWNSHIP

TITLES subcommand

Print formatting parameters: see chapter 4

Sample Job Setups:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
//TIS EXEC DTRIT,TIME=1,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-ACCIDENTS-BY-ACC-NUM,CODELIST
/*
//ACCNUM DD *
890450022
880100171
901020081
/*
```

The above job setup may be copied from TRN.RI00SYSE(ACCLA).

The I/I-VOLUME-CODING-FORM Command

Function: Produces a coding sheet for coding Intersection/Interchange data.

Description: The coding sheet is produced by printing one line per route per I/I record in the I/I listing. Space is available for coding I/I data at the various I/I points. Keypunching can then be performed from the completed coding sheet.

The following data elements are printed:

Route system, route number, reference point Interchange element, sequence number, card type, update code Direction and old volumes for the first and second legs per route Verbal description Intersection type

Space is provided for coding new volumes for the first and second legs for each route.

Required Command Parameters:

Routes subcommand - Operates under LIST classification.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed.

--> The option list is a listing of your command
parameters.

SELECT subcommand

- The INCLUDE/EXCLUDE clause is optional and has the
following format:

INCLUDE INTERSECTIONS IF:
EXCLUDE

- INT, INL data element can be referenced.
- INL data elements can only be referenced via the
multicorrelation facility (*ANY*/*ALL*).

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Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=10,REGION=300K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:I/I-VOLUME-CODING-FORM
+ROUTES
ROUTE-SYS=ISTH,ROUTE-NUM=90
/*
```

(pages 8-153 to 8-155 left blank intentionally)

The INTSECT-MATRIX-SUMMARY Command

Function: Produces general-purpose summaries of intersections.

Description: Summaries can be printed broken down by one, two, or three data elements from the intersection, intersection cross-reference, or roadlog files. The user should be aware that intersections may be counted more than once if the intersection cross-reference file is utilized to access intersections, since one intersection may be placed into several different categories. Roadlog data elements are retrieved from the roadlog record corresponding to the intersection's principal key.

When summarizing by one data element, the output format is similar to:

```
                                          NUM
          INX.COUNTY                    INTSECT

          01 - AITKIN                     1
          04 - BELTRAMI                  14
          11 - CASS                       7

        ----- GRAND TOTAL-----            22
```

When summarizing on two data elements, the output format is similar to:

```
                                                    NUM
     INT.INTSECT-TYPE        INT.GEN-ENVIRON       INTSECT

     1 - INTERCHANGE         1 - URBAN               6
     1 - INTERCHANGE         2 - SUBURBAN            2
     1 - INTERCHANGE      -----SUBTOTAL-----         8

     3 - INTERSECTION        1 - URBAN              23
     3 - INTERSECTION        4 - RURAL              13
     3 - INTERSECTION     -----SUBTOTAL-----        36

   -----GRAND TOTAL----->                          44
```

When summarizing on three data elements, the output format is identical to that for two data elements except that one summary is printed for each value of the additional data element.

Required Command Parameters:

ROUTES subcommand - Operates under SUM classification

CATEGORIES subcommand

- INT, INX, and RLG data elements can be referenced.
- The REDEFINES and GROUPS options can be used for grouping various codes together.

Optional Command Parameters:

VIA-XREF Records are accessed via the cross-reference file (all keys).

VIA-INTSECT Records are accessed via the intersection's principal key (default).

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

--> The option list is a listing of your command parameters.

SELECT subcommand

- The INCLUDE/EXCLUDE clause is optional and has the following format:

  INCLUDE INTERSECTIONS IF:
  EXCLUDE

- INT, INL, INX, and RLG data elements can be referenced.
- When RLG data elements are used, the roadlog record corresponding to the principal key of the intersection is used for the comparisons.
- INL data elements must be referenced via the multicorrelation facility (*ANY* or *ALL*).

TITLES subcommand

Print formatting parameters: see chapter 4

Sample Job Setups:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=2,REGION=350K,SCRSIZE=2,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:INTSECT-MATRIX-SUMMARY
+ROUTES
ROUTE-SYS=USTH,ROUTE-NUM=2
+CATEGORIES
DATA-ELEMENT=INX.COUNTY
/*
```

The above job setup prints a summary similar to the first example above.
It may be copied from DT99A1B.TSOLIB.CNTL(INTMT1).

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=2,REGION=350K,SCRSIZE=2,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:INTSECT-MATRIX-SUMMARY
+ROUTES
ROUTE-SYS=USTH,ROUTE-NUM=2
+CATEGORIES
DATA-ELEMENT=INT.INTSECT-TYPE
DATA-ELEMENT=INT.GEN-ENVIRON
/*
```

The above job setup prints a summary similar to the second example above.
It may be copied from DT99A1B.TSOLIB.CNTL(INTMT2).

The LIST-SECTIONS-FILE Command

Function: Prints a listing of the sections file.

Description: The listing consists of one line per record and shows all of the data elements stored:

- Route system, route number, and reference point
- Construction district
- Verbal description
- Road design
- Through lane description
- General median type
- Left turn lane description
- District category
- Central office category
- Speed limit
- Date of update

Required Command Parameters:

ROUTES subcommand

- Operates under LIST classification.
- Summary selection parameters (eg., ZERO-USER-TOTALS) have no effect.

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed.

--> The option list is a listing of your command

parameters.

NO-CODELIST No codelist is printed.
CODELIST   One codelist is printed.

             - The codelist is a summary of the meanings of the
               coded data elements in the report.

CARD-FORMAT   Data listed in input card format.
RECORD-FORMAT Data listed in record format.

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SELECT subcommand

INCLUDE SECTION-RECORDS can be used to include only those records meeting specified requirements based on sections file data.

- SEC data elements can be referenced.

TITLES subcommand

Print formatting parameters: see chapter 4

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-SECTIONS-FILE
+ROUTES
ROUTE-SYS=01-03,CONSTR-DIST=5
/*
```

The COMPUTE-ACCIDENT-RATES Command

Function: Reports accident statistics for user-specified sections of roadway and user-specified times.

Description: COMPUTE-ACCIDENT-RATES retrieves traffic volume and accident data and combines them to provide accident rate information. The user codes one input record to define each section. One line of output is produced for each section (the optional verbal description appears below the section on a second line), and upon request all accidents used in the calculations are outputted (the optional description would then appear in the heading). Data printed in the report include:

- Route system and route number
- Starting reference point
- Ending reference point
- Section length
- Traffic volume for selected time period)
- Accident data (numbers of accidents):
    - Fatal

- Injury severity A
- Injury severity B
- Injury severity C & U
- Property damage only
- Wet surface
- Total

- Accident rates:
  - Accident rate
  - Severity rate
  - Fatal rate
  - Wet to total percentage
  - Wet to wet + dry percentage
- Verbal description (optional)

Upon request data for each accident used in the calculations will be printed using the same format as that used in report AA-4B of the PRINT-I/I-ANAL-REPORT.

The user must specify the sections to be analyzed. This can be done by using the +ROUTES subcommand or via the ACCKEYS DD statement. The format for the input records (using the latter method) follows:

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Columns	Data Element	Description
1-2	Route system	Two-digit route system code
3		blank
4-11	Route number	Eight-character route number (see page 5-4)
12		blank
13-22	Starting ref. point	Beginning of section "nnn+nn.nnn"
23		blank
24-33	Ending ref. point	Ending reference point of section
34		blank
35-72	Verbal description	(Optional) description of section

73-80	blank

NOTE: Accidents that occurred exactly at the ending reference point of a section may not be selected. Accidents will be selected if they occurred at the ending reference point only if the ending reference point marks one of the following:

1. The end of a route.
   (roadlog remark = 'EN')
2. The beginning of a gap.
   (roadlog remark = 'GP')
3. The beginning of a coincident section.
   (roadlog remark = 'CO')
4. The beginning of a non-existant section.
   (roadlog remark = 'NE')

If the ending reference point falls within a continuous piece of a route (roadlog remark is blank), accidents that occurred at that point will not be selected.

Required Command Parameters:

START-DATE=mm/dd/yyyy	Specifies starting date for traffic volume calculations and counting accidents.
END-DATE=mm/dd/yyyy	Specifies ending date for traffic volume calculations and counting accidents. Average daily volume will be computed for the time between start and end dates. The SELECT subcommand may be used to choose only certain time intervals from the period (INCLUDE TIME IF:).

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed (default).

LIST	All accidents used in the calculations are listed.
NO-LIST	No accidents are printed (default).

CODELIST Print one code list.
NO-CODELIST Do not print code lists (default).

--> The codelist is a several-page report that explains headings and codes appearing in the report.

VEHIC-DATA Vehicle data will be printed when LIST is used.
NO-VEHIC-DATA No vehicle data will be printed (default).

+ROUTES subcommand Sections can be specifed by +ROUTES instead of using the ACCKEYS DD statement. Each +ROUTES card defines a section, eg., ROUTE-SYS=MNTH,ROUTE-NUM=22,START-REF=5, END-REF=14.7 would be a section.

An advantage of the +ROUTES method is that the SELECT-SECTIONS-LISTING command can be used with a LINK option to provide +SELECT on RLG or ADT data elements in determining sections.

SELECT subcommand

- May be used to select accidents.

- The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

  INCLUDE
  ACCIDENTS IF:
  EXCLUDE

  -ACD, ACP, ACJ, ACV, and RLG data elements can be referenced.
  -RLG references require access to the roadlog file.
  -ACP, ACJ, and ACV data elements must be referenced via the multi-correlation facility (*ANY*/*ALL*).

- May be used to choose time intervals for traffic volume calculations.

- The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

  INCLUDE
  TIME IF:
  EXCLUDE

  - TIM data elements can be referenced.
  - For more on traffic volume options, see "Introduction to Volume Models" and "Time Intervals".

TITLES subcommand

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
//TIS EXEC DTRITA,TIME=2,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:COMPUTE-ACCIDENT-RATES,START-DATE=01/01/1990,END-DATE=12/31/1990
/*
//ACCKEYS DD *
01 00000035 000+00.000 010+00.000
01 00000535 000+00.000 001+00.571 ALL OF ISTH 535
```

04 26000216 002+00.500 003+00.500 ONE MILE ON CSAH 216
/*

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Section Accident Analysis Capabilities

The section accident analysis software is intended as an aid in analyzing accidents in relation to the roadways on which they occurred. Substantial flexibility is provided for performing many different types of analysis. As a result, the use of the software is very complicated and requires an understanding of the methodology used and options provided.

Note : If the user is only interested in numbers of accidents and rates for a few specifiic sections of roadway, the COMPUTE-ACCIDENT-RATES command provides the basic information with minimal computations.

The section accident analysis capabilities are implemented in four separate commands:

- SECTION-ACCIDENT-SUMMARY provides most of the analysis capabilities without using a report file.
- CREATE-ACC-SECTN-ANAL-FILE creates a report file that is needed for complete analysis.
- SORT-ACC-SECTN-ANAL-FILE sorts a report file to produce additional reports without creating a new file.
- PRINT-ACC-SECTN-ANAL-REPORT prints analysis reports utilizing a report file created by CREATE-ACC-SECTN-ANAL-FILE.

The SECTION-ACCIDENT-SUMMARY command should be sufficient to meet most analysis needs. The full potential of analysis reports is achieved by

using the CREATE-ACC-SECTN-ANAL-FILE and PRINT-ACC-SECTN-ANAL-REPORT commands in sequence.

Types of Reports Available
****

Two reports are available: the AA-6A report and the AA-6B report. The AA-6A report can be obtained via the SECTION-ACCIDENT-SUMMARY command or the PRINT-ACC-SECTN-ANAL-REPORT command. The AA-6B report is only provide d through the PRINT-ACC-SECTN-ANAL-REPORT command.

The AA-6A report is a section-by-section listing. All of the data elements present in the analysis records (command parameters specify which elements are computed) are printed.

The AA-6B report is a group-by-group listing. Command parameters define how the sections are to be grouped. All of the traffic and accident data is added up to provide rates that apply to groups of sections.

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Section Groupings
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In the simplest forms of analysis, the user does not attempt to separate sections into groups, ie., there is a single group of sections. The analysis report in this case is only the AA-6A report (the AA-6B report serves no purpose with only one group).

Frequently the user will wish to separate sections into regional groupings. For example, groups based on construction district will allow a separate AA-6A report for each district. The AA-6B report will provide comparison between districts.

Regional groupings are available for the following data elements:

Construction district	County
Maintenance area	Municipality
Patrol district	Urban area
Patrol station	

Region within region grouping such as county within district is abailable. For example, if county within district grouping is chosen,

the reports available consist of:

District 1: AA-6A report for each county in district 1.
AA-6B report grouped by county in district 1.

District 2: AA-6A report for each county in district 2.
AA-6B report grouped by county in district 2.

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. .
. .
. .

Finally, region within region within region is available. For example, sections can be grouped by municipality within county within district.

It is possible to divide sections based on section characteristics rather than location. This type of grouping is called categorizational grouping. Each section analysis record contains a 5-digit "standard category" code that generally describes the section. The standard category depends upon the method used to define the section:

If only the roadlog file defines sections (RLG-METHOD), the standard category is completed from the following data elements:

Municipal/Rural Code (RLG.URBAN-MUNIC-CODE)
Control of Access (RLG.CONTROL-OF-ACCESS)
General Median Type Code (RLG.MEDIAN-TYPE)
Number of lanes Increasing MP (RLG.NUM-LANES-IM)
Number of lanes Decreasing MP (RLG.NUM-LANES-DM)

Note: Municipal/rural code and general median type code are translated into fewer codes for categorization -- see "Defining Section Breaks" for the codes used.

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If both the sections and roadlog files are considered to determine section breaks (SEC-METHOD), the standard category is completed from the following data elements:

General Environment (SEC.GEN-ENVIRON)
Road Design (SEC.ROAD-DESIGN)
Thru Lane Description (SEC.LEFT-TURN-LANE)
General Median Type Description (SEC.MEDIAN-TYPE)
Left Turn Lane Description (SEC.LEFT-TURN-LANE)

Besides standard categorizaton, the "user categorization" facility

allows users to choose virtually any type of grouping. Allowable data elements may be chosen from the roadlog and sections files. One, two, or three data elements can be specified to comprise a category control field.

For example, suppose the user wants to group sections based solely on the general environment (SEC.GEN-ENVIRON). SEC.GEN-ENVIRON is a 1-character field that contains one of the codes U, S, B, or R. By specifying SEC.GEN-ENVIRON as the category control field, four groups of sections are established.

When two or three data elements are used for the category control field, they are joined together to form a single control field. If SEC.GEN-ENVIRON and SEC.SPEED-LIMIT are chosen and a section has SEC.GEN-ENVIRON of "U" and SEC.SPEED-LIMIT of "55", that section's category is "U55."

Regional groupings can be combined with categorization grouping to allow grouping such as "category within county" or "category within municipality within county within district." Categorizational grouping is always the lowest level, ie., "category within county" is possible but "county within category" is not.

The Section Analysis Report File

The SECTION-ACCIDENT-SUMMARY command does not use a report file. It prints the sections as they are completed (AA-6A report) and makes only one pass throught the data.

Report files are produced by the CREATE-ACC-SECTN-ANAL-FILE command. One record is in the file for each selected section. The record is made up of seven segments:

- Section Identification segment
- Region segment
- Category segment
- Accident segment
- Significance segment
- Traffic/True mileage segment
- Descriptor segment

The section identification segment contains the starting and ending reference points and dates.

The region segment contains the data elements used for regional groupings, such as construction district and county.

The category segment contains the data elements used for categorizational grouping, including a standard category field and a user category field.

The accident segment contains numbers of accidents, rates, and wet accident percentages for the section.

The significance segment contains the statistical values for comparing sections within a group.

The descriptor segment contains the remaining data elements from the roadlog and sections files, such as verbal descriptions, speed limits, etc.

Computations Used When Creating the Report File

Accident analysis requires a number of computations to complete the traffic, accident, and significance segments of the report records.

The ADT (Average Daily Traffic) is a time-weighted average value for the section. Since a section may correspond to several traffic file records, the traffic volume may vary within the section and the software must combine true mileage and traffic data to obtain an average value. If the START-DATE and END-DATE parameters specify different years, the ADT is time-weighted for the report period. If effective dates in the roadlog file for the section fall between the START-DATE and END-DATE, the ADT is further adjusted to reflect the shorter analysis period for that roadlog section.

Vehicle miles are accumulated during the ADT computations:

$$\text{Vehicle miles (VM)} = \text{ADT} \times \text{LEN} \times \text{TIME}$$

ADT = Average daily traffic
LEN = Section length
TIME = Time period in days

The accident rate for the sectoin is computed as:

$$\text{Accident Rate (AR)} = \frac{1{,}000{,}000 \times \text{ACC}}{\text{VM}}$$

ACC = Number or accidents for the section
VM = Vehicle miles

The severity rate is similar to accident rate with a weighted value for the severity of the accident:

$$\text{Severity Rate} = \frac{1{,}000{,}000 \times ((10 \times \text{FAT}) + (4 \times \text{INJ}) + \text{PRP})}{\text{VM}}$$

FAT = Number of fatal accidents
INJ = Number of injury accidents
PRP = Number of property damage only accidents
VM = Vehicle miles

Accident and severity rates are not sufficient for comparing sections. If tow sections both have an accident rate of 5.0, but the first has 8 million vehicle miles and the second has 11 million vehicle miles, the second is the more severe case. Significance limits are intended to more accurately compare secitons.

In computing significance limits, factor K is used. The value of K determines how many sections will be identified as out of significance. Several commonly used values are:

2.326 Approximately 1% of the secions are identified as significantly above average and approximately 1% of the sections are identified as significantly below average.

1.645 Approximately 5% of the secions are identified as significantly above average and approximately 5% of the sections are identified as significantly below average.

1.281 Approximately 10% of the secions are identified as significantly above average and approximately 10% of the sections are identified as significantly below average.

The software normally uses K = 1.645, but the user is allowed to specify other values.

To compute significance limits, the software must first examine all of the sections in the group in order to compute an average accident rate for the group:

$$1{,}000{,}000 \times \text{TOTACC}$$

$$\text{Average Accident Rate (AAR)} = \frac{\text{TOTACC}}{\text{TOTVM}}$$

TOTACC = Total accidents for the group
TOTVM = Total vehicle miles for the group

An upper limit and a lower limit can then be computed for each section in the group:

$$\text{Upper Limit (UL)} = \text{AAR} + (\text{K} * \text{RAD}) + \frac{1}{2 \times \text{MVM}}$$

$$\text{Lower Limit (LL)} = \text{AAR} - (\text{K} * \text{RAD}) - \frac{1}{2 \times \text{MVM}}$$

AAR = Average accident rate for the group
K = Significance constant
MVM = Millions of vehicle miles for this section
RAD = Square root of (AAR/MVM)

The accident rate of the section can then be compared to the limits to compute amount out of significance and ratio out of significance.

The amount out of significance is computed as:

If AR < LL then AMTOUT = AR - LL (negative)

If LL ó AR ó UL then AMTOUT = 1 (in significance)

If AR > UL then AMTOUT = AR - UL (positive)

AR = Accident rate for the section
LL = Lower limit for the seciton
UL = Upper limit for the section
AMTOUT = Amout out of significance

Hence, the amount out of significance has these meanings:

If AMTOUT is zero, the accident rate is within significance.
If AMTOUT is negative, the accident rate is significantly below average.
If AMTOUT is positive, the accident rate is significantly above average.

The amount out of significance provides an easy determination as to whether a section is in or out of significance, but is still not a good factor for comparision. For example, if one section has an out of significance value of 3.6 and another has a value of 3.5, the first is not necessarily "worse" than the second. The ratio out of significance is better for such comparisons.

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The ratio out of significance is computed as:

$$RATOUT = \frac{AR - AAR}{UL - AAR} \quad \text{If AR ò AAR}$$

$$RATOUT = \frac{AR - AAR}{AAR - LL} \quad \text{If AR < AAR}$$

AR = Accident rate for the section
AAR = Average accident rate for the group
LL = Lower limit of significance
UL = Upper limit of significance
RATOUT = Ratio out of significance

The ratio out of significance has the following meanings:

If RATOUT > 1.0, AR is significantly above average.
If RATOUT = 1.0, AR = UL.
If 0.0 < RATOUT < 1.0, AR > AAR but is within significance.
If RATOUT = 0.0, AR = ARR.

If -1.0 < RATOUT < 0.0, AR < AAR but is within significance.
If RATOUT = -1.0, AR = LL.
If RATOUT < -1.0, AR is signifincantly below average.

Defining Section Breaks

The roadlog and sections files are the basis for determining starting and ending locations of analysis sections. The users control of section breaks is by the SELECT and BREAKS subcommands. There are default section breaks that will be used if no SELECT or BREAKS subcommand is coded. These are determined from the sections file (if considered) and the roadlog file.

Administrative breaks are determined by the roadlog file through the following data elements:

RLG.REMARK-CODE	A break occurs whenever codes GP, CO, NE, or EN are encountered.
RLG.EFFECTIVE-DATE	Sections are not considered if this date is later than the specified END-DATE.
RLG.INTERSECT-CATEGORY	A break occurs whenever codes 01-07 are found.
RLG.MEDIAN-TYPE	Codes are consolidated into unknown, raised, depressed, and couplet. When these change a break occurs.
RLG.URBAN-MUNIC-CODE	Breaks occur between municipal and non-municipal values.

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A break occurs whenever one of the following data elements changes:

RLG.COUNTY-NUM
RLG.CONSTR-DIST
RLG.MAINT-AREA
RLG.CONTROL-OF-ACCESS
RLG.TOTAL-THRU-LANES

If the sections file is included (an option of the commands), then a break will happen at the beginning of every section record (in addition to the breaks caused by the roadlog file).

A SELECT subcommand can cause additional breaks whenever the roadway data changes from "selected" to "not-selected" or vice versa. Portions of roadways not selected will not be included in the reports.

Use of the BREAKS Subcommand

The user can completely override the above default breaks by coding a BREAKS subcommand. When used, sections will be determined solely by the criteria of the BREAKS subcommand. The minimum required break points are when roadlog remark code changes (gaps, coincidence, non-existent mileage, and end-of-route records). The ROUTES subcommand can also force section breaks, because it limits the reports to certain parts of roadways (eg., when running BY-COUNTY). For further details on the BREAKS subcommand, see chapter 7.

Section Selection

A great deal of the flexibility of the section accident analysis software is due to the user's ability to choose which data is processed.

SELECT may be used in the first step of the analysis process against the base files - roadlog and sections. For example, the report can be limited to those sections whith surface width less than 24 feet by the statement:

```
INCLUDE ROADLOG-RECORDS IF:
     RLG.SURF-WID-RD1 *LT* '24' *AND* RLG.SURF-WID-RD2 *LT* '24'
```

SELECT could also be used on the sections file to include only 45 mph zones:

```
INCLUDE SECTION-RECORDS IF:
     SEC.SPEED-LIMIT *EQ* '45'
```

Base file selection may be applied to any data element in the roadlog or sections files.

Selection can be done on analysis records also. This allows the user to screen sections based on computed fields in completed records. An

example would be "include only sections less than one mile long with 20 or more accidents":

```
INCLUDE SECTN-ANAL-RECORDS IF:
     ASA.SECTION-LENGTH *LT* 1.0 *AND* ASA.TOT-NUM-ACC *GE* 20
```

Certain data elements could be selected either in the base file or in the analysis record (eg., SPEED-LIMIT). It is more efficient to eliminate sections as early as possible to minimize data retrieval and computations. Also note that significance limits computations are done BEFORE INCLUDE SECTN-ANAL-RECORDS selection is made.

INCLUDE SECTN-ANAL-RECORDS selection can be done either with CREATE-ACC-SECTN-ANAL-FILE or with PRINT-ACC-SECTN-ANAL-REPORT. The difference is only in the amount of storage space used for the report file because sections eliminated at creation are not placed in the file.

Accident Selection

The ability to select accidents adds additoinal flexibility to the section accident analysis software. For example, a use can compare accident histories among sections considering only those accidents on a wet surface.

The user always select accidents based on date of occurrence. Only those accidents that occurred between the START-DATE and END-DATE parameters are considered.

Each accident carries a location reliability code that serves to indicate how well the coder thought the accident was located:

1 No location error expected
2 Possible location error
3 Probable location error

The ACC-RELIABILITY parameter allows the user to easily exclude those with poor reliability.

Each accident carries a code that indicates whether it was a junction-related accident. The ACC-INT-LOCN parameter makes it easy to select accidents based on this field.

Finally, SELECT is implemented with an INCLUDE ACCIDENTS IF: option that allows the user to select accidents based on virtually any characteristic or combination of characteristics.

Guide to Command Parameters
****

- Which reports will be printed.

  The SECTION-ACCIDENT-SUMMARY command prints only the AA-6A report. The PRINT-ACC-SECTN-ANAL-REPORT always prints the AA-6B report and optionally the AA-6A report (specify LIST).

- Grouping sections for printing.

  The SORT subcommand defines groupings. It can be specified with CREATE-ACC-SECTN-ANAL-FILE, SORT-ACC-SECTN-ANAL-FILE, or PRINT-ACC-SECTN-ANAL-REPORT. No grouping is available with the SECTION-ACCIDENT-SUMMARY command.

- Grouping sections by user category

  When user categorizational grouing is used, a CATEGORIES sucommand is included with the CREATE-ACC-SECTN-ANAL-FILE command to identify which data element(s) form the category control field.

- Grouping sections for significance limits computations.

  Significance limits groupings are those specified by the SORT subcommand with CREATE-ACC-SECTN-ANAL-FILE. For example, if SORT indicates grouping by district, then one average accident rate is computed for each district so that sections of one district are never compared to sections of another district.

  If the file is subsequently resorted the significance limits are not recomputed. For example, if the file just described is resorted by category, the sections are still compared district-wide, but they will be printed by category.

- Order of sections within a group.

  The SORT subcommand is used to specify the order in which sections will be listed within each group. Unless specified otherwise, the sections will be in order by starting location (route system, route number, and starting refernece point).

  If CREATE-ACC-SECTN-ANAL-FILE is instructed to include accident or

significance limits data, SORT can be used to specify any of the following orders:

If accident data included:

Total number of accidents
Accident rate
Severity rate
Wet:wet+dry percentage
Wet:total percentage

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If significance limits data included:

Amount out of significance
Ratio out of significance

When SORT is used with CREATE-ACC-SECTN-ANAL-FILE or SORT-ACC-SECT-ANAL-FILE, the file is reordered until another SORT subcommand is used. The PRINT-ACC-SECTN-ANAL-REPORT command can only do a temporary sort and the file is never altered.

The SECTION-ACCIDENT-SUMMARY command has no sort capability. Sections will always be printed in the order specified by the ROUTES subcommand.

- Significance limits computations.

  The constant K in the upper and lower limits formulas is normally 1.645. The SIG-CONST parameter of CREATE-ACC-SECTN-ANAL-FILE can be used to enter an overriding value.

  The average accident rate (AAR) for a group of sections is normally computed by the software, requiring additional overhead. The AVG-ACC-RATE parameter of CREATE-ACC-SECTN-ANAL-FILE allows the user to enter a value, thus saving the additional overhead costs. If a value is entered, it applies to all of the groups.

- Best/worst searches.

  The software allows such requests as "find the 20 sections having the highest accident rates."

  To perform a best/worst search, the user must first choose which data element is to be used to define "best" or "worst" from the following list:

  Total number of accidents

Accident rate
Severity rate
Wet:wet+dry percentage
Wet:total percentage

Amount out of significance
Ratio out of significance

If one of the first 5 is chosen either ACCIDENTS or SIG-LIMITS must be specified with CREATE-ACC-SECTN-ANAL-FILE. If one of the last 2 is chosen, SIG-LIMITS must be specified.

The chosen data element must be indicated in the SORT subcommand to define the ordering within groups. Use the default sort of DOWN for worst searches and UP for best searches.

The MAX-NUMBER-I parameter can be used with PRINT-ACC-SECTN-ANAL-REPORT to indicate how many sections are to be printed. In the case of ties, more than the indicated number may be printed. For example, if the user requests 20 sections, and if the 20th, 21st, and 22nd sections have identical values, 22 sections are printed from that group.

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The SECTION-ACCIDENT-SUMMARY Command

Funciton: Provides most of the section accident analysis capabilities
--------- without utilizing an analysis file.

Description: The SECTION-ACCIDENT-SUMMARY command uses the same
------------ methodology for defining and analyzing roadway sections as the CREATE-ACC-SECTN-ANAL-FILE command. This command makes only one pass through the files and prints each section at the time the data from the various TIS files is combined. This minimal processing of data will cost considerably less than creating an analysis file, but implies certaion limitations:

(1) Sections are always printed in the order specified by the ROUTES subcommand.
(2) Significance limits are not computed.
(3) User categorization is not provided.

The section-by-section output format includes the refernece points and descriptions of non-existent, coincident, and non-selected sections, etc., but no analysis is done for excluded sections.

Required Command Parameters:

START-DATE=mm/dd/yyyy Specifies starting date for the report.

END-DATE=mm/dd/yyyy Specifies ending date for the report.

- Defines the report period for both traffic and accidents.
- Accidents will be considered for the time between these dates (inclusive), subject to other criteria.
- Vehicle miles will be computed for the time between start and end dates. The SELECT subcommand may be used to choose only certain time intervals from the period (INCLUDE TIME IF:).

ROUTES subcommand

- Operates under SUM classification.

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed with each individual summary (default).

- The option list is a summary of the command parameters.

NO-CODELIST	No codelists are printed.
CODELIST	A several-page codelist is printed with each individual summary (default).

- The codelist is a summary of codes and headings used in the report.

RLG-METHOD	Section breaks are defined solely by the roadlog file.
SEC-METHOD	Section breaks are defined by the sections and roadlog files together (default).

NO-ACCIDENTS	Do not retrieve accident data.
ACCIDENTS	Include accident data (default).

- NO-ACCIDENTS will set all accident and rate fields to zeroes. The sections will be reported with length and vehicle miles only.

LIST-ACC	List accidents for each section.
NO-LIST-ACC	Do not list accidents (default).

- Only meaningful if "ACCIDENTS" option (above).

NO-MESSAGES	Do not print error messages for missing traffic data.
MESSAGES	Print error messages when traffic data missing (default).

- When traffic data is incomplete the section will still be analyzed with available vehicle miles.

ACC-INT-LOCN =	INTSECT	Include intersection accidents only.
	NON-INTSECT	Include non-intersection accident only.
	ALL	Include all accidents (default).

"INTSECT" accidents are those with ACD.INTSECT-RELATION values of

- 02 - T-INTERSECTION
- 03 - Y-INTERSECTION
- 04 - 4-LEGGED INTERSECTION
- 05 - 5 OR MORE LEG INTERSECT
- 06 - TRF CIRCLE OR ROUNDABOUT
- 07 - INTERSECTION-RELATED
- 20 - INTERCHANGE ON RAMP
- 21 - INTERCHANGE OFF RAMP
- 22 - INTERCHANGE OTHER AREA

ACC-RELIABILITY =

- 1 Include reliability 1 only.
- 2 Include reliability 1 or 2.
- 3 Include reliability 1, 2, or 3 (default).

- Use to select accidents based on location reliability.
- Do not use ACC-RELIABILITY when NO-ACCIDENTS is used.

SELECT subcommand

- Four options are available: INCLUDE ROADLOG-RECORDS, INCLUDE SECTION-RECORDS, INCLUDE TIME, and INCLUDE ACCIDENTS.

- INCLUDE ROADLOG-RECORDS can be used to include only those sections meeting specified requirements based on roadlog data.
  - RLG data elements can be referenced.
  - A section break occurs whenever the select result changes (ie., from selected to not-selected, or vice versa).

- INCLUDE SECTION-RECORDS can be used to include only those sections meeting specified requirements based on sections file data.
  - SEC data elements can be referenced.
  - SEC-METHOD must be used to select on section file data.
  - When both INCLUDE ROADLOG-RECORDS and INCLUDE SECTION-RECORDS are used, both select results must be yes or the section is not selected.

- INCLUDE TIME can be used to choose only certain hours or dates for computing traffic volume (this only applies to traffic, it has no effect on accidents).

    - TIM data elements can be referenced.
    - Time is the period between the START-DATE and END-DATE. Select only applies within that range.
    - For more on traffic volume options, see "Introduction to Volume Models" and "Time Intervals".

- INCLUDE ACCIDENTS can be used to screen accidents.

    - ACD, ACV, ACP, and ACJ data elements can be referenced.
    - ACP, ACJ, and ACV data elements must be referenced via the multi-correlation facility (*ANY*/*ALL*).
    - ACCIDENTS must be in effect to allow selection of accidents.

BREAKS subcommand

Allows the user to specify what causes section breaks.

- RLG data elements can be referenced.
- SEC data elements can be referenced if SEC-METHOD.
- Up to 20 data elements can be chosen.
- The total length of the data elements must be less than 90.
- The REDEFINES option can be used to form groups of values for a particular data element. Breaks will then only occur when the value moves from one group to another.
- The POINTS option can be used to isolate certain values of a data element. Specified values will always cause breaks (even if the value does not change from the previous record).

If BREAKS not included, section breaks occur at default locations (RLG-METHOD or SEC-METHOD).

For further explanation, see chapter 7.

TITLES subcommand

Print formatting parameters: See chapter 4.

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Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
//TIS EXEC DTRITA,TIME=5,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:SECTION-ACCIDENT-SUMMARY,START-DATE=01/01/1989,
:  END-DATE=12/31/1989,SEC-METHOD
+ROUTES
ROUTE-SYS=01-03,CONSTR-DIST=1
+SELECT
 INCLUDE SECTION-RECORDS IF:
    SEC.SPEED-LIMIT *EQ* '55'
/*
```

The following commands illustrate how the BREAKS subcommand could be used to have the same section breaks as the default for SEC-METHOD.

```
:SECTION-ACCIDENT-SUMMARY,START-DATE=01/01/1982,
:  END-DATE=12/31/1982,ACCIDENTS,SEC-METHOD
+ROUTES
ROUTE-SYS=01,ROUTE-NUM=90
+BREAKS
SEC.REF-POINT
RLG.COUNTY-NUM
RLG.CONSTR-DIST
RLG.MAINT-AREA
RLG.CONTROL-OF-ACCESS
RLG.TOTAL-THRU-LANES
RLG.URBAN-MUNIC-CODE
REDEFINES
1 2
3 4
RLG.INTERSECT-CATEGORY
```

```
POINTS
01
02
03
04
05
06
07
RLG.MEDIAN-TYPE
REDEFINES
2 D
8 D
1 R
3 R
5 R
6 R
7 R
```


The above BREAKS occur on the following conditions:

```
SEC.REF-POINT   <-- break whenever this changes, which means
                    every section record location.

RLG.COUNTY-NUM
RLG.CONSTR-DIST         <-- break whenever the data elements
RLG.MAINT-AREA              change value (county lines, change
RLG.CONTROL-OF-ACCESS       in number of lanes, etc.).
RLG.TOTAL-THRU-LANES

RLG.URBAN-MUNIC-CODE   <-- break whenever code changes from (1
                           or 2) to (3 or 4) or vice versa
                           (municipal/nonmunicipal boundaries)
                           Redefining 1 to 2 means do not break
                           when there is a change from 1 to 2
                           or from 2 to 1.

RLG.INTERSECT-CATEGORY   <-- break on any value 01-07.  The
                             POINTS allow breaking on a
                             particular value or values of a
                             data element even though it did
                             not change from the previous
                             record.  In this case section
```

breaks will happen at
intersections with route systems
01 through 07.

RLG.MEDIAN-TYPE <-- Redefined similar to urban-munic-code,
codes are lumped into groups so that
breaks only occur when median changes
general type (depressed, raised, couplet)

The minimum required breaks are at change in roadlog remark code and route number (ie., the user can never turn off these breaks). Whenever the BREAKS subcommand is present, the breaks it defines are the only additional section breaks. Thus, the user may have more breaks than the default, or less then the default.

Note that some data elements which are printed on the report may vary within a section if they are not criteria for BREAKS. The user must be aware that this can happen, and that the value printed may only be valid at the start of the section.

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The CREATE-ACC-SECTN-ANAL-FILE Command

Function: Creates the section analysis report file for later use by the PRINT-ACC-SECTN-ANAL-REPORT command.

Description: The file produced by CREATE-ACC-SECTN-ANAL-FILE is a sequential file that can be placed on either disk or tape. It contains information gathered from the roadlog, trun mileage, traffic, and optionally, the sections and accident files. It can be considered as a "snapshot" of these files at the time it is created. As time goes on, it will become out of date with the source files because the other TIS files are constantly changing. The report file is needed to produce the AA-6A and AA-6B reports through the

PRINT-ACC-SECTN-ANAL-REPORT command, and can be retained for future reports or destroyed and recreated as needed.

The printed output from CREATE-ACC-SECTN-ANAL-FILE includes:

- Option list (list of command parameters).
- Listing of sections as they are written to the file.
- Termination message.

THe option list and listing of sections can be suppressed. The LIST parameter indicates whether the listing of sections is desired. Data elements printed in the lising include:

-Location information:
  - Route system and number
  - Starting and ending reference points
  - Starting verbal description
- Section length
- Vehicle miles
- Group number
- Jurisdicational information:
  - Municipal/rural code
  - Construction district
  - Maintenance area
  - Patrol station
  - County
  - City
  - Urban
- Standard category
- Accident information (if accidents requested):
  - Total accidents
  - Accident rate
  - Severity rate
  - Average accident rate for the group
- Significance limits data (if requested):
  - Lower limit
  - Upper limit
  - Amount out
  - Ratio out

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If SIG-LIMITS is requested and AVG-ACC-RATE is omitted, the program must compute an average accident rate for each group of sections. The LISTING OF AVERAGE ACCIDENT RATES FOR SIG-LIMITS shows the computed rates, together with the total number of accidents and total vehicle

miles that were used to compute the rates:

GROUP	NUM SECTION	TOT ACC	MILLION VEHICLE MILES	AVG RATE
1	69	758	691.795088	1.1
2	15	17	9.215055	0.7
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
TOTAL	175	2706	992.405365	1.3

The group numbers are assigned from 1 to n to relate sections to their groups.

JCL For Report File: Because the report file is a user-controlled file outside of the permanent TIS file system, the user must provide JCL (Job Control Language) that defines the location of the file. Four options are available to the user:

- The file may be a scratch file.
- The file may be a temporary file on disk.
- The file may be a permanent file on disk.
- The file may be a temporary or permanent file on tape.

If a scratch file is used, it is simplest to use a disk file. The file will be in existence only for the duration of the TIS job step, and is deleted immediately upon completion of the run. The advantages of using a scratch file are:

- No permanent storage space is retained.
- JCL is simplest for scratch files.
- There is no danger of confusing several existing files and using the wrong one.

The disadvantages of using a scratch file are:

- The PRINT-ACC-SECTN-ANAL-REPORT command must be included with the CREATE-ACC-SECTN-ANAL-FILE command, and if the user wishes to change any parameters, the entire job must be resubmitted.
- If the same file is recreated frequently, most of the analysis computations are being repeated unnecessarily.

If a temporary disk file is used, it is retained for a one-week period and is then purged by the operating system. When a temporary disk file is used, restart is possible when CREATE-ACC-SECTN-ANAL-FILE completes but PRINT-ACC-SECTN-REPORT fails for some reason without the need for recreating the file. The user is responsible for assigning a unique name to the file so it is not confused with other files. If the CREATE step is repeated, use DISP=OLD or a second file will be allocated, and

the PRINT command will see the original one (which does not have the data produced by the second CREATE job).

A permanent disk file -- one that is to be retained for longer than one week -- requires the user to make a request for disk space from ISB. The JCL for creating the permanent file is the same as that for a temporary disk file except that ISB provides a volume serial number where the file must be placed so they can protect it.

A tape file can be retained for any length of time without permission from ISB. The user specifies the retention period when the when the file is created.

The JCL for the report file consists of a single DD (Data Definition) statement. The user may choose any ddname for this DD statement, and informs CREATE-ACC-SECTN-ANAL-FILE via the OUTPUT-DD parameter. A suggested name for the DD statement is ASA.

The best situation for using a scratch file is for running a one-time small report. As the cost of creation the file increases or the user plans to run several reports from the same file, a temporary disk file should be used. The experienced user will probably find that tape files are the best method because they are cheapest and they need only be created occasionally and then retained for printing reports as needed.

Required Command Parameters:

OUTPUT-DD=ddname

- Use this parameter to indicate the name you have coded on the DD statment for the report file.

ROUTES subcommand

- Indicate which routes are to be processed.
- Gap, coincident, non-existent, and non-selected mileage is always excluded.
- This command operates under the LIST classification.

START-DATE=mm/dd/yyyy
END-DATE=mm/dd/yyyy

--> Use to indicate the time period of the analysis report.
--> Time intervals within these period may be further limited by using the SELECT subcommand for VEHICLE MILES COMPUTATIONS ONLY.
--> Omit these parameters if NO-ACCIDENTS is used.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

--> The option list is a listing of your command parameters.

SIG-LIMITS Include accident and sig-limits data elements.
ACCIDENTS Include accident but not sig-limits data elements.

```
NO-ACCIDENTS   Do not include accident and sig-limits data
               µ elements (default).

     --> If NO-ACCIDENTS is used, all accident an sig-limits data
            elements of the report file will contain zeroes.
     --> If ACCIDENTS is used, accident data is retrieved and
            added to the report ifle.  Sig-limits elements will
            contain zeroes.
     --> If SIG-LIMITS is used, accident elements as well as sig-
            limits elements will be included in the report file.
```


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```
                 INTSECT      Include intersection accidents only.
ACC-INT-LOCN =   NON-INTSECT  Include non-intersection accidents only
                 ALL          Include all accidents (default).


     --> "INTSECT" accidents are those with ACD.INTSECT-RELATION =
                          02 - T-INTERSECTION
                          03 - Y-INTERSECTION
                          04 - 4-LEGGED INTERSECTION
                          05 - 5 OR MORE LEG INTERSECT
                          06 - TRF CIRCLE OR ROUNDABOUT
                          07 - INTERSECTION-RELATED
                          20 - INTERCHANGE ON RAMP
                          21 - INTERCHANGE OFF RAMP
                          22 - INTERCHANGE OTHER AREA

     --> Do not use ACC-INT-LOCN when NO-ACCIDENTS is used.

                       1    Include reliability 1 only.
ACC-RELIABILITY =      2    Include reliability 1 or 2.
                       3    Include reliability 1, 2, or 3 (default).

                     - Use to select accidents based on location
                         reliability.
                     - Do not use ACC-RELIABILITY when NO-ACCIDENTS
                         is used.
```

SIG-CONST-nn.nnn

- This parameter can be used to enter an overriding valuse for the constant K in the significance limits formulas.
  In its absence a value of 1.645 is used.
- Do not code this parameter unless SIG-LIMITS is used.

AVG-ACC-RATE=nn.n

- This parameter can be used to enter an average accident rate for significance limits computations.
- When used, this parameter reduces overhead.
- Be sure the value entered is valid or errors will be introduced into the significance limits.
- Do not code this parameter unless SIG-LIMITS is used.

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NO-LIST	Do not print section listings.
LIST	Print section listings (default).

- LIST requests a listing showing the sections included in the report file.
- When SIG-LIMITS is used without AVG-ACC-RATE, the listing includes the summary of average accident rates.

RLG-METHOD	Section breaks are defined solely by the roadlog file.
SEC-METHOD	Section breaks are defined by the sections and roadlog files together (default).

NO-MESSAGES Do not print error messages for missing traffic.

MESSAGES Print error messages indicating missing traffic (default).

- When traffic data is incomplete the section will have zero vehicle miles.

CATEGORIES subcommand

- Use CATEGORIES when user-defined categories are needed for the purpose of grouping sections.
- If RLG-METHOD, only RLG data elements can be referenced.
- If SEC-METHOD, RLG and SEC data elements can be referenced.
- Indicate one, two, or three data elements where the combined lengths do not exceed 18 characters.
- The REDEFINES and GROUPS options of CATEGORIES can be used to combine several categories into one.
- RLG data elements are taken from the FIRST roadlog record corresponding to the section.

SORT subcommand

- Use SORT to indicate (1) how sections are grouped and (2) how sections are ordered within groups.
- If SORT is omitted, there will be just one group and the sections will be ordered by key (route system, route number, and starting reference point).

- The data elements that can be used in SORT are:

Class A-1:	ASA.CONSTR-DIST	Construction district
	ASA.MAINT-AREA	Maintenance area
	ASA.PTRL-STATION	Patrol station
	ASA.PTRL-DIST	Patrol district
Class A-2:	ASA.COUNTY	County
Class A-3:	ASA.CITY	Municipality
	ASA.URB-AREA	Urban area
Class A-4:	ASA.CATEGORY	Category (standard)
	ASA.USER-CATEGORY	Category (user-defined)
Class B:	ASA.TOT-NUM-ACC	Total number of accidents
	ASA.ACC-RATE	Accident rate
	ASA.SEV-RATE	Severity rate
	ASA.WET-DRY-PERCENT	Wet:wet+dry percentage
	ASA.WET-TOTAL-PERCENT	Wet:total percentage
	ASA.AMT-OUT-OF-SIG	Amount out of significance
	ASA.RATIO-OUT-OF-SIG	Ratio out of significance
	ASA.TOT-NUM-ACC-NJ	Total non-junction accidents
	ASA.ACC-RATE-NJ	Non-junction accident rate
	ASA.SEV-RATE-NJ	Non-junction severity rate

- Either zero or one data element can be chosen from each class.
- Under no circumstances can two elements be chosen from the same class.
- The class A data elements define the groupings of sections. These data elements default to UP (sorted smallest to largest).

Example 1. Group sections by county:

```
+SORT
ASA.COUNTY
```

Example 2. Group sections by urban area within district:

```
+SORT
ASA.CONSTR-DIST
ASA.URB-AREA
```


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- The class B data elements define the order of sections within groups. These data elements default to DOWN (sorted largest to smallest).

  Example 3. Default to statewide grouping and sort based on accident rate.

  ```
  +SORT
  ASA.ACC-RATE
  ```

  Example 4. Group sections by county and sort by number of accidents, smallest to largest:

  ```
  +SORT
  ASA.COUNTY
  ASA.TOT-NUM-ACC,UP
  ```

  - Of the class B data elements, ASA.AMT-OUT-OF-SIG and ASA.RATIO-OUT-OF-SIG can be referenced only if SIG-LIMITS is used. The remaining class B data elements can be referenced unless NO-ACCIDENTS is used.
  - The class A-4 data element ASA.USER-CATEGORY can be referenced only if a CATEGORIES subcommand is present.
  - The options UP and DOWN can be specified with any data element to explicitly state the order of sorting (note example 4).

SELECT subcommand

- INCLUDE ROADLOG-RECORDS can be used to include only those sections meeting specified requirements based on roadlog data.
  - RLG data elements can be referenced.
  - A section break occurs whenever the select result changes (ie., from selected to not-selected, or vice versa).
- INCLUDE SECTION-RECORDS can be used to include only those sections meeting specified requirements based on sections file data.
  - SEC data elemetns can be referenced.
  - SEC-METHOD must be used to select on section file data.
  - When both INCLUDE ROADLOG-RECORDS and INCLUDE SECTION-RECORDS are used, both select results must be yes or the section is not selected.
- INCLUDE TIME can be used to choose only certain hours or dates for computing ADT (this only applies to traffic, it has no effect

on accidents).

- TIM data elements can be referenced.
- Time is the period between the START-DATE and END-DATE. Select only applies within that range.
- For more on traffic volume options, see "Introduction to Volume Models" and "Time Intervals".

- INCLUDE ACCIDENTS can be used to screen accidents.

    - ACD, ACV, ACP, and ACJ data elements can be referenced.
    - ACP, ACV, and ACJ data elements must be referenced via the multi-correlation facility (*ANY* or *ALL*).
    - ACCIDENTS or SIG-LIMITS must be used to allow accident selection.

-INCLUDE SECTN-ANAL-RECORDS can be used to select completed analysis records before writing then to the report file.

    - ASA data elements can be refernced.
    - Accident data elements can be reference unless NO-ACCIDENTS is used.
    - Sig-limits data elements can be referenced only if SIG-LIMITS is used.
    - It is more efficient to use INCLUDE ROADLOG-RECORDS or INCLUDE SECTION-RECORDS for data elements that are placed directly into report records from those source files.

BREAKS subcommand

Allows the user to specify what causes section breaks.

- RLG data elements can be referenced.
- SEC data elements can be referenced if SEC-METHOD.
- Up to 20 data elements can be chosen.
- The total length of the data elements must be less than 90.
- The REDEFINES option can be used to form groups of values for a particular data element. Breaks will then only occur when the value moves from one group to another.
- The POINTS option can be used to isolate certain values of a data element. Those listed will always cause breaks (even if the value does not change from the previous record).

If BREAKS not included, section breaks occur at default
locations (RLG-METHOD or SEC-METHOD).

For further explanation, see chapter 7.

TITLES subcommand

Print formatting parameters: See chapter 4.

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Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
//TIS EXEC DTRITA,TIME=10,SCRSIZE=5,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:CREATE-ACC-SECTN-ANAL-FILE,OUTPUT-DD=ASAFILE,START-DATE=01/01/1987,
:  END-DATE=12/31/1987,SIG-LIMITS
+ROUTES
ROUTE-SYS=01
+CATEGORIES
DATA-ELEMENT=SEC.GEN-ENVIRON
DATA-ELEMENT=SEC.THRU-LANE
REDEFINES
3 M
4 M
+SELECT
 INCLUDE ACCIDENTS IF:
  ACD.INTCHANGE-ELEM *EQ* '   ' *OR* (ACD.INTCHANGE-ELEM
  *GE* '100' *AND* ACD.INTCHANGE-ELEM *LE* '999')
+SORT
ASA.USER-CATEGORY
+TITLES
  1987 INTERSTATE SECTIONS GROUPED BY DISTRICT
       ALSO GROUPED BY GENERAL ENVIRONMENT AND THRU LANES
/*
```

```
        //ASAFILE DD UNIT=TAPE,DISP=(NEW,CATLG),DSNAME=USER-ID.ASA001,
        //   LABEL=RETPD=30
```



```
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```


The following commands illustrate how the BREAKS subcommand could be used to have the same section breaks as the default for SEC-METHOD.

```
     :CREATE-ACC-SECTN-ANAL-FILE,OUTPUT-DD=ASAFILE,
     :  START-DATE=01/01/1977,END-DATE=12/31/1977,SIG-LIMITS
     +ROUTES
     ROUTE-SYS=01,ROUTE-NUM=90
     +BREAKS
     SEC.REF-POINT
     RLG.COUNTY-NUM
     RLG.CONSTR-DIST
     RLG.MAINT-AREA
     RLG.CONTROL-OF-ACCESS
     RLG.TOTAL-THRU-LANES
     RLG.URBAN-MUNIC-CODE
     REDEFINES
     1 2
     3 4
     RLG.INTERSECT-CATEGORY
     POINTS
```

01
02
03
04
05
06
07
RLG.MEDIAN-TYPE
REDEFINES
0 U
4 C
2 D
8 D
1 R
3 R
5 R
6 R
7 R

The above BREAKS occur on the following conditions:

SEC.REF-POINT <-- break whenever this changes, which means every section record location.

RLG.COUNTY-NUM
RLG.CONSTR-DIST <-- break whenever the data elements
RLG.MAINT-AREA change value (county lines, change
RLG.CONTROL-OF-ACCESS in number of lanes, etc.).
RLG.TOTAL-THRU-LANES

RLG.URBAN-MUNIC-CODE <-- break whenever code changes from (1 or 2) to (3 or 4) or vice versa (municipal/nonmunicipal boundaries) Redefining 1 to 2 means do not break when there is a change from 1 to 2 or from 2 to 1.

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RLG.INTERSECT-CATEGORY <-- break on any value 01-07. The POINTS allow breaking on a particular value or values of a data element even though it did not change from the previous record. In this case section breaks will happen at intersections with route systems

01 through 07.

```
       RLG.MEDIAN-TYPE   <-- Redefined similar to urban-munic-code,
                             codes are lumped into groups so that
                             breaks only occur when median changes
                             general type (depressed, raised, couplet)
```

The minimum required breaks are at change in roadlog remark code and route number (ie., the user can never turn off these breaks). Whenever the BREAKS subcommand is present, the breaks it defines are the only additional section breaks. Thus, the user may have more breaks than the default, or less then the default.

Note that some data elements which are printed on the report may vary within a section if they are not criteria for BREAKS. The user must be aware that this can happen, and that the value printed may only be valid at the start of the section.

****

Function: Sorts the section accident analysis report file.

Description: This command can be used to sort a report file created by the CREATE-ACC-SECTN-ANAL-FILE command. The sort allows (1) the grouping to be redefined and (2) the order of sections within groups to be redefined. The purpose of a seperate SORT-ACC-SECTN-ANAL-FILE command is to allow creation of a resorted report file, or another copy of the file in a different order. If the sorting is only temporary for printing one set of reports, use the sort capability or PRINT-ACC-SECTN-ANAL- REPORT.

Note: If SIG-LIMITS was included with CREATE-ACC-SECTN-ANAL-FILE, they will always be the values determined by the original grouping. To resort AND recompute SIG-LIMITS values, the report file must be recreated.

Required Command Parameters:

INPUT-DD=ddname

- Use this parameter to identify the DD statement that defines the input report file.

OUTPUT-DD=ddname

- Use this parameter to identify the DD statement that defines the output report file. (note that input and output files can be the same DD statement).

Optional Command Parameters:

SORT subcommand

- Used exactly like the sort subcommand of CREATE-ACC-SECTN-ANAL-FILE. If omitted, sections are sorted by route system, route number, and starting reference point into one statewide group.

TITLES subcommand

Print formatting parameters: see chapter 4

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CLASS Parameter: Use CLASS=D if tapes are used, otherwise use
********** CLASS=C.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRITA,TIME=5,REGION=300K,SCRSIZE=10,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//ASAIN  DD DISP=SHR,DSNAME=DT00A2B.ASA01
//ASAOUT DD DISP=(NEW,CATLG),DSNAME=DT00A2B.ASA02,
//          UNIT=TAPE,LABEL=RETPD=10
//SYSIN DD *
:SORT-ACC-SECTN-ANAL-FILE,INPUT-DD=ASAIN,OUTPUT-DD=ASAOUT
+SORT
ASA.CATEGORY
ASA.ACC-RATE,UP
/*
```

The PRINT-ACC-SECTN-ANAL-REPORT Command

Function: Prints section accident analysis reports using the report file produced by the CREATE-ACC-SECTN-ANAL-FILE command.

Description: PRINT-ACC-SECTN-ANAL-REPORT utilizes the section accident analysis report file to print the AA-6A and AA-6B reports. THe AA-6A report is merely a listing of the records in the report ifle, one record per section, and every data element present in the record is printed. The AA-6B report lists groups consisting of the highest class of sort used. If multiple levels of sorting are used, a separate AA-6B report is produced for the second highest level (eg., if +SORT specified ASA.COUNTY and ASA.CATEGORY, an AA-6B report is produced for each county with sections grouped by category). If no class A sorts have been done, the AA-6B report consists of one group -- all sections included in the report. Class B sorts define the ordering of sections within each group (class A sorts) in the AA-6A report. Class C sorts define the ordering of groups within each AA-6B report.

JCL For Report File: Because the section accident analysis report file is a user-controlled file outside of the permanent TIS report file, the user must provide JCL that defines the location of the report file. The JCL of the CREATE-ACC-SECTN-ANAL-FILE command defined where the file was placed. THe JCL of the PRINT-ACC-SECTN-ANAL-REPORT command defined where the file can be found for retrieval.

When the PRINT=ACC=SECTN-ANAL-REPORT command is placed in the same job step as the CREATE-ACC-SECTN-ANAL-FILE command, no additional JCL is required. Simple code INPUT-DD=ddname where ddname is the same name coded in the OUTPUT-DD parameter of CREATE-ACC-SECTN-ANAL-FILE.

If the report file was created in a separate job step, include the

following DD statement with the PRINT-ACC-SECTN-ANAL-REPORT command:

```
//ddname DD DISP=SHR,DSNAME=TRN.RIASAxxx
```

xxx is the the same as was used when creating the file to uniquely identify it. This format is used whether the report file was stored in a temporary disk file, a permanent disk file, or a tape file.

Required Command Parameters:
****

INPUT-DD=ddname

- Use this parameter to indicate the name of the DD statement included to define the report file.

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Optional Command Parameters:
****

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed.

--> The option list is a summary of parameters used to create and print the file. One option list is printed with each report.

NO-CODELIST No codelists are printed.
CODELIST A several-page codelist is printed with each
--- individual summary.

- The codelist is a summary of codes and headings used in the report. One codelist appears with each individual report.

nnn
MAX-NUMBER-I= 0
-

- This parameter can be ued to limit the number of

sections printed form each group in the AA-6A report. AA-6A report. AA-6A group totals and AA-6B reports still include the entire group.
- This parameter is intended for use in best/worst searches.

NO-LIST Do not print AA6A report.
LIST Print AA-6A report.

- The AA-6B report will always be printed, the size of which depends on how the report file is sorted.

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SORT subcommand

- Use SORT to define the grouping and ordering of the AA-6A and AA-6B reports.
- If SORT is omitted the reports use the sort performed by CREATE-ACC-SECTN-ANAL-FILE or SORT-ACC-SECTN-ANAL-FILE.
- SORT by this command is only temporary, ie., the file will not be permanently altered by this command.
- The data elements that can be used in SORT are:

Class A-1:	ASA.CONSTR-DIST	Construction district
	ASA.MAINT-AREA	Maintenance area
	ASA.PTRL-STATION	Patrol station
	ASA.PTRL-DIST	Patrol district
Class A-2:	ASA.COUNTY	County
Class A-3:	ASA.CITY	Municipality

	ASA.URB-AREA	Urban area
Class A-4:	ASA.CATEGORY	Category (standard)
	ASA.USER-CATEGORY	Category (user-defined)

Class B:	ASA.TOT-NUM-ACC	Total number of accidents
	ASA.ACC-RATE	Accident rate
	ASA.SEV-RATE	Severity rate
	ASA.WET-DRY-PERCENT	Wet:wet+dry percentage
	ASA.WET-TOTAL-PERCENT	Wet:total percentage
	ASA.AMT-OUT-OF-SIG	Amount out of significance
	ASA.RATIO-OUT-OF-SIG	Ratio out of significance
	ASA.TOT-NUM-ACC-NJ	Total non-junction accidents
	ASA.ACC-RATE-NJ	Non-junction accident rate
	ASA.SEV-RATE-NJ	Non-junction severity rate

Class C:	ASB.GROUP	Group field
	ASB.SECTION-LENGTH	Total miles in the group
	ABS.VEH-MILES	Vehicle miles in the group
	ABS.TOT-NUM-ACC	Total accidents in the group
	ABS.ACC-RATE	Accident rate in the group
	ABS.SEV-RATE	Severity rate for group
	ABS.WET-DRY-PERCENT	Wet:wet+dry percentage
	ABS.WET-TOTAL-PERCENT	Wet:total percentage

- Zero or one data elements can be chosen from each class.
- The class A data elements define the grouping of the sections. These data elements default to UP (sorted smallest to largest)

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Example 1. Group sections by district:

```
+SORT
ASA.CONSTR-DIST
```

Example 2. Group sections by category within district:

```
+SORT
```

```
ASA.CONSTR-DIST
ASA.CATEGORY,DOWN
```

- USER-CATEGORY has no effect unless a CATEGORIES subcommand was used when the file was created.

- The class B data elements define the order of sections within groups. These data elements default to DOWN (sorted largest to smallest).

Example 3. Put all sections into one group and sort on severity rate:

```
+SORT
ASA.SEV-RATE
```

Example 4. Group sections by city and sort by amount out of significance:

```
+SORT
ASA.CITY
ASA.AMT-OUT-OF-SIG
```

- AMT-OUT-OF-SIG and RATIO-OUT-OF-SIG are useful only if SIG-LIMITS were included when the file was created. All of the class B data elements will be useless if NO-ACCIDENTS was specified at creation.

- The class C data elements define the order of groups within the AA-6B reports. If no class A sorts were included with this command or in a prior sort, the class C sorts have no usefulness since only one group is present.

SELECT subcommand

- INCLUDE SECTN-ANAL-RECORDS can be used to include specific sections in the report.
- ASA data elements can be referenced (SIG-LIMITS and ACCIDENT fields should only be referenced if they were computed when the file was created).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

TIME Parameter: Use the following formula to estimate computer time:
****

$$time = 3 + \frac{num\text{-}asa}{1{,}000} + (num\text{-}asa/10{,}000) \times num\text{-}sort\text{-}classes$$

num-asa — The time needed to access the report file.
------- "num-asa" is the number of records stored in the
1,000 report file.

num-sort-classes — the number of sort data elements specified (maximum of 6).

SCRSIZE Parameter: Use the following formula to estimate scratch
********** size.

$$scrsize = 3 + \frac{num\text{-}asa}{1{,}000}$$

num-asa is the same as for TIME.

CLASS Parameter: If a tape is used, specify CLASS=D.
********** Otherwise use CLASS=C.
DATE 2/14/83

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=25
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=400K,SCRSIZE=9,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//ASA DD DISP=SHR,DSNAME=DT00A2B.ASA01
//SYSIN DD *
:PRINT-ACC-SECTN-ANAL-REPORT,INPUT-DD=ASA
+SORT
ASA.CATEGORY
ASB.ACC-RATE
+SELECT
INCLUDE SECTN-ANAL-RECORDS IF:  ASA.CONSTR-DIST *EQ* 5
/*
```

The LIST-BRIDGE-BY-BRIDGE-NUMBER Command

Function: Lists bridge records specified by bridge number and bridge match.

Discription: LIST-BRIDGE-BY-BRIDGE-NUMBER can be used to display a bridge record in one of several formats to verify what values are present in the various data elements:

- **PAGE-FORMAT** A full-page listing with headings shows every data element in the bridge record. This is the only means of displaying many of the bridge record data elements. The codelist option can be used to provide explanations of coded data elements.
- **CARD-FORMAT** The records are converted into data cards and several records are listed per page. This may be useful to anyone maintaining the file.
- **INV-FORMAT** The records are printed using the BRIDGE-STRUCTURE-INVENTORY format. If a very few bridge records are required, this command will be more efficient than using the BRIDGE-STRUCTURE-INVENTORY command.

The user specifies which bridge records are to be listed in the BDGNUM DD statement. Enter 7-character bridge number and bridge match, one per card. Leading blanks and zeroes must be coded.

Required Command Parameters: None.

Optional Command Parameters:

CARD-FORMAT Print bridge record in data card format.
INV-FORMAT Print bridge record in structure inventory format.
PAGE-FORMAT Print bridge record in full-page format.

NO-CODELIST Do not print the codelist.
CODELIST Print one codelist (default if PAGE-FORMAT is
--- effect).

TITLES subcommand

Any of the print-formatting parameter (see chapter 4). If
INV-FORMAT is specified, the print-formatting parameters will have
no effect.

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Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-BRIDGE-BY-BRIDGE-NUMBER,PAGE-FORMAT,NO-CODELIST
/*
//BDGNUM DD *
66808 2
L5669 1
   70
/*
```

The LIST-BDG-XREF-FILE Command

Function: Prints a listing of the bridge cross reference file.

Description: A listing by reference point or bridge number is printed with one line of output per record selected from the cross reference file.

The following data elements are printed on each line:

- Route system and number
- Reference point
- Intersection element
- Bridge number
- Usage
- Keys present
- Function
- Over/under code

Required Command Parameters:

+ROUTES subcommand

- Operates under LIST classification.
- Summary selection parameters (eg., ZERO-USR-TOTALS) have no effect.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST The user's command parameters are listed.

BY-BDG-NUMBER The listing will be printed in order by bridge number.
BY-REF-PNT The listing will be printed in order by reference
--- point.

TITLES subcommand

Print formatting parameters: see chapter 4

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Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-BDG-XREF-FILE
+ROUTES
ROUTE-SYS=01,ROUTE-NUM=35
```

```
        /*
```



```
        Optional Command Parameters:
        ----------------------------

             NO-OPTLIST   No option list is printed.
             OPTLIST      The user's command parameters are listed (default).
```

ROUTES subcommand

- Operates under SUM classification.

OVER Include only bridge records with over-or-under= 1
UNDER Include only bridge records with over-or-under= 2
OVER-&-UNDER Include both over and under bridge records (default).

- This parameter only has meaning when the ROUTES subcommand is included.

USAGE=
1 Use only the first key to access bridges.
2 Use only the second key to access bridges.
B Use only the bridge key to access bridges.

- The default is to use all keys.
- This parameter only has meaning when the ROUTES subcommand is included.

SELECT subcommand

Select criteria may be applied to data elements stored in the bridge record and also to the roadlog record corresponding to the bridge key IF THE ROUTES SUBCOMMAND IS INCLUDED.

- The INCLUDE/EXCLUDE clause is optional and has the following format:

INCLUDE BRIDGE-RECORDS IF:
EXCLUDE

- BDG and RLG data elements can be referenced.

- RLG references require the ROUTES subcommand. They will also raise execution time.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

The BRIDGE-MATRIX-SUMMARY Command

****

Function: Produces general purpose bridge summaries.

Description: Summaries can be printed broken down by one, two, or three data elements from the bridge file. The program counts bridge RECORDS so the user must use the SELECT subcommand to exclude duplicate records if a count of structures is desired.

When summarizing on one data element, the output format is similar to:

BDG.ROADWAY-CLASS	BRIDGES
- (BLANK) NO ROADWAY INVOLVED	20
1 - UNDIVIDED TWO-WAY ROAD	3,172
2 - ONE-WAY ROAD	406
3 - ONE ROADWAY OF DIVIDED ROAD	8,771
4 - DIVIDED ROAD	1,800
---- GRAND TOTAL ----	14,169

When summarizing on two data elements, the output format is similar to:

BDG.RUR-URB-FROM-CITY	BDG.OVER-UNDER	BRIDGES
1 - RURAL	1 - OVER	205
1 - RURAL	2 - UNDER	97
1 - RURAL	---- SUBTOTAL ----	312
2 - URBAN (< 50,000)	2 - UNDER	6
2 - URBAN (< 50,000)	---- SUBTOTAL ----	6
3 - URBANIZED (> 50,000)	1 - OVER	43
3 - URBANIZED (> 50,000)	2 - UNDER	104
3 - URBANIZED (> 50,000)	---- SUBTOTAL ----	147
---------- GRAND TOTAL ----------		455

When summarizing on three data elements, the output format is identical to that for two data elements, except that one summary is printed for each value of the additional data element.

Required Command Parameters:

CATEGORIES subcommand

- BDG data elements can be referenced.
- The REDEFINES or GROUPS options can be used for grouping
  various codes together.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST The user's command parameters are listed (default).

ROUTES subcommand

- Operates under SUM classification.

OVER Include only bridge records with over-or-under= 1
UNDER Include only bridge records with over-or-under= 2
OVER-&-UNDER Include both over and under bridge records
(default).

- This parameter only has meaning when the ROUTES
  subcommand is included.

1 Use only the first key to access bridges.
USAGE= 2 Use only the second key to access bridges.
S Use only the supplemental key to access bridges.

- The default is to use all keys.
- This parameter only has meaning when the ROUTES
  subcommand is included.

SELECT subcommand

Select criteria may be applied to data elements stored in the
bridge record and also to the roadlog record corresponding to
the bridge key IF THE ROUTES SUBCOMMAND IS INCLUDED.

- The INCLUDE/EXCLUDE clause is optional and has the following
  format:

INCLUDE BRIDGE-RECORDS IF:

- BDG and RLG data elements can be referenced.

- RLG references require the ROUTES subcommand. They will also raise execution time.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

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Sample Job Setups:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=2,REGION=400K,SCRSIZE=5,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:BRIDGE-MATRIX-SUMMARY
+CATEGORIES
DATA-ELEMENT=BDG.RUR-RUB-FROM-CITY
DATA-ELEMENT=BDG.OVER-UNDER
/*
```

The above job setup will count all bridge records in the file.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=2,REGION=400K,SCRSIZE=5,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:BRIDGE-MATRIX-SUMMARY,USAGE=1,NO-OPTLIST
+ROUTES
ROUTE-SYS=01,ROUTE-NUM=90
+CATEGORIES
DATA-ELEMENT=BDG.MAIN-SPAN-TYPE
/*
```

The above job setup will count bridge records with first key on interstate 90.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=4,REGION=400K,SCRSIZE=5,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:BRIDGE-MATRIX-SUMMARY
+SELECT
INCLUDE BRIDGE-RECORDS IF:
  BDG.BDG-MATCH *LE* '1' *AND* BDG.FUNCT-CLASS *EQ* 7
+CATEGORIES
DATA-ELEMENT=BDG.ROADWAY-CLASS
/*
```

The above job setup will count bridge records with functional class of 7

In general, the more complex the SELECT, ROUTES, and CATEGORIES subcommands, the more TIME should be allowed.

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The TRUNK-BRIDGE-LOG Command

Function: Produces the Trunk Bridge Log and Numerical Bridge List.

Description: The TRUNK-BRIDGE-LOG command optionally prints two reports; the Bridge Log of structures sorted by route number (does not consider route system) and reference point, and the Numerical List of structures sorted by bridge number and bridge match. Each bridge appears at most once in the reports, with the record having the lowest interchange element code taking priority (eg., " " is lower than "101", which is lower than "J51", etc, thus eliminating ramp bridges).

The ROUTES and SELECT subcommands can be used to determine which records are included in any given run.

SELECT MUST BE USED TO AVOID DUPLICATE LISTING OF BRIDGES (matches) except when duplicates are desired.

Required Command Parameters:

ROUTES subcommand

- Operates under LIST classification.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST The user's command parameters are listed (default).

OVER Include only bridge records with over-or-under= 1
UNDER Include only bridge records with over-or-under= 2
OVER-&-UNDER Include both over and under bridge records (default).

USAGE=
1 Use only the first key to access bridges.
2 Use only the second key to access bridges.
B Use only the bridge key to access bridges.

- The default is to use all keys.

LOG-ONLY Print only the Bridge Log.
LIST-ONLY Print only the Numerical Bridge List.
LOG-&-LIST Print the Bridge Log followed by the Numerical List. (default).

SELECT subcommand

- The INCLUDE/EXCLUDE clause is optional and has the following format:

```
                    INCLUDE  BRIDGE-RECORDS IF:
                    EXCLUDE
```

- BDG and RLG data elements can be referenced.
- If no roadlog records can be found the bridge record is not selected (when RLG is referenced).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=350K,SCRSIZE=2,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:TRUNK-BRIDGE-LOG
+ROUTES
ROUTE-SYS=01,ROUTE-NUM=35
+SELECT
INCLUDE BRIDGE-RECORDS IF:
BDG.USAGE *EQ* '1' *OR* BDG.USAGE *EQ* '2' *OR*
((BDG.USAGE *EQ* 'S') *AND* ((BDG.SUPP-RTE-NUM *NE*
BDG.SCND-RTE-NUM) *AND* (BDG.SUPP-RTE-NUM *NE* BDG.FIRST-RTE-NUM)))
/*
```

This job prints a log and a list of ISTH 35 bridges using first key, second key, and bridge key if it differs from the other two.

The above job setup may be copied from DT99A1B.TSOLIB.CNTL(BDGTBL).

The BRIDGE-STRUCTURE-INVENTORY Command

Function: Produces the Bridge Structure Inventory Report.

Description: The BRIDGE-STRUCTURE-INVENTORY command prints bridge records in a special format that is intended to be used on pre-printed forms, at 8 lines per inch. For this reason the usual print-formatting parameters have no effect with this command. Page size and page numbering is controlled by the program. The user's options consist of selecting bridge records to be printed and defining the order they will appear.

Required Command Parameters: None.

Optional Command Parameters:

SUMMARIES= 'BY DISTRICT' / 'BY COUNTY' / 'BY URBAN MUNICIPALITY' / 'BY SPECIAL AREA' / 'BY SPECIAL REQUEST'

- If left blank, the default is 'BY SPECIAL REQUEST'.
- This parameter determines which records are included and how they are sorted as follows:

SUMMARIES	Sort Fields	Report Jurisdiction
BY DISTRICT	Maintenance area Route number Reference point	1, 8
BY COUNTY	County number Bridge number Bridge match	2, 3, 4
BY URBAN NUMICIPALITY	City number Bridge number Bridge match	3, 5, 6, 8
BY SPECIAL AREA	County number Bridge number Bridge match	4, 6, 7
BY SPECIAL REQUEST	County number Bridge number	does not apply

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YEAR=NN -the default if not specified is the current year.

SELECT subcommand

- The INCLUDE/EXCLUDE clause is optional and has the following format:

INCLUDE BRIDGE-RECORDS IF:
EXCLUDE

- BDG data elements can be referenced (except BDG.USAGE).

- Bridge records are grouped by bridge number and the one with the lowest bridge match is used for selection. If it passes, the whole group is selected for printing.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=300K,SCRSIZE=5,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:BRIDGE-STRUCTURE-INVENTORY,SUMMARIES='BY COUNTY'
+SELECT
BDG.COUNTY *EQ* 'COOK'
/*
```

The following sample produces a listing of the bridges that have been updated with data through the 'co-pc' update program. The fields updated will have an asterisk next to them. To do this note the use of the line: //HOLDFILE DD DSN .... This job is run after the bridge file has been updated. The holdfile used is the update file.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
```

```
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=3,LINES=500
/*ROUTE  PRINT IMPACT
//TIS EXEC DTRIB,REGION=300K,SCRSIZE=5,PRTFCB=858,FORM='(S,,666)'
//HOLDFILE DD DSN=DT00A5T.FIXED.DATA,DISP=OLD
//SYSIN DD *
:BRIDGE-STRUCTURE-INVENTORY,SUMMARIES='BY COUNTY',YEAR=1996
/*
```


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The SELECT-BRIDGE-LIST Command

****

Function: Lists selected bridge records.

Description: SELECT-BRIDGE-LIST is used to list bridge records meeting specified selection criteria. One line is printed for each selected record, including the following data elements:

- Bridge number
- Bridge match
- County
- Section
- Township
- Range
- Functional use
- Name of feature crossed
- Bridge key
- First key
- Second key

Required Command Parameters:

SELECT subcommand

The INCLUDE/EXCLUDE clause is optional and has the following format:

INCLUDE BRIDGE-RECORDS IF:
EXCLUDE

- BDG data elements can be referenced.

Optional Command Parameters:

EXPORT Export bridge records.
NO-EXPORT Do not export bridge records (default).

- Selected records may be "exported" to an external file. The exported data is in "input record" format (see chapter 10 of the TIS Data Coding Manual for details). It will be written to a file defined in a DD statement named BDGXPORT, which must have a record length of 80.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setups:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
```

```
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=2,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:SELECT-BRIDGE-LIST
+SELECT
BDG.DATE-OF-UPDATE *EQ* 03/16/1991
/*
```

The following sample exports all records with first and second route system blank (i.e., all records with bridge key only) to a file named "user-id.CDS.DATA".

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=10
//TIS EXEC DTRIT,TIME=3,SCRSIZE=1,
//   FORM='(2)',PRINTDD=TSO,OUTFILE=
//BDGXPORT DD UNIT=SYSDA,DSN=USER-ID.CDS.DATA,DISP=(NEW,CATLG),
//            DSORG=(RECFM=FB,LRECL=80,BLKSIZE=4000),SPACE=(CYL,3)
//SYSIN DD *
:SELECT-BRIDGE-LIST,EXPORT
+SELECT
 INCLUDE BRIDGE-RECORDS IF:
 BDG.FIRST-RTE-SYS *EQ* '  ' *AND*
 BDG.SCND-RTE-SYS *EQ* '  '
/*
```


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Bridge Accident Analysis Capabilities

****

The Bridge (BDG) accident analysis software is intended as an aid in analyzing accidents that occured at various types of bridges. A great deal of flexibility is provided in the software for performing many differenct types of analysis. As a result, a large number of user-specified parameters are available and use of the software is fairly complicated.

The BDG accident analysis capabilities are implemented in three separate TIS user command:

--> CREATE-BDG-ACC-ANAL-FILE creates a report file that is needed for detailed analysis.

--> PRINT-BDG-ACC-ANAL-REPORT prints analysis reports using as
input a report file previously created by
CREATE-BDG-ACC-ANAL-FILE.

--> SORT-BDG-ACC-ANAL-FILE allows an existing report file to be
resorted for producting additional reports.

When a user wishes to obtain analysis reports, he always utilizes both
CREATE-BDG-ACC-ANAL-FILE and PRINT-BDG-ACC-ANAL-REPORT.
SORT-BDG-ACC-ANAL-FILE is needed much less frequently.

Types of Reports Available

Three major type of reports can be obtained from the BDG accident
analysis software:

--> S-I report: Shows data that pertains to a single bridge.

--> S-RL report: Shows data that pertains to a group of
bridges.

--> S-RH report: Shows data that pertains to several groups of
bridges.

An S-I report consists of any combination of the following four
reports:

--> BR-4A Formatted listing of bridges characteristics.

--> BR-4B Formatted listing of accidents that occurred at the
bridge.

--> BR-4C Summary of accidents that occurred at the bridge.
Accidents are summarized by accident type and
accidents severity.

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--> BR-4E Summary of accidents that occurred at the bridge.
Accidents are summarized by road surface conditions
and accident severity. Two summaries are included:
one for all of the accidents at the bridge, and one
limited to accidents that occurred between May 1 and

The BR-4A report is identical to the PAGE-FORMAT listing that can be obtained from LIST-BRIDGE-BY-BRIDGE-NUMBER. A BR-4A report requires one printed page.

The BR-4B report is identical in format to the listings that can be obtained from LIST-ACCIDENTS-BY-REF-POINT. One line is printed for each accident that occurred at the bridge.

The BR-4C report requires one printed page, and is printed in approximately the following format:

		INJURY					
		---	---	---	---	PROPERTY	
DIAGRAM CODE	FAT	A	B	C	TOT	DAMAGE	TOTAL
REAR END	0	0	0	0	0	2	2
LEFT TURN	0	0	0	0	0	4	4
.							
.							
.							
TOTAL	0	0	1	1	2	8	10

The BR-4E report requires one pritned page, and consists of two summaries printed in approximately the following format:

		INJURY					
ROAD SURFACE		---	---	---	---	PROPERTY	
CONDITION	FAT	A	B	C	TOT	DAMAGE	TOTAL
DRY	0	0	0	1	1	3	4
WET	0	0	0	0	0	2	2
.							
.							
.							
TOTAL	0	0	1	1	2	8	10

WT% = (WET/TOTAL) * 100 = 20.0%
WWD% = (WET/WET+DRY) * 100 = 33.3%

An S-RL report consists of any combination of the following three reports:

--> BR-4D Formatted lisitng of bridges in group.

--> BR-4C Identical to BR-4C of S-I report.

--> BR-4E Identical to BR-4E of S-I report.

The BR-4D report summarizes the characteristics of the bridges in the group. One line of printed for each bridge, showing the bridge's key, its accident statistics (eg., number of accidents, accident rate), and its traffic volume.

An S-RH report is similar to an S-RL report except that the BR-4D report cannot be obtained.

Bridge Groupings

In the simplist types of analysis, the user does not attempt to segregate the brdiges into groups. In effect, there is a single group of bridges. The analysis report in this case consists of a series of S-I reports followed by a single S-RL report:

```
S-I for first bridge
S-I for second bridge
    .
    .                          S-G Report
    .
S-I for last bridge
S-RL for group
```

This type of report -- several S-I reports followed by an S-RL report -- is called an S-G group report.

Frequently, the user will wish to segregate bridges into regional groupings. For example, he may wish to group the bridges based on construction district in order to obtain a separate report for each district. When this is done, nine S-G reports (one for each district) are printed, and a single S-RH report showing the bridges from all districts is printed after the last S-G report.

Regional grouping is available for the following data elements:

Construction district	County
Maintenance area	Municipality
Patrol district	Urban area
Patrol station	

Region within region groupings such as county within district is available. For example, if county within district grouping is chosen, the pritned output consists of:

District 1: One S-G report for each county in district 1, plus
one S-RH report for the entire district.

District 2: One S-G report for each coutny in district 2, plus
one S-RH report for the entire district.

.
.
.

One S-RH for all nine districts combined.

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Finally, region within region within region is available. For example, bridges can be grouped by municipality within county within district.

Sometimes the user will wish to divide bridges into groupings based on bridge characteristics rather than location. For example, the user may wish to group bridges based on functional use. This type of grouping is called categorizational grouping.

Each bridge stored in the BDG file can be associated with a 5-digit "standard category" code that may be used for categorizational grouping. The standard category consists of:

Roadway classification (BDG.ROADWAY-CLASS)	1 digit
Functional use (BDG.FUNCT-USE)	1 digit
Wearing surface (BDG.WEAR-SURF)	1 digit
Traffic lanes (BDG.NUM-LANES)	2 digit

When standard categorization is used, the printed report consists of:

S-G report for first category
S-G report for second category
.
.
.
S-G report for last category
S-RH report all categories combined

Besides standard categorization, a "user categorization" facility allows users to choose their own groupings. The user identifies one, two, or three data elements to comprise a category control field.

For example, suppose the user wants to group bridges based solely on the bridge functional use (BDG.FUNCT-USE). BDG.FUNCT-USE is a 1-digit field

that contains one of the codes 0, 1, 6-9, (2-5 are reserved for future use). By specifing BDG.FUNCT-USE as the category control field, six groups of bridges are established.

When two or three data elements are used for category control, the data elements are simply joined together to form a single control field. If the user indicates BDG.FUNCT-USE and BDG-NUM-LANES for category control and if a particular bridge has a functional use of 8 with 02 for the number of lanes, that bridge's category code is 802.

Regional grouping can be combined with categorizational grouping to allow a grouping such as "category within county" or "category within municipality within county within district." When the two types of groupings are used together, the categorizational grouping is always the lowest level of grouping. A grouping of "category within county" is possible but a grouping of "county within category" is not.

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The BDG Accident Analysis Report File
****

When a user wishes to obtain BDG accident analysis reports, he must first create a BDG accident analysis report file via the CREATE-BDG-ACC-ANAL-FILE command. The report file contains one record for each bridge being analyzed. Each record consists of six segments:

Record type segment.	Accident segment.
Region sgment.	Significance segment.
Category segment.	Bridge segment.

The record type segment contains the data elements used for internal reference within the program modules.

The region segment contains the data elements used for regional groupings, such as construction district number and county number.

The category segment contains the data elements used for categorizational groupings, including a standard category field and a user category field.

The accident segment contains accident statistics for the bridge, including:

- "Segment present" flag.
- Total number of accidents.
- Number of fatal accidents.
- Number of "A" severity accidents.
- Number of "B" severity accidents.
- Number of "C" severity accidents.
- Number of injury accidents.
- Number of property damage only accidents.
- Accident rate.
- Severity rate.
- Number of wet-surface accidents.
- Number of dry-surface accidents.
- Wet-to-dry percentage.
- Wet-to-wet+dry percentage.
- Number of days for which accidents statistics were gathered.
- Number of days from the given START-DATE to the given END-DATE.

The significance segment contains statistical elements for comparing bridges within a group:

- Lower and upper significance limits.
- Amount out of significance.
- Ratio out of significance.
- Average accidents rate used in computing significance limits.

The bridge segment contains bridge characteristics obtained from the BDG file.

Computations Used When Creating Report File

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In creating the BDG accident analysis report file, a number of computations are performed by the software.

When computing rates, the software must know the number of days for which a bridge is being analyzed. The user provides a starting date and an ending date for searching the accident files. Each bridge also carries a month and year opened that indicates from what date accident data is available.

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If a bridge's effective date (month and year opened) is more recent than the user's indicated ending date, that bridge is not included in the report file.

If a bridge's effective date is more recent then the user's indicated starting date (but not more recent than the ending date), the time period is computed from the bridge's effective date to the user's ending

date.

If a bridge's effective date is prior to the user's starting date, the time period is computed from the user's starting date to the user's ending date.

The accident rate for a bridge is computed as:

$$\text{Accident Rate} = \frac{1{,}000{,}000 \times b}{c \times d}$$

b = Total number of accidents at bridge
c = Time period in days
d = ADT (Average Daily Traffic)

Because c x d equals the total number of vehicles that crossed the bridge during the time period under consideration, the accident rate can be shown as:

$$\text{Accident Rate} = \frac{b}{y}$$

x = Total number of accidents at bridge.
y = Millions of vehicles crossed bridge.

The severity rate is computed exactly like the accident rate except that accidents are weighted by severity:

$$z = 10 \times F + 4 \times I + P$$

F = Number of fatal accidents
I = Number of injury accidents
P = Number of property damage accidents

$$\text{Severity Rate} = \frac{z}{y}$$

Accident rates and severity rates do not provide enough information in themselves to adequately compare two bridges. If two bridges both have an accident rate of 10.0, but the first bridge has an ADT of 1,000 while the second bridge has an ADT of 14,000, the first represents a more severe case. Significance limits computations are intended to more accurately compare bridges.

In computing significance limits, a factor k is used. The value of k determines how many bridges will be identified as out of significance. Several commonly used values are:

2.326 Approximately 1% of the bridges are identified as significantly above average and approximately 1% of the bridges are identified as significantly below average.

1.645 Approximately 5% of the bridges are identified as significantly above average and approximately 10% are edentified as significantly below average.

1.281 Approximatly 10% are identified as significantly above average, and approximately 10% are identified as significantly below average.

The software normally uses k = 1.645, but the user is allowed to specify an overriding value.

To compute significance limits, the software must first examine all of the bridges in the group in order to compute an average accident rate for the group:

$$\text{Average Accident Rate} = \frac{bb}{yy}$$

bb = Total accident rate at all bridges
yy = Million vehicles crossing all bridges

$$bb = (b)1 + (b)2 + \ldots + (b)n$$

$$yy = (y)1 + (y)2 + \ldots + (y)n$$

An upper and a lower limit can then be computed for each bridge in the group:

$$\text{Upper Limit} = T + k \sqrt{\frac{T}{y}} + \frac{1}{2y}$$

$$\text{Lower Limit} = T - k \sqrt{\frac{T}{y}} - \frac{1}{2y}$$

T = Average accident rate for group
y = Millions of vehicles crossing this bridge

After significance limits are computed, the accident rate of the bridge is compared to the limits to compute the amount out of significance and the ratio out of significance.

The amount out of significance S is computed as:

If b < w	S = b - w	(negative)
If w <= b <= E	S = 0	(in significance)
IF b < E	S = b - E	(positive)

w = lower limit
E = upper limit

Hence, the amount out of significance has these properties:

If S is 0, the accident rate is within significance.
If S is negative, the accident rate is significantly below average.
If S is positive, the accident rate is significantly above average.

The amount out of significance provides an easy determination as to whether a bridge is in or out of significance, but it is still not a good factor for comparison. For example, if one bridge has an out of significance value of 3.6 and another has a value of 3.5, the first is not necessarily "worse" than the second. The ratio out of significance is better for such comparisons.

The ratio out of significance is computed as:

$$p = \frac{b - bb}{E - bb} \quad \text{If } b \geq bb$$

$$p = \frac{b - bb}{bb - w} \quad \text{If } b < bb$$

b = Accident rate at bridge
bb = Average accident rate of group
E = Upper limit
w = Lower limit

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The ratio out of significance has the following characteristics:

If p > 1.0, b is significantly above average.
If p = 1.0, b = E.
If 0.0 < p < 1.0, b > bb but is within significance.
If p = 0.0, b = bb.
If -1.0 < p < 0.0, b < bb but is within significance.
If p = -1.0, b = w.
If p < -1.0, b is significantly below average.

Bridge Selection

A great deal of the flexibility of the BDG accident analysis software is due to the user's ability to choose what data is printed.

Initially, the BDG report file is created considering only bridges with OVER-UNDER=1 (over bridges), and FUNCT-USE=any legitimate value. While the user can specify a specific value for FUNCT-USE, the vale for OVER-UNDER selection cannot be changed. The user may use further selection criteria to indicate which bridges are to be placed in the file. When selection is performed at this point, any PRINT-BDG-ACC-ANAL-REPORT commands that are run against the created file can only show the selected bridges.

Alternatively, the user can delay specifying selection criteria until the PRINT-BDG-ACC-ANAL-REPORT command is run. The report file contains all of the bridges, and the user simply tells PRINT-BDG-ACC-ANAL-REPORT which the bridges in the report file are to be used.

The +SELECT subcommand of CREATE-BDG-ACC-ANAL-FILE provides two methods of selecting bridges:

INCLUDE BRIDGE-RECORDS IF:

Provides input selection based on information from the permanent BDG file.

INCLUDE BDG-ACC-ANAL-RECS IF:

Provides output selection based on information in the created report file.

When INCLUDE BRIDGE-RECORDS OF: is used, only data elements actually stored in the BDG file (and the TIS roadlog file) can be used for selection. For example, INCLUDE BRIDGE-RECORDS IF: allows selection based on functional use or number of lanes but does not allow selection based on number of accidents that occurred at the bridge or accident rate at the bridge.

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When INCLUDE BDG-ACC-ANAL-RECS IF: is used, each bridge is fully processed and an output record is produced. Just prior to writing the record to the record file, it is compared with the selection criteria specified. If the test is false, the record is not written to the file. The advantage of BDG-ACC-ANAL-RECS is that accident data is available for selection, so that the user can request selection such as "include only those bridges that had 10 or more accidents" or "include only those bridges that had an accident rate of at least 8.0".

Both BRIDGE-RECORDS and BDG-ACC-ANAL-RECS may be selected on a single CREATE-BDG-ACC-ANAL-FILE command. For example, BRIDGE-RECORDS could be used to initially restrict the chosen bridges to those of functional use 8 with 02 number of lanes, and BDG-ACC-ANAL-RECS could be used to further restrict the bridges to those with a accident rate of at least 4.0.

The +SELECT subcommand of PRINT-BDG-ACC-ANAL-REPORT allows input selection based on BDG-ACC-ANAL-RECS. This selection accomplishes exactly the same thing as BDG-ACC-ANAL-RECS used with

CREATE-BDG-ACC-ANAL-FILE. It is up to the user to decide with which command he wishes to place the BDG-ACC-ANAL-RECS selection:

--> If the selection is performed with CREATE-BDG-ACC-ANAL-FILE, the report file will be smaller and require less storage space, but the excluded bridges cannot be made available to PRINT-BDG-ACC-ANAL-REPORT without creating a new report file.

--> If the selection is performed with PRINT-BDG-ACC-ANAN-REPORT, the user has the added flexibility of modifying his selection criteria later and having the excluded bridges available without creating a new report file. However, the file will be larger and will require more storeage space.

BDG-ACC-ANAL-RECS selection can be specified with either CREATE-BDG-ACC-ANAL-FILE or with PRINT-BDG-ACC-ANAL-REPORT, but cannot be specified with both.

Accident Selection
****

The ability to select accidents adds additional flexibility to the BDG accident analysis software. For example, a user can compare accident histories among bridges considering only those accidents that involved drivers that had been drinking.

The user always select accidents based on date of occurrance. He does this by entering a START-DATE and an END-DATE. Only those accidents that occurred between these dates are considered.

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Each accident carries a location reliability code that serves to indicate how well the coder thought the accident was located:

1 No location error expected
2 Possible location error
3 Probable location error

The ACC-RELIABILITY parameter allows the user to easily exclude those with poor reliability.

Finally, +SELECT is implemented with an INCLUDE ACCIDENTS IF: option

that allows the user to select accidents based on virtually any characteristic or combination of characteristics.

Within the bridge accident analysis programs themselves, accidents are selected based on interchange elements. The following is a description of basically how the selection is done.

If BDG.INT-ELEM is blank then do:

Scan accidents within reference point limits of bridge key, considering all accidents with blank interchange element codes.

If BDG.ROADWAY-CLASS is 1, 4, or 5 then do:

Count all accidents considered.
end;

Else do: /* roadway class is 2 or 3 */

Further select accidents by comparing BDG.DIRECTION and ACV.VEHIC-DIREC(s). As each vehicle involved in the accident has an ACV.VEHIC-DIREC, it is necessary to follow certain rules when dealing with different combinations of directions. These rules are:

1) If ACV.VEHIC-DIREC=9, this vehicle should be disregarded in determining whether the accident is credited or not. If all vehicles in an accident are coded as ACV.VEHIC-DIREC=9, the accident should not be credited to a bridge.

2) After disregarding ACV.VEHIC-DIREC=9 vehicles, all other ACV.VEHIC-DIREC'S in the accident should be tallied. If more than 50% of the directions are within the limits of two clockwise or one counterclockwise (north =1, northeast=2, continue around clockwise, ending with northwest=8) of the bridge's direction, the accident should be credited to the bridge. If exactly 50% of the vehicles are within these limits, the accident should be credited only if the first ACV.VEHIC-DIREC was within the limits.

```
            If the BDG.DIRECTION is blank, print error message A4-062
            and do not count any accidents.
            end;
        end;

    Else do;  /* interchange element is present in BDG record */

        Scan accidents for all reference point limits of all roadways
        involved.  Both 1st and 2nd keys of all bridge records with
        this bridge number will be used for this scan.  Both "under"
        and "over" bridges will be looked at.  But unlike "over"
        bridges, only accident scans (if scanning is specified) will
        be used to determine the reference point limits of the bridge
        key.  The "over" bridges also use bridge ends in these
        calculations.


        If BDG.ROADWAY-CLASS is not 4 than do:

           Count selected accidents with the same interchange element
           code as the bridge.
           end;

        Else do:  /* roadway class 4 */

           Count selected accidents with either the same interchange
           element code or with one higher first character as the
           interchange element for the bridge.
           end;
        end;

Assigning ADT to Briges
**********************

    ADT is not necessarily taken directly from the traffic file or the
    bridge file.  Instead, it is determined in the following manner:

        If BDG-FUNCT-USE is 1 (mainline) then do:

           Use traffic file data for reference point of the bridge.
           If BDG.ROADWAY-CLASS is 2 or 3, divide traffic file value
           by 2.
           end;

        Else do:  /* non-mainline bridge */

           Use BDG.ADT.
           end;
```

Finding the Worst Bridges

In many cases, a user will be interested in finding the worst bridge of a group of bridges, where worst can be defined as having the largest number of accidents, the highest accident rate, the largest ratio of out of significance, etc.

As an example, let us suppose that a user wishes to locate the 10 bridges in a group that have the highest accident rates. To save printing an excessive amount of paper, he could select only those bridges with a rate of 10.0 or higher. However, he probably would not know in advance how many bridges will qualify. He could get 100 bridges printed, or only 5 bridges pritned. He might not get any at all.

Two parameters, MAX-NUMBER-I and MAX-NUMBER-RL, allow requests such as "print the 10 worst bridges based on accident rate". MAX-NUMBER-I applies to S-I reports, so that in this example 10 S-I reports are printed for each bridge group. MAX-NUMBER-RL applies to the BR-4D report of S-RL reports, so that in this example 10 bridges are printed.

MAX-NUMBER-I and MAX-NUMBER-RL can also be used to print the n best bridges rather than the n worst brdiges.

The data elements that can be used for worst/best searches include:

Accident rate.	Severity rate.
Wet:wet+dry percentage.	Wet:total percentage.
Amount out of significance.	Ratio out of significance.

Total number of accidents at the bridge.

Guide to Command Parameters
****

--> To identify which printed reports are to be producted.

Use the SUMMARIES parameter of the PRINT-BDG-ACC-ANAL-REPORT command. Can be used to print or not to print S-I, S-RL, and S-RH reports, as well as to choose which subreports such as BR-4A are to be included.

--> To identify how bridges are to be grouped.

The +SORT subcommand of CREATE-BDG-ACC-ANAL-FILE is used to identify how the bridges are grouped.

The bridges cannot be grouped differently by PRINT-BDG-ACC-ANAL-REPORT.

The grouping can be modified by running SORT-BDG-ACC-ANAL-FILE and identifying the new grouping in the +SORT subcommand.

--> Grouping bridges by user categories.

When user categorizational grouping is used, a +CATEGORIES subcommand is included with CREATE-BDG-ACC-ANAL-FILE to identify which data element(s) form the category control field.

--> Grouping bridges for significance limits computations.

Significance limits computations can be performed by CREATE-BDG-ACC-ANAL-FILE or they can be deferred until PRINT-BDG-ACC-ANAL-REPORT.

When performed by CREATE-BDG-ACC-ANAL-FILE, the significance limits groupings are identical to the grouping identified in +SORT. For example, if +SORT indicates grouping by district, then one average accident rate is computed for each district so that the bridges of one district are never compared with the bridges of another district.

If the file is subsequently resorted by SORT-BDG-ACC-ANAL-FILE, the significance limits computations are not repeated. For example, if the file just described is resorted by category within district, the bridges are still compared district-wide.

When significance limits computations are deferred until PRINT-BDG-ACC-ANAL-REPORT, the significance limits groupings are the lowest level grouping of the input file. For example, if a file is created by district without significance limits computations, and then resorted by SORT-BDG-ACC-ANAL-FILE by category within district, and the resorted file used for PRINT-BDG-ACC-ANAL-REPORT, significance limits groupings will be category within distict.

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--> Order of bridges within a group.

The +SORT subcommand of CREATE-BDG-ACC-ANAL-FILE and SORT-BDG-ACC-ANAL-FILE can, in addition to defining how bridges are grouped, specify the order in which bridges appear within a group.

Unless specified otherwise, the bridges will appear in order by key (route system, route number, reference point).

If CREATE-BDG-ACC-ANAL-FILE is instructed to include accident or significance limits computations, +SORT can be used to specify any of the following orders:

If accident data is included:

Total number of accidents
Accident rate
Severity rate
Wet:wet+dry percent
Wet:total percent

If significance limits computations included:

Amount out of significance
Ratio out of significance

The +SORT subcommand of create-BDG-ACC-ANAL-FILE or SORT-BDG-ACC-ANAL-FILE identifies the order bridges will appear in S-I reports and provides a default order for bridges in BR-4D reports. For example, if +SORT specifies an order by total number of accidents, subsequent S-G reports look like:

S-I report for bridge with most accidents
S-I report for bridge with second most accidents

.
.
.

S-I report for bridge with fewest accidents
S-RL report (BR-4D lists intersections in order from most accidents to fewest accidents

A +SORT subcommand is available with PRINT-BDG-ACC-ANAL-REPORT that can specify a different order for BR-4D reports only. For example, if +SORT of PRINT-BDG-ACC-ANAL-REPORT specifies accident rate, the S-I reports are printed in the same order as shown above but the BR-4D report lists bridges in order from highest to lowest accident rate.

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--> Specifying when accident and significance limits computations are performed.

Accident and significance limits data elements can be computed by CREATE-BDG-ACC-ANAL-FILE and place into the report file. Alternatively, these data elements can be left zero in the report file and computed by PRINT-BDG-ACC-ANAL-REPORT.

The user chooses the method to be used via the following command option of CREATE-BDG-ACC-ANAL-FILE:

NO-ACCIDENTS Defer both data types

ACCIDNENTS	Include accident but defer sig-limits
SIG-LIMITS	Include both accident and sig-limits

NO-ACCIDNETS makes the creation cheaper because the accident files do not need to be accessed. However, it also places some limitations on the types of analysis that can be performed with the report file.

ACCIDENTS increases the creation cost because the accident data is obtained from the accident files.

SIG-LIMITS further increases the creation cost becuase software must perform an additional pass through the file to compute average accident rates for the bridge groupings.

When NO-ACCIDENTS is used, the following limitations will apply:

--> The only ordering available for bridges within a group will be by key.

--> Best/worst searches will not be available.

--> +SELECT cannot be used to select bridges based on accident history (eg., to select only those bridges with more than 5 accidents).

--> Significance limits grouping will be restricted to the bridge grouping presented to PRINT-BDG-ACC-ANAL-REPORT.

ACCIDENTS reduces these limitations to some extent. Although the fourth limitation is not affected, the first three are eliminated except that ordering, best/worst, and +SELECT will not be available for amount out of significance or ratio out of significance.

SIG-LIMITS eliminates all of the limitations listed above.

As an example of the fourth limitations, a user might wish to print a report in which bridges are grouped by category within district, but to have the bridges grouped only by district for

the purposes of significance limits comparisons. He first must run CREATE-BDG-ACC-ANAL-FILE grouping by district with SIG-LIMITS. He then runs SORT-BDG-ACC-ANAL-FILE to group by category within district (without affecting the already computed significance limits data elements). He then runs PRINT-BDG-ACC-ANAL-REPORT using the resorted file.

--> Selecting bridges.

The INCLUDE BRIDGE-RECORDS option of +SELECT allows selection of bridges with CREATE-BDG-ACC-ANAL-FILE. Selection can be based on any of the data elements of the BDG and RLG files. Selection cannot be based on computed data elements such as number of accidents at the bridge.

When INCLUDE BRIDGE-RECORDS and SIG-LIMITS are both used, the user may request that excluded bridges be ignored completely. Alternatively, he may request that they be included in significance limits computations even though they will not appear in the final file, the choice is specified in the SIG-ALL/SIG-SELECTED parameter of CREATE-BDG-ACC-ANAL-FILE.

The INCLUDE BDG-ACC-ANAL-RECS option of +SELECT allows selection of bridges based on data elements in the report file being produced (BNA).

When INCLUDE BDG-ACC-ANAL-RECS is used with CREATE-BDG-ACC-ANAL-FILE, it cannot also be used with PRINT-BDG-ACC-ANAL-REPORT.

If ACCIDENTS is specified with CREATE-BDG-ACC-ANAL-FILE, INCLUDE BDG-ACC-ANAL-RECS can be used to select based on accident history (eg., include those bridges with more than 5 accidents or with an accident rate of 3.5 or higher).

If SIG-LIMITS is specified with CREATE-BDG-ACC-ANAL-FILE, INCLUDE BDG-ACC-ANAL-RECS can be used to select based on significance limits (eg., include only those bridges that are out of significance).

--> Selecting accidents.

Accidents are selected via the following parameters:

START-DATE (required)
END-DATE (required)
ACC-RELIABILITY
+SELECT (INCLUDE ACCIDENTS option)

When ACCIDENTS or SIG-LIMITS is used with

CREATE-BDG-ACC-ANAL-FILE, all accident selection criteria must be included with the create run. It is not possible to later override the criteria with PRINT-BDG-ACC-ANAL-REPORT.

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When NO-ACCIDENTS is used with CREATE-BDG-ACC-ANAL-FILE, the accident selection criteria is not specified until PRINT-BDG-ACC-ANAL-REPORT.

When used with INCLUDE BDG-ACC-ANAL-RECS of +SELECT, accident selection can indirectly select bridges. For example, if accidents are limited to head-on accidents and bridges are limited to those with 5 or more accidents, only those bridges having 5 or more head-on accidents are included.

--> Significance limits computations.

The constant k in the upper and lower limits computations is normally 1.645. The SIG-CONST parameter of CREATE-BDG-ACC-ANAL-FILE (if SIG-LIMITS is used) or PRINT-BDG-ACC-ANAL-REPORT can be used to enter an overriding value.

The average accident rate bb for group of bridges is normally computed by the software, requiring additional overhead. The AVG-ACC-RATE parameter of CREATE-BDG-ACC-ANAL-FILE allows the user to enter a value of his own, thus saving the additional overhead costs. However, errors may be introduced when an incorrect value is entered. If a value is entered, it applies to all of the bridge groups.

--> Best/worst searches.

The software allows requests such as "find the 20 bridges having the highest accident rates".

To perform a best/worst search, the user must first choose which data element is to be used to define "best" or "worst" from the following list:

- Total number of accidents
- Accident rate
- Severity rate
- Wet:wet+dry percentage
- Wet:total percentage
- Amount out of significance
- Ratio out of significance

If one of the first 5 is chosen, either ACCIDENTS or SIG-LIMITS must be specified with CREATE-BDG-ACC-ANAL-FILE. If one of the last 2 is chosen, SIG-LIMITS must be specified.

The chosen data element must be indicated in +SORT of CREATE-BDG-ACC-ANAL-FILE to define the ordering within groups. Use the default sort of DOWN for worst searches or sort of UP for best searches.

Finally, use the parameters MAX-NUMBER-I and/or MAX-NUMBER-RL of PRINT-BDG-ACC-ANAL-REPORT to indicate how many bridges are to be printed. NOTE: When either of these parameters is used, +SORT cannot be used with PRINT-BDG-ACC-ANAL-REPORT to reorder bridges in the BR-4D report.

In the case of ties, more than the indicated number may be printed. For example, if the user requests 20 bridges, and if the 20th, 21st, and 22nd bridges have identical values, 22 bridges are printed.

The CREATE-BDG-ACC-ANAL-FILE Command

Function: Creates a report file for later use by PRINT-BDG-ACC-ANAL-REPORT.

Description: Before attempting to use CTEATE-BDG-ACC-ANAL-FILE, read the preceding section "Bridge Accident Analysis Capabilities". This section describes the capabilities of the BDG accident analysis software to help in deciding which command options are needed.

The file produced by CREATE-BDG-ACC-ANAL-FILE is a sequential file that can be placed on either disc or tape. It contains information gathered from a number of TIS files, including the BDG and the accident files. It can be considered as a "snapshot" of there files at the time it is created. As time goes on, it will become out of date with the TIS files because it is not updates as the other files change. It is created as a stop in producing BDG accident analysis reports, and can be destroyed after the needed reports are obtained.

The printed output form CREATE-BDG-ACC-ANAL-FILE includes:

- --> Option list (listing of command parameters).
- --> Optional listing of bridge data.
- --> Termination message.

The option list can be eliminated by specifying the NO-OPTLIST option.

The parameter LIST/NO-LIST indicates whether the optional list is desired. When LIST is specified, either one or two listings are printed:

--> If SIG-LIMITS is specifeid and AVG-ACC-RATE is omitted, the program must compute an average accident rate for each group of bridges. The LISTING OF AVERAGE ACCIDENT RATES FOR SIG-LIMITS listing shows the computed rates, together with the total number of accidents and the total number of vehicles crossing bridges that are used for computing the rates. For example, if bridges are grouped by district the listing would appear as:

CONSTR DIST	GROUP	NUM BRIDGES	TOT ACC	MILLION VEHICLES	AVG RATE
1	1	8	54	29.254020	1.8
2	2	2	0	3.905500	0.0
.					
.					
.					
TOTAL		16	82	46.067015	1.7

The GROUP column simply numbers the groups from 1 to n so that bridges in the second listing can be easily related to their groups. NUM-BRIDGES provides the number of bridges in the group.

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--> The second listing shows the bridges that were included in the report file. One line is printed for each bridge, and the bridges are printed in the order specified in the +SORT command.

The data elements printed in the listing include:

Key (route system, route number, reference point).

Group number (for relating to first listing).
Regional data elements (county, district, etc.).
Standard category.
Number of days being analyzed.
ADT.
Total number of accidents.
Severity rate and accident rate.

Average accident rate for group.
Upper and lower significance limits.
Amount out of significance.
Ratio out of significance.

Because accident and sig-limits computations are optional, some of the fields listed above may be shown as blanks.

JCL For Report File: Because the report file is a user-controlled file outside of the permanent TIS file system, the user must provide JCL that defines the location of the file. Four options are available to the user:

--> The file may be a scratch file.
--> The file may be a temporary file on disk.
--> The file may be a permanent file on disk.
--> The file may be a temporary or permanent file on tape.

If a scratch file is used, it is simplest to use a disk file. The file will be in existence only for the duration of the TIS job step, and is deleted immediately upon completion of the run. The advantages of using a scratch file are:

--> No permanent storage space is retained.
--> JCL is simplest for scratch files.
--> There is no danger of confusing several existing files and getting the wrong one.

The disadvantages of using a scratch file are:

--> The scratch file is deleted immediately upon completion so that the run cannot be restarted later without performing the complete run over again.

--> If the user later wishes to change some options of PRINT-BDG-ACC-ANAL-REPORT, he will have to recreate his report file.

If a temporary file is used, it is retained for a one-week period and is then automatically deleted. When a temporary disk file is used, restart is possible when CREATE-BDG-ACC-ANAL-FILE completes but PRINT-BDG-ACC-ANAL-REPORT fails for some reason without the need for recreating the file. The user is responsible for assigning a unique

name to the file so that it can be located at a later time. If the CREATE step is repeated with a temporary file, use DISP=OLD or a second file will be allocated. If this happens, the PRINT command will see the first file (since it was cataloged).

A permanent file (one that is to be retained for longer than one week) requires the uer to make a request for disk space from ISB. The JCL for creating a permanent disk file is similar to that for a temporary disk file, except that ISB provides a volume serial number to you that must be included in the JCL.

A tape file can be retained for any length of time without permission from ISB. The disadvantages to using tape is that occasionally the job may be delayed while waiting for a tape to become available. However, tape is probably the best storage device for permanent files.

The JCL for the report file consists of a single DD statement. The user may choose any name for this DD statement, and informs CREATE-BDG-ACC-ANAL-FILE of the chosen name via the OUTPUT-DD parameter. A suggested name for this DD statement is BNA.

The DD statement for a scratch file is:

```
//BNA DD UNIT=SYSDA,SPACE=(CYL,(n,3))
```

Compute n as r/450+1 where r is the expected number of bridges that will be included in the file.

The DD statement for a temporary disk file is:

```
//BNA DD UNIT=SYSDA,DISP=(NEW,CATLG),DSNAME=user-id.BNAxxx,
//       SPACE=(CYL,(n,3),RLSE)
```

Compute n as for a scratch file.
"user-id" is your TSO user id.
Specify xxx so as to achieve a unique name for the file.

The DD statement for a permanent disk file is the same as above except that the parameter VOL=SER=serial is added.

The.DD statement for a tape is:

```
//BNA DD UNIT=TAPE,DISP=(NEW,CATLG),DSNAME=user-id.BNAxxx,
         LABEL=RETPD=n
```

In the LABEL=RETPD parameter, specify the retention period of the tape(ie.,the number of days the file is to be retained). Alternatively, specify LABEL=EXPDT=yyddd to identify an expiration date of the dddth day of the year yy.
"user-id" is your TSO user id.
Specify xxx so as to achieve a unique name for the file.

Required Command Parameters:
****

OUTPUT-DD=ddname

--> Use this parmeter to indicate the name you have coded on the DD statement for the report file.

ROUTES subcommand

--> Use this subcommand to indicate what routes are to be searched for bridges.
--> This program operates under the LIST classification.

START-DATE=mm/dd/yyyy
END-DATE=mm/dd/yyyy

--> Use to indicate the time period of the analysis report.
--> The SELECT subcommand may be used to choose only certain intervals within this period (INCLUDE TIME IF:...).

Optional Command Parameters:
****

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

--> The option list is a listing of your command parameters.

SIG-LIMITS Include accident and sig-limits data elements.
ACCIDENTS Include accident but not sig-limits data elements.
NO-ACCIDENTS Do not include accident and sig-limits data elements (default).

--> If NO-ACCIDENTS is used, all accident an sig-limits data elements of the report file will contain zeroes.
--> If ACCIDENTS is used, accident data is retrieved and added to the report ifle. Sig-limits elements will contain zeroes.
--> If SIG-LIMITS is used, accident elements as well as sig-limits elements will be included in the report

file.


```
                INTSECT      Include intersection accidents only.
ACC-INT-LOCN=   NON-INTSECT  Include non-intersection accidents only
                ALL          Include all accidents (default).

     --> "INTSECT" accidents are those with ACD.INTSECT-RELATION =
                          02 - T-INTERSECTION
                          03 - Y-INTERSECTION
                          04 - 4-LEGGED INTERSECTION
                          05 - 5 OR MORE LEG INTERSECT
                          06 - TRF CIRCLE OR ROUNDABOUT
                          07 - INTERSECTION-RELATED
                          20 - INTERCHANGE ON RAMP
                          21 - INTERCHANGE OFF RAMP
                          22 - INTERCHANGE OTHER AREA

     --> Do not use ACC-INT-LOCN when NO-ACCIDENTS is used.


                     1    Include reliability '1' only.
ACC-RELIABILITY=     2    Include reliabilities '1' and '2'.
                     3    Include reliabilities '1', '2', and '3'.

     --> Use to select accidents based on location reliability.
     --> Do not use ACC-RELIABILITY when NO-ACCIDENTS is used.


EXCLUDE-SCAN    Do not use accident scans to determine reference
                   points to search for accidents.
INCLUDE-SCAN    Use accident scans to determine reference points to
                   search for accidents (default).

ACC-SCAN=nnnn    0001 - 9999 (in feet).

             -->  This parameter can be used to override the
                  reference point limits stored in bridge records.
                  If a non-zero value is coded, it will be
```

subtracted and added to the bridge reference point
when searching for accidents. These limits are
stored in the BDG record and cannot be changed by
the PRINT-BDG-ACC-ANAL-REPORT command.

SIG-CONST=nn.nnn

--> This parameter can be used to enter an overriding value for
the constant in the significance limits formulas. In its
absence a value of 1.645 is used.
--> Do not code this parameter unless SIG-LIMITS is used.

AVG-ACC-RATE=nn.n

--> This parameter can be used to enter an average accident rate
for significance limits computations.
--> When used, this parameter reduces overhead.
--> This parameter can introduce errors when an incorrect value
is entered.
--> Do not code this parameter unless SIG-LIMITS is used.

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SIG-ALL Include non-selected bridges for sig-limits.
SIG-SELECTED Include only selected bridges for sig-limits (default)

--> This parameter is applicable only when both SIG-LIMITS is
used and +SELECT is used with the INCLUDE BRIDGES option.
--> SIG-SELECTED indicates that only those bridges that are
selected should be used for computing average accident rates.
--> SIG-ALL indicates that non-selected as well as selected
bridges should be used for computing average accident rates.
--> SIG-ALL will increase the cost of the run because accident
data must be retrieved for non-selected bridges.
--> Do not specify SIG-ALL when AVG-ACC-RATE is coded.

NO-LIST Do not print bridge listings.
LIST Print bridge listings (default).

--> LIST requests a listing showing the bridges included in the
report file.
--> When SIG-LIMITS is used without AVG-ACC-RATE, LIST also
requests a listing of the computed average accident rates.

NO-VERBAL Do not print the verbal description with the bridge.
VERBAL   Print the verbal description with each bridge (default).

--> If requested, the verbal description will be printed along with each bridge included in the report file.
--> VERBAL and NO-LIST is an invalid combination -- NO-LIST implies NO-VERBAL.

UNDER   Include only bridge records for roads under structure
OVER-&-UNDER   Include both over and under bridge records.
OVER   Include only bridge records for roads over structure (default).

FUNCT-USE=n

--> This parameter can be used to select bridges with only the specified FUNCT-USE. Defaults to -1 so that bridges with any functional use are selected.

CATEGORIES subcommand

--> Use the CATEGORIES when user-defined categories are needed for the purpose of grouping bridges.
--> Indicate one, two or three BDG/RLG data elements whose combined lengths do not exceed 18 characters.
--> The REDEFINES and GROUPS capabilities of CATEGORIES can be used to combine several categories into one.

SORT subcommand

--> Use SORT to indicate (1) how bridges are grouped and (2) how bridges are to be ordered within groups.
--> If SORT is omitted, there will be just one statewide group and the bridges will be in order by reference point location.
--> The data elements that can be used in SORT are:

Class A-1:	BNA.CONSTR-DIST	Construction district
	BNA.MAINT-AREA	Maintenance area
	BNA.PTRL-STATION	Patrol station
	BNA.PTRL-DIST	Patrol district
Class A-2:	BNA.COUNTY	County

```
 Class A-3:  BNA.CITY              Municipality
             BNA.URB-AREA          Urban area

 Class A-4:  BNA.CATEGORY          Category (standard)
             BNA.USER-CATEGORY     Category (user defined)

 Class B:  BNA.TOT-NUM-ACC           Total number of accidents
           BNA.ACC-RATE              Accident rate
           BNA.SEV-RATE              Severity rate
           BNA.WET-DRY-PERCENT       Wet:wet+dry percentage
           BNA.WET-TOTAL-PERCENT     Wet:total percentage
           BNA.AMT-OUT-OF-SIG        Amount out of significance
           BNA.RATIO-OUT-OF-SIG      Ratio out of significance

--> Either zero or one data element can be chosen from each
    class.
--> Under no circumstances can two data elements be chosen from
    the same class.
--> The Class A data elements define the groupings of bridges.
    These data elements default to UP (sorted smallest to
    largest).

      Example 1.  Group bridges by county.

           +SORT
           BNA.COUNTY

      Example 2.  Group bridges by urban area within district.

           +SORT
           BNA.CONSTR-DIST
           BNA.URB-AREA
```



```
--> The Class B data elements define the order of bridges
    within groups.  These data elements default to DOWN (sorted
    largest to smallest).
```

Example 3. Leave bridges in statewide grouping but SORT based on accident rate.

```
+SORT
BNA.ACC-RATE
```

Example 4. Group bridges by county and sort by number of accidents, smallest to largest.

```
+SORT
BNA.COUNTY
BNA.TOT-NUM-ACC,UP
```

--> Of the Class B date elements, BNA.AMT-OUT-OF-SIG and BNA.RATIO-OUT-OF-SIG can be specified only if SIG-LIMITS is used. The remaining Class B elements can be specified only if either ACCIDENTS of SIG-LIMITS is used.
--> The Class A-4 data element BNA.USER-CATEGORY can be specified only if a CATEGORIES subcommand is included.

SELECT subcommand

--> Four options are available: INCLUDE BRIDGE-RECORDS, INCLUDE BDG-ACC-ANAL-RECS, INCLUDE ACCIDENTS, and INCLUDE TIME.

--> INCLUDE BRIDGE-RECORDS can be used to select bridges based on criteria stored in the permanent TIS files.

--> BDG and RLG data elements can be used in the select statement.
--> If SIG-LIMITS is used, the SIG-ALL/SIG-SELECTED parameter applies.

--> INCLUDE BDG-ACC-ANAL-RECS can be used to select output records written to the report file, excluding from the file those that do not meet the selection criteria.

--> BNA data elements can be used in the select statement.
--> Accident data elements can be referenced only if SIG-LIMITS or ACCIDENTS is used.
--> Sig-limits data elements can be referenced only if SIG-LIMITS is used.
--> If INCLUDE BDG-ACC-ANAL-RECS is used with CREATE-BDG-ACC-ANAL-FILE, it cannot also be used with PRINT-BDG-ACC-ANAL-REPORT.

--> INCLUDE ACCIDENTS can be used to select accidents.

--> ACD, ACV, ACP, and ACJ data elements can be used in the select statement.
--> ACV, ACP, and ACJ data elements must be referenced via the multi-correlation facility (*ANY*/*ALL*).
--> ACCIDENTS selection can be used only if ACCIDENTS or SIG-LIMITS is used. Otherwise, defer accident selection to PRINT-BDG-ACC-ANAL-REPORT.

--> INCLUDE TIME can be used to select time intervals.

--> TIM data elements can be referenced in the select statement.
--> Selected time is used to compute ADT (i.e., may not be AADT) for MAINLINE bridges only (since traffic file is only accessed for these bridges).
--> There is no connection to accidents when selecting time.

TITLES subcommand

Can be used to enter user headings (eg., to indicate who requested the run or the data requested).

Any number of the print formatting parameters -- see chapter 4

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT REDUCE
//TIS EXEC DTRITA,TIME=10,SCRSIZE=10,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//BNA DD UNIT=TAPE,DISP=(NEW,CATLG),DSNAME=USER-ID.BNAV01,
//       LABEL=RETPD=30
//SYSIN DD *
:CREATE-BDG-ACC-ANAL-FILE,SIG-LIMITS,OUTPUT-DD=BNA,
:     START-DATE=01/01/1987,END-DATE=12/31/1988
+ROUTES
ROUTE-SYS=USTH
+CATEGORIES
```

```
        DATE-ELEMENT=BDG.BRIDGE-NUMBER
        +SORT
        BNA.CONSTR-DIST
        BNA.USER-CATEGORY
        BNA.ACC-RATE
        /*




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+
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```

The PRINT-BDG-ACC-ANAL-REPORT Command
****

Function: Print BDG accident analysis reports.

Description: Before attempting to use PRINT-BDG-ACC-ANAL-REPORT, read
---
the preceding sections entitled "Bridge Accident Analysis Capabilities" and "The CREATE-BDG-ACC-ANAL-FILE Command."

Before PRINT-BDG-ACC-ANAL-REPORT can be used to print BDG accident analysis reports, CREATE-BDG-ACC-ANAL-FILE must be used to create a BDG accident analysis report file.

The printed output from PRINT-BDG-ACC-ANAL-REPORT consists of one or more S-G reports plus zero or more S-RH reports. Each S-G report is a report for a group of bridges as defined by the report file produced by CREATE-BDG-ACC-ANAL-FILE. Each S-RH report summaries two or more groups.

An S-G report consists of:

- Option list (listing of command parameter).
- Code list (listing of codes used in reports).
- One S-I report for each bridge in the group.
- One S-RL report for the group.

S-I, S-RL, and S-RH reports are described in the section "Bridge Accident Analysis Capabilities."

JCL For Report File: Because the BDG accident analysis report file is
---
a user-controlled file outside of the permanent TIS file system, the user must provide JCL that defines the location of the file . The JCL of the CREATE-BDG-ACC-ANAL-FILE program defined where the file was placed. The

JCL of the PRINT-BDG-ACC-ANAL-REPORT program defines where the file can be found for retrieval.

When PRINT-BDG-ACC-ANAL-REPORT command is placed in the same job step as the CREATE-BDG-ACC-ANAL-FILE command, you do not need to include a DD statement in addition to the one used with CREATE-BDG-ACC-ANAL-FILE. Simply code INPUT-DD=ddname where the ddname is the same coded in the OUTPUT-DD parameter of CREATE-BDG-ACC-ANAL-FILE.

If the PRINT-BDG-ACC-ANAL-REPORT is used in a job step separate from the CREATE-BDG-ACC-ANAL-FILE, include the following DD statement with the PRINT-BDG-ACC-ANAL-REPORT command:

```
//ddname DD DISP=SHR,DSNAME=TRN.RIBNAxxx
```

This format is used whether the report file was stored in a temporary disk file, a permanent disk file, or a tape file.

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Required Command Parameters:
****

INPUT-DD=ddname

--> Use this parmeter to indicate the name of the DD statement you have included in the report file.

START-DATE=mm/dd/yyyy
END-DATE=mm/dd/yyyy

--> Use to indicate the time period of the analysis report.
--> Include these parameters only if NO-ACCIDENTS was used with the CREATE-BDG-ACC-ANAL-FILE command.

Optional Command Parameters:
****

NO-OPTLIST No option list is printed.
OPTLIST Print one option list with each S-G report.

--> The option list is a listing of the CREATE-BDG-ACC-ANAL-FILE and PRINT-BDG-ACC-ANAL-REPORT

command parameters.

NO-CODELIST Do not print code lists.
CODELIST   Print one code list with each S-G report.

--> The code list is a serveral page report that explains
    headings and codes in the report.

                INTSECT   Include intersection accidents
                               (ACD.INTSECT-RELATION = 1-3)
ACC-INT-LOCN = NON-INTSECT Include non-intersection accidents
                               only (ACD.INTSECT-RELATION = 4-9)
                ALL   Include all accidents.
                ---   (ACD.INTSECT-RELATION = 1-9)

--> Can be used only if NO-ACCIDENTS was used with
    CREATE-BDG-ACC-ANAL-FILE.

                  1   Include reliability 1 only.
ACC-RELIABILITY= 2   Include reliabilities 1 and 2.
                  3   Include reliabilities 1, 2, and 3.
                  -

--> Use to select accidents based on location reliability.
--> Can be used only if NO-ACCIDENTS was used with
    CREATE-BDG-ACC-ANAL-FILE.

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SIG-CONST=nn.nnn

--> Use this parameter to enter a value for constant k in
    significance limits formulas.
--> Can be used only when SIG-LIMITS was not included with
    CREATE-BDG-ACC-ANAL-FILE.

             ABCE   CDE   CE
SUMMARIES=(I=   ,RL=   ,RH=   )
             NONE   NONE   NONE

--> Use this parameter to indicate which reports are to be
    printed.
--> Default is SUMMARIES=(I=ABCE,RL=CDE,RH=CE).
--> I subparameter indicates which of the summaries BR-4A,

BR-4B, BR-4C, and BR-4E comprise S-I reports.
--> RL subparameter indicates which of the summaries BR-4C, BR-4D, and RB-4E comprise S-RL reports.
--> RH subparameter indicates which of the summaries BR-4C and BR-4E comprise S-RH reports.

Example: SUMMARIES=(I=CE,RH=NONE)

S-I report consists only of BR-4C and BR-4E.
S-RL report defaults to BR-4C, BR-4D, and BR-4E.
S-RH report is not printed.

MAX-NUMBER-I=	nnn	Maximum number of bridges in each group.
	0	Not using best/worst search (default).

MAX-NUMBER-RL=	nnn	Maximum number of bridges in each group.
	0	Not using best/worst search (default).

--> These two parameters are used to request best/worst reports.
--> MAX-NUMBER-I indicates the maximum number of S-I reports to be printed in each S-G report.
--> MAX-NUMBER-RL indicates the maximum number of bridges to be printed in each BR-4D report of S-RL.
--> If MAX-NUMBER-I is omitted (defaults to zero), MAX-NUMBER-RL also defaults to zero.
--> If MAX-NUMBER-I is included, MAX-NUMBER-RL defaults to the value specified in MAX-NUMBER-RL.

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NO-VERBAL	Do not print the verbal description with the bridge.
VERBAL	Print the verbal description with each bridge. (default).

--> This option applies to the BR-4D report and results in the

descriptive location and the name of feature crossed for each bridge being printed on a separate line.

EXCLUDE-SCAN Do not use accident scans to determine reference points of bridge key.
INCLUDE-SCAN Use accident scans to determine reference points of bridge key (default).

--> EXCLUDE-SCAN can only be specified if it was not used with the CREATE-BDG-ACC-ANAL-FILE command.

ACC-SCAN=nnnn 0001 - 9999 (in feet).

This parameter can be used to override the lengths stored in the bridge record. If a non-zero value is coded, it will be added to the upper bridge end and subtracted from the lower bridge end when scanning for accidents. Can only be used IF NOT USED WITH CREATE-BDG-ACC-ANAL-FILE.

SORT subcommand

Use SORT to indicate the order in which brdiges are printed in BR-4D reports.
If SORT is omitted, bridges appear in the order defined by the SORT subcommand of CREATE-BDG-ACC-ANAL-FILE.
The data elements that can be used in SORT are:

BNA.TOT-NUM-ACC	Total number of accidents
BNA.ACC-RATE	Accident rate
BNA.SEV-RATE	Severity rate
BNA.WET-DRY-PERCENT	Wet:wet+dry percentage
BNA.WET-TOTAL-PERCENT	Wet:total percentage
BNA.AMT-OUT-OF-SIG	Amount out of significance
BNA.RATIO-OUT-OF-SIG	Ratio out of significance

Any of these data elements may be used regardless of whether NO-ACCIDENTS, ACCIDENTS, or SIG-LIMITS was used with CREATE-BDG-ACC-ANAL-FILE.
SORT cannot be used if either MAX-NUMBER-I or MAX-NUMBER-RL is used.

SELECT subcommand

Two options are available: INCLUDE ACCIDENTS and INCLUDE BDG-ACC-ANAL-RECS.

INCLUDE ACCIDENTS can be used to select accidents. It cannot be used unless NO-ACCIDENTS was used with CREATE-BDG-ACC-ANAL-FILE. ACD, ACV, ACP, and ACJ data elements can be referenced. ACV, ACP, and ACJ data elements must be referenced via the multi-correlation facility (*ANY*/*ALL).

INCLUDE BDG-ACC-ANAL-RECS can be used to select BDG accident analysis report file records (referencing BNA data elements only). It cannot be used if INCLUDE BDG-ACC-ANAL-RECS was used with CREATE-BDG-ACC-ANAL-FILE. Significance limits data elements can be referenced only if SIG-LIMITS was used with CREATE-BDG-ACC-ANAL-FILE. Accident data elements cannot be referenced if NO-ACCIDENTS was used with CREATE-BDG-ACC-ANAL-FILE.

TITLES subcommand

Any number of the print formatting parameters -- see chapter 4

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRITA,TIME=10,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//BNA DD DISP=OLD,DSNAME=USER-ID.BNA,UNIT=SYSDA
//SYSIN DD *
:PRINT-BDG-ACC-ANAL-REPORT,INPUT-DD=BNA,
:     MAX-NUMBER-I=20,SUMMARIES=(I=B,RL=D,RH=NONE)
/*
```

The SORT-BDG-ACC-ANAL-FILE Command

****

Function: Sorts a BDG accident analysis report file.

Description: This program can be used to sort a report file produced by CREATE-BDG-ACC-ANAL-FILE. The sort allows (1) the bridge groupings to be redefined, and (2) the order of bridges within groups to be redefined.

Required Command Parameters:

****

INPUT-DD=ddname

Use this parmeter to indentify the DD statement that defines the input report file.

OUTPUT-DD=ddname

Use this parmeter to indentify the DD statement that defines the output report file.

Optional Command Parameters:

****

SORT subcommand

Used exactly like SORT subcommand of CREATE-BDG-ACC-ANAL-FILE. If omitted, bridges are sorted by key (route system, route number, reference point, bridge number, and bridge match).

TITLES subcommand

Can be used to enter user headings (eg., to indicate who requested the run or the data requested).

Any number of the print formatting parameters -- see chapter 4

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+

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,MSGCLASS=2
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT REDUCE
//TIS EXEC DTRIT,TIME=3,REGION=400K,SCRSIZE=5,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//BNAIN  DD DISP=SHR,DSNAME=TRN.RIBNAV01
//BNAOUT DD DISP=(NEW,CATLG),DSNAME=TRN.RIBNAV02,
//    UNIT=TAPE,LABEL=RETPD=30
//SYSIN DD *
:SORT-BDG-ACC-ANAL-FILE,INPUT-DD=BNAIN,OUTPUT-DD=BNAOUT
+SORT
BNA.COUNTY
BNA.CATEGORY
/*
```

The LIST-RAILWAY-FILE Command

Function: Prints a listing of the railway file.

Description: The listing consists of three lines per record and shows all of the data elements stored:

First line
- Railroad system code
- Railroad line number
- Reference point
- Ownership
- Abandonment status
- Densities - Most recent year
  - Year of density
  - Total density
  - Directional densities
- Division
- Subdivision
- FRA line identification
- Trackage rights

- FRA track class
- Maximum weight on rail
- Maximum height and corresponding width
- Maximum width and corresponding height
- Number of tracks
- Signal type - track 1
- Freight speed - increasing mileposts - track 1
- Freight speed - decreasing mileposts - track 1
- Weight of rail - track 1
- Remark code
- Legislative district
- Congressional district
- City number
- County number
- Functional class code

Second line - Densities - Second most recent year
  Year of density
  Total density
  Directional densities
- Signal type - track 2
- Freight speed - increasing mileposts - track 2
- Freight speed - decreasing mileposts - track 2
- Weight of rail - track 2

Third line - Densities - Third most recent year
  Year of density
  Total density
  Directional densities
- Verbal description
- Date of record update

1
+

Required Command Parameters: None.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

NO-CODELIST No codelist is printed.
CODELIST   One codelist is printed (default).

- The codelist is a summary of the meanings of the coded data elements in the report.

ROUTES subcommand

- Operates under LIST classification (meaning that summary selection parameters such as ZERO-USER-TOTALS have no effect).
- Allowable parameters: RAIL-SYS, RAIL-LINE, RAIL-SYS-&-LINE, RAIL-START-REF, RAIL-END-REF, CITY, COUNTY, and COUNTY(BY-CITY).
- If no ROUTES subcommand is coded, all records are included, subject to SELECT criteria, if any.

SELECT subcommand

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

```
INCLUDE
EXCLUDE  RAILWAY-RECORDS IF:
```

- RWY data elements can be referenced.

If no SELECT statement is coded, all records in the file are considered "selected". SELECT is performed BEFORE ROUTES data criteria are applied (if ROUTES subcommand is present).

ABANDONED=YES Include railway records with abandonment status 8. Abandoned sections are otherwise automatically excluded. THIS APPLIES ONLY WHEN +ROUTES IS CODED (without +ROUTES, abandoned sections will be included).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample produces output only at the TSO

---------------- terminal (default). To get the report at both the terminal and a line printer, change the third line to:

```
          //TIS EXEC DTRIRT,TIME=1,REGION=200K,OUTFILE=PRINTER
```

To get report only at a line printer, change the third line to:

```
          //TIS EXEC DTRIRT,TIME=1,REGION=200K,PRINTDD=PRINTER
```

And change the first line: MSGCLASS=2 to MSGCLASS=A.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
LIST-RAILWAY-FILE,CODELIST
+ROUTES
RAIL-SYS=BN
COUNTY=ANOKA,RAIL-SYS=(02-05,11)
CITY=1040-1105,RAIL-SYS=01-16
/*
```

The LIST-STATION-FILE Command

Function: Prints a listing of the station file.

Description: The listing consists of one line per record and shows all of the data elements stored:

- Railroad system code
- FSAC number
- SPLC number
- Station name
- Freight/passenger service code
- Intermodal transfer code
- Interchanges (other railroad systems)
- Yard code
- Agent/operator code
- Length of siding
- Date of record update

Required Command Parameters: None.

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed.

- The option list is a listing of command parameters used for the report.

NO-CODELIST	No codelist is printed.
CODELIST	One codelist is printed.

- The codelist is a summary of the meanings of the coded data elements in the report.

ROUTES subcommand

- Operates under LIST classification (meaning that summary selection parameters such as ZERO-USER-TOTALS have no effect).

- Allowable parameters: RAIL-SYS, RAIL-LINE, RAIL-SYS-&-LINE, RAIL-START-REF, RAIL-END-REF, CITY, COUNTY, and COUNTY(BY-CITY).
- If no ROUTES subcommand is coded, all records are included, subject to SELECT criteria, if any.

ABANDONED=YES Include stations on railway sections with abandonment status 8. Abandoned sections are otherwise automatically excluded. THIS APPLIES ONLY WHEN +ROUTES IS CODED (without +ROUTES, abandoned sections will be included).

SELECT subcommand

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE STATION-RECORDS IF:

- STA data elements can be referenced.

If no SELECT statement is coded, all records (subject to ROUTES criteria, if any) are considered "selected".

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample produces output only at the TSO terminal (default). To get the report at both the terminal and a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,OUTFILE=PRINTER
```

To get report only at a line printer, change the third line to:

```
                //TIS EXEC DTRIRT,TIME=1,REGION=200K,PRINTDD=PRINTER

                And change the first line:  MSGCLASS=2 to MSGCLASS=A.

        //JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
        //             MSGCLASS=2,MSGLEVEL=(2,0)
        /*JOBPARM ROOM=R820,LINES=5
        /*ROUTE  PRINT R0
        //TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
        //    PRINTDD=TSO,OUTFILE=
        //SYSIN DD *
        LIST-STATION-FILE,CODELIST
        +SELECT
        INCLUDE STATION-RECORDS IF:
           STA.YARD *EQ* '1' *AND* STA.SIDING-LEN *GT* 100
        +TITLES
         *** STATION RECORDS WITH YARD AND MORE THAN 100 FEET OF SIDING ***
        /*

           See chapters 3 and 4 of the TIS User's Manual for further explanation
           of TIS job setups.
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        The LIST-RAILPOINT-FILE Command
        ******************************

        Function:  Prints a listing of the railpoint file.
        --------

        Description:  The listing consists of one line per record and shows
        -----------   all of the data elements stored:

                          - Railroad system code
                          - Railroad line number
                          - Railroad reference point
                          - FSAC number (station record ID)
                          - RGC number (rail grade crossing ID)
                          - BDG number (bridge record ID)
                          - Verbal description
                          - Date of record update


        Required Command Parameters:  None.
        ---------------------------

        Optional Command Parameters:
        ---------------------------
```

NO-OPTLIST No option list is printed.
OPTLIST   A one-page option list is printed.

- The option list is a listing of command parameters used for the report.

NO-CODELIST No codelist is printed.
CODELIST   One codelist is printed.

- The codelist is a summary of the meanings of the coded data elements in the report.

ROUTES subcommand

- Operates under LIST classification (meaning that summary selection parameters such as ZERO-USER-TOTALS have no effect).
- Allowable parameters: RAIL-SYS, RAIL-LINE, RAIL-SYS-&-LINE, RAIL-START-REF, RAIL-END-REF, CITY, COUNTY, and COUNTY(BY-CITY).
- If no ROUTES subcommand is coded, all records are included, subject to SELECT criteria, if any.

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+

ABANDONED=YES Include railpoint records on railway sections with abandonment status 8. Abandoned sections are otherwise automatically excluded. THIS APPLIES ONLY WHEN +ROUTES IS CODED (without +ROUTES, abandoned sections will be included).

SELECT subcommand

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE RAILPOINT-RECORDS IF:

- RPT data elements can be referenced.

If no SELECT statement is coded, all records in the file are considered "selected". SELECT is performed AFTER ROUTES data criteria are applied (if ROUTES subcommand is present).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample produces output only at the TSO terminal (default). To get the report at both the terminal and a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,OUTFILE=PRINTER
```

To get report only at a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,PRINTDD=PRINTER
```

And change the first line: MSGCLASS=2 to MSGCLASS=A.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIRT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-RAILPOINT-FILE,NO-OPTLIST,CODELIST
+SELECT
EXCLUDE RAILPOINT-RECORDS IF:
  RPT.FSAC *NE* '     '
+ROUTES
RAIL-SYS-&-LINE=0501
+TITLES
*** LISTING OF RECORDS THAT DO NOT IDENTIFY STATIONS ***
/*
```


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The LIST-RAILTM-FILE Command

Function: Prints a listing of the railway true mileage file.

Description: The listing consists of one line per record and shows
-----------   all of the data elements stored:

- Railroad system code
- Railroad line number
- Railroad reference post
- True mileage
- Estimated/Actual code
- Effective date
- Date of record update

Records are always listed in the order stored in the file, ie., by key (railroad system code, line number, and reference post). The user defines which records are to be printed by the SELECT subcommand.

Required Command Parameters: None.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed.

- The option list is a listing of command parameters used for the report.

SELECT subcommand

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE RAILTM-RECORDS IF:

- RTM data elements can be referenced.

If no SELECT statement is coded, all records in the file are considered "selected".

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup:

The following sample produces output only at the TSO terminal (default). To get the report at both the terminal and a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,OUTFILE=PRINTER
```

To get report only at a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,PRINTDD=PRINTER
```

And change the first line: MSGCLASS=2 to MSGCLASS=A.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5,SYSAFF=ANY
//TIS EXEC DTRIRT,TIME=1,REGION=400K
//SYSIN DD *
:LIST-RAILTM-FILE,NO-OPTLIST
+SELECT
 INCLUDE RAILTM-RECORDS IF:
   RTM.ESTIMATED-ACTUAL *EQ* 'A'
+TITLES
***LISTING OF RECORDS WITH "ACTUAL" VALUES***
/*
```

The RAILWAY-MATRIX-SUMMARY Command

Function: Groups and counts railway records.

Description: Summaries can be printed broken down by one, two, or three data elements from the railway file.

When summarizing by one data element, the report format is similar to:

RWY.TRACK-CLASS	MILES	KILOMETERS
- (BLANK) NOT AVAILABLE	141.00	226.92
1 - 10 MPH	143.23	230.47
2 - 25 MPH	1,009.07	1,623.97
3 - 40 MPH	2,134.73	3,435.73
4 - 60 MPH	2,419.76	3,894.24
----- GRAND TOTAL ----->	5,847.79	9,411.33

When summarizing on two data elements, the report format is similar to:

RWY.SIGNAL-1	RWY.TRACK-CLASS	MILES	KILOMETERS
- (BLANK)	2 - 25 MPH	248.92	400.56
- (BLANK)	3 - 40 MPH	2.80	4.51
- (BLANK)	-- SUBTOTAL -->	251.72	405.07
1 - CENTRALIZED	2 - 25 MPH	18.31	29.47
1 - CENTRALIZED	3 - 40 MPH	250.07	402.59
1 - CENTRALIZED	4 - 60 MPH	392.01	630.85
1 - CENTRALIZED	-- SUBTOTAL -->	660.39	1,062.91
2 - AUTOMATIC	2 - 25 MPH	3.70	5.96

```
2 - AUTOMATIC       3 - 40 MPH           200.17     322.12
2 - AUTOMATIC       4 - 60 MPH           978.05   1,574.08
2 - AUTOMATIC       -- SUBTOTAL -->    1,181.92   1,902.16

3 - OTHER BLOCK     2 - 25 MPH             7.74      12.45
3 - OTHER BLOCK     3 - 40 MPH            22.30      35.89
3 - OTHER BLOCK     4 - 60 MPH           131.14     211.02
3 - OTHER BLOCK     -- SUBTOTAL -->      161.18     259.36

4 - UNSPECIFIED       - (BLANK)          141.00     226.92
4 - UNSPECIFIED     1 - 10 MPH           143.23     230.47
4 - UNSPECIFIED     2 - 25 MPH           730.40   1,175.53
4 - UNSPECIFIED     3 - 40 MPH         1,659.39   2,670.62
4 - UNSPECIFIED     4 - 60 MPH           918.56   1,478.29
4 - UNSPECIFIED     -- SUBTOTAL -->    3,592.58   5,781.83

                    -- GRAND TOTAL --> 5,847.79   9,411.33
```


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When summarizing on three data elements, the report format is the same as that for two data elements, except that one summary is printed for each value of the additional data element.

Required Command Parameters:

CATEGORIES subcommand

- RWY data elements can be referenced.
- The REDEFINES control card can be used to group various codes together.

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed.

- The option list is a listing of command parameters used for the report.

KILOMETERS	Mileage, kilometers and numbers of records are shown.
MILES	Mileages only are computed.

ROUTES subcommand

- Operates under SUM classification.
- Allowable parameters: RAIL-SYS, RAIL-LINE, RAIL-SYS-&-LINE, RAIL-START-REF, RAIL-END-REF, CITY, COUNTY, and COUNTY(BY-CITY), and any summary selection parameters.
- If no ROUTES subcommand is coded, all records are included, subject to SELECT criteria, if any.

SELECT subcommand

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE RAILWAY-RECORDS IF:

- RWY data elements can be referenced.

If no SELECT statement is coded, all records in the file are considered "selected". SELECT is performed BEFORE ROUTES data criteria are applied (if ROUTES subcommand is present).

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ABANDONED=YES Include railway records with abandonment status 8.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample produces output only at the TSO terminal (default). To get the report at both the terminal and a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,OUTFILE=PRINTER
```

To get report only at a line printer, change the third line to:

```
          //TIS EXEC DTRIRT,TIME=1,REGION=200K,PRINTDD=PRINTER

          And change the first line:  MSGCLASS=2 to MSGCLASS=A.

       //JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
       //             MSGCLASS=2,MSGLEVEL=(2,0)
       /*JOBPARM ROOM=R820,LINES=5
       /*ROUTE  PRINT R0
       //TIS EXEC DTRIRT,TIME=1,REGION=300K,SCRSIZE=3,FORM='(2)',
       //    PRINTDD=TSO,OUTFILE=
       //SYSIN DD *
       :RAILWAY-MATRIX-SUMMARY
       +CATEGORIES
       DATA-ELEMENT=RWY.SIGNAL-1
       DATA-ELEMENT=RWY.TRACK-CLASS
       +SELECT
       INCLUDE RAILWAY-RECORDS IF: RWY.REMARK *EQ* '  '
       +TITLES
       ALL RAILWAY MILEAGE RECORDS (REMARK = BLANK)
       /*

          See chapters 3 and 4 of the TIS User's Manual for further explanation
          of TIS job setups.
```


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```
       The STATION-MATRIX-SUMMARY Command
       **********************************

       Function:  Groups and counts station records.
       --------

       Description:  Summaries can be printed broken down by one, two, or three
       -----------   data elements from the station file.

           When summarizing by one data element, the report format is similar
```

to:

STA.RR-SYS	STATIONS
01 - BURLINGTON NORTHERN	315
02 - CHICAGO NORTHWEST TRANS.	147
03 - CHICAGO,MILW.,STP, & PAC.	70
04 - CHICAGO, ROCK IS. & PAC.	5
05 - SOO LINE RAILROAD	118
06 - DULUTH,MISSABE & IRON RNG	74
07 - ILLINOIS CENTRAL GULF	6
09 - DULUTH,WINNIPEG & PACIFIC	12
11 - MINNEAPOLIS,NRTHFLD,STHRN	8
----- GRAND TOTAL ----->	755

When summarizing on two data elements, the report format is similar to:

STA.FRT-PSGR-SRV	STA.YARD	STATIONS
1 - FREIGHT	(BLANKS)	2
1 - FREIGHT	1 - YES	181
1 - FREIGHT	2 - NO	561
1 - FREIGHT	----- SUBTOTAL ------->	744
2 - PASSENGER	2 - NO	1
2 - PASSENGER	----- SUBTOTAL ------->	1
3 - FREIGHT AND PASSENGER	1 - YES	9
3 - FREIGHT AND PASSENGER	2 - NO	1
3 - FREIGHT AND PASSENGER	----- SUBTOTAL ------->	10
	----- GRAND TOTAL ----->	755

When summarizing on three data elements, the report format is the same as that for two data elements, except that one summary is printed for each value of the additional data element.

Required Command Parameters:

CATEGORIES subcommand

- STA data elements can be referenced.
- The REDEFINES control card can be used to group various codes together.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

ROUTES subcommand

- Operates under SUM classification.
- Allowable parameters: RAIL-SYS, RAIL-LINE, RAIL-SYS-&-LINE, RAIL-START-REF, RAIL-END-REF, CITY, COUNTY, and COUNTY(BY-CITY), and any summary selection parameters.
- If no ROUTES subcommand is coded, all records are included, subject to SELECT criteria, if any.

ABANDONED=YES Include railway records with abandonment status 8. Abandoned sections are otherwise automatically excluded. THIS APPLIES ONLY WHEN +ROUTES IS CODED (without +ROUTES, abandoned sections will be included).

SELECT subcommand

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE STATION-RECORDS IF:

- STA data elements can be referenced.

If no SELECT statement is coded, all records in the file are considered "selected". SELECT is performed AFTER ROUTES data criteria are applied (if ROUTES subcommand is

present).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample produces output only at the TSO terminal (default). To get the report at both the terminal and a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,OUTFILE=PRINTER
```

To get report only at a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,PRINTDD=PRINTER
```

And change the first line: MSGCLASS=2 to MSGCLASS=A.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=300K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:STATION-MATRIX-SUMMARY,NO-OPTLIST
+CATEGORIES
DATA-ELEMENT=STA.RR-SYS
+SELECT
INCLUDE STATION-RECORDS IF:  STA.YARD *EQ* '1'
+ROUTES
RAIL-SYS=BN,COUNTY=02-04(BY-CITY)
+TITLES
*** BURLINGTON NORTHERN STATIONS WITH YARD ***
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

The SELECT-RAILWAY-LISTING Command

Function: Searches the railway for file for sections of rail lines meeting user-specified criteria.

Description: The user enters criteria via the SELECT subcommand. The command searches the railway file for sections that meet these criteria. Whenever a section is found that meets the criteria, the program continues searching until a section is found that does not meet the criteria. It then prints the following information:

- Reference point at which the railway first meets the criteria.
- Reference point at which the railway no longer meets the criteria.
- Verbal descriptions at both points.
- Length in both miles and kilometers of the selected section.

At the end of each rail line, the following summary is printed:

		Length (Miles)	Length (Kilom)	
Subtotal:	Selected	nnn.nnn	nnn.nnn	nnn.nn%
Subtotal:	Not selected	nnn.nnn	nnn.nnn	nnn.nn%
Total:		nnn.nnn	nnn.nnn	

Normally this summary is printed only for lines containing sections that were selected. The user can request this summary for all lines processed (included by +ROUTES).

Gap and coincident mileage is always excluded.

Required Command Parameters:

ROUTES subcommand

- Operates under LIST-&-SUM classification.
- Allowable parameters: RAIL-SYS, RAIL-LINE, RAIL-SYS-&-LINE, RAIL-START-REF, RAIL-END-REF, CITY, COUNTY, and COUNTY(BY-CITY), and any summary selection parameters.

SELECT subcommand

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE RAILWAY-RECORDS IF:

- RWY data elements can be referenced.

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Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed.

- The option list is a listing of command parameters used for the report.

LIST-ALL-LINES Prints a summary for each rail line.
LIST-SEL-LINES Prints a summary only for rail lines that have
--- selected sections.

ABANDONED=YES Include railway records with abandonment status 8.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample produces output only at the TSO

---------- terminal (default). To get the report at both the terminal and a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,OUTFILE=PRINTER
```

To get report only at a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,PRINTDD=PRINTER
```

And change the first line: MSGCLASS=2 to MSGCLASS=A.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:SELECT-RAILWAY-LISTING,NO-OPTLIST
+SELECT
INCLUDE RAILWAY-RECORDS IF:  RWY.NUM-TRACKS *EQ* '2'
+ROUTES
RAIL-SYS=BN
+TITLES
*** BURLINGTON NORTHERN LINES WITH 2 TRACKS ***
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

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The LIST-CROSSING-FILE Command

****

Function: Prints listings of the rail grade crossing file.

Description: The rail grade crossing (RGC) records can be listed in
----------- any of several formats:

Card Format: Prints records in input record format (3 data cards). This format shows all RGC data elements as they would

be coded when updating the file. There will be up to 9 records per page.

Page Format: Prints a full-page listing for each record. Every data element stored in the record is shown.

Abbreviated Format: Prints four lines per record, showing every data element except the hazard index ranks for the two earliest years. There will be up to 8 records per page.

Status Report Format: Prints records in the annual status report format. Special options must be specified in the PRINTER DD statement.

Composite Report Format: Prints records in the composite report format. Special options must be specified in the PRINTER DD statement.

Priority Format: Prints records in the priority report format, two lines per crossing, showing priority ratings and factors used to compute the rating (EXCEPT numbers of accidents). About 16 records per page.

Inventory Format: Prints records in the inventory report format, a minimum of three lines per crossing with additional lines for multiple protection devices. EXCEPTION: Does not show city or number of lanes because this command does not access roadlog data. About 9 records printed per page.

Railroad Format: Prints records in the railroad report format, two lines per crossing, showing location, highway, railroad and protection information. City is NOT printed because command does not access roadlog data. About 16 records per page.

The SELECT subcommand provides control over which records are to be printed. If a ROUTES subcommand is also included, only records that

have a valid route system, route number, and reference point will be considered. ROUTES criteria are applied before SELECT. The ROUTES subcommand allows the records to be printed in order by reference point. If it is not included, records are always printed in order by crossing ID number.

The CATEGORIES subcommand may be used to specify a different order. The specified data elements are used as a sort field to reorder records in each group (a group is the individual summary with +ROUTES, or a single group without +ROUTES).

Required Command Parameters:

LIST-FORMAT=	CARD	Print data in card (input record) format.
	PAGE	Print data in page format.
	ABBREV	Print data in abbreviated format.
	STATUS	Print data in status report format.
	COMPOSITE	Print data in composite report format.
	PRIORITY	Print data in priority report format.
	INVENTORY	Print data in inventory report format.
	RAILROAD	Print data in railroad report format.

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

NO-CODELIST	No codelist is printed.
CODELIST	One codelist is printed (default).

- The codelist is a summary of the meanings of the coded data elements in the report.

ROUTES subcommand

- Operates under LIST classification (meaning that summary selection parameters such as ZERO-USER-TOTALS have no effect).
- If no ROUTES subcommand is coded, all records are included, subject to SELECT criteria, if any.

SELECT subcommand

Select criteria can be applied to data elements in the rail grade crossing (RGC) record. The may also apply to the railway (RWY) record at the crossing, and the roadlog record corresponding to the RGC reference point location IF THE ROUTES SUBCOMMAND IS INCLUDED.

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE CROSSING-RECORDS IF:

- RGC, RWY, and RLG data elements can be referenced.
- RLG and RWY references will require the ROUTES subcommand. They will also raise execution time.

If no SELECT statement is coded, all records in the file are considered "selected". SELECT is performed AFTER ROUTES data criteria are applied (if ROUTES subcommand is present).

CATEGORIES subcommand

When coded, will be used as a sort field to determine the order records are listed. If two records have the same category, the order is by crossing id number.

- RGC data elements can be referenced.
- The REDEFINES and GROUPS options can be used.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample produces output only at the TSO terminal (default). To get the report at both the terminal and a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,OUTFILE=PRINTER
```

To get report only at a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,PRINTDD=PRINTER
```

And change the first line: MSGCLASS=2 to MSGCLASS=A.

****NOTE: The RGCHAZ DD statement must be included for PRIORITY format. See the CROSSING-PRIORITY-REPORT command.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIRT,TIME=1,REGION=500K
//SYSIN DD *
:LIST-CROSSING-FILE,CODELIST
+ROUTES
COUNTY=ANOKA,ROUTE-SYS=(02-05,11)
CITY=1040-1105,ROUTE-SYS=MUN
/*
```

The above job setup may be copied from DT99A1B.TSOLIB.CNTL(RGCLSM).

Sample Job Setup: The following sample produces output in the status report format. A special character set is specified in the PRINTER DD statement. The output is also printed at the TSO terminal, but the special symbols will appear as dots. The composite report requires

a similar job setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIRT,TIME=1,REGION=500K,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER,COPIES=1
//PRINTER DD SYSOUT=A,UCS=TN12,COPIES=1,
//           DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA)
//SYSIN DD *
:LIST-CROSSING-FILE,NO-CODELIST,STATUS-FORMAT
+SELECT
 INCLUDE CROSSING-RECORDS IF: RGC.ID-CNTY *EQ* '10'
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

The above job setup may be copied from DT99A1B.TSOLIB.CNTL(RGCLSM2).

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The CROSSING-MATRIX-SUMMARY Command

Function: Groups and counts rail grade crossing records.

Description: Summaries can be printed broken down by one, two, or three data elements from the rail grade crossing file or the roadlog file or the railway file.

When summarizing by one data element, the report format is similar to:

RGC.DEVELOPMENT	CROSSINGS
(BLANKS)	308
0 - UNKNOWN	17
1 - OPEN SPACE	3,738
2 - RESIDENTIAL AREA	827
3 - COMMERCIAL AREA	958
4 - INDUSTRIAL AREA	859
5 - INSTITUTIONAL AREA	62
----- GRAND TOTAL ----->	6,769

When summarizing on two data elements, the report format is similar to:

RGC.HWY-ALIGNMENT	RGC.RR-ALIGNMENT	CROSSINGS
1 - TANGENT	1 - TANGENT	3,756
1 - TANGENT	2 - CURVE	1,694
1 - TANGENT	----- SUBTOTAL ------->	5,450
2 - CURVE	1 - TANGENT	713
2 - CURVE	2 - CURVE	606
2 - CURVE	----- SUBTOTAL ------->	1,319
	----- GRAND TOTAL ----->	6,769

When summarizing on three data elements, the report format is the same as that for two data elements, except that one summary is printed for each value of the additional data element.

Required Command Parameters:

CATEGORIES subcommand

- RGC data elements can be referenced.
- RLG and RWY data elements can be referenced IF THE ROUTES SUBCOMMAND IS INCLUDED.
- The REDEFINES control card can be used to group various codes together.

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Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

ROUTES subcommand

- Operates under SUM classification.
- If no ROUTES subcommand is coded, all records are included, subject to SELECT criteria, if any.

SELECT subcommand

Select criteria can be applied to data elements in the rail grade crossing (RGC) record. They may also apply to the roadlog (RLG) record corresponding to the RGC reference point location and to the railway (RWY) record at the crossing IF THE ROUTES SUBCOMMAND IS INCLUDED.

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE CROSSING-RECORDS IF:

- RGC, RLG, and RWY data elements can be referenced.

- RLG or RWY references will require the ROUTES subcommand. They will also raise execution time.

If no SELECT statement is coded, all records in the file are considered "selected". SELECT is performed AFTER ROUTES data criteria are applied (if ROUTES subcommand is present).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

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Sample Job Setup: The following sample produces output only at the TSO terminal (default). To get the report at both the terminal and a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,OUTFILE=PRINTER
```

To get report only at a line printer, change the third line
to:

//TIS EXEC DTRIRT,TIME=1,REGION=200K,PRINTDD=PRINTER

And change the first line: MSGCLASS=2 to MSGCLASS=A.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5,SYSAFF=ANY
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:CROSSING-MATRIX-SUMMARY
+CATEGORIES
DATA-ELEMENT=RGC.HWY-ALIGNMENT
DATA-ELEMENT=RGC.RR-ALIGNMENT
+SELECT
INCLUDE CROSSING-RECORDS IF: RGC.TOT-TRAINS *GT* '09'
+TITLES
ALL CROSSINGS WITH MORE THAN 9 TRAINS PER DAY
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation
of TIS job setups.

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The LIST-RGC-XREF-FILE Command

****

Function: Prints listings of the rail grade crossing cross-reference file.

Description: The rail grade crossing cross-reference file (RGX) is used to locate crossings by reference point location. There is one record in the file for each crossing record that has a valid route system, route number, and reference point. This command provides a listing that can be used to find crossing locations.

Required Command Parameters:

+ROUTES subcommand

- Operates under LIST classification.
- Summary selection parameters (eg. ZERO-USER-TOTALS) have no effect.

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

BY-RGC-NUMBER	Listing printed in order by crossing ID number.
BY-REF-PNT	Listing printed in order by reference point (default).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
```

```
        //SYSIN DD *
        :LIST-RGC-XREF-FILE
        +ROUTES
        COUNTY=ANOKA,ROUTE-SYS=(02-05,11)
        CITY=1040-1105,ROUTE-SYS=MUN
        /*

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        The LIST-RGC-BY-RGC-NUMBER Command
        **********************************

        Function:  Prints listings of specified rail grade crossing records.
        --------

        Description:  The rail grade crossing (RGC) records can be listed in
        -----------   any of several formats:

            Card Format:  Prints records in input record format (3 data cards).
                          This format shows all RGC data elements as they would
                          be coded when updating the file.  There will be up to
                          9 records per page.

            Page Format:  Prints a full-page listing for each record.  Every
                          data element stored in the record is shown.

            Abbreviated Format:  Prints four lines per record, showing every
                                 data element except the hazard index ranks for
                                 the two earliest years.  There will be up to 8
                                 records per page.

            Status Report Format:  Prints records in the annual status report
                                   format.  Special options must be specified in
                                   the PRINTER DD statement.

            Composite Report Format:  Prints records in the composite report
                                      format.  Special options must be specified
                                      in the PRINTER DD statement.

            Priority Format:  Prints records in the priority report format, two
                              lines per crossing, showing priority ratings and
                              factors used to compute the rating (EXCEPT numbers
                              of accidents).  About 16 records per page.

            Inventory Format:  Prints records in the inventory report format, a
                               minimum of three lines per crossing with
                               additional lines for multiple protection devices.
                               EXCEPTION:  Does not show city or number of lanes
```

because this command does not access roadlog data. About 9 records printed per page.

Railroad Format: Prints records in the railroad report format, two lines per crossing, showing location, highway, railroad and protection information. City is NOT printed because command does not access roadlog data. About 16 records per page.

The user specifies which RGC records are to be listed in the RGCNUM DD statement. Enter the 8-character crossing ID number, one per card. Leading blanks and zeroes must be coded.

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Required Command Parameters: None.

LIST-FORMAT=	CARD	Print data in card (input record) format.
	PAGE	Print data in page format.
	ABBREV	Print data in abbreviated format.
	STATUS	Print data in status report format.
	PRIORITY	Print data in priority report format.
	COMPOSITE	Print data in composite report format.
	INVENTORY	Print data in inventory report format.
	RAILROAD	Print data in railroad report format.

Optional Command Parameters:

NO-CODELIST No codelist is printed.
CODELIST One codelist is printed.

- The codelist is a summary of the meanings of the coded data elements in the report.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

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Sample Job Setup: The following sample produces output only at the TSO terminal (default). To get the report at both the terminal and a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,OUTFILE=PRINTER
```

To get report only at a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,PRINTDD=PRINTER
```

And change the first line: MSGCLASS=2 to MSGCLASS=A.

To get the status sheet or compoiste report format, you must specify the special character set by adding the following after the line beginning "//TIS EXEC...":

```
//PRINTER DD SYSOUT=A,UCS=TN12,COPIES=1,
//           DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA)
```

DATE 6/14/83

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
```

```
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-RGC-BY-RGC-NUMBER
/*
//RGCNUM DD *
0802001
0802008
0802002
0802020
0802020C
0802025
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

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The CROSSING-STATUS-REPORT Command

Function: Prints the rail grade crossing status report.

Description: The rail grade crossing (RGC) status report uses one page per record, showing many data elements from the RGC record as well as the following:

From the roadlog file: Census number and name if the crossing is located within a city.

From the railpoint file: Railroad reference point of the crossing.

From the accident files: Accident history for a specified time period (usually the last 5 years).

The report format also allows room for coding comments about the condition of the crossing. The status report is printed using special print-characters to provide boxes around data elements. This requires a special character set and can only be printed on a line printer at ISB. If the job output is routed anywhere else (such as the DOT third floor printer or a TSO terminal), the boxes and other special characters will all appear as dots.

There are two modes of operation for this command. The program operates differently depending on whether a +ROUTES subcommand is included. The differences are as follows:

WITHOUT +ROUTES:
---

1) ALL RGC records passing +SELECT criteria are included in the report.
2) +SELECT can ONLY refer to RGC data elements.
3) A new "individual" summary starts when county number (from the crossing ID number) changes. This means:
   a) An optionlist is printed (if requested).
   b) A codelist is printed (if requested).
   c) Page numbers are reset to 1.

WITH +ROUTES:
---

1) Only RGC records with a valid route system, route number, and reference point are included in the report.
2) +SELECT can refer to RGC, RLG and RWY data elements. +SELECT is performed AFTER +ROUTES chooses records.
3) A new "individual" summary starts whenever the +ROUTES subcommand specifies (see chapter 5). County number changes have no special effect.

Within an individual summary, crossings are sorted by crossing ID number, regardless of the presence of +ROUTES.

Required Command Parameters:

START-DATE=mm/dd/yy Required if ACCIDENTS is specified.
Accidents that occurred on or AFTER this
date (month/day/year) are included.

END-DATE=mm/dd/yy Required if ACCIDENTS is specified.
Accidents that occurred on or BEFORE this
date (month/day/year) are included.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed.

- The option list is a listing of command parameters used for the report.

NO-CODELIST No codelist is printed.
CODELIST A several-page codelist is printed.

- The codelist is a summary of the meanings of the coded data elements in the report.

ACCIDENTS — Include accident data.
NO-ACCIDENTS — Do NOT include accident data (default).

ACC-INT-LOCN =

- INTSECT — Only intersection accidents are included.
- NON-INTSECT — Only non-intersection accidents are included.
- ALL — Both types of accidents are included (default).

-Intersection accidents are those with the following codes in the relationship to intersection data element:

1 Interchange area
2 Intersection
3 Intersection-related

ACC-RELIABILITY =

- 1 — Include accidents with reliability 1.
- 2 — Included accidents with reliability 1 or 2.
- 3 — Include accidents with reliability 1, 2, or 3 (default).

-This parameter selects accidents based on reliability of location information:

1 No location error expected
2 Possible location error
3 Probable location error

ACC-SCAN=nnnn — This parameter can be used to override the scan limits stored in each record. If coded (in feet), this value is added to and subtracted from the reference point of the crossing when searching for accidents to assign to the crossing.

-If not coded, the accident scan data elements stored in each RGC record are used.

- Operates under LIST classification (meaning that summary selection parameters such as ZERO-USER-TOTALS have no effect).
- If no ROUTES subcommand is coded, all records are included, subject to SELECT criteria, if any.

ACC-TAPE=YES Use the accident archive tape file.

- The accident archive data tape contains accidents prior to the active file (the active file contains accidents for the previous five years plus the current year). The archive dates back through 1977.

Use of the tape is also limited as follows:

1) The START-DATE and END-DATE must specify a time period within the period of data stored on the tape. If the dates go outside the tape data period, the report will print an error message and not execute.

2) Accidents must be processed in order by increasing route system, route number, and reference point. Each accident can be processed only once per command.

3) The job setup requires minor changes (see examples).

SELECT subcommand

Select criteria can be applied to data elements in the rail grade crossing (RGC) record. They may also apply to the roadlog (RLG) record and to the railway (RWY) record corresponding to the RGC reference point location IF THE ROUTES SUBCOMMAND IS INCLUDED.

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE CROSSING-RECORDS IF:

- RGC, RLG, and RWY data elements can be referenced.

- RLG or RWY references will require the ROUTES subcommand.

If no SELECT statement is coded, all records in the file are considered "selected". SELECT is performed AFTER ROUTES data criteria are applied (if ROUTES subcommand is present).

Select criteria can also be applied to accident data. The criteria are applied AFTER the other parameters shown above.
The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE ACCIDENTS IF:

-ACD, ACV, ACP, ACJ, and RLG data elements can be referenced.

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-ACV, ACP, and ACJ data elements must be referenced via the multi-correlation facility (*ANY*/*ALL*).
-RLG references require access to the roadlog file and hence raise execution costs.

TITLES subcommand

Sample Job Setup: The following sample produces output in the status report format. A special character set is specified in the PRINTER DD statement. The output is also printed at the TSO terminal, but the special symbols will appear as dots:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIRR,TIME=3,SCRSIZE=3,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//PRINTER DD SYSOUT=A,UCS=TN12,COPIES=1,
//           DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA)
//SYSIN DD *
:CROSSING-STATUS-REPORT,NO-CODELIST,ACCIDENTS,START-DATE=01/01/1986,
:  END-DATE=09/01/1990
+SELECT
INCLUDE CROSSING-RECORDS IF: RGC.CURRENT-HI-RANK *LE* 50
```

```
        /*

        The following example illustrates the use of the accident tape.
        Note the following:

           1) The job class on the first line has been changed to CLASS=D.

           2) The addition of the line specifying the tape:

              //ACCTAPE DD DISP=OLD,DSN=TRN.RI16ACC2(0),UNIT=TAPE

           3) The additional TIS command parameter "ACC-TAPE=YES".

        //JOBNAME  JOB (ACCOUNT),'NAME',CLASS=D,NOTIFY=USER-ID,
        //             MSGCLASS=2,MSGLEVEL=(2,0)
        /*JOBPARM ROOM=R820,LINES=5
        /*ROUTE  PRINT R0
        //TIS EXEC DTRIRR,TIME=3,SCRSIZE=3,FORM='(A)',
        //    PRINTDD=TSO,OUTFILE=PRINTER
        //PRINTER DD SYSOUT=A,UCS=TN12,COPIES=1,
        //           DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA)
        //ACCTAPE DD DISP=OLD,DSN=TRN.RI16ACC2(0),UNIT=TAPE
        //SYSIN DD *
        :CROSSING-STATUS-REPORT,NO-CODELIST,ACCIDENTS,START-DATE=01/01/1980,
        :  END-DATE=12/31/1984,ACC-TAPE=YES
        +ROUTES
        ROUTE-SYS=04,COUNTY=01
        +SELECT
          INCLUDE CROSSING-RECORDS IF:  RWY.WEIGHT-RAIL-1 *LE* '100'
        /*


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        The CROSSING-HAZARD-INDEX Command
        *********************************

            Function:  Computes hazard index ratings and rankings for rail
            --------   grade crossing records.


            Description:  CROSSING-HAZARD-INDEX computes the rail grade crossing
            -----------   hazard indexes.  Data from the crossing (RGC) file,
                          and the DPS accident files is used.  The AADT used is
                          the value stored in each RGC record.

            The command may be used annually to update all records in the file,
            or it may be used as a report to compute values for selected records
```

without making any updates to the file.

The hazard index is computed as follows:

$$\frac{\text{trains per day} * \text{AADT} * \text{number of accidents}}{\text{protection factor}}$$

where trains per day is:

day through + night through + day switch + night switch

and number of accidents is the number of selected accidents that meet the criteria defined by the command parameters.

The values used to compute protection factors reside in a separate table, so the user may vary the weight factors from one job to another. Protection factors are determined for each crossing by the data in the protection devices near and far fields. The highest value is used. The format of entries in the protection factor table is:

"x = nnnn.n"
or
"x + y = nnnn.n"

Where x and y are valid protection device characters (A-M, P, blank), and each "n" is a digit (leading zeroes must be coded). The sample job setup shown below shows current protection factor weights.

Default values must be specified for instances where trains per day or number of accidents is zero. There must exist a line in the table in the format:

"DEFAULTS: TRAINS=n.n ACCIDENTS=n.n"

The usual values are 0.5 and 0.1, respectively.

The table is defined in DD statement RGCHAZ.

The command optionally lists portions of RGC records and the data used to compute the hazard index. This listing includes:

Crossing ID Number AADT

```
     Route System           Year of AADT
     Route Number           Protection Factor
     Reference Point        Total Accidents
     Verbal Description     Hazard Index
     Accident Scans         Hazard Index Rank
     Total Trains
```

Required Command Parameters:

```
    ROUTES subcommand.   Operates under "LIST" classification.  All
                         selected records are processed in a single
                         group.

    START-DATE=mm/dd/yyyy  Accidents occurring before this date are
                           not considered.

    END-DATE=mm/dd/yyyy    Accidents occurring after this date are
                           not considered.

    YEAR=nnnn              Year assigned to the hazard index.
```

Optional Command Parameters:

```
    LIST      List all crossing records selected.
    NO-LIST   Do not list the records.
    -------


    UPDATE      Update the crossing file.
    NO-UPDATE   Do not update the crossing file.
    ---------


    RANK-ALL   Include ALL crossings on file when computing rank.
    RANK-SEL   Include only SELECTED crossings when computing rank.
    NO-RANK    Do not compute any ranking.
    -------
```

YEAR-SHIFT		If UPDATE is in effect, shift historical ranking to add new values. For example, a record that has 1981 data in the "current" fields, and 1980, 1979, 1978, and 1977 historical data will have 1982 data in the "current" fields, with 1981, 1980, 1979, and 1978 data after updating with YEAR=1982. If the "current" hazard year is the same as the YEAR parameter, no shifting takes place, the "current" fields are rewritten.
NO-YEAR-SHIFT		New values are to be placed in "CURRENT" data fields.
ACC-INT-LOCN=	INTSECT	Include intersection accidents only (ACD.INTSECT-RELATION = 1-3).
	NON-INTSECT	Include non-intersection accidents only (ACD.INTSECT-RELATION = 4-9).
	ALL	Include all accidents (subject to other criteria, if any).
ACC-RELIABILITY=	1	Include reliability 1 only.
	2	Include reliability 1 and 2.
	3	Include all accidents.
ACC-SCAN=nnnn		May be used to override the values stored in RGC records. The data elements RGC.ACC-SCAN-FAR and RGC.ACC-SCAN-NEAR are added and subtracted, respectively, to the reference point of the crossing to search the accident files for accidents at the crossing. Coding this parameter (0001 - 9999 feet) will override the accident scans stored in each RGC record.

SELECT subcommand

Can be used to select crossing records and accidents:

INCLUDE CROSSING-RECORDS can be used to select which RGC records are included. ONLY SELECTED RECORDS will have hazard indexes computed.

- RGC data elements can be referenced.
- RLG and RWY data elements can also be referenced, but this will raise execution costs.

INCLUDE ACCIDENTS can be used to further restrict which accident records are counted.

- ACD, ACV, ACP, and ACJ data elements can be referenced. ACV, ACP, and ACJ data elements must be referenced via the multi-correlation facility (*ANY* or *ALL*).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4 of the User's Manual).

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Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=9,SCRSIZE=5,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:CROSSING-HAZARD-INDEX,LIST,NO-UPDATE,START-DATE=01/01/1986,
:  END-DATE=12/31/1990,YEAR=1991
+ROUTES
ROUTE-SYS=CSAH
/*
//RGCHAZ DD *
DEFAULTS:  TRAINS=0.5  ACCIDENTS=0.1
  = 0001.0
A = 0019.0
B = 0019.0
C = 0019.0
D = 0019.0
F = 0058.0
G = 0058.0
H = 0096.0
I = 0096.0
J = 0096.0
K = 0096.0
E = 0228.0
L = 0333.0
M = 0333.0
```

```
F + H = 0114.0
F + I = 0114.0
F + J = 0114.0
F + K = 0114.0
/*
```


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Introduction to the Bikeway Subsystem

The bikeway subsystem gathers data from TIS files and uses it in formulas to rate sections of roadway as to their suitability for use by bicycle traffic. An intermediate file is produced (the bikeway file), that may be retained as input to multiple reports without the cost of reassembling the data. The TIS files used in producing the bikeway file include:

File	Data Used
Roadlog	Physical characteristics (shoulder width, etc).
True Mileage	Segment lengths.
Traffic	Average daily traffic.
Accident	Accident history.

The bikeway file will contain one record for each roadlog record. Once the file has been created, the only way it can be changed is by recreating it, ie., it does NOT reflect any changes to other TIS files automatically. Several bikeway files may exist simultaneously: it is up

to the user to create a large file to retain for many reports or to create smaller temporary files to be used once and then purged.

Roadway Types

The following roadway types are encountered in the state:

Type	Description
U	Undivided 2-way roadway
D	Divided 2-way roadway
O	One-way couplet (one roadway in each direction)
X	1-way carrying traffic towards decreasing reference posts.
Z	1-way carrying traffic towards increasing reference posts.

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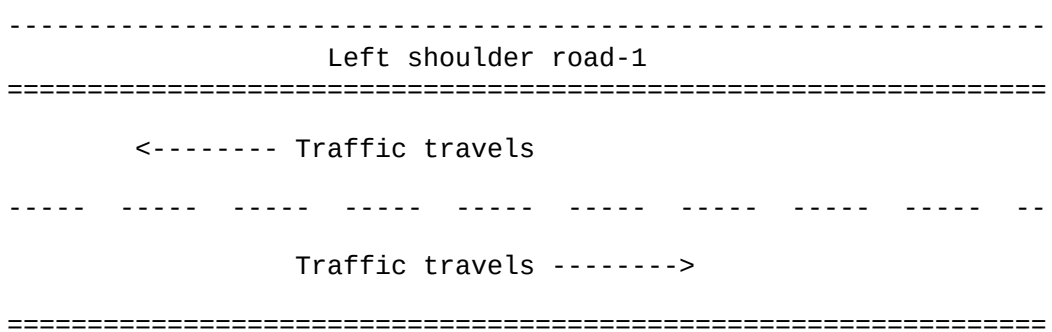
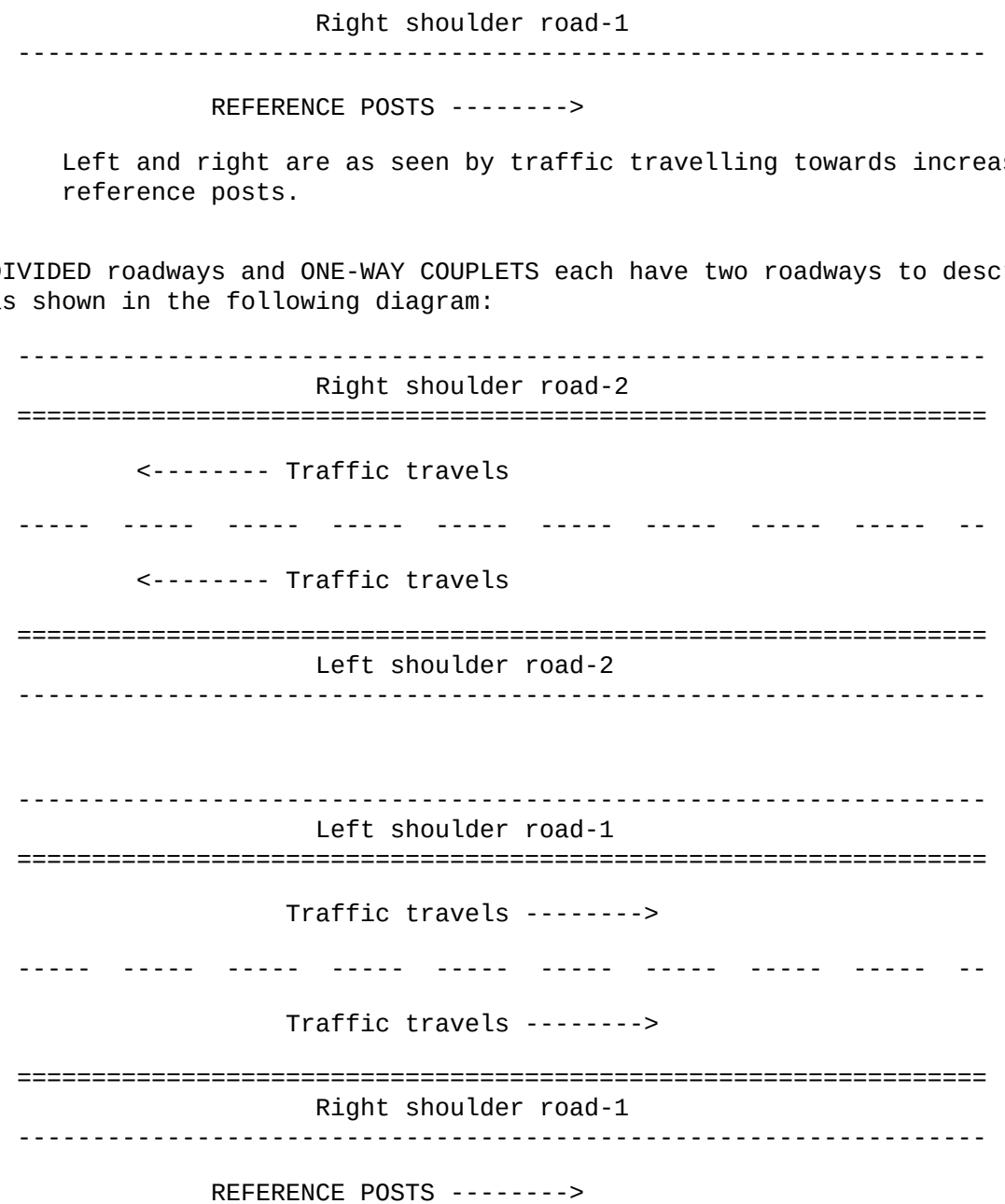
For undivided 2-way roadways, there is a road-1 but no road-2. The following diagram shows an UNDIVIDED 2-way roadway:





Left and right are as seen by traffic travelling towards increasing reference posts.

DIVIDED roadways and ONE-WAY COUPLETS each have two roadways to describe as shown in the following diagram:

Road-2 is the roadway that carries traffic traveling toward decreasing reference posts.

Road-1 is the roadway that carries traffic traveling towards increasing reference posts.

On each roadway, left and right are as seen by traffic traveling on the roadway.

One-way roadways are treated as half of a divided roadway. Hence, for roadway type 'X', there is a road-2 but no road-1. For roadway type 'Z', there is a road-1 but no road-2.

Roadway Designs

The bikeway rating formulas recognize three types of roadway designs:

Design	Description
MU	Municipal -- All sections with no shoulders on at least one side and within corporate limits.
PS	Paved Shoulders -- Any section with paved shoulders on both sides.
US	Unpaved Shoulders -- All other sections.

US Design:

The US formula evaluates rural design roads with unpaved shoulders. It is assumed that there will be no parking on the shoulders, but because the shoulders are unpaved the bicyclists will probably ride in the traffic lane.

PS Design:

PS design is essentially rural design with paved shoulders. It is assumed that there will be no parking on the shoulders and that bicyclists will ride on the shoulders whenever possible. For this reason, the the PS formulas assign more points than do the US formulas for roads with similar ADT's.

MU Design:

MU design generally has curb and gutter on one or both sides of the street. Bicyclists do not have shoulders to ride on, and parked vehicles present obstacles. The MU formulas hence incorporate various deductions for the presence of parking.

Gravel (or other non-paved) surfaces:

It is assumed that non-paved roads will not be utilized heavily by bicyclists. The current version of the software does not assign rating points to non-paved surfaces.

Fully Controlled Access Roadways:

By law, bicyclists cannot utilize fully controlled access roadways. Hence, the current version of the software does not assign rating points to controlled access roadways.

Computation of Design Points

The design points are computed on a scale from 0 through 160 points. The roadway quality for bicyclists is represented by the following breakdown of points:

0-45	Unsuitable
46-63	Poor
64-105	Fair
106-160	Good

Separate formulas are used for US, PS, and MU design:

NOTE: (1) = road-1 value
(2) = road-2 value
DES = Design points

US Formulas

U,Z,D,O:	DES(1) = (DES(1a) + DES(1b) + DES(1c))
X,D,O:	DES(2) = (DES(2a) + DES(2b) + DES(2c))
U,Z:	DES = DES(1)
X:	DES = DES(2)
D,O:	DES = Smaller of (DES(1),DES(2))

PS Formulas

U,Z,D,O: DES(1) = (DES(1a) + DES(1b) + DES(1c)) x 1.5

X,D,O: DES(2) = (DES(2a) + DES(2b) + DES(2c)) x 1.5

U,Z: DES = DES(1)

X: DES = DES(2)

D,O: DES = Smaller of (DES(1),DES(2))

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MU Formulas

U,Z,D,O: DES(1) = (DES(1d) + DES(1e)) x 1.5

X,D,O: DES(2) = (DES(2d) + DES(2e)) x 1.5

U,Z: DES = DES(1)

X: DES = DES(2)

D,O: DES = Smaller of (DES(1),DES(2))

DES(na) is the basic points value for US and PS design. Its formula is:

U,Z,D,O: DES(1a) = DFAC(1) x 160 x LWF(1) x VF(1) (1) = road-1

X,D,O: DES(2a) = DFAC(2) x 160 x LWF(2) x VF(2) (2) = road-2

DFAC = Design factor
LWF = Lane width factor (discussed in later section)
VF = Volume factor (discussed in later section)

U,X,Z,0: DFAC(i) is based on worst shoulder of road-i

D: DFAC(i) is based on right shoulder of road-i
(bicyclists do not use left shoulder)

DFAC(i): 1.0 No shoulder or 1-3' gravel shoulder
1.2 4-99' gravel shoulder
1.4 1-3' paved shoulder
1.6 4-99' paved shoulder

DES(nb) assigns additional points to US and PS roadways with good shoulders. Its formula is:

For no shoulder, gravel shoulder, or 1-3' paved shoulder:

U,Z,D,O: DES(1b) = 0

X,D,O: DES(2b) = 0

For 5-99' paved shoulder:

U,Z,D,O: DES(1b) = 0.02 x 160 x (SHW(1) - 4)

X,D,O: DES(2b) = 0.02 x 160 x (SHW(2) - 4)

SHW = Shoulder Width in Feet

Notes: U,X,Z,O: DES(ib) is based on worst shoulder of road-i

D: DES(ib) is based on right shoulder of road-i

D,O: It is possible that one roadway will have a zero value while the other has a non-zero value.

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DES(nc) assigns addititional points to US and PS roadways with better design. Its formula is:

U,X,D,O: DES(1c) = LFAC x 160

X,D,O: DES(2c) = LFAC x 160

LFAC: 0.00 U - 2-lane 2-way undivided (1 lane each direction)
0.00 U - 4-lane 2-way undivided

0.01 D,O - 2-lane divided (1 lane each direction)
0.01 D,O - 4-lane divided
0.01 D,O - 6-lane divided
0.01 D,O - 8-lane divided

0.01 X,Z - 1-lane 1-way undivided
0.03 X,Z - 2-lane 1-way undivided
0.05 X,Z - 3-lane 1-way undivided
0.07 X,Z - 4-lane 1-way undivided

DES(nd) is the basic points value for MU design. Its formula is:

U,Z,D,O: DES(1d) = PFAC(1) x 160 x LWF(1) x VF(1)

X,D,O: DES(2d) = PFAC(1) x 160 x LWF(2) x VF(2)

PFAC = Parking factor
LWF = Lane width factor (discussed in later section)
VF = Volume factor (discussed in later section)

U,X,Z,O:

PFAC(i) = 1.00 No parking on either side
0.98 Parallel parking on one side only
0.96 Parallel on both sides or diagonal on one side
0.94 Paralled on one side and diagnonal on other side
0.92 Diagonal parking on both sides

D: PFAC(i) = 1.00 No parking on right side
0.98 Parallel parking on right side
0.96 Diagonal parking on right side

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DES(ne) assigns additional points to MU sections with better design.
Its formula is:

U,Z,D,O: DES(1e) = LFAC x 160

X,D,O: DES(2e) = LFAC x 160

LFAC: 0.00 U - 2-lane 2-way undivided (1 lane each direction)
0.01 U - 4-lane 2-way undivided
0.03 U - 6-lane 2-way undivided

0.01 D,O - 2-lane divided (1 lane each direction)
0.02 D,O - 4-lane divided
0.04 D,O - 6-lane divided
0.05 D,O - 8-lane divided

```
                0.01  X,Z - 1-lane 1-way
                0.02  X,Z - 2-lane 1-way
                0.04  X,Z - 3-lane 1-way
                0.05  X,Z - 4-lane 1-way


      Computation of Lane Width  Factor
      *********************************

           U,Z,D,O:  LWF(1) = (LW(1) / 6) - 1    (1) = road-1

           X,D,O:    LWF(2) = (LW(2) / 6) - 1    (2) = road-2

                      LWF = Lane width factor
                       LW = Lane width (in feet)

                      US,PS design:  Maximum value for LWF(i) is 1 (any larger
                                     value is changed to 1).

                      MU design:  No maximum value is specified.

                      Note:  For US/PS design, bicyclists are probably on
                             shoulders, so that lane widths larger than 12 do
                             not provide significantly more safety.  For MU
                             design, bicyclists are probably riding in the
                             driving lanes so that wider lanes do provide
                             greater safety.

      U,Z,D,O:  LW(1) = (SW(1) - PW(1)) / #L(1)

      X,D,O:    LW(2) = (SW(2) - PW(2)) / #L(2)

                LW = Lane width        For US/PS design, PW(i) is always zero.
                SW = Surface width
                PW = Parking width
                #L = Number of lanes



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      If (1) SW(i) is unknown, variable, or not stated, or (2) LW(i)
      computes smaller than LW(min), LW(i) is set equal to LW(min).

           Route systems 01-07:  LW(min) = 10

           Route systems 08-23:  LW(min) = 8
```

US,PS designs: PW(1) = PW(2) = 0

MU design:

U,Z,D,O:	PW(1) = PW(1L) + PW(1R)	(1) = road-1
		(2) = road-2
X,D,O:	PW(2) = PW(2L) + PW(2R)	(L) = Left
		(R) = Right

PW(ix) = 0 Either (1) no parking or (2) shoulder present
8 Parallel parking and no shoulder
16 Diagonal parking and no shoulder

Computation of Volume Factor
****

The volume factor formulas are:

D,O,U,Z:	VF(1) = BASE(1) / ADT(1)	(1) = road-1
D,O,Z:	VF(2) = BASE(2) / ADT(2)	(2) = road-2

BASE = Base volume
ADT = Average daily traffic

From the TIS, a single CADT (computed ADT) value can be obtained. For U, X, and Z roadways, this value represents the ADT on the only roadway involved. For D and O roadways, this value represents a 2-way ADT -- roughly half of the traffic is on road-1 and the remainder is on road-2.

U,Z:	ADT(1) = CADT
X:	ADT(2) = CADT
D,O:	ADT(1) = CADT x 0.50
	ADT(2) = CADT x 0.50

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The base values are:

Number Lanes	MU Design	US Design	PS Design
2-lane	750	250	750
3-lane	1,125	250	750
4-lane	1,500	250	750
6-lane	2,250	250	750
8-lane	3,000	250	750

Note: For D and O roadways, it is possible that the MU formulas will be used for one roadway and the PS formulas for the other.

Computation of Accident Points and Severity Points

The formulas for these points are:

$$\text{ACC-PTS} = A \times (C - \text{ACC-PER-MILE})^2$$

$$\text{SEV-PTS} = A \times (C - \text{SEV-PER-MILE})^2$$

A = constant
C = constant
ACC-PER-MILE = NUM-ACC / SECTN-LENGTH
SEV-PER-MILE = NUM-SEV / SECTN-LENGTH
SECTN-LENGTH = section length in miles
NUM-ACC = number of accidents in section
NUM-SEV = (10 x NUM-FAT) + (4 x NUM-INJ) + NUM-PROP
NUM-FAT = number of fatality accidents in section
NUM-INJ = number of injury accidents in section
NUM-PROP = number of property damage accidents in section

If ACC-PER-MILE (or SEV-PER-MILE) is greater than C, ACC-PTS (or SEV-PTS) is set equal to zero.

Description	A ACC	C ACC	A SEV	C SEV
Urban - Undivided	0.1220	15.70	0.0140	26.60
Urban - Divided	0.0300	31.40	0.0035	53.30
Rural - Undivided	0.4870	7.85	0.0410	15.70
Rural - Divided	0.1220	15.70	0.0100	31.40

Application Record Format of the Bikeway File
****

Note: The record format as actually stored is 1 character longer, and uses an expanded 9-character format for the route number field.

Columns	Length	Format	Data Element
1	1	char(1)	Delete byte
2-3	2	char(2)	BIK.ROUTE-SYSTEM
4-11	8	char(8)	BIK.ROUTE-NUMBER
12-21	10	char(10)	BIK.START-REF-POINT
22-31	10	char(10)	BIK.END-REF-POINT
32-33	2	char(2)	BIK.REMARK-CODE
Jurisdictional/administrative segment (from roadlog file):			
34-35	2	num(2)	BIK.COUNTY
36-38	3	num(4)	BIK.CITY
39-41	3	num(4)	BIK.URB-AREA
42	1	num(1)	BIK.URBAN-MUNIC-CODE
43	1	num(1)	BIK.CONSTR-DIST
44-45	2	char(2)	BIK.MAINT-AREA
46-48	3	num(4)	BIK.PTRL-STATION
49-51	3	num(4)	BIK.CNTRL-SECTN
52-53	2	num(2)	BIK.FUNCT-CLASS
54	1	num(1)	BIK.CONTROL-OF-ACCESS
55-56	2	num(2)	BIK.INTERSECT-CATEGORY
Roadway characteristics segment (from roadlog file):			
57	1	char(1)	BIK.DIVIDED-&-ONE-WAY
58	1	num(1)	BIK.NUM-LANES-IM
59	1	num(1)	BIK.NUM-LANES-DM
60	1	char(1)	BIK.TURN-LANES-IM
61	1	char(1)	BIK.TURN-LANES-DM
62	1	num(1	BIK.ADD-LANES-RD1
63	1	num(1)	BIK.ADD-LANES-RD2

```
                64      1     char(1)       BIK.CURBS-RD1
                65      1     char(1)       BIK.CURBS-RD2
                66      1     num(1)        BIK.PARKING-RD1
                67      1     num(1)        BIK.PARKING-RD2
                68      1     char(1)       BIK.SIDEWALKS
             69-70      1     char(2)       BIK.SURF-TYPE-RD1
             71-72      2     char(2)       BIK.SURF-TYPE-RD2
             73-74      2     char(2)       BIK.SURF-WID-RD1
             75-76      2     char(2)       BIK.SURF-WID-RD2
             77-78      2     char(2)       BIK.SHOULD-WID-IM
             79-80      2     char(2)       BIK.SHOULD-WID-DM
             81-82      2     char(2)       BIK.SHOULD-TYPE-IM
             83-84      2     char(2)       BIK.SHOULD-TYPE-DM
             85-86      2     num(3)        BIK.RIGHT-OF-WAY-WIDTH
             87-88      2     num(2)        BIK.DESIGN-SPEED
             89-92      4     date          BIK.EFFECTIVE-DATE


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        Roadway characteristics segment (computed):

               93-94      2     num(2)        BIK.LANE-WID-RD1
               95-96      2     num(2)        BIK.LANE-WID-RD2
               97-98      2     num(2)        Contains 00
              99-102      4     num(7,3)      BIK.SECTN-LENGTH

        Traffic segment (computed from traffic and true mileage files):

             103-108      6     char(6)       BIK.ADT-CURRENT
             109-114      6     char(6)       BIK.ADT-TIME-WEIGHT
             115-119      5     char(5)       BIK.HEAVY-ADT-CURRENT

        Accident segment (computed from accident, traffic and true mileage
        files):

             120-121      2     num(3)        BIK.NUM-FAT-ACC
             122-123      2     num(3)        BIK.NUM-INJ-ACC
             124-125      2     num(3)        BIK.NUM-PROP-ACC
             126-127      2     num(3)        BIK.TOT-NUM-ACC
             128-129      2     num(3)        BIK.NUM-ACC-PER-MILE
             130-133      4     char(4)       BIK.ACC-RATE
             134-137      4     char(4)       BIK.SEV-RATE
             138-141      4     date          BIK.START-DATE
             142-145      4     date          BIK.END-DATE

        Points segment:
```

146-148	3	char(3)	BIK.DESIGN-POINTS
149-150	2	char(2)	BIK.ACC-POINTS
151-152	2	char(2)	BIK.SEV-POINTS
153-155	3	char(3)	BIK.TOTAL-POINTS

File characteristics:

- Application format

  Record length = 155
  Key length = 20

- ISAM as-stored format

  Record length = 156
  Block size = 2964
  Record format = FB
  Key length = 21
  Relative key position = 1

- Sequential as-stored format

  Record length = 156
  Block size = 12948
  Record format = FB

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Data Elements of the Bikeway File

Bikeway sections are identical to roadlog sections. One record is stored in the bikeway file for each record of the roadlog file.

Each bikeway section is fully defined by two roadlog records: the record at the beginning of the section and the record at the end of the section (note that the record at the end of one section is also the record at the beginning of the next section). The ending reference point is obtained from the roadlog record at the end of the section. All other roadlog information is obtained from the roadlog record at the beginning of the section.

The logpoint file is not utilized in the bikeway subsystem.

The CREATE-BIKEWAY-FILE Command

CREATE-BIKEWAY-FILE is used to create the bikeway file.

The bikeway file can be created in either of two formats: (1) disk-resident ISAM file, or (2) tape-resident sequential file. The disk-resident format is needed for using any of the bikeway report commands. Normally, a file will be created and one or more reports run, after wich the file is no longer needed (for later reports, information in other files will probably be altered and it will be necessary to re-create the bikeway file). For this reason, no permanent disk space

has been reserved for a bikeway file. The user will allocate a temporary ISAM file. The computer automatically purges the file after about a week (occasionally less).

When it is expected that a file will be needed longer than a week, it should be saved on tape. The COPY-BIKEWAY-FILE command can be used to either (1) copy a tape file onto disk, or (2) copy a disk file onto tape.

When creating a disk-resident file, precede the CREATE-BIKEWAY-FILE/COPY-BIKEWAY-FILE job setup with the following:

```
// EXEC PGM=IEFBR14
//BIKEWAY DD DISP=(NEW,CATLG),UNIT=SYSDA,DSNAME=user-id.BIK,
//           DCB=DSORG=IS,SPACE=(CYL,n)
```

NOTE: "user-id" is the TSO user id number (eg., DT00A1J) assigned to each TIS user. This means different users can have different bikeway files existing at the same time.

Compute n as follows:

n = 2 + (num-rec / 1368)

where num-rec is the number of records expected to be stored in the file. (num-rec = number of records in roadlog file for route system requested - if requesting trunk highways only, allow sufficient space for the number of records stored in the roadlog file for trunk highways).

Round all remainders upward when computing n (eg., if n computes to 4.2, specify 5).

Roadlog record counts as of March, 1982:

ISTH	724	TWNS	68,542
USTH	8,724	UTWN	2,936
MNTH	13,119	MUN	118,524
CSAH	28,279	Other	3,113
MSAS	10,400		
CMSA	221	Total	270,475
CNTY	15,923		

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When running CREATE-BIKEWAY-FILE/COPY-BIKEWAY-FILE, then include the

following DD statement:

```
//BIKEWAY DD DISP=OLD,DSNAME=user-id.RIBIK
```

When creating a tape-resident file, include the following DD statement with the CREATE-BIKEWAY-FILE/COPY-BIKEWAY-FILE job setup:

```
//BIKEWAYS DD DISP=(NEW,CATLG,DELETE),UNIT=TAPE,DCB=TRN.GENDSCB,
//            DSNAME=TRN.RI33CIBK(+1),LABEL=EXPDT=99000
```

The CREATE-BIKEWAY-FILE command parameters are:

(Required) +ROUTES subcommand

- Operates under "LIST" classification (see chapter 5 of the TIS User's Manual).

(Required) START-DATE=mm/dd/yyyy Eg., START-DATE=04/01/1984
(Required) END-DATE=mm/dd/yyyy Eg., END-DATE=10/31/1984

The year specified in END-DATE will be used when computing BIK.ADT-ANNUAL.

The roadlog effective date will replace START-DATE in sections where the effective date is more recent).

The actual time period will be used when computing BIK.ADT-SEASON, or the user may use the SELECT subcommand to select only certain intervals (see SELECT subcommand).

(Optional)	NO-OPTLIST	No option list is printed.
	OPTLIST	Command parameters are printed (default).
	WRITE-SEQL	Write a sequential (tape) file only.
(Optional)	WRITE-BOTH	Write both an ISAM and a sequential file.
	WRITE-ISAM	Write an ISAM (disk) file only (default).
	NO-ACCIDENTS	Do not retrieve accident data.
(Optional)	ACCIDENTS	Retrieve accident data (default).

	NO-MESSAGES	Do not print data edit check messages.
(Optional)	MESSAGES	Print data edit check messages (default).
(Optional)	+TITLES subcommand	
(Optional)	Print formatting parameters: see chapter 4	
(Optional)	SELECT subcommand	

May be used to choose only certain hours or dates for computing ADT (this only applies to traffic, it has no effect on accidents).

- To select on time intervals:

  INCLUDE
  EXCLUDE TIME IF:

- TIM data elements can be referenced.
- Time is the period between the START-DATE and END-DATE. Select only applies within that range.

Notes:

- When NO-ACCIDENTS is specified use DTRIB (or DTRIT) cataloged procedure. Otherwise, use DTRIBA (or DTRITA) cataloged procedure.
- When WRITE-SEQL or WRITE-BOTH is specified, include a BIKEWAYS DD statement for the tape as shown above.
- When WRITE-ISAM or WRITE-BOTH is specified or defaulted, include a BIKEWAY DD statement for the ISAM file as shown above remember to allocate the file first).
- When MESSAGES is defaulted or specified, warning messages are printed for the following types of data errors:

- Roadlog file - EN record missing on a route.
- Roadlog file - Records after EN record on a route.
- Minimum lane width used because lane width computed too
  small or because surface width was unknown or not stated.
- No shoulder assumed because shoulder width was unknown or
  not stated.
- Lane width factor reduced to 1 because it computed higher.
- ADT could not be computed due to missing data.

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Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=D,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRITA,TIME=10,SCRSIZE=5
//BIKEWAY DD DISP=OLD,DSNAME=user-id.BIK
//BIKEWAYS DD DISP=(NEW,CATLG),UNIT=TAPE,DCB=TRN.GENDSCB,
//            DSNAME=TRN.RI17BIKT(+1),LABEL=EXPDT=99000
//SYSIN DD *
:CREATE-BIKEWAY-FILE,START-DATE=01/01/1983,END-DATE=12/31/1983,
:  WRITE-BOTH
+ROUTES
ROUTE-SYS=02-03
+TITLES
REQUESTED BY:  NANCY MAHLE  1/1/1983
BIKEWAY FILE CREATION FOR USTH AND MNTH HIGHWAYS
/*
```

The COPY-BIKEWAY-FILE Command

COPY-BIKEWAY-FILE can be used to (1) copy a tape file to a disk file, or (2) copy a disk file to a tape file.

Whenever the command is run, there is one input file and one output file. For the output file, follow the rules for DD statements given with CREATE-BIKEWAY-FILE. For the input files, use the following DD statements:

Disk: //BIKEWAY DD DISP=SHR,DSNAME=user-id.BIK

Tape: //BIKEWAYS DD DISP=OLD,DSNAME-TRN.RI33CIBK(0)

Command parameters:

(Required)	COPY-TYPE=	VSAM-TO-SEQL	(disk to tape)
		SEQL-TO-VSAM	(tape to disk)

(Optional) +TITLES subcommand

(Optional) Print formatting parameters: see chapter 4

Sample job setup - Disk to Tape:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=D,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//BIKEWAY DD DISP=SHR,DSNAME=USER-id.BIK
//BIKEWAYS DD DISP=(NEW,CATLG,DELETE),UNIT=TAPE,DCB=TRN.GENDSCB,
//           DSNAME=TRN.RI17BIKT(+1),LABEL=EXPDT=99000
//SYSIN DD *
:COPY-BIKEWAY-FILE,COPY-TYPE=vSAM-TO-SEQL
/*
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=D,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
// EXEC PGM=IEFBR14
//BIKEWAY DD DISP=(NEW,CATLG),UNIT=SYSDA,DSNAME=user-id.BIK,
//           DCB=DSORG=IS,SPACE=(CYL,23)
//TIS EXEC DTRIT,REGION=400K,TIME=5,SCRSIZE=30
//BIKEWAY  DD DISP=OLD,DSNAME=user-id.BIK
//BIKEWAYS DD DISP=OLD,DSNAME=TRN.RI17BIKT(0)
//SYSIN DD *
:COPY-BIKEWAY-FILE,COPY-TYPE=SEQL-TO-vSAM
/*
```


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SUPPLEMENTAL BIKEWAY INSTRUCTIONS - July 7, 1981

This is the job setup used to create the bikeway file on 7/8/81. CPU time was 7 minutes, it will be higher with "accidents". To minimize CPU time (i.e., $$$$) and disk space, use a "tight-fitting" ROUTES subcommand when creating the file. Creating a lot of records that will not be needed for the print or diagram reports raises job costs substantially.

The file should always be created by writing to tape, and then copied to a disk file, since the disk space can be easily calculated by knowing the number of output records from the first step.

"NO-MESSAGES" is strongly urged, or mucho output will result (this particular run generated over 100,000 lines with "MESSAGES".

Note that this job was submitted from a TSO terminal, so DTRITA was used and output also went to the terminal. To run from cards, use DTRIBA procedure.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=10
/*ROUTE  PRINT REDUCE
//TIS EXEC DTRITA,TIME=30,REGION=400K,SCRSIZE=8,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//BIKEWAYS DD DISP=(NEW,CATLG,DELETE),UNIT=TAPE,DCB=TRN.GENDSCB,
//            DSNAME=TRN.RI17BIKT(+1),LABEL=EXPDT=99000
//SYSIN DD *
:CREATE-BIKEWAY-FILE,START-DATE=04/01/79,END-DATE=10/31/79,
:  WRITE-SEQL,NO-ACCIDENTS,NO-MESSAGES
+ROUTES
ROUTE-SYS=02-10
/*
```


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The second step is to copy the tape file to a disk file (the PRINT-BIKEWAY-BY-ROUTE, BIKEWAY-DIAGRAM-LISTING, and PRINT-SORTED-BIKEWAY- REPORT require a disk file). Use the number of records shown in the create job to calculate the number of cylinders. The space shown here is large (194) and may require a VOL=SER=nnnnnn parameter (the user must know which disk pack has enough free space) to find enough space. Note also the large

SCRSIZE on the EXEC card.

Again, this job was run from a TSO terminal. To run from cards, make similar changes as with the create. It will take less than 2 minutes.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=D,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT REDUCE
// EXEC PGM=IEFBR14
//BIKEWAY  DD DISP=(NEW,CATLG),UNIT=SYSDA,DSNAME=user-id.BIK,
//            DCB=DSORG=IS,SPACE=(CYL,194)
//TIS EXEC DTRIT,TIME=5,REGION=300K,SCRSIZE=30,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//BIKEWAY  DD DISP=OLD,DSNAME=user-id.BIK
//BIKEWAYS DD DISP=OLD,DSNAME=TRN.RI17BIKT(0)
//SYSIN DD *
:COPY-BIKEWAY-FILE,COPY-TYPE=SEQL-TO-vSAM
/*
```

The PRINT-BIKEWAY-BY-ROUTE Command

This command prints a section-by-section report of the bikeway file. Several lines are printed per section. All data elements of the file are printed, along with:

- Descriptions of starting and ending points (from roadlog file).
- City, county, and urban area names.

A disk-resident bikeway file must be in existence to run this command. Include the following DD statement with the run:

```
//BIKEWAY DD DISP=SHR,DSNAME=user-id.BIK
```

The command parameters are:

(Required) +ROUTES subcommand

- Operates under "LIST" classification (see chapter 5 of the TIS User's Manual).

(Optional) +SELECT subcommand

Use +SELECT to further restrict which records are printed in the report. The INCLUDE/EXCLUDE clause is required and has the following format:

```
INCLUDE
         BIKEWAY-RECORDS IF:
EXCLUDE
```

- BIK and RLG data elements can be referenced.
- The data element names for BIK are those shown under "Data Elements of the Bikeway File" on previous pages.

(Optional) START-DATE=mm/dd/yyyy
(Optional) END-DATE=mm/dd/yyyy

START-DATE and END-DATE have no effect. If you wish, include these parameters and specify the same values used when the bikeway fie was created. They will be printed and serve to document for you what time period was involved.

```
                    NO-OPTLIST   No option list is printed.
          (Optional)   OPTLIST      Your command parameters are printed.
                    -------
```



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```



```
                    NO-CODELIST  No code list is printed.
          (Optional)   CODELIST     A several-page summary of codes
                    --------       appearing in the listing is printed.

                     When running by some region (eg., construction
                     district or county), one code list is printed per
                     region when CODELIST is specified or defaulted.

          (Optional)   +TITLES subcommand

          (Optional)   Print formatting parameters: see chapter 4
```

Sample job setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=20
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=10,SCRSIZE=10
//BIKEWAY DD DISP=SHR,DSNAME=DT99A1B.BIK
//SYSIN DD *
:PRINT-BIKEWAY-BY-ROUTE,START-DATE=01/01/1976,END-DATE=12/31/1977
+ROUTES
ROUTE-SYS=02-03
+TITLES
REQUESTED BY:  JANE DOE 6/23/1978
/*
```

The BIKEWAY-DIAGRAM-LISTING Command

This command prints a section-by-section analysis from the bikeway file. A diagram printed for each section shows whether the section is classified as unsatisfactory, poor, fair, or good using the following schedules:

- If analyzing by design points only:

0-45	Unsatisfactory
46-63	Poor
64-105	Fair
106-160	Good

- If analyzing by total points:

0-85	Unsatisfactory
86-103	Poor
104-145	Fair
146-200	Good

One line is printed per section, and includes (1) diagram, (2) design, accident, severity, and total points, (3) section length, (4) route system and number, (5) reference point, and (6) verbal description.

A disk-resident bikeway file must be in existence. Include the following DD statement with the run:

```
//BIKEWAY DD DISP=SHR,DSNAME=user-id.BIK
```

The command parameters are:

(Required) +ROUTES subcommand

- Operates under "LIST" classification (see chapter 5 of the TIS User's Manual).

(Optional) +SELECT subcommand

Use +SELECT to further restrict which records are printed in the report. The INCLUDE/EXCLUDE clause is required and has the following format:

INCLUDE
BIKEWAY-RECORDS IF:
EXCLUDE

- BIK and RLG data elements can be referenced.
- The data element names for BIK are those shown under "Data Elements of the Bikeway File" on previous pages.

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(Optional) START-DATE=mm/dd/yy
(Optional) END-DATE=mm/dd/yy

START-DATE and END-DATE have no effect. If you wish, include these parameters and specify the same values used when the bikeway fie was created. They will be printed and serve to document for you what time period was involved.

NO-OPTLIST No option list is printed.
(Optional) OPTLIST Your command parameters are printed.

NO-ACCIDENTS Analyze based on design points.
(Optional) ACCIDENTS Analyze based on total points.

(Optional) +TITLES subcommand

(Optional) Print formatting parameters: see chapter 4

Sample job setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
//TIS EXEC DTRIT,TIME=10,SCRSIZE=5
//BIKEWAY DD DISP=SHR,DSNAME=DT99A1B.BIK
//SYSIN DD *
:BIKEWAY-DIAGRAM-LISTING,START-DATE=01/01/1976,END-DATE=12/31/1977
+ROUTES
ROUTE-SYS=02-03
/*
```


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The PRINT-SORTED-BIKEWAY-REPORT Command

This command prints a section-by-section analysis from the bikeway file. The sections are sorted by point ratings (fewest to highest) for paved roads. One line is printed per section.

A disk-resident bikeway file must be in existence. Include the following DD statement with the run:

```
//BIKEWAY DD DISP=SHR,DSNAME=user-id.BIK
```

The command parameters are:

(Required) +ROUTES subcommand

- Operates under "LIST" classification (see chapter 5 of the TIS User's Manual).

(Optional) +SELECT subcommand

Use +SELECT to further restrict which records are printed in the report. The INCLUDE/EXCLUDE clause is required and has the following format:

```
INCLUDE
         BIKEWAY-RECORDS IF:
EXCLUDE
```

- BIK and RLG data elements can be referenced.
- The data element names for BIK are those shown under "Data Elements of the Bikeway File" on previous pages.

(Optional) START-DATE=mm/dd/yyyy
(Optional) END-DATE=mm/dd/yyyy

START-DATE and END-DATE have no effect. If you wish, include these parameters and specify the same values used when the bikeway file was created. They will be printed and serve to document for you what time period was involved.

NO-OPTLIST No option list is printed.
(Optional) OPTLIST Your command parameters are printed.

```
                NO-ACCIDENTS   Sort based on design points.
     (Optional) ACCIDENTS      Sort based on total points.
                ---------


     (Optional) +TITLES subcommand


     (Optional) Print formatting parameters: see chapter 4
```

Sample job setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,REGION=300K,TIME=10,SCRSIZE=5
//BIKEWAY DD DISP=SHR,DSNAME=DT99A1B.BIK
//SYSIN DD *
:PRINT-SORTED-BIKEWAY-REPORT,NO-ACCIDENTS
+ROUTES
ROUTE-SYS=02,COUNTY=HENNEPIN
/*
```

The BIKEWAY-MATRIX-SUMMARY Command

****

Function: Produces general-purpose summaries of bikeway sections.

Description: Summaries can be printed broken down by one, two, or three data elements from the bikeway or roadlog files.

When summarizing by one data element, the output format is similar to:

BIK.DESIGN-POINTS	RECORDS	MILES
000 TO 045	68	45.534
046 TO 063	40	32.570
064 TO 105	83	51.361
106 TO 160	208	243.286
(NOT IN ANY GROUP)	5	0.000
----- GRAND TOTAL ----->	404	372.751

When summarizing on two data elements, the output format is similar to:

BIK.DIVIDED-&-ONE-WAY	BIK.DESIGN-POINTS	RECORDS	MILES
(BLANKS)	(NOT IN ANY GROUP)	5	0.000
(BLANKS)	----- SUBTOTAL ------->	5	0.000
D - DIVIDED	000 TO 045	5	0.400
D - DIVIDED	064 TO 105	23	2.797
D - DIVIDED	106 TO 160	3	0.850
D - DIVIDED	----- SUBTOTAL ------->	31	4.047
U - UNDIVIDED 2-WAY	000 TO 045	63	45.134
U - UNDIVIDED 2-WAY	046 TO 063	40	32.570
U - UNDIVIDED 2-WAY	064 TO 105	60	48.564
U - UNDIVIDED 2-WAY	106 TO 160	205	242.436
U - UNDIVIDED 2-WAY	----- SUBTOTAL ------->	368	368.704
	----- GRAND TOTAL ----->	404	372.751

When summarizing on three data elements, the output format is identical to that for two data elements except that one summary is printed for each value of the additional data element.

Required Command Parameters:

ROUTES subcommand - Operates under SUM classification

CATEGORIES subcommand

- BIK and RLG data elements can be referenced.
- The REDEFINES and GROUPS options can be used for grouping various codes together.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

--> The option list is a listing of your command parameters.

SELECT subcommand

- The INCLUDE/EXCLUDE clause is optional and has the following format:

  INCLUDE BIKEWAY-RECORDS IF:
  EXCLUDE

- BIK and RLG data elements can be referenced.

TITLES subcommand

Print formatting parameters: see chapter 4

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,SCRSIZE=1
//BIKEWAY DD DISP=SHR,DSNAME=DT99A1B.BIK
//SYSIN DD *
:BIKEWAY-MATRIX-SUMMARY
+CATEGORIES
DATA-ELEMENT=BIK.DIVIDED-&-ONE-WAY
DATA-ELEMENT=BIK.DESIGN-POINTS
GROUPS
000 TO 045
046 TO 063
064 TO 105
106 TO 160
/*
```

The above job setup may be copied from DT99A1B.TSOLIB.CNTL(BIKMAT).

The CROSSING-INVENTORY-REPORT Command

Function: Prints the rail grade crossing inventory report.

Description: The rail grade crossing (RGC) inventory report shows location information, physical characteristics, and protection for crossings.

The roadlog file is accessed (via RGC route system, route number, and reference point) to determine municipality and number of traffic lanes.

The +SELECT and/or +ROUTES subcommand is used to choose which records are printed. A new page is begun when the county changes, and records are listed in order by county number, railroad company, and map reference number.

The CATEGORIES subcommand may be used to specify a different order. The specified data elements are used as a sort field to reorder records in each county.

Required Command Parameters: None.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

NO-CODELIST No codelist is printed.
CODELIST One codelist is printed (default).

- The codelist is a summary of the meanings of the coded data elements in the report.

ROUTES subcommand

Operates under LIST classification.
All crossings will be included in a single summary.

SELECT subcommand

Select criteria can be applied to data elements in the rail grade crossing (RGC) record. They can also apply to the roadlog (RLG) and railway (RWY) records corresponding to the crossing location IF THE ROUTES SUBCOMMAND IS INCLUDED.

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE CROSSING-RECORDS IF:

- RGC data elements can be referenced.
- RLG and RWY data elements can also be referenced if the ROUTES subcommand is used.

If no SELECT statement is coded, all records in the file are considered "selected".

CATEGORIES subcommand

When coded, will be used as a sort field to determine the order records are listed. If two records have the same category, the order is by crossing id number.

- RGC and RLG data elements can be referenced.
- The REDEFINES and GROUPS options can be used.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample produces output only at the TSO terminal (default). To get the report at both the terminal and a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,OUTFILE=PRINTER
```

To get report only at a line printer, change the third line to:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,PRINTDD=PRINTER
```

And change the first line: MSGCLASS=2 to MSGCLASS=A.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIRT,TIME=1,REGION=400K
//SYSIN DD *
:CROSSING-INVENTORY-REPORT,CODELIST
+SELECT
  INCLUDE CROSSING-RECORDS IF:
    RGC.ID-RR-SYS *EQ* '04'
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

1
+

The CROSSING-RAILROAD-REPORT Command

Function: Prints the rail grade crossing report for railroads.

Description: The rail grade crossing (RGC) railroad report shows location information, highway and railroad data, types

of protection and the latest priority rank.

The roadlog file is accessed (via RGC route system, route number, and reference point) to determine municipality.

The +SELECT and/or +ROUTES subcommand is used to choose which records are printed. A new page is begun when the railroad company and/or county changes, and records are listed in order by railroad company, county, and map reference number.

Required Command Parameters: None.

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

NO-CODELIST	No codelist is printed.
CODELIST	One codelist is printed (default).

- The codelist is a summary of the meanings of the coded data elements in the report.

ROUTES subcommand

Operates under LIST classification.
All crossings are inclued in a single summary.

SELECT subcommand

Select criteria can be applied to data elements in the rail grade crossing (RGC) record. They can also be applied to the roadlog (RLG) and railway (RWY) records IF THE ROUTES SUBCOMMAND IS USED.

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE CROSSING-RECORDS IF:

- RGC data elements can be referenced.
- RLG and RWY data elements can be referenced if +ROUTES is used.

If no SELECT statement is coded, all records in the file are considered "selected".

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup:

The following sample produces output only at the TSO terminal (default). To get the report at both the terminal and a line printer, change the third line to include:

OUTFILE=PRINTER

To get report only at a line printer, change the third line to include:

PRINTDD=PRINTER

And change the first line: MSGCLASS=2 to MSGCLASS=A.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIRT,TIME=1,REGION=400K,SCRSIZE=5
//SYSIN DD *
:CROSSING-RAILROAD-REPORT,CODELIST
+SELECT
  INCLUDE CROSSING-RECORDS IF:
    RGC.ID-RR-SYS *EQ* '04'
/*
```

The above job setup may be copied from DT99A1B.TSOLIB.CNTL(RGCRRPT).

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

1
+

The CROSSING-PRIORITY-REPORT Command

Function: Prints the priority report, sorted by hazard index and priority (highest to lowest).

Description: CROSSING-PRIORITY-REPORT prints a sorted listing of rail grade crossings. The program optionally recomputes hazard indexes and/or priority rank. Data from the crossing (RGC) file, and the DPS accident files is used. The AADT used is the value stored in each RGC record.

The program does NOT make any permanent changes in the RGC record. To make annual computations to be stored in the RGC record, use the CROSSING-HAZARD-INDEX command.

There are several combinations of options allowed through the COMPUTE and RANK keywords (see required command parameters below). The options can be combined as follows:

COMPUTE	RANK	Effect
NO	NO	Selected crossings are sorted and printed in order by current rankings as stored in the RGC record.
NO	ALL	All crossings within +ROUTES are ranked as a group. Records meeting +SELECT criteria are printed, showing new rank.
NO	SELECTED	Only crossings meeting +SELECT criteria are ranked and printed.
YES	NO	Hazard index is recomputed, but stored ranking is used for sorting.
YES	ALL	Hazard index is recomputed, and all records within +ROUTES are ranked. Records meeting +SELECT criteria are printed.

YES	SELECTED	Hazard index is recomputed, and only selected records are included in the group for ranking and printing.

The hazard index is computed as follows:

$$\frac{\text{trains per day} * \text{AADT} * \text{number of accidents}}{\text{protection factor}}$$

where trains per day is:

day through + night through + day switch + night switch

and number of accidents is the number of selected accidents that meet the criteria defined by the command parameters.

The values used to compute protection factors reside in a separate table, so the user may vary the weight factors from one job to another. Protection factors are determined for each crossing by the data in the protection devices near and far fields. The highest value is used. The format of entries in the protection factor table is:

"x = nnnn.n"
or
"x + y = nnnn.n"

Where x and y are valid protection device characters (A-M, P, blank), and each "n" is a digit (leading zeroes must be coded). The sample job setup shown below shows current protection factor weights.

Default values must be specified for instances where trains per day or number of accidents is zero. There must exist a line in the table in the format:

"DEFAULTS: TRAINS=n.n ACCIDENTS=n.n"

The usual values are 0.5 and 0.1, respectively.

The table is defined in DD statement RGCHAZ.

Required Command Parameters:

ROUTES subcommand. Operates under "LIST" classification. All records are processed in a single group.

START-DATE=mm/dd/yyyy Accidents occurring before this date are not considered.

END-DATE=mm/dd/yyyy Accidents occurring after this date are not considered.

COMPUTE=
- YES Compute hazard index for selected records.
- NO Use stored hazard index.
  --

RANK=
- NO Use stored hazard index rank (current year).
- ALL Rank all records within +ROUTES.
- SELECTED Rank only records within +ROUTES AND +SELECT.

Optional Command Parameters:

ACC-INT-LOCN=	INTSECT	Include intersection accidents only (ACD.INTSECT-RELATION = 1-3).
	NON-INTSECT	Include non-intersection accidents only (ACD.INTSECT-RELATION = 4-9).
	ALL	Include all accidents (subject to other criteria, if any).

ACC-RELIABILITY=	1	Include reliability 1 only.
	2	Include reliability 1 and 2.
	3	Include all accidents.
	-	

ACC-SCAN=nnnn May be used to override the values stored in RGC records. The data elements RGC.ACC-SCAN-FAR and RGC.ACC-SCAN-NEAR are added and subtracted, respectively, to the reference point of the crossing to search the accident files for accidents at the crossing. Coding this parameter (0001 - 9999 feet) will override the accident scans stored in each RGC record.

1
+

SELECT subcommand

Can be used to select crossing records and accidents:

INCLUDE CROSSING-RECORDS can be used to select which RGC records are included. ONLY SELECTED RECORDS will be printed in the report. If SELECT is omitted, all records included by the +ROUTES subcommand are considered "selected".

- RGC, RLG, and RWY data elements can be referenced.

INCLUDE ACCIDENTS can be used to further restrict

which accident records are counted.

- ACD, ACV, ACP, and ACJ data elements can be referenced. ACV, ACP, and ACJ data elements must be referenced via the multi-correlation facility (*ANY* or *ALL*).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4 of the User's Manual).

1
+

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIRR,TIME=3,SCRSIZE=5,FORM='(A)',
```

```
//    PRINTDD=TSO,OUTFILE=PRINTER
//SYSIN DD *
:CROSSING-PRIORITY-REPORT,START-DATE=01/01/1986,
:  END-DATE=12/31/1990,RANK=SELECTED,COMPUTE=YES
+ROUTES
ROUTE-SYS=CSAH
+SELECT
 INCLUDE CROSSING-RECORDS IF:
    RGC.ID-RR-SYS *EQ* 'BN'
/*
//RGCHAZ DD *
DEFAULTS:  TRAINS=0.5  ACCIDENTS=0.1
  = 0001.0
A = 0019.0
B = 0019.0
C = 0019.0
D = 0019.0
F = 0058.0
G = 0058.0
H = 0096.0
I = 0096.0
J = 0096.0
K = 0096.0
E = 0228.0
L = 0333.0
M = 0333.0
F + H = 0114.0
F + I = 0114.0
F + J = 0114.0
F + K = 0114.0
/*
```


1

The CROSSING-COMPOSITE-REPORT Command

Function: Prints the rail grade crossing composite report.

Description: The rail grade crossing (RGC) composite report uses 1 page per record, showing many data elements from the RGC record as well as the following:

From the roadlog file: Census number and name if the crossing is located within a city.

From the railpoint file: Railroad reference point of the crossing.

From the accident files: Accident history for a specified time period (usually the last 5 years).

The composite report is printed using special print-characters to provide boxes around data elements. This requires a special character set and can only be printed on a line printer at ISB. If the job output is routed anywhere else (such as the DOT third floor printer or a TSO terminal), the boxes and other special characters will all appear as dots.

There are two modes of operation for this command. The program operates differently depending on whether a +ROUTES subcommand is included. The differences are as follows:

WITHOUT +ROUTES:

1) ALL RGC records passing +SELECT criteria are included in the report.
2) +SELECT can ONLY refer to RGC data elements.
3) A new "individual" summary starts when county number (from the crossing ID number) changes. This means:
   a) An optionlist is printed (if requested).
   b) A codelist is printed (if requested).
   c) Page numbers are reset to 1.

WITH +ROUTES:

1) Only RGC records with a valid route system, route number, and reference point are included in the report.
2) +SELECT can refer to RGC, RLG, and RWY data elements.

+SELECT is performed AFTER +ROUTES chooses records.

3) A new "individual" summary starts whenever the +ROUTES subcommand specifies (see chapter 5). County number changes have no special effect.

Within an individual summary, crossings are sorted by crossing ID number, regardless of the presence of +ROUTES.

Required Command Parameters:

START-DATE=mm/dd/yyyy Required if ACCIDENTS is specified. Accidents that occurred on or AFTER this date (month/day/year) are included.

END-DATE=mm/dd/yyyy Required if ACCIDENTS is specified. Accidents that occurred on or BEFORE this date (month/day/year) are included.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

NO-CODELIST No codelist is printed.
CODELIST A several-page codelist is printed (default).

- The codelist is a summary of the meanings of the coded data elements in the report.

ACC-INT-LOCN =
- INTSECT Only intersection accidents are included.
- NON-INTSECT Only non-intersection accidents are included.
- ALL Both types of accidents are included (default).

-Intersection accidents are those with the following codes in the relationship to intersection data element:

1 Interchange area
2 Intersection
3 Intersection-related

ACC-RELIABILITY = 1 Include accidents with reliability 1.
2 Included accidents with reliability 1 or 2.
3 Include accidents with reliability 1, 2, or 3 (default).

-This parameter selects accidents based on reliability of location information:

1 No location error expected
2 Possible location error
3 Probable location error

1
+

ACC-SCAN=nnnn This parameter can be used to override the scan limits stored in each record. If coded (in feet), this value is added to and subtracted from the reference point of the crossing when searching for accidents to assign to the crossing.

-If not coded, the accident scan data elements stored in each RGC record are used.

ROUTES subcommand

- Operates under LIST classification (meaning that summary selection parameters such as ZERO-USER-TOTALS have no effect).
- If no ROUTES subcommand is coded, all records are included, subject to SELECT criteria, if any.

SELECT subcommand

Select criteria can be applied to data elements in the rail grade crossing (RGC) record. They can also apply to the roadlog (RLG) record and railway (RWY) record corresponding to the RGC reference point location IF THE ROUTES SUBCOMMAND IS INCLUDED.

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE CROSSING-RECORDS IF:

- RGC, RLG, and RWY data elements can be referenced.

- RLG or RWY references will require the ROUTES subcommand.

If no SELECT statement is coded, all records in the file are considered "selected". SELECT is performed AFTER ROUTES data criteria are applied (if ROUTES subcommand is present).

1
+

Select criteria can also be applied to accident data. The criteria are applied AFTER the other parameters shown above.
The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE ACCIDENTS IF:

-ACD, ACV, ACP, ACJ, and RLG data elements can be referenced.
-ACV, ACP, and ACJ data elements must be referenced via the multi-correlation facility (*AND*/*ALL*).
-RLG references require access to the roadlog file and hence raise execution costs.

ACC-TAPE=YES Use the accident archive tape file.

- The accident archive data tape contains accidents prior to the active file (the active file contains accidents for the previous five years plus the current year). The archive dates back through 1977.

Use of the tape is also limited as follows:

1) The START-DATE and END-DATE must specify a time period within the period of data stored on the tape. If the dates go outside the tape data period, the report will print an error message and not execute.

2) Accidents must be processed in order by increasing route system, route number, and reference point. Each accident can be processed only once per command.

3) The job setup requires minor changes (see examples).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample produces output in the composite report format. A special character set is specified in the PRINTER DD statement. The output is also printed at the TSO terminal, but the special symbols will appear as dots:

1
+


```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=3,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//PRINTER DD SYSOUT=A,UCS=TN12,COPIES=1,
//           DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA)
```

```
//SYSIN DD *
:CROSSING-COMPOSITE-REPORT,NO-CODELIST,ACCIDENTS,
:   START-DATE=01/01/1986,END-DATE=09/01/1990
+SELECT
INCLUDE CROSSING-RECORDS IF: RGC.CURRENT-HI-RANK *LE* 50
/*
```

The following example illustrates the use of the accident tape.
Note the following:

1) The job class on the first line has been changed to CLASS=D.

2) The addition of the line specifying the tape:

```
   //ACCTAPE DD DISP=OLD,DSN=TRN.RI16ACC2(0),UNIT=TAPE
```

3) The additional TIS command parameter "ACC-TAPE=YES".

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=D,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=3,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//PRINTER DD SYSOUT=A,UCS=TN12,COPIES=1,
//           DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA)
//RGCHAZ DD DISP=SHR,DSN=TRN.RI00SYSU(RGCHAZ)
//ACCTAPE DD DISP=OLD,DSN=TRN.RI16ACC2(0),UNIT=TAPE
//SYSIN DD *
:CROSSING-COMPOSITE-REPORT,NO-CODELIST,ACCIDENTS,START-DATE=01/01/1980,
:  END-DATE=12/31/1984,NO-OPTLIST,ACC-TAPE=YES
+SELECT
INCLUDE ACCIDENTS IF:
ACD.ACC-TYPE *EQ* '04'
/*
```


1
+

The CROSSING-ACCIDENT-MATRIX Command

****

Function: Produces general-purpose summaries of accidents at rail grade crossings.

Description: Summaries can be broken down by one, two, or three data elements from the rail grade crossing record, or from the roadlog record corresponding to the crossing location.

For each category, the following are printed:

- Number of accidents broken down as:
    - Fatal accidents.
    - Injury accidents -- Severity A.
    - Injury accidents -- Severity B.
    - Injury accidents -- Severity C.
    - Injury accidents -- Total.
    - Property damage accidents.
    - Total number of accidents.
- Number of persons injured/killed broken down as:
    - Number of persons killed.
    - Number of persons injured -- Severity A (optional).
    - Number of persons injured -- Severity B (optional).
    - Number of persons injured -- Severity C (optional).
    - Number of persons injured -- Total.
    - Total number of persons injured/killed.

The output formats are similar to CROSSING-MATRIX-SUMMARY except that accident and injury data is printed instead of numbers of crossings.

There are two modes of operation for this command. The program operates differently depending on whether a +ROUTES subcommand is included. The differences are as follows:

WITHOUT +ROUTES:

1) ALL RGC records passing +SELECT criteria are included in the report.
2) +SELECT & +CATEGORIES can ONLY refer to RGC data elements.
3) All data is included in one summary.

WITH +ROUTES:

1) Only RGC records with a valid route system, route number, and reference point are included in the report.
2) +SELECT and +CATEGORIES can refer to RGC, RLG, and RWY data elements. +SELECT is performed AFTER +ROUTES chooses records.
3) A new "individual" summary starts whenever the +ROUTES subcommand specifies (see chapter 5).

Required Command Parameters:

START-DATE=mm/dd/yyyy Accidents that occurred on or AFTER this date (month/day/year) are included.

END-DATE=mm/dd/yyyy Accidents that occurred on or BEFORE this date (month/day/year) are included.

CATEGORIES subcommand

- RGC data elements can always be referenced.
- RLG and RWY data elements can be referenced IF THE ROUTES SUBCOMMAND IS USED.
- The REDEFINES and GROUPS control cards can be used for grouping various codes together in the summaries.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

INJURIES Persons injured are broken down by severity.
NO-INJURIES Injuries are not broken down by severity (default).

- INJURIES increases computer time because the accident injury file must be accessed.

ACC-INT-LOCN =	INTSECT	Only intersection accidents are included.
	NON-INTSECT	Only non-intersection accidents

are included.

ALL — Both types of accidents are included (default).

-Intersection accidents are those with the following codes in the relationship to intersection data element:

1 Interchange area
2 Intersection
3 Intersection-related

ACC-RELIABILITY = 1 Include accidents with reliability 1.
2 Included accidents with reliability 1 or 2.
3 Include accidents with reliability 1, 2, or 3 (default).

-This parameter selects accidents based on reliability of location information:

1 No location error expected
2 Possible location error
3 Probable location error

ACC-SCAN=nnnn This parameter can be used to override the scan limits stored in each record. If coded (in feet), this value is added to and subtracted from the reference point of the crossing when searching for accidents to assign to the crossing.

-If not coded, the accident scan data elements stored in each RGC record are used.

ROUTES subcommand

- Operates under LIST classification (meaning that summary selection parameters such as ZERO-USER-TOTALS have no effect).

- If no ROUTES subcommand is coded, all crossings are
  included, subject to SELECT criteria, if any.

SELECT subcommand

Select criteria can be applied to data elements in the rail grade crossing (RGC) record. They can also apply to the roadlog (RLG) record and railway (RWY) record corresponding to the RGC reference point location IF THE ROUTES SUBCOMMAND IS INCLUDED.

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE CROSSING-RECORDS IF:

- RGC, RLG, and RWY data elements can be
  referenced.

- RLG or RWY references will require the ROUTES
  subcommand.

If no SELECT statement is coded, all records in the file are considered "selected". SELECT is performed AFTER ROUTES data criteria are applied (if ROUTES subcommand is present).

Select criteria can also be applied to accident data. The criteria are applied AFTER the other parameters shown above. The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE ACCIDENTS IF:

-ACD, ACV, ACP, ACJ, and RLG data elements can be referenced.
-ACV, ACP, and ACJ data elements must be referenced via the multi-correlation facility (*AND*/*ALL*).
-RLG references require access to the roadlog file and hence raise execution costs.

ACC-TAPE=YES Use the accident archive tape file.

- The accident archive data tape contains accidents prior to the active file (the active file contains accidents for the previous five years plus the current year). The archive dates back through 1977.

Use of the tape is also limited as follows:

1) The START-DATE and END-DATE must specify a time period within the period of data stored on the tape. If the dates go outside the tape data period, the report will print an error message and not execute.

2) Accidents must be processed in order by increasing route system, route number, and reference point. Each accident can be processed only once per command.

3) The job setup requires minor changes (see examples).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

1
+

Sample Job Setup: The following sample can be used to run the CROSSING-ACCIDENT-MATRIX command. As shown, the report will be printed at the terminal and also at the laser printer at Intertech.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT REDUCE
```

```
//TIS EXEC DTRIT,TIME=3,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//SYSIN DD *
:CROSSING-ACCIDENT-MATRIX,START-DATE=01/01/1987,END-DATE=12/31/1990,
:    NO-INJURIES
+CATEGORIES
DATA-ELEMENT=RGC.ID-RR-SYS
+ROUTES
ROUTE-SYS=CSAH
+TITLES
ACCIDENTS AT CSAH CROSSINGS - 1987-1990
  BY RAILROAD SYSTEM
/*
```

The following example illustrates the use of the accident tape.
Note the following:

1) The job class on the first line has been changed to CLASS=D.

2) The addition of the line specifying the tape:

```
//ACCTAPE DD DISP=OLD,DSN=TRN.RI16ACC2(0),UNIT=TAPE
```

3) The additonal TIS command parameter "ACC-TAPE=YES".

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=D,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT REDUCE
//TIS EXEC DTRIRR,TIME=3,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//ACCTAPE DD DISP=OLD,DSN=TRN.RI16ACC2(0),UNIT=TAPE
//SYSIN DD *
:CROSSING-ACCIDENT-MATRIX,START-DATE=01/01/1990,END-DATE=12/31/1990,
:    ACC-TAPE=YES
+ROUTES
COUNTY=02,ROUTE-SYS=EACH
+CATEGORIES
DATA-ELEMENT=RGC.CROSSING-ID
+SELECT
INCLUDE CROSSING-RECORDS IF:
RGC.STATUS *LE* '900'
+TITLES
SAMPLE ACC MATRIX ANOKA CO.
/*
```


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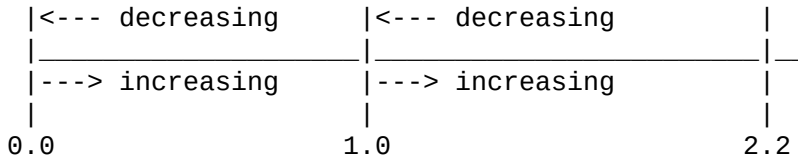
Pavement Management Reports

The Pavement File

The pavement management subsystem file ("PMS") contains data describing the surfaces of roadways for trunk highways in Minnesota. The data includes condition rating, surface rating, present serviceability rating, and percentages of defects.

Records in the file represent segments of roadway, with the segment beginning at the coded route system, route number, and reference point, and being terminated at the reference point of the next record in the file (ie., the file is sorted in order of increasing record key -- the route system code, route number, and reference point). Reports will process the pavement file in parallel with the roadlog file. This means pavement data will be terminated by a non-mileage record in roadlog (gap, coincidence, non-existent, or end-of route).

Pavement data always represents the roadway(s) in the direction of increasing mileposts, as illustrated below:



Here the data describing the roadway(s) between the records at 0.0 and 1.0 is stored in the record with a key at 0.0. Likewise the data for the segments between 1.0 and 2.2 is stored in the record at 1.0. This rule applies to 2-lane or multi-lane roadways.

The pavement record as stored on the file consists of a root segment and an historical segment. The root segment is NOT historical and contains data items such as the record's key. There can be up to 15 years of historical data in each record. Each year may have from 1 to 4 samples (a two-lane roadway would normally have 2 samples -- one for each lane, a roadway with 4 or more lanes may have 2 samples per direction).

Introduction to the Pavement Commands

The following commands are provided for accessing pavement file data:

PAVEMENT-CODING-FORM

Used to print forms for coding new data to be added to the file. The command accesses pavement records and uses them to determine required locations for coding data. It is intended for use by those responsible for collecting and maintaining pavement data.

LIST-PAVEMENT-FILE

Shows raw data from the file,with a minimum of processing. Data is merely displayed with no summarization. User options include choice of output formats, and control over what parts of roadways or what years are shown. It can be used by those maintaining the file, as well as those interested in ratings for particular roadways.

CONDITION-RATING-REPORT

Computes condition ratings for segments of roadways with constant design. "Segments" usually span several consecutive pavement records, with endpoints determined by "D" record locations. Rating information is averaged over the segment and one or more generations may be displayed. It is a true "report", where the raw data has been massaged to give a more general picture of the roadway. Summaries are computed at user-specified intervals, showing totals and averages.

PAVEMENT-MATRIX-SUMMARY

Summarizes average ratings for roadways with similar characteristics. The user chooses which roadways are included, how they are grouped, and how the averages are broken down. Segments of roadway are not displayed, only the totals and averages are shown. This command

permits a more detailed and flexible summarization than those above.

The LIST-CONDITION-RATING-FILE Command

Function: Prints listings of the condition rating file.

Description: The condition rating (CR) records can be listed in any of several formats:

- Card Format: Prints records in input record format (A and B formats). This format shows all CR data elements as they would be coded when updating the file. There will always be a B input record, and one A record for each selected year.
- Record Format: Prints one sample per line, decreasing direction data followed by increasing direction data. All records are printed (including "M" records).
- Section Format: Prints one sample per line, decreasing direction data followed by increasing direction data. Only "D" records are printed (values averaged).

There is minimal formatting of data by this command. Its purpose is to verify what is actually stored in the file. There are two modes of selecting data for input via the +ROUTES and +SELECT subcommands. If +ROUTES is included, it is applied before +SELECT. If +ROUTES is omitted, only +SELECT determines which records are printed, and they are always printed in the order stored in the file (by increasing route system, route number, and reference point).

Required Command Parameters:

ROUTES subcommand

- Operates under LIST classification (meaning that summary selection parameters such as ZERO-USER-TOTALS have no effect).
- If no ROUTES subcommand is coded, all records are included, subject to SELECT criteria, if any.

Optional Command Parameters:

OPTLIST — A one-page option list is printed.
NO-OPTLIST — No option list is printed (default).

- The option list is a listing of command parameters used for the report.

NO-CODELIST — No codelist is printed.
CODELIST — One codelist is printed (default).

- The codelist is a summary of the meanings of the coded data elements in the report.
- The codelist will not be printed if CARD-FORMAT is specified.

START-YEAR=nnnn — Data for years before nnnn is excluded.

END-YEAR=nnnn — Data for years after nnnn is excluded.

ALL-DRIVEN — All driven roads (includes RQI only samples).
RATED-ONLY — Only include rated samples (default).

IRI — Print international roughness index (instead of RQI).
RQI — Ride rating (default).

```
CARD-FORMAT      Print records in card (input record) format.
SECTION-FORMAT   Print "D" records in record format.
RECORD-FORMAT    Print all records in record format (default).
```

SELECT subcommand

Select criteria can be applied to data elements in the condition rating (CR) record and also to the roadlog (RLG) record corresponding to the CR reference point location IF THE ROUTES SUBCOMMAND IS INCLUDED.

There are two levels of data selection: selection of years and selection of records. Year selection is done first, and any years not selected are removed from the record before further processing. After year selection (if requested) is performed, record selection is done (if requested).

The user can select YEARS as shown below:

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE CR-YEARS IF:

- CRY data elements can be referenced.

START-YEAR and END-YEAR are processed BEFORE SELECT.

If no SELECT CR-YEARS statement is coded, all years in the record are considered "selected".

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The user can select RECORDS as shown below:

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE CR-RECORDS IF:

- CRR, CRY, CR1, and RLG data elements can be referenced.

- CRY data elements can only be referenced by

the multi-correlation facility (*ANY*/*ALL*).

- CR1 data elements are the same as the most recent CRY.

- RLG references will require the ROUTES subcommand. They will also raise execution time.

If no SELECT CR-RECORDS statement is coded, all records in the file are considered "selected". SELECT is performed AFTER ROUTES data criteria are applied (if ROUTES subcommand is present).

The CR data elements are grouped by 3-character prefix as follows:

CRR Root data elements of record (non-historical).

CRY Yearly data elements (up to 25 per record).

CR1 Most recent year of data on record.

MAX-NUM-ENTRIES=nn If coded, no more than "nn" years of data will be listed for each record (nn = 1-25).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

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Sample Job Setup: The following sample produces output only at the TSO terminal (default). To get the report at both the terminal and a line printer, change the third line to:

```
          //TIS EXEC DTRIPM,TIME=1,OUTFILE=PRINTER
```

To get report only at a line printer, change the fourth line to:

```
          //TIS EXEC DTRIPM,TIME=1,PRINTDD=PRINTER
```

And change the second line: MSGCLASS=2 to MSGCLASS=A.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIPM,TIME=1
//SYSIN DD *
:LIST-CONDITION-RATING-FILE,CODELIST,START-YEAR=1994
+ROUTES
COUNTY=ANOKA,ROUTE-SYS=USTH
ROUTE-SYS-&-NUM=0300000004
+SELECT
INCLUDE CR-RECORDS IF:  CRR.YRS-SPANNED *GE* 4
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

The CONDITION-RATING-REPORT Command

Function: Prints the annual condition rating report.

Description: The annual condition rating report combines data from the condition rating, roadlog, true mileage and traffic files. Information can be found about surface types and conditions of roadways for the past several years (up to 25 generations). The report includes:

From Roadlog: Control section number.

From Traffic: Average daily traffic volume for selected time and heavy commercial ADT (for time period specified in START-DATE and END-DATE parameters).

From True Mileage: Section length.

From Condition Rating:
- Route system.
- Route number.
- Starting and ending reference points.
- Starting and ending verbal descriptions.
- Construction district.
- Number of lanes

For each year on record:
- Year of data.
- Surface type.
- RQI (ride quality).
- SR (surface quality).
- CR (condition rating, = RQI+SR/2), or
- PQI (pavement quality index).

The roadways are broken into segments determined by locations of "D" records in the condition rating file (a "D" record indicates a change in the design of the roadway, such as surface type or number of lanes). Data displayed is averaged over the segment, ie., actual data may vary within the segment, such as year of rating, rating, or traffic volume. If any data is missing for a portion of the segment, the report will not show the data for any of the segment.

The command provides extensive options to choose what segments are printed, as well as what data is used to rate segments. A good understanding of how the condition rating file is structured is required if the +SELECT subcommand is used, or the report results may be

misleading.

The user should also be aware that the CONDITION-RATING-MATRIX command operates differently than this one, so resulting totals and averages will most likely differ for the two commands, even when requesting the same information.

Required Command Parameters:

ROUTES subcommand

- Used to make first specification of what roadways are to be included in the report. The SELECT subcommand can be used to further specify roadway segments.
- Operates under SUM classification (see chapter 5).

START-DATE=mm/dd/yyyy Specifies starting date for traffic volume calculations.

END-DATE=mm/dd/yyyy Specifies ending date for traffic volume calculations. Average daily volume will be computed for the time between start and end dates. The SELECT subcommand may be used to choose only certain time intervals from the period (INCLUDE TIME IF:).

START-YEAR=nn Data for years before 19nn is excluded.

END-YEAR=nn Data for years after 19nn is excluded.

Optional Command Parameters:

OPTLIST A one-page option list is printed.
NO-OPTLIST No option list is printed (default).

- The option list is a listing of command parameters used for the report.

NO-CODELIST No codelist is printed.
CODELIST One codelist is printed (default).

- The codelist is a summary of the meanings of the coded data elements in the report.

NO-MESSAGES Error messages A2-013 - A2-018 are not printed.
MESSAGES   Error messages A2-013 - A2-018 are printed (default)

- These error messages are caused by improper reference points in the roadlog or condition rating files.

MAX-NUMBER-I=n If coded, no more than "n" generations of ratings will be printed for a section.

PQI Summarize pavement quality index (instead of CR).
CR   Summarize condition rating (default).

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BY-IRI Sort sections by IRI.
BY-RQI Sort sections by RQI.
LOCAL-SORT= BY-SR Sort sections by SR.
BY-CR Sort sections by CR.
BY-PQI Sort sections by PQI.

When LOCAL-SORT is omitted, the reports shows sections in order by route system, route number, and reference point. Specifying LOCAL-SORT reorders the same data by the rating (increasing values). The value used for sorting is the FIRST generation. If two roadways are present, the lesser value is used. The sort is applied within "individual" summaries only (see chapter 5 for description of "individual summary").

SELECT subcommand

Select criteria can be applied to data elements in the condition rating (CR) record, to the roadlog (RLG) record, to the traffic (ADT) record, to time interval (TIM) record, and to the condition rating segment AFTER computing rating data (CRD).

There are three levels of data selection: selection of years, selection of records and selection of segments.

Year selection is done first, and any years not selected are removed from the record before further processing. After year selection (if requested) is performed, record selection is done (if requested). The remaining years and records are used to form segments, the segment data is computed, and segment selection is then done (if requested).

The user can select TIME as shown below:

May be used to choose only certain hours or dates for computing volume (this only applies to traffic, it has no effect on other data).

- To select on time intervals:

  INCLUDE
  EXCLUDE TIME IF:

- TIM data elements can be referenced.
- Time is the period between the START-DATE and END-DATE. Select only applies within that range.
- For more on traffic volume options, see "Introduction to Volume Models" and "Time Intervals".

The user can select YEARS as shown below:

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE
EXCLUDE CR-YEARS IF:

- CRY data elements can be referenced.
- START-YEAR and END-YEAR are processed BEFORE SELECT.

If no SELECT CR-YEARS statement is coded, all years in the record are considered "selected".

The user can select RECORDS as shown below:

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

```
INCLUDE
EXCLUDE  CR-RECORDS IF:
```

- CRR, CRY, CR1, and RLG data elements can be referenced.
- CRY data elements can only be referenced by the multi-correlation facility (*ANY*/*ALL*).
- CR1 data elements are the same as the most recent CRY.

If no CR-RECORDS statement is coded, all records in the file are considered "selected". SELECT is performed AFTER ROUTES data criteria are applied.

The user can select SEGMENTS as shown below:

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

```
INCLUDE
EXCLUDE  CR-SEGMENTS IF:
```

- CRD, CRC, ADT, and CRG data elements can be referenced.
- CRG data elements can only be referenced by the multi-correlation facility (*ANY*/*ALL*).
- CRC data elements are the same as the most recent CRG.

The condition rating data elements are grouped by 3-character prefix as follows:

CRR	Root data elements of record (non-historical).
CRY	Yearly data elements (up to 25 per record).
CR1	Most recent year of data on record.

CRD Root data elements of segment (non-historical).

CRC Computed data for entire segment (first generation)

CRG Computed data for entire segment (all generations).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample produces output only at the TSO terminal (default). To get the report at both the terminal and a line printer, change the third line to:

```
//TIS EXEC DTRIPM,TIME=10,OUTFILE=PRINTER
```

To get report only at a line printer, change the fourth line to:

```
//TIS EXEC DTRIPM,TIME=10,PRINTDD=PRINTER
```

And change the second line: MSGCLASS=2 to MSGCLASS=A.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIX,TIME=5
//SYSIN DD *
:CONDITION-RATING-REPORT,START-DATE=01/01/1990,END-DATE=12/31/1990,
:  START-YEAR=1988,END-YEAR=1990,MAX-NUMBER-I=3,PQI
+ROUTES
ROUTE-SYS=01-03,CONSTR-DIST=9
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

The CONDITION-RATING-MATRIX Command

Function: Produces general-purpose summaries of condition rating mileage totals.

Description: Summaries can be broken down by one, two, or three data elements from the condition rating, roadlog, or traffic files. The user may choose to summarize surface rating, ride rating, condition rating, or pavement quality index by lane miles or roadway miles.

This command operates on a record to record basis (condition rating records). It does not recognize "D" records like the CONDITION-RATING-REPORT does, so does not use the same segments. A segment for this command is each condition rating record. Each segment is categorized separately. If ADT is requested in +SELECT or +CATEGORIES, the volume is for the span of the segment. Similarly, the ratings used are from the immediate condition rating record. The signifigance of this is that this command uses data on a much finer level than the CONDITION-RATING-REPORT (since condition rating records are <= 1.6 miles apart, segments for the matrix will never be greater than 1.6 miles in length), and so numbers are not smoothed out by averaging. The user must be aware that the two commands will usually give different numbers for the same portions of roadway, and both are "correct".

When summarizing on one data element, the output format is similar to:

CONDITION RATING MILEAGES (LANE)

CRS.SURF-TYPE	0.0 TO 2.0	2.1 TO 3.0	3.1 TO 4.0	ABOVE 4.0	TOTAL	AVG
B - BITUMINOUS	13.784	52.904	323.840	0.360	390.888	3.5
C - JOINTED CONC	158.998	78.928	121.686	0.000	359.612	3.3
O - BITUM. OVER CONC	2.760	89.656	37.786	0.000	130.202	3.5
- GRAND TOTAL -->	175.542	221.488	483.312	0.360	880.702	3.4
-- PERCENTAGE -->	19.9	25.1	54.9	0.0		

When summarizing on two data elements, the output format is similar to:

CRR.ROAD-ID	CRY.YEAR	CONDITION RATING MILEAGES (LANE) 00 TO 2.8	ABOVE 2.8	TOTAL	AVG
UNDIVIDED	1980	1.495	36.875	38.370	3.0
UNDIVIDED	1981	8.278	6.886	15.164	2.7
UNDIVIDED	1982	0.000	101.014	101.014	3.5
UNDIVIDED	1983	120.685	77.173	197.858	2.9
UNDIVIDED	----- SUBTOTAL ------->	130.458	221.948	352.406	3.0
DIVIDED	1980	0.000	7.692	7.692	3.5
DIVIDED	1981	23.288	62.204	85.492	3.3
DIVIDED	1982	2.312	100.750	103.062	3.3
DIVIDED	1983	193.991	138.059	332.050	3.0
DIVIDED	----- SUBTOTAL ------->	219.591	308.705	528.296	3.2
	----- GRAND TOTAL ----->	350.049	530.653	880.702	3.1
	------ PERCENTAGE ----->	39.7	60.3		

When summarizing on three data elements, the output format is identical to that for two data elements except that one summary is printed for each value of the additional data element.

Required Command Parameters:

ROUTES subcommand

- Used to make first specification of what roadways are to be included in the report. The SELECT subcommand can be used to further specify roadway segments.
- Operates under SUM classification (see chapter 5).

CATEGORIES subcommand

- RLG, CRR, CRY, CRS, and ADT data elements can be referenced.
- The REDEFINES and GROUPS options may be used (see chapter 7).
- CRY and CRS data elements will be taken from the most recent year of data for the segment.
- CRS data elements can only be used with LANE MILES.

DIRECTION=	BOTH	Summarize in all roadways.
	INCREASE	Summarize in increasing r.p. roadways only.
	DECREASE	Summarize in decreasing r.p. roadways only.
	UNDIVIDED	Summarize in decreasing r.p. roadways only.

- Note: The same result could be accomplished by using the SELECT subcommand.

RATING=	CR	Summarize CR data (condition rating, =(RQI+SR)/2).
	RQI	Summarize RQI data (ride rating).
	SR	Summarize SR data (surface rating).
	PQI	Summarize PQI data (pavement quality index).

MILEAGE=	ROADWAY	Compute roadway miles.
	LANE	Compute lane miles.

SUMMARIES=(a.a,b.b,c.c) Defines groupings for ratings. a.a, b.b, etc are numbers from 0.0 to 5.0.

AT LEAST ONE AND NO MORE THAN SIX numbers must be specified. If x numbers are specified, there will be x+1 groupings. The first group is "LESS THAN OR EQUAL TO a.a"; the second group is "LESS THAN OR EQUAL TO b.b AND GREATER THAN a.a"; and so on. The last group is "ABOVE c.c".

For example, the first example shown above would have SUMMARIES=(2.0,3.0,4.0).

The second example shown above would have SUMMARIES=(2.8).

To get the same groupings as CONDITION-RATING-REPORT uses, code SUMMARIES=(2.0,2.4,2.8,3.2,3.6,4.0).

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Optional Command Parameters:

START-YEAR=nnnn Years of data before 19nn are not used. This is processed BEFORE SELECT on CR-YEARS.

END-YEAR=nnnn Years of data after 19nn are not used. This is processed BEFORE SELECT on CR-YEARS.

START-DATE=mm/dd/yyyy Specifies starting date for traffic volume calculations.

END-DATE=mm/dd/yyyy Specifies ending date for traffic volume calculations. Average daily volume will be computed for the time between start and end dates. The SELECT subcommand may be used to choose only certain time intervals from the period (INCLUDE TIME IF:).

OPTLIST A one-page option list is printed.
NO-OPTLIST No option list is printed (default).

- The option list is a listing of command parameters used for the report.

NO-MESSAGES Error messages A2-013 - A2-018 are not printed.
MESSAGES Error messages A2-013 - A2-018 are printed (default).

- These error messages are caused by improper reference points in the condition rating file.

SELECT subcommand

Select criteria can be applied to data elements in the roadlog (RLG) record, to the condition rating (CR) record, to time intervals (TIM), and also to the ADT record corresponding to the CR reference point location.

There are two levels of data selection: selection of years and selection of records. Year selection is done first, and any years not selected are removed from the record before further processing. After year selection (if requested) is performed, record selection is done (if requested).

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The user can select TIME as shown below:

May be used to choose only certain hours or dates for computing volume (this only applies to traffic, it has no effect on other data).

- To select on time intervals:

  INCLUDE
  EXCLUDE TIME IF:

- TIM data elements can be referenced.
- Time is the period between the START-DATE and END-DATE. Select only applies within that range.

- For more on traffic volume options, see "Introduction to Volume Models" and "Time Intervals".

The user can select YEARS as shown below:

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

```
       INCLUDE
       EXCLUDE  CR-YEARS IF:
```

- CRY data elements can be referenced.

START-YEAR and END-YEAR exclude years BEFORE SELECT.

If no SELECT CR-YEARS statement is coded, all years in the record are considered "selected".

The user can select RECORDS as shown below:

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

```
       INCLUDE
       EXCLUDE  CR-RECORDS IF:
```

- CRR, CRY, CR1, RLG, and ADT data elements can be referenced.

- CRY data elements can only be referenced by the multi-correlation facility (*ANY*/*ALL*).

- CR1 data elements are the same as the most recent CRY.

If no CR-RECORDS statement is coded, all records in the file are considered "selected". SELECT is performed AFTER ROUTES data criteria are applied.

Any record with no selected years or ignored.

The CR data elements are grouped by 3-character prefix as follows:

CRR Root data elements of record (non-historical).

CRY Yearly data elements (up to 25 per record).

CR1 Most recent year of data on record.

CRS Sample data (2 lanes per year). This is valid
     for CATEGORIES and LANE Miles only.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample produces output only at the TSO terminal (default). To get the report at both the terminal and a line printer, change the third line to:

```
//TIS EXEC DTRIPM,TIME=3,PRINTDD=PRINTER
```

To get report only at a line printer, change the fourth line to:

```
//TIS EXEC DTRIPM,TIME=3,PRINTDD=PRINTER
```

And change the second line: MSGCLASS=2 to MSGCLASS=A.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//            MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIPM,TIME=3
//SYSIN DD *
:CONDITION-RATING-MATRIX,START-DATE=01/01/1988,END-DATE=12/31/1988,
:  END-YEAR=1983,DIRECTION=BOTH,RATING=CR,MILEAGE=ROADWAY,
:  SUMMARIES=(2.1,2.4,2.8,3.2,3.6,4.0)
+ROUTES
ROUTE-SYS=02,CONSTR-DIST=1
+CATEGORIES
DATA-ELEMENT=CR1.SURF-TYPE-RD
DATA-ELEMENT=ADT.RECENT-ADT
GROUPS
000000 TO 000500
000501 TO 000999
001000 TO 999999
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

The TOWNSHIP-ROAD-LISTING Command

Function: Produces a formatted listing of roadlog and logpoint data.

Description: Each individual summary (specifed by the ROUTES subcommand -- see chapter 5) is sorted by 1) county, 2) township, and 3) route system, route number, and reference point of the beginning of each section. Data elements listed from the roadlog/logpoint files include:

- Township road number (route number)
- Primary/secondary code
- Milepoint
- Section (from section/township/range)
- Location (verbal description)
- Surface data
  - Left shoulder width and type
  - Driving surface width and type
  - Right shoulder width and type
  - (if divided road, second road data printed on second line)
- Right of way width
- Date of inventory

Mileage totals are shown for each township, county, and individual summary, by the following breakdown:

```
MILES PRIMARY TOWNSHIP ROAD----   aaa.aaa
MILES SECONDARY TOWNSHIP ROAD--   bbb.bbb
MILES--------------------------   ccc.ccc
```

Note that the sum of primary and secondary may be less than the total miles. "Primary" is defined as RLG.SPECIAL-SYSTEMS = 3, "secondary" is defined as RLG.SPECIAL-SYSTEMS = 4.

The report is designed for use with township roads (RLG.ROUTE-SYSTEM=08) but can be used with any local system (04,07-09,11-23).

Required Command Parameters:

ROUTES subcommand - Operates under LIST classification.

NOTE: Only route systems 04, 07-09, and 11-23
may be referenced.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

--> The option list is a listing of your command parameters.

NO-CODELIST No codelist is printed.
CODELIST One codelist is printed at the start of the report (default).

- The codelist is an explanation of headings and codes used in the report.

SELECT subcommand

Select criteria may refer to elements in the roadlog file.

- To select on roadlog data elements:

INCLUDE
EXCLUDE ROADLOG-RECORDS IF:

- RLG data elements can be referenced.

TITLES subcommand

Print formatting parameters: see chapter 4

Sample Job Setup: The following sample produces output at the TSO terminal and also at the default line printer at ISB.

To change printed output destinations, see chapter 4.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=300K,SCRSIZE=1,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//SYSIN DD *
:TOWNSHIP-ROAD-LISTING
+ROUTES
ROUTE-SYS=08,COUNTY=61
/*
```

The above sample may be copied from DT99A1B.TSOLIB.CNTL(RLGTW).

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

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The LIST-RAIL-FILE Command

Function: Prints a listing of the railway file combined with the railpoint file.

Description: The listing consists of three lines per railway record, showing all of the data elements stored:

Railway:
First line
- Railroad system code
- Railroad line number
- Reference point
- Ownership
- Abandonment status
- Densities - Most recent year
  - Year of density
  - Total density
  - Directional densities
- Division
- Subdivision
- FRA line identification
- Trackage rights
- FRA track class
- Maximum weight on rail

- Maximum height and corresponding width
- Maximum width and corresponding height
- Number of tracks
- Signal type - track 1
- Freight speed - increasing mileposts - track 1
- Freight speed - decreasing mileposts - track 1
- Weight of rail - track 1
- Remark code
- Legislative district
- Congressional district
- City number
- County number
- Functional class code

Second line
- Densities - Second most recent year
  - Year of density
  - Total density
  - Directional densities
- Signal type - track 2
- Freight speed - increasing mileposts - track 2
- Freight speed - decreasing mileposts - track 2
- Weight of rail - track 2

Third line
- Densities - Third most recent year
  - Year of density
  - Total density
  - Directional densities
- Verbal description
- Date of record update

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One line is printed for each railpoint record, showing all data elements stored:

Railpoint:
- Railroad system code
- Railroad line number
- Reference point
- FSAC number
- Crossing number
- Bridge number
- Verbal description
- Date of record update

Required Command Parameters: None.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

NO-CODELIST No codelist is printed.
CODELIST One codelist is printed (default).

- The codelist is a summary of the meanings of the coded data elements in the report.

ROUTES subcommand

- Operates under LIST classification (meaning that summary selection parameters such as ZERO-USER-TOTALS have no effect).
- Allowable parameters: RAIL-SYS, RAIL-LINE, RAIL-SYS-&-LINE, RAIL-START-REF, RAIL-END-REF, CITY, COUNTY, and COUNTY(BY-CITY).
- If no ROUTES subcommand is coded, all records are included, subject to SELECT criteria, if any.

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SELECT subcommand

The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

INCLUDE

EXCLUDE RAILWAY-RECORDS IF:

- RWY data elements can be referenced.

INCLUDE
EXCLUDE RAILPOINT-RECORDS IF:

- RPT data elements can be referenced.

If no SELECT statement is coded, all records in the file are considered "selected". SELECT is performed BEFORE ROUTES data criteria are applied (if ROUTES subcommand is present).

ABANDONED=YES Include railway (and railpoint) records with abandonment status 8. Abandoned sections are otherwise automatically excluded. THIS APPLIES ONLY WHEN +ROUTES IS CODED (without +ROUTES, abandoned sections will be included).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample produces output only at the TSO terminal (default). To get the report at both the terminal and a line printer, change the third line:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,OUTFILE=PRINTER
```

To get report only at a line printer, change the third line:

```
//TIS EXEC DTRIRT,TIME=1,REGION=200K,PRINTDD=PRINTER
```

And change the first line: MSGCLASS=2 to MSGCLASS=A.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-RAILWAY-FILE,CODELIST
+ROUTES
RAIL-SYS=BN
COUNTY=ANOKA,RAIL-SYS=(02-05,11)
CITY=1040-1105,RAIL-SYS=01-16
/*
```

The GRADE-CROSSING-REPORT Command

Function: Prints the grade crossing accident report.

Description: The grade crossing report shows accident history at crossings along railroad lines. The following are sources for data on the report:

- **Railpoint file:** Railroad reference point of the crossing.
- **DPS accident files:** Accident history for a specified time period (usually the last 5 years).
- **Rail grade crossing file:** Roadway reference point, protection devices, trains per day, street name.
- **Traffic file:** ADT for specified time period. If not available, grade crossing record value is used.
- **Roadlog file:** Grade crossing roadway reference point is used to find corresponding roadlog record, which is used to determine city and county names. If none found, grade crossing number is the alternate source for county number.

Within an individual summary, crossings are sorted by railroad system, railroad line, and reference point.

Required Command Parameters:

ROUTES subcommand

- Operates under LIST classification (meaning that summary selection parameters such as ZERO-USER-TOTALS have no effect).
- Allowable parameters: RAIL-SYS, RAIL-LINE, RAIL-SYS-&-LINE, RAIL-START-REF, RAIL-END-REF, CITY, COUNTY, and COUNTY(BY-CITY).

START-DATE=mm/dd/yy Accidents that occurred on or AFTER this date (month/day/year) are included.

END-DATE=mm/dd/yy Accidents that occurred on or BEFORE this
                   date (month/day/year) are included.

          NOTE: ADT is computed from the traffic file as an
                 average value over the time period specified by
                 START-DATE and END-DATE.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST   A one-page option list is printed (default).

- The option list is a listing of command parameters
  used for the report.

NO-CODELIST No codelist is printed.
CODELIST   One codelist is printed (default).

- The codelist is a summary of the meanings of the
  coded data elements in the report.

NO-ACCIDENTS Do not retrieve accident data.
ACCIDENTS   Include accident data (default).

- Computer time can be reduced by specifying
  NO-ACCIDENTS if accident summary is not needed.

NUM-ACCIDENTS=nnn If coded, only crossings with at least "nnn"
                   selected accidents are shown on the report.
                   "nnn" = 1-999.

ACCIDENT-SCAN=nnnn 0001 - 9999 (in feet).

--> This parameter can be used to override the
    distances stored in grade crossing records.
    The scans are added to and subtracted from
    the reference point of the crossing when
    computing reference points to use in
    searching for accidents at the crossing.

ABANDONED=YES Include railway records with abandonment status 8. Abandoned sections are otherwise automatically excluded.

SELECT subcommand

Select criteria may be applied to the railway record, the railpoint record, the rail grade crossing record, or the accident record.

- To select railway records, use the following format:

```
INCLUDE
EXCLUDE  RAILWAY-RECORDS IF:

         - RWY data elements can be referenced.
```

- To select railpoint records, use the following format:

```
INCLUDE
EXCLUDE  RAILPOINT-RECORDS IF:

         - RPT data elements can be referenced.
```

- To select rail grade crossing records, use the following format:

```
INCLUDE
EXCLUDE  CROSSING-RECORDS IF:

         - RGC data elements can be referenced.
```

- To select accident records, use the following format:

INCLUDE
EXCLUDE ACCIDENTS IF:

- ACD, ACV, ACI, and ACJ data elements can be referenced.
- ACV, ACI, and ACJ data elements must be referenced via the multi-correlation facility (*ANY*/*ALL*).
- Only accidents between START-DATE and END-DATE are considered.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

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Sample Job Setup: The following sample produces the grade crossing report. The output is printed at the TSO terminal, and also at the DOT third floor line printer.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT REDUCE
//TIS EXEC DTRIRR,TIME=5,REGION=500K,SCRSIZE=1,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//SYSIN DD *
:GRADE-CROSSING-REPORT,START-DATE=01/01/80,END-DATE=12/31/84,
:             ACCIDENTS,NUM-ACCIDENTS=1
+ROUTES
RAIL-SYS=MILW
+SELECT
   INCLUDE CROSSINGS IF: RGC.HWY-ALIGNMENT *EQ* '2'
   INCLUDE ACCIDENTS IF: ACD.ACC-TYPE *EQ* 4
+TITLES
```

ACCIDENTS AT CROSSING ON CURVE
ACCIDENT TYPE "COLLISION WITH TRAIN"
/*

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

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AUTOMATIC TRAFFIC RECORDER SUBSYSTEM

Introduction

Traffic data is collected at selected locations (stations) on roadways by automatic traffic recorders (ATR). The volume data is kept and processed in a separate file (referred to here as the ATR tape). Information includes station number, date, and counts by each hour of the day. This data is edited and averaged for use in updating maps and the TIS ADT file at station locations as well as all other locations statewide.

The ATR tape is initially created by software outside this subsystem.

Additional software also exists that produces reports from the tape at various stages in its development. The TIS ATR subsystem requires the following data files:

1) ATR data in the format described later. This file may be a tape, generation tape dataset, or any sequential disk file.

2) The ATR disk libraries. These are partitioned datasets that reside on the mainframe computer at ISB. The record format is the same as the tape, with a separate member for each station. Members of the library are named "STxxxx" where "xxxx" is the station number. Records within each member are sorted by date and time (increasing). A member also exists named "MASTER" that includes the station master description data (ATM records).

   There are three separate libraries:

   "Last year" data - contains all ATR data for all of the year prior to the current date. This is intended to be a "production" data library that does not change and is available for TIS users to access (but not modify).

   "Current" data - contains ATR data for one or more months of the current year. It is solely for the use of the Traffic Data Unit personnel responsible for access and development of incoming ATR data. At the end of each year, this data will be transferred into the "last year" library and the cycle restarted.

   "Variable" data - contains ATR data for a "rolling year". Usually a combination of last year and the current year to include the last twelve months. Solely for the use of the Traffic Data Unit.

The "general" user may access any of the functions described in the following pages, but will only be allowed "read-only" access to the "last year" ATR data. Amongst this group there may be multiple simultaneous users.

The Traffic Data Unit personnel will have a choice of working with any of the above libraries, and MUST HAVE EXCLUSIVE ACCESS to the library they choose (to allow updates to the data). This means any access by a user from this group prohibits any use by any other on-line user or batch command until this user has released the library.

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The remainder of this discussion is intended for the "general" user.

The TIS Data Coding Manual contains more complete documentation on all of the functions available to the Traffic Data Unit. Commands available to everyone include:

Program	Description
ATR-MATRIX-SUMMARY (batch command)	Accumulates selected data from the disk library in user-specified groupings, then computes average volumes and adjustment factors. Also can feed results into the IBM graphics libraries for use in drawing graphs with the Interactive Chart Utility.
TISSPF option Z.A (on-line)	Provides on-screen edits of data in the disk library (including station master description data). Also provides on-screen graphics.

Running TISSPF Option Z.A

The following steps are required to access ATR data on-line:

1) Logon to TSO at a video display terminal. The terminal must be capable of supporting ISPF. Any of the 3270 series display stations, or an IBM PC that can access TSO will work. The graphics requires a graphics terminal (also logon with at least SIZE(1500)).

2) After a "READY" prompt, type "TISSPF" (without quotes) and press the ENTER key.

3) The TISSPF primary option menu will be displayed. This is the standard ISPF menu with an additional option "Z". Type "Z" and press the ENTER key.

4) The TIS option menu will be displayed. Type "A" and press the ENTER key. (This step can be combined with step 3 by typing "Z.A" at step A).

5) At this point the menu determines the level of access by TSO user-id:

   a) Traffic Data Unit authorized users will be asked to specify whether they want to work with the ATR data library for last year, variable year or the current year (enter "L","V", or "C").

   b) Other users will default to using the ATR data library for "last year" in a read-only mode.

6) The ATR data option menu will be displayed. Its format is:

```
C  CALCULATE  - COMPUTE AVERAGES AND/OR FACTORS FOR A STATION
E  EDIT       - EDIT ATR DATA FOR A STATION ON SCREEN
G  GRAPH      - GRAPH ATR DATA ON SCREEN
I  IDENTIFY   - IDENTIFY AND LIST STATIONS
L  LOAD       - LOAD DISK ATR LIBRARY FROM TAPE (BATCH JOB)
S  SAVE       - SAVE ATR LIBRARY ON TAPE OR DISK (BATCH JOB)
U  UTILITIES  - UTILITIES (COPY OR DELETE STATIONS)
```

At this point there is a full onscreen tutorial to help guide the user through the dialogue. Press the HELP key (usually PF13) to see how to use the functions.

DATA SECURITY

Anyone can access any of the following panels, in fact they are encouraged to do so. All programs which make changes to the ATR data have built-in checks to make sure that only authorized Traffic Data Unit user-id's will make permanent changes (these checks are made BEFORE the ACF2 security system is involved). "General" users need not worry about making any permanent changes to the data, for example, by experimenting with the "EDIT" option.

The CALCULATE option menu provides the following options:

```
A  AADT         - COMPUTE AADT
D  DAY-OF-WEEK  - COMPUTE DAY-OF-WEEK (PER MONTH) ADTS AND FACTORS
M  MONTHLY      - COMPUTE MONTHLY ADTS
W  WEEKLY       - COMPUTE WEEKLY ADTS AND FACTORS
```

The EDIT panel provides full-screen data editing of data for a particular station.

The GRAPH option menu provides the following options:

```
A  ANNUAL     - DAILY VOLUME BY DATE
```

```
    H  HOURLY     - AVERAGE DAILY VOLUME BY HOUR
    M  MONTHLY    - AVERAGE DAILY VOLUME BY MONTH
    W  DAILY      - AVERAGE DAILY VOLUME BY DAY-OF-WEEK

    Y-AXIS ===>                        START DATE ===>
                                       END DATE   ===>
   (A=ACTUAL, P=PERCENT)
```


The IDENTIFY panel provides full-screen edit capability for the station master description file (library member MASTER).

The LOAD panel is for use by the Traffic Data Unit only.

The SAVE panel is for use by the Traffic Data Unit only.

The UTILITIES option menu provides the following options:

```
    C  COPY         - COPY DATA FROM A STATION TO ANOTHER STATION
    D  DELETE       - DELETE ALL DATA FOR A STATION
```

HELP Instructions on Menus and Panels

All of the above on-screen facilities have associated SPF HELP documentation. Press the HELP PF key whenever further explanation is needed for the displayed function.

ATR Station Master Description File

The new TIS ATR input software needs to have information describing each of the stations available in a computer file. This will enhance the various outputs with details such as a verbal description of the station's location.

The file will contain ONE RECORD PER STATION. Records are matched with stations by the first 3 characters of the station number (e.g., stations

025N and 025S contain directional data, but only one master record is allowed for station 025). See Appendix E of this manual for further explanation of the ATM record.

The ATR-MATRIX-SUMMARY Command
****

Function: Computes averages and factors for ATR data.

Description: Summarizes ATR volume data by user-specified groupings.
---- Data is combined to produce averages which may be listed and/or fed into the IBM graphics utility for producing graphs. Data grouping may be done by choosing data elements from the ATR record, ATM (station master description file) record, or the RLG (roadlog) record.

When summarizing on one data element, the output format is similar to:

ATR.STATION		VOLUME	DAYS
0010 - n of csah 15 in aitkin	(AADT= 1552)	1,552	261
0020 - TH 76 N. OF IOWA BORDER	(AADT= 1208)	1,208	294
0030 - TH 44 E. OF JCT. TH 52	(AADT= 2304)	2,304	174
0040 - TH 52 S. OF JCT. TH 44	(AADT= 3565)	3,565	123
0060 - TH 139 S. OF JCT. TH 44	(AADT= 504)	504	91
0070 - TH 44 W. OF JCT. TH 139	(AADT= 977)	977	260
0080 - TH 63 S. OF JCT. TH 56	(AADT= 494)	494	190
0090 - TH 56 W. OF JCT. TH 63	(AADT= 826)	826	244

```
 0100 - TH 63 N. OF JCT. TH 56          (AADT=  1339)    1,339     193

      ----- OVERALL AVERAGE --->        (AADT=  1419)    1,341     203
```

When summarizing on two data elements, the output format is similar to:

```
 ATR.MONTH              ATR.DAY-OF-WEEK              VOLUME  DAYS

 01 - JANUARY           1 - SUNDAY                     580    33
 01 - JANUARY           2 - MONDAY                   1,003    32
 01 - JANUARY           3 - TUESDAY                  1,110    31
 01 - JANUARY           4 - WEDNESDAY                1,075    26
 01 - JANUARY           5 - THURSDAY                 1,107    26
 01 - JANUARY           6 - FRIDAY                   1,192    26
 01 - JANUARY           7 - SATURDAY                   957    27
 01 - JANUARY           ----- AVERAGE --->             991    29

 02 - FEBRUARY          1 - SUNDAY                     579    31
 02 - FEBRUARY          2 - MONDAY                   1,037    31
 02 - FEBRUARY          3 - TUESDAY                  1,132    31
 02 - FEBRUARY          4 - WEDNESDAY                1,130    37
 02 - FEBRUARY          5 - THURSDAY                 1,155    30
 02 - FEBRUARY          6 - FRIDAY                   1,250    31
 02 - FEBRUARY          7 - SATURDAY                   985    31
 02 - FEBRUARY          ----- AVERAGE --->           1,040    32

              ----- OVERALL AVERAGE --->            1,017    30
```

When summarizing on three data elements, the output format is identical to that for two data elements, except that one summary is printed for each value of the additional data element.

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Selecting Data for Summary

The SELECT subcommand can be applied to each ATR record. ATR selection allows including or excluding data for certain stations or specific dates.

SELECT can also be used with the ATM (station master description) record that corresponds to the station. The ATM record identifies the volume group, route system, route number, and reference point, and verbal description of the station.

Since the ATM record contains the reference point location of the station, it is also possible to SELECT stations based on roadlog data (such as number of lanes, population, or functional class).

Grouping Data for Summary

The CATEGORIES subcommand is used to define groupings for computations. Its operation is similar to other matrix summaries: 1 to 3 data elements can be specified for use as a sort field in summarizing and averaging volumes. The last data element always varies most rapidly. The first data element varies the slowest. Data elements may be chosen from the ATR, ATM, or RLG record.

Types of Computations

Average volume for each category is always computed. Whenever ATR.STATION is specified as a category, the AADT for the station is computed. This allows factors to be computed (AADT divided by average volume), if requested. The following numbers are computed:

VOLUME	The average selected daily volume in the indicated category. When FACTOR or 48-HOUR option is used, VOLUME for each day is computed as the PM data for the day and the AM data of the NEXT day.
DAYS	The number of selected days of data in the category. VOLUME is actually the TOTAL selected volumes divided by DAYS.
FACTOR	(Optional) The AADT for the station divided by VOLUME.

48-HOUR	(Optional) Average of 2 FACTORS when the last category is ATR.DAY-OF-WEEK, computed as follows:

Printed next to Tuesday is:	FACTOR(Monday) + FACTOR(Tuesday)

```
                                        ---------------------
                                          divided by 2

                  Printed next to Wednesday is:   FACTOR(Tuesday)
                                                + FACTOR(Wednesday)
                                                ---------------------
                                                  divided by 2

                  Printed next to Thursday is:  FACTOR(Wednesday)
                                              + FACTOR(Thursday)
                                              ---------------------
                                                divided by 2
```

Types of Output

Results may be listed (in matrix-summary format shown previously), or fed into the IBM graphics package libraries, or both. By feeding the data into the ADMCDATA graphics library, the user can later log on to TSO and combine the data with graph forms to produce graphs with the Interactive Chart Utility.

The CATEGORIES subcommand specifies how the data will be graphed:

1) The last data element always determines the X-axis (independent variable) of the graphics data.

2) If multiple data elements are used, the first one will separate graphs, i.e., a separate graph is produced for each value of the first data element.

3) The second data element (when three data elements are used), causes multiple groups of data per graph, i.e., a separate line for each value.

Required Command Parameters:

CATEGORIES subcommand

- Defines data groups.
- ATR, ATM, and RLG data elements can be referenced.
- The REDEFINES and GROUPS control cards can be used for grouping various codes together.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

--> The option list is a listing of your command parameters.

DAY-ADT Compute ADT for each day selected.
AADT-SEL AADT computed from SELECTED volumes only.
AADT-ALL AADT computed from ALL volumes present for year (default).

AVG-&-FACTOR Compute average volumes and factors.
AVG-&-FACTOR48 Compute average volumes, factors, and 48-hour factors.
AVG-ONLY Compute average volumes only (default).

- NOTE: FACTOR requires the CATEGORIES subcommand to include ATR.STATION as a data element name. The AADT used to compute factors is that of the station. It also requires the "PERCENT-VOLUME" option.

LIST-&-GRAPH List results and save in graphics data library.
GRAPH Save results in graphics data library.
LIST List results (default).

PERCENT-VOLUME Graphics volumes stored as percent of AADT.
ACTUAL-VOLUME Graphics volumes are actual numbers (default).

- NOTE: PERCENT-VOLUME requires the CATEGORIES subcommand to include ATR.STATION as a data element name. The AADT used to compute percentage is that of the station.

ADMC-MEMBER=member "member" is the member name in the IBM user graphics libraries ("user-id.ADMCDATA.DATA") to receive data computed by this command.

- MUST be coded if "GRAPH" or LIST-&-GRAPH" is specified.

- The first character must be A-Z. Maximum length is 6 characters.

- If only one data element is specified under the CATEGORIES subcommand, one member will be added to the graphics data library with name "member".

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- If multiple data elements are specified under the CATEGORIES subcommand, one member will be added to the graphics data library for each value of the FIRST data element. Member names will be formed using "member" as a prefix and appending the value of the data element to form a unique name. For example, if the first data element is ATR.MONTH, and ADMC-MEMBER=MONTHS, then graphics member names will be "MONTHS01" (January data), "MONTHS02" (February data), etc.

MATRIX-SORT=
UP Sort lowest to highest.
DOWN Sort highest to lowest.

Matrix summaries normally use the "category" as a sort field before printing the summary. If MATRIX-SORT is included, the volume is used to order the report.

SELECT subcommand

Select criteria may refer to elements in the ATR record, the ATM record, or the roadlog record with reference point corrseponding to that for the station in the ATM record.

- The INCLUDE/EXCLUDE clause is required and has the following format:

  INCLUDE ATR-RECORDS IF:
  EXCLUDE

  - ATR, ATM, and RLG data elements can be referenced.

TITLES subcommand

Print formatting parameters: see chapter 4 of the TIS User's Manual.

Sample Job Setups: The following samples produce output at the TSO terminal and also at the default line printer at ISB. To change printed output destinations, see chapter 4 of the TIS User's Manual.

ATR-MATRIX-SUMMARY jobs work on the data in the ATR disk library. The library must be identified by DD statements "ATRLIB" and "ATRLIBD" as shown in the following examples.

Job class and region depend on whether or not the GRAPH option is used. If GRAPH, then use CLASS=H and REGION=1000K. Otherwise, use CLASS=C and REGION=500K.

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Sample #1 - Calculate AADT

The following job setup shows how to compute AADT for all stations.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=25
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=600K,SCRSIZE=3,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//ATRLIB   DD DISP=SHR,DSN=TRN.RI44ATRL
//ATRLIBD  DD DISP=SHR,DSN=TRN.RI44ATRL
//SYSIN DD *
:ATR-MATRIX-SUMMARY,LIST
+CATEGORIES
DATA-ELEMENT=ATR.STATION
+TITLES
*** USING LAST YEAR DATA LIBRARY ***
/*
```

The above sample may be copied from DT99A1B.TSOLIB.CNTL(ATRMX1).

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Sample #2 - Calculate Weekly ADT and Factors

The following job setup shows how to compute weekly ADT and weekly factors for all stations. CATEGORIES says to group data by week for each station. SELECT says to include only Monday through Friday. Adjustment factors are also requested.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=25
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=500K,SCRSIZE=3,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//ATRLIB   DD DISP=SHR,DSN=TRN.RI44ATRL
//ATRLIBD  DD DISP=SHR,DSN=TRN.RI44ATRL
//SYSIN DD *
:ATR-MATRIX-SUMMARY,LIST,AVG-&-FACTOR,PERCENT-VOLUME,SELECT-SIZE=2
+CATEGORIES
DATA-ELEMENT=ATR.STATION
```

```
DATA-ELEMENT=ATR.WEEK
+SELECT
 INCLUDE ATR-RECORDS IF:
  (ATR.STATION *EQ* '0010' *OR*
   ATR.STATION *EQ* '0020' *OR*
   ATR.STATION *EQ* '0030' *OR*
   ATR.STATION *EQ* '0040' *OR*
   ATR.STATION *EQ* '0500' *OR*
   ATR.STATION *EQ* '0510' *OR*
   ATR.STATION *EQ* '0540' *OR*
   ATR.STATION *EQ* '102N' *OR*
   ATR.STATION *EQ* '304N' *OR*
   ATR.STATION *EQ* '305N' *OR*
   ATR.STATION *EQ* '306E' *OR*
   ATR.STATION *EQ* '315N' *OR*
   ATR.STATION *EQ* '357W' *OR*
   ATR.STATION *EQ* '402N' *OR*
   ATR.STATION *EQ* '4070' *OR*
   ATR.STATION *EQ* '4510')
   *AND* (ATR.DAY-OF-WEEK *GT* '2' *AND* ATR.DAY-OF-WEEK *LT* '6' *OR*
   (ATR.DAY-OF-WEEK *EQ* '2' *AND* ATR.AMPM *EQ* '2' *OR*
    ATR.DAY-OF-WEEK *EQ* '6' *AND* ATR.AMPM *EQ* '1'))
   *AND* ATR.DATE *NE* '070485' *AND* (ATR.DATE *NE* '070385' *OR*
   (ATR.DATE *EQ* '070385' *AND* ATR.AMPM *EQ* '1'))
   *AND* ATR.DATE *NE* '052685' *AND* (ATR.DATE *NE* '052785' *OR*
   (ATR.DATE *EQ* '052785' *AND* ATR.AMPM *EQ* '2'))
   *AND* ATR.DATE *NE* '090185' *AND* (ATR.DATE *NE* '090285' *OR*
   (ATR.DATE *EQ* '090285' *AND* ATR.AMPM *EQ* '2'))
+TITLES
*** USING LAST YEAR ATR DATA LIBRARY ***
CERTAIN HOLIDAYS EXCLUDED
/*
```

The above sample may be copied from DT99A1B.TSOLIB.CNTL(ATRMX2).

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Sample #3 - Calculate ADT by Day of Week and Month with 48-Hour Factors

---

The following job setup shows how to compute average volume by day of week by month for all stations. CATEGORIES says to group data by day of week (Monday - Friday) and by month for each station. SELECT says to include only Monday through Friday. 48-hour adjustment factors will also be computed. The data is listed, but not graphed.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=25
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=500K,SCRSIZE=3,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//ATRLIB   DD DISP=SHR,DSN=TRN.RI44ATRL
//ATRLIBD  DD DISP=SHR,DSN=TRN.RI44ATRL
//SYSIN DD *
:ATR-MATRIX-SUMMARY,LIST,AVG-&-FACTOR48,PERCENT-VOLUME,SELECT-SIZE=2
+CATEGORIES
DATA-ELEMENT=ATR.STATION
DATA-ELEMENT=ATR.MONTH
DATA-ELEMENT=ATR.DAY-OF-WEEK
+SELECT
 INCLUDE ATR-RECORDS IF:
  (ATR.STATION *EQ* '0010' *OR*
   ATR.STATION *EQ* '0020' *OR*
   ATR.STATION *EQ* '0030' *OR*
   ATR.STATION *EQ* '0040' *OR*
   ATR.STATION *EQ* '0500' *OR*
   ATR.STATION *EQ* '0510' *OR*
   ATR.STATION *EQ* '0540' *OR*
   ATR.STATION *EQ* '102N' *OR*
   ATR.STATION *EQ* '304N' *OR*
   ATR.STATION *EQ* '305N' *OR*
   ATR.STATION *EQ* '306E' *OR*
   ATR.STATION *EQ* '315N' *OR*
   ATR.STATION *EQ* '357W' *OR*
   ATR.STATION *EQ* '402N' *OR*
   ATR.STATION *EQ* '4070' *OR*
   ATR.STATION *EQ* '4510')
   *AND* (ATR.DAY-OF-WEEK *GT* '2' *AND* ATR.DAY-OF-WEEK *LT* '6' *OR*
   (ATR.DAY-OF-WEEK *EQ* '2' *AND* ATR.AMPM *EQ* '2' *OR*
    ATR.DAY-OF-WEEK *EQ* '6' *AND* ATR.AMPM *EQ* '1'))
   *AND* ATR.DATE *NE* '070485' *AND* (ATR.DATE *NE* '070385' *OR*
   (ATR.DATE *EQ* '070385' *AND* ATR.AMPM *EQ* '1'))
   *AND* ATR.DATE *NE* '052685' *AND* (ATR.DATE *NE* '052785' *OR*
   (ATR.DATE *EQ* '052785' *AND* ATR.AMPM *EQ* '2'))
   *AND* ATR.DATE *NE* '090185' *AND* (ATR.DATE *NE* '090285' *OR*
   (ATR.DATE *EQ* '090285' *AND* ATR.AMPM *EQ* '2'))
+TITLES
*** USING LAST YEAR ATR DATA LIBRARY ***
CERTAIN HOLIDAYS EXCLUDED
/*
```

The above sample may be copied from DT99A1B.TSOLIB.CNTL(ATRMX3).

The remaining sample setups show how to feed data into the IBM graphics data libraries. Two additional DD statements have been added, "ADMCDATA" and "ADMCFORM". These identify the user's graphics libraries and must be in existence. Once the command has completed, the user can logon TSO and use the data to produce graphs with the Interactive Chart Utility.

Sample #4 - Calculate Monthly ADT and Feed Data to Graphics Utility

The following job setup shows how to compute monthly ADT for each station. CATEGORIES says to group data by station and by month. One graphics library member will be created for each station, with membername "PMONxxxx" where "xxxx" is the station number. The data is not listed. This data is in the format required to produce the "monthly variations in travel" graph as used in the ATR Data Summary.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=25
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=1200K,SCRSIZE=3,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//ATRLIB   DD DISP=SHR,DSN=TRN.RI44ATRL
//ATRLIBD  DD DISP=SHR,DSN=TRN.RI44ATRL
//ADMCDATA DD DISP=OLD,DSN=USER-ID.ADMCDATA.DATA
//ADMCFORM DD DISP=OLD,DSN=USER-ID.ADMCFORM.DATA
//SYSIN DD *
:ATR-MATRIX-SUMMARY,GRAPH,PERCENT-VOLUME,ADMC-MEMBER=PMON
+CATEGORIES
DATA-ELEMENT=ATR.STATION
DATA-ELEMENT=ATR.MONTH
+TITLES
*** USING ATR DATA LIBRARY FOR LAST YEAR ***
/*
```

The above sample may be copied from DT99A1B.TSOLIB.CNTL(ATRMX4).

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Sample #5 - Calculate Daily ADT and Feed Data to Graphics Utility

The following job setup shows how to compute average weekday traffic by station. CATEGORIES says to group data by station and by day of week. Note that days of the week are redefined from the ATR codes into codes used in the graphics package ("1" = Monday), so that a graph can easily be produced with X-axis labels MON, TUE, WED, etc. BE AWARE that if the results of this setup were listed, the days of the week would be WRONG (since REDEFINES shifted all values by one day). One graphics library member will be created for each station, with membername "PDOWxxxx" where "xxxx" is the station number. The data is not listed. This data is in the format required to produce the "daily volume variation pattern" graph as used in the ATR Data Summary.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=25
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=1200K,SCRSIZE=3,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//ATRLIB   DD DISP=SHR,DSN=TRN.RI44ATRC
//ATRLIBD  DD DISP=SHR,DSN=TRN.RI44ATRC
//ADMCDATA DD DISP=OLD,DSN=USER-ID.ADMCDATA.DATA
//ADMCFORM DD DISP=OLD,DSN=USER-ID.ADMCFORM.DATA
//SYSIN DD *
:ATR-MATRIX-SUMMARY,GRAPH,PERCENT-VOLUME,ADMC-MEMBER=PDOW
+CATEGORIES
DATA-ELEMENT=ATR.STATION
DATA-ELEMENT=ATR.DAY-OF-WEEK
REDEFINES
1 7
2 1
3 2
4 3
5 4
```

```
6 5
7 6
+TITLES
*** USING ATR DATA LIBRARY FOR LAST YEAR ***
/*
```

The above sample may be copied from DT99A1B.TSOLIB.CNTL(ATRMX5).


```
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```


Sample #6 - Calculate Hourly Volume and Feed Data to Graphics Utility

---

The following job setup shows how to compute average hourly traffic by station. CATEGORIES says to group data by station and by hour. One graphics library member will be created for each station, with membername "PHRxxxx" where "xxxx" is the station number. The data is not listed. This data is in the format required to produce the "hourly volume variation pattern" graph as used in the ATR Data Summary.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=25
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=50,REGION=1200K,SCRSIZE=3,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//ATRLIB   DD DISP=SHR,DSN=TRN.RI44ATRL
//ATRLIBD  DD DISP=SHR,DSN=TRN.RI44ATRL
//ADMCDATA DD DISP=OLD,DSN=USER-ID.ADMCDATA.DATA
//ADMCFORM DD DISP=OLD,DSN=USER-ID.ADMCFORM.DATA
//SYSIN DD *
:ATR-MATRIX-SUMMARY,GRAPH,PERCENT-VOLUME,ADMC-MEMBER=PHR
+CATEGORIES
DATA-ELEMENT=ATR.STATION
DATA-ELEMENT=ATR.HOUR
+TITLES
```

```
        *** USING ATR DATA LIBRARY FOR LAST YEAR ***
        /*
```

The above sample may be copied from DT99A1B.TSOLIB.CNTL(ATRMX6).


```
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```


Sample #7 - Calculate Group Averages and Feed Data to Graphics Utility

The following job setup shows how to generate a graph of all stations in each group by month. This might be useful in checking to see if stations are grouped correctly (could alos be done by day-of-week or hour). CATEGORIES says to group data by group, then station, then month. One graphics library member will be created for each group, with membername "GROUPxx" where "xx" is the group number. Each station in the group is a different line in the graph. The data is not listed.

```
        //JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
        //             MSGCLASS=2,MSGLEVEL=(2,0)
        /*JOBPARM ROOM=R820,LINES=25
        /*ROUTE  PRINT R0
        //TIS EXEC DTRIT,TIME=30,REGION=1200K,SCRSIZE=3,FORM='(A)',
        //    PRINTDD=TSO,OUTFILE=PRINTER
        //ATRLIB   DD DISP=SHR,DSN=TRN.RI44ATRL
```

```
//ATRLIBD  DD DISP=SHR,DSN=TRN.RI44ATRL
//ADMCDATA DD DISP=OLD,DSN=USER-ID.ADMCDATA.DATA
//ADMCFORM DD DISP=OLD,DSN=USER-ID.ADMCFORM.DATA
//SYSIN DD *
:ATR-MATRIX-SUMMARY,GRAPH,PERCENT-VOLUME,ADMC-MEMBER=GROUP
+CATEGORIES
DATA-ELEMENT=ATM.GROUP
DATA-ELEMENT=ATR.STATION
DATA-ELEMENT=ATR.MONTH
+TITLES
*** USING ATR DATA LIBRARY FOR LAST YEAR ***
/*
```

The above sample may be copied from DT99A1B.TSOLIB.CNTL(ATRMX7).

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

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The WHATS-THE-USE? Command

Function: Lists data from the usage tracking file.

Description: Each time a TIS command is run, a record is added to the usage tracking file. This record contains information about the job and command. Records are added to the file

in chronological order.

The usage tracking file has been active since January, 1985. The file is periodically archived, so it usually contains records only for the current month and the previous three months. The archived records are available on tape. Contact TIS programmers for assistance in getting to the complete set of records.

The fields of the usage record that would be of interest to most TIS users are:

- Job name
- Date
- Times (started and ended)
- Command
- Cost

Costs are not immediately available in the tracking record. They must be estimated from the IMB accounting system tape. The soonest they can be obtained is the next day. Currently the costs are computed on a weekly basis (i.e., costs for last week should be available). Costs are $0.00 until computed.

See USG data elements in appendix E for more detailed descriptions.

Required Command Parameters: None

Optional Command Parameters:

SELECT subcommand

Select criteria may be applied to the usage (USG) record, or to the DTU record that matches the user id of the usage record (see appendix E for description of the DTU record). Only selected records will be listed.

- To select usage records, use the following format:

INCLUDE
EXCLUDE USAGE-RECORDS IF:

- USG and DTU data elements can be referenced.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup:

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=20
//TIS EXEC DTRIMIN
//SYSIN DD *
:WHATS-THE-USE?
+SELECT
 INCLUDE USAGE-RECORDS IF:
  USG.DATE *GE* 1996300
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

The USAGE-MATRIX-SUMMARY Command

Function: Produces general-purpose summaries of TIS usage.

Description: Summaries can be broken down by one, two, or three data elements from the usage tracking file or the userdata file. There is one record in the usage file for each TIS command that has been run. The summary counts records (i.e., number of commands run) and costs.

The usage tracking file has been active since January, 1985. The file is periodically archived, so it usually contains records only for the current month and the previous three months. The archived records are available on tape. Contact TIS programmers for assistance in getting to the complete set of records.

Costs are not immediately available in the tracking record. They must be estimated from the IMB accounting system tape. The soonest they can be obtained is the next day. Currently the costs are computed on a weekly basis (i.e., costs for last week should be available). Costs are $0.00 until computed.

See USG data elements in appendix E for more detailed descriptions.

Required Command Parameters:

CATEGORIES subcommand

- USG and DTU data elements can be referenced.
- The REDEFINES and GROUPS options may be used (see chapter 7).

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

SELECT subcommand

Select criteria may be applied to the usage tracking (USG) record, or to the userdata (DTU) record for the user-id (from the usage record). Only selected records will be summarized.

- To select usage records, use the following format:

```
       INCLUDE
       EXCLUDE  USAGE-RECORDS IF:

                - USG and DTU data elements can be
                  referenced.
```

```
              DOWN        Sort by count, highest to lowest.
MATRIX-SORT= CATEGORY     Sort by category.
              UP          Sort by count, lowest to highest
```

- Specifies the sort order of categories ("count" is the number of records in the category).

- Default is to sort by the category.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following counts number of commands (highest to lowest) by command name. Note the category is columns 2-19, since 1) maximum category length is 18

characters, and 2) the first 18 characters of command name is not
unique within TIS (LIST-ACCIDENTS-BY-REF-POINT and
LIST-ACCIDENTS-BY-ACC-NUM would be lumped together).

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=20
//TIS EXEC DTRIMIN,TIME=1,REGION=400K
//SYSIN DD *
:USAGE-MATRIX-SUMMARY,MATRIX-SORT=DOWN
+CATEGORIES
DATA-ELEMENT=USG.COMMAND/2-19/
/*
```


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TRUNK HIGHWAY SUFFICIENCY RATING SUBSYSTEM

Introduction

The trunk highway sufficiency rating subsystem is composed of two files:
the sufficiency rating (SUF) file and the sufficiency hazards (SUH)
file. SUF records describe sections of trunk highway.

Sufficiency Rating Record

Location data elements

Route system
Route number
Begin reference point
 (the above data elements form the record key)
End reference point
Length of section

Jurisdictional data elements

County

Control section
District
Maintenance area
Regional development commission
Control of access
Functional classification
Federal aid system
Municipal/non-municipal lengths (up to 3):
   Length
   Urban classification
   Census number

Descriptive data elements

Termini
Special messages (up to 3)

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Roadway design data elements

Existing
   Design
   Number of lanes
   Divided or one-way
   Terrain
   Spring load limit
   Summer load limit
   Service level
Proposed
   Design
   Number of lanes
   Divided or one-way
   Terrain
   Spring load limit

Summer load limit
Service level

Physical data elements

Road-1 (or undivided roadway)	Road-2 (divided roadways only)
Direction	Direction
Surface type	Surface type
Surface width	Surface width
Surface year	Surface year
Left shoulder	Left shoulder
Type	Type
Width	Width
Right shoulder	Right shoulder
Type	Type
Width	Width
Grade year	Grade year

Traffic data elements

Present ADT
Year of present ADT
Projected ADT
Year of projected ADT
Percent heavy commercial (of present ADT)
Percent 30th peak hour
Volume to capacity ratio

Hazards data elements

Number of deficient intersections
Number of deficient rail grade crossings
Number of deficient bridges
Number of deficient curves
Number of stopping sight distance restrictions
No passing length

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Condition rating data elements

Road-1 (or undivided roadway)	Road-2 (divided roadways only)
Most recent	Most recent
Present servicability rating	Present servicability rating

Surface rating
Pavement quality index
Year of condition rating
Second most recent
Present servicability rating
Surface rating
Pavement quality index
Year of condition rating
Third most recent
Present servicability rating
Surface rating
Pavement quality index
Year of condition rating

Surface rating
Pavement quality index
Year of condition rating
Second most recent
Present servicability rating
Surface rating
Pavement quality index
Year of condition rating
Third most recent
Present servicability rating
Surface rating
Pavement quality index
Year of condition rating

Sufficiency rating data elements

Spring load points
Surface width points
Hazards points
Stopping sight distance restrictions points
Control of access points
Passing opportunity points
Volume/capacity ratio points

Road-1 (or undivided roadway)
- Structure points
- Shoulder points
- Ride quality points
- Basic rating points
- Adjusted rating points

Road-2 (divided roadways only)
- Structure points
- Shoulder points
- Ride quality points
- Basic rating points
- Adjusted rating points

For a more detailed explanation of data elements, see Appendix E, SUF data elements.

Sufficiency Hazards Record

Each Sufficiency Hazards (SUH) record identifies the location of one of four types of hazards along trunk highways. The hazard type is part of the record key, so it is possible to have more than one hazard at the same reference point. The hazards record contains the following data elements:

Route system
Route number
Begin reference point
Hazard type
(the above data elements form the record key)
End reference point
Length

For a more detailed explanation of data elements, see Appendix E, SUH data elements.

Sufficiency Data Access and Reporting

The "general" TIS user may access any of the functions described on the following pages. Security is built in to prevent making any changes to the data files. Users may be accessing the data at the same time data maintenance users are making updates to the files, without any contention problems.

The remainder of this section is intended for all TIS users. The TIS Data Coding Manual contains more complete documentation on all of the functions available to data maintenance users.

Functions available include:

Function	Description
TISSPF option Z.S	Provides on-line data access through a TSO terminal. Options include data inquiry, printed hardcopy, and export of data from the sufficiency files.
LIST-SUFFICIENCY-FILE	Prints a listing of sufficiency rating data in one of several formats. Data may be selected based on SUF data element values or roadlog (RLG) data

	element values. Hazards may also be listed.
SUFFICIENCY-MATRIX-SUMMARY	Accumulates selected data in user-specified groupings. Groups show mileage totals broken down by sufficiency rating. Data may be selected based on SUF data element values or roadlog (RLG) data element values.

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Running TISSPF Option Z.S

The following steps are required to access sufficiency data on-line:

1) Logon to TSO at a video display terminal. The terminal must be capable of supporting ISPF. Any of the 3270 series display stations, or an IBM PC that can access TSO will work.

2) After a "READY" prompt, type "TISSPF" (without quotes) and press the ENTER key.

3) The TISSPF primary option menu will be displayed. This is the standard ISPF menu with an additional option "Z". Type "Z" and press the ENTER key.

4) The TIS option menu will be displayed. Type "S" and press the ENTER key. (This step can be combined with step 3 by typing "Z.S" at step 3).

5) The sufficiency data option menu will be displayed. Its format is:

```
E  EXPORT     - EXPORT DATA FROM VSAM TO SEQUENTIAL FILE
I  IMPORT     - IMPORT DATA FROM SEQUENTIAL FILE TO VSAM
L  LIST DATA  - LIST DATA
U  UPDATE     - UPDATE OR BROWSE
```

At this point there is a full onscreen tutorial to help guide the user through the dialogue. Press the HELP key (usually PF13) to see how to use the functions.

Sufficiency Export/Import

The EXPORT and IMPORT options provide a "back door" into the sufficiency file. Records can be copied out of the file (exported), and processed

by non-TIS programs, then copied back into the file (imported), subject to all edits checks.

An example would be: to recompute all city fields (length, city number, and urban classification) from the roadlog file for USTH 169.

1) Export USTH 169 sufficiency records.
2) Use File-Aid edit to change the first character of each record in the export file to 'R' (for revise).
3) Import the file. All USTH 169 records are revised in the file. Segment length and city fields are always recomputed for revised records.

Note that step 2 could also be done by downloading the export file to a personal computer, using SPFPC EDIT, and uploading back into the export file.

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The LIST-SUFFICIENCY-FILE Command

Function: Lists data from the trunk highway sufficiency rating file and also the sufficiency hazards file.

Description: Records in the sufficiency rating (SUF) file describe segments of trunk highways. The sufficiency record differs from most TIS segment records in that it contains both the starting and ending reference points of the section. Records are stored in order by key: route system, route number, and start reference point.

This command can be run with or without the +ROUTES subcommand. The +ROUTES subcommand selects segments by location (e.g., route number, district, county) and groups segments into "summaries" (see the +ROUTES subcommand in chapter 5). The +SELECT subcommand operates AFTER the +ROUTES processing. If +ROUTES is omitted, +SELECT is the only criteria for choosing segments.

There are four list formats available: 1) "page" format, showing all data in the segment (one full page per record), , 2) "condensed" format, showing physical and traffic data (2-3 lines per segment), 3) "needs" format, showing physical and condition rating data (2-3 lines per segment), and 4) "segment" format, with most data from the record in a

formatted listing (one page per section).

If hazards records are listed, they will follow the segment to which they apply.

Required Command Parameters:

```
                    PAGE
      LIST-FORMAT= CONDENSED
                    NEEDS
                    SEGMENT
```

- Specifies which format is to be used.

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Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

NO-CODELIST	- Do not print any codelists.
CODELIST	- Print a codelist with each individual summary (default).

- The codelist is a several-page description of the meanings of the codes printed in the report.

HAZARDS - Include hazards records with the segments.

NO-HAZARDS - Do not include hazards records (default).

ROUTES subcommand

- Operates under "LIST" classification (see chapter 5 for a description of the ROUTES subcommand).

- Without +ROUTES, all data in the file is considered "selected", subject to SELECT subcommand below.

SELECT subcommand

Select criteria may be applied to the sufficiency (SUF) record, or to the roadlog record that begins at or prior to the start reference point of the SUF record. Only selected records will be listed.

- To select sufficiency records, use the following format:

INCLUDE
EXCLUDE SUFFICIENCY-RECORDS IF:

- SUF and RLG data elements can be referenced.

Select criteria may also be applied to sufficiency hazards records.

- To select hazards, use the following format:

INCLUDE
EXCLUDE SUFFICIENCY-HAZARDS IF:

- SUH data elements can be referenced.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample lists sufficiency data for interstate highways in segment format. Printed output goes to the terminal only.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=75
//TIS EXEC DTRIPM,TIME=1,REGION=400K,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-SUFFICIENCY-FILE,OPTLIST,NO-CODELIST,LIST-FORMAT=SEGMENT
+ROUTES
ROUTE-SYS=ISTH
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

****

Function: Produces general-purpose summaries of adjusted sufficiency rating mileage totals.

Description: Summaries can be broken down by one, two, or three data elements from the sufficiency rating or roadlog files. The average rating is computed for each "category". The ratings may be split into ranges, and a column for each range shows mileages. Percentages are also computed for the columns.

When summarizing by one data element, the output format is similar to:

	ADJUSTED RATING MILEAGES (ROADWAY)			
SUF.EXIST-SVC-LVL	BELOW 060	ABOVE 060	TOTAL	AVG
1 - FREEWAY	32.960	1,867.588	1,900.548	82
2 - EXPRESSWAY	25.699	1,810.739	1,836.438	80
4 - TRUNK HIGHWAY	1,467.311	8,933.893	10,401.204	73
----- GRAND TOTAL ----->	1,525.970	12,612.220	14,138.190	75
------ PERCENTAGE ----->	10.8	89.2		

When summarizing by two data elements, the output format is similar to:

		ADJUSTED RATING MILEAGES (ROADWAY)			
SUF.DESIGN	SUF.TERRAIN	BELOW 060	ABOVE 060	TOTAL	AVG
1 - RURAL	1 - FLAT	175.406	4,371.501	4,546.907	79
1 - RURAL	2 - ROLLING	1,093.309	7,254.118	8,347.427	74
1 - RURAL	3 - RUGGED	127.285	560.253	687.538	70
1 - RURAL	--- SUBTOTAL --->	1,396.000	12,185.872	13,581.872	75
2 - URBAN	1 - FLAT	70.323	219.868	290.191	67
2 - URBAN	2 - ROLLING	55.618	189.685	245.303	67
2 - URBAN	3 - RUGGED	4.029	16.795	20.824	66
2 - URBAN	--- SUBTOTAL --->	129.970	426.348	556.318	67
	GRAND TOTAL --->	1,525.970	12,612.220	14,138.190	75
	PERCENTAGE --->	10.8	89.2		

When summarizing by three data elements, the output format is identical to that for two data elements except that one summary is printed for each value of the additional data element.

Required Command Parameters:

ROUTES subcommand

- Used to make first specification of what roadways are to be included in the report. The SELECT subcommand can be used to further soecify roadway segments.
- Operates under SUM classification (see chapter 5).

CATEGORIES subcommand

- SUF and RLG data elements can be referenced. RLG data comes from the roadlog section at the beginning of the sufficiency segment. The actual roadlog value may vary within the sufficiency segment, since roadlog and sufficiency records usually do not correspond one-to-one.
- The REDEFINES and GROUPS options may be used (see chapter 7).

MILEAGE=
- ROADWAY Compute roadway miles.
- CENTERLINE Compute centerline miles.
  - For centerline miles on divided roadways, the sufficiency ratings are averaged for the segment.

SUMMARIES=(aaa,bbb,ccc) Defines groupings for ratings. aaa, bbb, ccc are numbers from 000 to 100.

- AT LEAST ONE AND NO MORE THAN THREE numbers must be specified. The first group is "LESS THAN aaa". The last group is "ABOVE ccc". The other numbers are upper limits for intermediate groups.
- The examples shown previously were produced using SUMMARIES=(060).

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

SELECT subcommand

Select criteria may be applied to the sufficiency (SUF) record, or to the roadlog record that begins at or prior to the start reference point of the SUF record. Only selected records will be summarized.

- To select sufficiency records, use the following format:

INCLUDE
EXCLUDE SUFFICIENCY-RECORDS IF:

- SUF and RLG data elements can be referenced.

ADMC-MEMBER=member "member" is the member name in the IBM user graphics libraries ("user-id.ADMCDATA.DATA") to receive data computed by this command.

- MUST be coded if "GRAPH" is specified.

- The first character must be A-Z. Maximum length is 6 characters.

- If only one data element is spceified under the CATEGORIES subcommand, one member will be added to the graphics data library with name "member".

- If multiple data elements are specified under the CATEGORIES subcommand, one member will be added to the graphics data library for each value of the first data element. Member names will be formed using "member" as a prefix and appending the value of the data element to form a unique name. For example, if the first data element is SUF.COUNTY, and ADMC-MEMBER=COUNTY, then graphics member names will be "COUNTY01", "COUNTY02", etc.

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```
       MILES    Graph data will be total miles for category.
GRAPH=
       AVERAGE  Graph data will be average rating for category.
```

- The dependent variable for graphics data can be either the total miles or the average rating. The default is GRAPH=MILES.

```
                MILES-UP    Sort by total miles, lowest to highest.
                MILES-DOWN  Sort by total miles, highest to lowest.
MATRIX-SORT=    CATEGORY    Sort by category.
                AVG-UP      Sort by average rating, lowest to highest
                AVG-DOWN    Sort by average rating, highest to lowest
```

- Specifies the sort order of each category within each individual summary produced by the report (see chapter 5 for explanation of how the ROUTES subcommand defines individual summaries).

- Default is to sort by the value of the category.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample produces a summary similar to
---------- the first example shown above:

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIPM,TIME=1,REGION=500K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:SUFFICIENCY-MATRIX-SUMMARY,MILEAGE=ROADWAY,
:  NO-OPTLIST,SUMMARIES=(060)
+ROUTES
ROUTE-SYS=01-03
+CATEGORIES
DATA-ELEMENT=SUF.EXIST-SVC-LVL
/*
```


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The following example produces a summary similar to the second
examples shown above:

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIPM,TIME=1,REGION=500K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:SUFFICIENCY-MATRIX-SUMMARY,MILEAGE=ROADWAY,
:  NO-OPTLIST,SUMMARIES=(060)
+ROUTES
ROUTE-SYS=01-03
+CATEGORIES
DATA-ELEMENT=SUF.EXIST-DESIGN
```

```
DATA-ELEMENT=SUF.EXIST-TERRAIN
/*
```

The next example shows how to use the command to put data into the graphics libraries. The intent is to produce a graph of the average sufficiency rating by district. After the command has run, a member of the ADMCDATA graphics library will have been created with the name "SUFDIST". It will have 9 xy pairs of data, one x for each district and the corresponding y value of sufficiency rating. When used with the PGF (Presentation Graphics Feature, found under the "USER" TSO dialogue, option 8), the data can be graphically presented. The printed results of the report may be discarded.

Note that the same results could have been accomplished by running the report and manually entering the data into the graphics dialogue.

Note also the "EXEC DTRIPGF" and two ADMC DD statements in the job setup below. The ADMC graphics libraries must exist prior to running this job or it will abend with a JCL error. Note also that the region has been increased to 750K.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIT,TIME=5,REGION=750K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//ADMCDATA DD DISP=SHR,DSN=USER-ID.ADMCDATA.DATA
//ADMCFORM DD DISP=SHR,DSN=USER-ID.ADMCFORM.DATA
//SYSIN DD *
:SUFFICIENCY-MATRIX-SUMMARY,MILEAGE=ROADWAY,
:  OPTLIST,SUMMARIES=(060,069,079),ADMC-MEMBER=SUFDIST,GRAPH=AVERAGE
+ROUTES
ROUTE-SYS=01-03
+CATEGORIES
DATA-ELEMENT=SUF.DISTRICT
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

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ROADWAY HISTORY SUBSYSTEM

Introduction

****

The roadway history file applies to trunk highways only. It is a historical record of all construction and maintenance work. Each record represents work on a particular section of roadway for one contract. Within the record are a variable number of layers (up to 50) describing the work done.

Roadway History Record

****

Record key is:

- Route system
- Route number
- Start reference point
- End reference point
- Roadway ID
- Contract number

Other data occurring once per record:

- Card number
- State project number
- Design ESALs
- Design subgrade type
- Design subgrade strength
- Date awarded
- Date began
- Date ended
- Date opened
- Project type
- Number of layers in the section

Within each record, there are up to 50 segments describing individual layers of work. Each layer segment contains the following:

- Work item
- Material ID
- Cross-section position
- Mode
- Transverse direction
- Transverse offset
- Width
- Constant/variable indicator
- Vertical position
- Depth

For further description of data elements, see Appendix E, RDH data elements.

Roadway History Data Access and Reporting

The "general" TIS user may access any of the functions described on the following pages. Security is built in to prevent making any changes to the data file. Users may be accessing the data at the same time data maintenance users are making updates to the file, without any contention problems.

The remainder of this section is intended for all TIS users. The TIS Data Coding Manual contains more complete documentation on all of the functions available to data maintenance users.

Functions available include:

Function	Description
TISSPF option Z.R	Provides on-line data access through a TSO terminal. Options include data inquiry, printed hardcopy, graphical display of data, editing of data, and a utility to translate between control section number and reference point keys.
LIST-ROADWAY-HISTORY-FILE	Prints a listing of roadway history data in one of several formats. Data may be selected based on RDH data element values, RDL data element values, or roadlog (RLG) data element values.
other reports are under development	

Running TISSPF Option Z.R

The following steps are required to access roadway history data on-line:

1) Logon to TSO at a video display terminal. The terminal must be capable of supporting ISPF. Any of the 3270 series display stations, or an IBM PC that can access TSO will work.

2) After a "READY" prompt, type "TISSPF" (without quotes) and press the ENTER key.

3) The TISSPF primary option menu will be displayed. This is the standard ISPF menu with an additional option "Z". Type "Z" and press the ENTER key.

4) The TIS option menu will be displayed. Type "R" and press the ENTER key. (This step can be combined with step 3 by typing "Z.R" at step 3).

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5) The roadway history data option menu will be displayed. Its format is:

```
D  Draw       - DRAW DATA ON SCREEN
M  Map        - DRAW PROJECT LOG MAP
E  Edit       - EDIT DATA (SUBMIT BATCH JOB)
L  List       - LIST DATA
P  Print      - PRINT GRAPHS AT REMOTE PRINTER (3287 TYPE)
A  lAser      - PRINT GRAPHS AT INTERTECH'S 3800-3 LASER PRINTER
T  Translate  - TRANSLATE CONTROL SECTION <-> REFERENCE POINTS
U  Update     - UPDATE OR BROWSE DATA
```

At this point there is a full onscreen tutorial to help guide the user through the dialogue. Press the HELP key (usually PF1) to see how to use the functions.

The LIST-ROADWAY-HISTORY-FILE Command

Function: Lists data from the roadway history file.

Description: Records in the roadway history file describe construction and maintenance history for sections of trunk highways. Each record contains the following information about the section that applies to a single contract:

Record key is:
- Route system
- Route number
- Start reference point
- End reference point
- Roadway ID
- Contract number

Other data occurring once per record:
- Card number
- State project number
- Design ESALs
- Design subgrade type
- Design subgrade strength
- Date awarded
- Date began

Date ended
Date opened
Number of layers in the section

Within each record, there are up to 50 segments describing individual layers of work. Each layer segment contains the following:

Work item
Material ID
Cross-section position
Mode
Transverse direction
Transverse offset
Width
Constant/variable indicator
Vertical position
Depth

For further description of data elements, see Appendix E, RDH data elements.

This command can be run with or without the +ROUTES subcommand. There are three list formats available: 1) "record" format, showing all data in the record, 2) "cross-section" format, showing layers grouped into uniform cross-sections showing all layer data, but not all section data from the record, and 3) "contract" format, showing sections grouped and ordered by contract number.

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Required Command Parameters:

LIST-FORMAT= RECORD / CROSS-SECTION / CONTRACT

- If CROSS-SECTION is specified, then the ROUTES subcommand is REQUIRED.

Optional Command Parameters:

NO-OPTLIST No option list is printed.

OPTLIST A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

NO-CODELIST - Do not print any codelists.
CODELIST - Print a codelist with each individual summary (default).

- The codelist is a several-page description of the meanings of the codes printed in the report.

HISTORY - All layers in the cross-section.
CURRENT - Only layers in current cross-section (default).

- This applies to CROSS-SECTION only.
- CURRENT excludes all layers prior to the most recent grading. "Removal" layers cancel out the layers below them that were removed.

CONTROL-SECTION=nnnn

- Control section "nnnn" is listed.

- CONTROL-SECTION and ROUTES cannot BOTH be coded.

ROUTES subcommand

- Operates under "LIST" classification (see chapter 5 for a description of the ROUTES subcommand).

- Without +ROUTES, all data in the file is considered "selected", subject to SELECT subcommand below.

- LIST-FORMAT=CROSS-SECTION requires either the ROUTES subcommand or the CONTROL-SECTION keyword.

- CONTROL-SECTION and ROUTES cannot BOTH be coded.

SELECT subcommand

Select can be applied to records, record layers, cross-sections, and cross-section layers. Cross-sections are formed from one or more records and consist of all applicable layers for a uniform segment of roadway. The

order of select is:

1) ROADDATA-LAYERS
2) ROADDATA-RECORDS
3) CROSS-SECTION-LAYERS
4) CROSS-SECTIONS

Data elements:

RDL - Layer of record (occurs 1-99 times per record).
RDH - Root portion of record.
RDY - Layer of cross-section (occurs 1-99 times per cross-section).
RDX - Root portion of cross-section.
RDD - Topmost layer of driving surface of cross-section.
RRS - Topmost layer of right shoulder of cross-section.
RLS - Topmost layer of left shoulder of cross-section.

Select criteria may be applied to the roadway history (RDH) record, or to the roadlog record that begins at or prior to the start reference point of the RDH record. Only selected records will be listed.

- To select RDH records, use the following format:

INCLUDE
EXCLUDE ROADDATA-RECORDS IF:

- RDH and RLG data elements can be referenced.
- RDL data elements may be referenced using the multi-correlation facility (*ANY* or *ALL*).

Select criteria may also be applied to individual layers in the roadway history record. This selection is done BEFORE selection on records, i.e., layers excluded by select will not be available for select on records (above).

- To select RDH layers, use the following format:

INCLUDE
EXCLUDE ROADDATA-LAYERS IF:

- RDL data elements can be referenced.

Select criteria may be applied to the roadway history cross-section (RDX) record, or to the roadlog record that begins at or prior to the start reference point of the RDX cross-section. Only selected cross-sections will be listed.

- To select RDX cross-sections, use the following format:

```
INCLUDE
EXCLUDE  CROSS-SECTIONS IF:

        - RDX, RDD, RRS, RLS, and RLG data elements
          can be referenced.
        - RDY data elements may be referenced using
          the multi-correlation facility (*ANY* or
          *ALL*).
```

Select criteria may also be applied to individual layers in the roadway history cross-section. This selection is done BEFORE selection on cross-sections, i.e., layers excluded by select will not be available for select on cross-sections (above).

- To select RDY cross-section layers, use the following format:

```
INCLUDE
EXCLUDE  CROSS-SECTION-LAYERS IF:

        - RDY data elements can be referenced.
```

AGGREGATE subcommand

The AGGREGATE subcommand can be used to combine adjacent layers in the cross-section (prior to CROSS-SECTION selection). It allows selection on depth of a layer that may be aggregated from several individual layers (within driving surface, right shoulder, or left shoulder).

- RDY data elements can be referenced.

- Example:

```
+AGGREGATE
RDY.WORK-ITEM
```

Would result in adjacent layers with the same work item

being combined into the upper layer. The resultant layer has all the characteristics of the top layer, except that the depth reflects both layers. See the AGGREGATE subcommand in chapter 7 for more details.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

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Sample Job Setups:

The following sample lists roadway history data for interstate highways in record format. Shoulder layers are excluded. Printed output goes to the terminal only.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=75,PROCLIB=TEST
//TIS EXEC DTRIT,TIME=1,REGION=500K,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-ROADWAY-HISTORY-FILE,CODELIST,LIST-FORMAT=RECORD
+ROUTES
ROUTE-SYS=01-04
+SELECT
 EXCLUDE ROADDATA-LAYERS IF:
   RDL.XSCTN-POSN *EQ* 'S'
/*
```

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The following sample lists roadway history data for interstate highways in cross-section format. All shoulder layers are excluded. Many other layers that are resurfacing or reconditioning are also excluded. Layers are aggregated by work item, with "BO" (bit overlay) combined with "B " (bituminous). Cross-sections are included if the top of the driving surface is bituminous or bituminous overlay. Printed output goes to the terminal only.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=75,PROCLIB=TEST
//TIS EXEC DTRIT,TIME=1,REGION=500K,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-ROADWAY-HISTORY-FILE,LIST-FORMAT=CROSS-SECTION
+ROUTES
ROUTE-SYS=01-04
+SELECT
 EXCLUDE ROADDATA-LAYERS IF:
   RDL.XSCTN-POSN *EQ* 'S' *OR*
   RDL.WORK-ITEM *EQ* 'AS' *OR*
   RDL.WORK-ITEM *EQ* 'ED' *OR*
   RDL.WORK-ITEM *EQ* 'JR' *OR*
   RDL.WORK-ITEM *EQ* 'MC' *OR*
   RDL.WORK-ITEM *EQ* 'SO' *OR*
   RDL.WORK-ITEM *EQ* 'GC' *OR*
   RDL.WORK-ITEM *EQ* 'FS' *OR*
   RDL.WORK-ITEM *EQ* 'RR' *OR*
   RDL.WORK-ITEM *EQ* 'SC' *OR*
```

```
   RDL.WORK-ITEM *EQ* 'SL' *OR*
   RDL.WORK-ITEM *EQ* 'JS'
 INCLUDE CROSS-SECTIONS IF:
   RDD.WORK-ITEM *EQ* 'B ' *OR*
   RDD.WORK-ITEM *EQ* 'BO'
+AGGREGATE
RDY.WORK-ITEM
REDEFINES
BO B
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

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The ROADWAY-HISTORY-MATRIX Command

Function: Produces general-purpose summaries of roadway history mileage.

Description: Summaries can be broken down by one, two, or three data elements from the roadway history or roadlog files. Mileages are "roadway" miles.

When summarizing by one data element, the output format is similar to:

RDD.WORK-ITEM	ROADWAY MILES
AB - AGGREGATE BASE	115.375
B - BITUMINOUS LAYER	1,818.567
BB - BITUMINOUS BASE	11.260
BO - BITUMINOUS OVERLAY	3,974.910
C - CONCRETE SLAB	2,047.302

```
CO - CONCRETE OVERLAY                 0.776
CR - CONCRETE (RECYCLED)             22.558
GR - GRADING                         78.587
GS - GRAVEL OR ROCK SURFACE           5.508
N  - CRCP NON-JOINTED CONCRET        94.849
SR - SUBGRADE RECONDITION             0.363

----- GRAND TOTAL ----->          8,170.063
```

When summarizing by two data elements, the output format is similar to:

```
                                                        ROADWAY
RDX.ROUTE-SYSTEM              RDD.WORK-ITEM              MILES

01 - ISTH            B  - BITUMINOUS LAYER               210.001
01 - ISTH            C  - CONCRETE SLAB                1,309.680
01 - ISTH            ----- SUBTOTAL  ------->          1,519.682

02 - USTH            B  - BITUMINOUS LAYER             1,304.496
02 - USTH            C  - CONCRETE SLAB                  871.223
02 - USTH            ----- SUBTOTAL  ------->          2,175.720

03 - MNTH            B  - BITUMINOUS LAYER             3,432.726
03 - MNTH            C  - CONCRETE SLAB                  507.825
03 - MNTH            ----- SUBTOTAL  ------->          3,940.552

                     ----- GRAND TOTAL ----->          7,635.956
```

When summarizing by three data elements, the output format is identical to that for two data elements except that one summary is printed for each value of the additional data element.

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Required Command Parameters:

ROUTES subcommand

- Used to make first specification of what roadways are to be included in the report. The SELECT subcommand can be used to further specify roadway segments.
- Operates under SUM classification (see chapter 5).

CATEGORIES subcommand

- RDX, RDY, RDD, RRS, RLS, and RLG data elements can be referenced. RLG data comes from the roadlog section at the beginning of the cross-section. The actual roadlog value may vary within the cross-section, since roadlog and cross-sections usually do not correspond one-to-one.

- The REDEFINES and GROUPS options may be used (see chapter 7).

- Data elements:

  RDY - Layer of cross-section (occurs 1-99 times per cross-section).
  RDX - Root portion of cross-section.
  RDD - Topmost layer of driving surface of cross-section.
  RRS - Topmost layer of right shoulder of cross-section.
  RLS - Topmost layer of left shoulder of cross-section.

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

HISTORY - All layers in the cross-section.
CURRENT - Only layers in current cross-section (default).

- CURRENT excludes all layers prior to the most recent grading. "Removal" layers cancel out the layers below them that were removed.

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ADMC-MEMBER=member "member" is the member name in the IBM user

graphics libraries ("user-id.ADMCDATA.DATA") to receive data computed by this command.

- The first character must be A-Z. Maximum length is 6 characters.

- If only one data element is spceified under the CATEGORIES subcommand, one member will be added to the graphics data library with name "member".

- If multiple data elements are specified under the CATEGORIES subcommand, one member will be added to the graphics data library for each value of the first data element. Member names will be formed using "member" as a prefix and appending the value of the data element to form a unique name. For example, if the first data element is SUF.COUNTY, and ADMC-MEMBER=COUNTY, then graphics member names will be "COUNTY01", "COUNTY02", etc.

MATRIX-SORT=	DOWN	Sort by mileage, highest to lowest.
	CATEGORY	Sort by category.
	UP	Sort by mileage, lowest to highest.

- Specifies the sort order of each category within each individual summary produced by the report (see chapter 5 for explanation of how the ROUTES subcommand defines individual summaries).

- Default is to sort by the value of the category.

SELECT subcommand

Select can be applied to records, record layers, cross-sections, and cross-section layers. Cross-sections are formed from one or more records and consist of all applicable layers for a uniform segment of roadway. The order of select is:

1) ROADDATA-LAYERS
2) ROADDATA-RECORDS
3) CROSS-SECTION-LAYERS
4) CROSS-SECTIONS

Data elements:

RDL - Layer of record (occurs 1-99 times per record).
RDH - Root portion of record.
RDY - Layer of cross-section (occurs 1-99 times per cross-section).
RDX - Root portion of cross-section.
RDD - Topmost layer of driving surface of cross-section.
RRS - Topmost layer of right shoulder of cross-section.
RLS - Topmost layer of left shoulder of cross-section.

Select criteria may be applied to the roadway history (RDH) record, or to the roadlog record that begins at or prior to the start reference point of the RDH record. Only selected records will be listed.

- To select RDH records, use the following format:

INCLUDE
EXCLUDE ROADDATA-RECORDS IF:

- RDH and RLG data elements can be referenced.
- RDL data elements may be referenced using the multi-correlation facility (*ANY* or *ALL*).

Select criteria may also be applied to individual layers in the roadway history record. This selection is done BEFORE selection on records, i.e., layers excluded by select will

not be available for select on records (above).

- To select RDH layers, use the following format:

```
INCLUDE
EXCLUDE  ROADDATA-LAYERS IF:

         - RDL data elements can be referenced.
```


Select criteria may be applied to the roadway history cross-section (RDX) record, or to the roadlog record that begins at or prior to the start reference point of the RDX cross-section. Only selected cross-sections will be listed.

- To select RDX cross-sections, use the following format:

```
INCLUDE
EXCLUDE  CROSS-SECTIONS IF:

         - RDX, RDD, RRS, RLS, and RLG data elements
           can be referenced.
         - RDY data elements may be referenced using
           the multi-correlation facility (*ANY* or
           *ALL*).
```

Select criteria may also be applied to individual layers in the roadway history cross-section. This selection is done BEFORE selection on cross-sections, i.e., layers excluded by select will not be available for select on cross-sections (above).

- To select RDY cross-section layers, use the following format:

```
INCLUDE
EXCLUDE  CROSS-SECTION-LAYERS IF:

         - RDY data elements can be referenced.
```

The AGGREGATE subcommand can be used to combine adjacent layers in the cross-section (prior to CROSS-SECTION selection). It allows selection on depth of a layer that may be aggregated from several individual layers (within driving surface, right shoulder, or left shoulder).

- RDY data elements can be referenced.

- Example:

```
+AGGREGATE
RDY.WORK-ITEM
```

Would result in adjacent layers with the same work item being combined into the upper layer. The resultant layer has all the characteristics of the top layer, except that the depth reflects both layers. See the AGGREGATE subcommand in chapter 7 for more details.

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TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setups:

The following sample produces a summary similar to the first example shown above:

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5,PROCLIB=TEST
//TIS EXEC DTRIT,TIME=5,REGION=500K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:ROADWAY-HISTORY-MATRIX,OPTLIST
+ROUTES
ROUTE-SYS=01-04
+CATEGORIES
DATA-ELEMENT=RDD.WORK-ITEM
+SELECT
```

```
 EXCLUDE ROADDATA-LAYERS IF:
   RDL.XSCTN-POSN *EQ* 'S' *OR*
   RDL.WORK-ITEM *EQ* 'AS' *OR*
   RDL.WORK-ITEM *EQ* 'ED' *OR*
   RDL.WORK-ITEM *EQ* 'JR' *OR*
   RDL.WORK-ITEM *EQ* 'MC' *OR*
   RDL.WORK-ITEM *EQ* 'SO' *OR*
   RDL.WORK-ITEM *EQ* 'GC' *OR*
   RDL.WORK-ITEM *EQ* 'FS' *OR*
   RDL.WORK-ITEM *EQ* 'RR' *OR*
   RDL.WORK-ITEM *EQ* 'SC' *OR*
   RDL.WORK-ITEM *EQ* 'SL' *OR*
   RDL.WORK-ITEM *EQ* 'JS'
/*
```

The above job setup can be copied from DT99A1B.TSOLIB.CNTL, member RDHMAT1.

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The following example produces a summary similar to the second example shown above:

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5,PROCLIB=TEST
//TIS EXEC DTRIT,TIME=5,REGION=500K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:ROADWAY-HISTORY-MATRIX,OPTLIST
+ROUTES
ROUTE-SYS=01-04
+CATEGORIES
DATA-ELEMENT=RDX.ROUTE-SYSTEM
```

```
DATA-ELEMENT=RDD.WORK-ITEM
+SELECT
 INCLUDE ROADDATA-LAYERS IF:
   RDL.XSCTN-POSN *NE* 'S' *AND*
  (RDL.WORK-ITEM *EQ* 'B ' *OR*
   RDL.WORK-ITEM *EQ* 'C ')
/*
```

The above job setup can be copied from DT99A1B.TSOLIB.CNTL, member RDHMAT2.

The next example shows how to use the command to put data into the graphics libraries. The intent is to produce a graph of the miles of roadway by driving surface type by district. Note that route system is used as the first data element and redefined into one value. After the command has run, a member of the ADMCDATA graphics library will have been created with the name "RDHTH". It will have 9 xy sets of data, one x for each district and the corresponding y values for surface type. When used with the PGF (Presentation Graphics Feature, found under the "USER" TSO dialogue, option 8), the data can be graphically presented. The printed results of the report may be discarded.

Note that the same results could have been accomplished by running the report and manually entering the data into the graphics dialogue.

Note also the "EXEC DTRIPGF" and two ADMC DD statements in the job setup below. The ADMC graphics libraries must exist prior to running this job or it will abend with a JCL error. Note also that the region has been increased to 1200K.

1
+


```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIT,TIME=5,REGION=1200K,SCRSIZE=3,FORM='(2)',
```

```
//    PRINTDD=TSO,OUTFILE=
//ADMCDATA DD DISP=SHR,DSN=USER-ID.ADMCDATA.DATA
//ADMCFORM DD DISP=SHR,DSN=USER-ID.ADMCFORM.DATA
//SYSIN DD *
:ROADWAY-HISTORY-MATRIX,ADMC-MEMBER=RDH
+ROUTES
ROUTE-SYS=01-04
+CATEGORIES
DATA-ELEMENT=RLG.ROUTE-SYSTEM
REDEFINES
01 TH
02 TH
03 TH
04 CS
DATA-ELEMENT=RDD.WORK-ITEM
DATA-ELEMENT=RLG.CONSTR-DIST
+SELECT
 INCLUDE ROADDATA-LAYERS IF:
   RDL.XSCTN-POSN *NE* 'S' *AND*
  (RDL.WORK-ITEM *EQ* 'B ' *OR*
   RDL.WORK-ITEM *EQ* 'BK' *OR*
   RDL.WORK-ITEM *EQ* 'BO' *OR*
   RDL.WORK-ITEM *EQ* 'GS' *OR*
   RDL.WORK-ITEM *EQ* 'N ' *OR*
   RDL.WORK-ITEM *EQ* 'CO' *OR*
   RDL.WORK-ITEM *EQ* 'C ')
/*
```

The above job setup can be copied from DT99A1B.TSOLIB.CNTL, member RDHMAT3.

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

Introduction to ESALS

ESALS (Equivalent Standard Axle Load) are computed for trunk highways. The files used as input to the computations are:

Roadway History - Uniform roadway cross-sections

Uniform roadway cross-sections are constructed from roadway history data. Information needed for ESALS is the date of construction and types of driving surface layers.

Traffic - Heavy commercial AADT

Heavy commercial AADT has been coded in the TIS traffic file since 1976. Data for 1972, 1966, 1959, 1951, 1940, and 1936 has been recently added to the file. HCADT is extrapolated for all years by straight line from the closest two actual values at the location.

ESALS always begin by determining a cross-section from the roadway history file, then accessing the traffic file for HCADT, and computing the numbers. Numbers computed are:

Type: Type of ESAL. "B"=BESAL (flexible surface).
"C"=CESAL (rigid surface).

Current Year ESALS: ESALS for the latest year requested (and since date of last surface).

Date of Last Surface:

Date of topmost roadway history layer in the driving surface that meets the following criteria:

Work Item	Definition
B	Bituminous layer
BO	Bituminous overlay
CU,CD	Concrete slab
N	CRCP non-jointed concrete slab
CR	Concrete (recycled)
CO,CB,CP	Concrete overlay

and transverse direction is "C" (centerline passes through

layer) and depth is non-zero.

Date of Pavement:

Date of bottommost roadway history layer in the driving surface which has a transerve direction of "C" (centerline passes through the layer), a non-zero depth, and a work- item which is similar (see chart below) to the work-item of the layer used to determine Date Of Last Surface. Date of pavement is defined thus in order to prevent the mixture of bituminous esals (BESALS) and concrete esals (CESALS).

If Work-Item of Data-Of-Last-Surface layer is:	Then Work-Item of Date-Of-Pavement layer must be:
B	B or BO
BO	B or BO
CU or CD	CU, CD, N, CR, CO, CB, or CP
N	CU, CD, N, CR, CO, CB, or CP
CR	CU, CD, N, CR, CO, CB, or CP
CO, CB, or CP	CU, CD, N, CR, CO, CB, or CP

Surface ESALS: ESALS between ESAL-END-DATE and either ESAL-START-DATE or date of last surface (whichever is later).

Pavement ESALS: ESALS between ESAL-END-DATE and either ESAL-START-DATE or date of pavement (whichever is later).

Growth Rate: Percent annual growth of ESALS over the last three years (can be negative).

ESAL Formula:

THE ESAL formula is:

$$ESALS = DAYS \times DC \times HCADT \times ((C1 \times Y) - C2)$$

where: DAYS = number of days in the year or portion of year.
HCADT = average daily heavy commercial traffic in the year (two-way value).
Y = Year.
DC = Design Constant (see explanation below).
C1 = Constant (see explanation below).
C2 = Constant (see explanation below).

DC is determined by the roadway history cross-section:

Undivided-->	Driving surface width	Design constant
	0-40 feet	.50
	41-55 feet	.45
	56+ feet	.30

1
+

Divided -->	Driving surface width	Design constant
	0-19 feet	.50
	20-30 feet	.45
	31-45 feet	.30
	46-55 feet	.25
	56+ feet	.20

C1 and C2 depend on the year, the HCADT, whether a roadway is rural or urban and whether a roadway's pavement is flexible or rigid.

Flexible vs. Rigid:

If the first character of the work item code for the layer used as "last surface" is "B", then use flexible formula. Otherwise use rigid.

Rural vs. Urban:

If the roadway is in a municipality with a population greater than or equal to 5000, the roadway is urban. Otherwise the roadway is rural.

Specific values for C1 and C2 are presented in the four tables below. There is one table for each of the four combinations, FLEXIBLE/RURAL, FLEXIBLE/URBAN, RIGID/RURAL, and RIGID/URBAN.

FLEXIBLE PAVEMENT - RURAL ROADWAY

Year: to 1944		HCADT
C1 = .00210	C2 = 003.96300	0 - 59
C1 = .00290	C2 = 005.50700	60 - 99
C1 = .00360	C2 = 006.85800	100 - 174
C1 = .00430	C2 = 008.20900	175 - 299
C1 = .00500	C2 = 009.56000	300 - 574
C1 = .00570	C2 = 010.91100	575 - 1399
C1 = .00640	C2 = 012.26200	1400 - up

Year: 1945 to 1952		HCADT
C1 = .00630	C2 = 012.12700	0 - 59
C1 = .00880	C2 = 016.97700	60 - 99
C1 = .01250	C2 = 024.16000	100 - 174
C1 = .01880	C2 = 036.39700	175 - 299
C1 = .02130	C2 = 041.24700	300 - 574
C1 = .02250	C2 = 043.57000	575 - 1399
C1 = .02500	C2 = 048.42000	1400 - up

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+

Year: 1953 to 1959		HCADT
C1 = .02140	C2 = 041.60300	0 - 59
C1 = .02000	C2 = 038.84000	60 - 99
C1 = .01710	C2 = 033.13900	100 - 174
C1 = .02000	C2 = 038.74000	175 - 299
C1 = .02290	C2 = 044.37100	300 - 574
C1 = .02570	C2 = 049.81600	575 - 1399
C1 = .02430	C2 = 047.05400	1400 - up

Year: 1960 to 1967		HCADT
C1 = .01250	C2 = 024.16800	0 - 59
C1 = .01250	C2 = 024.14800	60 - 99

```
C1 =  .01380    C2 = 026.67400          100 -  174
C1 =  .00630    C2 = 011.90200          175 -  299
C1 =  .00630    C2 = 011.85200          300 -  574
C1 =  .00880    C2 = 016.70900          575 - 1399
C1 =  .00750    C2 = 014.14300         1400 - up

Year:  1968 to 1975                      HCADT
-------------------                    -----------

C1 =  .00500    C2 = 009.41500            0 -   59
C1 =  .00500    C2 = 009.39500           60 -   99
C1 =  .00630    C2 = 011.92200          100 -  174
C1 =  .00750    C2 = 014.26300          175 -  299
C1 =  .00750    C2 = 014.21300          300 -  574
C1 =  .00630    C2 = 011.79200          575 - 1399
C1 =  .01130    C2 = 021.61700         1400 - up

Year:  1976 to 1982                      HCADT
-------------------                    -----------

C1 =  .01430    C2 = 027.78300            0 -   59
C1 =  .02290    C2 = 044.74800           60 -   99
C1 =  .02290    C2 = 044.70800          100 -  174
C1 =  .02290    C2 = 044.67800          175 -  299
C1 =  .02860    C2 = 055.88500          300 -  574
C1 =  .02710    C2 = 052.87300          575 - 1399
C1 =  .03290    C2 = 064.27800         1400 - up

Year:  1983 to 1999                      HCADT
-------------------                    -----------

C1 =  .00500    C2 = 009.35000            0 -   59
C1 =  .00500    C2 = 009.27000           60 -   99
C1 =  .00750    C2 = 014.18500          100 -  174
C1 =  .01000    C2 = 019.11000          175 -  299
C1 =  .01000    C2 = 019.02000          300 -  574
C1 =  .01000    C2 = 018.98000          575 - 1399
C1 =  .00500    C2 = 008.98000         1400 - up
```


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FLEXIBLE PAVEMENT - URBAN ROADWAY

```
Year:       to 1944                      HCADT
```

C1 = .00140	C2 = 002.61200	0 - 599
C1 = .00210	C2 = 003.96300	600 - 1499
C1 = .00290	C2 = 005.50700	1500 - 3499
C1 = .00360	C2 = 006.85800	3500 - up

Year: 1945 to 1959		HCADT
C1 = .01530	C2 = 029.63300	0 - 599
C1 = .01840	C2 = 035.65000	600 - 1499
C1 = .01900	C2 = 036.80600	1500 - 3499
C1 = .01930	C2 = 037.37900	3500 - up

Year: 1960 to 1975		HCADT
C1 = .00660	C2 = 012.58900	0 - 599
C1 = .00800	C2 = 015.27600	600 - 1499
C1 = .00730	C2 = 013.88600	1500 - 3499
C1 = .00690	C2 = 013.08700	3500 - up

Year: 1976 to 1999		HCADT
C1 = .00760	C2 = 014.56400	0 - 599
C1 = .00800	C2 = 015.27600	600 - 1499
C1 = .01250	C2 = 024.15600	1500 - 3499
C1 = .01450	C2 = 028.09700	3500 - up

RIGID PAVEMENT - RURAL ROADWAY

Year: to 1944		HCADT
C1 = .00290	C2 = 005.50700	0 - 59
C1 = .00360	C2 = 006.85800	60 - 99
C1 = .00430	C2 = 008.20900	100 - 174
C1 = .00500	C2 = 009.56000	175 - 299
C1 = .00570	C2 = 010.91100	300 - 574
C1 = .00640	C2 = 012.26200	575 - 1399
C1 = .00710	C2 = 013.61300	1400 - up

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+
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Year: 1945 to 1952		HCADT
C1 = .00630	C2 = 012.11700	0 - 59
C1 = .00880	C2 = 016.96700	60 - 99
C1 = .01130	C2 = 021.81700	100 - 174
C1 = .01880	C2 = 036.38700	175 - 299
C1 = .02250	C2 = 043.57000	300 - 574
C1 = .02500	C2 = 048.42000	575 - 1399
C1 = .02750	C2 = 053.27000	1400 - up

Year: 1953 to 1959		HCADT
C1 = .02710	C2 = 052.71900	0 - 59
C1 = .02710	C2 = 052.68900	60 - 99
C1 = .02860	C2 = 055.58700	100 - 174
C1 = .03290	C2 = 063.91100	175 - 299
C1 = .03860	C2 = 074.99700	300 - 574
C1 = .04290	C2 = 083.36100	575 - 1399
C1 = .05430	C2 = 105.58400	1400 - up

Year: 1960 to 1967		HCADT
C1 = .02380	C2 = 046.25400	0 - 59
C1 = .02630	C2 = 051.12200	60 - 99
C1 = .02630	C2 = 051.08200	100 - 174
C1 = .01880	C2 = 036.28900	175 - 299
C1 = .02000	C2 = 038.56000	300 - 574
C1 = .02630	C2 = 050.84200	575 - 1399
C1 = .02130	C2 = 040.93700	1400 - up

Year: 1968 to 1975		HCADT
C1 = .01250	C2 = 024.02800	0 - 59
C1 = .01250	C2 = 023.97800	60 - 99
C1 = .01250	C2 = 023.93800	100 - 174
C1 = .01250	C2 = 023.89800	175 - 299
C1 = .01750	C2 = 033.64300	300 - 574
C1 = .01250	C2 = 023.69800	575 - 1399
C1 = .01630	C2 = 031.10200	1400 - up

Year: 1976 to 1982		HCADT

C1 = .02290	C2 = 044.56800	0 - 59
C1 = .04000	C2 = 078.29000	60 - 99
C1 = .04140	C2 = 081.01500	100 - 174
C1 = .04290	C2 = 083.93800	175 - 299
C1 = .04710	C2 = 092.10300	300 - 574
C1 = .06000	C2 = 117.51000	575 - 1399
C1 = .05860	C2 = 114.64500	1400 - up

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+

Year: 1983 to 1999		HCADT
C1 = .00750	C2 = 014.04500	0 - 59
C1 = .00500	C2 = 008.92000	60 - 99
C1 = .01000	C2 = 018.78000	100 - 174
C1 = .02250	C2 = 043.50500	175 - 299
C1 = .02000	C2 = 038.39000	300 - 574
C1 = .00500	C2 = 008.50000	575 - 1399
C1 = .00750	C2 = 013.36500	1400 - up

RIGID PAVEMENT - URBAN ROADWAY

Year: to 1944		HCADT
C1 = .00290	C2 = 005.50700	0 - 599
C1 = .00360	C2 = 006.85800	600 - 1499
C1 = .00430	C2 = 008.20900	1500 - 3499
C1 = .00500	C2 = 009.56000	3500 - up

Year: 1945 to 1959		HCADT
C1 = .02000	C2 = 038.75300	0 - 599
C1 = .02530	C2 = 049.04300	600 - 1499
C1 = .02670	C2 = 051.75500	1500 - 3499
C1 = .02800	C2 = 054.27200	3500 - up

Year: 1960 to 1975		HCADT

```
C1 =  .00950    C2 = 018.18100          0 -  599
C1 =  .01380    C2 = 026.51400        600 - 1499
C1 =  .01280    C2 = 024.52500       1500 - 3499
C1 =  .01170    C2 = 022.34000       3500 -  up

Year:  1976 to 1999                    HCADT
-------------------                 -----------

C1 =  .01520    C2 = 029.43800          0 -  599
C1 =  .01490    C2 = 028.68700        600 - 1499
C1 =  .02320    C2 = 045.06600       1500 - 3499
C1 =  .02740    C2 = 053.34800       3500 -  up
```


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The LIST-ESALS Command

****

Function: Lists ESALS (and optionally roadway history data).

Description: Cross-sections are constructed from the roadway history file and ESALS are computed for each uniform cross-section. The ESAL numbers are listed. The cross-section data may also be listed. The formulas used to summarize the ESALS can also be listed. ESAL numbers are:

- Type ("B"=BESALS, "C"=CESALS)
- Current year ESALS
- Date of last surface
- ESALS on last surface
- Date of pavement
- ESALS on pavement
- Growth rate (last three years)

For further information, see "Introduction to ESALS" and Appendix E, RDX, RDY, and ESL data elements.

Required Command Parameters:

ROUTES subcommand - Operates under LIST classification

Optional Command Parameters:

ESAL-START-DATE=mm/dd/yyyy Starting date for accumulating data.

ESAL-END-DATE=mm/dd/yyyy Ending date for accumulating data.

- ESAL-START-DATE and ESAL-END-DATE define the outside limits for the desired time period.
- If ommitted, defaults to all ESALS up to current date.

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NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed (default).
	- The option list is a listing of command parameters used for the report.
NO-CODELIST	- Do not print any codelists.
CODELIST	- Print a codelist with each individual summary (default).
	- The codelist is a several-page description of the meanings of the codes printed in the report.
HISTORY	- All layers in the cross-section.
CURRENT	- Only layers in current cross-section (default).
	- CURRENT excludes all layers prior to the most

recent grading. "Removal" layers cancel out the layers below them that were removed.

LIST-FORMAT=CROSS-SECTION

- Roadway history cross-sections are listed.

DEBUG-LEVEL=C

- If coded, formulas used to compute ESALS will be printed.

SELECT subcommand

Select can be applied to roadway history records, roadway history record layers, cross-sections, cross-section layers, and ESAL numbers. Cross-sections are formed from one or more records and consist of all applicable layers for a uniform segment of roadway. The order of select is:

1) ROADDATA-LAYERS
2) ROADDATA-RECORDS
3) CROSS-SECTION-LAYERS
4) CROSS-SECTIONS
5) ESALS

The sooner data is eliminated by select, the less time and cost the report will use. For example, it is better to exclude concrete sections as cross-sections, rather than computing ESALS and then excluding "CESALS".

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Data elements:

RDL - Layer of record (occurs 1-99 times per record).
RDH - Root portion of record.
RDY - Layer of cross-section (occurs 1-99 times per cross-section).
RDX - Root portion of cross-section.

RDD - Topmost layer of driving surface of
cross-section.
RRS - Topmost layer of right shoulder of cross-section.
RLS - Topmost layer of left shoulder of cross-section.

Select criteria may be applied to the roadway history (RDH) record, or to the roadlog record that begins at or prior to the start reference point of the RDH record. Only selected records will be listed.

- To select RDH records, use the following format:

INCLUDE
EXCLUDE ROADDATA-RECORDS IF:

- RDH and RLG data elements can be referenced.
- RDL data elements may be referenced using the multi-correlation facility (*ANY* or *ALL*).

Select criteria may also be applied to individual layers in the roadway history record. This selection is done BEFORE selection on records, i.e., layers excluded by select will not be available for select on records (above).

- To select RDH layers, use the following format:

INCLUDE
EXCLUDE ROADDATA-LAYERS IF:

- RDL data elements can be referenced.

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Select criteria may be applied to the roadway history cross-section (RDX) record, or to the roadlog record that begins at or prior to the start reference point of the RDX cross-section. Only selected cross-sections will be listed.

- To select RDX cross-sections, use the following format:

```
INCLUDE
EXCLUDE  CROSS-SECTIONS IF:

         - RDX, RDD, RRS, RLS, and RLG data elements
           can be referenced.
         - RDY data elements may be referenced using
           the multi-correlation facility (*ANY* or
           *ALL*).
```

Select criteria may also be applied to individual layers in the roadway history cross-section. This selection is done BEFORE selection on cross-sections, i.e., layers excluded by select will not be available for select on cross-sections (above).

- To select RDY cross-section layers, use the following format:

```
INCLUDE
EXCLUDE  CROSS-SECTION-LAYERS IF:

         - RDY data elements can be referenced.
```

Select criteria may also be applied to the computed ESALS for the roadway history cross-section. This selection is done AFTER selection on cross-sections, i.e., ESALS are computed based on remaining selected layers.

- To select ESALS, use the following format:

```
INCLUDE
EXCLUDE  ESALS IF:

         - ESL data elements can be referenced.
```

AGGREGATE subcommand

The AGGREGATE subcommand can be used to combine adjacent layers in the cross-section (prior to CROSS-SECTION selection). It allows selection on depth of a layer that may be aggregated from several individual layers (within driving surface, right shoulder, or left shoulder).

- RDY data elements can be referenced.

- Example:

```
+AGGREGATE
RDY.WORK-ITEM
```

  Would result in adjacent layers with the same work item being combined into the upper layer. The resultant layer has all the characteristics of the top layer, except that the depth reflects both layers. See the AGGREGATE subcommand in chapter 7 for more details.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setups:

The following sample lists ESALS for US highways with a growth rate of + or - 99.9%:

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=75
//TIS EXEC DTRIT,TIME=5
//SYSIN DD *
:LIST-ESALS,
:   OPTLIST,ESAL-START-DATE=01/01/1901,ESAL-END-DATE=12/31/1986
+ROUTES
```

```
        ROUTE-SYS=02
        +SELECT
          INCLUDE ROADDATA-LAYERS IF:
           RDL.TRAN-DIRECT *EQ* 'C'
          INCLUDE ESALS IF:
           ESL.GROWTH-RATE/2-5/ *EQ* '99.9'
        /*

        The above job setup can be copied from TRN.RI00SYSE(ESLLST).
```



```
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```



```
        The ESAL-MATRIX-SUMMARY Command
        ******************************


        Function:  Produces general-purpose ESAL (equivalent standard axle load)
        ---------  or ESAL-MILE summaries.

        Description:  Summaries can be printed broken down by one, two, or
        ------------  three data elements from the roadway history or roadlog
                      files, or ESAL characteristics.  Distances are shown in
        roadway miles.  Distances are NOT included for sections of roadway
        missing roadway history or traffic data.

        When summarizing on one data element, the output format is similar to:


                                  AVERAGE CESALS     AVERAGE CESALS      ROADWAY
        RDX.YEAR-LAST-REHAB            SURFACE          PAVEMENT          MILES

        00 TO 65                      8,934,871          8,934,871        63.092
        66 TO 75                      4,648,397          4,648,427       322.000
        76 TO 85                      4,173,595          4,175,853       383.008
        86 TO 87                      2,127,663          2,643,357        57.229

        -----TOTAL---------->         4,580,947          4,617,766       825.332

        When summarizing on two data elements, the output format is similar to:


                                           AVERAGE BESALS  TOTAL BESALS  ROADWAY
        RDD.WORK-ITEM       RDX.PAVE-DEPTH      SURFACE       SURFACE     MILES
```

```
B  - BITUM LAYER    0000 TO 0600           1,456        24,210     3.957
B  - BITUM LAYER    0601 TO 1000       1,663,228    25,543,023    36.756
B  - BITUM LAYER    1001 TO 9999         876,119    79,542,849    71.848
B  - BITUM LAYER    -----SUBTOTAL----> 1,102,389   105,110,082   112.563

BO - BITUM OVERLAY  0000 TO 0600         146,134     2,103,268     1.079
BO - BITUM OVERLAY  0601 TO 1000       1,245,894    14,158,880    16.275
BO - BITUM OVERLAY  1001 TO 9999       1,280,106   150,380,196    63.359
BO - BITUM OVERLAY  -----SUBTOTAL----> 1,258,035   166,642,344    80.715

--- GRAND TOTAL ---->                  1,167,388   271,752,426   193.279
```

When summarizing on three data elements, the output format is identical to that for two data elements, except that one summary is printed for each value of the additional data element.

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There are several options controlling what is summarized:

(SURF-&-PAVE or SURFACE or PAVEMENT)

This option indicates which ESALS are accumulated.

SURFACE - Compute data for last surface of roadway (see "Introduction to ESALS" for definition of last surface).

PAVEMENT - Compute data for all pavement (see "Introduction to ESALS" for definition of pavement).

SURF-&-PAVE - Compute data for both last surface and pavement.

(TOTAL or AVERAGE or AVG-&-TOTAL)

This option indicates how data within each "category" is summarized over the time and length in the category.

TOTAL - Total for all segments of roadway within the

particular category.

AVERAGE - Length-weighted average for all segments of roadway within the category.

AVG-&-TOTAL - Print both average and total vehicle miles.

(ESAL-MILES or ESALS)

This option indicates a choice of computing ESAL miles or ESALS for each category.

ESAL-MILES - Compute ESAL miles (ESALS x section length).

ESALS - Compute ESALS.

$$\text{AVERAGE ESALS} = \frac{\text{SUM(ESALSxLENGTH)}}{\text{SUM(LENGTH)}}$$

$$\text{AVERAGE ESAL-MILES} = \frac{\text{SUM(ESALSxLENGTH)}}{\text{SUM(SEGMENTS)}}$$

TOTAL ESALS = SUM(ESALS)

TOTAL ESAL-MILES = SUM(ESALSxLENGTH)

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Data is always totalled by category. Allowable combinations for a report are:

AVERAGE,	ESALS,	SURFACE
TOTAL,	ESALS,	SURFACE
AVG-&-TOTAL,	ESALS,	SURFACE
AVERAGE,	ESAL-MILES,	SURFACE
TOTAL,	ESAL-MILES,	SURFACE
AVG-&-TOTAL,	ESAL-MILES,	SURFACE
AVERAGE,	ESALS,	PAVEMENT
TOTAL,	ESALS,	PAVEMENT

```
          AVG-&-TOTAL, ESALS,      PAVEMENT

          AVERAGE,     ESAL-MILES, PAVEMENT
          TOTAL,       ESAL-MILES, PAVEMENT
          AVG-&-TOTAL, ESAL-MILES, PAVEMENT

          AVERAGE,     ESALS,      SURF-&-PAVE
          TOTAL,       ESALS,      SURF-&-PAVE

          AVERAGE,     ESAL-MILES, SURF-&-PAVE
          TOTAL,       ESAL-MILES, SURF-&-PAVE
```

Use of Command Parameters:

Defining locations: Use ROUTES to specify route system, route number, reference point, or region. Use SELECT if necessary to eliminate sections based on other criteria.

Defining times: Use ESAL-START-DATE and ESAL-END-DATE to specify time period. Actual dates used for each cross-section depend on the dates of layers involved (see "Introduction to ESALS").

Defining groups: The CATEGORIES subcommand is used to define groupings for computations. Its operation is similar to other matrix summaries: 1 to 3 data elements can be specified for use as a sort field in summarizing and averaging results. The last data element always varies most rapidly. The first data element varies the slowest.

Defining summary: Use AVERAGE/TOTAL, SURFACE/PAVEMENT and ESALS/ESAL-MILES options to choose what will be computed.

Types of output: Results may be listed (in matrix-summary format shown previously), and optionally fed into the IBM graphics package libraries. By feeding the data into the ADMCDATA graphics library, the user can later log on to TSO and combine the data with graph forms to produce graphs with the Interactive Chart Utility.

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The CATEGORIES subcommand specifies how the data will be graphed:

1) The last data element always determines the X-axis (independent variable) of the graphics data.

2) If multiple data elements are used, the first one will separate graphs, i.e., a separate graph is produced for each value of the first data element.

3) The second data element (when three data elements are used), causes multiple groups of data per graph, i.e., a separate line for each value.

The ADMC-MEMBER and GRAPH keywords instruct the command to feed the data into the user's graphics libraries (Presentation Graphics Feature, USER menu option 8.1).

Required Command Parameters:

ROUTES subcommand - Operates under SUM classification

CATEGORIES subcommand

- ESL, RDX, RDD, and RLG data elements can be referenced.
- The REDEFINES and GROUPS control cards can be used for grouping various codes together.

Optional Command Parameters:

ESAL-START-DATE=mm/dd/yyyy Starting date for accumulating data.

ESAL-END-DATE=mm/dd/yyyy Ending date for accumulating data.

- ESAL-START-DATE and ESAL-END-DATE define the outside limits for the desired time period.
- If omitted, defaults to all ESALS up to current date.

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

--> The option list is a listing of your command parameters.

NO-MESSAGES Do not print an error message for sections missing traffic data.
MESSAGES Print an error message when no data is found in the traffic file (default).

--> No messages are printed for sections without ANY roadway history data.

--> Messages are ALWAYS printed for sections with roadway history data but missing pavement layers.

--> Mileage is NOT included for sections with errors.

TOTAL Compute totals only.
AVERAGE Compute averages only.
AVG-&-TOTAL Compute average and total (default).

PAVEMENT Pavement data only.
SURF-&-PAVE Surface and pavement data.
SURFACE Surface data only (default).

NOTE: The combination AVG-&-TOTAL with SURF-&-PAVE is invalid.

ESALS Compute ESALS.
ESAL-MILES Compute ESALS x section length (default).

ADMC-MEMBER=member "member" is the member name in the IBM user graphics libraries ("user-id.ADMCDATA.DATA") to receive data computed by this command.

- MUST be coded if "GRAPH" is specified.

- The first character must be A-Z. Maximum length is 6 characters.

- If only one data element is specified under the CATEGORIES subcommand, one member will be added to the graphics data library with name "member".

- If multiple data elements are specified under the

CATEGORIES subcommand, one member will be added to the graphics data library for each value of the FIRST data element. Member names will be formed using "member" as a prefix and appending the value of the data element to form a unique name. For example, if the first data element is RLG.COUNTY, and ADMC-MEMBER=COUNTY, then graphics member names will be "COUNTY01", "COUNTY02", etc.

GRAPH=	ESALS	Graph data will be ESALS.
	MILES	Graph data will be miles.
	ESAL-MILES	Graph data will be ESAL-miles.

- MUST BE CODED TO PRODUCE GRAPH DATA OUTPUT.
- One variable is produced, it will be MILES or the variable corresponding to the left (or only) column of ESALS or ESAL miles on the printed output:

  AVERAGE is always printed to the left of TOTAL, and SURFACE is always printed to the left of PAVEMENT.

  For example, to get graph data for average pavement esals, the report must be run with options PAVEMENT, ESALS and AVERAGE or AVG-&-TOTAL.

MATRIX-SORT=	UP	Sort lowest to highest.
	DOWN	Sort highest to lowest.

Matrix summaries normally use the "category" as a sort field before printing the summary. If MATRIX-SORT is included, the data value is used to order the report.

- The rules for which column of results is used as a sort field are the same as for graph, i.e., the left or only column is used.
- A typical use might be to rank counties by total ESAL miles -- the county with the highest value would be listed first.

SELECT subcommand

Select can be applied to roadway history records, roadway history record layers, cross-sections, cross-section layers, and ESAL numbers. Cross-sections are formed from one or more records and consist of all applicable layers for a uniform segment of roadway. The order of select is:

1) ROADDATA-LAYERS
2) ROADDATA-RECORDS
3) CROSS-SECTION-LAYERS
4) CROSS-SECTIONS
5) ESALS

The sooner data is eliminated by select, the less time and cost the report will use. For example, it is better to exclude concrete sections as cross-sections, rather than computing ESALS and then excluding "CESALS".

Data elements:

RDL - Layer of record (occurs 1-99 times per record).
RDH - Root portion of record.
RDY - Layer of cross-section (occurs 1-99 times per cross-section).
RDX - Root portion of cross-section.
RDD - Topmost layer of driving surface of

cross-section.
RRS - Topmost layer of right shoulder of cross-section.
RLS - Topmost layer of left shoulder of cross-section.

Select criteria may be applied to the roadway history (RDH) record, or to the roadlog record that begins at or prior to the start reference point of the RDH record. Only selected records will be listed.

- To select RDH records, use the following format:

INCLUDE
EXCLUDE ROADDATA-RECORDS IF:

- RDH and RLG data elements can be referenced.
- RDL data elements may be referenced using the multi-correlation facility (*ANY* or *ALL*).

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Select criteria may also be applied to individual layers in the roadway history record. This selection is done BEFORE selection on records, i.e., layers excluded by select will not be available for select on records (above).

- To select RDH layers, use the following format:

INCLUDE
EXCLUDE ROADDATA-LAYERS IF:

- RDL data elements can be referenced.

Select criteria may be applied to the roadway history cross-section (RDX) record, or to the roadlog record that begins at or prior to the start reference point of the RDX cross-section. Only selected cross-sections will be listed.

- To select RDX cross-sections, use the following format:

```
INCLUDE
EXCLUDE  CROSS-SECTIONS IF:

         - RDX, RDD, RRS, RLS, and RLG data elements
           can be referenced.
         - RDY data elements may be referenced using
           the multi-correlation facility (*ANY* or
           *ALL*).
```

Select criteria may also be applied to individual layers in the roadway history cross-section. This selection is done BEFORE selection on cross-sections, i.e., layers excluded by select will not be available for select on cross-sections (above).

- To select RDY cross-section layers, use the following format:

```
INCLUDE
EXCLUDE  CROSS-SECTION-LAYERS IF:

         - RDY data elements can be referenced.
```


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Select criteria may also be applied to the computed ESALS for the roadway history cross-section. This selection is done AFTER selection on cross-sections, i.e., ESALS are computed based on remaining selected layers.

- To select ESALS, use the following format:

```
INCLUDE
EXCLUDE  ESALS IF:
```

- ESL data elements can be referenced.

AGGREGATE subcommand

The AGGREGATE subcommand can be used to combine adjacent layers in the cross-section (prior to CROSS-SECTION selection). It allows selection on depth of a layer that may be aggregated from several individual layers (within driving surface, right shoulder, or left shoulder).

- RDY data elements can be referenced.

- Example:

```
+AGGREGATE
RDY.WORK-ITEM
```

Would result in adjacent layers with the same work item being combined into the upper layer. The resultant layer has all the characteristics of the top layer, except that the depth reflects both layers. See the AGGREGATE subcommand in chapter 7 for more details.

TITLES subcommand

Print formatting parameters: see chapter 4

Sample Job Setup: The following samples produce output at the TSO

```
----------------   terminal and also at the default line printer at ISB.
                   To change printed output destinations, see chapter 4.

//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=9
//SYSIN DD *
:ESAL-MATRIX-SUMMARY,NO-MESSAGES,ESALS,SURF-&-PAVE,AVERAGE,
:   OPTLIST,ESAL-START-DATE=01/01/1986,ESAL-END-DATE=12/31/1986,CESALS
+ROUTES
ROUTE-SYS=01
+CATEGORIES
DATA-ELEMENT=RDX.YEAR-LAST-REHAB
GROUPS
1900 TO 1965
1966 TO 1975
1976 TO 1985
1986 TO 1987
+SELECT
  INCLUDE ROADDATA-LAYERS IF:
   RDL.TRAN-DIRECT *EQ* 'C' *AND* RDL.DEPTH *GT* '0000'
+TITLES
 INTERSTATE AVERAGE CESALS (SURFACE AND PAVEMENT)
 BY YEAR OF LAST REHABILITATION
 (GROUPED: 1965 AND EARLIER, 1966-1975, 1976-1985, 1986 AND LATER)
/*
```

The above sample may be copied from TRN.RI00SYSE(ESLMAT1).

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```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=9,
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:ESAL-MATRIX-SUMMARY,NO-MESSAGES,ESALS,SURFACE,AVG-&-TOTAL,
:   OPTLIST,ESAL-START-DATE=01/01/1986,ESAL-END-DATE=12/31/1986,BESALS
+ROUTES
ROUTE-SYS=01
+CATEGORIES
DATA-ELEMENT=RDD.WORK-ITEM
DATA-ELEMENT=RDX.DRIVE-PAVE-DEPTH
GROUPS
0000 TO 0600
0601 TO 1000
1001 TO 9999
+SELECT
  INCLUDE ROADDATA-LAYERS IF:
   RDL.TRAN-DIRECT *EQ* 'C' *AND* RDL.DEPTH *GT* '0000'
  INCLUDE CROSS-SECTIONS IF:
   RDD.WORK-ITEM/1/ *EQ* 'B'
+TITLES
INTERSTATE SURFACE BESALS (AVERAGE AND TOTAL)
BY DRIVE SURFACE WORK ITEM AND
PAVEMENT DEPTH ( 0-6", 6-10", 10+")
/*
```

The above sample may be copied from TRN.RI00SYSE(ESLMAT2).

The next sample shows how to use the command to put data in the graphics libraries. The intent is to produce a graph of the average esals on latest surfaces by year of rehabilitation. After the command has run, members of the graphics library ADMCDATA will have records corresponding to the summarized data. When used with the PGF (Presentation Graphics Feature) to produce a graph, the desired picture can be produced with minimum effort.

Note the "EXEC DTRIPGF" and two ADMC DD statements must be included as shown in this case.

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```
        //JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
        //             MSGCLASS=2,MSGLEVEL=(2,0)
        /*JOBPARM ROOM=R820,LINES=5
        /*ROUTE  PRINT R0
        //TIS EXEC DTRIT,TIME=9,
        //    PRINTDD=TSO,OUTFILE=
        //ADMCDATA DD DISP=OLD,DSN=USER-ID.ADMCDATA.DATA
        //ADMCFORM DD DISP=OLD,DSN=USER-ID.ADMCFORM.DATA
        //SYSIN DD *
        :ESAL-MATRIX-SUMMARY,NO-MESSAGES,ESALS,SURFACE,AVERAGE,
        :   OPTLIST,ESAL-START-DATE=01/01/1986,ESAL-END-DATE=12/31/1986,
        :   GRAPH=ESALS,ADMC-MEMBER=ES3
        +ROUTES
        ROUTE-SYS=01-03
        +CATEGORIES
        DATA-ELEMENT=ESL.TYPE
        DATA-ELEMENT=RDX.YEAR-LAST-REHAB
        +SELECT
          INCLUDE ROADDATA-LAYERS IF:
           RDL.TRAN-DIRECT *EQ* 'C' *AND* RDL.DEPTH *GT* '0000'
        +TITLES
        AVERAGE SURFACE ESALS
        BY TYPE AND LAST REHABILITATION YEAR
        DATA TO GRAPHICS MEMBERS ES3B AND ES3C
        /*
```

The above sample may be copied from TRN.RI00SYSE(ESLMAT3).

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

Introduction to EXTRACTION

TIS data extraction is a complex process, requiring a good understanding of the TIS files. Each application should be carefully developed as follows:

1. Become familiar with the appropriate TIS files. Choose which file(s) will be the source of the desired data. Read: "TIS File Overview", pp. 8-426.

2. Understand the +EXTRACT subcommand; (1) how it combines data from different files, and (2) how extracted data elements determine segment breaks. Read: "The +EXTRACT Subcommand", pp. 8-442, and "Segments or Points", pp. 8-447.

3. Develop the report gradually by (1) using the LIST option initially, and (2) starting with a single route. After the data format is established, then the report should be run full-scale.

4. Understand the interaction between the EXTRACT-DEFAULT option and +SELECT.

EXTRACTION Sample Setups

Several sample EXTRACTION job setups are illustrated beginning on page 8-463. Each job setup is explained, along with a sample of the extracted data resulting from the report. The applications are:

1. Extract data necessary to compute accident rates in no passing zones.

2. Extract surface type from the roadlog and roadway history files to compare information.

3. Extract 1987 condition rating data and ADT.

4. Extract data necessary to compute a length-weighted sufficiency rating for condition rating "D" segments.

5. Extract traffic volumes for several years.

6. Extract length-weighted ADT between trunk highway intersections.

7. Extract roadway segments (determined by the sections file) and data required to compute accident rates for those segments.

8. Extract data to be used as a control section cross-reference.

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TIS File Overview

TIS is an integrated file system. The data is spread across many separate files, which are divided for logical, political, and chronological reasons. Ideally, each data value in the files is as close to "raw" as possible, and stored in exactly one place. There are many exceptions to this rule, which can result in conflicting information.

All files are integrated by a key made up of route system, route number, and reference point. Records are retrieved in order by this key, which makes programs fast when moving through the data in the increasing reference point direction. Record keys do not have to match exactly across files, i.e., key-low access is used to match data by location.

Some files contain data for all roadways, some only for the trunk highway system. Some files contain historical data, while others only "current" information.

Route system, route number, and reference point are never historical in TIS. Only the current value is present. Files that are "historical" describe the history of a physical location, but there is no way of determining if the route number associated with that location has ever been different.

The following pages describe the types of files in TIS. Each file is then described individually. For more on each file, see chapter 2. For complete details on each data element in the files, see Appendix E.

TIS File Types

Type 1. Segment flat file. Describes a length of route from reference point to reference point, i.e., each record has a beginning and an ending. The longest possible record (up to 1,000 miles) could describe an entire route, the shortest possible record is 0.001 miles long. Some records have separate parallel data elements describing individual roadways (if divided). All have only "current" values (some may have a fixed number of generations for traffic or rating information). TIS segment flat files are:

- Roadlog
- Sections
- Street name
- Sufficiency hazards (overlapping records)
- Sufficiency rating

Secondary files of this type are those that do not exist permanently, but are created by a TIS command from data in TIS primary files:

- Bikeway

Section accident analysis

Type 2. Point flat file. Describes a structure or event considered to be a point along a route. All have only "current" values (some may have a fixed number of generations for traffic or rating information). TIS point flat files are:

- Accidents
- Bridge
- Intersection/Interchange
- Rail grade crossing

Secondary files of this type are those that do not exist permanently, but are created by a TIS command from data in TIS primary files:

- Intersection accident analysis
- Bridge accident analysis

NOTE - The Logpoint file is merged into the Roadlog file from the viewpoint of extraction. Logpoint locations can be distinguished by remark code "DS".

Type 3. Segment hierarchical. Describes a length of roadway from reference point to reference point. The "hierarchy" makes this different from Type 1 file types, since each record here has "children" (multiple values for some data elements). TIS segment hierarchical files are:

- Condition rating
- Condition rating data
- Roadway history (overlapping records)
- Roadway history cross-section
- Traffic

Type 4. Computed. Viewed as a "file", this is actually a length-weighted value computed over a span of one or many records and years of the base file. Can be accessed for a segment or point. TIS computed "files" are:

- ADT
- ESALS

Type 5. Child. A child file is the variable segment of a hierarchical file. It can occur zero, one, or many times within each record. A child record does not have a reference point location -- that is inherited from the parent record. TIS child files are:

- Accident person
- Accident vehicle
- Accident person/vehicle
- Condition rating year
- Condition rating most recent year
- Condition rating data generation
- Intersection leg
- Roadway history layer
- Roadway history cross-section layer
- Roadway history cross-section top driving surface layer
- Roadway history cross-section top right shoulder layer
- Roadway history cross-section top left shoulder layer
- Traffic volume

Why the Roadlog File is Special

The Roadlog file is unique in TIS extraction. It is used to define valid reference point locations for any other data, i.e., no data in any other file can be extracted at a reference point that is not matched by a Roadlog record. This is done automatically by the extraction program, even if roadlog data is not selected or extracted.

Roadlog is also used to determine jurisdictional boundaries (e.g., construction district, maintenance area, patrol station, county, city) for the +ROUTES subcommand. When running +ROUTES by county, it has the same effect as extracting data and selecting based on the county from the corresponding Roadlog record.

Individual File Descriptions

Accident - ACD

Data: One accident.

Scope: All Minnesota roadways, most recent 5 years.

Record types: Point hierarchical. Each record has two child records: one child record per person, one child record per vehicle.

Significant fields: Interchange element - used to associate accidents with interchanges.

Oddities: Not all accidents are available (since not all records have reference points).

Related files: Accident person, vehicle, and person/vehicle.

Accident Person - ACP

Data: Person(s) in accident.

Scope: All persons in this accident.

Record type: Child of point (accident record).

Related files: Accident record is parent record, accident person/vehicle is combination of person child record and the associated vehicle child record.

Accident Vehicle - ACV

Data: Vehicle(s) involved in accident.

Scope: All vehicles involved in this accident.

Record type: Child of point (accident record).

Related files: Accident record is parent record, accident

person/vehicle is combination of vehicle child record and the associated person child record.

Accident Person/Vehicle - ACJ

Data: Person(s) in an accident, together with data for the vehicle they occupied.

Scope: All persons involved in this accident.

Record type: Child of point (accident record). Made by combining accident person record with vehicle record (associated by person "vehicle occupied" and vehicle "vehicle number").

Related files: Accident record is parent.

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ADT - ADT

Data: Length-weighted Annual Average Daily Traffic.

Scope: All roadways in Minnesota, available from 1978 to last year. Available at a point or over any valid segment.

Record types: Computed between command START-DATE and END-DATE, subject to +SELECT on time intervals. Source is traffic volume file.

Significant fields: ADT.

Related files: Traffic and traffic volume.

Section Accident Analysis - ASA

Data: Section accident rate analysis file. Generated by programs from raw data files.

Scope: Depends upon creation parameters.

Record type: Segment (flat).

Significant fields: Accident rate, statistics.

Oddities: Non-permanent file.

Related files: Sections, accidents.

Bridge - BDG

Data: Bridge information (includes culverts).

Scope: All Minnesota bridges with at least one roadway involved.

Record types: Point file.

Significant fields: Functional use (to determine mainline bridges). Over-under (to determine if going over or under structure. Usage (to limit which of three reference point keys is being used).

Oddities: Multiple records in the file for a single structure (one for each route involved). Many data elements have differing interpretations depending on which record is accessed. Each record has 1 to 3 reference point keys.

Related files: Bridge accident analysis.

Bikeway - BIK

Data: Bikeway rating analysis file. Generated by programs from raw data files.

Scope: Depends upon creation parameters.

Record type: Segment (flat).

Significant fields: Bikeway formula rating points.

Oddities: Non-permanent file.

Related files: None.

Bridge Accident Analysis - BNA

Data: Bridge accident rate analysis file. Generated by programs from raw data files.

Scope: Depends upon creation parameters.

Record type: Point file.

Significant fields: Accident rate, statistics.

Oddities: Non-permanent file.

Related files: Bridge, accidents.

Condition Rating Record - CRR

Data: Condition ratings for several years by lane by roadway (PSR - Present Serviceability Rating, SR - Structural Rating, CR - Condition Rating, PQI - Pavement Quality Index).

Scope: Trunk highways, 1967-present. Each record applies to ONE roadway (two records for divided roadways).

Record types: Segment hierarchical. Segment breaks can occur at different locations on each roadway of a divided highway.

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Significant fields: Roadway ID (defines roadway).
Record type (defines "design" breaks).

Oddities: Separate records for multiple roadways. Each type of roadway must be processed in a separate pass.

These fields have been coded as follows:

Roadway ID: "U" means undivided roadway. "I" and "D" mean divided roadway, increasing or decreasing milepost direction, respectively.

Record type: "D" means a design change in one or both roadways at this reference point. This includes changes in surface type or number of lanes. All other records have type "M", which is an intermediate record location at a milepost.

Related files: Condition rating segments (child) and condition rating data (computed from condition rating segments).

Condition Rating Segment - CRY

Data: One year of condition ratings and percent defects by lane for the roadway segment.

Scope: 2 lanes of data, valid within reference point limits of parent condition rating record.

Record types: Child of segment. All children are for same location, each is for a different year. Sorted in order from most recent to earliest.

Significant fields: Year. Surface type determines which defects subfields are present and what their interpretation is.

Oddities: Specific defects fields depend upon surface type code, i.e., only certain names have meaning for each surface type. For example, if the surface type is "C" (concrete), then the defects are stored in fields beginning with "CONC:".

Related files: Condition rating record (parent), condition rating most recent year, condition rating data.

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Condition Rating - Most Recent Year - CR1

Data: First selected generation of condition rating data segment.

Scope: One year of data by lane for the parent record location.

Record types: Child of segment.

Significant fields: Year. Surface type determines which defects subfields are present and what their interpretation is.

Oddities: Specific defects fields depend upon surface type code, i.e., only certain names have meaning for each surface type. For example, if the surface type is "C" (concrete), then the defects are stored in fields beginning with "CONC:".

Related files: Condition rating record (parent), condition rating segment, condition rating data.

Condition Rating Data - CRD

Data: Length-weighted condition rating data in "design" segments.

Scope: Trunk highways, 1967-present.

Record type: Segment hierarchical. Segment breaks can occur at different locations on each roadway. Each record corresponds to one or more CRR records.

Significant fields: Roadway ID, Number of generations.

Oddities: One record for each segment of each roadway (two records for divided roadways).

Related files: Condition rating record and condition rating data generation (child).

Condition Rating Data Generation - CRG

Data: One generation of condition rating data for the

roadway "design" segment.

Scope: Two lanes of data, valid for the roadway within the reference point limits of the "design" segment (CRD).

Record type: Child of segment.

Significant fields: Year.

Oddities: The year is a length-weighted average, e.g., the first year is the average year of the first generation of ratings.

Related files: Condition rating data segment (parent), condition rating segment (CRY).

ESALS - ESL

Data: Length-weighted ESALS (equivalent standard axle load). Currently estimated by formula from physical road data (roadway history cross-section) and heavy commercial average daily traffic (estimated from traffic volume).

Scope: Trunk highways in Minnesota. Available at a point or over any valid segment.

Record types: Computed between command ESAL-START-DATE and ESAL-END-DATE, subject to +SELECT on time intervals and available roadway history cross-section data.

Significant fields: Type (different number if flexible or rigid surface).

Oddities: If all relevant roadway history cross-section data is not also extracted (meaning uniform throughout segment), ESALS will be computed using roadway history cross-section at start of segment (even if it varies throughout the

segment). Traffic used will be valid over the entire segment. See "Introduction to ESALS" in chapter 8 of the User's Manual for more on ESAL calculations.

Related files: Roadway history cross-section and traffic volume.

Intersection Accident Analysis - INA

Data: Intersection accident rate analysis file. Generated by programs from raw data files.

Scope: Depends upon creation parameters.

Record type: Point file.

Significant fields: Accident rate, statistics.

Oddities: Non-permanent file.

Related files: Intersection, accidents.

Intersection - INT

Data: Intersection and interchange type, volumes, signalizations.

Scope: Trunk highways. Used for accident analysis and varies according to district interest.

Record type: Point hierarchical. Each record has 1-9 routes and 1-9 legs. Each intersection leg child records describes one leg.

Significant fields: Intersection type.

Oddities: Also used for rail grade crossing accident analysis (intersection type 5), by allowing programs to link to rail grade crossing file.

Related files: Intersection leg (child), intersection accident analysis.

Intersection Leg - INL

Data: Describes one leg of an intersection.

Scope: Applies only to one intersection and/or interchange.

Record type: Child of point (intersection).

Significant fields: Interchange element code, leg number, route system, route number, reference point (of leg).

Oddities: None.

Related files: Intersection (parent).

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Roadway History - RDH

Data: Construction and maintenance history of roadway. Each record describes a continuous segment of road work for a particular contract.

Scope: Trunk highways, by contract.

Record type: Segment hierarchical. Contains children that describe each layer of work in this segment of the contract.

Significant fields: Road ID (road-1, road-2, undivided), and contract number.

Oddities: Use the roadway history cross-section file to get data for a roadway cross-section (generated from this file). Records in this file are not "end-to-end" like other segment files, i.e., they can overlap each other. For this reason, RDH data cannot be extracted in combination with any other segment file(s) except RDL. Make a separate pass for the other segment

data (see Sample #1).

Related files: Roadway history layer (child), roadway history cross-section.

Roadway History Layer - RDL

Data: One layer of work on one segment of a contract (construction and/or maintenance).

Scope: Applies to one continuous segment of one contract.

Record types: Child of segment. Location determined by roadway history parent.

Significant fields: Cross-section position, transverse direction, work item.

Oddities: Order of layers in record is not consistent. RDL data elements cannot be extracted in combination with any other segment file except RDH (see RDH oddities above).

Related files: Roadway history (parent), roadway history cross-section layer.

Roadway History Cross-section - RDX

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Data: Cross-section for segment of one roadway. All physical data of roadway and its construction and maintenance history.

Scope: Trunk highways. Applies to one roadway for the indicated segment.

Record type: Segment hierarchical. Contains children that describe each layer in the roadway. Children are ordered from top to bottom.

Significant fields: Road ID (road-1, road-2, or

undivided), number of layers (children).

Oddities: Most useful information about the cross-section is in computed data elements of this record. Percent predominance should not be used.

Related files: Roadway history cross-section layer (child), roadway history, roadway history layer.

Roadway History Cross-section Layer - RDY

Data: One layer of a cross-section for a particular segment of a roadway.

Scope: One layer of one roadway defined by parent location (roadway history cross-section).

Record type: Child of segment. Similar to roadway history layer with addition of contract number.

Significant fields: Cross-section position, work item, transverse direction.

Oddities: "CURRENT" or "HISTORY" option affect what layers are present. See the EXTRACTION command for explanation of this option.

Related files: Roadway history cross-section, roadway history layer, roadway history.

Roadway History Cross-section Top Driving Surface Layer - RDD

Data: Top layer of a cross-section for a particular segment of a roadway in the driving surface.

Scope: One layer of one roadway defined by parent location (roadway history cross-section).

Record type: Child of segment. Similar to roadway history layer with addition of contract number.

Significant fields: Work item.

Oddities: "CURRENT" or "HISTORY" option affect what layers are present.

Related files: Roadway history cross-section, roadway history layer, roadway history.

Roadway History Cross-section Top Right Shoulder Layer - RRS

Data: Top layer of a cross-section for a particular segment of a roadway in the right shoulder.

Scope: One layer of one roadway defined by parent location (roadway history cross-section).

Record type: Child of segment. Similar to roadway history layer with addition of contract number.

Significant fields: Work item.

Oddities: "CURRENT" or "HISTORY" option affect what layers are present.

Related files: Roadway history cross-section, roadway history layer, roadway history.

Roadway History Cross-section Top Left Shoulder Layer - RLS

Data: Top layer of a cross-section for a particular segment of a roadway in the left shoulder.

Scope: One layer of one roadway defined by parent location (roadway history cross-section).

Record type: Child of segment. Similar to roadway history layer with addition of contract number.

Significant fields: Work item.

Oddities: "CURRENT" or "HISTORY" option affect what layers are present.

Related files: Roadway history cross-section, roadway history layer, roadway history.

Rail Grade Crossing - RGC

Data: Rail grade crossing.

Scope: All active rail grade crossings in Minnesota.

Record type: Point file.

Significant fields: None.

Oddities: None.

Related files: Intersection, intersection accident analysis.

Roadlog - RLG

Data: Jurisdictional boundaries, physical data.

Scope: All roadways in Minnesota.

Record types: Segment flat. Also contains "non-mileage" segments (gap, coincident, and non-existent mileage), which are never seen by extraction.

Significant fields: Remark code. Note: "DS" should be treated no differently than " ".

Oddities: Intersection category (indicates route system of intersecting route), and verbal description. Both really describe the beginning point of the segment and not the segment as a whole.

Related files: None.

Sections - SEC

Data: Used for accident section rate analysis. Contains general design characteristics.

Scope: Trunk highways.

Record type: Segment (flat).

Significant fields: None.

Oddities: Maintained by individual districts. Level of detail may vary.

Related files: Section accident analysis.

Street Name - STR

Data: Street names.

Scope: All Minnesota highways.

Record type: Segment (flat).

Significant fields: Street name.

Oddities: None.

Related files: None.

Sufficiency Rating - SUF

Data: Trunk highway sufficiency ratings and related data.

Scope: Trunk highways.

Record type: Segment (flat).

Significant fields: Sufficiency ratings, spring loads.

Oddities: Most data is duplicated in other TIS files.

Related files: Sufficiency hazard.

Sufficiency Hazard - SUH

Data: Trunk highway sufficiency hazards (deficient curves, no passing zones).

Scope: Trunk highways.

Record types: Segment (flat).

Significant fields: Hazard type.

Oddities: Records in this file are not "end-to-end" like other segment files, i.e., they can overlap each other. For this reason, SUH data cannot be extracted in combination with any other segment file(s). Make a separate pass for the other segment data (see Sample #1).

Related files: Sufficiency rating.

Traffic - TRF

Data: Raw ADT (non-directional).

Scope: All roadways in Minnesota, from 1978 to the year before the current year.

Record type: Segment hierarchical. Each child contains one year of ADT.

Significant fields: Full volumes (number of volume children selected).

Oddities: None.

Related files: Traffic volume segment (child).

Traffic Volume Segment - TRV

Data: One year of raw ADT for a roadway
(non-directional).

Scope: ADT for location in parent record (traffic).

Record type: Child of segment (traffic).

Significant fields: AADT, year.

Oddities: Heavy commercial AADT is -1 if unknown.

Related files: Traffic volume.

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The EXTRACTION Command
****

Function: "Extracts" specified data elements from
selected records in any of the TIS files.

Description: Data extractions means copying data from the
file where it is stored to some other place.
The other place can be another computer file
or printed output. This commands provides a means of
extracting information from any of 17 TIS files. The
intent is to provide a subset of TIS data in a
user-specified format that can be processed by other
software (e.g., SAS) or downloaded to a personal computer
for producing specialized reports not readily available
from TIS commands. The extracted data may also be printed
"as is" and used as a report.

The +EXTRACT Subcommand

A specialized subcommand, +EXTRACT, is used to specify data elements. The same names are used as with +SELECT or +CATEGORIES. Substring, REDEFINES, POINTS, and RE-GROUP are allowed.

Up to 20 different files can be referenced. Up to 500 data elements can be extracted. All extracted data is output in "character" format, with a maximum length of 8192 characters. "Literal" values may be merged into the output, which helps make the results more readable, and is useful in producing specialized data files.

Generic Data Elements

Generic data elements names are implemented with +EXTRACT. These names apply to the point or segment as a whole and not to any particular data file (although they are always determined by one or more data file values):

ROUTE-SYSTEM The 2-digit route system code of the segment or point.

ROUTE-NUMBER The 8-digit route number of the segment or point.

START-REF-POINT The starting reference point of the segment (for segment data), or the point location (for point data).

END-REF-POINT The ending reference point of the segment (for segment data), or the point location (for point data).

START-DESCRIPTION The verbal description at the starting reference point of the segment (may not always be available).

END-DESCRIPTION The verbal description at the ending reference point of the segment (may not always be available).

START-X The X-coordinate (Universal Transverse Mercator) of the starting reference point (trunk highways only).

START-Y The Y-coordinate (Universal Transverse Mercator) of the starting reference point (trunk highways only).

END-X The X-coordinate (Universal Transverse Mercator) of the ending reference point (trunk highways only).

END-Y The Y-coordinate (Universal Transverse Mercator) of the ending reference point (trunk highways only).

MILEPOINT The milepoint (nnnn.nnn) equivalent of the starting reference point of the segment or point.

END-MILEPOINT The milepoint (nnnn.nnn) equivalent of the ending reference point of the segment or point.

LENGTH8 The length (nnnn.nnn miles) of the segment.

LENGTH6 The length (nn.nnn miles) of the segment (will be incorrect for segments 100 miles or longer).

Literal Values

Format: L"string"

Any string from 1 to 30 characters may be placed between the double quotes (containing any character except "). This value will be placed exactly into the output.

Column Headings

Column headings may be used for listing output. Any string (without blanks in it) can be entered on the same line as the data element name (separated by at least one blank). If so, it will be used as a column heading for printed output. Literals can be used between data elements to provide spacing between columns of data.

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Examples:

```
+EXTRACT
SUF.SP-RD1-ADJUSTED   RD1-SR
L"      "
SUF.EXIST-NUM-LANES   RD1-LANES
L"      "
```

Note the use of literals to space the extracted data so the column headings will fit (otherwise column heading is limited to the width of the data field). Column headings do not apply to generic data elements or literals.

Substrings

Substring can be used to extract part of a data element (available for character format data elements only). The notation indicates which columns are to be extracted:

```
fid.name/i/  ith character of data element "name" from
             file "fid."

fid.name/i-j/  characters i-j of data element "name"
               from file "fid."
```

i and j must be between 1 and n, where "n" is the length of the data element. Examples:

```
RLG.SURF-TYPE-RD1/1/   first character of surface type.

SUF.ROUTE-NUMBER/5-8/  Columns 5-8 of route number.
```

NOTE: Substring cannot be used with generic data elements.

Redefines

Some or all of the values of a data element may be "redefined" into a smaller set of values. Values may be redefined to anything (same length as original data element). A maximum of 32 redefinitions can be specified for each data element.

Example:

```
RLG.URBAN-MUNIC-CODE
REDEFINES
1 R
```

```
   3 R
   2 U
   4 U
```


...redefines 4 urban-municipal codes into rural (R) or urban (U).

NOTE: Redefines cannot be used with generic data elements.

See chapter 7, "CATEGORIES Code Redefinition" for more on use of REDEFINES.

Re-Group

Regrouping is similar to redefining (explained above) except that a range of values can be grouped and another value substituted. It should be used for quantitative data elements with a large range of possible values (which would require many redefines lines). Example:

```
ADT.ADT
RE-GROUP
000000 004999 005000
005000 009999 010000
010000 024999 025000
025000 999999 025000
```

...re-group ADT into 4 ranges, under 5000, 5000-9999, 10000-24999, and above 25000, substituting the value in the rightmost column for any value falling in that range.

NOTE: Re-group cannot be used with generic data elements.

Points

Point values can be used to determine segment breaks when extracting segment data. The "POINTS" keyword is used to specify what point values should cause segment breaks. The data element associated is not actually extracted in this case. A maximum of 32 points can be specified with each data element. Example:

```
   RLG.INTERSECT-CATEGORY
   POINTS
   01
   02
   03
```

...a new segment is started whenever the intersection category is 01, 02, or 03 (intersecting route system code for Interstate, U.S., or Minnesota trunk highways). This would terminate the current segment and begin a new one at a Minnesota trunk highway location (even if the segment also began at a Minnesota trunk highway intersection). Note how this differs from the following:

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```
   RLG.INTERSECT-CATEGORY
```

...extracts the intersection category code. This would break a segment only when the value changed, which would not happen on two consecutive Minnesota trunk highway intersections. This particular data element really doesn't make sense in extracted segments without using the POINTS option.

NOTE: Points cannot be used with generic data elements.

Extracting Child Data

Whenever child data elements (file type 7 above) are extracted, the data element is repeated for each selected child. At most one child file can be referenced in the EXTRACT subcommand. Once a child data element has been specified, the only subsequent allowable data elements are literals and data elements from the same file. Example:

```
   +EXTRACT
   START-REF-POINT
   L" "
   END-REF-POINT
   L" "
   TRV.YEAR
   L" "
   TRV.AADT
```

L" "

Would extract the following:

000+00.000 003+00.540 1987 000550 1986 000515 1985 000511
003+00.540 010+00.100 1987 001015 1986 000999 1985 000510
....etc.

assuming there were volumes for 1987, 1986, and 1985 at the requested locations. Note how the TRV data elements are repeated for each "child occurrence" (traffic volume year in this case). The length of extracted data can vary from record to record, depending on the number of selected children.

Segments or Points?

Either a segment or point perspective must be chosen for extracted data. The data elements referenced by +EXTRACT must meet differing requirements based on the point/segment option:

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If POINTS:

Exactly 1 point file can be extracted. Zero or one of its children segments (if they exist) can be extracted. Zero, one, or all segment files (excluding segment children) can be extracted. Any computed values can be extracted. The generic data elements LENGTH6 and LENGTH8 will always be 0.000

Every extracted location corresponds to a selected point (start reference point = end reference point). Non-selected points will not be extracted.

Roadlog data elements will be retrieved from the record with a starting reference point at or preceding the point location except in the following circumstances:

1. When the point is exactly at the beginning of a non-mileage section of roadlog (gap, coincident,

or non-existent), the preceding roadlog record on the same route will be used.

2. When the point is exactly at the end of the route (roadlog EN record), the preceding roadlog record on the same route will be used.

Other segment data elements will be retrieved from the corresponding record with a starting reference point less than or equal to the point location.

If point children data elements are extracted, they are repeated for each selected child. For example, if extracting accidents and three vehicles are to be extracted for a particular accident, the vehicle data element fields are repeated three times.

If children of the point are extracted, and there are no selected children, then the point is not extracted.

If SEGMENTS:

Zero, one, or all segment files can be extracted. Zero or one child segment file can be extracted. Zero, one, or all point files (and children) can be extracted. All computed values, and all generic data elements can be extracted.

If EXTRACT-DEFAULT used:

Data will be extracted for all valid mileage

locations (defined by the roadlog file) on the requested roadways.

If EXTRACT-DEFAULT omitted:

Data will be extracted only for all valid mileage segments with selected data in all segment files referenced in +EXTRACT.

A segment break will occur at:

1) The end of valid mileage segment (end of route, beginning of gap or coincident or non-existent segment).

2) A change in any non-generic or non-computed extracted data element.

3) An occurrence of any specified POINT value (see POINTS option of +EXTRACT on previous pages).

4) The actual digitized location, if X/Y coordinate generic values extracted.

Point files counted:

Any point file (or children of point file) data elements will be extracted as "count" fields only. This is a 7-digit numeric count of the number of occurrences of selected points of that type within each segment. Points at segment breaks are counted with the segment beginning at the point location unless the next segment is not a valid mileage segment (such points are counted with the prior segment).

ADT and ESAL data are computed after the segment or point location has been determined. This means a change in ADT, for example, will not cause a segment break to occur. The ADT and ESAL data elements are always length-weighted values over the entire segment. When extracting points, the ADT and ESAL data apply to the point location exactly, and do not behave any differently than any other non-generic data element.

Specifying Locations

One of two methods must be used to specify locations for extracting data:

1) ROUTES subcommand, or

2) Termini file.

+ROUTES
The ROUTES subcommand indicates what routes or portions of routes should be processed by the EXTRACTION program. Within those limits, only valid mileage segments (according to the roadlog file) are processed. Within those limits, data can be further excluded by using the SELECT subcommand (and omitting the EXTRACT-DEFAULT option). Refer to "EXTRACT-DEFAULT omitted" on the previous page.

TERMINI
A termini file can be used instead of the ROUTES subcommand. Each termini record is limited to a single route. Cannot be used with POINTS.

Missing or Non-selected Data

If data is missing from one or more of the extracted files, one of two actions is taken:

1) If a user-specified default character has been supplied ("EXTRACT-DEFAULT" keyword), that value is substituted for missing or non-selected data in the extracted record, and the location is successfully extracted.

2) If no default character was specified, nothing is extracted for this location.

3) If POINTS extraction and the point has no children (or none selected), the point is not extracted.

Allowable Data Element Names for Extraction

Data Element Prefix	Data Type	Description
	generic	ROUTE-SYSTEM
	generic	ROUTE-NUMBER
	generic	START-REF-POINT
	generic	END-REF-POINT
	generic	START-DESCRIPTION
	generic	END-DESCRIPTION
	generic	START-X
	generic	START-Y
	generic	END-X
	generic	END-Y
	generic	MILEPOINT
	generic	END-MILEPOINT
	generic	LENGTH8
	generic	LENGTH6
ACD	point	Accident details record
ACV	child	Accident vehicle (of accident record)
ACP	child	Accident person (of accident record)
ACJ	child	Accident person/vehicle (of accident record)
ADT	computed	ADT data
*ASA	segment	Section accident analysis record
BDG	point	Bridge record
*BIK	segment	Bikeway record
*BNA	point	Bridge accident analysis record
CRD	segment	Condition rating data
CRG	child	Condition rating data generation
CRR	segment	Condition rating record
CRY	child	Condition rating (of condition rating record)
CR1	child	Condition rating most recent year (of condition rating record).
ESL	computed	ESAL data

*INA	point	Intersection accident analysis record
INT	point	Intersection record
INL	child	Intersection leg (of intersection record)
RDH	segment	Roadway history record
RDL	child	Roadway history layer (of roadway history record)
RDX	segment	Roadway history cross-section record
RDY	child	Roadway history cross-section layer (of roadway history cross-section record)

(continued on next page)

Data Element Prefix	Data Type	Description
RDD	child	Roadway history cross-section top driving surface layer (of roadway history cross-section record)
RRS	child	Roadway history cross-section top right shoulder layer (of roadway history cross-section record)
RLS	child	Roadway history cross-section top left shoulder layer (of roadway history cross-section record)
RGC	point	Rail grade crossing record
RLG	segment	Roadlog record
SEC	segment	Sections record
STR	segment	Street name record
SUF	segment	Sufficiency rating record
SUH	segment	Sufficiency hazards record
TRF	segment	Traffic record
TRV	child	Traffic volume (of traffic record)

*These are non-permanent files and must be created by other TIS commands before extracting. They require the following DD statements added to the extraction job setup:

BIK - BIKEWAY
ASA - ASAFILE
INA - INAFILE
BNA - BNAFILE

Data Destination

Extracted data can be printed (up to the first 132 columns) and/or written to a sequential file. This command will optionally compute necessary information such as record length for the target file. All extracted data written to a file is in "character" format, which is easily downloaded to a personal computer.

Writing to a File

If extracted data is to be written to a file, a DD statement named EXTFILE must be added to the job setup to define the target file. The file can be a disk or tape file. The file must not exist prior to running the job.

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The file must be specified by including a DD statement EXTFILE as follows:

```
//EXTFILE DD DISP=(NEW,CATLG,DELETE),DSN=user-id.anyname,
//           UNIT=SYSDA,SPACE=(CYL,(1,1))
```

where "user-id" is the user's TSO logon ID and "anyname" is a unique name for the dataset.

The specified file will be created during EXTRACTION. It will be a sequential file, with variable-length records, i.e., each record will be exactly the length of the data, even if child data is extracted. Variable-length records have the following format:

Columns	Length	Format	Data
1-2	2	binary	Record length (data length+4)
3-4	2	-	unused
5-n	-	data	Extracted data

The record length can be ignored for downloading. Most

utilities (such as SPF Edit or SAS) are capable of dealing with variable-length records).

Required Command Parameters:

EXTRACT subcommand

- Any data element from any of the files listed previously can be referenced.
- Any of the generic data elements can be referenced (up to 9 times each).
- Literal values may be used anywhere.
- The maximum number of extracted items (including generic and literal values) is 500.
- The maximum length of extracted data is 8192 bytes.
- The maximum number of files (different data element prefixes) that can be referenced is 20.
- Column headings can be used with any data element except literals. Headings cannot contain any embedded blanks. Example:

  ```
  +EXTRACT
  RLG.ROUTE-NUMBER   RTE-NUM
  RLG.FUNCT-CLASS    FC
  ```

- REDEFINES, RE-GROUP, POINTS, and substrings can be used (with non-generic data elements).

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If accidents or ADT extracted:

```
   START-DATE=mm/dd/yyyy   <-- required to set time period
     END-DATE=mm/dd/yyyy
```

If condition rating data extracted (CRD, CRR, CRY, CR1, or CRG data elements), or roadway history cross-sections extracted (RDX, RDY, RDD, RRS, or RLS data elements), or ESALS extracted (ESL data elements):

DIRECTION=	INCREASE	Increasing roadway data only.
	DECREASE	Decreasing roadway data only.
	UNDIVIDED	Undivided roadway data only.

- Condition rating data and roadway history cross-sections must be processed by roadway (i.e., a separate pass for each physical road).

Optional Command Parameters

NOTE: Either ROUTES or TERMINI is required.

ROUTES subcommand - Operates under LIST classification (see chapter 5). Extracted data will be in order specified by ROUTES parameters.

TERMINI file - Specifies beginning and endpoints:

- File identified by DD statement TERMINI.
- Format:

Columns	Length	Description
1-2	2	Route system (01-23)
3	1	blank
4-11	8	Route number (nnnnnnnx)
12	1	blank
13-22	10	Start reference point (nnn+nn.nnn)
23	1	blank
24-32	10	End reference point (nnn+nn.nnn)

If ESALS extracted:

ESAL-START-DATE=mm/dd/yyyy
ESAL-END-DATE=mm/dd/yyyy

- Optional to set time period. If left blank, defaults to all time up to current date.

NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed (default).

- The option list is a listing of your command parameters.

WRITE	Write the extracted records to EXTFILE.
LIST-&-WRITE	List and write extracted records.
LIST	List extracted records (default).

- If WRITE is used, the data will be written to DD statement EXTFILE (this must be included in the job setup).
- List will print only the first 132 columns of extracted data.

POINTS	Data will be extracted as points.
SEGMENTS	Data will be extracted as segments (default).

EXTRACT-DEFAULT=x

- If coded, the specified character will be substituted for any data element that is missing or not selected.

- If omitted, segments or points with any missing or non-selected data will not be extracted.

The following options apply to accident data only (ACD, ACV, ACP, or ACJ):

ACC-INT-LOCN=	INTSECT	Intersection accidents.
	NON-INTSECT	Non-intersection accidents.
	ALL	All accidents (default).

- "INTSECT" accidents are those with
  ACD.INTSECT-RELATION =
  02 - T-INTERSECTION
  03 - Y-INTERSECTION
  04 - 4-LEGGED INTERSECTION
  05 - 5 OR MORE LEG INTERSECT
  06 - TRF CIRCLE OR ROUNDABOUT
  07 - INTERSECTION-RELATED
  20 - INTERCHANGE ON RAMP
  21 - INTERCHANGE OFF RAMP
  22 - INTERCHANGE OTHER AREA

ACC-RELIABILITY=
- 1 Reliability '01' only.
- 2 Reliability '01' and '02'.
- 3 Reliabilities '01'-'03'. (default).

- Use to select based on reliability of
  location information (reference point).

ALL-ACCIDENTS - Include all accidents (R.P. 999+99.999, etc.)
RLG-ACCIDENTS - Only accidents in valid mileage segments (default).

FUNCT-USE=n

- This parameter can be used to include bridges
  with only the specified functional use.
  Defaults to -1 (all uses). See BDG.FUNCT-USE
  for details.

USAGE=
- 1 Use first key to access bridges.
- 2 Use second key to access bridges.
- B Use bridge key to access bridges.

- The default is to use all keys.

The following options apply to condition rating records and condition rating data only (CRR, CRY, CR1, CRD, or CRG data elements):

START-YEAR=nnnn Data for years before nnnn is excluded.

END-YEAR=nnnn Data for years after nnnn is excluded.

-This exclusion is done BEFORE SELECT is processed.

The following option applies to intersection data only (INT or INL data elements):

VIA-XREF	Intersections accessed via all keys.
VIA-INTSECT	Intersections accessed via principal key (default).

The following option applies to roadway history cross-section data only (RDX, RDY, RRD, RRS, or RLS data elements):

HISTORY	Include all layers in cross-section.
CURRENT	Include layers in current cross-section (default).

- CURRENT excludes all layers prior to the most recent grading.

TITLES subcommand

- Any of the print-formatting parameters (see chapter 4).

SELECT subcommand

Select criteria may be applied to any or all of the extracted files. The file must be referenced by the EXTRACT subcommand in order to have SELECT options (roadlog is the only exception). See the section "Missing or Non-selected Data" and the EXTRACT-DEFAULT option for more on selected vs. non-selected results. Also refer to the file descriptions section for help in coding select criteria.

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- To select accident records:

  EXCLUDE
  INCLUDE ACCIDENTS IF:

  - ACD, ACV, ACP, and ACJ data elements can be referenced.
  - ACV, ACP, and ACJ data elements must be referenced by the multi-correlation facility (*ANY* or *ALL*).

- To select vehicle records:

  EXCLUDE
  INCLUDE VEHICLES IF:

  - ACV data elements can be referenced.

- To select person records:

  EXCLUDE
  INCLUDE PERSONS IF:

  - ACP data elements can be referenced.

- To select ADT:

EXCLUDE
INCLUDE ADT-RECORDS IF:

- ADT data elements can be referenced.

- To on time intervals (for ADT computations):

EXCLUDE
INCLUDE TIME IF:

- TIM data elements can be referenced.
- Time is the period between START-DATE and END-DATE. Select only applies within that range.
- For more on traffic volume options, see "Introduction to Traffic Models" and "Time Intervals" in chapter 8.

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- To select bridge records:

EXCLUDE
INCLUDE BRIDGE-RECORDS IF:

- BDG data elements can be referenced.

- To select bridge analysis records:

EXCLUDE
INCLUDE BDG-ACC-ANAL-RECORDS IF:

- BNA data elements can be referenced.

- To select bikeway records:

EXCLUDE
INCLUDE BIKEWAY-RECORDS IF:

- BIK data elements can be referenced.

- To select condition rating data:

  EXCLUDE
  INCLUDE CR-SEGMENTS IF:

  - CRD and CRG data elements can be referenced.
  - CRG data elements must be referenced by the multi-correlation facility (*ANY* or *ALL*).

- To select condition rating records:

  EXCLUDE
  INCLUDE CR-RECORDS IF:

  - CRR, CRY, and CR1 data elements can be referenced.
  - CRY data elements must be referenced by the multi-correlation facility (*ANY* or *ALL*).

- To select condition rating years:

  EXCLUDE
  INCLUDE CR-YEARS IF:

  - CRY data elements can be referenced.

- To select ESALS:

  EXCLUDE
  INCLUDE ESALS IF:

  - ESL data elements can be referenced.

- To select intersection records:

  EXCLUDE

INCLUDE INTERSECTIONS IF:

- INT and INL data elements can be referenced.
- INL data elements must be referenced by the multi-correlation facility (*ANY* or *ALL*).

- To select intersection analysis records:

EXCLUDE
INCLUDE I/I-ACC-ANAL-RECORDS IF:

- INA data elements can be referenced.

- To select roadway history records:

EXCLUDE
INCLUDE ROADDATA-RECORDS IF:

- RDH and RDL data elements can be referenced.
- RDL data elements must be referenced by the multi-correlation facility (*ANY* or *ALL*).

- To select roadway history layers:

EXCLUDE
INCLUDE ROADDATA-LAYERS IF:

- RDL data elements can be referenced.

- To select roadway history cross-sections:

```
  EXCLUDE
  INCLUDE  CROSS-SECTIONS IF:

           - RDX, RDY, RDD, RRS, and RLS data elements
             can be referenced.
           - RDY data elements must be referenced by
             the multi-correlation facility (*ANY* or
             *ALL*).


- To select roadway history cross-section layers:

  EXCLUDE
  INCLUDE  CROSS-SECTION-LAYERS IF:

           - RDY data elements can be referenced.


- To select rail grade crossing records:

  EXCLUDE
  INCLUDE  CROSSINGS IF:

           - RGC data elements can be referenced.


- To select roadlog records:

  EXCLUDE
  INCLUDE  ROADLOG-RECORDS IF:

           - RLG data elements can be referenced.


- To select section records:

  EXCLUDE
  INCLUDE  SECTION-RECORDS IF:

           - SEC data elements can be referenced.


- To select section analysis records:

  EXCLUDE
  INCLUDE  SECTN-ANAL-RECORDS IF:

           - ASA data elements can be referenced.
```

- To select street name records:

  EXCLUDE
  INCLUDE STREET-NAME-RECORDS IF:

           - STR data elements can be referenced.

- To select sufficiency records:

  EXCLUDE
  INCLUDE SUFFICIENCY-RECORDS IF:

           - SUF data elements can be referenced.

- To select sufficiency hazard records:

  EXCLUDE
  INCLUDE SUFFICIENCY-HAZARDS IF:

           - SUH data elements can be referenced.

- To select traffic records:

  EXCLUDE
  INCLUDE TRAFFIC-RECORDS IF:

           - TRF and TRV data elements can be
             referenced.
           - TRV data elements must be referenced by
             the multi-correlation facility (*ANY* or
             ALL).

- To select traffic volumes:

  EXCLUDE
  INCLUDE TRAFFIC-VOLUMES IF:

           - TRV data elements can be referenced.

JCL for EXTRACTION

The JCL (Job Control Language) used to run EXTRACTION follows:

```
1  //jobname  JOB (account),'name',CLASS=G,NOTIFY=user-id,
2  //         MSGCLASS=2
3  /*JOBPARM ROOM=3,LINES=5
4  //TIS EXEC DTRIX,TIME=3,FORM='(2)',
5  //               PRINTDD=TSO,OUTFILE=
6  //EXTFILE DD DISP=(,CATLG),UNIT=SYSDA,
7  //           SPACE=(CYL,n),DSN=user-id.name
8  //SYSIN DD *
9  ...extraction command ...
10 /*
```

Things to note:

Line 1: CLASS=G <-- Always use this job class.

Line 4: TIME=3 <-- Minimum time. May need to be increased for larger amounts of data.

OUTFILE= <-- Change to OUTFILE=PRINTER to print at a line printer. Change Line 3 to specify which one.

Line 6-7: Delete these if extracted data is NOT to be written to a file (LIST option).

If WRITE is used, change "n" to the number of cylinders needed to contain the data. This can be estimated by using Option 6 on the TSO USER dialogue (or option U.6 of TISSPF.

If WRITE is used, the file must not exist prior

to running the job. If it does, the data will be written to a second file, which is not cataloged and will be hard to find. To prevent this, the following lines can be inserted between lines 3 and 4:

```
// EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
  DELETE 'user-id.name' PURGE
/*
```

A condition code of 8 will be returned by this step if no dataset is found to delete (this can be ignored).

1
+
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Sample #1 - Extract data necessary to compute accident rate in no passing zones.

Step 1. Extract no passing zone segments from sufficiency rating hazards file. Write extracted data to a file in a format which can be used as TERMINI input for step number 2.

Step 2. Use output from step 1 to define segments for extracting accident counts, segment length, and ADT.

The reason for using two steps is that sufficiency hazards data cannot be extracted in combination with other data files. By extracting the sufficiency hazards in "TERMINI" format, the second step will only consider roadway segments that are no passing zones.

Explanation of job setup

Step 1 - Extract no passing zone segments:

1. Define data destination by (a) LIST-&-WRITE option, and (b) //EXTFILE DD .... (allocates temporary file to write extracted data to).

2. Define locations by +ROUTES. In this case, trunk highway 13, from the reference post 84 to the end.

3. Further select locations with +SELECT to be no passing zones only (SUH.HAZARD-TYPE *EQ* 'Z').

4. Since the EXTRACT-DEFAULT option is omitted, only selected segments (i.e., no passing zones) will be extracted.

5. Extract segment termini. The last two data elements (sufficiency hazard type and length) are not required, but help confirm that the correct segments were extracted, and will be ignored by the second step anyway.

The job setup follows on the next page....

1
+
PAGE 593

```
//jobname  JOB (account),'name',CLASS=G,NOTIFY=user-id,
//         MSGCLASS=2
/*JOBPARM ROOM=3,LINES=5
//TIS EXEC DTRIX,TIME=3,REGION=1500K,FORM='(2)',
//               PRINTDD=TSO,OUTFILE=
//EXTFILE DD DISP=(,CATLG),UNIT=SYSDA,
//           SPACE=(CYL,1),DSN=user-id.SUH
//SYSIN DD *
:EXTRACTION,LIST-&-WRITE,SEGMENTS
+ROUTES
ROUTE-SYS=03,ROUTE-NUM=13,START-REF=84
+SELECT
INCLUDE SUFFICIENCY-HAZARDS IF:
 SUH.HAZARD-TYPE *EQ* 'Z'
+EXTRACT
ROUTE-SYSTEM
L" "
```

```
ROUTE-NUMBER
L" "
START-REF-POINT
L" "
END-REF-POINT
L" "
SUH.HAZARD-TYPE
L" "
SUH.LENGTH
/*
```

The printed output resulting from this job setup is on the following page. The file output will be used as TERMINI input to the EXTRACTION command in step 2 of this example.

1
+

Explanation of job setup

Step 2 - Accident rate data for segments:

1. Define data destination by LIST option.

2. Define accident and ADT time period by START-DATE and END-DATE.

3. Define locations by including //TERMINI DD statement,
   specifying file created by step 1.

```
//jobname  JOB (account),'name',CLASS=G,NOTIFY=user-id,
//         MSGCLASS=2
/*JOBPARM ROOM=3,LINES=5
//TIS EXEC DTRIX,TIME=3,FORM='(2)',
//               PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:EXTRACTION,LIST,EXTRACT-DEFAULT=?,SEGMENTS,
:   ACC-INT-LOCN=NON-INTSECT,
:   START-DATE=01/01/1987,END-DATE=12/31/1987
+EXTRACT
ROUTE-SYSTEM
L" "
ROUTE-NUMBER
L" "
START-REF-POINT
L" "
END-REF-POINT
L" "
ACD.ACC-TYPE _#ACCS
L" "
ADT.ADT __ADT
L" "
LENGTH6
L" "
START-DESCRIPTION
/*
//TERMINI DD DISP=SHR,DSN=user-id.SUH
```

The printed output resulting from this job setup is on the following page.

Sample #2 - Extract surface type from the roadlog and
roadway history files to compare information.

Explanation of job setup

1. Define data destination: LIST option.

2. Define locations by +ROUTES. In this case ISTH 90.

3. Roadway history must be processed by roadway, so use
DIRECTION=INCREASE and extract RLG.SURF-TYPE-RD1.

4. Use +SELECT to exclude certain work items (such as
joint seals).

5. Redefine surface type codes from each file into a
common set of codes.

6. Use EXTRACT-DEFAULT to retain segments where data is
missing from the roadway history file.

```
//jobname  JOB (account),'name',CLASS=G,NOTIFY=user-id,
//         MSGCLASS=2
/*JOBPARM ROOM=3,LINES=5
//TIS EXEC DTRIX,TIME=3,REGION=1500K,FORM='(2)',
//               PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:EXTRACTION,EXTRACT-DEFAULT=?,LIST,DIRECTION=INCREASE
+TITLES
INTERSTATE 90 - INCREASING DIRECTION
+ROUTES
ROUTE-SYS=01,ROUTE-NUM=90
+SELECT
 EXCLUDE CROSS-SECTION-LAYERS IF:
   RDY.WORK-ITEM *EQ* 'ED' *OR*
   RDY.WORK-ITEM *EQ* 'ES' *OR*
   RDY.WORK-ITEM *EQ* 'GD' *OR*
   RDY.WORK-ITEM *EQ* 'GC' *OR*
   RDY.WORK-ITEM *EQ* 'JS' *OR*
   RDY.WORK-ITEM *EQ* 'SC' *OR*
   RDY.WORK-ITEM *EQ* 'JR' *OR*
   RDY.WORK-ITEM *EQ* 'MC' *OR*
   RDY.WORK-ITEM *EQ* 'RR' *OR*
   RDY.WORK-ITEM *EQ* 'FS' *OR*
   RDY.WORK-ITEM *EQ* 'AS' *OR*
   RDY.WORK-ITEM *EQ* 'SL' *OR*
   RDY.WORK-ITEM *EQ* 'SO'
+EXTRACT
```

```
        ROUTE-SYSTEM
        L" "
```

(continued on next page)


```
1
+
PAGE 596

        ROUTE-NUMBER
        L" "
        START-REF-POINT
        L" "
        END-REF-POINT
        L"      "
        RLG.SURF-TYPE-RD1
        REDEFINES
        J  C
        I  B
        G  B
        G2 B
        L"  "
        RDD.WORK-ITEM
        REDEFINES
        CR C
        N  C
        L"  "
        LENGTH6
        L"  "
        RLG.COUNTY
        RLG.CNTRL-SECTN
        /*


        The printed output resulting from this job is on the
        following page.
```

1
+

Sample #3 - Extract 1987 condition rating data and ADT.

Explanation of job setup

1. Define data destination: LIST option.

2. Define locations by +ROUTES. In this case ISTH 35.

3. Use +SELECT to include 1987 ratings only.

4. Specify DIRECTION=INCREASE to process increasing milepost direction roadway. Change to DIRECTION=DECREASE and re-run the job to get the other roadway data.

```
//jobname  JOB (account),'name',CLASS=G,NOTIFY=user-id,
//         MSGCLASS=2
/*JOBPARM ROOM=3,LINES=5
//TIS EXEC DTRIX,TIME=3,FORM='(2)',
//               PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:EXTRACTION,LIST,START-DATE=01/01/1987,END-DATE=12/31/1987,
:  DIRECTION=INCREASE
+ROUTES
ROUTE-SYS=01,ROUTE-NUM=35
+SELECT
 INCLUDE CR-YEARS IF: CRY.YEAR-RD *EQ* '1987'
+EXTRACT
ROUTE-SYSTEM
L" "
```

```
        ROUTE-NUMBER
        L" "
        START-REF-POINT
        L" "
        END-REF-POINT
        L"  INC: "
        CRG.YEAR
        L" CR="
        CRG.CR-RD
        L" SURF="
        CRG.SURF-TYPE
        L" ADT="
        ADT.HCADT
        /*
```

The printed output resulting from this job is on the following page.

Sample #4 - Extract data necessary to compute a
length-weighted sufficiency rating for
condition rating "D" segments.

Explanation of job setup

1. Define data destination: LIST option.

2. Define locations by +ROUTES. In this case ISTH 90.

3. Specify DIRECTION=INCREASE to get the increasing
milepost direction roadway data. Change to
DIRECTION=DECREASE and re-run the job to get data for
the decreasing milepost direction roadway.

```
        //jobname  JOB (account),'name',CLASS=G,NOTIFY=user-id,
        //         MSGCLASS=2
        /*JOBPARM ROOM=3,LINES=5
        //TIS EXEC DTRIX,TIME=3,REGION=1500K,FORM='(2)',
```

```
//               PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:EXTRACTION,LIST,DIRECTION=INCREASE
+ROUTES
ROUTE-SYS=01,ROUTE-NUM=90
+EXTRACT
ROUTE-SYSTEM
L" "
ROUTE-NUMBER
L" "
START-REF-POINT
L" "
END-REF-POINT

L" "
LENGTH8
L" ROAD-1= "
SUF.SP-RD1-ADJUSTED
L" "
CRD.BEG-REF-POINT  <-- used only to cause breaks
+TITLES
LENGTH-WEIGHTED SUFFICIENCY RATING DATA
BREAKING AT RATING CHANGES OR CONDITION RATING "D" BREAKS
INCREASING MILEPOST DIRECTION
/*
```

The printed output resulting from this job is on the following page.

1
+
PAGE 599

Sample #5 - Extract traffic volumes for several years.

Explanation of job setup

1. Define data destination: LIST option.

2. Define locations by +ROUTES. In this case ISTH 35E.

3. Use +SELECT to choose data for years 1985 and later.

```
//jobname  JOB (account),'name',CLASS=G,NOTIFY=user-id,
//         MSGCLASS=2
/*JOBPARM ROOM=3,LINES=5
//TIS EXEC DTRIX,TIME=3,REGION=1500K,FORM='(2)',
//               PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:EXTRACTION,EXTRACT-DEFAULT=?,LIST
+ROUTES
ROUTE-SYS=01,ROUTE-NUM=35E
+SELECT
 INCLUDE TRAFFIC-VOLUMES IF:
     TRV.YEAR *GE* '1985'
+EXTRACT
ROUTE-SYSTEM
L" "
ROUTE-NUMBER
L" "
START-REF-POINT
L" "
END-REF-POINT
L"   "
TRV.YEAR
L"= "
TRV.AADT
L"   "
/*
```

The printed output resulting from this job is on the following page.

1
+

Sample #6 - Extract length-weighted ADT between trunk

highway intersection.

Explanation of job setup

1. Define data destination: LIST option.

2. Define locations by +ROUTES. In this case ISTH 35E.

3. Specify segment breaks by extracting
   RLG.INTERSECT-CATEGORY with the POINTS option and
   values 01, 02, and 03 (trunk highway route system
   codes).

4. Specify the ADT time period with START-DATE and
   END-DATE.

5. Extract ADT. Since this is a computed value, it is
   determined after the segment has been determined, and
   length-weighted over each segment.

```
//jobname  JOB (account),'name',CLASS=G,NOTIFY=user-id,
//         MSGCLASS=2
/*JOBPARM ROOM=3,LINES=5
//TIS EXEC DTRIX,TIME=3,FORM='(2)',
//               PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:EXTRACTION,EXTRACT-DEFAULT=?,LIST,
: START-DATE=01/01/1987,END-DATE=12/31/1987
+ROUTES
ROUTE-SYS=01,ROUTE-NUM=35E
+EXTRACT
ROUTE-SYSTEM
L" "
ROUTE-NUMBER
L" "
START-REF-POINT
L" "
END-REF-POINT
RLG.INTERSECT-CATEGORY
POINTS
01
02
03
LENGTH6
L" 1987 ADT "
ADT.ADT
L" FROM->"
START-DESCRIPTION
L" TO->"
```

```
        /*
        The printed output resulting from this job follows....


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1
+
PAGE 601

        Sample #7 - Extract roadway segments (determined by the
                    sections file) and data required to compute
                    accident rates for those segments.


        Explanation of job setup

        1. Define data destination: LIST option.

        2. Define locations by +ROUTES.  In this case MNTH 280.

        3. Extract an accident data element (any ACD element will
           do).  Since SEGMENTS is specified and the accident
           record is point data, the accident data will be
           extracted as a count of the number of selected records
           in each segment.

        4. This job illustrates the use of the accident data tape
           (defined in the line beginning "//ACCTAPE DD ....").
           The keyword parameter "ACCTAPE=YES" has also been
           added.


        //jobname  JOB (account),'name',CLASS=G,NOTIFY=user-id,
        //         MSGCLASS=2
        /*JOBPARM ROOM=3,LINES=5
        //TIS EXEC DTRIX,TIME=3,FORM='(2)',
        //               PRINTDD=TSO,OUTFILE=
        //ACCTAPE DD DISP=OLD,DSN=TRN.RI16ACC2(0),UNIT=TAPE
        //SYSIN DD *
        :EXTRACTION,LIST,EXTRACT-DEFAULT=?,ACC-TAPE=YES,
        : ACC-INT-LOCN=NON-INTSECT,
        : SEGMENTS,START-DATE=01/01/1983,END-DATE=12/31/1983
        +ROUTES
        ROUTE-SYS=03,ROUTE-NUM=280
        +EXTRACT
        ROUTE-SYSTEM
        ROUTE-NUMBER
        START-REF-POINT
        END-REF-POINT
        L" "
```

```
        SEC.GEN-ENVIRON
        SEC.ROAD-DESIGN
        L" "
        ACD.ACC-TYPE _#ACCS
        L" "
        ADT.ADT __ADT
        L" "
        LENGTH8
        L" "
        START-DESCRIPTION
        /*

        The printed output resulting from this job follows....



 PAGE 8-472
1
+
PAGE 602

        Sample #8 - Extract data to be used as a control section
                    cross-reference.


        Explanation of job setup

        1. Define data destination: LIST option.

        2. Define locations by +ROUTES.  In this case, Interstate
           and U.S. highways in construction district 7.

        3. Extract construction district and control section
           number.  Since these are the only data elements
           extracted, segment breaks will occur only when these
           values change.


        //jobname  JOB (account),'name',CLASS=G,NOTIFY=user-id,
        //         MSGCLASS=2
        /*JOBPARM ROOM=3,LINES=5
        //TIS EXEC DTRIX,TIME=3,REGION=1500K,FORM='(2)',
        //               PRINTDD=TSO,OUTFILE=
        //SYSIN DD *
        :EXTRACTION,LIST
        +ROUTES
        ROUTE-SYS=01-02,CONSTR-DIST=7
        +EXTRACT
        RLG.CONSTR-DIST
        L"  "
        RLG.COUNTY
```

```
        RLG.CNTRL-SECTN
        L"  "
        ROUTE-SYSTEM
        L" "
        ROUTE-NUMBER
        L" "
        START-REF-POINT
        L" "
        END-REF-POINT
        L"  "
        LENGTH6
        /*
```

The printed output resulting from this job is on the following page.

1
+
PAGE 603

The ATR-BATCH-GRAPH Command

Function: Produces ATR data graphs for multiple stations at a user-specified printer.

Description: The same ATR data graphs that can be displayed on the terminal screen by TISSPF option Z.A.G (or TISATR option G) can be mass-produced by this command. The job runs in the background (without displaying graphics at a terminal) and automatically prints the graphs at the specified printer. A range of ATR stations can be selected, and the SELECT subcommand can be used to further specify stations (such as choosing only those in a particular volume variation group). Only one particular type of graph can be printed within each program run.

Required Command Parameters:

```
        AA    Annual Actual - volume by day of year
        HA    Hourly Actual - volume by hour
        MA    Monthly Actual - volume by month
        WA    Weekly Actual -  volume by day-of-week
GRAPH=  AP    Annual Percent - volume by day of year (% of avg)
        HP    Hourly Percent - volume by hour (% of average)
        MP    Monthly Percent - volume by month (% of average)
        WP    Weekly Percent - volume by day-of-week (% of avg)
        1     Combination of AP and HP
        2     Combination of MP and WP
```

ADMC-MEMBER=printer-name

Specify the system name of a graphics printer. For example, the DOT 8th floor printer in room 814 is H17P.

START-STATION=nnnx

ATR stations with numbers equal to or greater than "nnnx" will be printed. For example, the first station is 001 (be sure to include leading zeroes).

END-STATION=nnnx

ATR stations with numbers less than or equal to "nnnx" will be printed (be sure to include leading zeroes).

DEPTH=nn

Indicate the depth of the picture in rows. Suggested value for graphs 1 and 2 is 70. For all other graphs, 40.

WIDTH=nnn

Indicate the width of the picture in columns. Suggested value for graphs 1 and 2 is 75. For all other graphs, 80.

MAX-NUM-ENTRIES=nnn

- Use to limit the number of graphs produced for the run. If this parameter is omitted and the START-STATION/END-STATION range or SELECT subcommand is incorrect, all stations in the file may inadvertently be graphed.

Optional Command Parameters:

NO Print graphs in black-and-white.
COLOR= YES Print graphs in color (default).

- Use COLOR=NO to produce black graphs on white paper. These will produce better copy quality and will print in about half the time as color graphs. If many graphs are to be printed, the 3287 printer (such as H17P) can be used with a black-only ribbon, which is cheaper than the 4-color ribbon.

SELECT subcommand

Select criteria may refere to data elements in the ATR station Master File record, or to the roadlog record corresponding to the reference point location in the master file record for the station. This permits selecting stations by volume variation group, or any roadlog value.

- The INCLUDE/EXCLUDE clause is REQUIRED and has the following format:

  INCLUDE ATR-STATIONS IF:
  EXCLUDE

- ATM and RLG data elements can be referenced.

Which Data Library?

There are three different ATR data libraries. The job setup must specify the correct library in the ATRLIB and ATRLIBD DD statements:

Library	DD Statements used
"Last Year"	//ATRLIB DD DISP=SHR,DSN=TRN.RI44ATRL
	//ATRLIBD DD DISP=SHR,DSN=TRN.RI44ATRL
"Current Year"	//ATRLIB DD DISP=SHR,DSN=TRN.RI44ATRC
	//ATRLIBD DD DISP=SHR,DSN=TRN.RI44ATRC
"Variable Year"	//ATRLIB DD DISP=SHR,DSN=TRN.RI44ATRV
	//ATRLIBD DD DISP=SHR,DSN=TRN.RI44ATRV

Sample Job Setup: The following sample setup prints graph type 1 at H17P in black-and-white for all stations in group 04, using the "Last Year" data library.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=20
//TIS EXEC DTRIT,TIME=1,REGION=500K,SCRSIZE=3,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=
//ADMPRNTQ DD DSN=GDDM.REQUEST.QUEUE,DISP=SHR
//ADMDEFS DD *
         ADMMDFT TSOPRNT=USER-ID
/*
//ATRLIB   DD DISP=SHR,DSN=TRN.RI44ATRX
//ATRLIBD  DD DISP=SHR,DSN=TRN.RI44ATRX
//SYSIN DD *
:ATR-BATCH-GRAPH,ADMC-MEMBER=H17P,DEPTH=70,WIDTH=75,GRAPH=1,
:  COLOR=NO,START-STATION=001,END-STATION=999
+SELECT
  INCLUDE ATR-STATIONS IF:
     ATM.GROUP *EQ* '04'
/*
```

The RDH-BATCH-GRAPH Command

Function: Produces roadway history data graphs at a user-specified printer.

Description: The same RDH data graphs that can be displayed on the terminal screen by TISSPF option Z.R can be mass-produced by this command. The job runs in the background (without displaying graphics at a terminal) and automatically prints the graphs at the specified printer. A control section can be specified, or a +ROUTES subcommand entered, and the SELECT subcommand can be used to select records or layers. Only one particular type of graph can be printed within each program run. This program is the same as that executed under TISSPF option Z.R.A, but allows additional user options (such as +SELECT).

Required Command Parameters:

GRAPH=

CROSS-SECTION	Draw each cross-section in the segment.
PROJECT-LOG	Draw the segment project log.
PLAN	Draw the segment in plan view (from above).
PROFILE	Draw the segment in profile (from the side).

ADMC-MEMBER=printer-name

Specify the system name of a graphics printer. For example, the DOT 8th floor printer in room 814 is H17P. Specify LASER to print on the Intertech 3800 laser printer (see sample setups).

Optional Command Parameters:

DEPTH=nn

Indicate the depth of the picture in rows. Has no effect for laser printer.

WIDTH=nnn

Indicate the width of the picture in columns. Has no effect for laser printer.

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+

MAX-NUM-ENTRIES=nnn

- Use to limit the number of graphs produced for the run. In the case of project log, this number will limit the total number of segments graphed, but each segment may have multiple pages in the project log.

NO	Print graphs in black-and-white.
COLOR= YES	Print graphs in color (default).

- Use COLOR=NO to produce black graphs on white paper. This will produce better copy quality and will print in about half the time as color graphs. If many graphs are to be printed, the 3287 printer (such as H17P) can be used with a black-only ribbon, which is cheaper than the 4-color ribbon.

LEGEND	Print a legend before the graphs.
NO-LEGEND	Do not produce a legend (default).

- The legend shows the various colors and patterns assigned to each work item and material ID. Not available for the laser printer.

NO-OPTLIST	No option list is printed.
OPTLIST	An option list is printed (default).

- The option list is a summary of the command parameters used to produce the report.

NO-CODELIST No code list is printed.

CODELIST A code list is printed (default).

- The code list is a description of the methods and codes used to produce the report.

ROUTES subcommand

Used to specify locations by route system, route number, and reference point. EITHER ROUTES OR CONTROL-SECTION is required. If used, the ROUTES must include START-REF and END-REF or a region parameter (such as COUNTY) with a single route number. Examples:

ROUTE-SYS-&-NUM=0100000090,START-REF=000,END-REF=020.5

ROUTE-SYS-&-NUM=0200000002,COUNTY=BLUE-EARTH

ROUTE-SYS=MNTH,CONSTR-DIST=1

all of these examples are valid, since they will generate specific segments of routes.

1
+

The following are NOT VALID with this command:

ROUTE-SYS=USTH <-- INVALID

ROUTE-SYS-&-NUM=169,START-REF=101+00.000 <-- INVALID

NOTE: CONTROL-SECTION and ROUTES cannot BOTH be coded.

SCALE=nnnn

Used with GRAPH=PROJECT-LOG, PLAN, or PROFILE, to scale the pictures. Units depend on which graph:

If GRAPH=PROFILE, then SCALE=nn.nn INCHES.

Otherwise, SCALE=nnnn FEET.

The default is 36.00 inches and 250 feet.

NOTE: Do NOT code the decimal point.

HISTORY - All layers in the cross-section.
CURRENT - Only layers in current cross-section (default).

- This applies to CROSS-SECTION only.
- CURRENT excludes all layers prior to the most recent grading. "Removal" layers cancel out the layers below them that were removed.

CONTROL-SECTION=nnnn

- Control section "nnnn" is graphed.

- CONTROL-SECTION and ROUTES cannot BOTH be coded.

AGGREGATE subcommand

Can be used to combine adjacent layers.

For GRAPH=PROJECT-LOG:

Aggregation is done AFTER +SELECT (if any). RDL data elements can be referenced. The picture is drawn after layers are aggregated. The +AGGREGATE subcommand automatically used in TISSPF option Z.R.A is:

1
+


```
+AGGREGATE
RDL.WORK-ITEM
REDEFINES
CO C
CR C
CC C
BO B
RA AB
SA AB
GS AB
BS AB
BB AB
DL AB
```

The result is to combine variations of concrete,

bituminous, and aggragate base layers for drawing.

For GRAPH=other than PROJECT-LOG:

Aggregation is done BEFORE cross-section selection (if any). RDY data elements can be referenced. Aggregation simplifies the raw data by combining layers within each cross-section.

SELECT subcommand

Select can be applied to records, record layers, cross-sections, and cross-section layers. Cross-sections are formed from one or more records and consist of all applicable layers for a uniform segment of roadway.

Data elements:

- RDL - Layer of record (occurs 1-99 times per record).
- RDH - Root portion of record.
- RDY - Layer of cross-section (occurs 1-99 times per cross-section).
- RDX - Root portion of cross-section.
- RDD - Topmost layer of driving surface of cross-section.
- RRS - Topmost layer of right shoulder of cross-section.
- RLS - Topmost layer of left shoulder of cross-section.

ONLY If GRAPH=PROJECT-LOG:

Select criteria may be applied to the roadway history (RDH) record. Only selected records will be included in the project log.

- To select RDH records, use the following format:

```
INCLUDE
EXCLUDE  ROADDATA-RECORDS IF:

        - RDH data elements can be referenced.
        - RDL data elements may be referenced using
          the multi-correlation facility (*ANY* or
          *ALL*).
```

ONLY If GRAPH=PROJECT-LOG:

Select criteria may also be applied to individual layers in the roadway history record. This selection is done BEFORE selection on records, i.e., layers excluded by select will not be available for select on records (above).

- To select RDH layers, use the following format:

```
INCLUDE
EXCLUDE  ROADDATA-LAYERS IF:

        - RDL data elements can be referenced.
```

ONLY If GRAPH=CROSS-SECTION or PLAN or PROFILE:

Select criteria may be applied to the roadway history cross-section (RDX) record. Only selected cross-sections will be graphed.

- To select RDX cross-sections, use the following format:

```
INCLUDE
EXCLUDE  CROSS-SECTIONS IF:

        - RDX, RDD, RRS, and RLS data elements
          can be referenced.
        - RDY data elements may be referenced using
          the multi-correlation facility (*ANY* or
          *ALL*).
```

ONLY If GRAPH=CROSS-SECTION or PLAN or PROFILE:

Select criteria may also be applied to individual layers in the roadway history cross-section. This selection is done BEFORE selection on cross-sections, i.e., layers excluded by select will not be available for select on cross-sections (above).

- To select RDY cross-section layers, use the following format:

```
INCLUDE
EXCLUDE  CROSS-SECTION-LAYERS IF:

         - RDY data elements can be referenced.
```

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setups:

The following sample prints cross-section graphs for MNTH highways in Blue Earth county. Shoulder layers are excluded. Grpahs will be printed at printer H17P, in color, 60 rows by 120 columns, with no more than 10 graphs produced.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIT,TIME=1,SCRSIZE=1,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=
//ADMPRNTQ DD DSN=GDDM.REQUEST.QUEUE,DISP=SHR
//ADMDEFS DD *
         ADMMDFT TSOPRNT=USER-ID
/*
//SYSIN DD *
:RDH-BATCH-GRAPH,ADMC-MEMBER=H17P,DEPTH=60,WIDTH=120,
:  COLOR=YES,GRAPH=CROSS-SECTION,
:  MAX-NUM-ENTRIES=10
+SELECT
 INCLUDE CROSS-SECTION-LAYERS IF:
  RDY.XSCTN-POSN *NE* 'S'
+ROUTES
ROUTE-SYS=03,COUNTY=BLUE-EARTH
```

```
        /*
```



```
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```


The following sample will print the project log for control section 0714 at printer H17P, 60 rows by 120 columns, in black and white. A legend will precede the project log. A scale of 250 feet will be used in displaying the roadway layers.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIT,TIME=1,SCRSIZE=1,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=
//ADMPRNTQ DD DSN=GDDM.REQUEST.QUEUE,DISP=SHR
//ADMDEFS DD *
         ADMMDFT TSOPRNT=USER-ID
/*
//SYSIN DD *
:RDH-BATCH-GRAPH,ADMC-MEMBER=H17P,DEPTH=60,WIDTH=120,
:  COLOR=NO,GRAPH=PROJECT-LOG,SCALE=250,LEGEND,
:  CONTROL-SECTION=0714
/*
```

The following sample will print the project log for control section 2480 at the Intertech 3800 laser printer. Layers are aggregated the same way as is automatically done in TISSPF option Z.R.A.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIT,TIME=20,SCRSIZE=1,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//ADMLASER OUTPUT DEST=AFP,PAGEDEF=08080,PRMODE=PAGE,FORMDEF=0101PA
//ADMOUT   DD SYSOUT=(T,,681),OUTPUT=*.ADMLASER,DCB=RECFM=M
//SYSIN DD *
:RDH-BATCH-GRAPH,ADMC-MEMBER=LASER,
: GRAPH=PROJECT-LOG,
: CONTROL-SECTION=2480
+AGGREGATE
RDL.WORK-ITEM
```

```
        REDEFINES
        CO C
        CR C
        CC C
        BO B
        RA AB
        SA AB
        GS AB
        BS AB
        BB AB
        DL AB
        /*
```


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The AGGREGATE-SECTIONS Command

Function: Provides additional processing of data output by the EXTRACTION command.

Description: AGGREGATE-SECTIONS is an extension of the EXTRACTION command. It manipulates data produced by EXTRACTION and must therefore be run after the EXTRACTION command has been run. The EXTRACTION command breaks (i.e., writes one record and begins a new record) whenever the value of ANY data element being extracted changes. This can result in more breaks and more records than the user desires. The AGGREGATE-SECTIONS command can be used to re-combine or aggregate the records in the EXTRACTION output file in a manner determined by the user.

The following steps must be performed to use AGGREGATE-SECTIONS.

1. Run the EXTRACTION command with the following options:

   SEGMENTS mode must be used (as opposed to POINTS mode).
   The WRITE or LIST-&-WRITE option must be used in order to produce an output file.
   The SCHEMA option must be specified in order to produce a SCHEMA file.

   EXTRACTION will produce an ouptut data file (DD EXTFILE) and

the SCHEMA file (DD SCHEMA).

2. Edit the SCHEMA file.

   Enter the desired action code for each data element or literal in column 47 of the SCHEMA file.

3. Run AGGREGATE-SECTIONS.

   Input to AGGREGATE-SECTIONS is the output data file (DD EXTFILE) from EXTRACTION and the edited SCHEMA file (DD SCHEMA). Output from AGGREGATE-SECTIONS is the aggregated data file (DD AGGFILE) if the WRITE or LIST-&-WRITE options are used. If the LIST or the LIST-&-WRITE options are used, the output will be sent to a dataset on IOF.

The SCHEMA file

A SCHEMA file will be written by EXTRACTION if the SCHEMA option-word is used. The SCHEMA file is used to pass instructions in the form of one-digit action codes and other information to AGGREGATE-SECTIONS. The SCHEMA file consists of one record for each data element, one record for each generic data element, and one record for each literal coded in +EXTRACT in the EXTRACTION command. There is also a header record that passes the extraction default character and the direction to AGGREGATE-SECTIONS. Except for the action codes, all fields in all records in the SCHEMA file are filled in by EXTRACTION. The SCHEMA file has the following format:

Columns	Length	Description
		For the first record only

For the header record		
1	1	an asterisk to mark this record as the header record
2	1	blank
3	1	direction I = increasing D = decreasing U = undivided
4	1	blank
5	1	Extract-default character
For all other records		
1-35	35	Data element name or literal
36	1	Data element format. C = character D = date N = numeric
37	1	blank
38-41	4	Starting position in extraction record of the value of the data element
42	1	blank
43-45	3	Length in extraction record of the value of the data element
46	1	blank
47	1	Action code

After running EXTRACTION and before running AGGREGATE-SECTIONS, the user should edit the SCHEMA file by entering in column 47 an action code for each data element or literal. The action codes are used by AGGREGATE-SECTIONS to decide where to make section breaks, to decide which data elements are to be written to the aggregated output file, and to decide how to process the data element values from the records that are being aggregated.

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The SCHEMA file action codes

Action codes are entered by the user in column 47 of the SCHEMA file. The AGGREGATE-SECTIONS command uses the action codes to determine how to process the values of each of the data elements listed in the SCHEMA file and where to make section breaks.

The action codes of generic data elements are pre-marked by EXTRACTION and, in general, should not or need not be changed by the user.

The pre-marked generic data elements Beginning Reference Point, (action code B), End Reference Point (action code E), Route System (action code S), and Route Number (action code R) are required by the AGGREGATE-SECTIONS command. These data elements must be present in the EXTRACTION output file, and they must be present in the SCHEMA file with their correct pre-marked action codes.

If the AGGREGATE-SECTIONS command must calculate length-weighted averages, either or both of the pre-marked generic data elements LENGTH6 (action code 6) or LENGTH8 (action code 8) must be present in the EXTRACTION output file, and they must be present in the SCHEMA file with their correct pre-marked action codes.

Column 36 of the SCHEMA file contains a code indicating the data element type: N for numeric, C for character, or D for date. The action codes A, L, and T can be used only for numeric data elements. If you know that a character data element (type C) contains only numeric data, the type code can be changed from C to N in order to use action codes A, L, or T.

Action code C is the breaks action code. A change in the value of any data element marked with action code C will cause AGGREGATE-SECTIONS to break and to begin a new record. The only other conditions that can cause a break is a change in the route number or route system or a gap in the route being processed. Note that if no data elements are marked with action code C, AGGREGATE-SECTIONS may create only a single record to describe an entire route.

If the action code is left blank, the data element will not be written to the output file. The length of the output record will be decreased by the length of the value of the data element omitted.

Any literals output by EXTRACTION will be listed in the SCHEMA file. Action code F will cause AGGREGATE-SECTIONS to write literals to the output file.

Action code X, use the value from the roadway history predominant cross-section, can be used only for RDX or RDY data elements.

Records output by AGGREGATE-SECTIONS will be the same length as records output by EXTRACTION except when the SCHEMA file contains data elements or literals with action code P or action code "blank". For each data element with action code P, the length of the output record will be increased by 3 bytes (see discussion of predominant values below). For each data element or literal with action code "blank", the length of the output record will be decreased by the length of the value of the data element omitted.

ALPHABETIC LIST OF ACTION CODES

A - store Average value (data must be format N).
B - Beginning reference point (pre-marked).
C - Change in value causes section break (data is output unchanged).
E - End reference point (pre-marked).
F - store First value (use this to reproduce literals).
G - store Last value (use this for end descriptions).
blank - ignore this data element (data is omitted from output).
L - store Length-weighted average (data must be format N; LENGTH6 or LENGTH8 must be present.)
P - store Predominant value followed by percent predominance.
Q - store Predominant value without percent predominance.
R - Route number(pre-marked).
S - route System(pre-marked).
T - store Total value(i.e. the sum of the values from all the records being aggregated) (data must be format N).
X - store value from roadway history predominant cross-section. (only for RDX or RDY data elements).
6 - LENGTH6 (Pre-marked) (nn.nnn miles).
8 - LENGTH8 (Pre-marked) (nnnn.nnn miles).

PRE-MARKED DATA ELEMENTS

B - Beginning reference point.
E - End reference point.
R - Route number.
S - route System.
6 - LENGTH6.
8 - LENGTH8.

BREAK SPECIFICATION AND ACTION TYPES FOR NON-PRE-MARKED DATA ELEMENTS

A - store Average value (data must be format N).
C - Change in value causes section break (data is output unchanged).
F - store First value (use this to reproduce literals).
G - store Last value (use this for end descriptions).
blank - ignore this data element (data is omitted from output).
L - store Length-weighted average (data must be format N; LENGTH6
    or LENGTH8 must be present.)

(continued on next page)

P - store Predominant value followed by percent predominance.
Q - store Predominant value without percent predominance.
T - store Total value(i.e. the sum of the values from all the
    records being aggregated) (data must be format N).
X - store value from roadway history predominant cross-section,
    (only for RDX or RDY data elements).

PREDOMINANT VALUES

Predominant value followed by percent predominance (action code P)

The predominant value of a data element is the value that describes a greater length of roadway in the aggregated section than any other unique value of that data element. If predominant value is requested, the percent predominant is also written to the output file in the 3 bytes immediately following the predominant value. The percent predominant is the percentage of the total length of the aggregated section that is described by the predominant value. Thus for each data element coded with P, the length of the output record is increased by three bytes.

Predominant value without percent predominance (action code Q)

This is the same as action code P above, except that the percent predominance is not output.

Value from roadway history predominant cross-section(action code X)

The Roadway History Predominant Cross-Section is the portion of the road section defined by AGGREGATE-SECTIONS that consists of all the identical Roadway History cross-sections that when combined are longer than any other cross-section or combination of

identical cross-sections.

Two cross-sections are considered identical if all their non-shoulder, pavement layers are in the same relative, vertical positions and have the same work-items, material ids, and depths. Pavement layers are those with work-items of "B ", "BO", "BB", "CU", "CD", "CB", "CO", "CP", "CR", "N ", and "BK".

Most of the RDX and RDY data elements for the road section defined by AGGREGATE-SECTIONS are taken from the predominant cross-section. The exceptions are RDX.LENGTH and all of the RDX area data elements which are defined for the entire aggregated section. For example, RDX.DRIVE-WIDTH, RDX.YEAR-LAST-REHAB, and RDX.ROAD-ID are taken from the predominant cross-section. RDX.LENGTH is the length of the entire aggregated section and RDX.DRIVE-AREA is the drive-area of the entire aggregated section.

RDX.PERCENT-PREDOM is the percentage of the length of the entire aggregated road section taken up by the predominant cross-section. For example, if the aggregated road section is 10 miles long and the predominant cross-section is 6.5 miles long then RDX.PERCENT-PREDOM is 065.

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An example

EXTRACTION produces an output file with 4 records thus:

```
10+00.000                11+00.305
   |------------------------|        Length of section = 1.305 mi.
                                     ADT = 150   RDX.YEAR-GRADE=1975

11+00.305                12+00.478
   |------------------------|        Length of section = 1.173 mi.
                                     ADT = 175   RDX.YEAR-GRADE=1966

12+00.478                13+00.788
   |------------------------|        Length of section = 1.310 mi.
                                     ADT = 150   RDX.YEAR-GRADE=1958

13+00.788                15+00.000
   |------------------------|        Length of section = 1.212 mi.
                                     ADT = 200   RDX.YEAR-GRADE=1958
```

The CRD file contains a single record that describes the section of roadway from 10+00.000 to 15+00.000. The EXTRACTION command, because of changes in the values of data elements from other files

such as ADT or RDX has, however, written 4 records. The user would like an extraction file which still contains ADT and RDX data elements but which has only a single record to describe the above section of roadway. The user can run AGGREGATE-SECTIONS to combine or aggregate the 4 records above into one record with a starting reference point of 10+00.000 and an ending reference point of 15+00.000.

From which of the original, 4 extraction records should the data element values be taken for writing to the new, single aggregated record? Should an ADT of 150, or 175, or 200, or some other value be used? AGGREGATE-SECTIONS uses the action codes in the edited SCHEMA file to answer such questions.

The action codes appropriate for ADT and the resultant values that would be written to the aggregated record are listed below:

Action Code	Value of ADT written to aggregated record
A (average value)	169
F (first value)	150
L (length-weighted average)	168
P (predominant value)	150
T (total value)	675

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The action code C is used to mark data elements that will cause AGGREGATE-SECTIONS to break and begin a new record. AGGREGATE-SECTIONS will break under the following conditions ONLY: the route-system/route-number changes or there is a gap in a route, or the value of a data element marked with a C action code changes. In this example, the user can mark CRD.BEG-REF-POINT and CRD.END-REF-POINT to force AGGREGATE-SECTIONS to build just one record to describe the section from 10+00.000 to 15+00.000.

So, an output file with one record to describe the section of roadway from 10+00.000 to 15+00.000, with the average ADT of the 4 records, and with RDX.YEAR-GRADE from the roadway history predominant cross-section would be created by AGGREGATE-SECTIONS

using the SCHEMA file below.

```
* I ?
ROUTE-SYSTEM                    C 0001 002 S
LITERAL                         C 0003 001 F
ROUTE-NUMBER                    C 0004 008 R
LITERAL                         C 0012 001 F
CRD.BEG-REF-POINT               C 0013 010 C
LITERAL                         C 0023 001 F
CRD.END-REF-POINT               C 0024 010 C
LITERAL                         C 0034 001 F
START-REF-POINT                 C 0035 010 B
LITERAL                         C 0045 001 F
END-REF-POINT                   C 0046 010 E
LITERAL                         C 0056 001 F
ADT.ADT                         N 0057 006 A
LITERAL                         C 0063 001 F
RDX.YEAR-GRADE                  N 0064 004 X
```

AGGREGATE-SECTIONS produces an output file with 1 record thus:

```
   10+00.000               15+00.000
      |-----------------------|        Length of section = 5.000 mi.
                                       ADT = 169   RDX.YEAR-GRADE=1958
```

Assume that ADT.ADT had instead been marked with action code P for Predominant value. 23.5% of the distance from 10+00.000 to 15+00.000 has an ADT of 175, 52.3% has an ADT of 150, and 24.2% has an ADT of 200. The predominant value for the ADT is therefore 150 and the percent predominant is 052. The length of the output record would be increased by 3 bytes and "000150052" would be written to the output record starting at column 57.

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Required Command Parameters:

```
    DD statement SCHEMA  - to identify SCHEMA file output by EXTRACTION

    DD statement EXTFILE - to identify data file output by EXTRACTION

Optional Command Parameters:
----------------------------


         WRITE         Write the aggregated records to AGGFILE.
         LIST-&-WRITE  List and write the aggregated records.
         LIST          List aggregated records (default).

                       - If WRITE or LIST-&-WRITE is used, the data will
                         be written to DD statement AGGFILE which must
                         be included in the job setup.
                       - List will print only the first 132 columns of
                         the aggregated records.

    DD statement AGGFILE - to identify data file output by AGGREGATE-
                           SECTIONS.
                           Required if the WRITE or the LIST-&-WRITE
                           options are used.
Sample Job Setup:
-----------------

//jobname JOB (account),'name',CLASS=C,NOTIFY=user-id,
//         MSGCLASS=2
/*ROUTE PRINT REDUCE
/*JOBPARM ROOM=R820,LINES=5
//SYSIN DD *
//AGGRSEC EXEC DTRIX,TIME=1,REGION=1500K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SCHEMA  DD DISP=SHR,DSN=user-id.SCHEMA
//EXTFILE DD DISP=SHR,DSN=user-id.EXT
//AGGFILE  DD UNIT=SYSDA,DISP=(,CATLG,CATLG),DSN=user-id.AGG,
//            SPACE=(CYL,1)
//SYSIN DD *
:AGGREGATE-SECTIONS,LIST-&-WRITE
/*
```

SEGSUM processing option of AGGREGATE-SECTIONS

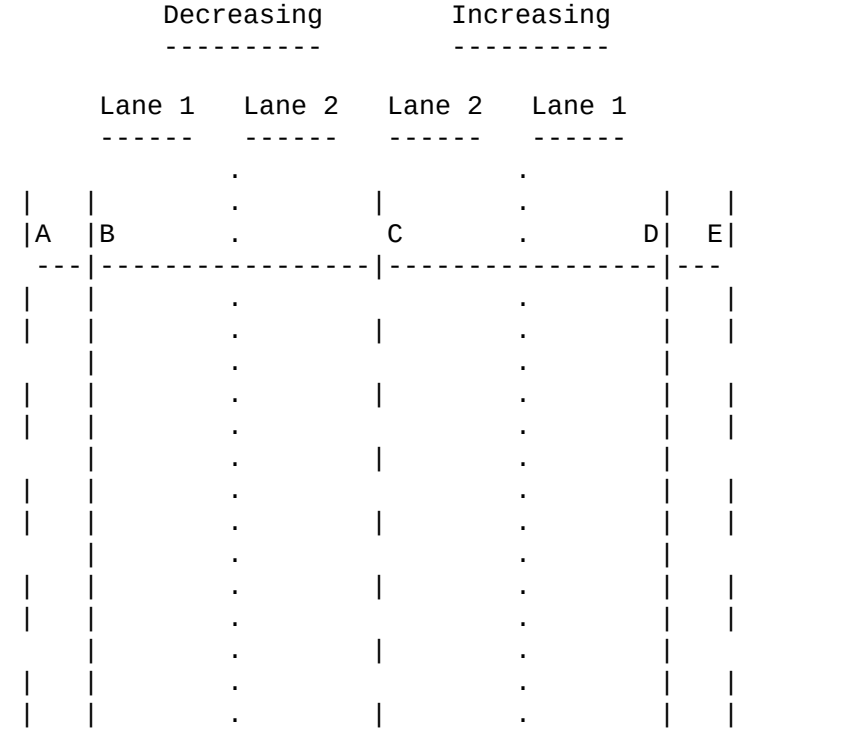
The SEGSUM processing option is used by Pavement Management to create a SEGSUM file. The SEGSUM file is used as input to the COMPUTE-SEG-DEFLECTION-DATA command.

This option is available because the Roadway History, Condition Rating, and Sufficiency systems define "undivided roadway" differently. A two-way, 4-lane highway which is undivided in a physical sense is considered divided by Condition Rating but undivided by Roadway History and Sufficiency. Also, the description of a roadway can be more generalized in Condition Rating than in Roadway History. For example, an undivided, 2-lane roadway may divide and become a divided, 4-lane roadway just for the short stretch that runs under a freeway and then merge to again become an undivided, 2-lane roadway once past the freeway. Condition Rating may ignore the short stretch of divided roadway and describe the entire road as being an undivided, 2-lane roadway. Roadway History would, however, describe the divided roadway as divided roadway. So, Condition Rating and Roadway History differ in describing the short stretch of roadway that runs under the freeway.

In addition, the Sufficiency file designates roadways differently than do other TIS files. The Sufficiency file defines roadway one as the roadway running in the direction of decreasing mileposts and roadway two as the roadway running in the direction of increasing mileposts. Other TIS files define roadway one as the roadway running in the direction of increasing mileposts and roadway two as the roadway running in the direction of decreasing mileposts.

The SEGSUM processing option adjusts the values of RDX, RDY, ESL, and SUF data elements in order to accomodate the differences between the Roadway History and Sufficiency systems and the Condition Rating system.

The roadway below is considered undivided by Roadway History and Sufficiency but divided by Condition Rating. The Roadway History and Sufficiency files describe one roadway, an undivided roadway (roadway one); the Condition Rating file describes two roadways, one in the increasing direction and one in the decreasing direction.



Assume that AGGREGATE-SECTIONS is run for the increasing direction of the above roadway. Adjustments to RDX data elements are as follows:

As read from RDX file	As output by AGGREGATE-SECTIONS
DRIVE-WIDTH = distance B-D	DRIVE-WIDTH = distance C-D
DRIVE-AREA = distance B-D * LENGTH	DRIVE-AREA = distance C-D * LENGTH
TOTAL-WIDTH = distance A-E	TOTAL-WIDTH = distance C-E
TOTAL-AREA = distance A-E *	TOTAL-AREA = distance C-E *

LENGTH LENGTH

All LSHOUL(left shoulder) data elements are assigned values of zero or blank since there is no left shoulder for the increasing direction. All other RDX data elements not mentioned specifically and all the RDY data elements are taken from the predominant cross-section.

The numeric data elements from the ESL file are output as length-weighted averages of the ESL data elements from all cross-sections with a direction of "U" or "1". Non-numeric data elements from the ESL file are taken from the predominant cross-section.

Assume that AGGREGATE-SECTIONS is run for the decreasing direction of the above roadway. Adjustments to RDX data elements are as follows:

As read from RDX file	As output by AGGREGATE-SECTIONS
DRIVE-WIDTH = distance B-D	DRIVE-WIDTH = distance B-C
DRIVE-AREA = distance B-D * LENGTH	DRIVE-AREA = distance B-C * LENGTH
TOTAL-WIDTH = distance A-E	TOTAL-WIDTH = distance A-C
TOTAL-AREA = distance A-E * LENGTH	TOTAL-AREA = distance A-C * LENGTH

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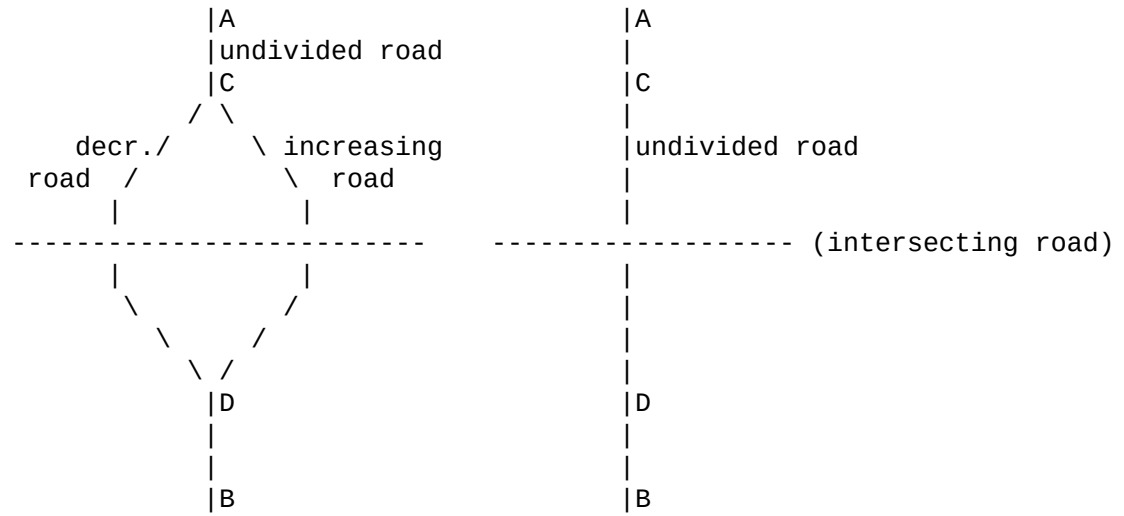
All RSHOUL(right shoulder) data elements are assigned the values of the LSHOUL data elements as read from the RDX file and all LSHOUL(left shoulder) data elements are assigned values of zero or blank since there is no left shoulder for the decreasing direction. Note that for the decreasing direction, the right side of the roadway is on the reader's left and vice-versa. All other RDX data elements not mentioned specifically and all the RDY data elements are taken from the predominant cross-section.

The numeric data elements from the ESL file are output as length-weighted averages of the ESL data elements from all cross-sections with a direction of "U" or "2". Non-numeric data elements from the ESL file are taken from the predominant cross-section.

The sketches below represent a undivided roadway that splits for an intersection and then merges after the intersection to once again become an undivided roadway. Roadway History contains a true picture of the roadway between points C and D as in the left- hand sketch. Condition Rating generalizes its description of the roadway and describes the entire distance from A to B as undivided as in the righthand sketch.



Assume that AGGREGATE-SECTIONS is run for the undivided direction as would be the case for the above situation. Adjustments to RDX data elements are as follows:

All RDX area data elements output by AGGREGATE-SECTIONS are the sums of the area data elements from all the cross-sections between the start of a section and the end of a section regardless of direction. For example, assume that a CRD section runs from point A to point B. RDX.DRIVE-AREA for that section is the sum of the DRIVE-AREAS from all the cross-sections on the undivided roadway between points A and C plus the DRIVE-AREAS from all the cross-sections on the undivided roadway between points D and B plus the DRIVE-AREAS from all the cross-sections on the increasing AND the decreasing roadways between points C and D.

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RDX.ROADID is assigned a value of "U" for undivided. RDX.LENGTH is the distance between point A and B and is not the total distance of all the roadway between A and B. All other RDX data elements not mentioned specifically and all the RDY data elements are taken from the predominant cross-section.

The numeric data elements from the ESL file are output as length-weighted averages of the ESL data elements from all cross- sections regardless of direction. Non-numeric data elements from the ESL file are taken from the predominant cross-section.

Below are the rules used to assign values to sufficiency (SUF) file data elements when using the SEGSUM processing option. Note that the AGGREGATE-SECTIONS command determines whether to use roadway-one sufficiency data or roadway-two sufficiency data regardless of whether a roadway-one or a roadway-two data element is coded in the SCHEMA file.

General rules are:

1. If the increasing direction is being processed, SUF data for roadway two will be used.

2. If the decreasing direction is being processed, SUF data for roadway one will be used.

3. If the undivided direction is being processed, SUF data for roadway one will be used. In this situation, SUF data for roadway two is undefined.

Exceptions to the above general rules are:

1. If the increasing direction or decreasing direction is being processed, SUF.EXIST-DIV-ONE-WAY is one (undivided), and SUF.EXIST-NUM-LANES is less than four, then this roadway segment is not divided. Therefore use the extraction default character.

2. If the increasing direction or decreasing direction is being processed, SUF.EXIST-DIV-ONE-WAY is one (undivided), and SUF.EXIST-NUM-LANES is greater than or equal to four, then this roadway segment is considered divided by the Condition Rating file. Therefore use SUF data for roadway one. SUF roadway two data in this situation is undefined.

3. If the undivided direction is being processed, SUF.EXIST-DIV-ONE-WAY is two (divided) or three (one way pair), then this roadway segment is not undivided. Therefore use the extraction default character.

To enable the SEGSUM processing option:

---

1. Code an "S" in column 7 of the first record in the SCHEMA file.
2. Assign RDX and RDY data elements an action code of "X".
3. Assign ESL.CURRENT-ESALS, ESL.SURFACE-ESALS, ESL.PAVEMENT-ESALS, and ESL.GROWTH-RATE an action code of "X".
4. Assign ESL.TYPE, ESL.SURF-DATE, and ESL.PAVE-DATE an action code of "X".
5. Assign SUF data elements action codes of "F", "G", "A", "T", "L", or "Q".
5. If any ESL data elements are being aggregated, optionally code the command parameter:

```
ESAL-START-DATE=mm/dd/yyyy
                if not coded will default to 01/01/0001.

ESAL-END-DATE  =mm/dd/yyyy
                 if not coded will default to current date.
```

The EXPAND-&-COPY-WIM-FILE Command

Function: Writes a copy of the entire WIM file.

Description: EXPAND-&-COPY-WIM-FILE reads data from the WIM file one week at a time. After reading one week's data, the data is expanded (i.e. unweighed vehicles are distributed throughout the thirteen types of vehicles) and the total number of trucks and the total number of vehicles for each day of the week are counted. The expanded and re-formatted data (see below) along with the total number of trucks and vehicles is then written to a disk dataset.

FORMAT OF A RECORD FROM THE WIM FILE

The WIM fill will ideally have one record per site per lane per day. In actual practice, data is not always available for each day for each lane at each site.

```
SITE              CHAR(3), AFT, BEM, BLO, or MAN
LANE              CHAR(1),
DATE              CHAR(6),
DAY_OF_WEEK       CHAR(1), 1 = Mon., 7 = Sun
CARS              CHAR(5), Number of cars
LTTRUCKS          CHAR(5), Number of light trucks
TRUCKS(03),
   NUMBER         CHAR(5), Number of type-03 trucks
   ESALR          CHAR(4), Rigid ESALs
   ESALF          CHAR(4), Flexible ESALs
TRUCKS(04),
   NUMBER         CHAR(5),
   ESALR          CHAR(4),
   ESALF          CHAR(4),
TRUCKS(05),
   NUMBER         CHAR(5),
   ESALR          CHAR(4),
   ESALF          CHAR(4),
TRUCKS(06),
   NUMBER         CHAR(5),
   ESALR          CHAR(4),
   ESALF          CHAR(4),
```

```
               TRUCKS(07),
                  NUMBER         CHAR(5),
                  ESALR          CHAR(4),
                  ESALF          CHAR(4),
               TRUCKS(08),
                  NUMBER         CHAR(5),
                  ESALR          CHAR(4),
                  ESALF          CHAR(4),
               TRUCKS(09),
                  NUMBER         CHAR(5),
                  ESALR          CHAR(4),
                  ESALF          CHAR(4),
 PAGE 8-496
1
+
PAGE 627
               TRUCKS(10),
                  NUMBER         CHAR(5),
                  ESALR          CHAR(4),
                  ESALF          CHAR(4),
               TRUCKS(11),
                  NUMBER         CHAR(5),
                  ESALR          CHAR(4),
                  ESALF          CHAR(4),
               TRUCKS(12),
                  NUMBER         CHAR(5),
                  ESALR          CHAR(4),
                  ESALF          CHAR(4),
               TRUCKS(13),
                  NUMBER         CHAR(5),
                  ESALR          CHAR(4),
                  ESALF          CHAR(4),
               TOTAL_NOT_WEIGHED CHAR(5),
               DATATYPE          CHAR(1);  /* C - COLLECTED, NOT DISTRIBUTED */
                                           /* D - COLLECTED, VEH DISTRIBUTED */
                                           /* Z - ZERO VEHICLES WEIGHED      */
                                           /* E - EMPTY RECORD, G - GENERATED*/
```

FORMAT OF THE EXPANDED AND RE-FORMATED COPY OF THE WIM FILE.

The copy of the WIM file will ideally have one record per site per lane per vehicle type per week (fifteen records per site per lane per week). However, if the original WIM file contained no data for an entire week, no records representing that week will be written to the copy.

```
      SITE_NUMBER   CHAR(3), AFT=347, BEM=171, BLO=494, MAN=616
      LANE_NUMBER   CHAR(1), AFT(4 lanes), BEM(3), BLO(2), MAN(2)
      MONTH         CHAR(2),
```

```
            DATE          CHAR(2), Date for the Monday of the week
            YEAR          CHAR(2),
            VEHICLE_TYPE  CHAR(2), Codes 1 through 13 plus TT (total trucks)
                                   and TV (total vehicles)
            DAYS          CHAR(1), Days in week for which data is available
            NUMBERS-MON
                     3 VOLUME      CHAR(6), Number of vehicles on Monday
                     3 FLEX_ESAL   CHAR(4), Flexible ESALs
                     3 TOTAL_ESAL  CHAR(7), VOLUME times FLEX_ESAL
            NUMBERS-TUE
                     3 VOLUME      CHAR(6),
                     3 FLEX_ESAL   CHAR(4),
                     3 TOTAL_ESAL  CHAR(7),
            NUMBERS-WED
                     3 VOLUME      CHAR(6),
                     3 FLEX_ESAL   CHAR(4),
                     3 TOTAL_ESAL  CHAR(7),
            NUMBERS-THU
                     3 VOLUME      CHAR(6),
                     3 FLEX_ESAL   CHAR(4),
                     3 TOTAL_ESAL  CHAR(7),
```


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+


```
            NUMBERS-FRI
                     3 VOLUME      CHAR(6),
                     3 FLEX_ESAL   CHAR(4),
                     3 TOTAL_ESAL  CHAR(7),
            NUMBERS-SAT
                     3 VOLUME      CHAR(6),
                     3 FLEX_ESAL   CHAR(4),
                     3 TOTAL_ESAL  CHAR(7),
            NUMBERS-SUN
                     3 VOLUME      CHAR(6),
                     3 FLEX_ESAL   CHAR(4),
                     3 TOTAL_ESAL  CHAR(7),
```

Two DD statements must be included with this command, one specifying the input file (the WIM file) and one specifying the output file (the copy of the WIM file).

```
   //WIMFILE DD DSN=TRN.RI46WIMP,DISP=SHR
   //WIMOUT DD DSN=logonid.WIMCOPY.DATA,DISP=(NEW,CATLG,DELETE),
   //          UNIT=SYSDA,DCB=(LRECL=132,BLKSIZE=1320,RECFM=FB),
   //          SPACE=(TRK,(15,5))
```

Sample Job Setup: The following sample writes the output file to the
----------------- TSO terminal and also to the disk dataset specified
                   in the WIMOUT DD statement.

```
//jobname JOB (account),'name',CLASS=C,MSGCLASS=2,
//    NOTIFY=logon-id
/*JOBPARM ROOM=xxx,LINES=5
//LIST1 EXEC DTRIT,TIME=5,SCRSIZE=5,PRINTDD=TSO,OUTFILE=
//WIMFILE DD DSN=TRN.RI46WIMP,DISP=SHR
//WIMOUT DD DSN=DT00C7B.WIMCOPY.DATA,DISP=(NEW,CATLG,DELETE),
//          UNIT=SYSDA,DCB=(LRECL=132,BLKSIZE=1320,RECFM=FB),
//          SPACE=(TRK,(15,5))
//SYSIN DD *
:EXPAND-&-COPY-WIM-FILE
/*
```


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+

C H A P T E R 9

S Y S T E M M A I N T E N A N C E C O M M A N D S

Introduction

The commands described in this chapter are used for maintaining various types of data within the Transportation Information System. The commands fall into two categories:

(1) Commands that create cross-reference files from T.I.S. base files.

(2) Commands that perform cross-testing among various T.I.S. base files to ensure agreement.

The cross-reference files are generally created on a frequent periodic basis to ensure up-to-date information.

Commands of the second category print error reports that indicate inconsistencies among the T.I.S. files. File maintenance personnel need to run these programs frequently to ensure that the files remain consistent.

The CREATE-CONSTR-DIST-XREF Command
****

Function: Creates the construction district cross-reference file.

Description: The construction district cross-reference file is created from the roadlog file. It is used for the +ROUTES subcommand whenever a command specifies a CONSTR-DIST parameter. The file should be created whenever updates to the roadlog file change construction district boundaries.

The record format of the construction district cross-reference file is:

Columns	Length	Data Elememt
1	1	Delete byte
2	1	Construction district
3-4	2	Starting route system
5-13	9	Starting route number
14-23	10	Starting reference point
24-25	2	Ending route system
26-34	9	Ending route number
34-44	10	Ending reference point
45-46	2	County number
47-50	4	City number

The records in the file are sorted and stored in ascending order based on columns 2 through 23.

For trunk highways, the construction district comes from the construction district data element of the roadlog file. For non-trunk roadways, the construction district is determined from the county number.

Required Command Parameters:

ROUTES subcommand

- Operates under GEN classification
- The following control cards should always be used when creating the entire file:

```
ROUTE-SYS=(01-04,07-09,11-23)
ROUTE-SYS=(05,10)
```

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A 1-page option list is printed.

- The option list is a listing of your command parameters.

LIST The file is listed during creation.
NO-LIST The file is not listed.

- If LIST is specified, a listing in order by route system, route number, and reference point is printed.

NO-WRITE The file is not created.
WRITE The file is created.

NO-MESSAGES Edit check messages are not printed.
MESSAGES Edit check messages are printed.

- Unless NO-MESSAGES is specified, certain error conditions in the roadlog file (eg., missing EN records) are reported.

TITLES subcommand

Print formatting parameters: See chapter 4 of the User Manual.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=10,SCRSIZE=10,FORM='(2)',
```

```
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:CREATE-CONSTR-DIST-XREF
+ROUTES
ROUTE-SYS=(01-04,07-09,11-23)
ROUTE-SYS=(05,10)
/*
```


The CREATE-MAINT-AREA-XREF Command

Function: Creates the maintenance area cross-reference file.

Description: The maintenance area cross-reference file is created from the roadlog file. It is used for the +ROUTES subcommand whenever a command specifies a MAINT-AREA parameter. The file should be created whenever updates to the roadlog file change maintenance area boundaries.

The record format of the maintenance area cross-reference file is:

Columns	Length	Data Element
1	1	Delete byte
2-3	2	Maintenance area
4-5	2	Route system
6-14	9	Route number
15-24	10	Starting reference point
25-34	10	Ending reference point

The records in the file are sorted and stored in ascending order based on columns 2 through 24.

Records are stored for trunk highways only. The maintenance area comes from the maintenance area element of the roadlog file.

Required Command Parameters:

ROUTES subcommand

- Operates under GEN classification.

- The following control card should be used when creating the
  entire file:

      ROUTE-SYS=01-03

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+

Optional Command Parameters: Same as for CREATE-CONSTR-DIST-XREF.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:CREATE-MAINT-DIST-XREF
+ROUTES
ROUTE-SYS=01-03
/*
```

The CREATE-PATROL-STATION-XREF Command

Function: Creates the patrol station cross-reference file.

Description: The patrol station cross-reference file is created from the roadlog file. It is used for the +ROUTES subcommand whenever a command specifies a PATROL-STATION parameter. The file should be created whenever updates to the roadlog file change patrol station boundaries.

The record format of the patrol station cross-reference file is:

Columns	Length	Data Element
1	1	Delete byte
2-5	4	Patrol station number
6-7	2	Route system
8-16	9	Route number
17-26	10	Starting reference point
27-36	10	Ending reference point

37-38	2	County number
39-42	4	City number

The records in the file are sorted and stored in ascending order based on columns 2 throught 26. Records are stored for trunk highways only.

Required Command Parameters:

ROUTE subcommand

- Operates under GEN classification.
- The following control card should be used when creating the entire file:

```
ROUTE-SYS=01-03
```


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+

Optional Command Parameters: Same as for CREATE-CONSTR-DIST-XREF.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
```

```
:CREATE-PATROL-STATION-XREF
+ROUTES
ROUTE-SYS=01-03
/*
```


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+

The CREATE-COUNTY-XREF Command
****

Function: Creates the county cross-reference file.

Description: The county cross-reference file is created from the
------------ roadlog file. It is used for the +ROUTES subcommand

whenever a command specifies a COUNTY parameter. The file should be created whenever updates to the roadlog file change county boundaries.

The record format of the county cross-reference file is:

Columns	Length	Data Element
1	1	Delete byte
2-3	2	County number
4-5	2	Starting route system
6-14	9	Starting route number
15-24	10	Starting reference point
25-26	2	Ending route system
27-35	9	Ending route number
36-45	10	Ending reference point
46-49	4	City number

The records in the file are sorted and stored in ascending order based on columns 2 through 24.

Required Command Parameters:

ROUTES subcommand

- Operates under GEN classification.
- The following control cards should be used when creating the entire file:

```
ROUTE-SYS=(1-04,07-09,11-23)
ROUTE-SYS=(05,10)
```

Optional Command Parameters: Same as for CREATE-CONSTR-DIST-XREF.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=10,REGION=400K,SCRSIZE=10,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:CREATE-COUNTY-XREF
+ROUTES
ROUTE-SYS=(01-04,07-09,11-23)
ROUTE-SYS=(05,10)
/*
```

The CREATE-CITY-XREF Command

Function: Creates the city cross-reference file.

Description: The city cross-reference file is created from the roadlog file. It is used for the +ROUTES subcommand whenever a command specifies a CITY parameter. The file should be created whenever updates to the roadlog file change city boundaries.

The record format of the city cross-reference file is:

Columns	Length	Data Element
1	1	Delete byte
2-5	4	City number
6-7	2	Starting route system
8-16	9	Starting route number
17-26	10	Starting reference point
27-28	2	Ending route system
29-37	9	Ending route number
38-47	10	Ending reference point

The records in the file are sorted and stored in ascending order based on columns 2 through 26.

Required Command Parameters:

ROUTES subcommand

- Operates under GEN classification.
- The following control cards should be used when creating the entire file:

```
ROUTE-SYS=(1-04,07-09,11-23)
ROUTE-SYS=(05,10)
```

Optional Command Parameters: Same as for CREATE-CONSTR-DIST-XREF.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=10,REGION=400K,SCRSIZE=10,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:CREATE-CITY-XREF
+ROUTES
ROUTE-SYS=(01-04,07-09,11-23)
ROUTE-SYS=(05,10)
/*
```

The CREATE-INTSECT-XREF Command

Function: Creates the intersection cross-reference file.

Description: The intersection cross-reference file allows access to an intersection's data based on any of the intersecting routes of the intersection. For example, an intersection involving an Interstate route and a U.S. highway is stored in the intersection file under just one of these locations (probably the Interstate route). Two records appear in the cross-reference file, one for the Interstate route and one for the U.S. highway.

During the creation of the cross-reference file, the roadlog file is accessed and jurisdiction information is retrieved. The following items are retrieved:

- Construction district
- Maintenance area
- Patrol station
- County
- City
- Urban area

Intersections for which roadlog data cannot be found are not written to the cross-reference file. The following message is printed for each such intersection:

***** A4-019-7 - NO ROADLOG RECORD FOR INTSECT RECORD AT key

where "key" is the intersection's key.

Required Command Parameters: None.

Optional Command Parameters:

TITLES subcommand

Print formatting parameters: See chapter 4 of the User Manual.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRITA,TIME=10,REGION=400K,SCRSIZE=5,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=,DISPINT=OLD
//SYSIN DD *
:CREATE-INTSECT-XREF
/*
```


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+

The ROADLOG-TRUMILE-EDIT Command

Function: Checks for discrepancies between the roadlog and true mileage files.

Description: ROADLOG-TRUMILE-EDIT is an aid to data and file management. It reads the roadlog and true mileage files and prints a report that shows (1) discrepancies between the two files, and (2) certain errors in the roadlog file.

Optionally, the program can print a listing of the major breakpoints of the roadlog file. The major breakpoints are (1) any record with NE, CO, GP, or EN remark codes, and (2) the first record of a group of records with blank remark codes. The listing hence provides a handy guide to locations of coincident sections, gaps, and non-existent sections. The data elements printed in the listing include:

- Route system, route number, and reference point.

- Remark code.
- Section length to the next major breakpoint.
- Description of section.

The following list shows the error conditions that will be detected by ROADLOG-TRUMILE-EDIT:

- Errors in the roadlog file:
    - Routes that do not have a record with reference point 000+00.000.
    - Routes that do not have an EN record.
    - Routes that have ecords with reference points larger than that of the EN record.
    - Routes for which only one record is stored.
- Errors in the true mileage file:
    - Successive records whose true distances are not in ascending order.
- Discrepancies between the two files:
    - Missing true mileage records.
    - Roadlog records with reference points not adjusted to nearest post.

Required Command Parameters:

ROUTES subcommand

- Operates under GEN classification (regional parameters such as CONSTR-DIST and COUNTY cannot be used).

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A 1-page option list is printed.

- The option list is a listing of your command parameters.

```
                    RLG-ONLY    Edit only the roadlog file and true
                                mileage file.
          RLG-FILES =  RLG-&-LPT   Edit roadlog, logpoint and true mileage
                                files.
                    LPT-&-RLG   Edit roadlog, logpoint and true mileage
                    ---------   files.


          NOLIST        Major breakpoints are not listed.
          LIST          Major breakpoints are listed.
          ----

          TITLES subcommand


          Print formatting parameters:  See chapter 4 of the User Manual.
```

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=10,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:ROADLOG-TRUMILE-EDIT,NOLIST
+ROUTES
ROUTE-SYS=01-03
/*
```

****

Function: Checks for discrepancies between the roadlog and coincident files.

Description: ROADLOG-COINFILE-EDIT is an aid to data and file management. It reads the roadlog and coincident files and prints a report that shows any discrepancies between the two.

As an example of a valid relationship between the two files, consider the data stored in the files when an Interstate route is coincident with a U.S. highway:

- Roadlog file:

Route	Ref-Point	Remark	
IS 35	227+00.235	blanks	
IS 35	228+00.946	blanks	-- Coincident section begins here
IS 35	232+00.200	blanks	
IS 35	235+00.774	blanks	
IS 35	240+00.219	blanks	
IS 35	241+00.690	blanks	-- Coincident section ends here
IS 35	243+00.600	blanks	
US 12	041+00.300	blanks	
US 12	043+00.262	CO	-- Coincident section begins here
US 12	057+00.693	blanks	-- Coincident section ends here
US 12	058+00.300	blanks	

- Coincident file:

Coin Route	Coin Start-Ref	Coin End-Ref	Base Route	Base Start-Ref	Base End-Ref
US 12	043+00.262	057+00.693	IS 35	228+00.946	241+00.690

The following must be true to have a valid relationship:

- For every record in the coincident file:

  - There must be four corresponding records in the roadlog file (one each for the coincident starting and ending keys and for the base starting and ending keys).

  - There must NOT be any records stored in the roadlog file between the coincident starting and ending keys.

- The roadlog record at the coincident starting key must have remark code CO (the record at the coincident ending key may have any remark code).

- There may be any number of records stored in the roadlog file between the base starting key and the base ending key, but none of these records can have remark code CO.

- The roadlog record at the base starting key may not have remark code CO (the record at the base ending key may have any remark code).

- For every CO-type record in the roadlog file:

  - There must be a corresponding record stored in the coincident file.

Required Command Parameters:

ROUTES subcommand

- Operates under GEN classification (regional parameters such as CONSTR-DIST and COUNTY cannot be used).

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A 1-page option list is printed.

- The option list is a listing of your command parameters.

TITLES subcommand

Print formatting parameters: See chapter 4 of the User Manual.

Sample Job Setup:

```
        ----------------

        //JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
        //             MSGCLASS=2,MSGLEVEL=(2,0)
        /*JOBPARM ROOM=R820,LINES=5
        /*ROUTE  PRINT R0
        //TIS EXEC DTRIT,TIME=3,REGION=400K,SCRSIZE=3,FORM='(2)',
        //    PRINTDD=TSO,OUTFILE=
        //SYSIN DD *
        :ROADLOG-COINFILE-EDIT
        +ROUTES
        ROUTE-SYS=01-03
        /*
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1
+
PAGE 645
```

The COINFILE-TRUMILE-EDIT Command

Function: Checks for discrepancies between the coincident and true mileage files.

Description: COINFILE-TRUMILE-EDIT is an aid to data and file management. It reads the coincident file and true mileage file and prints a report that shows any discrepancies between the two files.

A sample record from the coincident file could be:

Coin Route	Coin Start-Ref	Coin End-Ref	Base Route	Base Start-Ref	Base End-Ref
US 12	043+00.262	057+00.693	IS 35	228+00.946	241+00.690

In order for the true mileage file to be in agreement with the coincident file, the following must be true:

- The true mileage file must contain information that allows the computation of the coincident length on the coincident route (eg., between 043+00.262 and 257+00.693 on US 12).
- The true mileage file must contain information that allows the computation of the coincident length on the base route (eg., between 228+00.946 and 241+00.690 on IS 35).
- The coincident length must compute to the same value when computed on the coincident route as when computed on the base route.

Required Command Parameters: None.

Optional Command Parameters:

TITLES subcommand

Print formatting parameters: See chapter 4 of the User Manual.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=3,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:COINFILE-TRUMILE-EDIT
/*
```

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The ACCIDENT-ROADLOG-EDIT Command
****

Function: Checks to see that geocoded accidents are located in valid
--------- roadlog sections.

Description: The key field of each record stored in the accident
------------ location cross-reference file is compared to the roadlog
file to ensure valid roadway locations.

Required Command Parameters: None.

Optional Command Parameters:

START-DATE=mm/dd/yyyy Accidents prior to this date are not
edited.

END-DATE=mm/dd/yyyy Accidents after this date are not edited.

CODELIST A codelist is printed.
NO-CODELIST No codelist is printed (default).

-The codelist is a summary of codes used in the report.

SELECT subcommand

-The INCLUDE/EXCLUDE clause is optional and has the following format:

INCLUDE
ACCIDENTS IF:
EXCLUDE

-ACD, ACV, ACP and ACJ data elements can be referenced
-ACV, ACP, and ACJ data elements must be referenced via the multi-correlation facility (*ANY*/*ALL*).

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
//TEST   EXEC DTRITA
//SYSIN DD *
:ACCIDENT-ROADLOG-EDIT,NEWS=NO,CODELIST,
:   START-DATE=01/01/1991
+SELECT
 INCLUDE ACCIDENTS IF:
  ACD.ROUTE-SYSTEM *LE* '07'
/*
```


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+

The COUNT-ROADLOG-RECORDS Command

Function: Provides a count by route system of records stored in the Roadlog/Logpoint files.

Description: COUNT-ROADLOG-RECORDS can help the user estimate time required by other programs to process traffic date. This

program ALWAYS reads the entire Roadlog/Logpoint files,
but SELECT may be used to count only certain records.

Required Command Parameters: None.

Optional Command Parameters:

SELECT subcommand

- The INCLUDE/EXCLUDE clause is optional and has the following format:

  INCLUDE
  EXCLUDE ROADLOG-RECORDS IF:

- RLG data elements can be referenced.

TITLES subcommand

Print formatting parameters: See chapter 4 of the User Manual.

Time Parameters: This program will use about 7 minutes as a minimum to count about 500,000 records. SELECT will require some additional time.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=10,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:COUNT-ROADLOG-RECORDS
/*
```

The SECTIONS-ROADLOG-EDIT Command

Function: Checks for discrepancies between the sections and roadlog files.

Description: SECTIONS-ROADLOG-EDIT is an aid to data and file management. It prints a side-by-side listing of the roadlog and sectons files, along with error messages indicating errors in the sections file. Any errors indicated should be removed before sections analysis reports are run.

Data elements printed include:

Route system & number	Printed on each line for the roadlog or section record (or both).
Roadlog reference point	Certain roadlog records are indicated for various reasons: 1) Every record with remark code of CO, NE, GP, or EN. 2) First record in a group with blank remark codes. 3) First record in a new construction district. 4) Same location as section record.
Roadlog remark code	Printed with reference points.
Roadlog district	Construction district according to the roadlog file.
Section reference point	Printed from every section record.
Section district	Constructin district according to the section file.
Verbal description	From the section record if available -- otherwise from the roadlog record.

Errors indicated in the sections file include:

No data in sections file	Records must be stored at district boundaries, and any location where a group of mileage records begins in the roadlog file.
No verbal descr. available	The sections record contains no

description and none exists at this location in the roadlog or logpoint files.

Constr. districts disagree	District is stored in both files and must agree.
Sectn key beyond end of rte	Section reference point is beyound the roadlog EN record.
Key is in coincident sectn	Section reference point is within a roadlog coincident section.
Section key is in gap	Section reference point is within a roadlog gap section.
Key is in non-existnt sectn	Section reference point is within a roadlog non-existent section.
Route does not exist in rlg	No roadlog data exists for the route system and route number of the sections record.

Required Command Parameters:

ROUTES subcommand

- Operates under GEN classification.

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed.

- The optionlist is a summary of command parameters used.

NO-CODELIST	No codelists are printed.

CODELIST A several-page codelist is printed.

- The codelist is a summary of headings and codes and error messages printed in the listing.

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TITLES subcommand

Print formatting parameters: See chapter 4 of the User Manual.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=5,REGION=300K,SCRSIZE=10,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:SECTIONS-ROADLOG-EDIT,NO-OPTLIST
+ROUTES
ROUTE-SYS=01-03
/*
```

The CHECK-CNTY-CITY-RTE Command

Function: Edits roadlog records.

Description: CHECK-CNTY-CITY-RTE is a specialized program that scans non-trunk roadlog records and verifies that the city or county number in the route number field agrees with the city or county field in the record. Records with conflicting values are listed. The program always scans all blank and NE records for route systems 04 through 23.

Required Command Parameters: None.

Optional Command Parameters:

TITLES subcommand

Print formatting parameters: See chapter 4 of the User Manual.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=6,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:CHECK-CNTY-CITY-RTE
/*
```


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The LIST-SELECT-TABLE Command

Function: Prints and edits specified select tables.

Description: LIST-SELECT-TABLE is an aid to those responsible for
--- maintaining the tables used by the TIS select and
category software. Optional editing checks the format of
the fields in records stored in the table.

Required Command Parameters:

FILE-NAME=xxx

- xxx is the 3-character prefix for the file to be listed, eg., FILE-NAME=RLG.

- To list all select tables, specify FILE-NAME=ALL.

Optional Command Parameters:

LIST-BY-SEQ — List data elements by order stored in the table.
LIST-BY-NAME — List data elements by alphabetic order of names.
LIST-BY-NAME/SEQ — List data elements in both orders.

- The table is stored in order of appearance of the data elements as they are stored in the record.

- Listing by name makes it easier to locate particular data elements.

NOEDIT — Do not edit records.
EDIT — Edit the records as they are listed.

- Edits are simple format checks.

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TITLES subcommand

Print formatting parameters: See chapter 4 of the User Manual.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
```

```
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-SELECT-TABLE,FILE-NAME=ALL,LIST-BY-NAME
/*
```


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The CREATE-BDG-XREF-FILE Command
****

The CREATE-BDG-XREF-FILE command creates the bridge cross reference file for use in accessing the bridge data by reference point. The bridge cross reference file is completely replaced when this command is run. One, two, or three records may exist in the file corresponding to the three possible locations coded in each bridge record. If a bridge record contains none of the location data elements (route system, route number, AND reference point) in ANY of the three possible keys, no record will be in the cross reference file and the bridge record will not be included when processing by reference point.

The command parameters of CREATE-BDG-XREF-FILE include:

(Optional)	TITLES subcommand
(Optional)	Any of the print-formatting parameters (see chapter 4 in the User's Manual).

The parameters on the EXEC card include:

- REGION=200K
- TIME=1
- SCRSIZE=3
- DISPBDG=OLD

A Sample job setup follows:

```
---------------------------
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=3,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:CREATE-BDG-XREF-FILE
/*
```

The BRIDGE-ROADLOG-EDIT Command

Function: Checks for discrepancies between the bridge and roadlog files.

Description: BRIDGE-ROADLOG-EDIT is an aid to data and file management. It accesses bridge records by reference point location, and compares certain data elements with those found in the roadlog file and prints a report comparing the data elements that exist in both files.

The roadlog record used is the one with reference point the same as the bridge record, or the one with the next lower location. The edits performed correspond to input data edits for the bridge record and indicates which file disagrees - RLG=roadlog and TRM=true mileage.

Error messages include:

1	BDG - FORMAT ERROR IN BRIDGE KEY
2	TRM - ROUTE DOES NOT EXIST
3	TRM - REFERENCE POST DOES NOT EXIST
4	TRM - REF. POINT SHOULD BE - XXX+XX.XXX
5	TRM - TRUE MILEAGE IS LESS THAN ZERO
6	RLG - ROUTE DOES NOT EXIST
7	RLG - REFERENCE POINT IS BEYOND END OF ROUTE
8	RLG - REFERENCE POINT IS IN GAP
9	RLG - REFERENCE POINT IS IN COINCIDENT SECTION
10	RLG - REFERENCE POINT IS IN NON-EXISTENT SECTN
11	RLG - CONTROL SECTIONS DIFFER; RLG=xx, BDG=xx
12	RLG - CONSTRUCT. DISTS DIFFER; RLG=x, BDG=x
13	RLG - MAINT. AREAS DIFFER; RLG=xx, BDG=xx
14	RLG - CITY NUMBERS DIFFER; RLG=xxxx, BDG=xxxx
15	RLG - COUNTY NUMBERS DIFFER; RLG=xx, BDG=xx
16	RLG - ROADWAY CLASSES DIFFER; RLG=x, BDG=x
17	RLG - FED. AID SYSTEMS DIFFER; RLG=x/x, BDG=xx
18	RLG - FUNCT. CLASSES DIFFER; RLG=xx, BDG=xx
19	RLG - TRAFFIC LANES DIFFER; RLG=x/x, BDG=xx

Any combinataion of edits may be disabled for a particular run by using the SUMMARIES parameter. To disable the nth edit, code a "D" in the nth position of the summaries parameter. Any other character has no effect. For example, to disable the 14th and 19th edits, code SUMMARIES=(1234567890123D5678D) on the command (the digits help count to

the proper positions).

Data elements printed include:

Bridge Record	Roadlog Record
Route system	
Route number	Remark code
Reference point	Reference point
Bridge number	
Bridge match	
Over or under	
Usage	
Descriptive location	

Required Command Parameters:

ROUTES subcommand

- Operates under LIST classification.

Optional Command Parameters:

NO-OPTLIST Do not print the list of options used.
OPTLIST Print a 1-page list of options used.

LIST-ALL List all bridge records edited.
LIST-ERR List only records with error messages.

SUMMARIES=(xxxxxxxxxxxxxxxxxx)

- The summaries parameter is used to disable certain
  edits, by coding "D" in corresponding positions.

```
OVER          Edit only those records with over-or-under= 1 (over).
UNDER         Edit only those records with over-or-under= 2 (under)
OVER-&-UNDER  Edit both over and under bridges.
------------

        1     Use only first key to access bridge records.
USAGE=  2     Use only second key to access bridge records.
        S     Use only supplemental key to access bridge records.
```

- Default is to use all keys.

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SELECT subcommand

- The INCLUDE/EXCLUDE clause is optional and has the
  following format:

```
  INCLUDE
  EXCLUDE    BRIDGE-RECORDS IF:
```

- BDG data elements can be referenced.

- The OVER/UNDER and USAGE parameters are more efficient and
  should be used to exclude records rather than selecting on
  those data elements.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job setup:

```
-----------------

//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
```

```
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=10,REGION=400K,SCRSIZE=5,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:BRIDGE-ROADLOG-EDIT,USAGE=1
+ROUTES
ROUTE-SYS=ISTH
/*
```


The PRINT-DSCB Command

Function: Prints data set control block information.

Description: The user provides a DD statement for the file to be reported on. This can be an ISAM (indexed sequential) file, a partitioned dataset (eg., TSOLIB or TABLES), or any other format (excluding tape files). The user does not need to code a DD statement for most RIS files, since they are already defined in the DTRIT/DTRIT cataloged procedures (see ANALYZE-ISAM-FILE command in chapter 8).

The information printed by PRINT-DSCB must be interpreted by those familiar with IBM JCL (job control language), and includes the following:

```
            DDNAME
            DSNAME
            VOL=SER

            ----- DCB FIELDS -----

               DSORG
               BLKSIZE
               LRECL
               RECFM
               OPTCD
               KEYLEN
               RKP
               CYLOFL
               NTM
```



```
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            If the file is indexed-sequential, the following additional
            information is printed:

                ----- FILE STATUS -----

                   NUMBER OF RECORDS IN PRIME AREA
                   NUMBER OF RECORDS IN OVERFLOW AREA
                   TOTAL
                   NUMBER OF DELETED RECORDS
                   TOTAL NUMBER OF RECORDS IN FILE
```

INDEX SPACE ALLOCATED
PRIME SPACE ALLOCATED
INDP OVERFLOW SPACE ALLOCATED

CYLINDER OVERFLOW TRACKS PER PRIME CYLINDER
INDEX TRACKS PER PRIME CYLINDER
PRIME TRACKS PER PRIME CYLINDER

(PRIME) RECORDS/BLOCK
(PRIME) RECORDS/TRACK
(PRIME) RECORDS/CYLINDER

CURRENT FILE CAPACITY
SPACE LEFT FOR RECORDS
PERCENT OF SPACE UTILIZED

NUMBER OF INDEX LEVELS
TRACKS TO CREATE MASTER INDEX
HIGH-LEVEL INDEX - BYTES
HIGH-LEVEL INDEX - TRACKS

RECORDS/CYLINDER OVERFLOW TRACK
RECORDS/INDEPENDENT OVERFLOW TRACK
EMPTY TRACKS IN INDEPENDENT OVERFLOW AREA
FULL CYLINDER OVERFLOW AREAS

Required Command Parameters:

INPUT-DD=ddname Specify name of DD statement defining file.

Optional Command Parameters:

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:PRINT-DSCB,INPUT-DD=ROADLOG
/*
```

The CROSSING-ROADLOG-EDIT Command

Function: Checks for discrepancies between the rail grade crossing (RGC), roadlog (RLG), and true mileage files (TRM).

Description: CROSSING-ROADLOG-EDIT is an aid to data and file management. It accesses crossing records by reference point location, and compares certain data elements with those found in the roadlog file. The primary usage is to check for valid reference point locations in RGC records. This is necessary for other report commands to work properly.

The roadlog record used is the one with a reference point the same as the crossing record, or the one with the next lower location if none exists at the same reference point. The edits performed are similar to edit checks performed by UPDATE-CROSSING-FILE and CROSSING-MULTIPLE-UPDATE.

Error messages include:

1 RGC - FORMAT ERROR IN CROSSING KEY
2 TRM - ROUTE DOES NOT EXIST
3 TRM - REFERENCE POST DOES NOT EXIST
4 TRM - REF. POINT SHOULD BE - XXX+XX.XXX
5 TRM - TRUE MILEAGE IS LESS THAN ZERO
6 RLG - ROUTE DOES NOT EXIST
7 RLG - REFERENCE POINT IS BEYOND END OF ROUTE
8 RLG - REFERENCE POINT IS IN GAP
9 RLG - REFERENCE POINT IS IN COINCIDENT SECTION
10 RLG - REFERENCE POINT IS IN NON-EXISTENT SECTION
11 RLG - DIRECTIONS DIFFER; RLG=XX, RGC=XX
12 RLG - ROAD WIDTHS NEAR DIFFER; RLG=XX, RGC=XX
13 RLG - ROAD WIDTHS FAR DIFFER; RLG=XX, RGC=XX
14 RLG - SURFACE TYPES NEAR DIFFER; RLG=X, RGC=X
15 RLG - SURFACE TYPES FAR DIFFER; RLG=X, RGC=X

Any combination of edits may be disabled for a particular run by using the SUMMARIES parameter. To disable the nth edit, code a "D" in the nth position of the SUMMARIES parameter. Any other character has no effect. For example, to disable the 12th and 13th edits, code SUMMARIES=(12345678901DD45) on the command (the digits help count to the proper positions). Note that if edit 11 fails, edits 12-15 are not performed, since NEAR/FAR cannot be related.

Data elements printed include:

Crossing Record	Roadlog Record
Route system	Reference point
Route number	Remark code
Reference point	
Crossing ID number	
Verbal Description	

Required Command Parameters:

ROUTES subcommand - Operates under LIST classification.

Optional Command Parameters:

NO-OPTLIST Do not print the list of options used.
OPTLIST Print a 1-page option list.

LIST-ALL List all crossing records edited.
LIST-ERR List only those records with error messages.

SUMMARIES=(xxxxxxxxxxxxxxx)

- The summaries parameter is used to disable certain edits, by coding a "D" in the corresponding position.

SELECT subcommand

- The INCLUDE/EXCLUDE clause is required and has the following format:

INCLUDE CROSSING-RECORDS IF:
or EXCLUDE CROSSING-RECORDS IF:

- RGC data elements can be referenced.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=,COPIES=1,DISPTBL=SHR
//SYSIN DD *
:CROSSING-ROADLOG-EDIT,LIST-ALL,SUMMARIES=(123456789012345),
:  OPTLIST
+ROUTES
ROUTE-SYS=10
/*
```


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The CR-ROADLOG-EDIT Command
****

Function: Checks for discrepancies between the condition rating and roadlog files.

Description: CR-ROADLOG-EDIT is an aid to data and file management. It prints a side-by-side listing of the roadlog and condition rating (CR) files, along with error messages indicating errors in the CR file. Any errors indicated should be removed before condition rating reports are run.

Data elements printed include:

Route system & number	Printed on each line for the roadlog or CR record(s) (or both).
Roadlog reference point	Certain roadlog records are indicated for various reasons: 1) Every record with remark code of CO, NE, GP, or EN. 2) First record in a group with blank remark codes. 3) First record in a new construction district.

4) Same location as CR record.

Roadlog remark code	Printed with reference points.
District	On lines with CR reference points, the CR construction district. On lines with ONLY roadlog reference points, the first digit of the maintenance area.
CR reference point	Printed from CR record.
CR district	Construction district according to the CR file.
Verbal description	From the CR record if available -- otherwise from the roadlog record.

Errors indicated in the CR file include:

No data in CR file	Records must be stored to cover all roadlog mileage segments.
Route not in RLG	No roadlog data exists for the route system and route number of the CR record.
CR data in gap	CR beginning and/or ending reference point is within a roadlog gap.

CR data in CO sectn	CR beginning and/or ending reference point is within a roadlog coincident segment.
CR data in NE sectn	CR beginning and/or ending reference point is within a roadlog non-existent segment.
CR data after EN	CR beginning or ending reference point is beyond the roadlog EN record.
Overlap in CR data	The beginning reference point of the CR record is less than the ending reference point of the previous record in the same roadway.

Districts disagree	District is stored in both files.
Gap in CR data	The beginning reference point of the CR record is greater than the ending reference point of the previous record in the same roadway.

Required Command Parameters:

ROUTES subcommand

- Operates under LIST classification.

Optional Command Parameters:

OPTLIST	A one-page option list is printed.
NO-OPTLIST	No option list is printed (default).

- The optionlist is a summary of command parameters used.

NO-CODELIST	No codelists are printed.
CODELIST	A several-page codelist is printed (default).

- The codelist is a summary of headings and codes and error messages printed in the listing.

LIST-ALL	All CR and roadlog records are printed.
LIST-ERR	Only records with error messages are printed.
LIST-ABR	"D" records, major roadlog records, and records with error messages are printed (default).

SUMMARIES=(xxxxxxxxx)

The summaries parameter can be used to selectively disable edits. Each edit is identified by the position in the "xxxxxxxxx" string. Code "N" to disable the edit.

Edit positions: 1. No data in CR file
                 2. Route not in RLG
                 3. CR data in gap
                 4. CR data in CO sectn
                 5. CR data in NE sectn
                 6. CR data after EN
                 7. Overlap in CR data
                 8. Districts disagree
                 9. Gap in CR data

For example, to disable the "districts disagree" edit,
code SUMMARIES=(YYYYYYYNY).

TITLES subcommand

Print formatting parameters: See chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIPM,TIME=2,REGION=500K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:CR-ROADLOG-EDIT,NO-CODELIST,LIST-ERR,SUMMARIES=(YYYYYYYNY)
+ROUTES
ROUTE-SYS=01-03
/*
```

The CREATE-RGC-XREF-FILE Command

The CREATE-RGC-XREF-FILE command creates the rail grade crossing (RGC) cross reference file for use in accessing RGC records by reference point. The RGC cross reference file is completely replaced when this command is run. If a crossing record contains none of the location data elements (route system, route number, AND reference point), no record will be in the cross reference file and the record will not be included when processing by reference point.

The command parameters of CREATE-RGC-XREF-FILE include:

(Optional)	TITLES subcommand
(Optional)	Any of the print-formatting parameters (see chapter 4 in the User's Manual).

A Sample job setup follows:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIRT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=,DISPRGC=OLD
//SYSIN DD *
:CREATE-RGC-XREF-FILE
/*
```

The above job setup may be copied from DT99A1B.TSOLIB.CNTL(RGCCX).

The RAIL-FILE-EDIT Command

Function: Checks for discrepancies between the rail true mileage, railway, railpoint, station, bridge, and rail grade crossing files.

Description: RAIL-FILE-EDIT is an aid to data and file management. It prints an abbreviated listing of the railway and railpoint files along with error messages indicating possible errors. Any errors indicated should be removed before rail reports are run.

Data elements printed include:

From Railway File: Railroad system and line number, reference point, and remark code.

Certain railway records are indicated for various reasons:

1) Every record with remark code of CO, GP, or EN.
2) First record in a group with blank remark codes.
3) Same location as railpoint record.
4) Possible error found.

From Railpoint File: Railroad system and line number, reference point, FSAC number, crossing number, and bridge number.

Railpoint records are only indicated if:

1) Same location as railpoint record.
2) Possible error found.

Errors detected include:

Reference post does not exist	The post indicated in the reference point is not found in the rail true mileage file.
Reference point not normalized	The post indicated in the reference point is not the closest post at or before the point of the line.
Rail line does not exist	The railpoint reference point is not on a valid mileage section according to the railway file.

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Point beyond end of rail line	The railpoint reference point is not on a valid mileage section according to the railway file (it is beyond the railway "EN" record).
Point is in gap	The railpoint reference point is not on a valid mileage section according to the railway file (it falls just after a railway "GP" record).
Point is in coincident	The railpoint reference point is not on a valid mileage section according to the railway file (it falls just after a railway "CO" record).
Point is before start of line	The railpoint reference point is not on a valid mileage section according to the railway file (it is before the first railway record for the line).
Station record does not exist	The FSAC number shown combined with railroad system code does not match a record in the station file.
Bridge record does not exist	The bridge number shown does not match a record in the bridge file.
Crossing record does not exist	The crossing number shown does not match a record in the crossing

file.

"EN" record missing	The railway file did not contain a record with remark code "EN" as the last record stored for the line.
Multiple "EN" records	More than one railway record was found on the line with remark code "EN".

Required Command Parameters: None.

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Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed (default).

- The optionlist is a summary of command parameters used.

NO-CODELIST	No codelists are printed.
CODELIST	A several-page codelist is printed (default).

- The codelist is a summary of headings and codes and error messages printed in the listing.

LIST-ALL	All records are listed.
LIST-ERR	Only signifigant records or those with errors are listed (default).

YES Include abandoned railways.

ABANDONED=

NO Do not include abandoned railways (default).

TITLES subcommand

Print formatting parameters: See chapter 4 of the User Manual.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIRT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:RAIL-FILE-EDIT,LIST-ERR
/*
```

The above job setup may be copied from DT99A1B.TSOLIB.CNTL(RWYEDIT).

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The COMPUTE-ADT-MODEL-FACTORS Command

****

Function: Computes adjustment factors used by the ADT modelling software.

Description: The Automatic Traffic Recorder (ATR) data for each year is used to compute adjustment factors for use in reports that use traffic volume information. These factors are applied to annual average daily traffic to give more precise estimates of volumes for each day and hour of the year. The models will use the factors based on the same year of ATR data if available, otherwise, the closest year's factors are used.

This command should be run when all of the ATR data for a year has been edited and has been placed in the "last year" ATR data library (see "Automatic Traffic Recorder System" in chapter 8 of the User's Manual for more information on ATR libraries).

The ADT model factor table is stored in DT99A1A.TABLES.CNTL(ADTFAX). The table includes an explanation of its format and may be maintained manually with TSO or SPF edit. This command includes a WRITE option that will automatically add the resulting factors to the factor table.

Required Command Parameters:

YEAR=nn — Code the last two digits of the year of ATR data and factors.

Optional Command Parameters:

NO-OPTLIST — No option list is printed.
OPTLIST — A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

WRITE — Write the factors to the table.
LIST-ONLY — Compute and list factors, but do not list (default).

- If the table already contains factors for the year, they will be replaced by the results of the subsequent run.

SELECT subcommand

Select criteria may be applied to the ATR record. Only selected records will be used to compute factors.

- To select ATR records, use the following format:

```
INCLUDE
EXCLUDE  ATR-RECORDS IF:
```

- ATR and ATM data elements can be referenced.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample computes factors for 1984 and writes them to the table. The results are printed at the TSO terminal, and also at the DOT third floor line printer.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=REDUCE,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=2,REGION=500K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//ATRLIB   DD DISP=SHR,DSN=TRN.RI44ATRL
//ATRLIBD  DD DISP=SHR,DSN=TRN.RI44ATRL
//SYSIN DD *
:COMPUTE-ADT-MODEL-FACTORS,YEAR=84,WRITE
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

The SUFFICIENCY-HAZARDS-EDIT Command

****

Function: Transfers hazards data from the roadlog, logpoint, bridge, rail grade crossing, and sufficiency hazards files to the sufficiency rating file.

Description: Sufficiency rating (SUF) records contain summary fields for numbers of hazards in the segment. These fields may be maintained through the TISSPF online dialogue on a record-by-record basis, or they can be computed from the various TIS files using this command.

This command processes the entire sufficiency rating file, subject to the optional +SELECT subcommand. Selected records will be matched with the other files, using the route system, route number, beginning and ending reference points of the sufficiency segment.

The command optionally lists selected sufficiency records, showing information to identify the section, along with the existing hazard counts and the computed new values.

The +SELECT subcommand should be used to screen which bridges and rail grade crossings are considered "hazards". Presently the criteria are:

for bridges: length 20 feet or longer and any of the following appraisal ratings ranging 0 through 5:
- structure
- deck geometry
- underclearance

for rail grade crossings: hazard rating greater than 100.

Hazardous intersections are counted in the roadlog and logpoint files, any intersection category value of 2 through 7 is counted (intesection category is the route system code of the highest intersecting route).

Stopping sight distance restrictions, hazardous curves, and no passing length is computed from the sufficiency hazards file.

In all cases, hazards at the beginning reference point of the segment ARE counted, hazards at the ending reference point of the segment are NOT counted.

Required Command Parameters: None.

SELECT subcommand

Select criteria may be applied to the sufficiency (SUF) record. Only selected records will be included in the report.

- To select sufficiency records, use the following format:

```
INCLUDE
EXCLUDE  SUFFICIENCY-RECORDS IF:
```

- SUF data elements can be referenced.

Select criteria should be applied to the bridge (BDG) record. Only selected records will be counted as hazardous.

- To select bridge records, use the following format:

```
INCLUDE
EXCLUDE  BRIDGE-RECORDS IF:
```

- BDG data elements can be referenced.

Select criteria should be applied to the rail grade crossing (RGC) record. Only selected records will be counted as hazardous.

- To select crossing records, use the following format:

```
INCLUDE
EXCLUDE  CROSSING-RECORDS IF:
```

- RGC data elements can be referenced.

Optional Command Parameters:

LIST-ALL — List all selected sufficiency segments.
LIST-CHANGES — List only those segments where values change or there are errors (default).

UPDATE - Update selected records.
EDIT - Make no changes to the sufficiency file (default).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

1
+

Sample Job Setup: The following sample lists all sufficiency segments on highway 169 and computes hazard counts. The new values are placed in the sufficiency file. Note the select statement defining hazardous bridges and crossings. Output goes to the terminal only.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=50
//TIS EXEC DTRIT,TIME=1,REGION=400K,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:SUFFICIENCY-HAZARDS-EDIT,LIST-ALL,UPDATE
+SELECT
 INCLUDE CROSSING-RECORDS IF:
  RGC.HAZARD-RATING *GT* 100
 INCLUDE BRIDGE-RECORDS IF:
   BDG.STRUCT-LEN *GE* 20 *AND*
  ((BDG.STRUCT-APSL *GE* '0' *AND* BDG.STRUCT-APSL *LT* '6') *OR*
  (BDG.DECK-GEOM-APSL *GE* '0' *AND* BDG.DECK-GEOM-APSL *LT* '6') *OR*
  (BDG.UND-CLR-APSL *GE* '0' *AND* BDG.UND-CLR-APSL *LT* '6'))
 INCLUDE SUFFICIENCY-RECORDS IF:
  SUF.ROUTE-NUMBER *EQ* '00000169'
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

The SUFFICIENCY-ROADLOG-EDIT Command

Function: Compares data from the sufficiency rating file, the sufficiency hazards file, and the roadlog file.

Description: Records are listed side-by-side from the files. Edits check that sufficiency segments cover all roadlog mileage segments and that they do not extend into non-mileage roadlog sections (gaps, coincident, non-existent) or beyond the end of the route as defined in the roadlog file. Hazards records are checked to see that they are completely "covered" by sufficiency rating records. These are termed "location" edits.

Sufficiency rating vs. roadlog

Once corresponding records from the files have been aligned, the second type of edits are performed. These compare data fields between the two records. Sometimes the roadlog uses a different set of codes, in these cases the roadlog values are translated into sufficiency values before comparisons are made.

Data elements edited include:

Edit Number	Data Element
1	County
2	Control section
3	District
4	Maintenance area
5	Regional development commission
6	Access control
7	Functional classification
8	Federal aid system
9	Surface type - road-1
10	Surface type - road-2
11	Surface width - road-1
12	Surface width - road-2
13	Left shoulder type - road-1
14	Right shoulder type - road-1
15	Left shoulder width - road-1
16	Right shoulder width - road-1
17	Surface year - road-1
18	Grade year - road-1
19	Left shoulder type - road-2
20	Right shoulder type - road-2
21	Left shoulder width - road-2
22	Right shoulder width - road-2
23	Surface year - road-2
24	Grade year - road-2
25	Number of lanes
26	Divided/1-way

The purpose of edit numbers is to allow certain edits to be "turned off" for a particular run.

1
+

Required Command Parameters:

ROUTES subcommand

- Operates under "LIST" classification (see chapter 5 for a description of the ROUTES subcommand).

SUMMARIES=(12345678901234567890123456)

Specifies which edits are to be performed (location edits are always done). To disable certain edits, change the SUMMARIES keyword to have "D" in the position corresponding to the edit number. As shown above, all edits are done. Use the numbers to keep track of position, i.e., (12345... means edit numbers 1,2,3,4,5,....

Example: to disable surface and shoulder edits, code
------- SUMMARIES=(12345678DDDDDDDD78DDDD3456).

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

NO-CODELIST - Do not print any codelists.
CODELIST - Print a codelist with each individual summary (default).

- The codelist is a several-page description of the edits.

LIST-ALL - List all sufficiency records.
LIST-ERR - List only those records with errors (default).

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample edits sufficiency data for
----------------   interstate highways. Only the access control edit
                   (edit number 6) is done. Printed output goes to the
                   terminal only.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIPM,TIME=3,REGION=300K,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:SUFFICIENCY-ROADLOG-EDIT,OPTLIST,NO-CODELIST,LIST-ALL,
:  SUMMARIES=(DDDDD3DDDDDDDDDDDDDDDDDD)
+ROUTES
ROUTE-SYS=ISTH
/*
```

   See chapters 3 and 4 of the TIS User's Manual for further explanation
   of TIS job setups.

The SUFFICIENCY-PAVEMENT-EDIT Command

Function: Compares the sufficiency tape to the condition rating and roadlog files. Optionally retrieves PSR and SR data for input to the sufficiency tape.

Description: SUFFICIENCY-PAVEMENT-EDIT reads the sufficiency tape (outside TIS) and compares sections (route system, route number, starting and ending reference points) to the corresponding condition rating (CR) and roadlog (RLG) data. PSR and SR data is optionally written to a file for the sufficiency sections. The data is output in a format that is acceptable to the sufficiency tape file maintenance software.

Data elements required from the sufficiency tape include:

Route number, starting and ending reference points:

- The route system is determined from the true mileage file by making a table of route numbers versus route system.
- Starting and ending reference points are coded on the tape in the format pppddddd which is expanded into TIS format as ppp+dd.ddd.

Data elements provided for updating the sufficiency tape include:

Route number
Direction
Beginning milepoint
Card type - "08"
Update function - "U"
Ending milepoint
PSR
SR
Year

The output data is written to a DD statement defined in the OUTPUT-DD parameter.

Required Command Parameters:

OUTPUT-DD=ddname Defines where the output data is to go.

Optional Command Parameters:

YEAR=nn The year of data, 19nn. If coded, "nn" will be written for all sufficiency sections. If not coded, "nn" will be the latest year available from the condition rating file for each section (subject to SELECT criteria below).

WRITE Write the PSR and SR data to OUTPUT-DD.
NO-WRITE Do not write the data (default).

NO-MESSAGES Error messages A2-013 - A2-018 are not printed.
MESSAGES Error messages A2-013 - A2-018 are printed (default)

- These error messages are caused by improper reference points in the roadlog, condition rating or sufficiency records.

LIST-FORMAT= LONG List in long format.
SHORT List in short format.
ERROR List in error format (default).

SELECT subcommand Can be used to choose which samples in the condition rating record are to be used in calculating PSR and SR for the sufficiency section.

The INCLUDE/EXCLUDE clause is REQUIRED and has the

following format:

INCLUDE
EXCLUDE CR-SAMPLES IF:

- CRY and CRS data elements can be referenced.

- CRS data elements can only be referenced by the multi-correlation facility (*ANY*/*ALL*).

If no SELECT CR-SAMPLES statement is coded, all samples in the record are considered "selected".

TITLES subcommand

Print formatting parameters: See chapter 4.

1
+

Sample Job Setup: The following is a job setup that can be used to run the SUFFICIENCY-PAVEMENT-EDIT command. The DD statement SUFFTAPE defines the sufficiency file, the DD statement PMSDATA defines where to put the PSR and SR data. If the NO-WRITE option is used, code it "//PMSDATA DD DUMMY". Otherwise, it may be a disk or tape file, or SYSOUT=2.

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIPM,TIME=60,REGION=500K,SCRSIZE=3,FORM='(A)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//SUFFTAPE DD DISP=OLD,DSN=TRN.PN01MAST(0),UNIT=TAPE
//PMSDATA  DD *    (Define output file here)
//SYSIN DD *
:SUFFICIENCY-PAVEMENT-EDIT,YEAR=82,LIST-FORMAT=ERROR,
:  WRITE,OUTPUT-DD=PMSDATA,NO-MESSAGES
/*
```

The SUFFICIENCY-RATING Command

Function: Computes new value of sufficiency rating.

Description: Sufficiency rating is computed from various data fields in the sufficiency rating record, combined with counts of intersections from the roadlog/logpoint file. Ten tables are used to determine the various point values. The ten tables can be reviewed and modified by the TISSPF online dialogue, which also provides this calculation on a record-by-record basis.

This command processes the entire sufficiency rating file, subject to the optional +SELECT subcommand. Selected records are optionally listed, showing information to identify the segment, all data fields pertinent to the calculation, and the current and new sufficiency ratings.

All of the sufficiency rating points fields are updated in the record.

To see the tables used, use the TISSPF dialogue, option Z.S, browse or revise any record, and go to sufficiency display.

Required Command Parameters: None.

Optional Command Parameters:

UPDATE - Update selected records.
EDIT - Make no changes to the sufficiency file (default).

SELECT subcommand

Select criteria may be applied to the sufficiency (SUF) record. Only selected records will be included in the report.

- To select sufficiency records, use the following format:

INCLUDE
EXCLUDE SUFFICIENCY-RECORDS IF:

- SUF data elements can be referenced.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

1
+

Sample Job Setup: The following sample lists all sufficiency segments on highway 169 and computes new sufficiency ratings. The new value is placed in the sufficiency file.

Output goes to the terminal only.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=50
//TIS EXEC DTRIPM,TIME=5,REGION=400K,FORM='(2)',
```

```
//    PRINTDD=TSO,OUTFILE=
//TABLESS  DD UNIT=SYSDA,DISP=SHR,DSN=TRN.RI00SYSU(SUFSPARM)
//SYSIN DD *
:SUFFICIENCY-RATING,UPDATE
+SELECT
 INCLUDE SUFFICIENCY-RECORDS IF:
  SUF.ROUTE-NUMBER *EQ* '00000169'
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

The SUF-VOLUME-CAPACITY-RATIO Command

Function: Computes new value of volume to capacity ratio in the
--------   sufficiency rating record.

Description: Volume/capacity ratio is computed from various data
-----------   fields in the sufficiency rating record, combined with
              the passing sight distance restriction computed from the
              sufficiency hazards file. One of five formulas is
used together with six tables. The six tables can be reviewed and
modified by the TISSPF online dialogue, which also provides this
calculation on a record-by-record basis.

This command processes the entire sufficiency rating file, subject to
the optional +SELECT subcommand. Selected records are optionally
listed, showing information to identify the segment, all data fields
pertinent to the calculation, and the current and new volume/capacity
ratios.

The formulas and criteria for choosing them are:

   Existing design freeway or expressway:

$$\text{ratio} = \frac{.5 \times ADT \times K}{2000 \times N \times Sv/C \times W \times T}$$

      where: K = 30th peak hour (%/100)
              N = existing number of lanes (one direction)
           Sv/C = service volume (from table 1)
              W = clearance factor (from table 2)
              T = truck factor (from table 3)

   Not freeway or expressway and 4 or more lanes:

$$\text{ratio} = \frac{.5 \times ADT \times K}{57 \times S}$$

      where: K = 30th peak hour (%/100)
              S = total surface width divided by 2

Less than 4 lanes and rural design or functional class rural:

$$ratio = \frac{ADT \times K}{2000 \times Sv/C \times W \times T}$$

where: K = 30th peak hour (%/100)
Sv/C = service volume (from table 4)
W = clearance factor (from table 5)
T = truck factor (from table 6)

Less than 4 lanes and urban design and 7-county metro area:

$$ratio = \frac{ADT \times K}{37 \times S}$$

where: K = 30th peak hour (%/100)
S = total surface width divided by 2

Less than 4 lanes and urban design and not 7-county metro area:

$$ratio = \frac{ADT \times K}{25 \times S}$$

where: K = 30th peak hour (%/100)
S = total surface width divided by 2

To see tables 1-6, use the TISSPF dialogue, option Z.S, browse or revise any record, and go to traffic display.

Required Command Parameters: None.

Optional Command Parameters:

UPDATE - Update selected records.
EDIT - Make no changes to the sufficiency file (default).

SELECT subcommand

Select criteria may be applied to the sufficiency (SUF) record. Only selected records will be included in the report.

- To select sufficiency records, use the following format:

```
INCLUDE
EXCLUDE  SUFFICIENCY-RECORDS IF:
```

- SUF data elements can be referenced.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample lists all sufficiency segments on highway 169 and computes new volume/capacity ratio. The new value is placed in the sufficiency file. Output goes to the terminal only.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=50
//TIS EXEC DTRIPM,TIME=5,REGION=400K,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
```

```
//TABLESV  DD UNIT=SYSDA,DISP=SHR,DSN=TRN.RI00SYSU(SUFVLCAP)
//SYSIN DD *
:SUF-VOLUME-CAPACITY-RATIO,UPDATE
+SELECT
 INCLUDE SUFFICIENCY-RECORDS IF:
  SUF.ROUTE-NUMBER *EQ* '00000169'
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

1
+

The SUFFICIENCY-TRAFFIC-EDIT Command

Function: Retrieves traffic data from the traffic file for input to the sufficiency tape.

Description: SUFFICIENCY-TRAFFIC-EDIT reads the sufficiency tape (outside TIS) and retrieves traffic data from the TIS traffic file. The data is output in a format that is acceptable to the sufficiency tape file maintenance software.

Data elements required from the sufficiency tape include:

Route number, starting and ending reference points:

- The route system is determined from the true mileage file by making a table of route numbers versus route system.
- Starting and ending reference points are coded on the tape in the format pppddddd which is expanded into TIS format as ppp+dd.ddd.

City numbers:

- Heavy commercial ADT is not coded in the traffic file for Minneapolis, St Paul, and Duluth. For sufficiency records in these cities, HCADT is computed as a percentage of the

total volume, 10% for Minneapolis and St Paul, 7% for Duluth.

Data elements provided for updating the sufficiency tape include:

Route number
Direction
Beginning milepoint
Card type
Update function
Year
Average daily traffic volume for selected time
Heavy commercial ADT (as a percentage)

The output data is written to a DD statement defined in the OUTPUT-DD parameter.

1
+

Required Command Parameters:

OUTPUT-DD=ddname Defines where the output data is to go.

YEAR=nn The year of data, 19nn.

START-DATE=mm/dd/yy Specifies starting date for traffic volume calculations.

END-DATE=mm/dd/yy Specifies ending date for traffic volume calculations. Average daily volume will be computed for the time between start and end dates. The SELECT subcommand may be used to choose only certain time intervals from the period (INCLUDE TIME IF:).

Optional Command Parameters:

(Optional) SELECT subcommand

May be used to choose only certain hours or dates for computing traffic volume.

- To select on time intervals:

  INCLUDE
  EXCLUDE TIME IF:

- TIM data elements can be referenced.
- Time is the period between the START-DATE and END-DATE. Select only applies within that range.

TITLES subcommand

Print formatting parameters: See chapter 4.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=10,REGION=300K,SCRSIZE=3,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=PRINTER
//SUFFTAPE DD DISP=OLD,DSN=TRN.PN01MAST(0),UNIT=TAPE
//ADTDATA  DD *    (define output file here)
//SYSIN DD *
:SUFFICIENCY-TRAFFIC-EDIT,YEAR=82,START-DATE=01/01/82,
:  END-DATE=12/31/82,OUTPUT-DD=ADTDATA
/*
```


1
+

The CREATE-SUFFICIENCY-TAPE Command
****

Function: Converts the TIS sufficiency rating file into the format
--- used by the Trunk Highway Sufficiency Rating system.

Description: The Trunk Highway Sufficiency Rating system is a series of

---------- programs that were used prior to the conversion of the data file into TIS. This command converts TIS sufficiency rating records back into the prior format. See documentation from the old system for explanation of converted record format.

The converted records are written to a file defined in a DD statement named "TAPE". This may be a sequential disk file or a tape.

Required Command Parameters: None.

Optional Command Parameters:

SELECT subcommand

Select criteria may be applied to the sufficiency (SUF) record. Only selected records will be converted.

- To select sufficiency records, use the following format:

INCLUDE
EXCLUDE SUFFICIENCY-RECORDS IF:

- SUF data elements can be referenced.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample creates a new generation of the
----------------   tape named TRN.PN01MAST. You must have ACF2
                   authorization to write to that tape.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=D,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIPM,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//TAPE     DD UNIT=TAPE,DISP=(NEW,CATLG,DELETE),DSN=TRN.PN01MAST(+1),
//            LABEL=EXPDT=99000,DCB=TRN.GENDSCB
//SYSIN DD *
:CREATE-SUFFICIENCY-TAPE
/*
```

The above job setup can be copied from DT99A1B.TSOLIB.CNTL(SUFTAPE).

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

The CREATE-MILEPOINT-TAPE Command

Function: Converts the TIS sufficiency hazards file into the format used by the Trunk Highway Sufficiency Rating system.

Description: The Trunk Highway Sufficiency Rating system is a series of programs that were used prior to the conversion of the data file into TIS. This command converts TIS sufficiency hazards records back into the prior format for the milepoint tape. See documentation from the old system for explanation of converted record format.

The TIS sufficiency file is the source for milepoint condition rating records (one milepoint record per sufficency segement). The TIS sufficiency hazards file is the source for no passing zones, deficient curves, passing sight distance restrictions, and stopping sight distance restrictions.

The converted records are written to a file defined in a DD statement named "MPTAPE". This may be a sequential disk file or a tape.

Required Command Parameters: None.

Optional Command Parameters:

SELECT subcommand

Select criteria may be applied to the sufficiency (SUF) record. Only selected records will be converted.

- To select sufficiency records, use the following format:

INCLUDE
EXCLUDE SUFFICIENCY-RECORDS IF:

- SUF data elements can be referenced.

Select criteria may be applied to the hazards (SUH) record. Only selected records will be converted.

- To select hazards records, use the following format:

```
INCLUDE
EXCLUDE  SUFFICIENCY-HAZARDS IF:

        - SUH data elements can be referenced.
```

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

1
+

Sample Job Setup: The following sample creates a new generation of the tape named TRN.PN61MPNT. You must have ACF2 authorization to write to that tape.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=D,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
//TIS EXEC DTRIPM,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//MPTAPE   DD UNIT=TAPE,DISP=(NEW,CATLG,DELETE),DSN=TRN.PN61MPNT(+1),
//            LABEL=EXPDT=99000,DCB=TRN.GENDSCB
//SYSIN DD *
:CREATE-MILEPOINT-TAPE
/*
```

The above job setup can be copied from DT99A1B.TSOLIB.CNTL(SUFTAPM).

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

The EDIT-ROADWAY-HISTORY-FILE Command

Function: Edits data from the roadway history file.

Description: Records in the roadway history file describe construction and maintenance history for sections of trunk highways. Each record contains the following information about the section that applies to a single contract:

Record key is:
- Route system
- Route number
- Start reference point
- End reference point
- Roadway ID
- Contract number

Other data occurring once per record:
- Card number
- State project number
- Design ESALs
- Design subgrade type
- Design subgrade strength
- Date awarded
- Date began
- Date ended

Date opened
Number of layers in the section

Within each record, there are up to 50 segments describing individual layers of work. Each layer segment contains the following:

Work item
Material ID
Cross-section position
Mode
Transverse direction
Transverse offset
Width
Constant/variable indicator
Vertical position
Depth

For further description of data elements, see Appendix E, RDH data elements.

1
+

The roadway history record is maintained through an option of the TIS/SPF dialogue. Each record is edited before being written to the file. The EDIT-ROADWAY-HISTORY-FILE command provides a means of applying the data entry edits to a large group of selected records.

The output from this command consists of a listing of each section (in order by record key) in "contract" format, followed by an error message (if edits fail). ONLY THE FIRST EDIT TO FAIL IS PRINTED. The first error must be corrected and this command repeated until the record passes ALL edits.

Required Command Parameters:

ROUTES subcommand

- Operates under "LIST" classification (see chapter 5 for a description of the ROUTES subcommand).

- All data included by +ROUTES can be further filtered by the SELECT subcommand.

Optional Command Parameters:

NO-OPTLIST	No option list is printed.
OPTLIST	A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

NO-CODELIST	- Do not print any codelists.
CODELIST	- Print a codelist with each individual summary (default).

- The codelist is a several-page description of the edit criteria.

LIST-ALL	- List all selected records.
LIST-ERR	- List only records found to have errors (default).

SELECT subcommand

Select criteria may be applied to the roadway history (RDH) record, or to the roadlog record that begins at or prior to the start reference point of the RDH record. Only selected records will be edited.

- To select RDH records, use the following format:

INCLUDE
EXCLUDE ROADDATA-RECORDS IF:

- RDH and RLG data elements can be referenced.
- RDL data elements may be referenced using the multi-correlation facility (*ANY* or *ALL*).

Select criteria may also be applied to individual layers in the roadway history record. This selection is done BEFORE selection on records, i.e., layers excluded by select will not be available for select on records (above).

- To select RDH layers, use the following format:

INCLUDE
EXCLUDE ROADDATA-LAYERS IF:

- RDL data elements can be referenced.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample edits roadway history data for interstate highways. Printed output goes to the terminal only.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=75
//TIS EXEC DTRIT,TIME=1,REGION=400K,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//XCSFILE  DD DISP=SHR,DSN=TRN.RI26XCSP
//ISPMLIB  DD DISP=SHR,DSN=TRN.RI00LIBM
//SYSIN DD *
:EDIT-ROADWAY-HISTORY-FILE,CODELIST,LIST-ERR
+ROUTES
ROUTE-SYS=01
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

The USAGE-COST-COMPUTE Command

Function: Estimates TIS command costs for usage tracking.

Description: Records in the usage tracking file have cost set to 0.00 at the time of tracking. The IMB cost accounting tape contains costs for jobs run in the current month up through the previous day. This command matches records from the usage tracking file with the IMB job cost tape and stores cost estimates in the usage tracking records.

The usage tracking record corresponds to a TIS COMMAND. The IMB job cost accounting tape record corresponds to a JOB. This program tries to divide the cost of the job between commands. It operates as follows:

1) Consider only cost records for authorized TIS users (the user-ids in the current list of users - TRN.RI00USER(CURRENT)).

2) Match tracking records with cost records by date, time, and jobname. The cost record has start and end time of the JOB. The tracking record has time command started and ended.

3) If there was only one command in the job, assign full cost to that command.

4) If there was more than one command in the job or the job ran in foreground, estimate the cost based ratio of total job time to elapsed time for the command.

WARNING: Certain circumstances will cause job costs to be missing or wrong:

Missing costs: For jobs not on the cost tape (jobs that ran today or jobs still on the output queue).
For jobs from user-ids that are no longer on the TIS authorized user list.

Wrong costs: For jobs with names that ran at the same time as another job with the same name (no way to choose which one applies). This is rare, but seems to happen occasionally.

High costs: For jobs with multiple steps. This program can only assume one-step jobs. If other steps were included, the costs for those steps will be assigned to the command.

The IMB cost tapes are generation datasets, one per month. This command needs generation 0 (the current month) and generation -1 (the previous month).

Required Command Parameters: None.

Optional Command Parameters:

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup: The following sample computes costs for all usage tracking records on the active file prior to the day it is run.

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=D,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=20
//TIS EXEC DTRIMIN,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//USAGE   DD DISP=OLD
//COSTIN  DD DSN=ISD.MU00MXUT(0),DISP=OLD,UNIT=TAPE
//        DD DSN=ISD.MU00MXUT(-1),DISP=OLD,UNIT=TAPE
//SYSIN DD *
:USAGE-COST-COMPUTE
/*
```

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

The CREATE-CROSS-SECTION-FILE Command

Function: Creates the roadway history cross-section file.

Description: Roadway history data for reports and +SELECT or +CATEGORIES use the roadway history cross-section file. This is a file of uniform cross-sections that are created from the basic roadway history file. Changes made to roadway history data are not reflected in reports until this file has been recreated.

EXCEPTIONS: LIST-ROADWAY-HISTORY-FILE when specifying data by CONTROL-SECTION keyword will access the basic file.

The roadway history on-line graphics always use the basic file.

Required Command Parameters:

ROUTES subcommand

- Operates under "LIST" classification (see chapter 5 for a description of the ROUTES subcommand).

Optional Command Parameters:

NO-OPTLIST No option list is printed.
OPTLIST A one-page option list is printed (default).

- The option list is a listing of command parameters used for the report.

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SELECT subcommand

Select can be applied to records, record layers, cross-sections, and cross-section layers. Cross-sections are formed from one or more records and consist of all applicable layers for a uniform segment of roadway. The order of select is:

1) ROADDATA-LAYERS
2) ROADDATA-RECORDS
3) CROSS-SECTION-LAYERS
4) CROSS-SECTIONS

Data elements:

RDL - Layer of record (occurs 1-99 times per record).
RDH - Root portion of record.
RDY - Layer of cross-section (occurs 1-99 times per cross-section).
RDX - Root portion of cross-section.
RDD - Topmost layer of driving surface of cross-section.
RRS - Topmost layer of right shoulder of cross-section.

RLS - Topmost layer of left shoulder of cross-section.

Select criteria may be applied to the roadway history (RDH) record.

- To select RDH records, use the following format:

```
       INCLUDE
       EXCLUDE  ROADDATA-RECORDS IF:

                - RDH data elements can be referenced.
                - RDL data elements may be referenced using
                  the multi-correlation facility (*ANY* or
                  *ALL*).
```

Select criteria may also be applied to individual layers in the roadway history record. This selection is done BEFORE selection on records, i.e., layers excluded by select will not be available for select on records (above).

- To select RDH layers, use the following format:

```
       INCLUDE
       EXCLUDE  ROADDATA-LAYERS IF:

                - RDL data elements can be referenced.
```


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Select criteria may be applied to the roadway history cross-section (RDX) record. Only selected cross-sections will be written to the cross-section file.

- To select RDX cross-sections, use the following format:

```
       INCLUDE
       EXCLUDE  CROSS-SECTIONS IF:

                - RDX, RDD, RRS, and RLS data elements can
                  be referenced.
                - RDY data elements may be referenced using
                  the multi-correlation facility (*ANY* or
```

ALL).

Select criteria may also be applied to individual layers in the roadway history cross-section. This selection is done BEFORE selection on cross-sections, i.e., layers excluded by select will not be available for select on cross-sections (above).

- To select RDY cross-section layers, use the following format:

```
INCLUDE
EXCLUDE  CROSS-SECTION-LAYERS IF:

         - RDY data elements can be referenced.
```

AGGREGATE subcommand

The AGGREGATE subcommand can be used to combine adjacent layers in the cross-section (prior to CROSS-SECTION selection). It allows selection on depth of a layer that may be aggregated from several individual layers (within driving surface, right shoulder, or left shoulder).

- RDY data elements can be referenced.

- Example:

```
+AGGREGATE
RDY.WORK-ITEM
```

  Would result in adjacent layers with the same work item being combined into the upper layer. The resultant layer has all the characteristics of the top layer, except that the depth reflects both layers. See the AGGREGATE subcommand in chapter 7 for more details.

TITLES subcommand

Any of the print-formatting parameters (see chapter 4).

Sample Job Setup:

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=75,PROCLIB=TEST
//TIS EXEC DTRIT,TIME=5,REGION=500K,SCRSIZE=5,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=,DISPRDH=OLD
//SYSIN DD *
:CREATE-CROSS-SECTION-FILE
+ROUTES
ROUTE-SYS=01-04
/*
```

The above sample can be copied from DT99A1B.TSOLIB.CNTL(RDHXCR).

See chapters 3 and 4 of the TIS User's Manual for further explanation of TIS job setups.

The CORRECT-RDH-BITUM-WKITEMS Command

Function: Examine all bituminous ('B' and 'BO') work-item values in the Roadway History file, and update file to correct those values judged to be incorrect.

Description: The CORRECT-RDH-BITUM-WKITEMS command reads the entire ROADWAY HISTORY file, examining and judging the correctness of all bituminous, 'B' and 'BO', work item values. The rules for judging correctness include the following:

"B " is allowed in the following situations:

1. The bituminous layer is above an aggregate-base layer (AB) and one of either of the following conditions is met.

   A. If the bituminous layer is in the same contract as the base layer, there can be no non-"B " pavement layers between the bituminous layer and the base layer.

   B. If the bituminous layer is in a later contract than the base layer, there can be no pavement layers of any type between the bituminous layer and the base layer.

2. The bituminous layer is above a grading layer (GL, GR) and one of either of the following conditions is met.

   A. If the bituminous layer is in the same contract as the grading layer, there can be no non-"B " pavement layers between the bituminous layer and the grading layer.

   B. If the bituminous layer is in a later contract than the grading layer, there can be no pavement layers of any type between the bituminous layer and the grading layer.

3. The bituminous layer is above a removal layer (RA, RB, RC, MI..) and one of either of the following conditions is met.

   A. If the bituminous layer is in the same contract as the removal layer, there can be no non-"B " pavement layers between the bituminous layer and the removal layer.

   B. If the bituminous layer is in a later contract than the removal layer, there can be no pavement layers of any type between the bituminous layer and the removal layer.

4. The bituminous layer is above another bituminous layer ("B ") and

is in the same contract as the other "B " layer with no intervening non-"B " pavement layers.

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A pavement layer is a layer with one of the following work-items:

"B ", "BO", "CB", "CD", "CO", "CP", "CR", "CU", "N "

In rule one above, any layer with a work-item from the following list can be substituted for an AB layer.

"AB", "BB", "BS", "CT", "DL", "GS", "SA"

Required Command Parameters:

DD statement CHGD - to identify CHGD file written to IOF. Print file CHGD documents each work item value that was changed and why it was judged incorrect.

DD statement JUDG - to identify JUDG file written to IOF. Print file JUDG documents each work item value for which judgment could not be performed.

Optional Command Parameters: None

Sample Job Setup:

```
//jobname  JOB (account),'name',CLASS=C,
//             NOTIFY=logon-id,MSGCLASS=2
/*JOBPARM ROOM=820,LINES=10
/*ROUTE PRINT  REDUCE
//*
//TIS      EXEC DTRIT,SCRSIZE=5,FORM='(2)',TIME=5
//SYSIN    DD *
:CORRECT-RDH-BITUM-WKITEMS
//*
//CHGD     DD SYSOUT=*,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=1330)
//JUDG     DD SYSOUT=*,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=1330)
//*
```

The RGC_INT_ADT_EDIT Command

Function: Mainline command of RGC-INT-ADT-EDIT.
Edits and Updates rhe Rail-Grade-Crossings numbers in the Rail-Grade-Crossings (RGC) file and the Intersection / Interchange (I/I) file. Edits and Updates ADTs in the RGC file.

Description: For each sequentially retrieved record from the RGC file an attempt is made to find a record from the I/I file for a type-5 intersection at the same location as specified in the RGC record. A type-5 intersection (INT.INTSECT-TYPE = 5) is a Rail-Grade-Crossing. If such an intersection is found, the crossing number from the RGC record is compared to the crossing number from the I/I record. Any discrepancies are reported. If an I/I record is found with a crossing number equal to the RGC crossing number but at a different location, the locational discrepancy is reported. If a crossing is found at the same location as the RGC record but is not type five intersection the Intersection-Type error is reported.

Both the ADT from the RGC file and the ADT from the I/I file are compared to the latest ADT in the corresponding Traffic file (TRF) record. Any discrepancies are reported.

After the RGC file has been read sequentially, the I/I file is read sequentially. All type-5 intersections in the I/I file that are not found in the RGC file or that are found at a different locations are reported.

The results of all comparisons are reported in the status field of the

output report. See below for an explanation of the status field.

Besides reporting descrepancies, the crossing number in the I/I file
and the ADT in the RGC file may be updated if the appropriate command
options are selected.

Required Command Parameters: None.

Optional Command Parameters:

ROUTES subcommand

- Operates under LIST classification

USAGE = |R| - ADT, RGC# discrepancies reported, not updated.(Default)
|B| - ADT, RGC# discrepancies are reported and RGC# updated.
|U| - RGC# discrepancies are updated but not reported.

LIST-FORMAT = |ALL | - the report lists all record sets. (Default)
|ERROR| - the report lists only erroneus record sets.

STATUS is a four-character word that contains the results of all the
comparisons done by this command.

If COLUMN 1 contains "-": the RGC crossing number is matched
exactly by the I/I crossing number.

If COLUMN 1 contains "N": the RGC crossing number is not matched
by an I/I crossing number.

If COLUMN 2 contains "-":	the RGC record has the same reference point as the I/I record.
If COLUMN 2 contains "R":	the RGC record does not have the same reference point as the I/I record.
If COLUMN 3 contains "-":	the ADT from the RGC record equals the ADT from the I/I record.
If COLUMN 3 contains "A":	the ADT from the RGC record does not equal the ADT from the I/I record.
If COLUMN 4 contains "-":	the ADT from the RGC record equals the most recent ADT from the TRF record.
If COLUMN 4 contains "T":	the ADT from the RGC record does not equal the most recent ADT from the TRF record.
If STATUS is "ORGC":	a type-5 intersection was found in the I/I file, but no corresponding record was found in the RGC file.
If STATUS is "MRGC":	a type-5 intersection was found in the I/I file, and a RGC record with the same crossing number was found in the RGC file, but the records had different reference points.

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Sample Job Setup:

```
**********
```

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT
//SYSIN DD *
:RGC-INT-ADT-EDIT,USAGE=R,LIST-FORMAT=ERROR
+ROUTES
ROUTE-SYS=03,ROUTE-NUM=55
```

```
        /*
```



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```


C H A P T E R 1 0

P R O G R A M M E R U T I L I T Y C O M M A N D S

Introduction

The commands described in this chapter are intended for use by programmers involved in maintaining the Transportation Information System. Included are commands for the following functions:

- Obtaining listings of internal module names and of source modules.
- Listing internal files and tables.
- Testing the operation of certain pieces of software.

The PRINT-MODULE-NAMES Command

Function: Prints a listing of source module names.

Description: Three separate listings are produced. The format of each of these three listings is:

Panvalet	TIS	Calling	Lang	Description
DTRI0510	CITCRT	CITCRT	PL/I	CREATE-CITY-TABLE
DTRI0511	CITUPD	CITUPD	PL/I	UPDATE-CITY-TABLE

The "Panvalet" column shows the module's name as used for storage in PANVALET library.

The "TIS" column shows the module's name as used for identification with T.I.S. This name differs from the PANVALET name so that T.I.S. documentation can be less dependant upon naming conventions used within the computer.

The "Calling" column shows, for subroutines, the name by which calling programs call the module. For mainline programs (as in the above example), the calling program is equivalent to the TIS name.

The "Lang" column shows the module's language (PL/I or ASMB for PL/I or assembler).

The "Description" column gives a brief description of the module. For mainline modules (as shown above), the T.I.S. command name is given.

Three listings are provided:

- Listing in order by PANVALET name showing all modules.
- Listing in order by TIS name showing all modules except multi-use modules (for multi-use modules, the TIS name equals the PANVALET name).
- Listing in order by Calling name showing only those modules whose Calling names differ from their TIS names.

Required Command Parameters: None.

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Optional Command Parameters:

TITLES subcommand

Print formatting parameters: See chapter 4 of the User Manual.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:PRINT-MODULE-NAMES
/*
```

The PRINT-SOURCE-MODULES Command

Funciton: Prints source modules stored in the active PANVALET library.

Description: This program prints user-specified source modules from the active PANVALET library. Source modules can be selected on the basis of both PANVALET user number and on PANVALET member name.

Required Command Parameters:

USER=user-number

- Specify your PANVALET user number (eg., USER=990).
- To print modules regardless of user number, specify USER=9999.

Optional Command Parameters:

SUMMARIES = name / name1-name2

- If SUMMARIES is not included on the command, all source modules stored for your PANVALET user number are printed.
- If SUMMARIES=name is included, only those source modules whose names begin with "name" are printed. "name" can be

from 1 to 10 characters in length.
- If SUMMARIES=name1-name2 is included, only those source modules whose names fall between name1 and name2 inclusive are printed. Each name can be from 1 to 10 characters in length.

TITLES subcommand

Print formatting parameters: See chapter 4 of the User Manual.

The EXCLUDES DD Statement: It is possible to exclude modules within the SUMMARIES range from printing. To do this, use an EXCLUDES DD statement as shown:

```
//EXCLUDES DD *
place one or more excludes cards here
/*
```

The excludes cards have the following format:

```
Columns 1-10       First member name
Columns 11-20      Second member name or blanks
    .
    .
    .
Columns 61-70      Seventh member name or blanks
Columns 71-80      Unused
```

The PANDD1 DD Statement: You must include a PANDD1 statement that describes the PANVALET library. The standard IS PANVALET library is obtained by using the following DD statement:

```
//PANDD1 DD DISP=SHR,DSNAME=ISD.PANLIB
```

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//PANDD1 DD DISP=SHR,DSNAME=ISD.PANLIB
//SYSIN DD *
:PRINT-SOURCE-MODULES,USER=990,SUMMARIES=DTRI00
/*
```


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The LIST-DECRTE Command
****

Function: Prints a listing of the DECRTE +ROUTES control file.

Description: The DECRTE control file is built by the command decoder
------------ whenever one or more commands have a +ROUTES subcommand.
              Only one control file is built regardless of the number of
+ROUTES subcommands used in the run. The series of records that apply
to a given command is preceded by a header record that provides the
number of the command for which the series of records applies.

LIST-DECRTE lists the entire DECRTE ifle. When LIST-DECRTE is run, a
+ROUTES subcommand must be included with at least one command in the run
(but not necessarily with the LIST-DECRTE command).

For each +ROUTES subcommand, the DECRTE file contains (1) the user's input as coded, and (2) a decoded format of the same information.

Required Command Parameters:

ROUTES subcommand

- The ROUTES subcommand need not be included with the LIST-DECRTE command, but must be included with at least one command in the run.

Optional Command Parameters:

TITLES subcommand

Print formatting parameters: See chapter 4 of the User Manual.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-DECRTE
+ROUTES
CONSTR-DIST=EACH,ROUTE-SYS=ISTH
/*
```


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The LIST-PROUTES Command

Function: Prints a listing of the PROUTES +ROUTES constrol file.

Description: The PROUTES control file is built by the +ROUTES

---------- preprocessor when needed for a given command. Unlike the DECRTE control file, which contains records for all +ROUTES subcommands included in a run, the PROUTES control file only contains information needed for the current command.

The PROUTES control file contains all of the information needed to "drive" a +ROUTES-controlled mainline program. This information includes (1) control elements that identify when to perform housekeeping functions such as initializing values to zeroes, (2) page headings, and (3) startkey-endkey ranges for searching T.I.S. files.

Required Command Parameters:

ROUTES subcommand

- Operates under LIST classification.

Optional Command Parameters:

TITLES subcommand

Print formatting parameters: See chapter 4 of the User Manual.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:LIST-PROUTES
+ROUTES
ROUTE-SYS=01-03
/*
```


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The TEST-GETRTE Command

Function: Prints the results of calls to the GETRTE subroutine.

Description: GETRTE is the subroutine that interprets information in the PROUTES control file. TEST-GETRTE enters a loop in which GETRTE is called and the results of the call are printed. The loop ends when GETRTE signals end-of-file or program error.

Required and Optional Command Parameters: Same as LIST-PROUTES.

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:TEST-GETRTE
+ROUTES
ROUTE-SYS=01=03
/*
```

The TEST-GETCNT Command

Function: Prints the results of calls to the GETCNT subroutine.

Description: GETCNT is the file access subroutine for the county name table. It has the following entry points:

GETCNTO	Open the file
GETCNTC	Close the file
GETCNTR	Read -- Sequential
GETCNTD	Read -- Direct

When using TEST-GETCNT, you must prepare input records that identify (1) which entry points are to be called, and (2) what arguments are to be passed. The format of these input records are:

Columns 1-7	Entry point name being called
Columns 8	Blank
Columns 9-10	Numeric field
Columns 11-80	Blanks

Use of numeric field:

GETCNTO	Leave blank
GETCNTC	Leave blank
GETCNTR	Leave blank if just one call is to be performed. If more than one call is to be performed, code number of calls.
GETCNTD	Code county number for direct search.

The input records are entered via DD statement TSTCNTY.

Required Command Parameters: None.

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Optional Command Parameters:

TITLES subcommand

Print formatting parameters: See chapter 4 of the User Manual.

Sample Job Setup:

```
//JOBNAME JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//         MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=5
/*ROUTE  PRINT R0
//TIS EXEC DTRIT,TIME=1,REGION=400K,SCRSIZE=1,FORM='(2)',
//    PRINTDD=TSO,OUTFILE=
//SYSIN DD *
:TEST-GETCNT
/*
//TSTCNTY DD *
GETCNTO        --- Opens the file
GETCNTR 04     --- Reads and prints first four counties
GETCNTD 28     --- Reads and prints county 28
GETCNTR 02     --- Reads and prints counties 29 & 30
GETCNTC        --- Closes the file
/*
```

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The CONVERT-ACCIDENTS-TO-TIS Command

Function: Converts accident records provided by DPS to TIS format.

Description: This program converts three sequential files of accident data from the DPS VAX computer: ACCIDENT, VEHICLE, and PERSON into TIS format. The output is a variable-length sequential file in the same format as the TIS VSAM accident file. This file is then sorted and merged with the current VSAM file. THIS PROGRAM DOES NOT RECOGNIZE DUPLICATE RECORD KEYS DURING THE MERGE.

The program is intended to be used to add data to the TIS file as DPS codes new accidents or makes corrections to earlier data. At present, DPS does not have the capability to identify which records have been added or modified since the previous data transfer, so the following procedure assumes that the DPS data is ALL accidents occurring AFTER 1990, and the TIS data is ALL accidents prior to 1991. The program must be eventually modified to recorgnize duplicate keys between the two input streams and retain only the DPS version in those cases.

Required JCL: The input and output files are identified as follows:

ACCIDENT - DPS accident data
VEHICLE - DPS vehicle data
PERSON - DPS person data

ACCCONV - Converted TIS format data

The sorting and merging of output data is done through JCL in a
separate job step.

Required Command Parameters: none

Optional Command Parameters: none

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+

Sample Job Setup:

```
//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=D,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM ROOM=R820,LINES=25
/*ROUTE  PRINT R0
//*********************************************************************
//* USE THIS JOB SETUP TO ADD 1991 ACCIDENT DATA FROM DPS TO TIS.
//* JOB SETPS:
//*
//*  1. CONVERT DPS SEQUENTIAL FILES TO TIS FORMAT.
//*  2. MERGE WITH PRE-1990 TIS ACCIDENT TAPE AND SORT BY KEY.
//*  3. COPY MERGED DATA TO VSAM FILE.
//*
//* REQUIRED INPUT FILES:
//*
//*  ACCIDENT - SEQUENTIAL DPS FORMAT ACCIDENT RECORDS
```

```
        //*  VEHICLE  - SEQUENTIAL DPS FORMAT VEHICLE RECORDS
        //*  PERSON   - SEQUENTIAL DPS FORMAT PERSON RECORDS
        //*           - TAPE OF PRE-1991 TIS FORMAT FILE (ALL DATA)
        //*******************************************************************
        //* STEP1:  CONVERT 1991 DATA TO TIS FORMAT.
        //*******************************************************************
        //STEP1 EXEC DTRITA,TIME=1,SCRSIZE=1,FORM='(2)',
        //    PRINTDD=TSO,OUTFILE=
        //VAXACDIN DD DISP=SHR,DSN=USER-ID.ACCIDENT
        //VAXACVIN DD DISP=SHR,DSN=USER-ID.VEHICLE
        //VAXACPIN DD DISP=SHR,DSN=USER-ID.PERSON
        //ACCCONV  DD DSN=&&TEMP1,DISP=(,PASS),UNIT=SYSDA,
        //           DCB=(DSORG=PS,RECFM=VB,LRECL=10978,BLKSIZE=10986),
        //           SPACE=(CYL,30)
        //SYSIN DD *
        :CONVERT-ACCIDENTS-TO-TIS
        /*
        //*******************************************************************
        //* STEP2:  MERGE WITH PRE-1991 TAPE AND SORT BY KEY.
        //*******************************************************************
        //STEP2   EXEC SORTW,TIME=2,CYL=30
        //SORTIN  DD DISP=OLD,DSN=TRN.RI16AC90,UNIT=TAPE
        //        DD DISP=SHR,DSN=&&TEMP1,UNIT=SYSDA
        //SORTOUT DD DSN=&&TEMP2,DISP=(,PASS),UNIT=SYSDA,
        //           DCB=(DSORG=PS,RECFM=VB,LRECL=10978,BLKSIZE=10986),
        //           SPACE=(CYL,300)
        //SYSIN DD *
          SORT FIELDS=(9,30,CH,A)
        /*
        //*******************************************************************
        //* STEP3:  REPLACE CURRENT TIS VSAM FILE WITH MERGED DATA.
        //*******************************************************************
        //STEP3    EXEC PGM=IDCAMS
        //SYSPRINT DD SYSOUT=2
        //VSAM DD DISP=OLD,DSN=TRN.RI16ACDP
        //SEQL DD DISP=SHR,DSN=&&TEMP2,UNIT=SYSDA
        //SYSIN DD *
           REPRO INFILE(SEQL) OUTFILE(VSAM) REUSE
        /*
 PAGE 10-12
1
+
PAGE 719
```

The INT-ADT-UPDATE Command
****

Function: Updates or lists intersection/interchange (I/I) records
--------- with traffic volumes from the ADT file.

Description: The intersection leg reference points (+ an - the accident scan limits) are used to access the ADT file and copy the ADT into the leg volume fields. Each I/I record has up to five volumes for each leg. Only the most recent volume will be changed (or added). Use the START-YEAR and END-YEAR parameters to specify what years of ADT will be considered. For example, START-YEAR=1996, END-YEAR=1998 means that 1998 will be used if available, otherwise 1997 if available, otherwise 1996 if available. No changes are made if the leg already has a volume for a year later than the most recent available from the ADT file in the years specified.

To delete existing volumes, code START-YEAR and END-YEAR to specify the range of years to delete, and add the DELETE optionword. Volumes between those years (inclusive) will be deleted.

Required Command Parameters:

START-YEAR=yyyy	The earliest year to use for volume data.
END-YEAR=yyyy	The latest year to use for volume data.
+ROUTES subcommand	Operates under GEN classification.

Optional Command Parameters:

DELETE	Delete existing volumes between start and end year.
REPLACE	Replace existing volumes for the same year.
NO-REPLACE	Do not replace existing volumes for the same year. (default).
UPDATE	Make actual updates to the I/I file.
UPDATE-&-LIST	List changes and make actual updates.
LIST	List changes but do not implement (default).
	- UPDATE or UPDATE-&-LIST require ACF2 clearance.
ALL-TYPES	Include all intersection types.
NO-TYPE-2	Do not include type 2 (intersection within interchange, default).
	- Type 2 intersection updates should rarely be performed, as the ramp volumes are not known, and the mainline volume will be incorrectly inserted.

```
     OPTLIST         Print command parameters.
     NO-OPTLIST      Do not print command parameters (default).
     ----------


     SELECT subcommand

         -The INCLUDE/EXDLUDE clause is optional and has this format:


               INCLUDE  INTERSECTIONS IF:
               EXCLUDE


         -INT, INL, and RLG data elements can be referenced.
         -INL data elements can only be referenced via the
          multi-correlation facility (*AND*/*ALL*).
         -RLG references require access to the roadlog file and
          therefore raise execution costs.


     TITLES subcommand


     Print formatting parameters:  See chapter 4 of the User Manual.


Sample Job Setup:
-----------------

//JOBNAME  JOB (ACCOUNT),'NAME',CLASS=C,NOTIFY=USER-ID,
//             MSGCLASS=2,MSGLEVEL=(2,0)
/*JOBPARM LINES=5
//   EXEC DTRIT,DISPINT=OLD,TIME=5,SCRSIZE=5
//SYSIN DD *
:INT-ADT-UPDATE,NEWS=NO,UPDATE-&-LIST,START-YEAR=1996,END-YEAR=1998,
:   NO-REPLACE
+ROUTES
ROUTE-SYS=01,CONSTR-DIST=9
/*
```

A P P E N D I X A

E R R O R M E S S A G E S

INTRODUCTION

TIS error messages are broadly grouped into two classifications:

- Edit check messages

  Edit check messages are printed as the result of an error detected in input data to a file maintenance program (eg., errors in input data to an update program). Edit check messages carry the following message levels:

Level	Type
2	Warning
3	Severe

  The messages are printed in one of the following formats:

  ***** fil-nnn-WARNING - error message
  ***** fil-nnn-SEVERE - error message

  "fil" identifies the file being updated. "nnn" is a unique message number for that file. Examples:

  ***** RLG-011-SEVERE - ROUTE SYSTEM IN ERROR - xx

  ***** RLG-095-WARNING - CURBS RD2 IN ERROR - x - CHANGED TO U

The edit check messages are described in detail in the TIS Data Coding Manual.

- Program error messages

Program error messages include all messages other than edit check messages. Program error messages carry one of the following levels:

Level	Type
1	Informatory (may indicate an error)
7	Warning (probable error, processing continues)
8	Severe (error, processing may or may not continue)
9	Termination (error, processing terminates)

Program error messages are printed in the following format:

```
****** A0-000-9 - BIKEWAY DD STATEMENT MISSING
```

The program error messages are described in this appendix.

MESSAGES A0-000 THROUGH A0-999
****

A0-000-x - ddname DD STATEMENT MISSING

The TIS program(s) being utilize the indicated DD statement, but the DD statement has not been included with the job setup. Check the program documentation for the program(s) being run.

If the documentation indicates that the user must provide the name DD statement, add the DD statement to your job setup and resubmit the run.

If the documentation does not indicate that the user must provide the named DD statement, refer the problem to system maintenance personnel. They will add the DD statement to the necessary cataloged procedures.

A0-001-x - PROGRAM ERROR DETECTED BY PL/I

This messages indicates a programming error. Refer the problem to system maintenance personnel.

Programmer note: An IBM message accompanies this message. The IBM message describes the cause of the error, the name of the source

module in which the error occurred, and the location within the source module at which the error occurred. If the error occurred in an assembler-language subroutine, the location within the source module points to the beginning of the PL/I statement immediately following the call. If a dump is needed, resubmit the job and include a +DUMP-LEVEL,9 subcommand.

A0-010-x - OUTPUT-FILE CANNOT BE OPENED - DD STATEMENT MAY BE MISSING

The OUTPUT-FILE parameter of the EXEC card specifies a name for which no DD statement was included. Processing continues as if OUTFILE was not specified.

A0-020-x - PROGRAM ERROR IN SUBFET - FETCH CORE TABLE OVERFLOW

This message indicates a programming error. Refer the problem to system maintenance personnel.

Programmer note: This error message originates from the SUBFET source module. SUBFET is responsible for retrieving and deleting load modules for execution. At the current time, it can handle 30 load modules in core at any one time. Modify SUBFET to increase the number of load modules that can be handled.

A0-021-x - PROGRAM ERROR IN SUBFET - LOAD MODULE name NOT FOUND - ACCESS NAME name

This message indicates a programming error. Refer the problem to system maintenance personned.

Programmer note: The indicated load module was not found in any of the STEPLIB/JOBLIB libraries. The message is equivalent to a system 806 abend. The load module name and access name are identical unless an load module name. The error may be caused by an invalid entry in either the equivalence table or the decoder's program table.

A0-022-x - PROGRAM ERROR IN SUBFET - LOAD MODULE name NOT EXECUTABLE - ACCESS NAME name

This message indicates a programming error. Refer the problem to system maintenance personnel.

Programmer note: The indicated load module was marked not executable by the linkage-editor the most recent time the load module was link-edited. The message is equivalent to a system 706 abend. Re-link the load module.

A0-023-x - PROGRAM ERROR IN SUBFET - FETCH COULD NOT DELETE LOAD MODULE name

This message indicates a programming error. Refer the problem to system maintenane personnel.

Programmer note: A load module that had been loaded by SUBFET was no longer in core when SUBFET tried to delete it.

A0-200-x - PROGRAM ERROR IN module - RETURN CODE FROM entry IS rc

This message indicates a programming error. Refer the problem to system maintenance person. Note: If "entry" is PLISRTA, a sort failure has occurred. The cause is indicated in the printed output from the sort program that follows the TIS printed output, and the problem can probably be corrected by either increasing core size (larger value in the REGION parameter of the EXEC or JOB card) or by increasing scratch disk space (specify SCRTYPE=CYL and a larger value in the SCRSIZE parameter of the EXEC card).

Programmer note: The error message originated from the source module identified by "module." The subroutine with entry point "entry" has been called and the return code "rc" value printed indicated that the called subroutine was unable to perform its task. The return code meanings can be found in the TIS Programming Details manual in the section that describes the called subroutine with entry point "entry."

A0-201-x - CARD IS IN ERROR - card

The indicated input record ("card") contained an error that precluded further processing. Correct the input record and resubmit the run.

A0-202-x - PERMANENT UPDATE IS NOT ALLOWED AFTER TEMPORARY UPDATES

A permanent update to a decoder table (such as +PROGTBL,UPDATE) cannot be performed after a temporary update (such as +PROGTBL) has

been performed. Execution continues but all updates are treated as temporary.

A0-203-x - TOO MANY DATA CARDS - MAXIMUM IS number

The programming does not allow more than the indicated number of input records. Split the input into two or more separate groupings, each with no more than the indicated maximum, and resubmit.

A0-204-x - ENTRY NOT FOUND FOR DELETION - entry

An input record requested that an entry in a table be deleted, but the indicated entry did not exist in the table.

A0-205-x - PROGRAM ERROR IN module - NO INTIALIZATION CALL

This message indicates a programming error. Refer the problem to system maintenance personnel.

Programmer note: "module" is either DECPROG, DECEQUV, or DECPPRM. The DECODER source module failed to initialize the indicated module prior to processing the user's input commands. Modify DECODER to initialize the indicated module.

A0-206-x - PROGRAM ERROR IN module - table TABLE OVERFLOW

This message indicates a programming error. Refer the problem to system maintenance personnel.

Programmer note: The error originated from source module "module." The indicated table "table" was being read into a core array or being updated in place in a core array, and insufficient core was allocated to the array. Increase the core allocation by modifying the source module (in some cases, the core allocation is provided by a program that called the indicated source module and the called program must be modified instead).

A0-207-x - ABOVE CARD DOES NOT HAVE A + OR A : IN COLUMN 1

An input record in the user's TIS command input does not contain the proper record identifier (":" for commands and "+" for subcommands). The problem can be caused by omitting a subcommand that precedes some input date, such as a +ROUTES or +SELECT subcommand. Example:

```
:LIST-ROADLOG-FILE
ROUTE-SYS=USTH
```

The user has omitted the +ROUTES subcommand card that belongs immediately following the :LIST-ROADLOG-FILE command card.

A0-208-x - ABOVE CARD TYPE UNKNOWN

The indicated command, subcommand, or input data card is not recognizable to the program. Compare the flagged record to the documentation for the program being run, correct the record, and resubmit. It the record appears to be in conformance with the documentation, refer the problem to system maintenance personnel.

A0-209-x - UNMATCHED QUOTE OR PARENTHESIS IN ABOVE COMMAND

Either (1) a quote (') is unmatched or (2) there are unequal numbers of left and right parenthesis. Note that parenthesis within quotes are not counted.

A0-210-x - ABOVE COMMAND IS TOO LONG

The flagged command exceeds the limitation for the size of a command. If possible, remove unnecessary parameters and resubmit. Otherwise, refer the problem to system maintenance personnel.

A0-211-x - UNKNOWN KEYWORD IN ABOVE COMMAND - keyword

The indicated keyword (eg., START-DATE in START-DATE=01/01/78) is not known to the system. Check the documentation to ensure that the keyword is correctly spelled. If the command appears to agree with the documentation, refer the problem to system maintenance personnel.

A0-212-x - CONTINUATION CARD MISSING

A TIS command ends with a comma but is not immediately followed by a comtinuation card.

- If no continuation was intended, remove the ending comma and resubmit.
- The comtinuation card must contain a ":" in column 1 and a blank in column 2. If the comtinuation card was not prepared in this manner, correct it and resubmit.
- If the continuation card was inadvertantly omitted, add it to the job setup and resubmit.

A0-213-x - PROGRAM NAME IN ABOVE COMMAND IS TOO LONG - BEGINS WITH name

The program name coded in the TIS command is probably mispelled. The maximum length of a program name is 30 characters. Check the documentation for the correct spelling of the program name.

A0-214-x - REQUIRED KEYWORD MISSING - keyword

The indicated keyword parameter (eg., START-DATE=01/01/78) is required by the program being run but was not included in the TIS command. Add the keyword parameter to the command and resubmit.

A0-215-x - INVALID OPTION IN KEYWORD keyword-name

The option portion of a keyword parameter (eg., 01/01/78 in START-DATE= 01/01/78) is not valid. Refer to the documentation for the correct option and resubmit the job.

A0-216-x - PROGRAM ERROR IN DECKEYU - UNDEFINED CHAR-UNIQUE KEYWORD - name

This message indicates a programming error. Refer the problem to system maintenance personnel.

Programmer note: The indicated keyword is defines as a character-unique keyword in the table, but no corresponding entries are included in the character-unique table.

A0-217-x - ABOVE COMMAND HAS TOO MANY KEYWORD PARAMETERS

An TIS command can have at most 20 keyword parameters. If possible, remove unneeded keyword parameters from the command and resubmit. Otherwise, request system maintenance personnel to increase the maximum number of keyword parameters.

A0-218-x - ABOVE COMMAND HAS TOO MANY OPTIONWORD PARAMETERS

An TIS command can have at most 5 optonword parameters (eg., LIST). Refer to the documentation to determine which optionwords are permitted on the command.

A0-219-x - OPTION OF KEYWORD PARAMETER IS TO LONG - KEYWORD keyword

The maximum length for an option (eg., 01/01/78 in START-DATE=01/01/78) is 70 characters not counting surrounding quotes. Refer to the documenation to determine the correct option.

A0-220-x - KEYWORD IS TOO LONG - BEGINS WITH keyword

The maximum length for an option (eg., 01/01/78 in START-DATE=01/01/78) is 20 characters. The keyword is probably mispelled. Refer to the documenation to determine the correct keyword name.

A0-221-x - KEYWORD APPEARS TWICE IN ABOVE COMMAND - keyword

Any given keyword can appear only once in a single TIS command. Remove the extraneous keyword and resubmit the job.

A0-222-x - OPTIONWORD IS TOO LONG - BEGIN WITH optionword

The maximum length of an optionword is 15 characters. Refer to the documentation for the correct spelling, and resubmit the job after correcting the error.

A0-223-x - PROGRAM NAME IN ABOVE COMMAND IS UNKNOWN - NAME CODED IS name

The program name coded in the TIS command is probably mispelled. Correct the name and resubmit. If the name seems to agree with the documentation, refer the problem to system maintenance personned.

A0-224-x - OPTIONWORD APPEARS TWICE IN ABOVE COMMAND - optionword

The indicated optionword was coded in the same command. Remove the extraneous optionword and resubmit the job.

A0-225-x - TOO MANY CONTINUATION CARDS - MAXIMUM IS 1 CARD

At most one continuation card can be used for +ROUTES input data. Recode the offending input data onto one or two cards and resubmit the job.

A0-226-x - CARD DOES NOT BEGIN IN COLUMN 1

All input records other than continuation cards for the +ROUTES subcommand must begin in column 1. Continuation cards must contain a blank in column 1. Correct the error and resubmit the job.

A0-227-x - SYNTAX ERROR IN ABOVE COMMAND

The flagged TIS command contains an error so severe that further processing is impossible. Check the program documentation for the proper command format and resubmit the job.

A0-228-x - OPTIONWORDS optword AND optword CANNOT BOTH BE CODED

The indicated optionword parameters are mutually exclusive (eg., LIST and NOLIST both coded in a single TIS command). Remove one of the optionwords and resubmit the job.

A0-229-x - UNKNOWN OPTIONWORD IN ABOVE COMMAND - optword

The indicated optionword is not valid for the program being run. Refer to the documentation for correct spellings for optionwords, and resubmit the run after correcting the problem.

A0-230-x - DATA SELECTIONS AND SUMMARY SELECTIONS ARE MIXED IN THE ABOVE CARD

In the +ROUTES subcommand, data selectins (such as ROUTE-SYS=01) and summary selections (such as INDIVIDUAL) cannot both be included in a single input records. Separate the data selections from the summary selections and resubmit the job.

A0-231-x - INVALID CONSTRUCT IN ABOVE CARD

Two mutually exclusive parameters (such as CONSTR-DIST and MAINT-AREA) are included on the same input record of the +ROUTES subcommand. Eliminate one of the parameters or separate them onto separate records, and resubmit the job.

A0-232-x - PROGRAM ERROR IN DECKEYS - UNDEFINED SPECIAL KEYWORD - keyword

This message indicates a programming error. Refer the problem to system maintenance personnel.

Programmer note: Theindicated keyword is defined as a special-processing keyword in the keyword table, but the keyword is not recognized in the DECKEYS source module.

A0-233-x - IMPROPER PASSWORED OR NO PASSWORD SPECIFIED

The program being requested is password-protected, but the proper password has not been specified.

A0-234-x - +ROUTES SPECIFIES COMMAND NUMBER FOR WHICH NO +ROUTES WAS SUPPLIED

A +ROUTES,n subcommand does not refer to an TIS command with which a non-referback +ROUTES subcommand was provided. Correct "n" to refer to the correct command or replace the referback +ROUTES,n with a non-referback +ROUTES subcommand, and resubmit the job.

A0-235-x - SUMMARIES PARAMETER IS IN ERROR

The SUMMARIES=option parameter of the TIS command is not coded in the proper format. Refer to the documentation to determine the correct format of the SUMMARIES option and resubmit the job.

A0-236-x - NO MEMBERS FOUND FOR SUMMARIES=summaries

The member name(s) requested in the SUMMARIES parameter were not found in the library being listed.

A0-237-x - DATA SET IS NOT PARTITIONED - DDNAME=ddname

The TIS program being executed requires a partitioned data set (library), but the data set referred to by the indicated DD statement is not a partitioned data set.

A0-238-x - DDNAMES ddname AND ddname REFER TO DIFFERENT DATA SETS

The LIST-PDS-MEMBERS program requires two DD statements, each referring to the same partitioned data set (library).

A0-239-x - NO CROSS-REFERENCE DATA FOUND FOR region=region(s)

An input record of the +ROUTES subcommand specifies a construction district, maintenance area, patrol station, county, or city that was not known to the system.

- Check to be sure that a valid region was specified. If not, correct the +ROUTES subcommand and resubmit the job.

- If the indicated region is valid, re-create the associated cross-reference file and resubmit the job.

- If the problem still occurs, refer the problem to system maintenance personnel.

A0-240-x - SELECT TABLE member HAS NO RECORDS

The indicated select table either (1) does not exist in the TABLES library, or (2) exists but contains no records. Refer the problem to system maintenance personnel if you are sure that the requested select table should exist.

A0-241-x - NO SELECT TABLES EXIST

The TABLES library does not contain any select tables (member names SELCTxxx). Refer the problem to system maintenance personnel.

A0-242-x - SELECT MEMBER member DOES NOT EXIST

The indicated select table does not exist in the TABLES library. If you believe that the table should exist, refer the problem to system maintenance personnel.

A0-243-x - CITY NAME IS NOT UNIQUE - SPECIFY BY CITY NUMBER - CITY name

The indicated city name is not unique -- there are at least two cities in the state by that name. Specify the city number rather than the city name and resubmit the job.

A0-244-x - ONLY TRUNK HIGHWAYS CAN BE PROCESSED

The TIS command and associated subcommands request that local roadways be processed, but the requested TIS application program only deals with trunk highway data.

A0-245-x - PREVIOUS SUMMARY SELECTIONS DO NOT PERMIT summary-selection

Note: "summary-selection" is PRINT-USER-TOTALS or PRINT-USER-SUBTOTALS.

Either (1) the PRINT-USER-TOTALS/SUBTOTALS is not preceded by ZERO-USER-TOTALS/SUBTOTALS, or (2) the ZERO statement has been cancelled by a subsequent START-STANDARD-TOTALS/SUBTOTALS or STOP-TOTALS/SUBTOTALS.

A0-246-x - TOO MANY TITLES - THIS CARD IGNORED: card

The maximum number of titles that follow a +TITLES subcommand is 5. Any additional titles are ignored.

A0-247-x - NO VALID +ROUTES CARDS

The user has not supplied any valid +ROUTES input following the +ROUTES subcommand card.

- If some records were included but were flagged with errors, correct these records and resubmit.
- If the input records were inadvertantly omitted, include them in the job setup and resubmit.
- If the +ROUTES card was to be used in referback mode, change the card to the format +ROUTES,n and resubmit.

A0-248-x - INVALID +ROUTES KEYWORD FOR THIS COMMAND

Either a roadway keyword was included with a rail command, or a railway keyword was included with a roadway command. See chapter 5 for details.

A0-249-x - LOCAL-SORT AND +CATEGORIES CANNOT BOTH BE CODED

There is a conflict since both the LOCAL-SORT and the +CATEGORIES parameter specify sorting order for this command.

A0-250-x - KEYWORD xxxxxxxxx NOT ALLOWED WITH THIS COMMAND

The indicated keyword is not accepted with this command.

A0-260-x - USE +ROUTES ONLY WITH GEOCODED OPTION

When the options 'NON-GEOCODED' or 'GEO-&-NON-GEO' are used, +ROUTES cannot be used.

A0-300-9 - SWITCH-ROADLOG-VALUES COMMAND CANNOT SPECIFY USAGE=2
BECAUSE PREVIOUS USE OF COMMAND SPECIFIED USAGE=n

The command CANNOT be run with USAGE=2 if the most recent execution of the program used USAGE=2 OR USAGE=3.

Execution with USAGE=2 requires that RLG.ALT-FED-AID-SYS in all records contains a valid urban-municipal code, and that RLG.ALT-FED-AID-RTE in all records contains a valid FAUA city number. This is not the case after execution with USAGE=2 or with USAGE=3.

A0-301-9 - SWITCH-ROADLOG-VALUES COMMAND CANNOT EXECUTE BECAUSE
PREVIOUS USAGE VALUE NOT RETRIEVED FROM TABLE

TABLES member RLGSW must exist and must contain previous usage value from most recent execution.

A0-302-9 - SWITCH-ROADLOG-VALUES COMMAND CANNOT SPECIFY USAGE=3
BECAUSE PREVIOUS USE OF COMMAND SPECIFIED USAGE=n

The command CANNOT be run with USAGE=3 if the most recent execution of the program used USAGE=2 or USAGE=1.

Execution with USAGE=3 requires that both RLG.FUNCT-CLASS and RLG.ALT-FUNCT-CLASS in all records contain valid functional class codes; that both RLG.FED-AID-SYS and RLG.ALT-FED-AID-SYS in all records contain valid federal aid system codes; and that both RLG.FED-AID-RTE and RLG.ALT-FED-AID-RTE in all records contain a valid federal aid route designation. This is not the case after execution with USAGE=1 or with USAGE=2.

A0-303-9 - USAGE=n IS INVALID FOR SWITCH-ROADLOG-VALUES COMMAND.
USAGE VALUE MUST BE 1, 2, 3 or 4.

Usage options 1, 2, 3 and 4 are the only valid options.

A0-304-8 - SWITCH-ROADLOG-VALUES COMMAND CANNOT CONVERT ALT-FA-SYS=x
TO NUMERIC IN RECORD WITH KEY=nnnnnnnnnn.

Value of RLG.ALT-FA-SYS is alpha and cannot be converted to numeric.

A0-305-8 - SWITCH-ROADLOG-VALUES COMMAND CANNOT CONVERT ALT-FA-RTE=x
TO NUMERIC IN RECORD WITH KEY=nnnnnnnnnn.

Value of RLG.ALT-FA-SYS is alpha and cannot be converted to numeric.

A0-306-9 - SWITCH-ROADLOG-VALUES PROGRAM ENCOUNTERED IO ERROR IN
TRN.RI00SYSU(RLGSW). MODULE XXXXXXXX RETURN CODE IS n.

Contact TIS programming staff.

A0-307-9 - SWITCH-ROADLOG-VALUES PROGRAM ENCOUNTERED IO ERROR IN
MODULE XXXXXXXX. RETURN CODE IS n.

Contact TIS programming staff.

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+

MESSAGES A1-001 THROUGH A1-999
****

A1-001-x - TIS HAS BEEN ABORTED DUE TO PRECEEDING ERRORS

A command printed one or more error messages either (1) at severity level 8 or 9, or (2) at or above the severity level set by a TERMINATION-LEVEL subcommand.

MESSAGES A2-000 THROUGH A2-999
****

A2-000-x- SEVERE - DUPLICATE RECORD

When loading a file: Two input record contain the same key. The first is written to the file but the second is discarded.

When updating a file: An input record for addition to the file contains a key identical to that of a record already stored in the file. The existing record is not modified. Theinput record is discarded.

A2-001-x- SEVERE - NO RECORD EXISTS FOR REWRITE

An input record specifies a key for which no record can be found.

A2-002-x- SEVERE - NO RECORDS EXIST FOR DELETE

An input record specifies a key for which no record can be found.

A2-003-x- SEVERE - OLDKEY RECORDS DONES NOT EXIST

An input record specifies an oldkey for which no record can be found.

A2-004-x- SEVERE - NEWKEY RECORD ALREADY EXISTS

An input record specifies a newkey identical to that of a record already stored in the file. Neither the oldkey record nor the newkey record are modified.

A2-006-x - PROGRAM ERROR IN module - ERROR CODE x

This message indicates a programming error. Refer the problem to system maintenance personnel.

Programmer note: The error message originated from source module "module." Refer to the TIS Programming Details documentation in the section for this source module for an explaanation of "x".

A2-007-x - NO SPACE LEFT IN FILE file-name

Theindicated file has no room left in its overflow areas. The file must be reorganized before any more updates can be performed. Refer the problem to system maintenance personnel.

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A2-008-x - NO DATA SELECTED FOR INDIVIDUAL SUMMARY

No data in the file(s) met all of the selection criteria specified for the +ROUTES individual summary.

A2-009-x- SEVERE - DELECT KEYS CONFLICT

An input record specifies two delete keys that conflict. Either (1) the keys are differenct routes, or (2) the starting key is larger than the ending key.

A2-010-x - PROGRAM ERROR IN SUBCDL - CANNOT FIND CODELIST MEMEBER member

The CODELIST option counld not be processed due to a program error. Refer the problem to system maintenance personnel.

Programmer note: The codelist for the program should have been stored in the codelist library under the indicated name. The name of the codelist member is passed to the SUBCDL subroutine by the

mainline program.

A2-011-x - NO EN RECORD STORED FOR ROUTE ss nnnnnnnn

"ss" is the route system.
"nnnnnnnn" is the route number.

No EN (end-of-route) record is stored in the roadlog file for the indicated route. Refer the problem to roadlog file maintenance personnel.

Note: This message may be printed when an END-REF parameter is used in the +ROUTES subcommand. If so, the message can be ignored.

A2-012-x - ONE OR MORE RECORDS AFTER EN RECORD IGNORED - ROUTE ss nnnnnnnn

One or more records are stored in the roadlog file following the EN record (end-of-route record). Refer the problem to roadlog file maintenance personnel.

A2-013-x - KEY ERROR IN module - FORMAT ERROR IN PASSED KEY - key

The indicated key contains a format error such as a non-numeric character in a numeric column. The correct format is:

1-2	"nn" -- Route system
3-10	"nnnnnnnx" -- Route number
11-20	"nnn+-nn.nnn" -- Reference point

A2-014-x - KEY ERROR IN module - REFERENCE POST DOES NOT EXIST - Key1 (,key2)

The refernece post (columns 11-13) field of the indicated key(s) refers to a reference post for which no record is stored in the true mileage file. See A2-013 for the format of a key.

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A2-015-x - KEY ERRORIN module - TRUE MILEAGE IS NEGATIVE - key

When the system computed the accumulated mileage from the beginning of a route to the reference point in the indicated key, a negative value was obtained (eg., a reference point such as 001-02.25-). See A2-013 for the format of a key.

A2-016-x - KEY ERROR IN module - KEYS ARE ON DIFFERENT ROUTES - key1, key2

When computing the distance between two reference points, it was discovered that the two reference points were on different routes. This message may indicate a programming error. See A3-013 for the format of the key fields.

A2-017-x - KEY ERROR IN module - ROUTE DOES NOT EXIST - key

The indicated key refers to a route that does not exist in the true mileage file. See A2-013 for the format of a key.

A2-018-x - TRUE MILEAGE FOR KEY - key1 - IS GREATER THAN TRUE MILEAGE FOR KEY - key2

The reference point of key1 is not adjusted to the nearest preceeding post. Key1 precedes key2 in the file but key2 is closer to the start of the route.

A2-020-SEVERE - NO UPSTREAM ROADLOG RECORD EXISTS

A roadlog vertical propagation update was attempted but no mileage record immediately preceded the new record location.

A2-021-SEVERE - START-YEAR AND RESULT-YEAR ARE THE SAME

FACTOR-ADT-FILE requires that the RESULT-YEAR keyword is later than the START-YEAR keyword.

****

A3-000-x - DATA ELEMENT NAME TOO LONG - BEGINS WITH name

The miximum length of a data element name is 24 characters. The maximum length when combined with substring notation (eg., RLG. DESCRIPTION/5-9/) is 35 characters.

Check the documentation for the correct name and resubmit the job.

A3-001-x - FORMAT ERROR IN DATA ELEMENT NAME - name

All data element names must have the format "fil.element-name" where "fil" is a 3-character fle name and "element-name" consists of 1-20 characters (eg., RLG.DATE-OF-UPDATE).

If a character-string constant (eg., 'G2') is not enclosed in quotes, the system may treat it as a data element name resulting in this message.

A3-002-x - UNMATCHED QUOTE

The select statement contains an unmatched quote (').

A3-003-x - CHARACTER STRING TOO LONG - BEGINS WITH string

A character-string constant (eg., 'G2') can be no longer than 35 characters not counting the surrounding quotes. This message may be printed if the ending quote is omitted.

A3-004-x - INVALID DATE - date

The indicated date-format constant (eg., 01/01/78) is not coded in the proper format.

A3-005-x - DECIMAL VALUE TOO LONG - BEGINS WITH value

The maximum length of a packed-decimal constant (eg., 42) is 15 digits plus optional sign (+,-) and decimal point.

A3-006-x - INVALID DECIMAL VALUE - BEGINS WITH value

The indicated decimal value contains one or more non-numeric characters, a sign (+,-_ as other than the first character, or more that one decimal point (eg., 34R, 0+04, 50.6.8).

If a character-string constant (eg., '2G') is not enclosed in quotes, the system may treat it as a packed-decimal constant resulting in this message.

A3-007-x - UNKNOWN SYMBOL - *xxxx*

The only valid symbols are: *OR*, *AND*, *EQ*, *NE*, *LE*, *LT*, *GE*, *GT*, *HAS*, *HASNT*, *ANY*, and *ALL*.

A3-008-x - UNBALANCED PARENTHESIS

The number of left parenthesis does not equal the number of right parenthesis. Note that parenthesis appearing within quotes are not counted.

A3-009-x - +SELECT SPECIFIES A COMMAND NUMBER FOR WHICH NO +SELECT WAS SUPPLIED

The +SELECT,n referback +SELECT subcommand refers to a command number "n" for which no non-referback +SELECT subcommand was supplied.

A3-010-x 0 UNKNOWN FILE CODE IN DATA ELEMENT NAME - name

The file code (eg., RLG in RLG.REMARK-CODE) is not a code known to the system.

Check the documentation to ensure that you have coded the proper code.

A3-011-x - UNKNOWN DATA EDEMENT NAME - name

The data element name (eg., REMARK-CODE in RLG.REMARK-CODE) is not known to the system. Check the documentation to ensure that you have coded the proper file code and data element name.

A3-012-x - INVALID CONSTANT COMPARED TO name

A relationship specifies an invalid comparison, such as the comparison of a character-format constant to a decimal-format data element.

Example:

RLG.SURF-WID-RD1 *EQ* 20

RLG.SURF-WID-RD1 is a character-format data element, so the relationship must be coded as:

RLG.SURF-WID-RD1 *EQ* '20'

A3-013-x - DATA ELEMENTS HAVE DIFFERENT ATTRIBUTES - name1,name2

Two data elements being compared to each other have different attributes.

Example:

RLG.SURF-WID-RD1 *EG* RLG.YEAR-BUILT-RD1

RLG.SURF-WID-RD1 is a character-format data element but RLG.YEAR-BUILT- RD1 is a numberic-format data element.

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A3-014-x - SELECT STORAGE OVERFLOW - SPECIFY LARGER SELECT-SIZE AND RESUBMIT

If SELECT-SIZE is included on the TIS command, specify a larger value and resubmit.

Is SELECT-SIZE is not included on the TIS command, add SELECT-SIZE=2 to the command and resubmit.

A3-015-x - SYNTAX ERROR IN SELECT STATEMENT

The select statement contains an error so severe that the program could not continue processing. A dollar sign is printed under the item in which the error was detected. Check the documentation for the proper format and resubmit the job.

A3-016-x - TOO MANY FILES REFERENCED IN SELECT STATEMENT - MAXIMUM IS 25

At most 25 files can be referred to in a single select statement.

A3-017-x - FILE file CANNOT BE REFERENCED IN THIS SELECT STATEMENT

The select statement contains a reference to a file (eg., RLG in RLG.REMARK-CODE) that cannot be selected on with the INCLUDE/EXCLUDE clause immediately above.

This message can be printed if the user has ommitted an INCLUDE/EXCLUDE clause with a command that requires one to be present.

A3-018-x - INVALID INCLUDE/EXCLUDE CLAUSE

The name coded in the INCLUDE/EXCLUDE clause (eg., ACCIDENTS in INCLUDE ACCIDENTS IF:) is not known to the system.

A3-020-x - TWO OR MORE INCLUDE/EXCLUDE CLAUSES REFER TO name

Two or more INCLUDE/EXCLUDE clauses contain the same name (eg., ACCIDENTS in INCLUDE ACCIDENTS IF:).

A3-021-x - ORDERING ERROR IN MULTI-CORRELATION CLAUSE

Items within a multi-correlation clause have not been coded in the proper order. Example:

ANY (ACV.VEHIC-TYPE *EQ* *NE* 02)

A3-022-x - SELECT STATEMENT IS INCOMPLETE

The last item in the select statement is neither a complete relationship nor a right parenthesis. Example:

RLG.SURF-WID-RD1 *EQ*

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A3-023-x - TOO MANY INCLUDE/EXCLUDE CLAUSES - MAXIMUM IS 5

No more than five INCLUDE/EXCLUDE clauses can be included with a +SELECT subcommand.

A3-024-x - FIRST SELECT STATEMENT HAS NO INCLUDE/EXCLUDE CLAUSE

Either (1) the user's application program requires that an INCLUDE/EXCLUDE clause be included and the user has omitted the clause, or (2) the user has included two or more select statements and the first is not preceded by an INCLUDE/EXCLUDE clause.

A3-025-x - FILE USED AS BOTH SINGLE AND MULTI-CORRELATION - file

A file appears in both single- and multi-correlation usage in the select statement. Example:

ACV.VEHIC-TYPE *EQ* 02 *AND* *ANY* (ACV.DRIVER-AGE *LT* 26)

A3-026-x - ERROR IN SUBSTRING NOTATION - name/substring/

The substring notation is in error. The ending column is probably smaller than the starting column as in RLG.DESCRIPTION/9-5/

A3-027-x - SUBSTRING IS BEYOND END OF DATA ELEMENT - name/substring/

The substring notation extends beyond the end of the data element. Examples:

RLG.REMARK-CODE/3/ (RLG.REMARK-CODE is 2 characters in length)

RLG.REMARK-CODE/3-4/

RLG.REMARK-CODE/1-3/

A3-028-x - SUBSTRING USED WITH NUMERIC/DATE DATA ELEMENT - name/substring/

Substring notation can only be used with character-format data elements.

A3-029-x - INVALID SEQUENCE IN SELECT STATEMENT - item

An item is coded out of sequence. Example:

RLG.REMARK *EQ* *NE* 'EN'

A3-030-x - *HAS*/*HASNT* USED WITH NUMERIC/DATE DATA ELEMENT - name

HAS and *HASNT* can only be used with character-format data elements.

A3-031-x - ORDERING ERROR IN SELECT STATEMENT

An item is coded out of sequence. Example:

RLG.REMARK *EQ* *NE* 'EN'

A3-032-x - UNKNOWN INCLUDE/EXCLUDE NAME - name

The name coded in an INCLUDE/EXCLUDE clause (eg., ACCIDENTS in INCLUDE ACCIDENTS IF:) is not known to the system. Check the documentation for proper spelling.

A3-033-x - UNKNOWN CITY NAME - name

The indicated city name is not known to the system. Check the documentation for proper spelling.

A3-034-x - UNKNOWN COUNTY NAME - name

The indicated county name is not known to the system. Check the documentation for proper spelling.

A3-035-x - INVALID INCLUDE/EXCLUDE CLAUSE(S)

One or more of the INCLUDE/EXCLUDE clauses in the select subcommand cannot be utilized with the user's application program.

A3-036-x - NO CODE GROUPS FOLLOW GROUPS RECORD

The GROUPS option was used with a +CATEGORIES subcommand, but no data groupings followed the "GROUPS" keyword.

A3-037-x - GROUPS MUST BE PRECEDED BY DATA ELEMENT

The GROUPS keyword can only appear immediately following a DATA-ELEMENT=name line.

A3-038-x - FORMAT ERROR IN CODE GROUP

The format of a code group is:

xxx TO yyy

where the lengths of xxx and yyy are the length of the data element. "xxx" starts in column 1, " TO " follows, then "yyy". Leading zeroes and blanks must be coded. Decimal points are not coded.

A3-039-x - TOO MANY CODE GROUPS - MAXIMUM IS 32

A maximum of 32 groups can follow a GROUPS keyword.

A3-040-x - BREAK OVERFLOW - CANNOT SUMMARIZE ON SPECIFIED DATA ELEMENTS

The combined total field lengths of the data elements specified for the +BREAKS subcommand exceeds 90.

A3-041-x - +BREAKS SPECIFIES A COMMAND NUMBER FOR WHICH NO +BREAKS WAS SPECIFIED

A +BREAKS referback subcommand ("+BREAKS,n") refers to a command

number "n" for which no non-referback +BREAKS subcommand was supplied.

A3-042-x - FIRST RECORD OF +BREAKS MUST BE DATA ELEMENT NAME

The first input record of the +BREAKS subcommand (right after the +BREAKS line) must be in the format xxx.nnnnnnnnn where "xxx" is a file identifier and "nnnnnnnnnn" is a data element name.

A3-043-x - UNKNOWN RECORD TYPE IN +BREAKS

The flagged input record cannot be deciphered. The known types are (1) data element name (xxx.nnnnnnnnnn), (2) REDEFINES, (3) redefinitions, (4) POINTS, or (5) point values.

A3-044-x - NO CODE REDEFINITIONS FOLLOW REDEFINES RECORD

Either a data element name, another REDEFINES record, or a POINTS record follows immediately after a REDEFINES input record of the +BREAKS subcommand.

A3-045-x - TOO MANY DATA ELEMENT RECORDS IN +BREAKS - MAXIMUM IS 20

A maximum of 20 data elements can be used with +BREAKS.

A3-046-x - REDEFINES MUST BE PRECEDED BY DATA ELEMENT NAME

The REDEFINES input record can only appear immediately following a data element name record.

A3-047-x - INVALID FILE REFERENCED IN +BREAKS - data-element-name

The indicated data element cannot be used with this command.

A3-048-x - NO CODE POINTS FOLLOW POINTS RECORD

Either a data element name, another POINTS record, or a REDEFINES record follows immediately after a POINTS input record of the +BREAKS subcommand.

A3-049-x - POINTS MUST BE PRECEDED BY DATA ELEMENT NAME

The POINTS input record can only appear immediately following a data element name record.

A3-050-x - FORMAT ERROR IN CODE POINT

The format of a code point record is "xxx" where the length of "xxx" equals the length of the data element.

A3-051-x - TOO MANY CODE POINTS - MAXIMUM IS 32

A maximum of 32 code points can follow a POINTS record.

A3-053-x - CROSSING NUMBER xxxxxxxx NOT FOUND - I/I RECORD IGNORED -
xx xxxxxxxx xxx+xx.xxx

The railroad crossing number in the indicated I/I record did not correspond to a record key in the railroad crossing (RGC) file. The I/I record was considered "not selected."

A3-055-x - +ROUTES CANNOT REFER TO SYSTEMS 01-03, 05, OR 10 WITH THIS COMMAND

This command is programmed to be used with "local" route systems only (ROUTE SYSTEM codes 04, 07-09, and 11-23). See chapter 5 of the User Manual for more information on +ROUTES.

A3-057-x - +ROUTES REQUIRED WITH LIST-FORMAT=CROSS-SECTION

The +ROUTES subcommand must be used to list roadway history data in cross-section format.

A3-060 - INVALID FILE COMBINATION IN +EXTRACT

Certain files cannot be extracted together in the same run, examples are:

TRF and ADT	ACI and ACV
TRF and ESL	ACI and ACJ
TRV and ADT	ACV and ACI
TRV and ESL	ACV and ACJ

A3-061 - START-DATE AND END-DATE REQUIRED FOR ADT OR ESAL EXTRACTION

Whenever +EXTRACT references ADT or ESL data elements, the START-DATE and END-DATE keywords must be specified on the command to define the time period for traffic.

A3-062 - START-DATE AND END-DATE REQUIRED FOR ACCIDENT EXTRACTION

Whenever +EXTRACT references ACD, ACI, ACV, or ACJ data elements, the START-DATE and END-DATE keywords must be specified on the command to define the time period for accident data.

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MESSAGES A4-000 THROUGH A4-999
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A4-000-x - INSUFFICIENT CORE STORAGE - SPECIFY LARGER REGION SIZE

The value specified in the REGION parameter of the JOB/EXEC statement is insufficient. Specify a larger value and resubmit the job.

A4-001-x - ROADLOG AND COINCIDENT FILES DISAGREE

The roadlog file is not in agreement with the coincident file. Refer the problem to roadlog/coincident file maintenance personnel.

A4-002-x - BASE ROUTE CONTAINS ONE OR MORE COINCIDENT SECTIONS

The roadlog file is not in agreement with the coincident file. Refer the problem to roadlog/coincident file maintenance personnel.

A4-003-x - THIS PROGRAM ALLOWS ONLY THE ROUTE SYSTEM MODES OF +ROUTES

The job setup utilizes a +ROUTES region mode (such as by construction distric or by county), but the command being run only allows the route system modes.

A4-004-x - NO RECORD IN COUNTY TABLE FOR COUNTY NUMBER xx

If "xx" is 01-87, this message indicates a programming error that should be referred to system maintenance personnel. Otherwise, this message indicates an invalid county number.

A4-005-x - ERROR IN COUNTY TABLE - CONSTRUCTION DISTRICT OF COUNTY nn IS n

This message indicates a programming error. Refer the problem to system maintenance personnel.

Programmer note: The construction district field of record "nn" in

the county table cointains a code other than 1-9.

A4-006-x - TRUMILE FILE - ROUTE ss nnnnnnnn - REFERENCE POSTS nnn THROUGH nnn ARE MISSING

This message indicates a disagreement between the true mileage file and the roadlog file. Refer the problem to roadlog/trumile file maintenance personnel.

A4-007-x - ROADLOG FILE - ROUTE ss nnnnnnnn CONTAINS ONLY ONE RECORD

This message indicates an error in the roadlog file. Refer the problem to file maintenance personnel.

A4-008-x - ROALDOG FILE - FIRST RECORD OF ROUTE ss nnnnnnnn IS AN EN RECORD

This message indicates an error in the roadlog file. Refer the problem to file maintenance personnel.

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A4-009-x - TRUMILE FILE - REFERENCE POST nnn DOES NOT PRECEDE REFERENCE POST nnn - nnn.nnn/nnn.nnn - ROUTE ss nnnnnnnn

This message indicates an error in the true mileage file. Refer the problem to file maintenance personnel.

A4-010-x - ROADLOG FILE - FIRST RECORD OF ROUTE ss nnnnnnnn DOSE NOT CONTAIN REF POINT 000+00.000

This message indicates an error in the roadlog file. Refer the problem to roadlog file maintenance personnel.

Note: Each route stored in the roadlog file must begin with a record at 000+00.000. If the route does not begin at that location, a GP record with reference point 000+00.000 must be used.

A4-011-x - COINCIDENT FILE - NO RECORD STORED FOR KEY ss nnnnnnnn nnn+nn.nnn

This message indicates a discrepancy between the roadlog and coincident files. Refer the problem to roadlog/coincident file maintenance personnel.

Note: The display key is the key of a roadlog CO-type record. The coincident file does not contain a corresponding record.

A4-012-x - ACCIDENT nnnnnnnn AT KEY ss nnnnnnnn nnn+nn.nnn IGNORED - reason

This message indicates a discrepancy between the accident files and either the true mileage file or the roadlog file. Refer the problem to file maintenance personnel.

"reason" is one of the following:

KEY FORMAT ERROR
The key stored in the accident record is not in the proper format.

NOT ADJUSTED TO NEAREST REF POST
The location reference point is not normalized (see the true mileage file section in chapter 2).

FER POST NOT FOUND
The reference point specifies a reference post for which no record is stored in the true mileage file.

ROUTES DOES NOT EXIST
The route indicated in the accident's key does not exist in either the roadlog or true mileage file.

NEGATIVE TRUE MILEAGE
The key stored in the accident record contains an error that causes the computed milepoint to be negative (eg., 001-02.356).

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A4-014-x - MATRIX OVERFLOW - CANNOT SUMMARIZE ON SPECIFIED DATA ELEMENTS

The combined total field lengths of data elements specified in DATA-ELEMENT records of the +CATEGORIES subcommands exceeds 18 characters.

A4-015-x - INVALID +ROUTES OPTION - option

The indicated option of the +ROUTES subcommand cannot be used with this T.I.S. command.

A4-016-x - SKIP PARAMETER LARGER THAN NUMBER OF CARDS SUBMITTED

The SKIP parameter (used to skip the first "n" input records) specifies a value that is larger than the total number of input records submitted.

A4-019-x - NO ROADLOG RECORD FOR INTSECT RECORD AT ss nnnnnnnn

nnn+nn.nnn eee (verbal description from intsect record)
RGC-NUMBER: xxxxxxxx

This message indicates a discrepancy between the roadlog and intersection files. (NOTE: RGC-NUMBER is added for type 5 intersections - rail grade crossings). Refer the problem to intersection file maintenance personnel.

A4-020-x - PROGRAM ERROR IN module - TOTAL ENTRY xxxxx - RETURN CODE IS xxxx - ACC NUM IS xxxxxxxx

This message incidates a programming problem. Refer the problem to system maintenance personnel.

NOTE: "module" is the name of the source module in which the error was detected. This source module has invoked TOTAL requesting the function shown in "TOTAL ENTRY xxxxx." "RETURN CODE IS xxxx" identifies the status code returned by TOTAL for the call.

A4-021-x - DISCREPANCY IN DPS ACCIDENT FILE xxxx - ACCIDENT nnnnnnnn

This message indicates contradiction in the Department of Public Safety accident records file between:

"number of vehicles", "number of vehicle records", and actual number of vehicle records found on file, or
"number of injuries", "number of injury records", and actual number of injury records found on file.

NOTE: "xxxx" identifies the name of one of the TOTAL accident files (MVDL means vehicle, INJR means injury).

Refer the discrepancy to the TIS Unit.

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A4-022-x - +CATEGORIES SPECIFIES A COMMAND NUMBER FOR WHICH NO +CATEGORIES WAS SUPPLIED

A +CATEGORIES referback subcommand ("+CATEGORIES,n") refers to a command number "n" for which no non-referback +CATEGORIES subcommand was supplied.

A4-023-x - NO RECORD IN INTSECT FILE FOR XREF RECORD AT ss nnnnnnnn

nnn+nn.nnn

This message indicates a file maintenance problem in the intersection file. Refer the problem to file maintenance personnel.

Note: This problem can be fixed be re-creating the intersection cross-reference file.

A4-024-x - NO RECORD IN XREF FILE FOR INTSECT RECORD AT ss nnnnnnnn nnn+nn.nnn eee

This message indicates a file maintenance problem in the intersection file. Refer the problem to file maintenance personnel.

Note: This problem can be fixed be re-creating the intersection cross-reference file.

A4-025-x - NO RECORD IN ROADLOG FILE FOR INTESCT RECORD AT ss nnnnnnnn nnn+nn.nnn

This message indicates a discrepancy between the roadlog and intersection files. Refer the problem to intersection file maintenance personnel.

A4-026-x - ONE OR MORE NON-NUMERICS IN file RECORD WERE CHANGED TO ZEROES - ACCIDENT nnnnnnnnnn

This message indicates an error in the indicated accident file (INJR, MVDL, or ACDT). Refer the problem to accident file maintenance personnel.

A4-027-x - ERROR IN BIKEWAY FILE AT ss nnnnnnnn nnn+nn.nnn nnn+nn.nnn - NO type ROADLOG RECORD

This message indicates a descrepancy between the roadlog and bikeway files that can be corrected by recreating the bikeway file.

The two reference points printed in the error message provide the starting and ending points of a bikeway section. "type" is either STARTING or ENDING to show which roadlog record is missing.

A4-028-x - FIRST RECORD OF +CATEGORIES MUST BE DATA-ELEMENT=NAME

The first input record of the +CATEGORIES subcommand (right after the +CATEGORIES record) must be in the format DATA-ELEMENT=name.

A4-029-x - UNKNOWN RECORD TYPE IN +CATEGORIES

The flagged input record cannot be deciphered. The known types are (1) DATA-ELEMENT=name, (2) REDEFINES, (3) redefines control cards, (4) GROUPS, or (5) groups control cards.

A4-030-x - NO CODE REDEFINITIONS FOLLOW REDEFINES RECORD

Either a DATA-ELEMENT=name or another REDEFINES record follows immediately after a REDEFINES input record of the +CATEGORIES subcommand.

A4-031-x - TOO MANY DATA-ELEMENT RECORDS IN +CATEGORIES - MAXIMUM IS 3

A maximum of three data elements can be summarized on in a matrix summary.

A4-032-x - REDEFINES MUST BE PRECEDED BY DATA-ELEMENT

A REDEFINES input record can only appear immediately following a DATA-ELEMENT=name input record.

A4-033-x - TOO MANY CODE REDEFINITIONS - MAXIMUM IS 32

A maximum of 32 code redefinitions input records can follow a REDEFINES input record.

A4-034-x - FORMAT ERROR IN CODE REDEFINITION

The format of a code redefinition input record is:

```
xxx yyy
```

where "xxx" is the code as stored in the record and "yyy" is the replacement code for this summary. The lengths of the xxx and yyy fields equal the length of the data element. xxx must begin in column 1, and one blank must separate the xxx and yyy fields.

A4-035-x - INVALID FILE REFERENCED IN +CATEGORIES - data-element-name

The indicated data element name cannot be used with this command.

A4-036-x - +ROUTES IS NOT VALID WITH THIS COMMAND

One or more +ROUTES features are utilized that are not implemented with this command.

A4-037-x 0 FILE xxx HAS INSUFFICIENT SPACE ALLOCATED

The indicated file has consumed all of its allocated space. The

file must be reallocated with additional space.

A4-038-x - UPDATE CODE NOT ALLOWED WITH LOAD OPTION - x

When loading a file, you may not input data that indicates update operations such as record revision or deletion.

A4-039-x - ERROR IN xxxxxxxx TABLE - record

The indicated internal program control table contains an invalid record. The error message includes a print-out of the record that is in error.

This message indicates a programming problem. Refer the problem to system maintenance personnel.

A4-040-x - +SORT SPECIFIES A COMMAND NUMBER FOR WHICH NO +SORT WAS SUPPLIED

A +SORT subcommand of the refer-back type (eg., +SORT,2) indicates the number of a command for which no +SORT command was supplied.

A4-041-x - UNKNOWN NAME IN +SORT - name

The indicated data element name is not known to the system. Check the spelling to ensure that it agrees with the documentation.

If the name is listed in the documentation, refer the problem to system maintenance personnel.

A4-042-x - NAME OUT OF ORDER IN +SORT - name

Check the documentation to determine the order in which data element names must appear in the +SORT subcommand.

A4-043-x - ACCIDENT nnnnnnnn AT ss rrrrrrrr xxx+xx.xxx IGNORED - NO CORRESPONDING ROADLOG RECORD

The indicated accident has not been included in the printed report because the indicated reference point does not fall within a valid roadway section. For example, it may lie within a coincident section, beyond the end of a route, or on a non-existing route.

A4-044-x - ACCN RECORD CONTAINS INVALID DATE - ACCIDENT nnnnnnnn - DATE mmddyy

The indicated accident has not been included because an invalid

date is stored in the accident number master file record for the accident.

A4-045-x - +SELECT ACCIDENT SELECTION NOT ALLOWED - I/I-ACC-ANAL FILE CONTAINS ACCIDENT DATA

+SELECT for accident selection cannot be used on the PRINT-I/I-ACC-ANAL-REPORT command when accident data is entered into the report file by CREATE-I/I-ACC-ANAL-FILE (ie., either ACCIDENTS or SIG-LIMITS is used). To use accident selection, either (1) rerun CREATE-I/I-ACC- ANAL-FILE with NO-ACCIDENTS or (2) rerun CREATE-I/I-ACC-ANAL-FILE and place the +SELECT subcommand wiht the CREATE-I/I-ACC-ANAL-FIE command instead of with the PRINT-I/I-ACC-ANAL-REPORT command.

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A4-046-x - +SELECT I/I-ACC-ANAL SELECTION NOT ALLOWED - SPECIFIED FOR CREATE-I/I-ACC-ANAL-FILE

+SELECT for I/I-ACC-ANAL selection can be used with either CREATE-I/I- ACC-ANAL-FILE or with PRINT-I/I-ACC-ANAL-REPORT, but cannot be used with both.

A4-047-x - TOO MANY +SORT DATA ELEMENTS

Refer to the documentation to determine how the +SORT subcommand is used.

A4-048-x - KEYWORD PARAMETER NOT ALLOWED - name

The indicated keyword parameter is not allowed on this subcommand.

A4-049-x - xxx.USER-CATEGORY NOT ALLOWED IN +SORT - NO +CATEGORIES PRESENT

When +CATEGORIES is omitted from the command, the user category field is always blank. xxx is INA (intersection) or ASA (section).

A4-050-x - DATA ELEMENT NOT ALLOWED IN +SORT BECAUSE NO-ACCIDENTS IS USED - na,e

The indicated name refers to one of the data elements in the accident segment of the accident analysis file. When NO-ACCIDENTS is used, the accident segment is not filled in.

A4-051-x - DATA ELEMENT NOT ALLOWED IN +SORT BECAUSE SIG-LIMITS IS NOT

USED - name

The indicated name refers to one of the data elements in the sig-limits segment of the accident analysis file. When SIG-LIMITS is not used, the sig-limits segment is not filled in.

A4-052-x - +SORT IS NOT ALLOWED WHEN MAX-NUMBER-I or MAX-NUMBER-RL IS USED

On the PRINT-I/I-ACC-ANAL-REPORT-COMMAND, MAX-NUMBER-I and MAX-NUMBER- RL can be used only when +SORT is not used.

A4-053-x - ACCIDENT nnnnnnnn AT ss rrrrrrrr xxx+xx.xxx ON mm/dd/yy - ROUTE DOES NOT EXIST

The indicated accident is coded incorrectly. Route ss rrrrrrrr has no data stored in the roadlog file.

A4-054-x - ACCIDENT nnnnnnnn AT ss rrrrrrrr xxx+xx.xxx ON mm/dd/yy - LOCATION IS BEYOND END OF ROUTE

The indicated accident is coded incorrectly. Route ss rrrrrrrr ends at a reference point smaller than xxx+xx.xxx.

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A4-055-x - ACCIDENT nnnnnnnn AT ss rrrrrrrr xxx+xx.xxx ON mm/dd/yy - LOCATION IS BEFORE START OF ROUTE

The indicated accident is coded incorrectly. The roadlog file contains no records for route ss rrrrrrrr that have reference points less than or equal to xxx+xx.xxx.

This message also indicates an error in roadlog file because the roadlog file should have a record at 000+00.000 for every route.

A4-056-x - ACCIDENT nnnnnnnn AT ss rrrrrrrr xxx+xx.xxx ON mm/dd/yy - LOCATION IS IN COINCIDENT SECTION

The indicated accident is coded incorrectly. The indicated reference no point on the indicated route falls within a coincident section.

A4-065-x - CROSSING xxxxxxxx NOT FOUND - XREF KEY IS ss rrrrrrrr xxx+xx.xxx

The RGC cross-reference file contains a record with a crossing number that was not found in the crossing file. Recreate the cross-reference file.

A4-067-x - NO RECORD IN ROADLOG FILE FOR CROSSING AT ss rrrrrrrr xxx+xx.xxx

A record should exist in the roadlog file on route ss rrrrrrrr with a reference point equal to or less than xxx+xx.xxx, but none was found. The reference point in the crossing record may be invalid.

A4-068-x - NO RECORD IN RAILWAY FILE FOR CROSSING xxxxxxxx AT ss ll xxx+x.xx

A record should exist in the railway file on line ss ll with a reference point equal to or less than xxx+x.xx, but none was found. The reference point loaction is determined by a railpoint record with the crossing id xxxxxxxx. The problem may be in the railpoint file.

A4-069-x - CROSSING xxxxxxxx - IGNORED - XREF KEY IS ss rrrrrrrr xxx+xx.xxx BUT STORED KEY IS ss rrrrrrrr xxx+xx.xxx

The location of the crossing in the cross reference file does not agree with the location stored in the crossing record. Recreate the cross reference file.

A4-070-x - TABLE name NOT FOUND

The indicated table was not found in the tables library. Refer problem to system maintenance personnel.

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A4-071-x - FORMAT ERROR IN RGCHAZ TABLE

The hazard index table (RGCHAZ) was not in a correct format. See the CROSSING-HAZARD-INDEX command in chapter 8.

A4-072-x - ERROR IN ADT FACTOR TABLE

The factor table input for use in modelling was not in the correct format. Refer to traffic data unit, since they are responsible for maintaining the table.

A4-074-x - ADT FACTOR MISSING FOR YEAR nn, TYPE aa

The factor table input for use in modelling was not in the correct format. Refer to traffic data unit, since they are responsible for maintaining the table.

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MESSAGES A5-000 THROUGH A5-999

A5-001-x - START-DATE AND END-DATE TOO MANY YEARS APART FOR TRFADT SUBROUTINE

A program requiring traffic volume or vehicle-miles did not have START-DATE and END-DATE parameters specifying years differing by 20 or less.

A5-003-x - SEQUENTIAL BIKEWAY FILE IS NOT SORTED BY KEY -- COPY ABORTED

The COPY-BIKEWAY-FILE command prints this message whenever COPY-TYPE=SEQL-TO-ISAM is specified but the sequential (tape) file is not sorted by lowest to highest key (route sytem, route number, and reference point). The ISAM file cannot be created from this sequential file.

A5-006-x - TRAFFIC FILE DOES NOT CONTAIN ADT BETWEEN KEYS /ss nnnnnnnn rrr+rr.rrr/ AND ss nnnnnnnn rrr+rr.rrr/

To compute volume the traffic file must contain CONTINUOUS volume data for the year(s) specified between the locations specified. A volume of zero is returned. The section may or may not be ignored.

A5-010-x - NUMBER OF LANES IS ZERO, VALUE OF 1 USED - KEY= ss nnnnnnnn rrr+rr.rrr

The CREATE-BIKEWAY-FILE command substitutes a value of 1 in the rating formulas for roadlog sections indicating zero lanes.

A5-012-x - LANE WIDTH COMPUTED LESS THAN yy FEET, VALUE OF yy FEET USED - KEY= ss nnnnnnnn rrr+rr.rrr

The CREATE-BIKEWAY-FILE rating formulas require a minimum lane width. The value yy will be:

10	For route systems 01 - 07
8	For route systems 08 - 23

A5-014-x - LANE WIDTH FACTOR GREATER THAN 1, VALUE OF 1 USED - KEY= ss nnnnnnnn rrr+rr.rrr

The CREATE-BIKEWAY-FILE program's rating formula limits the lane width factor to 1 for sections with rural or municipal-rural design.

A5-015-x - NO ADT AVAILABLE, VOLUME FACTOR IS SET TO ZERO - KEY= ss nnnnnnnn rrr+rr.rrr

The CREATE-BIKEWAY-FILE sets the volume factor to zero for sections that do not have volume available from the traffic file for the most recent year specified on the command (see message A5-006). This means there will be no design points computed for this section.

A5-018-x - KEY /ss nnnnnnnn rrr+rr.rrr/ IS LESS THAN OR EQUAL TO PRIOR KEY /ss nnnnnnnn rrr+rr.rrr/ - RECORD NOT WRITTEN

When creating an ISAM file, each record loaded must have a key field larger than any previous record written to the file.

A5-022-x - START-DATE AND END-DATE CONFLICT

The date specified in the END-DATE parameter was prior to the date specified in the START-DATE parameter.

A5-040-x - +ROUTES CARD SPECIFIES KEY LESS THAN PRIOR CARD

Certain commands required the +ROUTES subcommands to be coded in increasing sequence of keys (route system, route number, and reference point), otherwise error message A5-018 will be printed.

A5-046-x - INVALID COUNTY /xx/ IN ROADLOG RECORD WITH KEY - ss nnnnnnnn rrr+rr.rrr

The value stored in the County field is not a number 01 through 87.

A5-050 NO DATA IN SECTIONS FILE

Sections file records must be stored at construction district boundaries and at any location where a group of mileage records begins in the roadlog file.

A5-052 NO VERBAL DESCR. AVAILABLE

A sections file record contains no description and none exists at that location in the roadlog or logpoint files.

A5-054 CONSTR. DISTRICTS DISAGREE

The construction district field in the sections file does not agree with the roadlog file.

A5-056 SECTN KEY BEYOND END OF RTE

A record is stored in the sections file at a location beyond the roadlog EN record for the route.

A5-058 KEY IS IN COINCIDENT SECTN

A record is stored in the sections file that falls in a coincident section in the roadlog file.

A5-060 SECTION KEY IS IN GAP

A record is stored in the sections file that falls in a gap according to the roadlog file.

A5-062 KEY IS IN NON-EXISTNT SECTN

A record is stored in the sections file that falls in a non-existent section of the roadlog file.

A5-064 ROUTE DOES NOT EXIST IN RLG

A record is stored in the sections file for a route which is not found in the roadlog file.

A5-066-x - ANALYSIS FILE CONTAINS NO RECORDS

The CREATE-... command did not select any records to be written to the analysis file.

A5-067-x - INVALID VALUE SPECIFIED FOR ROADWAY-CLASS - VALUE IS xx

Accepted values for the parameter are 01, 02, 03, and 04.

A5-069-x - NO RECORD IN CITY TABLE FOR CITY NUMBER xxxx

The number xxxx does not exist in the TIS city table and is therefore considered invalid.

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A5-071-x - ERROR IN TRAFFIC FACTOR TABLE - FACTOR IS xxxxx

The format for the traffic factor table is "snn.n" where s is blank for positive and "-" for negative, each n is a digit.

A5-073-x - REFERENCE POINT xxx+xx.xxx DOES NOT REFER TO NEAREST PRECEDING POST - yyy - ROUTE xxxx xxxxxxxx

Reference post yyy is closer to the location specified than is post xxx according to the true mileage file. The reference point shown should be changed.

A5-075-x - ACCIDENT - nnnnnnnn - NOT FOUND

No record exists in the accident details file with accident number nnnnnnnn.

A5-077-x - ADT SELECTION REQUIRES BOTH START-DATE AND END-DATE ON COMMAND

Any command using INCLUDE ADT-RECORDS IF: selection must include START-DATE and END-DATE to allow computation of ADT.

A5-082-x - START-YEAR IS NOT LESS THAN END-YEAR - xx IS NOT LESS THAN yy

START-YEAR of xx must be less than END-YEAR of yy.

A5-083-x - RESULT-YEAR MUST FALL WITHIN START-YEAR AND END-YEAR - xx < yy < zz IS NOT TRUE

START-YEAR of xx must be less than RESULT-YEAR of yy which must be

less than END-YEAR of zz.

A5-085-x - BRIDGE RECORD - nnnnnnn - NOT FOUND

The bridge file does not contain a record with the indicated key.

A5-087-x - OPTIONS (xxxxx) AND (yyyy) CONFLICT

The coded options are contradictory and one or the other must be changed.

A5-089-x - INVALID +ROUTES FOR THIS COMMAND

The only valid +ROUTES keywords for this command are ROUTE-SYS, ROUTE-SYS-&-NUM, ROUTE-NUM, START-REF, and END-REF.

A5-091-x - MISSING SAMPLE DATA - ss rrrrrrrr xxx+xx.xxx, YEAR yy, DIRECTION d

The software could not form a continuous generation of sample data for the section for the indicated year and direction. The indicated record did not have a sample with the same number of lanes as did one or more generations for a previous record. (Just look around the neighborhood, there is an error somewhere).

A5-093-x - NO PAVEMENT DATA - ss rrrrrrrr xxx+xx.xxx, DIRECTION d

The indicated record did not have as many generations of sample data as was being accumulated from previous records.

A5-095-x - TOO MANY TIME INTERVALS, MAXIMUM ALLOWED IS nnn
TIME: nnnnnnnnn

The TRAFFIC-TIME-MATRIX command can accept a limited number of SELECTED time intervals. The TIME record being processed when the limit was exceeded is shown. The current limit is 2196.

A5-096-x - TOO MANY CATEGORIES FOR AVERAGING, MAXIMUM ALLOWED IS nnn

The TRAFFIC-TIME-MATRIX is limited in the number of distinct categories is can compute an average vehicle miles for. The current maximum is 2196. There is no limit for total vehicle miles.

A5-098-x - GRAPHICS NOT ALLOWED WITH MULTIPLE CATEGORIES

When writing data to the ADMCDATA graphics library, the command accepts a maximum of one data element with the CATEGORIES subcommand.

A5-098-x - GRAPHICS STORAGE OVERFLOW, GRAPH DATA WILL BE INCOMPLETE

One of the following limits was exceeded when storing data to be graphed into the ADMCDATA library:

1) 998 pairs of data.
2) Total label length of 998 characters.

In the first case, the first 998 pairs of data will be written to the specified graphics library member.

In the second case, the graphics data will be written WITHOUT labels.

A5-100-x - GDDM ERROR - ......(GDDM message)......

An error occurred while GDDM was attempting to construct a graph. Refer problem to program maintenance personnel.

A5-102-x - MATRIX-SORT NOT ALLOWED WITH 3 DATA ELEMENT CATEGORIES

The MATRIX-SORT keyword will not operate when the CATEGORIES subcommand specifies 3 DATA-LEMENT names. Delete MATRIX-SORT or remove on of the DATA-ELEMENTS.

A5-104-x - "TIM" DATA ELEMENT REQUIRED WITH +CATEGORIES SUBCOMMAND (OR ELSE USE TRAFFIC-MATRIX-SUMMARY)

The TRAFFIC-TIME-MATRIX is designed to be used with at least one DATA-ELEMENT name beginning "TIM.". If this is not necessary, use the TRAFFIC-MATRIX-SUMMARY command, as it will be more efficient.

A5-106-x - "ATR.STATION" REQUIRED WITH +CATEGORIES WHEN GRAPHING PERCENT-VOLUME

PERCENT-VOLUME is percent of AADT for the station. This is not computed unless station is one of the data elements specified.

A5-107-x - TOO MANY LIBRARY MEMBERS FOR STATION xxxx

The ATR data library had more than two members with names beginning "STxxx". A station can have either one or two members in the library (e.g., 0010 for station 001, 025N and 025S for station 25).

A5-108-x - OPTIONWORDS "DAY-CAT" AND "PERCENT-VOLUME" AND +CATEGORIES DISAGREE

If the ATR-MATRIX-SUMMARY uses the "DAY-ADT" option, then PERCENT-VOLUME must also be used and +CATEGORIES must reference the ATR.DAY-OF-WEEK data element.

A5-110-x - NO MASTER RECORD OR NO GROUP FOR STATION xxxx - STATION DATA IGNORED

There must be a record in the ATR station master file (ATR library member "MASTER"), and the record must have a group for the station.

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MESSAGES A6-001 THROUGH A6-999
****

A6-001-x - DONOR ROUTE DOES NOT EXIST

No records are stored in the roadlog file for the specified route.

A6-002-x - UPDATE CODE IS GPDL BUT ROUTE DOES NOT BEGIN WITH GAP

The donor route must have a record at 000+00.000 with remark code GP in the roadlog file.

A6-003-x - UPDATE CODE IS GPLN BUT DONOR START-REF DOES NOT CORRESPOND TO A GAP

The donor route must have a record at start-ref with remark code GP in the roadlog file.

A6-004-x- UPDATE CODE IS GPLN BUT INDICATED GAP IS VARIABLE-LENGTH

The record stored in the roadlog file immediately after the indicated gap refers to a higher reference post than the GP record.

A6-005-x - DONOR START-REF IS BEFORE THE BEGINNING OF THE ROUTE

The first record stored in the roadlog file is at a key higher than the key specified in donor start-ref.

A6-006-x - DONOR START-REF IS AT OR BEYOND THE END OF THE ROUTE

The last record stored in the roadlog file for the donor route has a key less than or equal to the specified donor start-ref.

A6-007-x - DONOR END-REF IS AT OR BEYOND THE END OF THE ROUTE

The last record stored in the roadlog file for the donor route has a key less than or equal to donor end-ref and the donor format if B or D.

A6-008-x - ONE OR MORE OF THE ABOVE POSTS ARE OUT OF SEQUENCE

The reference posts are sorted by post number but one of the posts is at a location beyond the next higher-numbered post.

A6-009-x - GPLN UPDATE NOT PERFORMED - NEW GAP LENGTH IS NOT VALID

The computed new gap length is less than or equal to zero or greater than 100 miles.

A6-010-x - CANNOT COMPUTE GAP LENGTH - REFERENCE POST xxx NOT SPECIFIED

The donor route is complex but reference post xxx is not present in the true mileage file. "xxx" is the post referred to by the roadlog record immediatedly following the gap.

A6-011-x - UPDATE CODE IS GPDL AND FORMAT IS E BUT GAP ENDS AT
xxx+xx.xxx
xxx+xx.xxx must be of the format 000+nn.nnn for format E.

A6-015-x - FIRST CARD FOR THIS TRANSAXTION IS NOT A DONOR CARD

Every transaction (ie., all input records with the same unique transaction number) must have an update code of DNR in the first record.

A6-016-x - UPDATE CODE IN ERROR - xxxx

Valid update codes are: ABAN, CNEW, BCEG, CMID, CEND, TNEW, TMID, TBEG, TEND, XMEW, GPLN, GPAD, GPDL, and REMI.

A6-017-x - REFERENCE POST IN ERROR - xxx

EACH "x" must be a digit on post cards.

A6-018-x - REFERENCE POST SAME AS PRECEDING DATA CARD - xxx

Duplicate post numbers were specified on post cards within one transaction.

A6-019-x - DONOR FORMAT AND UPDATE CODE DISAGREE -x/xxxx

Each update code allows only certain donor formats -- see the documentation.

DONOR START-REF
A6-020-x - IN ERROR - xxxxxxxxxx
RECEPTOR END-REF

The specified field was not in the format "nnn+nn.nnn" where each "n" is a digit.

START-REF
A6-021-x - DONOR FORMAT AND DONOR DISAGREE - x/xxxxxxxxxx
END-REF

The donor format determines whether start-ref and/or end-ref should or should not be coded -- see the documentation.

START-REF
A6-022-x - UPDATE CODE AND DONOR DISAGREE - xxxx/xxxxxxxxxx
END-REF

The update code determines whether donor start-ref and/or end-ref should or should not be coded -- see the documentation.

A6-023-x - DONOR START-REF AND DONOR END-REF DISAGREE - xxxxxxxxxx/xxxxxxxxxx

The donor end-ref must be greater than donor start-ref.

A6-024-x - RECEPTOR CARD SHOULD NOT BE USED WITH UPDATE CODE xxxx

Receptor cards must not be included with donor update code of ABAN, CPLN, GPDL, GPAD, or REMI.

A6-025-x - UPDATE CODE AND RECEPTOR FORMAT DISAGREE - xxxx/x

The donor card update code determines which receptor formats are acceptable -- see the documentation.

A6-026-x - RECEPTOR ROUTE SYSTEM IN ERROR - xx

The route system must be 01-20 or 23.

A6-027-x - RECEPTOR ROUTE NUMBER IN ERROR - xx xxxxxxxx

The route number must be in the format nnnnnnnx where each "n" is a digit. The route number must also follow rules depending on which route system is coded -- see the data coding manual.

A6-028-x - RECEPTOR END-REF SHOULD NOT BE CODED

The receptor end-ref should be left blank with certain donor and/or receptor formats -- see the documentation.

A6-029-x - UPDATE CODE, RECEPTOR RORMAT, AND RECEPTOR START-REF DISAGREE - xxxx/x/xxxxxxxxxx

The particular combination of update code and receptor format determine whether receptor start-ref should or should not be coded -- see the documentation.

A6-031-x - POST CARDS SHOULD NOT BE USED WITH UPDATE CODE xxxx

Post cards cannot be used with update codes ABAN, CNEW, CBEG, CMID, and CEND.

A6-032-x - POST CARDS ARE MISSING

Post cards are required for certain combinations of update codes and formats, either none were included or they did not specify acceptable locations -- see the documentation.

A6-033-x - DISTANCE FIELD OR POST CARD xxx IN ERROR - xxxxxx

The format is nnnnnn where each "n" is a digit.

A6-034-x - DIST-TYPE FIELD OF POST CARD xxx IN ERROR - x

The dist-type field must be either blank or X.

A6-035-x - EXISTING THEORETICAL FIELD OF POST CARD xxx IN ERROR - x

Allowable codes are blank, E, and T.

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A6-036-x - EFFECTIVE DATE FIELD OF POST CARD xxx IN ERROR - xxxxxx

The field must be blank or a 6-digit number in the format mmddyy which is a valid date.

A6-037-x - ONLY POST 000 IS ALLOWED FOR GPLN UPDATE CODE

One post card with post number 000 must be present with a GPLN update.

A6-038-x - UPDATE CODE IS xxxx BUT RECEPTOR ROUTE ALREADY EXISTS

The update code is CNEW, TNEW, or XNEW but records are stored in the roadlog file for the receptor route.

A6-039-x - UPDATE CODE IS xxxx BUT RECEPTOR ROUTE DOES NOT EXIST

The update code is CBEG, CMID, CEND, TBEG, TMID, or TEND but no records are stored in the roadlog file for the receptor route.

A6-040-x - UPDATE CODE IS xxxx BUT RECEPTOR ROUTE DOES NOT BEGIN WITH GAP

Update code CBEG or TBEG requires that the receptor route have a GP record stored at 000+00.000.

A6-041-x - UPDATE CODE IS xxxx BUT RECEPTOR ROUTE GAP IS TOO SHORT TO ACCEPT DONOR SECTION

The computed length of the receptor route gap must be equal to or greater than the length of the donor section. Update code is transfer.

A6-042-x - UPDATE CODE IS xxxx BUT RECEPTOR ROUTE DOES NOT CONTAIN GAP LONG ENOUGH TO ACCEPT DONOR SECTION

The gap in the receptor route is too short for the donor section. The update code is copy.

A6-043-x - UPDATE CODE IS xxxx BUT RECEPTOR ROUTE IS TOO LONG

The update code is CEND or TEND but the donor section begins before the end of the receptor route.

A6-044-x - RECEPTOR IS COMPLEX BUT NO POST CARDS ARE INCLUDED

Some transactions require post cards -- see the documentation.

A6-045-x - RECEPTOR REFERENCE POST xxx NOT FOUND IN TRUE MILEAGE
DONOR FILE

The receptor route is complex but post were missing in the true mileage file.

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A6-046-x - POST CARD xxx IS FOR POST THAT PRECEDES DONOR SECTION
FOLLOWS

Post cards should not be included for reference posts not referenced in the donor section.

A6-047-x - PLACEMENT OF POST xxx FALLS ONTO RECEPTOR SECTION

The new location of post xxx falls on the existing receptor route outside of the transferred section.

A6-048-x - NO POST CARD INCLUDED FOR POST xxx

The location of post xxx was required but not specified.

A6-049-x - POST CARDS SHOULD NOT BE INCLUDED WITH FIXED-LENGTH GAP

No true mileage updates are done with fixed-length gaps.

A6-050-x - DONOR EFFECTIVE DATE IN ERROR - xx/xx/xx

The effective date must be a valid date in the format mm/dd/yy.

A6-051-x - NO TRUE MILEAGE FOR ROUTE xx xxxxxxxx

The indicated route was a trunk highway but no records were stored in the true mileage file.

A6-052-x - WARNING - ACCIDENTS ALREADY STORED ON RECEPTOR SECTION

The ARS accident files already contained accidents for the receptor section -- these accidents may have improper locations.

A6-053-x - UNABLE TO COMPUTE NEW REFERENCE POINT FOR LOCATION xxxx.xxx

No reference post was available at a location less than or equal to the specified milepoint.

A6-054-x - DONOR END-REF MUST BE LESS THAN OR EQUAL TO R.P. AT END OF GAP

The receptor route gap must be long enough to allow the donor section to be copied.

A6-055-x - RECEPTOR FORMAT 1 BUT DONOR SECTION DOES NOT FIT GAP EXACTLY

Donor format 1 specifies that the starting and ending reference points of the donor section will match those of the receptor route gap.

A6-056-x - DUPLICATE TRANSACTIONS IN MFUWORK FILE

The MFUWORK file input to the command contains two or more transactions with the same transaction number.

A6-057-x - GAP OR COINCIDENCE IN SECTION

Gaps and coincident sections cannot be copied or transferred.

A6-059-x - DONOR END-REF BEFORE END OF ROUTE

Records were stored for this route with reference points beyond the coded END-REF.

A6-061-x - DONOR FORMAT C, BUT END-REF IS NOT LAST ON ROUTE

Records were stored for this route with reference points beyond the coded END-REF.

A6-063-x - RECEPTOR FORMAT 1, BUT NO EN RECORD AT START-REF

The receptor route does not have an EN record with the reference point indicated in receptor START-REF.

A6-065-x - DUPLICATE INTSECT KEY - ss nnnnnnnn rrr+rr.rrreee - INTERSECTION AT ss nnnnnnnn rrr+rr.rrreee TRANSACTION xxxx

The intersection multifile program could not move the intersection from the first key to the second key because a record already exists there. The indicated transaction should be looked into.

MESSAGES A7-001 THROUGH A7-999
****

A7-001-x - STATION RECORD NOT FOUND - ss/xxxxx

No record exists in the station file with the indicated rail system and station number (xxxxx). The message occurs when a railpoint record with rail system ss has the station number.

A7-003-x - SAMPLE JOB SETUP MEMBER mmmmmmmm NOT FOUND

The expected member was not found in the sample job setup library.

A7-013-x - KEY ERROR IN RTMDSR - FORMAT ERROR IN PASSED KEY - ssllrrr+r.rr

The indicated key contains a format error such as a non-numeric character in a numeric column. The correct format is:

1-2	"ss" -- Rail system
3-4	"ll" -- Line number
5-12	"rrr+r.rr" -- Reference point

A7-014-x - KEY ERROR IN RTMDSR - REFERENCE POST DOES NOT EXIST - ssllrrr+r.rr,ssllrrr+r.rr

The reference post (columns 5-12) field of the indicated key(s) refers to a reference post for which no record is stored in the rail true mileage file. See A7-013 for the format of a key.

A7-015-x - KEY ERROR IN RTMDSR - TRUE MILEAGE IS NEGATIVE - ssllrrr+r.rr,ssllrrr+r.rr

When the system computed the accumulated mileage from the beginning of the line to the reference point in the indicated key, a negative value was obtained (eg., a reference point such as 001-2.25). See A7-013 for the format of a key.

A7-016-x - KEY ERROR IN RTMDSR - KEYS ARE ON DIFFERENT LINES - ssllrrr+r.rr,ssllrrr+r.rr

When computing the distance between two reference points, it was discovered that the two reference points were on different lines. This message may indicate a file error (such as missing "EN" record in the railway file), or a programming error. See A7-013 for the format of the key fields.

A7-018-x - TRUE MILEAGE FOR KEY - key1 - IS GREATER THAN TRUE MILEAGE FOR KEY - key2

The reference point of key1 is not adjusted to the nearest preceeding post. Key1 precedes key2 in the file but key2 is closer to the start of the line.

A7-019-1 - INTERSECTION AT - key - MAY HAVE BEEN MODIFIED SIGNIFICANTLY ON mmm dd, 19yy.

The user has used the IGNORE-EFF-DATE parameter as opposed to the USE-EFF-DATE parameter. When the IGNORE-EFF-DATE parameter is used, an intersection WILL be selected EVEN if the intersection's effective date (INT.EFFECTIVE-DATE) is after END-DATE. An accident at an intersection WILL be selected EVEN if the accident occurred prior to the intersection's effective date (INT.EFFECTIVE-DATE). This is an informatory message to caution the user that the intersection may have been changed in the midst of the period specified by START-DATE and END-DATE.

A7-020-1 - INTERSECTION AT - key - HAS AN EFFECTIVE DATE OF mmm dd, 19yy. ACCIDENTS THAT OCCURRED BEFORE mmm dd, 19yy will not BE SELECTED.

The user has used the USE-EFF-DATE parameter as opposed to the IGNORE-EFF-DATE parameter. When the USE-EFF-DATE parameter is used, an accident at an intersection WIIL NOT be selected if the accident occurred prior to the intersection's effective date (INT.EFFECTIVE-DATE).

A7-021-1 - INTERSECTION AT - key - NOT SELECTED BECAUSE INTERSECTION'S EFFECTIVE DATE (mm/dd/yy) IS AFTER THE END DATE (mm/dd/yy).

The user has used the USE-EFF-DATE parameter as opposed to the IGNORE-EFF-DATE parameter. When the USE-EFF-DATE parameter is used, an intersection WILL NOT be selected if the intersection's effective date (INT.EFFECTIVE-DATE) is after END-DATE.

A P P E N D I X B

I B M J O B C O N T R O L L A N G U A G E S U M M A R Y

Introduction

This appendix contains a summary of the IBM JCL language used for controlling job execution.

The following list shows the types of JCL cards discussed in this appendix:

- JOB card
- JOBPARM card
- ROUTE card
- EXEC card
- DD card

The JOB Card

ALL JOB cards used with T.I.S. have the following basic format:

```
//jobname JOB account,name,CLASS=class
```

TSO users will usually use the following additional parameters on their JOB cards:

- NOTIFY=user-id
- MSGCLASS=class

MSGLEVEL=(level-1,level-2)

All of these parameters are discussed in chapter 3.

The following additional parameters will occasionally be of use to T.I.S. users:

COND=((code,operator),...)

- code = Return code 0-4095.

- operator = GT, GE, EQ, NE, LT, or LE (eg., GT = Greater than).

- COND is useful only with multi-step jobs, and allows subsequent steps to be bypassed if earlier steps do not run to normal completion.

  Example: //jobname JOB ...,COND=(7,LT)
            // EXEC step1
            // EXEC step2

  step2 is not executed if the return code from step1 is greater than 7 (ie., bypass step2 if 7 is less than the return code from step1).

- The T.I.S. return codes are:

```
   0  Successful run - No error messaages printed
   4  Successful run - One or more data edit check messages
                       printed
   8  Unsuccessful run - One or more level 7-9 messaages printed
  12  Unsuccessful run - Programming error in T.I.S.
```

16 Unsuccessful run - Error in user's command(s)

PRTY=priority

- priority = 0-13 (13 = highest priority)
- Check with ISB before attempting to utilize the priority parameter.

TIME=minutes
TIME=(minutes,seconds)

- Time is best coded on EXEC statements rather than JOB statements. If coded on the JOB statement, the time limit for any given step will be "n - m" where n is the value specified on the JOB statement and m is the amount of time already utilized by any preceding steps (if a value smaller than "n - m" is coded on the EXEC statement, the value will be used instead).

- Code TIME=1440 if the job is not to be timed.

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HOLD
TYPRUN = JCLHOLD
SCAN
COPY

- HOLD requests that the job be held for execution until the operates releases it (you must inform the operator when the job should be released).

- JCLHOLD is similar to HOLD, but further requests that JCL processing be held as well.

- SCAN requests that the JCL be checked for errors and that the job not be run.

- COPY requests that the input job control statements be copied directly to SYSOUT (either a printer or as punched cards) to the

SYSOUT class specified in MSGCLASS. The job itself is not run.

The JOBPARM Card

Most T.I.S. users will utilize only the ROOM and LINES parameters of JOBPARM. These are discussed in chapter 3. Other parameters available on JOBPARM are:

CARDS=nnn C=nnn	Speciafies estimate of maximum number of output punched cards (nnn = 0-9999999).
COPIES=nnn N=nnn	Specifies number of copies of printed output. When coded on JOBPARM, COPIES applies to ALL printed output of the job. nnn - 1-255.
LINES=nnn L=nnn	Specifies estimate of maximum number of printed lines in thousands that will be produced by the job (nnn = 0-9999 and defaults to 5).
NOLOG J	Specifies that no JES2 job log will be produced. The job log contains a list of all messages written to the operator that relate to your job as well as any operator replies.
PROCLIB=xxx P=xxx	Specifies DDNAME to be used for the cataloged procedure library (xxx must be the name of a DD statement in the JES2 cataloged procedure).
ROOM=xxxx R=xxxx	Specifies your room number. This value is shown on all printed output so that the output can be delivered correctly. Suggested use is Rnnn where "nnn" is the user's room number.

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The MESSAGE Card

The MESSAGE card allows you to send a message to the operator. The message is sent at the time you job is read into the computer. The format of the MESSAGE card is:

```
/*MESSAGE  message to be sent to operator.
```

Leave two blanks after /*MESSAGE. Code the message in columns 12-71.

The ROUTE card

The ROUTE card controls the routing of printed output (ie., to either ISB's central line printers or to an RJE terminal).

When routing output to an RJE terminal, all output should be identified as SYSOUT=A on the DD statements.

The ROUTE card does not apply to TSO output (SYSOUT=2).

The format of the ROUTE card is:

```
/*ROUTE  PRINT Rn
```

- Leave two blanks between /*ROUTE and PRINT, and leave one blank between PRINT and Rn.
- Rn is R0 to route to Intertech's line printers. REDUCE is the laser printer, 8.5 by 11 inch paper.
- R0 can be replaced by LOCAL (/*ROUTE PRINT LOCAL).

The EXEC Card

The EXEC card has the following basic formats:

```
//stepname EXEC PGM=pgm-name,...

//stepname EXEC PROC=proc-name,...

//stepname EXEC proc-name,...
```

- stepname is optional. If omitted, leave one or more blanks between // and EXEC.
- When PGM=pgm-name is used, a specific program is named and will be run. All DD statements needed by the named program must be included with the job setup.
- When proc-name or PROC=proc-name is used, a cataloged procedure is named. The cataloged procedure consists of one or more job steps, and can supply some or all of the DD statements needed by the step(s).
- The "proc-name" form is used within T.I.S. (//TIS EXEC DTRIT,...).

The following parameters are the EXEC statement parameters:

COND
PARM
TIME

In general, parameters other than these that you place on your EXEC statement are not EXEC statement parameters, but are parameters that allow you to override items in the cataloged procedure (eg., DTRIT) that you are using.

The TIME parameter is discussed in chapter 3. The PARM parameter is used to pass parameters to the program(s) being run, and is not used directly by users of T.I.S. The remaining EXEC card parameter is COND:

```
COND=(code,operator)
                                    EVEN
COND=((code,operator,stepname),..., ONLY )
                                                 EVEN
COND=((code,operator,stepname.procstepname),..., ONLY )
```

- code = 0-4095.
- operator = GT, GE, EQ, LT, LE, NE (eg., EQ = equal).
- stepname = Name of a preceding step whose return code is to be tested.
- procstepname = Name of a step in a preceding cataloged procedure.
- EVEN = Step is to run even if a preceding step has abended.
- ONLY = Step is to run only if a preceding step has abended.

- Example:

```
//jobname JOB ...
//STEP1 EXEC DTRIT,...

    .
    .
    .

//STEP2 EXEC DTRIT,...,COND=((7,LT,STEP1.TIS))

    .
    .
    .
```

If 7 is less than the return code of step1 (ie., the return code of step1 is 8 or larger), step2 is bypassed.

DD Cards - Printed Output

DD cards for printed output have the general format

```
//ddname DD SYSOUT=class
```

- ddname is specified internally in the software, and must be coded in conformity with the program's expectations.

The parameters of the DD cards are:

COPIES=nnn	Specifies number of copies being produced (nnn = 1-255 and defaults to 1).
DEST=R0	Specifies routing to Intertech's line printers.
OUTLIM=nnn	Specifies maximum number of lines that will be printed (1-16777215). If the coded limit is reached, the job will be terminated.
SYSOUT=(class,,form) SYSOUT=class	SYSOUT is discussed in chapters 3 and 4.

DD Cards - Existing Disk or Tape Files

For an existing CATALOGED disk or tape file, the following DD statement is used for data retrieval:

```
//ddname DD DISP=disp,DSNAME=dsname
```

- DISP=SHR specifies that other jobs can share the file (read-only access will be used).
- DISP=OLD specifies that exclusive control is needed.
- DISP=MOD specifies that the file will be extended.
- dsname is the name under which the file is cataloged.

- Note: DISP=SHR is equivalent to DISP=OLD for tape files.

For an uncataloged disk file, the following parameters must be added:

- UNIT=SYSDA
- VOL=SER=serial

    - serial provides the disk's volume serial number.

For an uncataloged tape file or for a tape from outside ISB's tape library, contact ISB for assistance.

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To read a tape produced in keypunching (KDTAPE), use the following:

```
//ddname DD DISP=OLD,UNIT=TAPE,VOL=SER=KDnnn,LABEL=(,NL),
//          DCB=(RECFM=FB,LRECL=80,BLKSIZE=800)
```

- VOL=SER=KDnnn specifies the serial number of the KD-tape. If several tapes must be inputed, use VOL=SER=(KDnnn, KDnnn,...).

DD Cards - New Disk Files
****

To allocate a new disk file that is to be retained only for the duration of this job step, use the following DD statement:

```
//ddname DD UNIT=SYSDA,SPACE=(type,num),DCB=(dcb-attributes)
```

- SPACE has two formats:

    SPACE=(type,num)
    SPACE=(type,(num,nums))

    type specifies the type of units allocated (TRK=tracks, CYL=cylinders). A cylinder consists os 19 tracks on 3330 disk packs.

    num is the primary quantity allocated. nums is a secondary quantity that will be allocated should num be insufficient (if numbs is not coded, the job will terminate if num is insufficient). Up to 15 allocations of nums size may take place if the allocated disk pack has

sufficient space.

For ISAM files, numbs cannot be coded.

- DCB needs to be included only if the program does not specify DCB attributes internally.

To pass the file to a subsequent job step, add the parameter DISP=(NEW,PASS).

To keep the file without cataloging it, add the parameters DISP=(NEW,KEEP), DSNAME=dsname, and VOL=SER=serial.

To keep and catalog the file, add the parameters DISP=(NEW,CATLG) and DSNAME=dsname. VOL=SER=serial should be added if the file is to be placed on a particular disk pack.

Unless ISB assigns you a disk pack serial number for a file, any kept or cataloged files will be automatically deleted by the computer after one week.

DD Cards - New Tape Files

When adding a file to ISB's tape system, use the following DD statement.

```
//ddname DD UNIT=TAPE,DSNAME=dsname,LABEL=EXPDT=99000,
//          DISP=(NEW,CATLG),DCB=(dcb-attributes)
```

- DCB must be included if the program does not provide DCB attributes internally.
- LABEL=EXPDT=99000 specifies that the file will be kept indefinitely. Alternatively, you can specify an expiration date yyddd where yy is the year of expiration and ddd is the julian day.

Obtain help from ISB when preparing tapes for removal from the computing center.

DD Cards - Deleting Files

To delete a cataloged file, use the following DD statement:

```
//ddname DD DISP=(OLD,DELETE),DSNAME=dsname
```

If the file is not cataloged, include UNIT and VOL=SER parameters (disk files). For uncataloged tape files, obtain help from ISB.

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Cataloged Procedures

TIS jobs can run under several different cataloged procedures, depending on where the job is submitted (cards or from terminal), and what type of commands are included. The procedures currently available are:

Procedure	Usage in TIS
DTRIB	Commands submitted from card decks. Can be used for any command not requiring accident, railway, or pavement data.
DTRIBA	Commands submitted from card decks. Same as DTRIB except accident data is provided here.

DTRIC	Control section file commands. Terminal submittal only.
DTRIH	HPMS commands. Terminal submittal only.
DTRIMIN	Basic DD statements required for non-railway commands. DD statements must be added for ANY TIS files needed. Terminal submittal only.
DTRIPGF	Graphics data commands. Terminal submittal only.
DTRIPM	Pavement file commands. Terminal submittal only.
DTRIRB	Commands submitted from card decks requiring railway data.
DTRIRR	Commands requiring railway, grade crossing, and/or accident data. Terminal submittal only.
DTRIRT	Commands requiring grade crossing and accident data. Terminal submittal only.
DTRIT	Commands submitted from a terminal. Can be used for any command not requiring accident, railway, or pavement data.
DTRITA	Commands submitted from a terminal. Same as DTRIT except accident data is provided here.

The basic difference between a procedure used for submitting jobs from a TSO terminal and one used for submitting jobs from card decks is the DD statement:

```
//TSO      DD SYSOUT=2,DCB=(BLKSIZE=132,LRECL=132,RECFM=FA)
```

is present for output to the terminal (any DD statement with SYSOUT=2 goes to the terminal).

The basic differences in procedures providing access to accident files is:

- DISPACC=SHR is included on the PROC statement.

- The following DD statements appear after the XREFCNTY DD statement:

```
//ACCIDENT   DD DISP=&DISPACC,DSNAME=TRN.RI16ACDP
```

Every command shows which procedure to use in the sample job setup. Note that DTRIB and DTRIT are interchangeable, depending on whether you are sitting at a terminal or not. The same is true for DTRIBA/DTRITA.

The DTRIT Cataloged Procedure

DTRIT contains the following JCL statements:

```
//DTRIT  PROC OUTFILE=,PRINTDD=TSO,S=,D=,SYSIN=,DUMP=,COPIES=1,
//            FORM='(A)',SCRTYPE=CYL,SCRSIZE=1,
//            DISPTRM=SHR,DISPRLG=SHR,DISPXRF=SHR,DISPTBL=SHR,
//            DISPSEC=SHR,DISPBDG=SHR,DISPRGC=SHR,DISPRDH=SHR,
//            DISPCIT=SHR,DISPCOF=SHR,DISPTRF=SHR,DISPINT=SHR,
//            DISPSUF=SHR
//DTRIT EXEC PGM=DTRI0110,
//  PARM='OF=&OUTFILE,PDD=&PRINTDD,S=&S,D=&D,DUMP=&DUMP,SYSIN=&SYSIN'
//STEPLIB  DD DISP=SHR,DSNAME=MHD.JOBLIB02
//         DD DISP=SHR,DSNAME=SYS1.PLILINK
//         DD DISP=SHR,DSNAME=ISD.UTILIB
//SYSPRINT DD SYSOUT=*
//DIAGNOST DD SYSOUT=*,DCB=(BLKSIZE=1320,LRECL=132,RECFM=FBA)
//PRINTER  DD SYSOUT=&FORM,DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA),
//            COPIES=&COPIES
//TSO      DD SYSOUT=2,DCB=(BLKSIZE=132,LRECL=132,RECFM=FA)
//SYSOUT   DD DUMMY
//PLIDUMP  DD SYSOUT=*
//MINIDUMP DD SYSOUT=*
//$ORTPARM DD DISP=SHR,DSN=TRN.RI00SYSU(SORTPARM)
//USAGE    DD DISP=SHR,DSN=TRN.RI00USES
//USERS    DD DISP=SHR,DSN=TRN.RI00USER
//INSTRCT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//DECRTE   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//PROUTES  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//DECSEL   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//TITLES   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
```

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```
        //REDEFINE DD UNIT=SYSDA,SPACE=(TRK,(1,1))
        //BREAKS   DD UNIT=SYSDA,SPACE=(TRK,(1,1))
        //DECSORT  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
        //SCRATCH1 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH2 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH3 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH4 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH5 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH6 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SORTIN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SORTOUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SORTWK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
        //SORTWK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
        //SORTWK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
        //TABLES   DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
        //TABLESO  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
        //TABLESD  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
        //CODELIST DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSC
        //CITYTBL  DD DISP=&DISPCIT,DSNAME=TRN.RI09CITP
        //ROADLOG  DD DISP=&DISPRLG,DSNAME=TRN.RI09RLGP
        //LOGPNT   DD DISP=&DISPRLG,DSNAME=TRN.RI09LPTP
        //TRUMILE  DD DISP=&DISPTRM,DSNAME=TRN.RI13TRMP
        //ROADDATA DD DISP=&DISPRDH,DSNAME=TRN.RI41RDHP
        //COINFILE DD DISP=&DISPCOF,DSNAME=TRN.RI09COFP
        //TRAFFIC  DD DISP=&DISPTRF,DSNAME=TRN.RI42TRFP
        //INTSECT  DD DISP=&DISPINT,DSNAME=TRN.RI15INTP
        //SECTIONS DD DISP=&DISPSEC,DSNAME=TRN.RI15SECP
        //BRIDGE   DD DISP=&DISPBDG,DSNAME=TRN.RI20BDGP
        //BDGXREF  DD DISP=&DISPBDG,DSNAME=TRN.RI20XBRP
        //CROSSING DD DISP=&DISPRGC,DSNAME=TRN.RI22RGCP
        //RGCXREF  DD DISP=&DISPRGC,DSNAME=TRN.RI22XRGP
        //XREFINT  DD DISP=&DISPINT,DSNAME=TRN.RI15XINP
        //TOWNSHIP DD DISP=&DISPXRF,DSNAME=TRN.RI09TWNP
        //SUFFFILE DD DISP=&DISPSUF,DSNAME=TRN.RI48SUFP
        //HAZARDS  DD DISP=&DISPSUF,DSNAME=TRN.RI48SUHP
        //XREFSTRT DD DISP=&DISPXRF,DSNAME=TRN.RI09STRP
        //XREFPTRL DD DISP=&DISPXRF,DSNAME=TRN.RI09XPTP
        //XREFCDIS DD DISP=&DISPXRF,DSNAME=TRN.RI09XCDP
        //XREFMNT  DD DISP=&DISPXRF,DSNAME=TRN.RI09XMNP
        //XREFCITY DD DISP=&DISPXRF,DSNAME=TRN.RI09XCIP
        //XREFCNTY DD DISP=&DISPXRF,DSNAME=TRN.RI09XCNP
        //XCSFILE  DD DISP=&DISPXRF,DSNAME=TRN.RI26XCSP
```

Notes:

Sorts could be made more efficient by adding additional SORTWKnn DD statements to the procedure. This has not been done to date because (1) most TIS runs do not require sorts so that additional disk space allocated would be wasted, and (2) most sorts that are performed are for fairly few records so that additional scratch space would not greatly improve efficiency. If, at some point in the future, additional SORTWKnn DD statements are added, DO NOT overlay them with SCRATCH4 or SCRATCH5 or SCRATCH6 in the same manner as SORTWK01-03 are overlaid with SCRATCH1-3 since SCRATCH4-6 are used independently by some programs.

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DTRIT is used with a large number of different application programs (all TIS programs except those that use accident railway, or pavement files). The advantages to this approach are:

Implementation of each new command is simplified since no cataloged procedure has to be added.

When a change is made that necessitates a JCL change to cataloged procedures, only a few procedures need to be updated.

The disadvantages are:

For most TIS runs, files that are not actually needed for the run are allocated. If a file is being updated by another job, a job could be delayed even though it does not utilize that file.

- A number of scratch files are included in the cataloged procedure and are allocated for each TIS run. For most runs, some or all of these scratch files are used -- but often, some are not.

Because of these disadvantages, it may become necessary at some point in the future to install tailored procedures for some (or all) of the TIS application programs. For a given program, a tailored procedure can be created by following these steps:

- Always include the following DD statement: STEPLIB (with its concatenations), SYSPRINT, DIAGNOST, PRINTER, SYSOUT, PLIDUMP, MINIDUMP, INSTRCT, TITLES, TABLES, TABLESO, TABLESD, CITYTBL.

- If +ROUTES will be used, include the following DD statements:

DECRTE, PROUTES, SCRATCH1-3, SORTIN, SORTOUT, SORTWK01-3,
XREFPTRL, XREFCDIS, XREFMNT, XREFCITY, XREFCNTY.

- If +SELECT will be used, include DECSEL.

- If +CATEGORIES will be used, include REDEFINE and BREAKS.

- If any sorts will be performed, include SCRATCH1-3, SORTIN,
SORTOUT, SORTWK01-3.

- Include DD statements for all programs that will be run under the
procedure. This is difficult to determine, but the Programming
Details manual explains how to find out (decoder table DECDD).
Ask system maintenance personnel for assistance.

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The DTRIB Cataloged Procedure

DTRIB contains the following JCL statements:

```
//DTRIB  PROC OUTFILE=,PRINTDD=PRINTER,S=,D=,SYSIN=,DUMP=,COPIES=1,
//            FORM=A,DIAG=A,SCRTYPE=CYL,SCRSIZE=1,
//            DISPTRM=SHR,DISPRLG=SHR,DISPXRF=SHR,DISPTBL=SHR,
//            DISPSEC=SHR,DISPBDG=SHR,DISPRGC=SHR,DISPRDH=SHR,
//            DISPCIT=SHR,DISPCOF=SHR,DISPTRF=SHR,DISPINT=SHR
//DTRIB EXEC PGM=DTRI0110,
//  PARM='OF=&OUTFILE,PDD=&PRINTDD,S=&S,D=&D,DUMP=&DUMP,SYSIN=&SYSIN'
//STEPLIB  DD DISP=SHR,DSNAME=MHD.JOBLIB02
//         DD DISP=SHR,DSNAME=SYS1.PLILINK
//         DD DISP=SHR,DSNAME=ISD.UTILIB
//SYSPRINT DD SYSOUT=A
//DIAGNOST DD SYSOUT=&DIAG,DCB=(BLKSIZE=1320,LRECL=132,RECFM=FBA)
//PRINTER  DD SYSOUT=&FORM,DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA),
//            COPIES=&COPIES
//SYSOUT   DD DUMMY
//PLIDUMP  DD SYSOUT=A
//MINIDUMP DD SYSOUT=A
//$ORTPARM DD DISP=SHR,DSN=TRN.RI00SYSU(SORTPARM)
```

```
        //USAGE    DD DISP=SHR,DSN=TRN.RI00USES
        //USERS    DD DISP=SHR,DSN=TRN.RI00USER
        //INSTRCT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
        //DECRTE   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
        //PROUTES  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
        //DECSEL   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
        //TITLES   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
        //REDEFINE DD UNIT=SYSDA,SPACE=(TRK,(1,1))
        //BREAKS   DD UNIT=SYSDA,SPACE=(TRK,(1,1))
        //DECSORT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
        //SCRATCH1 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH2 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH3 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH4 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH5 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH6 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SORTIN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SORTOUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SORTWK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
        //SORTWK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
        //SORTWK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
        //TABLES   DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
        //TABLESO  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
        //TABLESD  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
        //CODELIST DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSC
        //CITYTBL  DD DISP=&DISPCIT,DSNAME=TRN.RI09CITP
        //ROADLOG  DD DISP=&DISPRLG,DSNAME=TRN.RI09RLGP
        //LOGPNT   DD DISP=&DISPRLG,DSNAME=TRN.RI09LPTP
        //TRUMILE  DD DISP=&DISPTRM,DSNAME=TRN.RI13TRMP
        //ROADDATA DD DISP=&DISPRDH,DSNAME=TRN.RI41RDHP
        //COINFILE DD DISP=&DISPCOF,DSNAME=TRN.RI09COFP
        //TRAFFIC  DD DISP=&DISPTRF,DSNAME=TRN.RI42TRFP
```

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```
        //INTSECT  DD DISP=&DISPINT,DSNAME=TRN.RI15INTP
        //SECTIONS DD DISP=&DISPSEC,DSNAME=TRN.RI15SECP
        //BRIDGE   DD DISP=&DISPBDG,DSNAME=TRN.RI20BDGP
        //BDGXREF  DD DISP=&DISPBDG,DSNAME=TRN.RI20XBRP
        //CROSSING DD DISP=&DISPRGC,DSNAME=TRN.RI22RGCP
        //RGCXREF  DD DISP=&DISPRGC,DSNAME=TRN.RI22XRGP
        //XREFINT  DD DISP=&DISPINT,DSNAME=TRN.RI15XINP
        //TOWNSHIP DD DISP=&DISPXRF,DSNAME=TRN.RI09TWNP
        //XREFSTRT DD DISP=&DISPXRF,DSNAME=TRN.RI09STRP
        //XREFPTRL DD DISP=&DISPXRF,DSNAME=TRN.RI09XPTP
```

```
//XREFCDIS DD DISP=&DISPXRF,DSNAME=TRN.RI09XCDP
//XREFMNT  DD DISP=&DISPXRF,DSNAME=TRN.RI09XMNP
//XREFCITY DD DISP=&DISPXRF,DSNAME=TRN.RI09XCIP
//XREFCNTY DD DISP=&DISPXRF,DSNAME=TRN.RI09XCNP
//XCSFILE  DD DISP=&DISPXRF,DSNAME=TRN.RI26XCSP
```

The DTRIBA Cataloged Procedure

DTRIBA contains the following JCL statements:

```
//DTRIBA PROC OUTFILE=,PRINTDD=PRINTER,S=,D=,SYSIN=,DUMP=,COPIES=1,
//            FORM=A,DIAG=A,SCRTYPE=CYL,SCRSIZE=1,DISPRDH=SHR,
//            DISPTRM=SHR,DISPRLG=SHR,DISPXRF=SHR,DISPTBL=SHR,
//            DISPCIT=SHR,DISPCOF=SHR,DISPACC=SHR,DISPTRF=SHR,
//            DISPINT=SHR,DISPSEC=SHR,DISPBDG=SHR,DISPRGC=SHR
//DTRIBA EXEC PGM=DTRI0110,
//  PARM='OF=&OUTFILE,PDD=&PRINTDD,S=&S,D=&D,DUMP=&DUMP,SYSIN=&SYSIN'
//STEPLIB  DD DISP=SHR,DSNAME=MHD.JOBLIB02
//         DD DISP=SHR,DSNAME=SYS1.PLILINK
//         DD DISP=SHR,DSNAME=ISD.UTILIB
//SYSPRINT DD SYSOUT=A
//DIAGNOST DD SYSOUT=&DIAG,DCB=(BLKSIZE=1320,LRECL=132,RECFM=FBA)
//PRINTER  DD SYSOUT=&FORM,DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA),
//            COPIES=&COPIES
//SYSOUT   DD DUMMY
//PLIDUMP  DD SYSOUT=A
//MINIDUMP DD SYSOUT=A
//$ORTPARM DD DISP=SHR,DSN=TRN.RI00SYSU(SORTPARM)
//USAGE    DD DISP=SHR,DSN=TRN.RI00USES
//USERS    DD DISP=SHR,DSN=TRN.RI00USER
//INSTRCT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//DECRTE   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//PROUTES  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//DECSEL   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//TITLES   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//REDEFINE DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//BREAKS   DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//AGGREGAT DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//DECSORT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
```

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```
//SCRATCH1 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH2 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH3 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH4 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH5 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH6 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTIN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTOUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTWK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
//SORTWK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
//SORTWK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
//TABLES   DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//TABLESO  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//TABLESD  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//CODELIST DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSC
//CITYTBL  DD DISP=&DISPCIT,DSNAME=TRN.RI09CITP
//ROADLOG  DD DISP=&DISPRLG,DSNAME=TRN.RI09RLGP
//LOGPNT   DD DISP=&DISPRLG,DSNAME=TRN.RI09LPTP
//TRUMILE  DD DISP=&DISPTRM,DSNAME=TRN.RI13TRMP
//ROADDATA DD DISP=&DISPRDH,DSNAME=TRN.RI41RDHP
//CROSS    DD DISP=&DISPRDH,DSNAME=TRN.RI41RDXP
//TRAFFIC  DD DISP=&DISPTRF,DSNAME=TRN.RI42TRFP
//COINFILE DD DISP=&DISPCOF,DSNAME=TRN.RI09COFP
//INTSECT  DD DISP=&DISPINT,DSNAME=TRN.RI15INTP
//SECTIONS DD DISP=&DISPSEC,DSNAME=TRN.RI15SECP
//BRIDGE   DD DISP=&DISPBDG,DSNAME=TRN.RI20BDGP
//BDGXREF  DD DISP=&DISPBDG,DSNAME=TRN.RI20XBRP
//CROSSING DD DISP=&DISPRGC,DSNAME=TRN.RI22RGCP
//RGCXREF  DD DISP=&DISPRGC,DSNAME=TRN.RI22XRGP
//XREFINT  DD DISP=&DISPINT,DSNAME=TRN.RI15XINP
//TOWNSHIP DD DISP=&DISPXRF,DSNAME=TRN.RI09TWNP
//XREFSTRT DD DISP=&DISPXRF,DSNAME=TRN.RI09STRP
//XREFPTRL DD DISP=&DISPXRF,DSNAME=TRN.RI09XPTP
//XREFCDIS DD DISP=&DISPXRF,DSNAME=TRN.RI09XCDP
//XREFMNT  DD DISP=&DISPXRF,DSNAME=TRN.RI09XMNP
//XREFCITY DD DISP=&DISPXRF,DSNAME=TRN.RI09XCIP
//XREFCNTY DD DISP=&DISPXRF,DSNAME=TRN.RI09XCNP
//XCSFILE  DD DISP=&DISPXRF,DSNAME=TRN.RI26XCSP
//ACCIDENT DD DISP=&DISPACC,DSNAME=TRN.RI16ACDP
```

The DTRIC Cataloged Procedure

```
//DTRIC  PROC OUTFILE=,PRINTDD=TSO,S=,D=,SYSIN=,DUMP=,COPIES=1,
//            FORM='(A)',SCRTYPE=CYL,SCRSIZE=1,
//            DISPTBL=SHR,DISPCSN=SHR
//TIS EXEC PGM=DTRI0110,
```

```
        //  PARM='OF=&OUTFILE,PDD=&PRINTDD,S=&S,D=&D,DUMP=&DUMP,SYSIN=&SYSIN'
        //STEPLIB  DD DISP=SHR,DSNAME=MHD.JOBLIB02
        //         DD DISP=SHR,DSNAME=SYS1.PLILINK
        //         DD DISP=SHR,DSNAME=ISD.UTILIB
        //SYSPRINT DD SYSOUT=*
        //DIAGNOST DD SYSOUT=*,DCB=(BLKSIZE=1320,LRECL=132,RECFM=FBA)

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        //PRINTER  DD SYSOUT=&FORM,DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA),
        //            COPIES=&COPIES
        //TSO      DD SYSOUT=2,DCB=(BLKSIZE=132,LRECL=132,RECFM=FA)
        //SYSOUT   DD DUMMY
        //PLIDUMP  DD SYSOUT=*
        //MINIDUMP DD SYSOUT=*
        //$ORTPARM DD DISP=SHR,DSN=TRN.RI00SYSU(SORTPARM)
        //USAGE    DD DISP=SHR,DSN=TRN.RI00USES
        //USERS    DD DISP=SHR,DSN=TRN.RI00USER
        //INSTRCT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
        //DECRTE   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
        //PROUTES  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
        //DECSEL   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
        //TITLES   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
        //REDEFINE DD UNIT=SYSDA,SPACE=(TRK,(1,1))
        //BREAKS   DD UNIT=SYSDA,SPACE=(TRK,(1,1))
        //DECSORT  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
        //SCRATCH1 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH2 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH3 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH4 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH5 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH6 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SORTIN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SORTOUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SORTWK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
        //SORTWK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
        //SORTWK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
        //TABLES   DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
        //TABLESO  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
        //TABLESD  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
        //CODELIST DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSC
        //ROADLOG  DD DISP=SHR,DSNAME=TRN.RI09RLGP
        //LOGPNT   DD DISP=SHR,DSNAME=TRN.RI09LPTP
        //TRUMILE  DD DISP=SHR,DSNAME=TRN.RI13TRMP
        //NOTES    DD DISP=&DISPCSN,DSNAME=TRN.RI26CSNP
```

```
        //XREFPTRL DD DISP=SHR,DSNAME=TRN.RI09XPTP
        //XREFCDIS DD DISP=SHR,DSNAME=TRN.RI09XCDP
        //XREFMNT  DD DISP=SHR,DSNAME=TRN.RI09XMNP
        //XREFCITY DD DISP=SHR,DSNAME=TRN.RI09XCIP
        //XREFCNTY DD DISP=SHR,DSNAME=TRN.RI09XCNP
```


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The DTRIH Cataloged Procedure

DTRIH contains the following JCL statements:

```
        //DTRIH  PROC OUTFILE=,PRINTDD=TSO,S=,D=,SYSIN=,DUMP=,COPIES=1,
        //            FORM='(A)',SCRTYPE=CYL,SCRSIZE=1,
        //            DISPTRM=SHR,DISPRLG=SHR,DISPXRF=SHR,DISPTBL=SHR,
        //            DISPCIT=SHR,DISPACC=SHR,DISPTRF=SHR
        //DTRIH EXEC PGM=DTRI0110,
        //  PARM='OF=&OUTFILE,PDD=&PRINTDD,S=&S,D=&D,DUMP=&DUMP,SYSIN=&SYSIN'
        //STEPLIB  DD DISP=SHR,DSNAME=MHD.JOBLIB02
        //         DD DISP=SHR,DSNAME=SYS1.PLILINK
        //         DD DISP=SHR,DSNAME=ISD.UTILIB
        //SYSPRINT DD SYSOUT=*
        //DIAGNOST DD SYSOUT=*,DCB=(BLKSIZE=1320,LRECL=132,RECFM=FBA)
        //PRINTER  DD SYSOUT=&FORM,DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA),
        //            COPIES=&COPIES
        //TSO      DD SYSOUT=*,DCB=(BLKSIZE=132,LRECL=132,RECFM=FA)
        //SYSOUT   DD DUMMY
        //PLIDUMP  DD SYSOUT=*
        //MINIDUMP DD SYSOUT=*
        //$ORTPARM DD DISP=SHR,DSN=TRN.RI00SYSU(SORTPARM)
        //USAGE    DD DISP=SHR,DSN=TRN.RI00USES
        //USERS    DD DISP=SHR,DSN=TRN.RI00USER
        //INSTRCT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
```

```
//DECRTE   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//PROUTES  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//DECSEL   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//TITLES   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//REDEFINE DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//BREAKS   DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//DECSORT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//SCRATCH1 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH2 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH3 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH4 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH5 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH6 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTIN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTOUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTWK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
//SORTWK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
//SORTWK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
//SRT2IN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SRT2OUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SRT2WK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
//SRT2WK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
//SRT2WK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
//TABLES   DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//TABLESO  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//TABLESD  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
```

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```
//CODELIST DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSC
//CITYTBL  DD DISP=&DISPCIT,DSNAME=TRN.RI09CITP
//ROADLOG  DD DISP=&DISPRLG,DSNAME=TRN.RI09RLGP
//LOGPNT   DD DISP=&DISPRLG,DSNAME=TRN.RI09LPTP
//TRUMILE  DD DISP=&DISPTRM,DSNAME=TRN.RI13TRMP
//TRAFFIC  DD DISP=&DISPTRF,DSNAME=TRN.RI42TRFP
//XREFSTRT DD DISP=&DISPXRF,DSNAME=TRN.RI09STRP
//XREFPTRL DD DISP=&DISPXRF,DSNAME=TRN.RI09XPTP
//XREFCDIS DD DISP=&DISPXRF,DSNAME=TRN.RI09XCDP
//XREFMNT  DD DISP=&DISPXRF,DSNAME=TRN.RI09XMNP
//XREFCITY DD DISP=&DISPXRF,DSNAME=TRN.RI09XCIP
//XREFCNTY DD DISP=&DISPXRF,DSNAME=TRN.RI09XCNP
//ACCIDENT DD DISP=&DISPACC,DSNAME=TRN.RI16ACDP
//BRIDGE   DD DISP=SHR,DSNAME=TRN.RI20BDGP
```

```
//BDGXREF  DD DISP=SHR,DSNAME=TRN.RI20XBRP
//CROSSING DD DISP=SHR,DSNAME=TRN.RI22RGCP
//RGCXREF  DD DISP=SHR,DSNAME=TRN.RI22XRGP
```

The DTRIMIN Cataloged Procedure

DTRIMIN contains the following JCL statements:

```
//DTRIMIN  PROC OUTFILE=,PRINTDD=TSO,S=,D=,SYSIN=,DUMP=,COPIES=1,
//            FORM='(A)',SCRTYPE=CYL,SCRSIZE=1,
//            DISPTBL=SHR,DISPCIT=SHR
//TIS EXEC PGM=DTRI0110,
//  PARM='OF=&OUTFILE,PDD=&PRINTDD,S=&S,D=&D,DUMP=&DUMP,SYSIN=&SYSIN'
//STEPLIB  DD DISP=SHR,DSNAME=MHD.JOBLIB02
//         DD DISP=SHR,DSNAME=SYS1.PLILINK
//         DD DISP=SHR,DSNAME=ISD.UTILIB
//SYSPRINT DD SYSOUT=*
//DIAGNOST DD SYSOUT=*,DCB=(BLKSIZE=1320,LRECL=132,RECFM=FBA)
//PRINTER  DD SYSOUT=&FORM,DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA),
//            COPIES=&COPIES
//TSO      DD SYSOUT=*,DCB=(BLKSIZE=132,LRECL=132,RECFM=FA)
//SYSOUT   DD DUMMY
//PLIDUMP  DD SYSOUT=*
//MINIDUMP DD SYSOUT=*
//$ORTPARM DD DISP=SHR,DSN=TRN.RI00SYSU(SORTPARM)
//USAGE    DD DISP=SHR,DSN=TRN.RI00USES
//USERS    DD DISP=SHR,DSN=TRN.RI00USER
//INSTRCT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//DECRTE   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//PROUTES  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//DECSEL   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//TITLES   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//REDEFINE DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//BREAKS   DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//DECSORT  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
```

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```
//SCRATCH1 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH2 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH3 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
```

```
//SCRATCH4 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH5 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH6 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTIN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTOUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTWK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
//SORTWK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
//SORTWK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
//SRT2IN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SRT2OUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SRT2WK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
//SRT2WK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
//SRT2WK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
//TABLES   DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//TABLESO  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//TABLESD  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//CODELIST DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSC
//CITYTBL  DD DISP=&DISPCIT,DSNAME=TRN.RI09CITP
```

The DTRIPGF Cataloged Procedure

DTRIPGF contains the following JCL statements:

```
//DTRIPGF PROC OUTFILE=,PRINTDD=TSO,S=,D=,SYSIN=,DUMP=,COPIES=1,
//             FORM='(A)',SCRTYPE=CYL,SCRSIZE=1,
//             DISPTRM=SHR,DISPRLG=SHR,DISPXRF=SHR,DISPTBL=SHR,
//             DISPSEC=SHR,DISPBDG=SHR,DISPRGC=SHR,DISPRDH=SHR,
//             DISPCIT=SHR,DISPCOF=SHR,DISPTRF=SHR,DISPINT=SHR
//DTRIPGF EXEC PGM=DTRI0110,
//  PARM='OF=&OUTFILE,PDD=&PRINTDD,S=&S,D=&D,DUMP=&DUMP,SYSIN=&SYSIN'
//STEPLIB  DD DISP=SHR,DSNAME=MHD.JOBLIB02
//         DD DISP=SHR,DSNAME=SYS1.PLILINK
//         DD DISP=SHR,DSNAME=ISD.UTILIB
//         DD DISP=SHR,DSNAME=GDDM.R4M0.GDDMLOAD
//SYSPRINT DD SYSOUT=*
//DIAGNOST DD SYSOUT=*,DCB=(BLKSIZE=1320,LRECL=132,RECFM=FBA)
//PRINTER  DD SYSOUT=&FORM,DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA),
//            COPIES=&COPIES
//TSO      DD SYSOUT=2,DCB=(BLKSIZE=132,LRECL=132,RECFM=FA)
//SYSOUT   DD DUMMY
//PLIDUMP  DD SYSOUT=*
//MINIDUMP DD SYSOUT=*
//$ORTPARM DD DISP=SHR,DSN=TRN.RI00SYSU(SORTPARM)
//USAGE    DD DISP=SHR,DSN=TRN.RI00USES
//USERS    DD DISP=SHR,DSN=TRN.RI00USER
//INSTRCT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//DECRTE   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//PROUTES  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
```

```
        //DECSEL   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
        //TITLES   DD UNIT=SYSDA,SPACE=(TRK,(3,3))

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        //REDEFINE DD UNIT=SYSDA,SPACE=(TRK,(1,1))
        //BREAKS   DD UNIT=SYSDA,SPACE=(TRK,(1,1))
        //DECSORT  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
        //SCRATCH1 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH2 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH3 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH4 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH5 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SCRATCH6 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SORTIN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SORTOUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
        //SORTWK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
        //SORTWK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
        //SORTWK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
        //TABLES   DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
        //TABLESO  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
        //TABLESD  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
        //CODELIST DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSC
        //CITYTBL  DD DISP=&DISPCIT,DSNAME=TRN.RI09CITP
        //ROADLOG  DD DISP=&DISPRLG,DSNAME=TRN.RI09RLGP
        //LOGPNT   DD DISP=&DISPRLG,DSNAME=TRN.RI09LPTP
        //TRUMILE  DD DISP=&DISPTRM,DSNAME=TRN.RI13TRMP
        //ROADDATA DD DISP=&DISPRDH,DSNAME=TRN.RI41RDHP
        //COINFILE DD DISP=&DISPCOF,DSNAME=TRN.RI09COFP
        //TRAFFIC  DD DISP=&DISPTRF,DSNAME=TRN.RI42TRFP
        //INTSECT  DD DISP=&DISPINT,DSNAME=TRN.RI15INTP
        //SECTIONS DD DISP=&DISPSEC,DSNAME=TRN.RI15SECP
        //BRIDGE   DD DISP=&DISPBDG,DSNAME=TRN.RI20BDGP
        //BDGXREF  DD DISP=&DISPBDG,DSNAME=TRN.RI20XBRP
        //CROSSING DD DISP=&DISPRGC,DSNAME=TRN.RI22RGCP
        //RGCXREF  DD DISP=&DISPRGC,DSNAME=TRN.RI22XRGP
        //XREFINT  DD DISP=&DISPINT,DSNAME=TRN.RI15XINP
        //TOWNSHIP DD DISP=&DISPXRF,DSNAME=TRN.RI09TWNP
        //SUFFFILE DD DISP=SHR,DSN=TRN.RI48SUFP
        //HAZARDS  DD DISP=SHR,DSN=TRN.RI48SUHP
        //XREFSTRT DD DISP=&DISPXRF,DSNAME=TRN.RI09STRP
        //XREFPTRL DD DISP=&DISPXRF,DSNAME=TRN.RI09XPTP
        //XREFCDIS DD DISP=&DISPXRF,DSNAME=TRN.RI09XCDP
        //XREFMNT  DD DISP=&DISPXRF,DSNAME=TRN.RI09XMNP
        //XREFCITY DD DISP=&DISPXRF,DSNAME=TRN.RI09XCIP
```

```
        //XREFCNTY DD DISP=&DISPXRF,DSNAME=TRN.RI09XCNP
        //XCSFILE  DD DISP=&DISPXRF,DSNAME=TRN.RI26XCSP
```



```
        The DTRIPM Cataloged Procedure
        ------------------------------

        DTRIPM contains the following JCL statements:

        //DTRIPM PROC OUTFILE=,PRINTDD=TSO,S=,D=,SYSIN=,DUMP=,COPIES=1,
        //            FORM='(A)',SCRTYPE=CYL,SCRSIZE=1,
        //            DISPTRM=SHR,DISPRLG=SHR,DISPXRF=SHR,DISPTBL=SHR,
        //            DISPPMS=SHR,DISPBDG=SHR,DISPRDH=SHR,DISPSUF=SHR,
        //            DISPCIT=SHR,DISPCOF=SHR,DISPTRF=SHR
        //DTRIPM EXEC PGM=DTRI0110,
        //  PARM='OF=&OUTFILE,PDD=&PRINTDD,S=&S,D=&D,DUMP=&DUMP,SYSIN=&SYSIN'
        //STEPLIB  DD DISP=SHR,DSNAME=MHD.JOBLIB02
        //         DD DISP=SHR,DSNAME=SYS1.PLILINK
        //         DD DISP=SHR,DSNAME=ISD.UTILIB
        //SYSPRINT DD SYSOUT=*
        //DIAGNOST DD SYSOUT=*,DCB=(BLKSIZE=1320,LRECL=132,RECFM=FBA)
        //PRINTER  DD SYSOUT=&FORM,DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA),
        //            COPIES=&COPIES
        //TSO      DD SYSOUT=2,DCB=(BLKSIZE=132,LRECL=132,RECFM=FA)
        //SYSOUT   DD DUMMY
        //PLIDUMP  DD SYSOUT=*
        //MINIDUMP DD SYSOUT=*
        //$ORTPARM DD DISP=SHR,DSN=TRN.RI00SYSU(SORTPARM)
        //USAGE    DD DISP=SHR,DSN=TRN.RI00USES
        //USERS    DD DISP=SHR,DSN=TRN.RI00USER
        //INSTRCT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
        //DECRTE   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
        //PROUTES  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
        //DECSEL   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
```

```
//TITLES   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//REDEFINE DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//BREAKS   DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//DECSORT  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//SCRATCH1 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH2 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH3 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH4 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH5 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH6 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTIN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTOUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTWK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
//SORTWK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
//SORTWK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
//TABLES   DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//TABLESO  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//TABLESD  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//CODELIST DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSC
//CITYTBL  DD DISP=&DISPCIT,DSNAME=TRN.RI09CITP
//ROADLOG  DD DISP=&DISPRLG,DSNAME=TRN.RI09RLGP
//LOGPNT   DD DISP=&DISPRLG,DSNAME=TRN.RI09LPTP
//TRUMILE  DD DISP=&DISPTRM,DSNAME=TRN.RI13TRMP
//ROADDATA DD DISP=&DISPRDH,DSNAME=TRN.RI41RDHP
//COINFILE DD DISP=&DISPCOF,DSNAME=TRN.RI09COFP
```

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```
//TRAFFIC  DD DISP=&DISPTRF,DSNAME=TRN.RI42TRFP
//BRIDGE   DD DISP=&DISPBDG,DSNAME=TRN.RI20BDGP
//BDGXREF  DD DISP=&DISPBDG,DSNAME=TRN.RI20XBRP
//TOWNSHIP DD DISP=&DISPXRF,DSNAME=TRN.RI09TWNP
//PAVEMENT DD DISP=&DISPPMS,DSNAME=TRN.RI24PMSP
//SUFFFILE DD DISP=&DISPSUF,DSNAME=TRN.RI48SUFP
//HAZARDS  DD DISP=&DISPSUF,DSNAME=TRN.RI48SUHP
//XREFSTRT DD DISP=&DISPXRF,DSNAME=TRN.RI09STRP
//XREFPTRL DD DISP=&DISPXRF,DSNAME=TRN.RI09XPTP
//XREFCDIS DD DISP=&DISPXRF,DSNAME=TRN.RI09XCDP
//XREFMNT  DD DISP=&DISPXRF,DSNAME=TRN.RI09XMNP
//XREFCITY DD DISP=&DISPXRF,DSNAME=TRN.RI09XCIP
//XREFCNTY DD DISP=&DISPXRF,DSNAME=TRN.RI09XCNP
//XCSFILE  DD DISP=&DISPXRF,DSNAME=TRN.RI26XCSP
```

The DTRIRB Cataloged Procedure

DTRIRB contains the following JCL statements:

```
//DTRIRB   PROC OUTFILE=,PRINTDD=PRINTER,S=,D=,SYSIN=,DUMP=,COPIES=1,
//            FORM=A,SCRTYPE=CYL,SCRSIZE=1,DISPRWY=SHR,DISPRTM=SHR,
//            DISPTBL=SHR,DISPCIT=SHR,DISPSTA=SHR,DISPRPT=SHR,
//            DISPBDG=SHR,DISPRGC=SHR
//DTRIRB EXEC PGM=DTRI0110,
//  PARM='OF=&OUTFILE,PDD=&PRINTDD,S=&S,D=&D,DUMP=&DUMP,SYSIN=&SYSIN'
//STEPLIB  DD DISP=SHR,DSNAME=MHD.JOBLIB02
//         DD DISP=SHR,DSNAME=SYS1.PLILINK
//         DD DISP=SHR,DSNAME=ISD.UTILIB
//SYSPRINT DD SYSOUT=*
//DIAGNOST DD SYSOUT=*,DCB=(BLKSIZE=1320,LRECL=132,RECFM=FBA)
//PRINTER  DD SYSOUT=&FORM,DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA),
//            COPIES=&COPIES
//SYSOUT   DD DUMMY
//PLIDUMP  DD SYSOUT=*
//MINIDUMP DD SYSOUT=*
//$ORTPARM DD DISP=SHR,DSN=TRN.RI00SYSU(SORTPARM)
//USAGE    DD DISP=SHR,DSN=TRN.RI00USES
//USERS    DD DISP=SHR,DSN=TRN.RI00USER
//INSTRCT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//DECRTE   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//PROUTES  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//DECSEL   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//TITLES   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//REDEFINE DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//BREAKS   DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//DECSORT  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//SCRATCH1 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH2 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH3 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH4 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH5 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH6 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
```

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```
//SORTIN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTOUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTWK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
//SORTWK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
//SORTWK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
//SRT2IN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
```

```
//SRT2OUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SRT2WK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
//SRT2WK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
//SRT2WK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
//TABLES   DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//TABLESO  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//TABLESD  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//CODELIST DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSC
//CITYTBL  DD DISP=&DISPCIT,DSNAME=TRN.RI09CITP
//ROADLOG  DD DISP=SHR,DSNAME=TRN.RI09RLGP
//LOGPNT   DD DISP=SHR,DSNAME=TRN.RI09LPTP
//TRUMILE  DD DISP=SHR,DSNAME=TRN.RI13TRMP
//TRAFFIC  DD DISP=SHR,DSNAME=TRN.RI42TRFP
//BRIDGE   DD DISP=&DISPBDG,DSNAME=TRN.RI20BDGP
//STATION  DD DISP=&DISPSTA,DSNAME=TRN.RI32STAP
//RAILPNT  DD DISP=&DISPRPT,DSNAME=TRN.RI34RPTP
//RAILWAY  DD DISP=&DISPRWY,DSNAME=TRN.RI36RWYP
//RAILTM   DD DISP=&DISPRTM,DSNAME=TRN.RI31RTMP
//CROSSING DD DISP=&DISPRGC,DSNAME=TRN.RI22RGCP
//RGCXREF  DD DISP=&DISPRGC,DSNAME=TRN.RI22XRGP
//XREFINT  DD DISP=SHR,DSNAME=TRN.RI15XINP
//XREFPTRL DD DISP=SHR,DSNAME=TRN.RI09XPTP
//XREFCDIS DD DISP=SHR,DSNAME=TRN.RI09XCDP
//XREFMNT  DD DISP=SHR,DSNAME=TRN.RI09XMNP
//XREFCITY DD DISP=SHR,DSNAME=TRN.RI09XCIP
//XREFCNTY DD DISP=SHR,DSNAME=TRN.RI09XCNP
```

The DTRIRR Cataloged Procedure

DTRIRR contains the following JCL statements:

```
//DTRIRR   PROC OUTFILE=,PRINTDD=TSO,S=,D=,SYSIN=,DUMP=,COPIES=1,
//            FORM=A,SCRTYPE=CYL,SCRSIZE=1,DISPRWY=SHR,DISPRTM=SHR,
//            DISPTBL=SHR,DISPCIT=SHR,DISPSTA=SHR,DISPRPT=SHR,
//            DISPBDG=SHR,DISPRGC=SHR
//DTRIRR EXEC PGM=DTRI0110,
//  PARM='OF=&OUTFILE,PDD=&PRINTDD,S=&S,D=&D,DUMP=&DUMP,SYSIN=&SYSIN'
//STEPLIB  DD DISP=SHR,DSNAME=MHD.JOBLIB02
//         DD DISP=SHR,DSNAME=SYS1.PLILINK
//         DD DISP=SHR,DSNAME=ISD.UTILIB
//SYSPRINT DD SYSOUT=*
//DIAGNOST DD SYSOUT=*,DCB=(BLKSIZE=1320,LRECL=132,RECFM=FBA)
//PRINTER  DD SYSOUT=&FORM,DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA),
//            COPIES=&COPIES
//TSO      DD SYSOUT=*,DCB=(BLKSIZE=132,LRECL=132,RECFM=FA)
//SYSOUT   DD DUMMY
//PLIDUMP  DD SYSOUT=*
//MINIDUMP DD SYSOUT=*
//$ORTPARM DD DISP=SHR,DSN=TRN.RI00SYSU(SORTPARM)
//USAGE    DD DISP=SHR,DSN=TRN.RI00USES
//USERS    DD DISP=SHR,DSN=TRN.RI00USER
//INSTRCT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//DECRTE   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//PROUTES  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//DECSEL   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//TITLES   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//REDEFINE DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//BREAKS   DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//DECSORT  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//SCRATCH1 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH2 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH3 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH4 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH5 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH6 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTIN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTOUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTWK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
//SORTWK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
//SORTWK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
//SRT2IN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SRT2OUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SRT2WK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
```

```
        //SRT2WK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
        //SRT2WK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
        //TABLES   DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
        //TABLESO  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
        //TABLESD  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
        //CODELIST DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSC
        //CITYTBL  DD DISP=&DISPCIT,DSNAME=TRN.RI09CITP
```

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```
        //ROADLOG  DD DISP=SHR,DSNAME=TRN.RI09RLGP
        //LOGPNT   DD DISP=SHR,DSNAME=TRN.RI09LPTP
        //TRUMILE  DD DISP=SHR,DSNAME=TRN.RI13TRMP
        //TRAFFIC  DD DISP=SHR,DSNAME=TRN.RI42TRFP
        //BRIDGE   DD DISP=&DISPBDG,DSNAME=TRN.RI20BDGP
        //STATION  DD DISP=&DISPSTA,DSNAME=TRN.RI32STAP
        //RAILPNT  DD DISP=&DISPRPT,DSNAME=TRN.RI34RPTP
        //RAILWAY  DD DISP=&DISPRWY,DSNAME=TRN.RI36RWYP
        //RAILTM   DD DISP=&DISPRTM,DSNAME=TRN.RI31RTMP
        //CROSSING DD DISP=&DISPRGC,DSNAME=TRN.RI22RGCP
        //RGCXREF  DD DISP=&DISPRGC,DSNAME=TRN.RI22XRGP
        //ACCIDENT DD DISP=SHR,DSNAME=TRN.RI16ACDP
        //XREFPTRL DD DISP=SHR,DSNAME=TRN.RI09XPTP
        //XREFCDIS DD DISP=SHR,DSNAME=TRN.RI09XCDP
        //XREFMNT  DD DISP=SHR,DSNAME=TRN.RI09XMNP
        //XREFCITY DD DISP=SHR,DSNAME=TRN.RI09XCIP
        //XREFCNTY DD DISP=SHR,DSNAME=TRN.RI09XCNP
```

The DTRIRT Cataloged Procedure

DTRIRT contains the following JCL statements:

```
        //DTRIRT   PROC OUTFILE=,PRINTDD=TSO,S=,D=,SYSIN=,DUMP=,COPIES=1,
        //            FORM='(A)',SCRTYPE=CYL,SCRSIZE=1,DISPRWY=SHR,DISPRTM=SHR,
        //            DISPTBL=SHR,DISPCIT=SHR,DISPSTA=SHR,DISPRPT=SHR,
        //            DISPBDG=SHR,DISPRGC=SHR
        //DTRIRT EXEC PGM=DTRI0110,
        //  PARM='OF=&OUTFILE,PDD=&PRINTDD,S=&S,D=&D,DUMP=&DUMP,SYSIN=&SYSIN'
        //STEPLIB  DD DISP=SHR,DSNAME=MHD.JOBLIB02
        //         DD DISP=SHR,DSNAME=SYS1.PLILINK
        //         DD DISP=SHR,DSNAME=ISD.UTILIB
        //SYSPRINT DD SYSOUT=*
```

```
//DIAGNOST DD SYSOUT=*,DCB=(BLKSIZE=1320,LRECL=132,RECFM=FBA)
//PRINTER  DD SYSOUT=&FORM,DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA),
//            COPIES=&COPIES
//TSO      DD SYSOUT=*,DCB=(BLKSIZE=132,LRECL=132,RECFM=FA)
//SYSOUT   DD DUMMY
//PLIDUMP  DD SYSOUT=*
//MINIDUMP DD SYSOUT=*
//$ORTPARM DD DISP=SHR,DSN=TRN.RI00SYSU(SORTPARM)
//USAGE    DD DISP=SHR,DSN=TRN.RI00USES
//USERS    DD DISP=SHR,DSN=TRN.RI00USER
//INSTRCT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//DECRTE   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//PROUTES  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//DECSEL   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//TITLES   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//REDEFINE DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//BREAKS   DD UNIT=SYSDA,SPACE=(TRK,(1,1))
```

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```
//DECSORT  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//SCRATCH1 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH2 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH3 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH4 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH5 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH6 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTIN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTOUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTWK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
//SORTWK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
//SORTWK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
//SRT2IN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SRT2OUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SRT2WK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
//SRT2WK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
//SRT2WK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
//TABLES   DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//TABLESO  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//TABLESD  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//CODELIST DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSC
//CITYTBL  DD DISP=&DISPCIT,DSNAME=TRN.RI09CITP
//ROADLOG  DD DISP=SHR,DSNAME=TRN.RI09RLGP
```

```
//LOGPNT   DD DISP=SHR,DSNAME=TRN.RI09LPTP
//TRUMILE  DD DISP=SHR,DSNAME=TRN.RI13TRMP
//TRAFFIC  DD DISP=SHR,DSNAME=TRN.RI42TRFP
//BRIDGE   DD DISP=&DISPBDG,DSNAME=TRN.RI20BDGP
//STATION  DD DISP=&DISPSTA,DSNAME=TRN.RI32STAP
//RAILPNT  DD DISP=&DISPRPT,DSNAME=TRN.RI34RPTP
//RAILWAY  DD DISP=&DISPRWY,DSNAME=TRN.RI36RWYP
//RAILTM   DD DISP=&DISPRTM,DSNAME=TRN.RI31RTMP
//CROSSING DD DISP=&DISPRGC,DSNAME=TRN.RI22RGCP
//RGCXREF  DD DISP=&DISPRGC,DSNAME=TRN.RI22XRGP
//XREFINT  DD DISP=SHR,DSNAME=TRN.RI15XINP
//XREFPTRL DD DISP=SHR,DSNAME=TRN.RI09XPTP
//XREFCDIS DD DISP=SHR,DSNAME=TRN.RI09XCDP
//XREFMNT  DD DISP=SHR,DSNAME=TRN.RI09XMNP
//XREFCITY DD DISP=SHR,DSNAME=TRN.RI09XCIP
//XREFCNTY DD DISP=SHR,DSNAME=TRN.RI09XCNP
```


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The DTRITA Cataloged Procedure

DTRITA contains the following JCL statements:

```
//DTRITA PROC OUTFILE=,PRINTDD=TSO,S=,D=,SYSIN=,DUMP=,COPIES=1,
//            FORM='(A)',SCRTYPE=CYL,SCRSIZE=1,DISPRDH=SHR,
//            DISPTRM=SHR,DISPRLG=SHR,DISPXRF=SHR,DISPTBL=SHR,
//            DISPCIT=SHR,DISPCOF=SHR,DISPACC=SHR,DISPTRF=SHR,
//            DISPINT=SHR,DISPSEC=SHR,DISPBDG=SHR,DISPRGC=SHR
//DTRITA EXEC PGM=DTRI0110,
//  PARM='OF=&OUTFILE,PDD=&PRINTDD,S=&S,D=&D,DUMP=&DUMP,SYSIN=&SYSIN'
//STEPLIB  DD DISP=SHR,DSNAME=MHD.JOBLIB02
//         DD DISP=SHR,DSNAME=SYS1.PLILINK
```

```
//         DD DISP=SHR,DSNAME=ISD.UTILIB
//SYSPRINT DD SYSOUT=*
//DIAGNOST DD SYSOUT=*,DCB=(BLKSIZE=1320,LRECL=132,RECFM=FBA)
//PRINTER  DD SYSOUT=&FORM,DCB=(BLKSIZE=1330,LRECL=133,RECFM=FBA),
//            COPIES=&COPIES
//TSO      DD SYSOUT=2,DCB=(BLKSIZE=132,LRECL=132,RECFM=FA)
//SYSOUT   DD DUMMY
//PLIDUMP  DD SYSOUT=*
//MINIDUMP DD SYSOUT=*
//$ORTPARM DD DISP=SHR,DSN=TRN.RI00SYSU(SORTPARM)
//USAGE    DD DISP=SHR,DSN=TRN.RI00USES
//USERS    DD DISP=SHR,DSN=TRN.RI00USER
//INSTRCT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//DECRTE   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//PROUTES  DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//DECSEL   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//TITLES   DD UNIT=SYSDA,SPACE=(TRK,(3,3))
//REDEFINE DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//BREAKS   DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//AGGREGAT DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//DECSORT  DD UNIT=SYSDA,SPACE=(TRK,(1,1))
//SCRATCH1 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH2 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH3 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH4 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH5 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SCRATCH6 DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTIN   DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTOUT  DD UNIT=SYSDA,SPACE=(&SCRTYPE,(&SCRSIZE,&SCRSIZE))
//SORTWK01 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH1,VOL=REF=*.SCRATCH1
//SORTWK02 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH2,VOL=REF=*.SCRATCH2
//SORTWK03 DD DISP=(OLD,PASS),DSNAME=*.SCRATCH3,VOL=REF=*.SCRATCH3
//TABLES   DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//TABLESO  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
//TABLESD  DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSU
```

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```
//CODELIST DD DISP=&DISPTBL,DSNAME=TRN.RI00SYSC
//CITYTBL  DD DISP=&DISPCIT,DSNAME=TRN.RI09CITP
```

```
//ROADLOG  DD DISP=&DISPRLG,DSNAME=TRN.RI09RLGP
//LOGPNT   DD DISP=&DISPRLG,DSNAME=TRN.RI09LPTP
//TRUMILE  DD DISP=&DISPTRM,DSNAME=TRN.RI13TRMP
//ROADDATA DD DISP=&DISPRDH,DSNAME=TRN.RI41RDHP
//CROSS    DD DISP=&DISPRDH,DSNAME=TRN.RI41RDXP
//COINFILE DD DISP=&DISPCOF,DSNAME=TRN.RI09COFP
//TRAFFIC  DD DISP=&DISPTRF,DSNAME=TRN.RI42TRFP
//INTSECT  DD DISP=&DISPINT,DSNAME=TRN.RI15INTP
//SECTIONS DD DISP=&DISPSEC,DSNAME=TRN.RI15SECP
//BRIDGE   DD DISP=&DISPBDG,DSNAME=TRN.RI20BDGP
//BDGXREF  DD DISP=&DISPBDG,DSNAME=TRN.RI20XBRP
//CROSSING DD DISP=&DISPRGC,DSNAME=TRN.RI22RGCP
//RGCXREF  DD DISP=&DISPRGC,DSNAME=TRN.RI22XRGP
//XREFINT  DD DISP=&DISPINT,DSNAME=TRN.RI15XINP
//TOWNSHIP DD DISP=&DISPXRF,DSNAME=TRN.RI09TWNP
//XREFSTRT DD DISP=&DISPXRF,DSNAME=TRN.RI09STRP
//XREFPTRL DD DISP=&DISPXRF,DSNAME=TRN.RI09XPTP
//XREFCDIS DD DISP=&DISPXRF,DSNAME=TRN.RI09XCDP
//XREFMNT  DD DISP=&DISPXRF,DSNAME=TRN.RI09XMNP
//XREFCITY DD DISP=&DISPXRF,DSNAME=TRN.RI09XCIP
//XREFCNTY DD DISP=&DISPXRF,DSNAME=TRN.RI09XCNP
//XCSFILE  DD DISP=&DISPXRF,DSNAME=TRN.RI26XCSP
//ACCIDENT DD DISP=&DISPACC,DSNAME=TRN.RI16ACDP
```

A P P E N D I X C

C I T Y N A M E S A N D N U M B E R S

This appendix consists of a computer-generated listing of the TIS city table.

In the listing, one line is printed per city per county (eg., a city that lies entirely in one county is printed on one line, a city in two counties is printed on two lines, etc.).

The items printed in the listing include:

- County number of county in which the city is located (see table 1 in chapter 1 for a listing of the county names).
- Census number of the city
- Urban area number if population is greater than 5000 (the urban area number is not utilized within TIS).
- Construction district in which the city is located.
- Name of the city.
- Year in which census was taken.
- Population of the city (includes all counties in which the city is located).
- Population of the city within the county.

LIST-CITY-TABLE - DEC 20,2001 LISTED BY CENSUS NUMBER

CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
54	0005		2	ADA	2000	1657	1657
50	0010		6	ADAMS	2000	800	800
53	0015		7	ADRIAN	2000	1234	1234
82	0020		9	AFTON	2000	2839	2839
01	0025		3	AITKIN	2000	1984	1984
29	0030		2	AKELEY	2000	412	412
73	0035		3	ALBANY	2000	1796	1796
75	0040		4	ALBERTA	2000	142	142
24	0045	101	6	ALBERT LEA	2000	18356	18356
86	0050		3	ALBERTVILLE	2000	3621	3621
24	0055		6	ALDEN	2000	652	652
80	0060		3	ALDRICH	2000	53	53
21	0065	102	4	ALEXANDRIA	2000	8820	8820
32	0070		7	ALPHA	2000	126	126
85	0075		6	ALTURA	2000	417	417
45	0080		2	ALVARADO	2000	371	371
07	0085		7	AMBOY	2000	575	575
02	0088	198	5	ANDOVER	2000	26588	26588
86	0090		3	ANNANDALE	2000	2684	2684
02	0095	103	5	ANOKA	2000	18076	18076
76	0100		4	APPLETON	2000	2871	2871
19	0102	186	9	APPLE VALLEY	2000	45527	45527
41	0105		8	ARCO	2000	100	100
62	0110	187	9	ARDEN HILLS	2000	9652	9652
45	0115		2	ARGYLE	2000	656	656
72	0120		7	ARLINGTON	2000	2048	2048
26	0125		4	ASHBY	2000	472	472
58	0130		1	ASKOV	2000	368	368
34	0135		8	ATWATER	2000	1079	1079
03	0140		4	AUDUBON	2000	445	445
69	0145		1	AURORA	2000	1850	1850
50	0150	104	6	AUSTIN	2000	23314	23314

51	0155	8	AVOCA	2000	146	146
73	0160	3	AVON	2000	1242	1242
69	0165	1	BABBITT	2000	1670	1670
11	0170	3	BACKUS	2000	311	311
68	0175	2	BADGER	2000	470	470
15	0180	2	BAGLEY	2000	1235	1235
42	0185	8	BALATON	2000	637	637
14	0195	4	BARNESVILLE	2000	2173	2173
09	0200	1	BARNUM	2000	525	525
26	0205	4	BARRETT	2000	355	355
06	0210	4	BARRY	2000	25	25
56	0215	4	BATTLE LAKE	2000	686	686
39	0220	2	BAUDETTE	2000	1104	1104
18	0225	3	BAXTER	2000	5555	5555
82	0230	9	BAYPORT	2000	3162	3162
06	0235	4	BEARDSLEY	2000	262	262
38	0240	1	BEAVER BAY	2000	175	175

LIST-CITY-TABLE - DEC 20,2001 LISTED BY CENSUS NUMBER

CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
67	0245		7	BEAVER CREEK	2000	250	250
71	0250		3	BECKER	2000	2673	2673
44	0255		4	BEJOU	2000	94	94
73	0260		3	BELGRADE	2000	750	750
25	0265		6	BELLECHESTER	2000	172	133
79	0265		6	BELLECHESTER	2000	172	39
70	0270		5	BELLE PLAINE	2000	3789	3789
37	0275		8	BELLINGHAM	2000	205	205
60	0280		2	BELTRAMI	2000	101	101
64	0285		8	BELVIEW	2000	412	412
04	0290	105	2	BEMIDJI	2000	11917	11917
11	0295		3	BENA	2000	110	110
76	0300		4	BENSON	2000	3376	3376
77	0310		3	BERTHA	2000	470	470
02	0315		5	BETHEL	2000	443	443
53	0320		7	BIGELOW	2000	231	231
36	0325		1	BIG FALLS	2000	264	264
31	0330		1	BIGFORK	2000	469	469
71	0335		3	BIG LAKE	2000	6063	6063
17	0340		7	BINGHAM LAKE	2000	167	167

62	0345		9	BIRCHWOOD VILLAGE	2000	968	0
82	0345		9	BIRCHWOOD VILLAGE	2000	968	968
65	0350		8	BIRD ISLAND	2000	1195	1195
43	0355		8	BISCAY	2000	114	114
69	0360		1	BIWABIK	2000	954	954
04	0365		2	BLACKDUCK	2000	696	696
02	0370	106	5	BLAINE	2000	44942	44942
62	0370	106	9	BLAINE	2000	44942	0
34	0375		8	BLOMKEST	2000	186	186
74	0380		6	BLOOMING PRAIRIE	2000	1933	1933
27	0385	107	5	BLOOMINGTON	2000	85172	85172
22	0390		7	BLUE EARTH	2000	3621	3621
56	0395		4	BLUFFTON	2000	210	210
48	0400		3	BOCK	2000	106	106
54	0405		2	BORUP	2000	91	91
31	0410		1	BOVEY	2000	662	662
49	0415		3	BOWLUS	2000	260	260
37	0420		8	BOYD	2000	210	210
11	0425		3	BOY RIVER	2000	38	38
30	0430		3	BRAHAM	2000	1276	1276
18	0435	108	3	BRAINERD	2000	13178	13178
21	0440		4	BRANDON	2000	450	450
84	0445		4	BRECKENRIDGE	2000	3559	3559
18	0447		3	BREEZY POINT	2000	979	979
53	0450		7	BREWSTER	2000	502	502
22	0455		7	BRICELYN	2000	379	379
27	0460	109	5	BROOKLYN CENTER	2000	29172	29172
27	0465	110	5	BROOKLYN PARK	2000	67388	67388
58	0470		1	BROOK PARK	2000	156	156

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LIST-CITY-TABLE - DEC 20,2001 LISTED BY CENSUS NUMBER

CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
63	0475		2	BROOKS	2000	141	141
69	0480		1	BROOKSTON	2000	98	98
61	0485		4	BROOTEN	2000	649	0
73	0485		3	BROOTEN	2000	649	649
77	0490		3	BROWERVILLE	2000	735	735
50	0495		6	BROWNSDALE	2000	718	718
78	0500		4	BROWNS VALLEY	2000	690	690
28	0505		6	BROWNSVILLE	2000	517	517

43	0510		8	BROWNTON	2000	807	807
58	0515		1	BRUNO	2000	102	102
49	0520		3	BUCKMAN	2000	208	208
86	0525	213	3	BUFFALO	2000	10097	10097
65	0530		8	BUFFALO LAKE	2000	768	768
69	0535		1	BUHL	2000	983	983
19	0537	179	9	BURNSVILLE	2000	60220	60220
77	0540		3	BURTRUM	2000	146	146
83	0545		7	BUTTERFIELD	2000	564	564
55	0550		6	BYRON	2000	3500	3500
28	0555		6	CALEDONIA	2000	2965	2965
03	0560		4	CALLAWAY	2000	200	200
31	0565		1	CALUMET	2000	383	383
30	0570	218	3	CAMBRIDGE	2000	5520	5520
84	0575		4	CAMPBELL	2000	241	241
87	0580		8	CANBY	2000	1903	1903
25	0585		6	CANNON FALLS	2000	3795	3795
23	0590		6	CANTON	2000	343	343
21	0595		4	CARLOS	2000	329	329
09	0600		1	CARLTON	2000	810	810
10	0601		5	CARVER	2000	1266	1266
11	0605		3	CASS LAKE	2000	860	860
47	0610		8	CEDAR MILLS	2000	53	53
13	0615		9	CENTER CITY	2000	582	582
02	0620		5	CENTERVILLE	2000	3202	3202
46	0625		7	CEYLON	2000	413	413
27	0630	193	5	CHAMPLIN	2000	22193	22193
51	0635		8	CHANDLER	2000	276	276
10	0640	194	5	CHANHASSEN	2000	20321	20321
27	0640	194	5	CHANHASSEN	2000	20321	0
10	0645	196	5	CHASKA	2000	17449	17449
23	0650		6	CHATFIELD	2000	2394	1257
55	0650		6	CHATFIELD	2000	2394	1137
11	0655		3	CHICKAMAW BEACH	2000	148	148
13	0660		9	CHISAGO CITY	2000	2622	2622
69	0665	111	1	CHISHOLM	2000	5000	5000
75	0670		4	CHOKIO	2000	443	443
02	0675		5	CIRCLE PINES	2000	4663	4663
12	0680		8	CLARA CITY	2000	1393	1393
20	0685		6	CLAREMONT	2000	620	620
77	0690		3	CLARISSA	2000	609	609

CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
87	0695		8	CLARKFIELD	2000	944	944
24	0700		6	CLARKS GROVE	2000	734	734
15	0705		2	CLEARBROOK	2000	551	551
71	0710		3	CLEAR LAKE	2000	266	266
73	0715		3	CLEARWATER	2000	858	0
86	0715		3	CLEARWATER	2000	858	858
64	0720		8	CLEMENTS	2000	191	191
40	0725		7	CLEVELAND	2000	673	673
60	0730		2	CLIMAX	2000	243	243
06	0735		4	CLINTON	2000	453	453
56	0740		4	CLITHERALL	2000	118	118
76	0745		4	CLONTARF	2000	173	173
09	0750	112	1	CLOQUET	2000	11201	11201
19	0755		9	COATES	2000	163	163
08	0760		7	COBDEN	2000	61	61
31	0765		1	COHASSET	2000	2481	2481
86	0770		3	COKATO	2000	2727	2727
73	0775		3	COLD SPRING	2000	2975	2975
31	0780		1	COLERAINE	2000	1110	1110
10	0785		5	COLOGNE	2000	1012	1012
02	0790	113	5	COLUMBIA HEIGHTS	2000	18520	18520
08	0795		7	COMFREY	2000	367	357
17	0795		7	COMFREY	2000	367	10
14	0800		4	COMSTOCK	2000	123	123
24	0805		6	CONGER	2000	133	133
69	0810		1	COOK	2000	622	622
02	0820	114	5	COON RAPIDS	2000	61607	61607
27	0825	215	5	CORCORAN	2000	5630	5630
06	0830		4	CORRELL	2000	47	47
47	0835		8	COSMOS	2000	582	582
82	0837	180	9	COTTAGE GROVE	2000	30582	30582
42	0840		8	COTTONWOOD	2000	1148	1148
52	0845		7	COURTLAND	2000	538	538
09	0850		1	CROMWELL	2000	143	143
60	0855	115	2	CROOKSTON	2000	8192	8192
18	0860		3	CROSBY	2000	2299	2299
18	0865		3	CROSS LAKE	2000	1893	1893
27	0870	116	5	CRYSTAL	2000	22698	22698
51	0875		8	CURRIE	2000	225	225
18	0880		3	CUYUNA	2000	231	231
61	0885		4	CYRUS	2000	303	303
85	0890		6	DAKOTA	2000	329	329
56	0895		4	DALTON	2000	258	258
65	0900		8	DANUBE	2000	529	529
76	0905		4	DANVERS	2000	108	108

83	0910		7	DARFUR	2000	137	137
47	0915		8	DARWIN	2000	276	276
47	0920		8	DASSEL	2000	1233	1233
37	0925		8	DAWSON	2000	1539	1539

LIST-CITY-TABLE - DEC 20,2001 LISTED BY CENSUS NUMBER

CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
27	0930		5	DAYTON	2000	5000	5000
86	0930		3	DAYTON	2000	5000	314
27	0935		5	DEEPHAVEN	2000	3853	3853
56	0940		4	DEER CREEK	2000	328	328
31	0945		1	DEER RIVER	2000	903	903
18	0950		3	DEERWOOD	2000	590	590
76	0955		4	DE GRAFF	2000	133	133
86	0960		3	DELANO	2000	3837	3837
22	0965		7	DELAVAN	2000	223	223
64	0970		8	DELHI	2000	69	69
82	0975		9	DELLWOOD	2000	1033	1033
58	0980		1	DENHAM	2000	40	40
25	0985		6	DENNISON	2000	168	159
66	0985		6	DENNISON	2000	168	9
56	0990		4	DENT	2000	192	192
03	0995	117	4	DETROIT LAKES	2000	7348	7348
50	1000		6	DEXTER	2000	333	333
14	1005		4	DILWORTH	2000	3001	3001
20	1010		6	DODGE CENTER	2000	2226	2226
35	1015		2	DONALDSON	2000	41	41
75	1020		4	DONNELLY	2000	254	254
84	1025		4	DORAN	2000	59	59
55	1030		6	DOVER	2000	438	438
51	1035		8	DOVRAY	2000	67	67
69	1040	118	1	DULUTH	2000	86918	86918
78	1045		4	DUMONT	2000	122	122
66	1050		6	DUNDAS	2000	547	547
53	1055		7	DUNDEE	2000	102	102
46	1060		7	DUNNELL	2000	197	197
19	1063	195	9	EAGAN	2000	63557	63557
77	1065		3	EAGLE BEND	2000	595	595
07	1070		7	EAGLE LAKE	2000	1787	1787
02	1072	203	5	EAST BETHEL	2000	10941	10941

60	1075	119	2	EAST GRAND FORKS	2000	8658	7501
11	1080		3	EAST GULL LAKE	2000	978	978
22	1085		7	EASTON	2000	214	214
87	1090		8	ECHO	2000	278	278
27	1094	181	5	EDEN PRAIRIE	2000	54901	54901
47	1095		8	EDEN VALLEY	2000	866	500
73	1095		3	EDEN VALLEY	2000	866	366
59	1100		8	EDGERTON	2000	1033	1033
27	1105	120	5	EDINA	2000	47425	47425
31	1110		1	EFFIE	2000	91	91
28	1115		6	EITZEN	2000	229	229
85	1120		6	ELBA	2000	214	214
26	1125		4	ELBOW LAKE	2000	1275	1275
79	1130		6	ELGIN	2000	826	826
56	1135		4	ELIZABETH	2000	172	172
70	1140		5	ELKO	2000	472	472

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LIST-CITY-TABLE - DEC 20,2001 LISTED BY CENSUS NUMBER

CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
71	1145	204	3	ELK RIVER	2000	16447	16447
50	1150		6	ELKTON	2000	149	149
74	1155		6	ELLENDALE	2000	590	590
53	1160		7	ELLSWORTH	2000	540	540
49	1165		3	ELMDALE	2000	107	107
22	1170		7	ELMORE	2000	735	735
73	1175		3	ELROSA	2000	166	166
69	1180		1	ELY	2000	3724	3724
40	1185		7	ELYSIAN	2000	486	486
81	1185		7	ELYSIAN	2000	486	0
18	1190		3	EMILY	2000	847	847
24	1195		6	EMMONS	2000	432	432
56	1200		4	ERHARD	2000	150	150
60	1205		2	ERSKINE	2000	437	437
21	1215		4	EVANSVILLE	2000	566	566
08	1216		7	EVAN	2000	91	91
69	1220		1	EVELETH	2000	3865	3865
27	1225		5	EXCELSIOR	2000	2393	2393
55	1230		6	EYOTA	2000	1644	1644
65	1235		8	FAIRFAX	2000	1295	1295
46	1240	123	7	FAIRMONT	2000	10889	10889

62	1245	124	9	FALCON HEIGHTS	2000	5572	5572
66	1250	125	6	FARIBAULT	2000	20818	20818
19	1255	212	9	FARMINGTON	2000	12365	12365
61	1260		4	FARWELL	2000	57	57
11	1265		3	FEDERAL DAM	2000	101	101
14	1270		4	FELTON	2000	216	216
56	1275	126	4	FERGUS FALLS	2000	13471	13471
60	1280		2	FERTILE	2000	893	893
18	1285		3	FIFTY LAKES	2000	392	392
58	1290		1	FINLAYSON	2000	314	314
60	1295		2	FISHER	2000	435	435
49	1300		3	FLENSBURG	2000	244	244
69	1305		1	FLOODWOOD	2000	503	503
42	1310		8	FLORENCE	2000	61	61
05	1315		3	FOLEY	2000	2154	2154
21	1320		4	FORADA	2000	197	197
82	1325	214	9	FOREST LAKE	2000	6798	6798
48	1330		3	FORESTON	2000	389	389
18	1335		3	FORT RIPLEY	2000	74	74
60	1340		2	FOSSTON	2000	1575	1575
23	1345		6	FOUNTAIN	2000	343	343
84	1350		4	FOXHOME	2000	143	143
65	1355		8	FRANKLIN	2000	498	498
03	1370		4	FRAZEE	2000	1377	1377
24	1375		6	FREEBORN	2000	305	305
73	1380		3	FREEPORT	2000	454	454
02	1385	127	5	FRIDLEY	2000	27449	27449
22	1390		7	FROST	2000	251	251

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LIST-CITY-TABLE - DEC 20,2001 LISTED BY CENSUS NUMBER

CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
51	1395		8	FULDA	2000	1283	1283
04	1400		2	FUNKLEY	2000	15	15
21	1405		4	GARFIELD	2000	281	281
18	1410		3	GARRISON	2000	213	213
42	1415		8	GARVIN	2000	159	159
54	1420		2	GARY	2000	215	215
72	1425		7	GAYLORD	2000	2279	2279
62	1430		9	GEM LAKE	2000	419	419
24	1435		6	GENEVA	2000	449	449

49	1440		3	GENOLA	2000	71	71
14	1445		4	GEORGETOWN	2000	125	125
42	1450		8	GHENT	2000	315	315
72	1455		7	GIBBON	2000	808	808
69	1460		1	GILBERT	2000	1847	1847
05	1465		3	GILMAN	2000	215	215
43	1470		8	GLENCOE	2000	5453	5453
24	1475		6	GLENVILLE	2000	720	720
61	1480		4	GLENWOOD	2000	2594	2594
14	1485		4	GLYNDON	2000	1049	1049
27	1495	128	5	GOLDEN VALLEY	2000	20281	20281
15	1500		2	GONVICK	2000	294	294
25	1505		6	GOODHUE	2000	778	778
57	1510		2	GOODRIDGE	2000	98	98
07	1515		7	GOOD THUNDER	2000	592	592
85	1520		6	GOODVIEW	2000	3373	3373
06	1525		4	GRACEVILLE	2000	605	605
46	1530		7	GRANADA	2000	317	317
16	1535		1	GRAND MARAIS	2000	1353	1353
50	1540		6	GRAND MEADOW	2000	945	945
31	1545	129	1	GRAND RAPIDS	2000	7764	7764
12	1550		8	GRANITE FALLS	2000	3070	1045
87	1550		8	GRANITE FALLS	2000	3070	2025
82	1553		9	GRANT	2000	4026	4026
33	1555		3	GRASSTON	2000	105	105
68	1560		2	GREENBUSH	2000	784	784
27	1565		5	GREENFIELD	2000	2544	2544
72	1570		7	GREEN ISLE	2000	334	334
73	1575		3	GREENWALD	2000	201	201
27	1580		5	GREENWOOD	2000	729	729
77	1585		3	GREY EAGLE	2000	335	335
47	1590		8	GROVE CITY	2000	608	608
45	1595		2	GRYGLA	2000	228	228
60	1600		2	GULLY	2000	106	106
11	1605		3	HACKENSACK	2000	285	285
51	1610		8	HADLEY	2000	81	81
35	1615		2	HALLOCK	2000	1196	1196
35	1620		2	HALMA	2000	78	78
54	1625		2	HALSTAD	2000	622	622

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CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
10	1630		5	HAMBURG	2000	538	538
02	1633	197	5	HAM LAKE	2000	12710	12710
79	1635		6	HAMMOND	2000	198	198
19	1640		9	HAMPTON	2000	434	434
75	1645		4	HANCOCK	2000	717	717
87	1650		8	HANLEY FALLS	2000	323	323
27	1655		5	HANOVER	2000	1355	332
86	1655		3	HANOVER	2000	1355	1023
08	1660		7	HANSKA	2000	443	443
49	1665		3	HARDING	2000	105	105
67	1670		7	HARDWICK	2000	222	222
23	1675		6	HARMONY	2000	1080	1080
13	1680		9	HARRIS	2000	1121	1121
24	1685		6	HARTLAND	2000	288	288
19	1686	130	9	HASTINGS	2000	18204	18201
82	1686	130	9	HASTINGS	2000	18204	3
59	1690		8	HATFIELD	2000	47	47
14	1695		4	HAWLEY	2000	1882	1882
20	1700		6	HAYFIELD	2000	1325	1325
24	1705		6	HAYWARD	2000	249	249
87	1710		8	HAZEL RUN	2000	64	64
65	1715		8	HECTOR	2000	1166	1166
40	1720		7	HEIDELBERG	2000	72	72
72	1725		7	HENDERSON	2000	910	910
41	1730		8	HENDRICKS	2000	725	725
54	1735		2	HENDRUM	2000	315	315
56	1740		4	HENNING	2000	719	719
58	1745		1	HENRIETTE	2000	101	101
26	1750		4	HERMAN	2000	452	452
69	1752	202	1	HERMANTOWN	2000	7448	7448
32	1755		7	HERON LAKE	2000	768	768
77	1760		3	HEWITT	2000	267	267
69	1765	131	1	HIBBING	2000	17071	17071
01	1770		3	HILL CITY	2000	479	479
49	1775		3	HILLMAN	2000	29	29
67	1780		7	HILLS	2000	565	565
02	1785		5	HILLTOP	2000	766	766
58	1790		1	HINCKLEY	2000	1291	1291
14	1795		4	HITTERDAL	2000	201	201
26	1800		4	HOFFMAN	2000	672	672
28	1805		6	HOKAH	2000	614	614
73	1810		3	HOLDINGFORD	2000	736	736
59	1818		8	HOLLAND	2000	215	215
24	1820		6	HOLLANDALE	2000	292	292
76	1825		4	HOLLOWAY	2000	112	112
45	1830		2	HOLT	2000	89	89

27	1835	132	5	HOPKINS	2000	17145	17145
28	1840		6	HOUSTON	2000	1020	1020
86	1845		3	HOWARD LAKE	2000	1853	1853

LIST-CITY-TABLE - DEC 20,2001 LISTED BY CENSUS NUMBER

CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
69	1850		1	HOYT LAKES	2000	2082	2082
82	1855		9	HUGO	2000	6363	6363
35	1860		2	HUMBOLDT	2000	61	61
43	1865	133	8	HUTCHINSON	2000	13080	13080
59	1870		8	IHLEN	2000	107	107
27	1875		5	INDEPENDENCE	2000	3236	3236
86	1875		3	INDEPENDENCE	2000	3236	0
36	1880	134	1	INTERNATIONAL FALLS	2000	6703	6703
19	1886	178	9	INVER GROVE HEIGHTS	2000	29751	29751
51	1890		8	IONA	2000	173	173
69	1895		1	IRON JUNCTION	2000	93	93
18	1900		3	IRONTON	2000	498	498
30	1905		3	ISANTI	2000	2324	2324
48	1920		3	ISLE	2000	707	707
41	1925		8	IVANHOE	2000	679	679
32	1930		7	JACKSON	2000	3501	3501
81	1935		7	JANESVILLE	2000	2109	2109
59	1940		8	JASPER	2000	597	522
67	1940		7	JASPER	2000	597	75
17	1945		7	JEFFERS	2000	396	396
18	1950		3	JENKINS	2000	287	287
06	1955		4	JOHNSON	2000	32	32
70	1960		5	JORDAN	2000	3833	3833
34	1965		8	KANDIYOHI	2000	555	555
35	1970		2	KARLSTAD	2000	794	794
40	1975		7	KASOTA	2000	680	680
20	1980		6	KASSON	2000	4398	4398
31	1985		1	KEEWATIN	2000	1164	1164
04	1990		2	KELLIHER	2000	294	294
79	1995		6	KELLOGG	2000	439	439
35	2005		2	KENNEDY	2000	255	255
67	2010		7	KENNETH	2000	61	61
21	2015		4	KENSINGTON	2000	286	286
84	2020		4	KENT	2000	120	120

CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
25	2025		6	KENYON	2000	1661	1661
76	2030		4	KERKHOVEN	2000	759	759
58	2035		1	KERRICK	2000	71	71
09	2040		1	KETTLE RIVER	2000	168	168
22	2045		7	KIESTER	2000	540	540
40	2050		7	KILKENNY	2000	148	148
73	2055		3	KIMBALL	2000	635	635
53	2060		7	KINBRAE	2000	21	21
47	2063		8	KINGSTON	2000	120	120
69	2065		1	KINNEY	2000	199	199
28	2070		6	LA CRESCENT	2000	4923	4923
52	2075		7	LAFAYETTE	2000	529	529
72	2075		7	LAFAYETTE	2000	529	0
41	2085		8	LAKE BENTON	2000	703	703

CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
35	2090		2	LAKE BRONSON	2000	246	246
25	2091		6	LAKE CITY	2000	4950	620
79	2091		6	LAKE CITY	2000	4950	4330
07	2095		7	LAKE CRYSTAL	2000	2420	2420
82	2100	206	9	LAKE ELMO	2000	6863	6863
32	2105		7	LAKEFIELD	2000	1721	1721
73	2115		3	LAKE HENRY	2000	90	90
82	2120		9	LAKELAND	2000	1917	1917
82	2125		9	LAKELAND SHORES	2000	355	355
34	2130		8	LAKE LILLIAN	2000	257	257
03	2135		4	LAKE PARK	2000	782	782
82	2138		9	LAKE ST CROIX BEACH	2000	1140	1140
11	2140		3	LAKE SHORE	2000	966	966
19	2150	188	9	LAKEVILLE	2000	43128	43128
51	2155		8	LAKE WILSON	2000	270	270
64	2160		8	LAMBERTON	2000	859	859
35	2165		2	LANCASTER	2000	363	363
82	2170		9	LANDFALL	2000	700	700
23	2175		6	LANESBORO	2000	788	788
29	2180		2	LAPORTE	2000	145	145
31	2185		1	LA PRAIRIE	2000	605	605
83	2190		7	LA SALLE	2000	90	90

49	2195		3	LASTRUP	2000	99	99
62	2200		9	LAUDERDALE	2000	2364	2364
40	2205		7	LE CENTER	2000	2240	2240
60	2210		2	LENGBY	2000	79	79
15	2215		2	LEONARD	2000	29	29
69	2220		1	LEONIDAS	2000	60	60
50	2225		6	LE ROY	2000	925	925
43	2230		8	LESTER PRAIRIE	2000	1377	1377
40	2235		7	LE SUEUR	2000	3922	3919
72	2235		7	LE SUEUR	2000	3922	3
85	2240		6	LEWISTON	2000	1484	1484
83	2245		7	LEWISVILLE	2000	274	274
02	2250		5	LEXINGTON	2000	2214	2214
19	2255		9	LILYDALE	2000	552	552
13	2260		9	LINDSTROM	2000	3015	3015
02	2265	210	5	LINO LAKES	2000	16791	16791
53	2270		7	LISMORE	2000	238	238
47	2275	135	8	LITCHFIELD	2000	6562	6562
62	2280	200	9	LITTLE CANADA	2000	9771	9771
49	2285	136	3	LITTLE FALLS	2000	7719	7719
36	2290		1	LITTLE FORK	2000	680	680
61	2295		4	LONG BEACH	2000	271	271
27	2300		5	LONG LAKE	2000	1842	1842
77	2305		3	LONG PRAIRIE	2000	3040	3040
11	2310		3	LONGVILLE	2000	180	180
66	2315		6	LONSDALE	2000	1491	1491
27	2320		5	LORETTO	2000	570	570

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CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
37	2325		8	LOUISBURG	2000	26	26
61	2330		4	LOWRY	2000	271	271
64	2335		8	LUCAN	2000	226	226
67	2340		7	LUVERNE	2000	4617	4617
50	2345		6	LYLE	2000	566	566
42	2350		8	LYND	2000	346	346
23	2353		6	MABEL	2000	766	766
01	2355		3	MC GRATH	2000	65	65
01	2360		3	MC GREGOR	2000	404	404
60	2365		2	MC INTOSH	2000	638	638

69	2370		1	MC KINLEY	2000	80	80
83	2380		7	MADELIA	2000	2340	2340
37	2385		8	MADISON	2000	1768	1768
07	2390		7	MADISON LAKE	2000	837	837
67	2395		7	MAGNOLIA	2000	221	221
44	2400		4	MAHNOMEN	2000	1202	1202
82	2405	219	9	MAHTOMEDI	2000	7563	7563
24	2410		6	MANCHESTER	2000	81	81
18	2415		3	MANHATTAN BEACH	2000	50	50
07	2420	137	7	MANKATO	2000	32427	32427
52	2420	137	7	MANKATO	2000	32427	0
20	2425		6	MANTORVILLE	2000	1054	1054
27	2430	189	5	MAPLE GROVE	2000	50365	50365
86	2435		3	MAPLE LAKE	2000	1633	1633
27	2440		5	MAPLE PLAIN	2000	2088	2088
07	2445		7	MAPLETON	2000	1678	1678
50	2450		6	MAPLEVIEW	2000	189	189
62	2455	138	9	MAPLEWOOD	2000	34947	34947
82	2455	138	9	MAPLEWOOD	2000	34947	0
31	2460		1	MARBLE	2000	695	695
37	2465		8	MARIETTA	2000	174	174
82	2470		9	MARINE ON ST CROIX	2000	602	602
42	2475	139	8	MARSHALL	2000	12735	12735
10	2480		5	MAYER	2000	554	554
12	2485		8	MAYNARD	2000	388	388
79	2490		6	MAZEPPA	2000	778	778
69	2495		1	MEADOWLANDS	2000	111	111
74	2500		6	MEDFORD	2000	984	984
27	2505		5	MEDICINE LAKE	2000	368	368
27	2510		5	MEDINA	2000	4005	4005
73	2515		3	MEIRE GROVE	2000	149	149
73	2520		3	MELROSE	2000	3091	3091
80	2525		3	MENAHGA	2000	1220	1220
19	2532		9	MENDOTA	2000	197	197
19	2535	140	9	MENDOTA HEIGHTS	2000	11434	11434
60	2540		2	MENTOR	2000	150	150
45	2545		2	MIDDLE RIVER	2000	319	319
19	2550		9	MIESVILLE	2000	135	135
48	2555		3	MILACA	2000	2580	2580

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LIST-CITY-TABLE - DEC 20,2001 LISTED BY CENSUS NUMBER

CNTY	CENSUS	URBN	CNS		CENSUS	TOTAL	COUNTY

NMBR	NUMBER	NMBR	DST	--------CITY NAME--------	YEAR	POP	POP
12	2560		8	MILAN	2000	326	326
21	2565		4	MILLERVILLE	2000	115	115
79	2570		6	MILLVILLE	2000	186	186
64	2575		8	MILROY	2000	271	271
21	2580		4	MILTONA	2000	279	279
27	2585	141	5	MINNEAPOLIS	2000	382618	382618
79	2590		6	MINNEISKA	2000	116	56
85	2590		6	MINNEISKA	2000	116	60
42	2595		8	MINNEOTA	2000	1449	1449
85	2600		6	MINNESOTA CITY	2000	235	235
07	2605		7	MINNESOTA LAKE	2000	681	0
22	2605		7	MINNESOTA LAKE	2000	681	681
27	2610	142	5	MINNETONKA	2000	51301	51301
27	2612		5	MINNETONKA BEACH	2000	614	614
27	2617		5	MINNETRISTA	2000	4358	4358
36	2620		1	MIZPAH	2000	78	78
12	2625	143	8	MONTEVIDEO	2000	5346	5346
40	2630		7	MONTGOMERY	2000	2794	2794
86	2635	222	3	MONTICELLO	2000	7868	7868
86	2640		3	MONTROSE	2000	1143	1143
14	2645	144	4	MOORHEAD	2000	32177	32177
09	2650		1	MOOSE LAKE	2000	2239	2239
33	2655		3	MORA	2000	3193	3193
64	2660		8	MORGAN	2000	903	903
75	2670	190	4	MORRIS	2000	5068	5068
66	2675		6	MORRISTOWN	2000	981	981
65	2680		8	MORTON	2000	442	442
11	2685		3	MOTLEY	2000	585	2
49	2685		3	MOTLEY	2000	585	583
27	2690	145	5	MOUND	2000	9435	9435
62	2695	146	9	MOUNDS VIEW	2000	12738	12738
69	2700		1	MOUNTAIN IRON	2000	2999	2999
17	2705		7	MOUNTAIN LAKE	2000	2082	2082
76	2710		4	MURDOCK	2000	303	303
24	2715		6	MYRTLE	2000	63	63
84	2720		4	NASHUA	2000	69	69
31	2725		1	NASHWAUK	2000	935	935
37	2730		8	NASSAU	2000	83	83
21	2735		4	NELSON	2000	172	172
66	2740		6	NERSTRAND	2000	233	233
29	2745		2	NEVIS	2000	364	364
72	2750		7	NEW AUBURN	2000	488	488
62	2755	147	9	NEW BRIGHTON	2000	22206	22206
45	2760		2	NEWFOLDEN	2000	362	362
10	2765		5	NEW GERMANY	2000	346	346
27	2770	182	5	NEW HOPE	2000	20873	20873
34	2775		8	NEW LONDON	2000	1066	1066

70	2780		5	NEW MARKET	2000	332	332
73	2785		3	NEW MUNICH	2000	352	352

LIST-CITY-TABLE - DEC 20,2001 LISTED BY CENSUS NUMBER

CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
82	2790		9	NEWPORT	2000	3715	3715
40	2795		7	NEW PRAGUE	2000	4559	1402
70	2795		5	NEW PRAGUE	2000	4559	3157
81	2800		7	NEW RICHLAND	2000	1197	1197
19	2805		9	NEW TRIER	2000	116	116
08	2810	148	7	NEW ULM	2000	13594	13594
56	2815		4	NEW YORK MILLS	2000	1158	1158
52	2820		7	NICOLLET	2000	889	889
60	2825		2	NIELSVILLE	2000	91	91
80	2830		3	NIMROD	2000	75	75
18	2835		3	NISSWA	2000	1953	1953
26	2840		4	NORCROSS	2000	59	59
13	2845		9	NORTH BRANCH	2000	8023	8023
19	2850	149	9	NORTHFIELD	2000	17147	557
66	2850	149	6	NORTHFIELD	2000	17147	16590
52	2855	150	7	NORTH MANKATO	2000	11798	11798
62	2860		9	NORTH OAKS	2000	3883	3883
36	2865		1	NORTHOME	2000	230	230
46	2875		7	NORTHROP	2000	262	262
62	2880	151	9	NORTH ST PAUL	2000	11929	11929
10	2885		5	NORWOOD YOUNG AMERICA	2000	3108	3108
82	2888	185	9	OAKDALE	2000	26653	26653
02	2889	223	5	OAK GROVE	2000	6903	6903
82	2890		9	OAK PARK HEIGHTS	2000	3957	3957
06	2895		4	ODESSA	2000	113	113
83	2900		7	ODIN	2000	125	125
03	2905		4	OGEMA	2000	143	143
33	2910		3	OGILVIE	2000	474	474
32	2915		7	OKABENA	2000	185	185
63	2920		2	OKLEE	2000	396	396
65	2925		8	OLIVIA	2000	2570	2570
48	2930		3	ONAMIA	2000	847	847
46	2935		7	ORMSBY	2000	154	56
83	2935		7	ORMSBY	2000	154	98
27	2940	152	5	ORONO	2000	7538	7538

55	2942		6	ORONOCO	2000	883	883
69	2945		1	ORR	2000	249	249
06	2950		4	ORTONVILLE	2000	2158	2158
21	2955		4	OSAKIS	2000	1567	1392
77	2955		3	OSAKIS	2000	1567	175
45	2960		2	OSLO	2000	347	347
27	2965		5	OSSEO	2000	2434	2434
23	2970		6	OSTRANDER	2000	212	212
86	2972	217	3	OTSEGO	2000	6389	6389
56	2975		4	OTTERTAIL	2000	451	451
74	2980	153	6	OWATONNA	2000	22434	22434
01	2985		3	PALISADE	2000	118	118
56	2990		4	PARKERS PRAIRIE	2000	991	991

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CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
29	2995		2	PARK RAPIDS	2000	3276	3276
73	3000		3	PAYNESVILLE	2000	2267	2267
48	3005		3	PEASE	2000	163	163
56	3015		4	PELICAN RAPIDS	2000	2374	2374
07	3020		7	PEMBERTON	2000	246	246
34	3025		8	PENNOCK	2000	504	504
18	3030		3	PEQUOT LAKES	2000	947	947
56	3035		4	PERHAM	2000	2559	2559
54	3040		2	PERLEY	2000	121	121
23	3045		6	PETERSON	2000	269	269
49	3050		3	PIERZ	2000	1277	1277
11	3055		3	PILLAGER	2000	420	420
58	3060		1	PINE CITY	2000	3043	3043
25	3065		6	PINE ISLAND	2000	2337	2219
55	3065		6	PINE ISLAND	2000	2337	118
11	3070		3	PINE RIVER	2000	928	928
82	3075		9	PINE SPRINGS	2000	421	421
59	3080		8	PIPESTONE	2000	4280	4280
79	3085		6	PLAINVIEW	2000	3190	3190
43	3090		8	PLATO	2000	336	336
73	3095		3	PLEASANT LAKE	2000	504	504
63	3100		2	PLUMMER	2000	270	270
27	3105	155	5	PLYMOUTH	2000	65894	65894

87	3110		8	PORTER	2000	190	190
23	3115		6	PRESTON	2000	1426	1426
48	3120		3	PRINCETON	2000	3933	3926
71	3120		3	PRINCETON	2000	3933	7
34	3125		8	PRINSBURG	2000	458	458
70	3130	201	5	PRIOR LAKE	2000	15917	15917
69	3135		1	PROCTOR	2000	2852	2852
33	3140		3	QUAMBA	2000	98	98
50	3145		6	RACINE	2000	355	355
02	3148	199	5	RAMSEY	2000	18510	18510
49	3150		3	RANDALL	2000	535	535
19	3155		9	RANDOLPH	2000	318	318
36	3160		1	RANIER	2000	188	188
34	3165		8	RAYMOND	2000	803	803
63	3170		2	RED LAKE FALLS	2000	1590	1590
25	3175	156	6	RED WING	2000	16116	16116
64	3180		8	REDWOOD FALLS	2000	5459	5459
34	3185		8	REGAL	2000	40	40
11	3190		3	REMER	2000	372	372
65	3195		8	RENVILLE	2000	1323	1323
64	3200		8	REVERE	2000	100	100
05	3205		3	RICE	2000	711	711
27	3210	157	5	RICHFIELD	2000	34439	34439
73	3215		3	RICHMOND	2000	1213	1213
56	3220		4	RICHVILLE	2000	124	124
18	3225		3	RIVERTON	2000	115	115

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CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
27	3230	158	5	ROBBINSDALE	2000	14123	14123
55	3235	159	6	ROCHESTER	2000	85806	85806
58	3237		1	ROCK CREEK	2000	1119	1119
27	3240		5	ROCKFORD	2000	3484	144
86	3240		3	ROCKFORD	2000	3484	3340
73	3245		3	ROCKVILLE	2000	749	749
27	3250		5	ROGERS	2000	3588	3588
85	3255		6	ROLLINGSTONE	2000	697	697
05	3260		3	RONNEBY	2000	16	16
39	3265		2	ROOSEVELT	2000	166	3
68	3265		2	ROOSEVELT	2000	166	163

73	3270		3	ROSCOE	2000	116	116
68	3275		2	ROSEAU	2000	2756	2756
50	3280		6	ROSE CREEK	2000	354	354
19	3285	208	9	ROSEMOUNT	2000	14619	14619
62	3290	160	9	ROSEVILLE	2000	33690	33690
56	3295		4	ROTHSAY	2000	497	226
84	3295		4	ROTHSAY	2000	497	271
53	3300		7	ROUND LAKE	2000	424	424
49	3305		3	ROYALTON	2000	816	816
13	3310		9	RUSH CITY	2000	2102	2102
23	3315		6	RUSHFORD CITY	2000	1696	1696
23	3320		6	RUSHFORD VILLAGE	2000	714	714
53	3325		7	RUSHMORE	2000	376	376
42	3330		8	RUSSELL	2000	371	371
59	3335		8	RUTHTON	2000	284	284
58	3340		1	RUTLEDGE	2000	196	196
14	3345		4	SABIN	2000	421	421
65	3350		8	SACRED HEART	2000	549	549
27	3360	161	5	ST ANTHONY	2000	8012	5664
62	3360	161	9	ST ANTHONY	2000	8012	2348
73	3362		3	ST ANTHONY	2000	90	90
27	3365		5	ST BONIFACIUS	2000	1873	1873
85	3370		6	ST CHARLES	2000	3295	3295
07	3375		7	ST CLAIR	2000	827	827
05	3380	162	3	ST CLOUD	2000	59107	6391
71	3380	162	3	ST CLOUD	2000	59107	5982
73	3380	162	3	ST CLOUD	2000	59107	46734
02	3382		5	ST FRANCIS	2000	4910	4910
57	3385		2	ST HILAIRE	2000	272	272
83	3390		7	ST JAMES	2000	4695	4695
73	3395		3	ST JOSEPH	2000	5000	5000
87	3400		8	ST LEO	2000	106	106
27	3405	163	5	ST LOUIS PARK	2000	44126	44126
73	3410		3	ST MARTIN	2000	278	278
82	3415		9	ST MARYS POINT	2000	344	344
86	3420		3	ST MICHAEL	2000	9099	9099
62	3425	164	9	ST PAUL	2000	287151	287151
82	3430		9	ST PAUL PARK	2000	5070	5070

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CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP

40	3435	165	7	ST PETER	2000	9747	0
52	3435	165	7	ST PETER	2000	9747	9747
73	3440		3	ST ROSA	2000	44	44
73	3445		3	ST STEPHEN	2000	860	860
35	3450		2	ST VINCENT	2000	117	117
64	3455		8	SANBORN	2000	434	434
58	3460		1	SANDSTONE	2000	1549	1549
50	3465		6	SARGEANT	2000	76	76
05	3470	220	3	SARTELL	2000	9641	2011
73	3470	220	3	SARTELL	2000	9641	7630
73	3475		3	SAUK CENTRE	2000	3930	3930
05	3480	191	3	SAUK RAPIDS	2000	10213	10213
70	3485	211	5	SAVAGE	2000	21115	21115
09	3490		1	SCANLON	2000	838	838
64	3495		8	SEAFORTH	2000	77	77
80	3500		3	SEBEKA	2000	710	710
61	3505		4	SEDAN	2000	65	65
13	3510		9	SHAFER	2000	343	343
70	3515	166	5	SHAKOPEE	2000	20568	20568
54	3520		2	SHELLY	2000	266	266
46	3525		7	SHERBURN	2000	1082	1082
15	3530		2	SHEVLIN	2000	160	160
62	3535	167	9	SHOREVIEW	2000	25924	25924
10	3540	216	5	SHOREWOOD	2000	7400	0
27	3540	216	5	SHOREWOOD	2000	7400	7400
38	3545		1	SILVER BAY	2000	2068	2068
43	3550		8	SILVER LAKE	2000	761	761
07	3555		7	SKYLINE	2000	330	330
51	3560		8	SLAYTON	2000	2072	2072
08	3565		7	SLEEPY EYE	2000	3515	3515
49	3570		3	SOBIESKI	2000	196	196
04	3575		2	SOLWAY	2000	69	69
86	3585		3	SOUTH HAVEN	2000	204	204
19	3595	168	9	SOUTH ST PAUL	2000	20167	20167
34	3600		8	SPICER	2000	1126	1126
08	3605		7	SPRINGFIELD	2000	2215	2215
28	3610		6	SPRING GROVE	2000	1304	1304
73	3615		3	SPRING HILL	2000	55	55
02	3620	183	5	SPRING LAKE PARK	2000	6772	6667
62	3620	183	9	SPRING LAKE PARK	2000	6772	105
27	3625		5	SPRING PARK	2000	1717	1717
23	3630		6	SPRING VALLEY	2000	2518	2518
31	3635		1	SQUAW LAKE	2000	99	99
13	3640		9	STACY	2000	1278	1278
77	3645		3	STAPLES	2000	3104	2462
80	3645		3	STAPLES	2000	3104	642
61	3650		4	STARBUCK	2000	1314	1314
67	3655		7	STEEN	2000	182	182

45	3660		2	STEPHEN	2000	708	708

LIST-CITY-TABLE - DEC 20,2001 LISTED BY CENSUS NUMBER

CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
43	3665		8	STEWART	2000	564	564
55	3670		6	STEWARTVILLE	2000	5411	5411
82	3675	169	9	STILLWATER	2000	15143	15143
85	3685		6	STOCKTON	2000	682	682
17	3690		7	STORDEN	2000	274	274
45	3695		2	STRANDQUIST	2000	88	88
68	3700		2	STRATHCONA	2000	29	29
58	3705		1	STURGEON LAKE	2000	347	347
34	3710		8	SUNBURG	2000	110	110
19	3715		9	SUNFISH LAKE	2000	504	504
49	3720		3	SWANVILLE	2000	351	351
77	3720		3	SWANVILLE	2000	351	0
31	3725		1	TACONITE	2000	315	315
01	3730		3	TAMARACK	2000	59	59
50	3735		6	TAOPI	2000	93	93
42	3740		8	TAUNTON	2000	207	207
13	3745		9	TAYLORS FALLS	2000	951	951
84	3750		4	TENNEY	2000	6	6
04	3755		2	TENSTRIKE	2000	195	195
57	3760	170	2	THIEF RIVER FALLS	2000	8410	8410
09	3765		1	THOMSON	2000	153	153
78	3770		4	TINTAH	2000	79	79
27	3775		5	TONKA BAY	2000	1547	1547
69	3780		1	TOWER	2000	479	479
42	3785		8	TRACY	2000	2268	2268
60	3790		2	TRAIL	2000	62	62
46	3795		7	TRIMONT	2000	754	754
18	3800		3	TROMMALD	2000	125	125
59	3805		8	TROSKY	2000	116	116
46	3810		7	TRUMAN	2000	1259	1259
04	3815		2	TURTLE RIVER	2000	75	75
24	3820		6	TWIN LAKES	2000	168	168
54	3825		2	TWIN VALLEY	2000	865	865
38	3830		1	TWO HARBORS	2000	3613	3613
41	3835		8	TYLER	2000	1218	1218
14	3840		4	ULEN	2000	532	532

56	3845		4	UNDERWOOD	2000	319	319
49	3850		3	UPSALA	2000	424	424
56	3855		4	URBANK	2000	59	59
85	3860		6	UTICA	2000	230	230
62	3865	209	9	VADNAIS HEIGHTS	2000	13069	13069
56	3870		4	VERGAS	2000	311	311
19	3875		9	VERMILLION	2000	437	437
80	3880		3	VERNDALE	2000	575	575
07	3885		7	VERNON CENTER	2000	359	359
64	3890		8	VESTA	2000	339	339
10	3895		5	VICTORIA	2000	4025	4025
45	3900		2	VIKING	2000	92	92
61	3905		4	VILLARD	2000	244	244

CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
56	3910		4	VINING	2000	68	68
69	3915	171	1	VIRGINIA	2000	9157	9157
79	3920		6	WABASHA	2000	2599	2599
64	3925		8	WABASSO	2000	643	643
10	3930		5	WACONIA	2000	6814	6814
56	3935		4	WADENA	2000	4294	50
80	3935		3	WADENA	2000	4294	4244
48	3940		3	WAHKON	2000	314	314
73	3945	221	3	WAITE PARK	2000	6568	6568
81	3950		7	WALDORF	2000	242	242
11	3955		3	WALKER	2000	1069	1069
64	3960		8	WALNUT GROVE	2000	599	599
22	3965		7	WALTERS	2000	88	88
50	3970		6	WALTHAM	2000	196	196
25	3975		6	WANAMINGO	2000	1007	1007
64	3980		8	WANDA	2000	103	103
31	3985		1	WARBA	2000	183	183
45	3990		2	WARREN	2000	1678	1678
68	3995		2	WARROAD	2000	1722	1722
81	4000	172	7	WASECA	2000	8493	8493
10	4005		5	WATERTOWN	2000	3029	3029
40	4010		7	WATERVILLE	2000	1833	1833
47	4015		8	WATKINS	2000	880	880
12	4020		8	WATSON	2000	209	209

44	4025		4	WAUBUN	2000	403	403
86	4030		3	WAVERLY	2000	732	732
27	4035		5	WAYZATA	2000	4113	4113
46	4040		7	WELCOME	2000	721	721
22	4045		7	WELLS	2000	2494	2494
26	4050		4	WENDELL	2000	177	177
17	4055		7	WESTBROOK	2000	755	755
20	4060		6	WEST CONCORD	2000	836	836
61	4065		4	WESTPORT	2000	72	72
19	4070	173	9	WEST ST PAUL	2000	19405	19405
77	4075		3	WEST UNION	2000	87	87
23	4080		6	WHALAN	2000	64	64
78	4085		4	WHEATON	2000	1619	1619
62	4090	174	9	WHITE BEAR LAKE	2000	24325	23974
82	4090	174	9	WHITE BEAR LAKE	2000	24325	351
32	4095		7	WILDER	2000	69	69
82	4100		9	WILLERNIE	2000	549	549
39	4105		2	WILLIAMS	2000	210	210
34	4110	175	8	WILLMAR	2000	18351	18351
58	4115		1	WILLOW RIVER	2000	309	309
53	4120		7	WILMONT	2000	332	332
04	4125		2	WILTON	2000	186	186
17	4130		7	WINDOM	2000	4490	4490
60	4135		2	WINGER	2000	205	205
22	4140		7	WINNEBAGO	2000	1487	1487

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LIST-CITY-TABLE - DEC 20,2001 LISTED BY CENSUS NUMBER

CNTY NMBR	CENSUS NUMBER	URBN NMBR	CNS DST	--------CITY NAME--------	CENSUS YEAR	TOTAL POP	COUNTY POP
85	4145	176	6	WINONA	2000	27069	27069
43	4150		8	WINSTED	2000	2094	2094
72	4155		7	WINTHROP	2000	1367	1367
69	4160		1	WINTON	2000	185	185
03	4165		4	WOLF LAKE	2000	31	31
84	4170		4	WOLVERTON	2000	122	122
82	4173	192	9	WOODBURY	2000	46463	46463
87	4175		8	WOOD LAKE	2000	436	436
27	4180		5	WOODLAND	2000	480	480
59	4185		8	WOODSTOCK	2000	132	132
53	4190	177	7	WORTHINGTON	2000	11283	11283
09	4195		1	WRENSHALL	2000	308	308

09	4200		1	WRIGHT	2000	93	93
23	4205		6	WYKOFF	2000	460	460
13	4210		9	WYOMING	2000	3048	3048
31	4220		1	ZEMPLE	2000	75	75
71	4222		3	ZIMMERMAN	2000	2851	2851
79	4225		6	ZUMBRO FALLS	2000	177	177
25	4230		6	ZUMBROTA	2000	2789	2789
62	9999	999	9	URBAN AREA - TWIN CITIES	1970	700000	700000

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A P P E N D I X D

A C T U A L R E C O R D F O R M A T S

Introduction

****

The actual record formats of the T.I.S. files are structures of the records as they are physically stored in the files. Within the T.I.S. software, application record formats that can vary considerably from the actual formats are sometimes used for processing. Actual record formats are provided for those users that need to utilize the T.I.S. files without going through the T.I.S. software (eg., with ASI-ST).

In all files keyed on route system, route number, and reference point, the route number is expanded from 8 to 9 characters for storage in the file. If the 8-character route number ends with a digit, a blank is added in the ninth position. If the 8-character route number ends with an alphabetic, the route number is broken between the fourth and fifth characters and a zero is inserted in the middle. For example, 25850081A is stored as "25850081A". Route 81A is thus stored immediately following route 81.

The "data of update" field found in many records is zero when the file is initially loaded. Once the record is in the file, the date of update is modified to indicate the most recent date that any part of the record was updated by T.I.S. update software. This includes records inserted into the files.

Several formats are used in the T.I.S. files:

- CHAR format: Characters are stored one character per byte. All characters can be stored. "char(n)" identifies a character format field that can hold n characters. CHAR format is the same as (1) COBOL's DISPLAY format, (2) PL/I's CHAR format, or BAL's CL format.

- FIXED format: Fixed format is used when only numbers, decimal points, and arithmetic signs will be stored. Two digits can be stored in each byte, except that only one digit is stored in the last byte along with the sign. Fixed format is the same as (1) COBOL's COMP-s format, (2) PL/I's DECIMAL FIXED format, or (3) BAL's PL format. Fixed(n,m) is a fixed field with n digits, m of which lie to the right of the decimal point.

- BINARY format: Binary halfwords (length = 2) are occasionally used to store numeric information.

- BIT format: Used for IBM control fields. Bit(n) is a bit field with n bits (8 bits = 1 byte).

The Roadlog Record Format

The roadlog record is 269 bytes long and the key field is columns 2-22:

Columns	Length	Format	Data Element
1	1	Bit(8)	Delete byte (1111 1111 = deleted record)
2-3	2	Char(2)	Route system
4-12	9	Char(9)	Route number
13-22	10	Char(10)	Reference point
23-73	51	Char(51)	Description
74-75	2	Char(2)	Remark code
76	1	Fixed(1)	Break code
77-78	2	Fixed(2)	Intersection category
79-83	5	Fixed(8)	Date of update(year-month-day)
84-91	8	Char(8)	Section township and range
92-93	2	Char(2)	Direction code
94	1	Fixed(1)	Control of access
95-96	2	Char(2)	Right shoulder width rd2
97-98	2	Char(2)	Right shoulder type rd2
99-100	2	Char(2)	Surface width rd2
101-102	2	Char(2)	Surface type rd2
103-104	2	Char(2)	Left shoulder width rd2
105-106	2	Char(2)	Left shoulder type rd2
107-108	2	Char(2)	Median width
109	1	Char(1)	Median type
110-111	2	Char(2)	Left shoulder width rd1
112-113	2	Char(2)	Left shoulder type rd1
114-115	2	Char(2)	Surface width rd1
116-117	2	Char(2)	Surface type rd1
118-119	2	Char(2)	Right shoulder width rd1
120-121	2	Char(2)	Right shoulder type rd1
122	1	Char(1)	Number of lanes d.m.
123	1	Char(1)	Number of lanes i.m.
124	1	Char(1)	Turning lanes d.m.
125	1	Char(1)	Turning lanes i.m.
126	1	Char(1)	Additional lanes rd2
127	1	Char(1)	Additional lanes rd1
128	1	Char(1)	Sidewalks
129	1	Char(1)	Divided & one-way code
130	1	Char(1)	Curbs rd2
131	1	Char(1)	Curbs rd1
132	1	Char(1)	Parking rd2
133	1	Char(1)	Parking rd1
134-135	2	Fixed(2)	County number
136-138	3	unused	
139	1	Fixed(1)	Urban-municipal code

Columns	Length	Format	Data Element
140-142	3	Char(3)	Right of way width
143-144	2	Fixed(2)	Control section number
145-148	4	Char(4)	Patrol station
149-150	2	Fixed(2)	Functional classification
151-152	2	Char(2)	Maintenance area
153	1	Fixed(1)	Construction district
154-156	3	Fixed(4)	City number
157-159	3	Fixed(4)	City number faua
160	1	Char(1)	Federal aid system
161-164	4	Char(4)	Federal aid route number
165	1	Char(1)	Federal aid system designated
166	1	Char(1)	Federal aid system regualr
167-169	3	Char(3)	Legislative route numbe
170-172	3	Char(3)	Township number
173	1	Char(1)	Storm sewers
174-175	2	Fixed(2)	Location code 1
176-177	2	Fixed(2)	Area name code 1
178-179	2	Fixed(2)	Location code 2
180-181	2	Fixed(2)	Area name code 2
182-183	2	Fixed(2)	Location code 3
184-185	2	Fixed(2)	Area name code 3
186	1	Fixed(1)	Special systems
187-188	2	Char(2)	Corridor
189-190	2	unused	
191-194	4	Char(4)	Surface type spec number rd2
195-197	3	Char(4)	Surface thickness rd2
198-201	4	Char(4)	Base spec number rd2
202-204	2	Char(4)	Base thickness rd2
205-206	2	Char(2)	Truck route classification
207-210	4	unused	
211-214	4	Char(4)	Surface type spec number rd1
215	1	Char(1)	Federal functional code
216	1	Char(1)	Transportation subsystem
217	1	Char(1)	Bike Plan exists
218-221	4	Char(4)	Base spec number rd1

222-224	3	Char(3)	Base thickness rd1
225-226	2	Char(2)	Base width rd1
227-231	5	Char(5)	State project number
232-234	3	Char(3)	Federal project number
235-236	2	Fixed(2)	Design speed
237-240	4	unused	
241-242	2	Fixed(2)	Alternate Functional classification
243	1	Char(1)	Alternate Federal aid system
244-247	4	Char(4)	Alternate Federal aid route number
248-252	5	Fixed(8)	Date of inventory (year-month-day)
253-257	5	Fixed(8)	Effective date (year-month-day)
258-260	3	Fixed(4)	Year built rd2
261-263	3	Fixed(4)	Year improved rd2
264-266	3	Fixed(4)	Year built rd1
267-269	3	Fixed(4)	Year improved rd1

The Logpoint Record Format
****

The logpoint record is 83 bytes long and the key field is columns 2-22:

Columns	Length	Format	Data Element
1	1	Bit(8)	Delete byte(1111 1111 = deleted record)
2-3	2	Char(2)	Route system
4-12	9	Char(9)	Route number
13-22	10	Char(10)	Reference point
23-73	51	Char(51)	Description
74-75	2	Char(2)	Remark code
76	1	Fixed(1)	Break code
77-78	2	Fixed(2)	Intersection category
79-83	5	Fixed(8)	Date of update (year-month-day)

The True Mileage Record Format
****

The true mileage record is 38 bytes long and the key field is columns 2-15

Columns	Length	Format	Data Element
1	1	Bit(8)	Delete byte (1111 1111 = delete record)
2-3	2	Char(2)	Route system
4-12	9	Char(9)	Route number
13-15	3	Char(3)	Reference point
16-19	4	Fixed(6,3)	True mileage
20-23	4	unused	
24	1	Char(1)	Existing/theoretical code
25-28	4	unused	
29-33	5	Fixed(8)	Effective date (year-month-day)
34-38	5	Fixed(8)	Date of update (year-month-day)

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Coincident Record Format

The coincident record is 72 bytes long and the key field is columns 2-22:

Columns	Length	Format	Data Element
1	1	Bit(8)	Delete byte (1111 1111 = deleted record)
2-3	2	Char(2)	Coincident route system
4-12	9	Char(9)	Coincident route number
13-22	10	Char(10)	Coincident beginning ref. point
23-32	10	Char(10)	Coincident ending ref. point
33-34	2	Char(2)	Base route system
35-42	8	Char(8)	Base route number
43-52	10	Char(10)	Base beginning reference point

53-62	10	Char(10)	Base ending reference point
63	1	Char(1)	Direction code
64-67	4	unused	
68-72	5	Fixed(8)	Date of update (year-month-day)

The Traffic Record Format
****

The traffic record is variable-length ranging from 40 to 460 bytes long. The key field is columns 5 - 25:

Columns	Length	Format	Data Element
1-2	2	Binary(16)	Length of record (binary halfword number of bytes)
3-4	2	Binary(16)	Reserved for IBM use
5-6	2	Char(2)	Route system
7-15	9	Char(9)	Route number
16-25	10	Char(10)	Reference point
26-29	4	unused	
30-31	2	Fixed(2)	TOTAL number of volume fields
34-35	2	Fixed(2)	Number of BLANK volume fields
32-33	2	Fixed(2)	Number of FULL volume fields
36-40	5	Fixed(8)	Date of update (yyyymmdd)
41-54	14	Segment	Volume field #1 (if present)
55-68	14	Segment	Volume field #2 (if present)
.	.	.	.
.	.	.	.
.	.	.	.
447-460	14	Segment	Volume field #30 (if present)

The format of each volume field is:

1-4	4	Char(4)	Year to which data applies
5	1	Char(1)	Volume type
6-7	2	Char(2)	Volume group
8-11	4	Fixed(6)	AADT
12-14	3	Fixed(5)	Heavy commercial AADT

The Intersection Record Format
****

The intersection record is variable-length ranging from 261-1397 bytes long. The key field is columns 5 - 28:

Columns	Length	Format	Data Element
1-2	2	Binary(16)	Length of record (binary halfword number of bytes)
3-4	2	Binary(16)	Reserved for IBM use
5-6	2	Char(2)	Route system
7-15	9	Char(9)	Route number
16-25	10	Char(10)	Reference point
26-28	3	Char(3)	Interchange element number
29	1	Fixed(1)	Intersection type
30	1	Fixed(1)	Intersection description
31-38	8	Char(8)	Railroad crossing number
39	1	Fixed(1)	Traffic control devices
40	1	Fixed(1)	Traffic signal progressing
41	1	Fixed(1)	Traffic signal timing
42	1	Fixed(1)	Traffic signal construction
43	1	Fixed(1)	Traffic signal head placement
44	1	Fixed(1)	Traffic signal pedestrian signal
45-46	2	Char(2)	Traffic signal time on
47-48	2	Char(2)	Traffic signal time off
49	1	Fixed(1)	Traffic signal phasing
50	1	Fixed(1)	Traffic signal preemption
51	1	Fixed(1)	Roadway lighting
52	1	Fixed(1)	General environment
53-54	2	Fixed(2)	Specific environment
55-56	2	Char(2)	District category
57-58	2	Char(2)	Central office category
59-60	2	unused	
61	1	Char(1)	Safety improvement - district
62-63	2	Char(2)	Safety improvement - project number
64-65	2	Char(2)	Safety improvement - classification
66-69	4	unused	
70-99	30	Char(30)	Verbal description
100-103	4	unused	
104	1	Fixed(1)	Number of routes involved
105	1	Fixed(1)	Number of legs present
106-109	4	Char(4)	Safety improvement - year
110-114	5	Fixed(8)	Effective date (year-month-day)
115-119	5	Fixed(8)	Date of update (year-month-day)
120-261	142	Segment	First INL segment
262-403	142	Segment	Second INL segment (if present)
.	.	.	.
.	.	.	.
.	.	.	.
1256-1397	142	Segment	Ninth INL segment (if present)

The format of each INL segment is:

Columns	Length	Format	Data Element
1-2	2	Char(2)	Route system
3-10	8	Char(8)	Route number
11-20	10	Char(10)	Reference point
21	1	Fixed(1)	Road description
22-24	3	Fixed(4)	Lower limit
25-27	3	Fixed(4)	Upper limit
28	1	Fixed(1)	Number of legs present
29-85	57	Segment	Leg #1
86-142	57	Segment	Leg #2

The format of each Leg segment is:

1	1	Fixed(1)	Leg number
2	1	Fixed(1)	Direction
3-6	4	Fixed(6)	AADT - first year
7-10	4	Char(4)	Year of AADT - first year
11-14	4	Fixed(6)	AADT - second year
15-18	4	Char(4)	Year of AADT - second year
19-22	4	Fixed(6)	AADT - third year
23-26	4	Char(4)	Year of AADT - third year
27-30	4	Fixed(6)	AADT - fourth year
31-34	4	Char(4)	Year of AADT - fourth year
35-38	4	Fixed(6)	AADT - fifth year
39-42	4	Char(4)	Year of AADT - fifth year
43-44	2	Fixed(2)	Approach speed limit
45	1	Fixed(1)	Approach control
46	1	Fixed(1)	Approach thru lanes - off-peak
47	1	Fixed(1)	Approach thru lanes - peak
48	1	Fixed(1)	Leaving thru lanes - off-peak
49	1	Fixed(1)	Leaving thru lanes - peak
50	1	Fixed(1)	Approach bypass/turn lanes
51-57	7	Char(7)	Approach comments

The Sections Record Format
****

The sections record is 94 bytes long and the key field field is columns 2 - 22:

Columns	Length	Format	Data Element
1	1	Bit(8)	Delete byte(1111 1111 = deleted record)
2-3	2	Char(2)	Route system
4-12	9	Char(9)	Route number
13-22	10	Char(10)	Reference point
23	1	Fixed(1)	Construction district
24	1	Char(1)	General environment
25	1	Char(1)	Road design
26	1	Char(1)	Thru lane description
27	1	Char(1)	Median type
28	1	Char(1)	Left turn lane description
29-30	2	Char(2)	District category
31 32	2	Char(2)	Central office category
33-34	2	Char(2)	Speed limit
35-85	51	Char(51)	Description
86-89	4	unused	
90-94	5	Fixed(8)	Date of update (year-month-day)

The City Table Record Format
****

The city table record is 54 bytes long and the key field is columns 2-7:

Columns	Length	Format	Data Element

1	1	Bit(8)	Delete byte(1111 1111 = deleted record)
2-5	4	Char(4)	City number
6-7	2	Char(2)	County number
8-32	25	Char(25)	City name
33-39	7	Char(7)	Total population
40-46	7	Char(7)	Partial population in this county
47-50	4	Char(4)	Year of census
51-53	3	Char(3)	Urban area number
54	1	Char(1)	Construction district

The Township Record Format
****

The township record is 31 bytes long and the key field is columns 2-6:

Columns	Length	Format	Data Element
1	1	Bit(8)	Delete byte(1111 1111 = deleted record)
2-3	2	Char(2)	County number
4-6	3	Char(3)	Township number
7-31	25	Char(25)	Township name

The Street Name Cross-reference Record Format
****

The street name cross-reference record is 34 bytes long and the key field is columns 2-22:

Columns	Length	Format	Data Element
1	1	Bit(8)	Delete byte(1111 1111 = deleted record)
2-3	2	Char(2)	Route system

4-12	9	Char(9)	Route number
13-22	10	Char(10)	Starting reference point
23-32	10	Char(10	Ending reference point
33-36	4	Char(4)	City number
37-38	2	Char(2)	County number
39-63	25	Char(25)	Street name

The Patrol Station Cross-reference Record Format
****

The patrol station cross-reference record is 42 bytes long and the key field is columns 2 - 26:

Columns	Length	Format	Data Element
1	1	Bit(8)	Delete byte(1111 1111 = deleted record)
2-5	4	Char(4)	Patrol station
6-7	2	Char(2)	Route system
8-16	9	Char(9)	Route number
17-26	10	Char(10)	Statring reference point
27-36	10	Char(10)	Ending reference point

37-38	2	Char(2)	County number
39-42	4	Char(4)	City number

The Construction District Cross-reference Record Format
****

The construction district cross-reference record is 42 bytes long and the key field is columns 2 - 26:

Columns	Length	Format	Data Element
1	1	Bit(8)	Delete byte(1111 1111 = deleted record)
2	1	Char(1)	Construction district
3-4	2	Char(2)	Starting route system
5-13	9	Char(9)	Starting route number
14-23	10	Char(10)	Starting reference point
24-25	2	Char(2)	Ending route system
26-34	9	Char(9)	Ending route number
35-44	10	Char(10)	Ending reference point
45-46	2	Char(2)	County number
47-50	4	Char(4)	City number

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The Maintenance Area Cross-reference Record Format
****

The maintenance area cross-reference record is 34 bytes long and the key field is columns 2 - 24:

Columns	Length	Format	Data Element

Columns	Length	Format	Data Element
1	1	Bit(8)	Delete byte(1111 1111 = deleted record)
2-3	2	Char(2)	Maintenance area
4-5	2	Char(2)	Route system
6-14	9	Char(9)	Route number
15-24	10	Char(10)	Starting reference point
25-34	10	Char(10)	Ending reference point

The City Cross-reference Record Format
****

The city cross-reference record is 47 bytes long and the key field is columns 2 - 26:

Columns	Length	Format	Data Element
1	1	Bit(8)	Delete byte(1111 1111 = deleted record)
2-5	4	Char(4)	City number
6-7	2	Char(2)	Starting route system
8-16	9	Char(9)	Starting route number
17-26	10	Char(10)	Starting reference point
27-28	2	Char(2)	Ending route system
29-37	9	Char(9)	Ending route number
38-47	10	Char(10)	Ending reference point

The County Cross-reference Record Format
****

The county cross-reference record is 49 bytes long and the key field is columns 2 - 24:

Columns	Length	Format	Data Element
1	1	Bit(8)	Delete byte(1111 1111 = deleted record)
2-3	2	Char(2)	County number
4-5	2	Char(2)	Starting route system
6-14	9	Char(9)	Starting route number
15-24	10	Char(10)	Starting reference point
25-26	2	Char(2)	Ending route system
27-35	9	Char(9)	Ending route number
36-45	10	Char(10)	Ending reference point
46-49	4	Char(4)	City number

The Intersection Cross-reference Record Format

The intersection cross-reference record is 60 bytes long and the key field is columns 2 - 45:

Columns	Length	Format	Data Element
1	1	Bit(8)	Delete byte(1111 1111 = deleted record)
2-3	2	Char(2)	Route system
4-12	9	Char(9)	Route number
13-22	10	Char(10)	Reference point
23-24	2	Char(2)	Intersection key route sytem
25-32	8	Char(8)	Intersection key route number
33-42	10	Char(10)	Intersection key reference point
43-45	3	Char(3)	Intersection element number
46	1	Fixed(1)	Construction district
47-48	2	Char(2)	Maintenance area
49-52	4	Char(4)	Patrol station
53-54	2	Fixed(2)	County number
55-57	3	Fixed(4)	City number
58-60	3	Fixed(4)	Urban area number

The Bridge Cross-Reference Record Format

The bridge cross-reference record is 38 bytes long and the key field is columns 2-33.

Columns	Length	Format	Data Element
1	1	Bit(8)	Delete byte
2-3	2	Char(2)	Route system
4-12	9	Char(9)	Route number
13-22	10	Char(10)	Reference point
23-25	3	Char(3)	Interchange element code
26-31	6	Char(6)	Bridge number
32	1	Char(1)	Bridge match
33	1	Char(1)	Usage
34	1	Char(1)	First-key flag
35	1	Char(1)	Second-key flag
36	1	Char(1)	Supplemental-key flag

37	1	Fixed(1)	Functional use
38	1	Fixed(1)	Over or under

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The Bridge Record Format

The bridge record is 700 bytes long and the key field is columns 4-10.

Columns	Length	Format	Data Element
1	1	Bit(1)	A card flag
		Bit(1)	B card flag
		Bit(1)	C card flag
		Bit(1)	D card flag
		Bit(1)	E card flag
		Bit(1)	F card flag
		Bit(1)	G card flag
		Bit(1)	H card flag
2	1	Bit(1)	I card flag
		Bit(7)	FILLER
3	1	Bit(1)	BRIDGE KEY FLAG
		Bit(1)	FIRST KEY FLAG
		Bit(1)	SECOND KEY FLAG
		Bit(5)	FILLER
4-9	6	Char(6)	BRIDGE NUMBER
10	1	Char(1)	BRIDGE MATCH
11	2	Char(2)	COUNTY
13	2	Char(2)	CNTL-SECTN
15	1	Char(1)	CONST-DIST
16	2	Char(2)	MAINT-AREA
18	4	Char(4)	CITY
22	25	Char(25)	FEATURE-NAME
47	2	Char(2)	DETOUR-LENGTH
49	1	Char(1)	TOLL
50	2	Char(2)	MAINT-RESPONS
52	2	Char(2)	OWNER

54	1	Char(1)	FED-AID-SYS
55	2	Char(2)	FUNCT-CLASS
57	2	Char(2)	SECTION
59	3	Char(3)	TWNSHP
62	3	Char(3)	RANGE
65	2	Char(2)	NUM-LANES
67	1	Char(1)	FUNCT-USE
68	1	Char(1)	ROADWAY-CLASS
69	1	Char(1)	OVER-UNDER
70	2	Char(2)	BDG-RTE-SYS
72	5	Char(5)	BDG-RTE-NUM
77	10	Char(10)	BDG-REF-PNT
87	10	Char(10)	TIS-REF-PT
97	3	Char(3)	MAIN-SPAN-TYPE
100	3	Char(3)	APPR-SPAN-TYPE
103	2	Char(2)	NUM-MAIN-SPANS
105	2	Char(2)	NUM-APPR-SPANS
107	3	Char(3)	NUM-TOT-SPANS
110	4	Char(4)	MAIN-SPAN-LEN
114	5	Char(5)	STRUCTURE-LEN

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Columns	Length	Format	Data Element
119	3	Char(3)	SDWK-WID-LFT
122	3	Char(3)	SDWK-WID-RGT
125	3	Char(3)	WID-RD1-OVER
128	3	Char(3)	WID-RD2-OVER
131	3	Char(3)	WID-RD1-UNDER
134	3	Char(3)	WID-RD2-UNDER
137	4	Char(4)	DECK-WIDTH
141	3	Char(3)	APPR-SHLDR-WID
144	3	Char(3)	APPR-SURF-WID
147	3	Char(3)	VERT-CLR-OVER-RD1
150	3	Char(3)	VERT-CLR-OVER-RD2
153	1	Char(1)	UNDER-CLR-REF-FEAT
154	3	Char(3)	VERT-CLR-UNDER-RD1
157	3	Char(3)	VERT-CLR-UNDER-RD2
160	3	Char(3)	LAT-CLR-UNDER-RGT
163	3	Char(3)	LAT-CLR-UNDER-LFT
166	4	Char(4)	YR-BUILT
170	4	Char(4)	YR-REMOD
174	1	Char(1)	DESIGN-LOAD
175	6	Char(6)	POST-CAPA
181	4	Char(4)	INV-RATING

Columns	Length	Format	Data Element
185	4	Char(4)	OPR-RATING
189	2	Char(2)	MO-CAP-RAT
191	2	unused	
193	1	Char(1)	NEW-CAP-RAT
194	2	Char(2)	MED-WID-OVER
196	1	Char(1)	TYPE-MED-OVER
197	2	Char(2)	MED-WID-UNDER
199	3	Char(3)	ANGL-SKEW
202	1	Char(1)	FLARED
203	1	Char(1)	NAVG-CNTL
204	1	Char(1)	NAVG-PROTECTION
205	3	Char(3)	NAVG-VERT-CLR
208	4	Char(4)	NAVG-HORZ-CLR
212	2	Char(2)	TYPE-SVC
214	1	Char(1)	WEAR-SURF
215	4	Char(4)	THK-WEAR-SURF
219	12	Char(12)	CULV-ID
231	3	Char(3)	CULV-LEN
234	25	Char(25)	DESCR-LOCN
259	6	Char(6)	LATITUDE
265	6	Char(6)	LONGITUDE
271	1	Char(1)	REPORT-JURIS
272	6	Char(6)	ADT
278	2	unused	
280	5	Char(5)	HCADT
285	1	Char(1)	NATL-TRUCK-SYS
286	2	Char(2)	MONTH-OPENED
288	2	unused	
290	6	Char(6)	STRUCTURE-AREA
296	6	Char(6)	ROADWAY-AREA
302	1	Char(1)	DEFENSE-HGWY
303	1	Char(1)	DECK-COND
304	1	Char(1)	SUPER-COND

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Columns	Length	Format	Data Element
305	1	Char(1)	SUBST-COND
306	1	Char(1)	CHAN-COND
307	1	Char(1)	CULV-COND
308	1	Char(1)	STRUCT-APSL
309	1	Char(1)	DECK-GEOM-APSL
310	1	Char(1)	UND-CLR-APSL
311	1	Char(1)	BDG-POSTING
312	1	Char(1)	WATER-APSL

313	1	Char(1)	APPR-ALIGN-APSL
314	2	Char(2)	RTN-INSPEC-FREQ
316	2	Char(2)	RTN-INSPEC-PROC
318	6	unused	
324	1	Char(1)	LOAD-LIM-SIGN
325	1	Char(1)	TRAF-CNTL-SIGN
326	1	Char(1)	HORZ-CNTL-SIGN
327	1	Char(1)	VERT-CNTL-SIGN
328	3	Char(3)	WORK-PROPOSED
331	5	Char(5)	PROP-LENGTH
336	3	Char(3)	PROP-WIDTH
339	6	Char(6)	PROP-ADT
345	2	unused	
347	1	Char(1)	PROP-APPR-WORK
348	5	Char(5)	BDG-IMP-COST
353	5	Char(5)	APPR-IMP-COST
358	5	Char(5)	TOTL-IMP-COST
363	2	unused	
365	1	Char(1)	ESTIMATE-METH
366	1	Char(1)	DEF-STATUS
367	1	Char(1)	FHWA20
368	3	Char(3)	SUFF-RATG
371	1	Char(1)	TEMPORARY-STR
372	2	Char(2)	LEFT-RAIL-TYPE
374	1	Char(1)	LEFT-RAIL-COND
375	3	Char(3)	LEFT-RAIL-HGHT
378	2	Char(2)	LEFT-CURB-HGT
380	2	Char(2)	RIGHT-RAIL-TYPE
382	1	Char(1)	RIGHT-RAIL-COND
383	3	Char(3)	RIGHT-RAIL-HGHT
386	2	Char(2)	RIGHT-CURB-HGHT
388	1	Char(1)	APPR-GUARD
389	2	unused	
391	2	Char(2)	TYPE-PAINT
393	6	Char(6)	AREA-PAINTED
399	2	Char(2)	PCT-UNSND-PAINT
401	3	Char(3)	MAX-VRT-CLR-RD1
404	3	Char(3)	MAX-VRT-CLR-RD2
407	6	Char(6)	CNTY-BDG-NMBR
413	2	Char(2)	LOW-APPR-PANEL-TYPE
415	1	Char(1)	LOW-APPR-PANEL-COND
416	2	Char(2)	LOW-APPR-PANEL-LEN
418	2	Char(2)	UPP-APPR-PANEL-TYPE
420	1	Char(1)	UPP-APPR-PANEL-COND
421	2	Char(2)	UPP-APPR-PANEL-LEN
423	5	unused	

Columns	Length	Format	Data Element
428	1	Char(1)	DECK-MATERIAL
429	4	Char(4)	DECK-UNSOUND
433	1	Char(1)	DECK-PROTECTION
434	2	unused	
436	1	Char(1)	REBARS
437	2	unused	
439	1	Char(1)	PLAN-AVAIL
440	1	Char(1)	HISTORIC-SIG
441	2	Char(2)	FIRST-RTE-SYS
443	8	Char(8)	FIRST-RTE-NUM
451	10	Char(10)	FIRST-REF-POINT
461	3	Char(3)	FIRST-INT-ELEM
464	5	Char(5)	FIRST-LOW-END
469	5	Char(5)	FIRST-UPP-END
474	2	Char(2)	DIRECTION
476	3	Char(3)	TOWNSHIP-NUM
479	1	Char(1)	FRC-MEMBER-DEFN
480	1	Char(1)	FRC-INSPEC-PROC
481	1	Char(1)	FRC-INSPEC-RSLT
482	11	unused	
493	1	Char(1)	UND-INSPEC-PROC
494	4	unused	
498	1	Char(1)	SCOUR-ANAL
499	4	unused	
503	1	Char(1)	ABUTMENT-MATERIAL
504	1	Char(1)	ABUTMENT-FOUNDATION
505	1	Char(1)	PIER-MATERIAL
506	1	Char(1)	PIER-FOUNDATION
507	1	Char(1)	TYPE-CONN
508	1	Char(1)	TYPE-CANTL-BEARING
509	1	Char(1)	BLANK1
510	2	Char(2)	SCND-RTE-SYS
512	8	Char(8)	SCND-RTE-NUM
520	10	Char(10)	SCND-REF-PNT
530	3	Char(3)	SCND-INT-ELEM
533	5	Char(5)	SCND-LOW-END
538	5	Char(5)	SCND-UPP-END
543	5	Char(5)	H2O-OPENING
548	6	Char(6)	DRAIN-AREA
554	3	Char(3)	BORDER-STRUCTURE
557	2	Char(2)	RESPONSIBILITY
559	3	Char(3)	MIN-VERT-CLEAR-LBDG
562	1	Char(1)	BIRD-NESTS
563	3	Char(3)	BUILDER

566	1	Char(1)	MAIN-SPAN-DEF
567	1	Char(1)	APPR-SPAN-DEF
568	1	Char(1)	HISTORIC-RPT
569	3	Char(3)	HORZ-CLR-RD1
572	3	Char(3)	HORZ-CLR-RD2

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Columns	Length	Format	Data Element
575	1	Char(1)	PARALLEL-STR
576	4	Char(4)	BLANK2
580	1	Char(1)	PERMIT-RESTR-L48K
581	1	Char(1)	PERMIT-RESTR-L60K
582	1	Char(1)	PERMIT-RESTR-L72K
583	1	Char(1)	PERMIT-RESTR-LFUT
584	5	Char(5)	REPL-PRTY
589	1	Char(1)	USAGE
590	4	Char(4)	YR-CAP-RAT
594	4	Char(4)	YR-ADT
598	4	Char(4)	YEAR-OPENED
602	4	Char(4)	PROP-ADT-YR
606	4	Char(4)	YR-IMP-EST
610	4	Char(4)	YR-PAINTED
614	4	Char(4)	EXP-DEVICE-YR
618	4	Char(4)	DECK-PROT-YR
622	4	Char(4)	YEAR-REBARRED
626	6	Char(6)	FRC-INSPEC-DATE
632	6	Char(6)	SPC-INSPEC-DATE
638	6	Char(6)	UND-INSPEC-DATE
644	4	Char(4)	YR-SCOUR-ANAL
648	8	Char(8)	RTN-INSPEC-DATE
656	4	Char(4)	FED-REHAB
660	41	Char(41)	FUTURE

The Rail Grade Crossing Record Format

The rail grade crossing record is 308 bytes long and the key field is columns 2-9.

Columns	Length	Format	Data Element
1	1	Char(1)	Delete Byte
2-9	8	Char(8)	Crossing ID Number
10-11	2	Char(2)	Route System
12-19	8	Char(8)	Route Number
20-29	10	Char(10)	Reference Point
30-36	7	Char(7)	National Survey Number
37-43	7	Char(7)	Section, township & range
44	1	Char(1)	Development
45-75	31	Char(31)	Verbal Description
76-79	4	Char(4)	Plat Number
80-81	2	unused	
82-83	2	Char(2)	Direction of Increasing R.P.
84-89	6	Char(6)	Advance Warning Signs - Near
90-95	6	Char(6)	Advance Warning Signs - Far
96-101	6	Char(6)	Protection Devices - Near
102-107	6	Char(6)	Protection Devices - Far
108-109	2	Fixed(3,1)	Total Trains

Columns	Length	Format	Data Element
110-111	2	Char(2)	Total Tracks
112	1	Char(1)	Stop Sign Authorization - Near
113	1	Char(1)	Stop Sign Authorization - Far
114	1	Char(1)	Stopping Lanes
115-116	2	Char(2)	Roadway Width - Near
117-118	2	Char(2)	Roadway Width - Far
119	1	Char(1)	Approach Surface - Near
120	1	Char(1)	Approach Surface - Far
121-123	3	Char(3)	Approach Grade - Near
124-126	3	Char(3)	Approach Grade - Far
127	1	Char(1)	Road Intersection - Near
128	1	Char(1)	Road Intersection Distance - Near
129	1	Char(1)	Road Intersection - Far
130	1	Char(1)	Road Intersection Distance - Far
131	1	Char(1)	Highway Alignment
132	1	Char(1)	Railroad Alignment
133-135	3	Char(3)	Angle of Skew
136	1	Char(1)	Crossing Surface
137	1	Char(1)	Crossing Surface Condition
138-139	2	Char(2)	Crossing Surface Width
140-142	3	Char(3)	Crossing Surface Length
143	1	Char(1)	Number of Main Tracks
144-145	2	Char(2)	Number of Other Tracks
146	1	Char(1)	Lighted Crossing
147-150	4	Char(4)	Minimum Sight Distance - NR
151	1	Char(1)	Sight Obstruction Code - NR
152-155	4	Char(4)	Minimum Sight Distance - NL
156	1	Char(1)	Sight Obstruction Code - NL
157-160	4	Char(4)	Minimum Sight Distance - FR
161	1	Char(1)	Sight Obstruction Code - FR
162-165	4	Char(4)	Minimum Sight Distance - FL

Columns	Length	Format	Data Element
166	1	Char(1)	Sight Obstruction Code - FL
167-170	4	Fixed(6)	AADT
171-172	2	unused	
173-174	2	Char(2)	Legal Speed Limit
175-176	2	Char(2)	Highway Speed
177	1	Char(1)	Legal Speed Limit Signing
178-179	2	Fixed(3,1)	Daytime Through Trains
180-181	2	Fixed(3,1)	Daytime Switch Trains
182-183	2	Fixed(3,1)	Nighttime Through Trains
184-185	2	Fixed(3,1)	Nighttime Switch Trains
186-187	2	Char(2)	Passenger Movements

188-189	2	Char(2)	Maximum Allowed Timetable Speed
190-192	3	Char(3)	Accident Scan Limit - Near
193-195	3	Char(3)	Accident Scan Limit - Far
196	1	Char(1)	Protection Device Activation
197-199	3	Char(3)	Obstruction Time
200-204	5	unused	
205-207	3	Fixed(5)	Hazard Rating
208-209	2	unused	
210-212	3	Fixed(5)	Current Hazard Index Rank
213-216	4	Char(4)	Prior Year of H.I. Rank - 1
217-219	3	Fixed(5)	Prior H.I. Rank - 1
220-223	4	Char(4)	Prior Year of H.I. Rank - 2
224-226	3	Fixed(5)	Prior H.I. Rank - 2
227-230	4	Char(4)	Prior Year of H.I. Rank - 3
231-233	3	Fixed(5)	Prior H.I. Rank - 3
234-237	4	Char(4)	Prior Year of H.I. Rank - 4
238-240	3	Fixed(5)	Prior H.I. Rank - 4
241	1	Char(1)	Advance Warning Sign Cond. - Near
242	1	Char(1)	Advance Warning Sign Cond. - Far
243	1	Char(1)	Protection Device Cond. - Near
244	1	Char(1)	Protection Device Cond. - Far
245-258	4	Char(4)	City number
249	1	Char(1)	Method of determining AADT
250-257	8	Char(8)	Rail point
258	1	Char(1)	Vendor of rubber or plastic crossing surface
259-263	5	Fixed(8)	Exposure
264-265	2	Char(2)	Advisory Speed
266-268	3	Char(3)	Crossing Surface Length Material
269-272	4	Char(4)	Year of Inventory
273-277	5	Fixed(8)	Signal Installation Date
278-281	4	Char(4)	Year of AADT
282-285	4	Char(4)	Obstruction Time - Year Monitored
286-290	5	Char(5)	Status
291-294	4	Char(4)	Year of Hazard Rating
295-298	4	Char(4)	Year rubber or plastic crossing surface installed
299-303	5	Fixed(8)	Date of prot.-device-activation change
304-308	5	Fixed(8)	Date of Update

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The Condition Rating Record Format

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The condition rating record is variable-length ranging from 108 to 5628 bytes long. The key field is columns 5-26:

Columns	Length	Format	Data Element
1-2	2	Bin fixed	Record length
3-4	2	Bin fixed	Reserved for IBM use
5-6	2	Char(2)	Route system
7-15	9	Char(9)	Route number
16-25	10	Char(10)	Begin reference point
26	1	Char(1)	Roadway ID
27-36	10	Char(10)	End reference point
37	1	Fixed(1)	Construction district
38	1	Char(1)	Record type
39-40	2	Char(2)	Central office category
41-42	2	Char(2)	District category
43-93	51	Char(51)	Verbal description
94-95	2	Char(2)	Last update code
96-97	2	Fixed(2)	Number of years spanned
98-99	2	Fixed(2)	Number of years on record
100-104	5	Fixed(8)	Date of last update
105-108	4	Char(4)	Last year segment updated
**** YEAR segment - Length 138 bytes ****			
1-4	4	Char(4)	Year of data
5	1	Char(1)	Surface type
6-7	2	Fixed(2,1)	SR road
8-9	2	Fixed(2,1)	PSR road
10-11	2	Fixed(2,1)	CR road
12-13	2	Fixed(2,1)	PQI road
14-16	3	Char(3)	IRI road
17	1	Char(1)	Surface type lane 1
18-19	2	Fixed(2,1)	SR lane 1
20-21	2	Fixed(2,1)	PSR lane 1
22-23	2	Fixed(2,1)	CR lane 1
24-25	2	Fixed(2,1)	PQI lane 1
26-28	3	Char(3)	IRI left wheelpath lane 1
29-31	3	Char(3)	IRI right wheelpath lane 1
32-33	2	Fixed(3)	Lane 1 Defects(1) (%)
34-35	2	Fixed(3)	Lane 1 Defects(2) (%)
36-37	2	Fixed(3)	Lane 1 Defects(3) (%)
38-39	2	Fixed(3)	Lane 1 Defects(4) (%)
40-41	2	Fixed(3)	Lane 1 Defects(5) (%)
42-43	2	Fixed(3)	Lane 1 Defects(6) (%)
44-45	2	Fixed(3)	Lane 1 Defects(7) (%)
46-47	2	Fixed(3)	Lane 1 Defects(8) (%)

Columns	Length	Format	Data Element
48-49	2	Fixed(3)	Lane 1 Defects(9) (%)
50-51	2	Fixed(3)	Lane 1 Defects(10) (%)
52-53	2	Fixed(3)	Lane 1 Defects(11) (%)

condition rating record format (continued)

Columns	Length	Format	Data Element
54-55	2	Fixed(3)	Lane 1 Defects(12) (%)
56-57	2	Fixed(3)	Lane 1 Defects(13) (%)
58-59	2	Fixed(3)	Lane 1 Defects(14) (%)
60-61	2	Fixed(3)	Lane 1 Defects(15) (%)
62-63	2	Fixed(3)	Lane 1 Defects(16) (%)
64-65	2	Fixed(3)	Lane 1 Defects(17) (%)
66-67	2	Fixed(3)	Lane 1 Defects(18) (%)
68-69	2	Fixed(3)	Lane 1 Defects(19) (%)
70-71	2	Fixed(3)	Lane 1 Defects(20) (%)
72-73	2	Fixed(3)	Lane 1 Defects(21) (%)
74-75	2	Fixed(3)	Lane 1 Defects(22) (%)
76-77	2	Fixed(3)	Lane 1 Defects(23) (%)

*** lane 2 data ***

Columns	Length	Format	Data Element
78	1	Char(1)	Surface type lane 2
79-80	2	Fixed(2,1)	SR lane 2
81-82	2	Fixed(2,1)	PSR lane 2
83-84	2	Fixed(2,1)	CR lane 2
85-86	2	Fixed(2,1)	PQI lane 2
87-89	3	Char(3)	IRI left wheelpath lane 2
90-92	3	Char(3)	IRI right wheelpath lane 2
93-94	2	Fixed(3)	Lane 2 Defects(1) (%)
95-96	2	Fixed(3)	Lane 2 Defects(2) (%)
97-98	2	Fixed(3)	Lane 2 Defects(3) (%)
99-100	2	Fixed(3)	Lane 2 Defects(4) (%)
101-102	2	Fixed(3)	Lane 2 Defects(5) (%)
103-104	2	Fixed(3)	Lane 2 Defects(6) (%)
105-106	2	Fixed(3)	Lane 2 Defects(7) (%)
107-108	2	Fixed(3)	Lane 2 Defects(8) (%)
109-110	2	Fixed(3)	Lane 2 Defects(9) (%)
111-112	2	Fixed(3)	Lane 2 Defects(10) (%)

113-114	2	Fixed(3)	Lane 2 Defects(11) (%)
115-116	2	Fixed(3)	Lane 2 Defects(12) (%)
117-118	2	Fixed(3)	Lane 2 Defects(13) (%)
119-120	2	Fixed(3)	Lane 2 Defects(14) (%)
121-122	2	Fixed(3)	Lane 2 Defects(15) (%)
123-124	2	Fixed(3)	Lane 2 Defects(16) (%)
125-126	2	Fixed(3)	Lane 2 Defects(17) (%)
127-128	2	Fixed(3)	Lane 2 Defects(18) (%)
129-130	2	Fixed(3)	Lane 2 Defects(19) (%)
131-132	2	Fixed(3)	Lane 2 Defects(20) (%)
133-134	2	Fixed(3)	Lane 2 Defects(21) (%)
135-136	2	Fixed(3)	Lane 2 Defects(22) (%)
137-138	2	Fixed(3)	Lane 2 Defects(23) (%)

**** Up to 40 years on record = maximum record length = 5628 bytes ****

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The Sufficiency Rating Record Format

The sufficiency rating record is variable-length ranging from 336 to 540 bytes long. The key field is columns 5-25:

Columns	Length	Format	Data Element
1-2	2	Bin fixed	Record length
3-4	2	Bin fixed	Reserved for IBM use
5-6	2	Char(2)	Route system
7-15	9	Char(9)	Route number
16-25	10	Char(10)	Beginning reference point
26-35	10	Char(10)	Ending reference point
36-37	2	Char(2)	County
38-39	2	Char(2)	Control section
40	1	Char(1)	District
41-42	2	Char(2)	Maintenance area
43-44	2	Char(2)	Regional development commission
45	1	Char(1)	Access control
46-47	2	Char(2)	Functional class
48	1	Char(1)	Federal aid system
49-53	5	Char(5)	First city length
54	1	Char(1)	First city urban classification
55-58	4	Char(4)	First city length
59-63	5	Char(5)	Second city length

Columns	Length	Format	Data Element
64	1	Char(1)	Second city urban classification
65-68	4	Char(4)	Second city length
69-73	5	Char(5)	Third city length
74	1	Char(1)	Third city urban classification
75-78	4	Char(4)	Third city length
79-134	56	Char(56)	Termini
135-140	6	Char(6)	Segment length
141	1	Char(1)	Road-1 direction
142	1	Char(1)	Road-1 surface type
143-144	2	Char(2)	Road-1 surface width
145-148	4	Char(4)	Road-1 surface year
149	1	Char(1)	Road-1 left shoulder type
150-151	2	Char(2)	Road-1 left shoudler width
152	1	Char(1)	Road-1 right shoulder type
153-154	2	Char(2)	Road-1 right shoulder width
155-158	4	Char(4)	Road-1 grade year
159	1	Char(1)	Road-2 direction
160	1	Char(1)	Road-2 surface type
161-162	2	Char(2)	Road-2 surface width
163-166	4	Char(4)	Road-2 surface year
167	1	Char(1)	Road-2 left shoulder type
168-169	2	Char(2)	Road-2 left shoudler width
170	1	Char(1)	Road-2 right shoulder type
171-172	2	Char(2)	Road-2 right shoulder width
173-176	4	Char(4)	Road-2 grade year

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Columns	Length	Format	Data Element
177-180	4	Char(4)	Present ADT year
181-186	6	Char(6)	Present ADT volume
187-190	4	Char(4)	Projected ADT year
191-196	6	Char(6)	Projected ADT volume
197-199	3	Char(3)	Percent heavy commercial
200-202	3	Char(3)	Percent 30th peak hour
203-206	4	Char(4)	Volume/capacity ratio
207-208	2	Char(2)	Number of hazardous intersections
209-210	2	Char(2)	Number of hazardous crossings
211-212	2	Char(2)	Number of hazardous bridges
213-214	2	Char(2)	Number of hazardous curves
215-216	2	Char(2)	Number of sight dist. restr.
217-221	5	Char(5)	No passing length

Columns	Length	Format	Data Element
222-223	2	Char(2)	Road-1 structure points
224-225	2	Char(2)	Road-1 shoulder points
226	1	Char(1)	Road-1 ride quality points
227-229	3	Char(3)	Road-1 basic rating points
230-232	3	Char(3)	Road-1 adjusted rating points
233-234	2	Char(2)	Road-2 structure points
235-236	2	Char(2)	Road-2 shoulder points
237	1	Char(1)	Road-2 ride quality points
238-240	3	Char(3)	Road-2 basic rating points
241-243	3	Char(3)	Road-2 adjusted rating points
244-245	2	Char(2)	Spring load points
246-247	2	Char(2)	Surface width points
248-249	2	Char(2)	Hazards points
250	1	Char(1)	Stopping sight distance points
251	1	Char(1)	Access control points
252-253	2	Char(2)	Passing opportunity points
254-255	2	Char(2)	Volume/capacity ratio points
256-257	2	Char(2)	Road-1 1st rating PSR
258-259	2	Char(2)	Road-1 1st rating SR
260-261	2	Char(2)	Road-1 1st rating CR
262-265	4	Char(4)	Road-1 1st rating CR year
266-267	2	Char(2)	Road-1 2nd rating PSR
268-269	2	Char(2)	Road-1 2nd rating SR
270-271	2	Char(2)	Road-1 2nd rating CR
272-275	4	Char(4)	Road-1 2nd rating CR year
276-277	2	Char(2)	Road-1 3rd rating PSR
278-279	2	Char(2)	Road-1 3rd rating SR
280-281	2	Char(2)	Road-1 3rd rating CR
282-285	4	Char(4)	Road-1 3rd rating CR year

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Columns	Length	Format	Data Element
286-287	2	Char(2)	Road-2 1st rating PSR
288-289	2	Char(2)	Road-2 1st rating SR

290-291	2	Char(2)	Road-2 1st rating CR
292-295	4	Char(4)	Road-2 1st rating CR year
296-297	2	Char(2)	Road-2 2nd rating PSR
298-299	2	Char(2)	Road-2 2nd rating SR
300-301	2	Char(2)	Road-2 2nd rating CR
302-305	4	Char(4)	Road-2 2nd rating CR year
306-307	2	Char(2)	Road-2 3rd rating PSR
308-309	2	Char(2)	Road-2 3rd rating SR
310-311	2	Char(2)	Road-2 3rd rating CR
312-315	4	Char(4)	Road-2 3rd rating CR year
316	1	Char(1)	Existing design
317-318	2	Char(2)	Existing number of lanes
319	1	Char(1)	Existing divided/one-way
320	1	Char(1)	Existing terrain
321-322	2	Char(2)	Existing spring load
323-324	2	Char(2)	Existing summer load
325	1	Char(1)	Existing service level
326	1	Char(1)	Proposed design
327-328	2	Char(2)	Proposed number of lanes
329	1	Char(1)	Proposed divided/one-way
330	1	Char(1)	Proposed terrain
331-332	2	Char(2)	Proposed spring load
333-334	2	Char(2)	Proposed summer load
335	1	Char(1)	Proposed service level
336	1	Char(1)	Number of messages
337-404	68	Char(68)	1st message (if present)
405-472	68	Char(68)	2nd message (if present)
473-540	68	Char(68)	3rd message (if present)

The Sufficiency Hazards Record Format

The sufficiency rating record is fixed-length 37 bytes long. The key field is columns 1-22:

Columns	Length	Format	Data Element
1-2	2	Char(2)	Route system
3-11	9	Char(9)	Route number
12-21	10	Char(10)	Beginning reference point
22	1	Char(1)	Hazard type
23-32	10	Char(10)	Ending reference point
33-37	5	Char(5)	Hazard length

The Roadway History Record Format

The roadway history record is variable-length ranging from 127 to 1177 bytes long. The key field is columns 5-42:

Columns	Length	Format	Data Element
1-2	2	Bin fixed	Record length
3-4	2	Bin fixed	Reserved for IBM use
5-6	2	Char(2)	Route system
7-15	9	Char(9)	Route number
16-25	10	Char(10)	Beginning reference point
26-35	10	Char(10)	Ending reference point
36	1	Char(1)	Road ID
37-42	6	Char(6)	Contract number
43-46	4	Char(4)	Card
47-56	10	Char(10)	State project number
57-64	8	Char(8)	Design ESALS
65	1	Char(1)	Design subgrade type
66-68	3	Char(3)	Design subgrade strength
69-92	24	unused	
93	1	Char(1)	Project type
94-95	2	Char(2)	Number of layers
96-103	8	Char(8)	Date awarded
104-111	8	Char(8)	Date began
112-119	8	Char(8)	Date ended
120-127	8	Char(8)	Date opened
**** LAYER segment - Length 21 bytes ****			
1-2	2	Char(2)	Work item
3-4	2	Char(2)	Material ID
5	1	Char(1)	Cross section position
6	1	Char(1)	Mode
7	1	Char(1)	Transverse direction
8-11	4	Char(4)	Transverse offset
12-15	4	Char(4)	Width
16	1	Char(1)	Constant or variable

17	1	Char(1)	Vertical position
18-21	4	Char(4)	Depth

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The Accident Record Format

The accident record is variable-length ranging from 469 to 29064 bytes long. The key field is columns 5-25. Vehicle segments (if any) begin in column 469. 0-150 vehicle segments may be present. Person segments begin in the first column after the last vehicle segment. 0-150 person segments may be present. Use the number of vehicle records (columns 5-6) and number of person records (columns 7-8) to compute the location of the repeated segments.

The VSAM file and tape file use the same format.

Columns	Length	Format	Data Element
1-2	2	Bin fixed	Record length
3-4	2	Bin fixed	Reserved for IBM use
5-6	2	Fixed(2)	Number of vehicle records
7-8	2	Fixed(2)	Number of person records
9-10	2	Char(2)	Route system
11-19	9	Char(9)	Route number (9-character format)
20-29	10	Char(10)	Reference point
30-38	9	Char(9)	Accident number
39-48	12	Char(12)	Local case number
49-50	2	unused	
53-54	2	Char(2)	Accident type
55	1	unused	
56-57	2	Char(2)	Diagram code
58	1	Char(1)	Property damage flag
59	1	unused	

Columns	Length	Format	Data Element
60	1	Char(1)	Severity of accident
61-66	6	unused	
67	1	Char(1)	Hit and run flag
68-69	2	unused	
70-71	2	Char(2)	First event location
72-73	2	Char(2)	Intersection relation
76-77	2	Char(2)	Traffic control device code
78-79	2	Char(2)	Device working code
80-81	2	Char(2)	Light conditions
82-83	2	Char(2)	Weather conditions 1
84-85	2	Char(2)	Road surface code
86-87	2	unused	
88-89	2	Char(2)	Road characteristics code
90-91	2	Char(2)	Road design code
92-93	2	Char(2)	Speed limit
94-95	2	Fixed(2)	County code
96-145	50	Char(50)	Location description
146-149	4	Char(4)	Patrol station
150-157	8	Char(8)	Route number
158-164	7	Char(7)	Distance from ref. point
165	1	Char(1)	Dist from rp measure units
166-168	3	Char(3)	Interchange element code
169	1	Char(1)	Urban-rural location code
170	1	Char(1)	Location info reliability
171-172	2	Char(2)	Reported location accuracy

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Columns	Length	Format	Data Element
173-175	3	Fixed(4)	City number
176	1	Char(1)	Bridge flag
177	1	Char(1)	Location error flag
178-179	2	Fixed(3)	Officer total units
180-181	2	Fixed(3)	Officer total injured
182-183	2	Fixed(3)	Officer total fatalities
184	1	Char(1)	Location complete flag
185-188	4	Char(4)	Reporting agency
189	1	Fixed(1)	Day of week code
190-191	2	Fixed(3)	Township number
192-196	5	Fixed(8)	Date occurred
197-199	3	Fixed(4)	Accident time
200-201	2	Char(2)	School bus accident flag
202	1	Char(1)	Reliability DPS code
203-204	2	Char(2)	Officer reporting code
205	1	Char(1)	Minimum dollar flag

206	1	Char(1)	Travel direction
207-208	2	Char(2)	Work zone code
209-210	2	Char(2)	Location relative to work zone
211	1	Char(1)	Workers present flag
212-213	2	Char(2)	Weather conditions 1
214	1	Char(1)	Photos
215-469	255	Char(255)	Officer narrative

**** VEHICLE segment - length 82 bytes ****

1-2	2	Fixed(3)	Relative vehicle number
3-4	2	Char(2)	Officer total people
5-6	2	Char(2)	Vehicle type code
7-8	2	Char(2)	Plate state
9-10	2	Char(2)	Most harmful event
11-12	2	Char(2)	Vehicle model
13-16	4	Char(4)	Vehicle make
17-19	3	Char(3)	Vehicle series
20	1	Char(1)	Causal vehicle
21	1	Char(1)	In transport
22-25	4	Char(4)	vehicle make from VIN
26-27	2	Char(2)	Damage severity code
28-29	2	Char(2)	Damaged area code
30-31	2	Char(2)	Prior action code
32-33	2	Char(2)	Direction code
34-35	2	Char(2)	Contributing factor 1
36-37	2	Char(2)	Contributing factor 2
38	1	Char(1)	Towaway vehicle flag
39	1	Char(1)	Fire code
40	1	Char(1)	Towing flag
41-43	3	Char(3)	Vehicle series VIN
44-45	2	Char(2)	Vehicle model VIN
46-47	2	Char(2)	Body type
48-51	4	Char(4)	Vehicle year VIN
52	1	Char(1)	Hazardous matl placard flag
53-54	2	Char(2)	Vehicle color (body)
55-56	2	Char(2)	Vehicle color (roof)

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Columns	Length	Format	Data Element
57-58	2	Char(2)	Seq of event code1
59-60	2	Char(2)	Seq of event code2
61-62	2	Char(2)	Seq of event code3
63-64	2	Char(2)	Seq of event code4

65-68	4	Char(4)	Vehicle year
69	1	Char(1)	Inspection waived
70-77	8	Char(8)	Badge number
78-80	3	Char(3)	Color
81-82	2	Char(2)	Vehicle use
**** PERSON segment - length 112 bytes ****			
1-2	2	Char(2)	Relative person number
3-10	8	Char(8)	State ambulance run number
11-12	2	Char(2)	Position in vehicle code
13-14	2	Char(2)	Ejection code
15	1	Char(1)	Injury code
16	1	Char(1)	Hospitalized code
17	1	Char(1)	Transport to hospital mthd
18	1	Char(1)	Sex
19-20	2	Char(2)	Driver physical condition
21-22	2	Char(2)	License issuing state
23-24	2	Fixed(2)	Residence county code
25-32	8	Char(8)	Driver class
33-34	2	Char(2)	Valid license flag
35	1	Char(1)	Withdrawn flag
36	1	Char(1)	Address correct flag
37	1	Char(1)	Coroner report rec. flag
38-42	5	Fixed(8)	Birth date
43-47	5	Fixed(8)	Fatality date
48-49	2	Char(2)	Safety equipment type
50-51	2	Char(2)	Safety equipment used
52-53	2	Char(2)	Airbag
54-56	3	Char(3)	Relative vehicle number
57-59	3	Char(3)	Age
60	1	Char(1)	Driver recommendations
61-65	5	Char(5)	Fatality number
66	1	Char(1)	Violations
67-68	2	Char(2)	License restrictions flag
69	1	Char(1)	Alcohol test
70	1	Char(1)	Drug test
71-90	20	Char(20)	Ambulance service name
91	1	Char(1)	Person type
92-94	3	Char(3)	Person age group 1-year
95-96	2	Char(2)	Person age group 5-year
97	1	Char(1)	Injury code group B
98	1	Char(1)	Driver class code
99	1	Char(1)	License restriction A
100	1	Char(1)	License restriction B
101	1	Char(1)	License restriction C
102	1	Char(1)	Endorsement triple trailer
103	1	Char(1)	Endorsement tanker
104	1	Char(1)	Endorsement hazardous matl
105	1	Char(1)	Endorsement hazardous tanker
106	1	Char(1)	Endorsement school bus

107	1	Char(1)	Endorsement bus
108	1	Char(1)	Endorsement motorcycle
109-110	2	Char(2)	Alcohol test result
111-112	2	Char(2)	Drug test result

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The Roadway History Cross-Section Record Format
****

The roadway history cross-section record is variable in length with lengths ranging from 194 to 5192 bytes. The record key is columns 1 through 32.

Columns	Length	Format	Data Element
1-2	2	Char(2)	Route system
3-10	8	Char(8)	Route number
11-20	10	Char(10)	Beginning reference point
21-30	10	Char(10)	Ending reference point
31	1	Char(1)	Road ID
32-33	2	Char(2)	Number layers
34-37	4	Fixed(7,3)	Length
38-41	4	Char(4)	Driving section width
42-47	6	Char(6)	Driving section area
48-51	4	Char(4)	Driving section pavement depth
52-55	4	Char(4)	Driving section total depth
56-59	4	Char(4)	Driving section granular equivalents
60-61	2	Char(2)	Left shoulder type
62-65	4	Char(4)	Left shoulder width
66-71	6	Char(6)	Left shoulder area
72-75	4	Char(4)	Left shoulder pavement depth
76-79	4	Char(4)	Left shoulder total depth
80-81	2	Char(2)	right shoulder type
82-85	4	Char(4)	right shoulder width
86-91	6	Char(6)	right shoulder area
92-95	4	Char(4)	right shoulder pavement depth
96-99	4	Char(4)	right shoulder total depth
100-103	4	Char(4)	Entire roadway width
104-109	6	Char(6)	Entire roadway area
110-117	8	unused	
118-121	4	Char(4)	Depth of rehabilitation of driving sect.
122-124	3	Char(3)	Predominant section percentage
125-126	2	Char(2)	Work item of rehabilitation of dr. sect.
127	1	Char(1)	Presence/absence of edge drains
128-131	4	Char(4)	Year of grading of driving section
132-135	4	Char(4)	Year of paving of driving section
136-139	4	Char(4)	Year of sealing of driving section
140-143	4	Char(4)	Year of rehabilitation of driving sect.

**** LAYER segment - Length 51 bytes ****

1-2	2	Char(2)	Work item
3-4	2	Char(2)	Material ID
5	1	Char(1)	Position in cross section
6	1	Char(1)	Mode
7	1	Char(1)	Transverse direction
8-11	4	Char(4)	Transverse offset
12-15	4	Char(4)	Layer width
16	1	Char(1)	Constant/variable width indicator
17	1	Char(1)	Vertical position in cross section
18-21	4	Char(4)	Layer depth
22-27	6	unused	
28-33	6	Char(6)	Contract number
34-43	10	Char(10)	State project number
44-51	8	Char(8)	Date of construction of layer

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The Traffic Segment Sequence Number Record Format

The traffic sequence number record is 37 bytes long and the key field is columns 1 - 21:

Columns	Length	Format	Data Element
1-2	2	Char(2)	Route system
3-11	9	Char(9)	Route number
12-21	10	Char(10)	Statring reference point
22-31	10	Char(10)	Ending reference point
32-37	6	Char(6)	Sequence number

ACD - Listing of Names in File Order
****

Format	Name	Stored	Generated From
NUM(3)	ACD.NUM-VEH-REC	X	
NUM(3)	ACD.NUM-PER-REC	X	
CHAR(2)	ACD.ROUTE-SYSTEM	X	
CHAR(9)	ACD.ROUTE-NUMBER-9	X	
CHAR(10)	ACD.REF-POINT	X	
CHAR(9)	ACD.ACC-NUM	X	
CHAR(12)	ACD.LOCAL-CASE-NUM	X	
CHAR(2)	ACD.ACC-TYPE	X	
CHAR(2)	ACD.ACC-DIAGRAM	X	
CHAR(1)	ACD.PUB-PROP-DAMAGE	X	
CHAR(1)	ACD.ACC-SEVERITY	X	
CHAR(1)	ACD.HIT-AND-RUN	X	
CHAR(2)	ACD.LOCN-FIRST-EVENT	X	
CHAR(2)	ACD.INTSECT-RELATION	X	
CHAR(2)	ACD.TRAF-CNTRL-DEV	X	
CHAR(2)	ACD.TRAF-CNTRL-DEV-WORK	X	
CHAR(2)	ACD.LIGHT-COND	X	

Format	Name	Stored	Generated From
CHAR(2)	ACD.WEATHER-COND-1	X	
CHAR(2)	ACD.ROAD-SURFACE	X	
CHAR(2)	ACD.ROAD-CHAR	X	
CHAR(2)	ACD.ROAD-DESIGN	X	
CHAR(2)	ACD.SPEED-LIMIT	X	
NUM(2)	ACD.COUNTY	X	
NUM(1)	ACD.DISTRICT-FROM-CNTY		ACD.COUNTY
CHAR(2)	ACD.RDC-FROM-CNTY		ACD.COUNTY
NUM(7)	ACD.POP-FROM-CNTY		ACD.COUNTY
CHAR(50)	ACD.LOCN-NARRATIVE	X	
CHAR(4)	ACD.PTRL-STATION	X	
CHAR(8)	ACD.ROUTE-NUMBER	X	
CHAR(7)	ACD.RP-DISTANCE	X	
CHAR(1)	ACD.RP-MEASURE	X	
CHAR(3)	ACD.INTCHANGE-ELEM	X	
CHAR(1)	ACD.URBAN-RURAL-CODE	X	

(continued on next page)

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Format	Name	Stored	Generated From
CHAR(1)	ACD.LOCN-RELIABILITY	X	
CHAR(2)	ACD.LOCN-ACCURACY	X	
NUM(4)	ACD.CITY	X	
NUM(7)	ACD.POP-FROM-CITY		ACD.CITY
NUM(1)	ACD.RUR-URB-FROM-CITY		ACD.CITY
NUM(1)	ACD.POP-GROUP-FROM-CITY		ACD.CITY
NUM(4)	ACD.CENSUS-YR-FROM-CITY		ACD.CITY
CHAR(1)	ACD.ON-BRIDGE	X	
CHAR(1)	ACD.VALID-LOCATION	X	
NUM(3)	ACD.NUM-VEHIC	X	

NUM(2)	ACD.NUM-INJURED	X	
NUM(2)	ACD.NUM-KILLED	X	
CHAR(1)	ACD.LOCN-COMPLETE	X	
CHAR(4)	ACD.AGENCY-REPORT	X	
NUM(1)	ACD.DAY-OF-WEEK	X	
NUM(3)	ACD.TOWNSHIP	X	
CHAR(5)	ACD.COUNTY-TOWNSHIP		ACD.COUNTY & ACD.TOWNSHIP
DATE	ACD.DATE-OCCURRED	X	
NUM(2)	ACD.DAY-OCCURRED		ACD.DATE-OCCURRED
NUM(2)	ACD.MONTH-OCCURRED		ACD.DATE-OCCURRED
NUM(4)	ACD.YEAR-OCCURRED		ACD.DATE-OCCURRED
NUM(4)	ACD.TIME-OCCURRED	X	
NUM(2)	ACD.HOUR-OCCURRED		ACD.TIME-OCCURRED
CHAR(2)	ACD.SCHOOL-BUS	X	
CHAR(1)	ACD.LOCN-RELIA-DPS	X	
CHAR(2)	ACD.OFFICER-TYPE	X	
CHAR(1)	ACD.MIN-DOLLAR	X	
CHAR(1)	ACD.TRAVEL-DIR	X	
CHAR(2)	ACD.WORK-ZONE	X	
CHAR(2)	ACD.LOC-WORK-ZONE	X	
CHAR(1)	ACD.WORKERS-PRESENT	X	
CHAR(2)	ACD.WEATHER-COND-2	X	
CHAR(1)	ACD.PHOTOS	X	
CHAR(99)	ACD.OFFICER-NARR	X	

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ACD - Listing of Names in Alphabetical Order
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Format	Name	Stored	Generated From
CHAR(2)	ACD.ACC-DIAGRAM	X	
CHAR(9)	ACD.ACC-NUM	X	
CHAR(1)	ACD.ACC-SEVERITY	X	
CHAR(2)	ACD.ACC-TYPE	X	
CHAR(4)	ACD.AGENCY-REPORT	X	
NUM(4)	ACD.CENSUS-YR-FROM-CITY		ACD.CITY
NUM(4)	ACD.CITY	X	
NUM(2)	ACD.COUNTY	X	
CHAR(5)	ACD.COUNTY-TOWNSHIP		ACD.COUNTY & ACD.TOWNSHIP
DATE	ACD.DATE-OCCURRED	X	
NUM(2)	ACD.DAY-OCCURRED		ACD.DATE-OCCURRED
NUM(1)	ACD.DAY-OF-WEEK	X	
NUM(1)	ACD.DISTRICT-FROM-CNTY		ACD.COUNTY
CHAR(1)	ACD.HIT-AND-RUN	X	
NUM(2)	ACD.HOUR-OCCURRED		ACD.TIME-OCCURRED
CHAR(3)	ACD.INTCHANGE-ELEM	X	
CHAR(2)	ACD.INTSECT-RELATION	X	
CHAR(2)	ACD.LIGHT-COND	X	
CHAR(2)	ACD.LOC-WORK-ZONE	X	
CHAR(12)	ACD.LOCAL-CASE-NUM	X	
CHAR(2)	ACD.LOCN-ACCURACY	X	
CHAR(1)	ACD.LOCN-COMPLETE	X	
CHAR(2)	ACD.LOCN-FIRST-EVENT	X	
CHAR(50)	ACD.LOCN-NARRATIVE	X	
CHAR(1)	ACD.LOCN-RELIA-DPS	X	
CHAR(1)	ACD.LOCN-RELIABILITY	X	
CHAR(1)	ACD.MIN-DOLLAR	X	
NUM(2)	ACD.MONTH-OCCURRED		ACD.DATE-OCCURRED
NUM(2)	ACD.NUM-INJURED	X	
NUM(2)	ACD.NUM-KILLED	X	
NUM(3)	ACD.NUM-PER-REC	X	
NUM(3)	ACD.NUM-VEH-REC	X	
NUM(3)	ACD.NUM-VEHIC	X	
CHAR(99)	ACD.OFFICER-NARR	X	
CHAR(2)	ACD.OFFICER-TYPE	X	
CHAR(1)	ACD.ON-BRIDGE	X	
CHAR(1)	ACD.PHOTOS	X	
NUM(7)	ACD.POP-FROM-CITY		ACD.CITY
NUM(7)	ACD.POP-FROM-CNTY		ACD.COUNTY
NUM(1)	ACD.POP-GROUP-FROM-CITY		ACD.CITY
CHAR(4)	ACD.PTRL-STATION	X	
CHAR(1)	ACD.PUB-PROP-DAMAGE	X	
CHAR(2)	ACD.RDC-FROM-CNTY		ACD.COUNTY
CHAR(10)	ACD.REF-POINT	X	
CHAR(2)	ACD.ROAD-CHAR	X	
CHAR(2)	ACD.ROAD-DESIGN	X	
CHAR(2)	ACD.ROAD-SURFACE	X	

(continued on next page)

Format	Name	Stored	Generated From
CHAR(8)	ACD.ROUTE-NUMBER	X	
CHAR(9)	ACD.ROUTE-NUMBER-9	X	
CHAR(2)	ACD.ROUTE-SYSTEM	X	
CHAR(7)	ACD.RP-DISTANCE	X	
CHAR(1)	ACD.RP-MEASURE	X	
NUM(1)	ACD.RUR-URB-FROM-CITY		ACD.CITY
CHAR(2)	ACD.SCHOOL-BUS	X	
CHAR(2)	ACD.SPEED-LIMIT	X	
NUM(4)	ACD.TIME-OCCURRED	X	
NUM(3)	ACD.TOWNSHIP	X	
CHAR(2)	ACD.TRAF-CNTRL-DEV	X	
CHAR(2)	ACD.TRAF-CNTRL-DEV-WORK	X	
CHAR(1)	ACD.TRAVEL-DIR	X	
CHAR(1)	ACD.URBAN-RURAL-CODE	X	
CHAR(1)	ACD.VALID-LOCATION	X	
CHAR(2)	ACD.WEATHER-COND-1	X	
CHAR(2)	ACD.WEATHER-COND-2	X	
CHAR(2)	ACD.WORK-ZONE	X	
CHAR(1)	ACD.WORKERS-PRESENT	X	
NUM(4)	ACD.YEAR-OCCURRED		ACD.DATE-OCCURRED

ACD - Descriptions of Data Elements
****

ACD.ACC-DIAGRAM - CHAR(2) - Diagram of Accident Code

'00' Officer left field blank
'01' Rear end
'02' Sideswipe -- same direction
'03' Left turn
'04' Ran off road--left side
'05' Right angle
'06' Right turn
'07' Ran off road--right side
'08' Head on
'09' Sideswipe opposing
'90' Other
'98' Not applicable
'99' Officer reported that DIAGRAM was unknown

ACD.ACC-NUM - CHAR(9) - Accident Number

Prior to 2003....
'yydddnnnn' Accident number
yy = Last two digits of year occurred (e.g., 90 for 1990)
ddd = Julian day of year
nnnn = 0000-9999

2003 and later....
'nnnnnnnnn' Unique accident number

ACD.ACC-SEVERITY - CHAR(1) - Accident Severity

'K' Fatal
'A' Injury - Incapacitating injury
'B' Injury - Non-incapacitating injury

'C' Injury - Possible injury
'N' Property damage - No apparent injury

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ACD.ACC-TYPE - CHAR(2) - Accident Type

'01' Collision with motor vehicle in transport
'02' Collision with parked motor vehicle
'03' Collision with roadway equipment--snowplow
'04' Collision with roadway equipment--other
'05' Collision with train
'06' Collision with pedalcycle
'07' Collision with pedestrian
'08' Collision with deer
'09' Collision with other animal
'10' Collision -- underride, rear
'11' Collision -- underride, side
'12' Collision with non-fixed object of other type
'13' Other type of collision
'14' Collision with non-fixed object of unknown type
'21' Collision with construction equipment
'22' Collision with traffic signal
'23' Collision with RR crossing device
'24' Collision with light pole
'25' Collision with utility pole
'26' Collision with sign structure or post
'27' Collision with mailboxes and/or posts
'28' Collision with other poles
'29' Collision with hydrant
'30' Collision with tree/shrubbery

'31' Collision with bridge piers
'32' Collision with median safety barrier
'33' Collision with crash cushion
'34' Collision with guardrail
'35' Collision with fence (non-median barrier)
'36' Collision with culvert / headwall
'37' Collision with embankment / ditch / curb
'38' Collision with building / wall
'39' Collision with rock outcrops
'40' Collision with parking meter
'41' Collision with other fixed object
'42' Collision with unknown type of fixed object
'51' Overturn / rollover
'52' Submersion
'53' Fire / explosion
'54' Jackknife
'55' Loss/spillage non-haz mat
'56' Loss/spillage hazardous mat
'64' Non-collision of other type
'65' Non-collision of unknown type
'90' Other type of accident
'99' Accident of unknown accident type

ACD.AGENCY-REPORT - CHAR(4) - Reporting Agency

Codes unknown.

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ACD.CENSUS-YR-FROM-CITY - NUM(4) - Census Year Computed From City

0000 Nonmunicipal
0001-9999 Census year for city

This field is computed by accessing the city name file

ACD.CITY - NUM(4) - City Number

0000 Nonmunicipal
0001-9999 Municipality number

Note: In select statements, cities can be identified by number (eg., ACD.CITY *EQ* 2885) or by name (eg., ACD.CITY *EQ* 'ST-CLOUD').

ACD.COUNTY - NUM(2) - County Number

01-87 County number

Note: In select statements, counties can be identified by number (eg., ACD.COUNTY *EQ* 39) or by name (eg., ACD.COUNTY *EQ* 'LAKE-OF-THE-WOODS').

ACD.COUNTY-TOWNSHIP - CHAR(5) - County and Township Number

The county number followed by the township number.

'01000' - '87999'

NOTE: Accident matrix summaries format this category into township name for printing.

ACD.DATE-OCCURRED - DATE - Date Accident Occurred

mm/dd/yyyy Date occurred (mm=month dd=day yyyy=year)

ACD.DAY-OCCURRED - NUM(2) - Day of Month Accident Occurred

01-31 Day of month accident occurred

ACD.DAY-OF-WEEK - NUM(1) - Day of Week Accident Occurred

1	Sunday	4	Wednesday	6	Friday
2	Monday	5	Thursday	7	Saturday
3	Tuesday				

ACD.DISTRICT-FROM-CNTY - NUM(1) - Construction District Computed From County

1-9 Construction district

The construction district is determined by accessing the county name file. The value may not agree with the construction

district shown in the roadlog file for trunk highway accidents.

ACD.HIT-AND-RUN - CHAR(1) - Hit and Run

'N' No - No hit and run involved
'Y' Yes - Hit and run involved
'X' Unknown
'Z' Not specified

ACD.HOUR-OCCURRED - NUM(2) - Hour Occurred

00 - 23 HH Hour of accident in military time.
98 left blank.
99 unknown

ACD.INTCHANGE-ELEM - CHAR(3) - Interchange Element Code

' ' Not on interchange
'ann' Interchange element code (a = A-Z, nn = 00-99)
'nnn' Interchange element code (nnn = 100 - 999)

ACD.INTSECT-RELATION - CHAR(2) - Relation to Intersection

'00' Not specified
'01' Not at intersection or junction
'02' T-intersection
'03' Y-intersection
'04' 4-legged intersection
'05' 5-or-more-legged intersection
'06' Traffic circle or roundabout
'07' Intersection-related
'08' At alley or driveway access
'09' At school crossing
'10' At railroad crossing
'11' At recreational trail crossing
'20' Interchange -- on ramp
'21' Interchange -- off ramp
'22' Interchange -- other area
'90' Other
'99' Officer reported that INTREL was unknown

ACD.LIGHT-COND - CHAR(2) - Light Conditions

'00' Not specified
'01' Daylight
'02' Sunrise
'03' Sunset
'04' Dark - Street lights on
'05' Dark - Street lights off
'06' Dark - No street lights
'07' Dark - unknown lighting
'90' Other
'99' Unknown

ACD.LOC-WORK-ZONE - CHAR(2) - Location of Crash Relative to Work Zone

'00' Not specified
'01' Before 1st warning sign
'02' Advance warning area
'03' Transition area
'04' Activity area
'05' Termination area
'90' Other
'98' Not applicable
'99' Unknown

ACD.LOCAL-CASE-NUM - CHAR(12) - Local Case Number

'00'	Not specified
'00000001' - '99999999'	Local case number
'98'	Not applicable

ACD.LOCN-ACCURACY - CHAR(2) - Location Accuracy

Codes unknown.

ACD.LOCN-COMPLETE - CHAR(1) - Location Complete

'Y' Yes
'N' No
'X' Unknown
'Z' Not specified

ACD.LOCN-FIRST-EVENT - CHAR(2) - Location of First Harmful Event

'00' Not specified
'01' On the roadway (alley, driveway, etc)
'02' Off the roadway on the shoulder
'03' Off the roadway on the median
'04' Off the roadway on the roadside
'05' Off the roadway on the separator
'06' Parking lot
'07' Private property
'08' Outside right-of-way
'90' Other
'99' Unknown

ACD.LOCN-NARRATIVE - CHAR(50) - Location Narrative

Contains 50-character verbal description of location

ACD.LOCN-RELIA-DPS - CHAR(1) - Location Reliability DPS Opinion

'0' Not specified
'1' Confident
'2' Less confident
'3' Best guess
'8' Not geocoded

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ACD.LOCN-RELIABILITY - CHAR(1) - Location Reliability DOT Opinion

'0' Not specified
'1' Confident
'2' Less confident
'3' Best guess
'8' No reference points
'A' Confident - corrected by MnDOT
'B' Less confident - corrected by MnDOT
'C' Best guess - corrected by MnDOT
'D' Corrected by MnDOT prior to A, B, C codes

ACD.MIN-DOLLAR - CHAR(1) - Minimum Dollar Threshold

Did this crash rise to the threshold level at which the law requires a report to DPS?

'Y' Yes
'N' No
'X' Unknown
'Z' Not specified

ACD.MONTH-OCCURRED - NUM(2) - Month Accident Occurred

01-12 Month accident occurred

ACD.NUM-PER-REC - NUM(3) - Number of ACP Records Stored

000-150 Number of ACP records for this accident

ACD.NUM-INJURED - NUM(3) - Number of Persons Injured

000-150 Number of persons injured

ACD.NUM-KILLED - NUM(3) - Number of Persons Killed

000-150 Number of persons killed

ACD.NUM-VEH-REC - NUM(3) - Number of ACV Records Stored

000-150 Number of records in ACV file for this accident

ACD.NUM-VEHIC - NUM(2) - Number of Vehicles Involved

01-99 Number of vehicles involved

ACD.OFFICER-NARR - CHAR(99) - Officer Narrative

Contains 99-character officer's narrative of the crash.

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ACD.OFFICER-TYPE - CHAR(2) - Type of Investigating Officer

'00' Not specified
'01' State patrol
'02' Sheriff
'03' Local (city police)
'90' Other officer type
'98' Not applicable (citizen report)
'99' Unknown officer type

ACD.ON-BRIDGE - CHAR(1) - Accident Occurred on Bridge

'Y' Yes, physically on bridge (not at abutment).
'N' No, not on bridge.
'X' Unknown
'Z' Not specified

ACD.PHOTOS - CHAR(1) - Were Photos Taken?

'Y' Yes
'N' No
'X' Unknown
'Z' Not specified

ACD.POP-FROM-CITY - NUM(7) - Population Computed From City

0000000 Nonmunicipal accident

0000001-9999999 Population of city in which accident occurred

This field is computed by accessing the city name file.

ACD.POP-FROM-CNTY - NUM(7) - Population Computed from ACD.COUNTY

0000000 County unknown
0000001-9999999 Population of county

This field is computed by accessing the county table.

ACD.POP-GROUP-FROM-CITY - NUM(1) - Population Group Computed From City

See ACD.URBAN-RURAL-CODE for codes (code 0 is not used). Use ACD.URBAN-RURAL-CODE if possible - ACD.POP-GROUP-FROM-CITY is computed by accessing the city name file.

ACD.PTRL-STATION - CHAR(4) - Patrol Station

'0000' Not specified
'0098' Not applicable
'2100' - '4700' Patrol station in which accident occurred

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ACD.PUB-PROP-DAMAGE - CHAR(1) - Public Property Damage

'Y' Yes
'N' No
'X' Unknown
'Z' Not specified

ACD.RDC-FROM-CNTY - CHAR(2) - Regional Development Commission from County Number

' 1' - '11' Regional Development Commission determined from County Number

ACD.REF-POINT - CHAR(10) - Reference Point

'Z ' Non-geocoded
'nnn+nn.nnn' Reference point

ACD.ROAD-CHAR - CHAR(2) - Road Characteristics

'00' Not specified
'01' Straight and level
'02' Straight and grade
'03' Straight at hillcrest
'04' Straight in sag
'05' Curve and level
'06' Curve and grade
'07' Curve at hillcrest
'08' Curve in sag
'90' Other (includes combination)
'99' Unknown

ACD.ROAD-DESIGN - CHAR(2) - Road Design

'00' Not specified
'01' Freeway--mainline
'02' Freeway--ramps
'03' Other divided highway
'04' One-way street
'05' 4-6 lanes undivided (2 to 3 lanes each way)
'06' 3 lanes undivided
'07' 5 lanes undivided (center left turn lane)
'08' 2 lanes--1 each way
'09' Alley / driveway
'10' Road on private property
'90' Other
'99' Unknown

ACD.ROAD-SURFACE - CHAR(2) - Road Surface Conditions

'00' Not specified
'01' Dry
'02' Wet
'03' Snow
'04' Slush
'05' Ice / packed snow

'06' Water (standing, moving)
'07' Muddy
'08' Debris
'09' Oily
'90' Other
'99' Unknown

ACD.ROUTE-NUMBER - CHAR(8) - Route Number

'nnnnnnxx' Route number (n = 0-9, x = 0-9 or A-Z)

Systems '01' - '03': 00000nnn or 0000nnna (a = A-Z)

Systems '05' and '10': ccccnnnx (cccc = city number)

Other systems: cc00nnxx (cc = county number)

NOTE: 'nnnn9999' or 'Z' means route number is unknown.

ACD.ROUTE-SYSTEM - CHAR(2) - Route System

'01' Interstate -- ISTH
'02' US Trunk Highway -- USTH
'03' MN Trunk Hwy -- MNTH
'04' County State Aid Highway--CSAH
'05' Municipal State Aid Highway--MSAH
'07' County Road -- CNTY
'08' Township Road -- TWNS
'09' Unorganized Township Road
'10' Municipal Street--MUN
'11' National Park Road--NATP
'12' National Forest Road--NATF
'13' Indian Service Road--IND
'14' State Forest Road--SFR
'15' State Park Road--SPRK
'16' Military Road -- MIL
'17' National Monument Road--NATM
'18' National Wildlife Refuge Road
'19' Frontage Road--FRNT
'20' State Game Reserve Road
'21' Private Road Open to Public
'23' Airport roads
'25' Non-traffic Ways
'30' Alleyways
'98' Not geocoded

1

ACD.RP-DISTANCE - CHAR(7) - Distance from Reference Point as Coded

'snn.nnn' Distance from reference point as initially coded, "s" is + or -, "n" is 0-9.

ACD.RP-MEASURE - CHAR(1) - Units of Measure for RP-DISTANCE

'F' Feet
'M' Miles
'Z' Not specified

ACD.RUR-URB-FROM-CITY - NUM(1) - Rural-Ruban-Urbanized Code From City

1 Rural
2 Urban (5,000 - 49,999)
3 Urbanized (50,000 and greater)

This field is computed by accessing the city name file.

ACD.SCHOOL-BUS - CHAR(2) - School Bus Accident

'01' Yes, involved directly
'02' Yes, involved indirectly
'03' No
'99' Unknown
'00' Not specified

ACD.SPEED-LIMIT - CHAR(2) - Speed Limit

'00' Speed limit not specified
'01' - '98' Posted speed limit in miles per hour
'99' Speed limit unknown

ACD.TIME-OCCURRED - NUM(4) - Time Occurred

0000 - 2359 HHMM Time of accident in military time.
9800 left blank.
9900 unknown

ACD.TOWNSHIP - NUM(3) - Township Number

000 Unknown
001-999 Township number

1
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ACD.TRAF-CNTRL-DEV - CHAR(2) - Traffic Control Devices

'00' Not specified
'01' Traffic signals
'02' Overhead flashers
'03' Stop sign - All approaches
'04' Stop sign - Other
'05' Yield sign
'06' Officer, flagman, or school patrol
'07' School bus stop arm
'08' School zone sign
'09' No passing zone
'10' Railroad crossing - Gates
'11' Railroad crossing - Flashing lights
'12' Railroad crossing - Stop signs
'13' Railroad crossing - Overhead flashers
'14' Railroad crossing - Overhead flashers and gates
'15' Railroad crossing - crossbuck
'90' Other
'98' Not applicable
'99' Unknown

ACD.TRAF-CNTRL-DEV-WORK - CHAR(2) - Traffic Control Devices Working

'00' Not specified
'01' Signal working properly
'02' Signal not working properly
'03' Signal working modified (e.g., temporarily flashing)
'04' Signal obscured or damaged
'90' Other
'98' Not applicable
'99' Unknown

ACD.TRAVEL-DIR - CHAR(1) - Travel Direction on Roadway

'E' East
'N' North
'S' South
'W' West

'Z' Not specified

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ACD.URBAN-RURAL-CODE - CHAR(1) - Urban-Rural Code

'0' Unknown
'1' Urban -- 250,000 and over
'2' Urban -- 100,000 - 249,999
'3' Urban -- 50,000 - 99,999
'4' Urban -- 25,000 - 49,999
'5' Urban -- 10,000 - 24,999
'6' Urban --   5,000 -   9,999
'7' Rural --   2,500 -   4,999
'8' Rural --   1,000 -   2,499
'9' Rural --   1 -   999 or nonmunicipal

ACD.VALID-LOCATION - CHAR(1) - Location Error

'1' Record passed location edits
'2' Record failed location edits

ACD.WEATHER-COND-1 - CHAR(2) - Weather Conditions
ACD.WEATHER-COND-2 - CHAR(2) - Weather Conditions

'00' Not specified
'01' Clear
'02' Cloudy
'03' Rain
'04' Snow
'05' Sleet, hail, or freezing rain
'06' Fog, smog, or smoke
'07' Blowing sand, dust or snow
'08' Severe cross winds

'90' Other
'99' Unknown

ACD.WORK-ZONE - CHAR(2) - Road Work Being Performed

'00' Not specified
'01' Lane closure
'02' Lane shift/crossover
'03' Work on shoulder or median
'04' Intermittent or moving workzone
'90' Other
'98' No or Not applicable
'99' Unknown

ACD.WORKERS-PRESENT - CHAR(1) - Workers Present in Work Zone?

'Y' Yes
'N' No
'X' Unknown
'Z' Not specified

ACD.YEAR-OCCURRED - NUM(4) - Year Accident Occurred

0000-9999 Year accident occurred

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ACJ - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(2)	ACJ.PER-NUM	X	
CHAR(8)	ACJ.AMBULANCE-NUMBER	X	
CHAR(2)	ACJ.POSN-IN-VEHIC	X	
CHAR(2)	ACJ.EJECTED	X	
CHAR(1)	ACJ.INJ-SEVERITY	X	
CHAR(1)	ACJ.HOSPITAL	X	
CHAR(1)	ACJ.HOSPITAL-METHOD	X	
CHAR(1)	ACJ.SEX	X	
CHAR(2)	ACJ.PHYS-COND	X	
CHAR(2)	ACJ.DL-STATE	X	
NUM(2)	ACJ.COUNTY	X	
CHAR(8)	ACJ.DL-CLASS	X	
CHAR(2)	ACJ.VALID-LICENSE	X	
CHAR(1)	ACJ.DL-WITHDRAWAL	X	

CHAR(1)	ACJ.ADDR-CORRECT	X
CHAR(1)	ACJ.CORONER-REPORT	X
DATE	ACJ.DATE-OF-BIRTH	X
DATE	ACJ.FATAL-DATE	X
CHAR(2)	ACJ.EQUIP-TYPE	X
CHAR(2)	ACJ.EQUIP-USED	X
CHAR(2)	ACJ.AIRBAG	X
CHAR(3)	ACJ.VEHIC-OCCUPIED	X
CHAR(3)	ACJ.AGE	X
CHAR(1)	ACJ.RECOMMENDATIONS	X
CHAR(5)	ACJ.FAT-NUM	X
CHAR(1)	ACJ.VIOLATIONS	X
CHAR(2)	ACJ.RESTRICTIONS	X
CHAR(1)	ACJ.ALCOHOL-TEST	X
CHAR(1)	ACJ.DRUG-TEST	X
CHAR(20)	ACJ.AMBULANCE-SERVICE	X
CHAR(1)	ACJ.PERSON-TYPE	X
CHAR(3)	ACJ.PERSON-AGE-GRP-1	X
CHAR(2)	ACJ.PERSON-AGE-GRP-2	X
CHAR(1)	ACJ.INJ-SEVERITY-B	X
CHAR(1)	ACJ.DL-CLASS-2	X
CHAR(1)	ACJ.DL-RESTRICTION-A	X
CHAR(1)	ACJ.DL-RESTRICTION-B	X
CHAR(1)	ACJ.DL-RESTRICTION-C	X
CHAR(1)	ACJ.ENDORSE-TRIPLE	X
CHAR(1)	ACJ.ENDORSE-TANKER	X
CHAR(1)	ACJ.ENDORSE-HAZARD	X
CHAR(1)	ACJ.ENDORSE-TANK-HAZARD	X
CHAR(1)	ACJ.ENDORSE-SCHOOL	X
CHAR(1)	ACJ.ENDORSE-BUS	X
CHAR(1)	ACJ.ENDORSE-CYCLE	X
CHAR(2)	ACJ.ALCOHOL-RESULT	X
CHAR(2)	ACJ.DRUG-RESULT	X

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Format	Name	Stored	Generated From
NUM(3)	ACJ.VEHIC-NUM	X	
CHAR(2)	ACJ.TOTAL-PERSONS	X	
CHAR(2)	ACJ.VEHIC-TYPE	X	
CHAR(2)	ACJ.VEHIC-STATE	X	

CHAR(2)	ACJ.MOST-EVENT	X
CHAR(2)	ACJ.STYLE	X
CHAR(4)	ACJ.MAKE	X
CHAR(3)	ACJ.SERIES	X
CHAR(1)	ACJ.CAUSAL	X
CHAR(1)	ACJ.INTRANSPORT	X
CHAR(4)	ACJ.MAKE-VIN	X
CHAR(2)	ACJ.DAMAGE-SEVERITY	X
CHAR(2)	ACJ.AREA-DAMAGED	X
CHAR(2)	ACJ.PRE-ACC-ACTION	X
CHAR(2)	ACJ.VEHIC-DIREC	X
CHAR(2)	ACJ.CONTRIB-FACTOR-1	X
CHAR(2)	ACJ.CONTRIB-FACTOR-2	X
CHAR(1)	ACJ.TOWAWAY	X
CHAR(1)	ACJ.FIRE	X
CHAR(1)	ACJ.TOWING	X
CHAR(3)	ACJ.SERIES-VIN	X
CHAR(2)	ACJ.STYLE-VIN	X
CHAR(2)	ACJ.MC-BODY-TYPE	X
CHAR(4)	ACJ.YEAR-MODEL-VIN	X
CHAR(1)	ACJ.MC-HAZ-PLAC	X
CHAR(1)	ACJ.COLOR-1-VIN	X
CHAR(1)	ACJ.COLOR-2-VIN	X
CHAR(2)	ACJ.EVENT1	X
CHAR(2)	ACJ.EVENT2	X
CHAR(2)	ACJ.EVENT3	X
CHAR(2)	ACJ.EVENT4	X
CHAR(4)	ACJ.YEAR-MODEL	X
CHAR(1)	ACJ.WAIVED	X
CHAR(8)	ACJ.BADGENO	X
CHAR(3)	ACJ.COLOR	X

ACJ - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(1)	ACJ.ADDR-CORRECT	X	
CHAR(3)	ACJ.AGE	X	
CHAR(2)	ACJ.AIRBAG	X	
CHAR(2)	ACJ.ALCOHOL-RESULT	X	
CHAR(1)	ACJ.ALCOHOL-TEST	X	
CHAR(8)	ACJ.AMBULANCE-NUMBER	X	
CHAR(20)	ACJ.AMBULANCE-SERVICE	X	
CHAR(2)	ACJ.AREA-DAMAGED	X	
CHAR(8)	ACJ.BADGENO	X	
CHAR(1)	ACJ.CAUSAL	X	
CHAR(3)	ACJ.COLOR	X	
CHAR(1)	ACJ.COLOR-1-VIN	X	
CHAR(1)	ACJ.COLOR-2-VIN	X	
CHAR(2)	ACJ.CONTRIB-FACTOR-1	X	
CHAR(2)	ACJ.CONTRIB-FACTOR-2	X	
CHAR(1)	ACJ.CORONER-REPORT	X	
NUM(2)	ACJ.COUNTY	X	
CHAR(2)	ACJ.DAMAGE-SEVERITY	X	
DATE	ACJ.DATE-OF-BIRTH	X	
CHAR(8)	ACJ.DL-CLASS	X	
CHAR(1)	ACJ.DL-CLASS-2	X	
CHAR(1)	ACJ.DL-RESTRICTION-A	X	
CHAR(1)	ACJ.DL-RESTRICTION-B	X	
CHAR(1)	ACJ.DL-RESTRICTION-C	X	
CHAR(2)	ACJ.DL-STATE	X	
CHAR(1)	ACJ.DL-WITHDRAWAL	X	
CHAR(2)	ACJ.DRUG-RESULT	X	
CHAR(1)	ACJ.DRUG-TEST	X	
CHAR(2)	ACJ.EJECTED	X	
CHAR(1)	ACJ.ENDORSE-BUS	X	
CHAR(1)	ACJ.ENDORSE-CYCLE	X	
CHAR(1)	ACJ.ENDORSE-HAZARD	X	
CHAR(1)	ACJ.ENDORSE-SCHOOL	X	
CHAR(1)	ACJ.ENDORSE-TANK-HAZARD	X	
CHAR(1)	ACJ.ENDORSE-TANKER	X	
CHAR(1)	ACJ.ENDORSE-TRIPLE	X	
CHAR(2)	ACJ.EQUIP-TYPE	X	
CHAR(2)	ACJ.EQUIP-USED	X	
CHAR(2)	ACJ.EVENT1	X	
CHAR(2)	ACJ.EVENT2	X	
CHAR(2)	ACJ.EVENT3	X	

CHAR(2)	ACJ.EVENT4	X	
CHAR(5)	ACJ.FAT-NUM	X	
DATE	ACJ.FATAL-DATE	X	
CHAR(1)	ACJ.FIRE	X	
CHAR(1)	ACJ.HOSPITAL	X	
CHAR(1)	ACJ.HOSPITAL-METHOD	X	

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Format	Name	Stored	Generated From
CHAR(1)	ACJ.INJ-SEVERITY	X	
CHAR(1)	ACJ.INJ-SEVERITY-B	X	
CHAR(1)	ACJ.INTRANSPORT	X	
CHAR(4)	ACJ.MAKE	X	
CHAR(4)	ACJ.MAKE-VIN	X	
CHAR(2)	ACJ.MC-BODY-TYPE	X	
CHAR(1)	ACJ.MC-HAZ-PLAC	X	
CHAR(2)	ACJ.MOST-EVENT	X	
CHAR(2)	ACJ.PER-NUM	X	
CHAR(3)	ACJ.PERSON-AGE-GRP-1	X	
CHAR(2)	ACJ.PERSON-AGE-GRP-2	X	
CHAR(1)	ACJ.PERSON-TYPE	X	
CHAR(2)	ACJ.PHYS-COND	X	
CHAR(2)	ACJ.POSN-IN-VEHIC	X	
CHAR(2)	ACJ.PRE-ACC-ACTION	X	
CHAR(1)	ACJ.RECOMMENDATIONS	X	
CHAR(2)	ACJ.RESTRICTIONS	X	
CHAR(3)	ACJ.SERIES	X	
CHAR(3)	ACJ.SERIES-VIN	X	
CHAR(1)	ACJ.SEX	X	
CHAR(2)	ACJ.STYLE	X	
CHAR(2)	ACJ.STYLE-VIN	X	
CHAR(2)	ACJ.TOTAL-PERSONS	X	
CHAR(1)	ACJ.TOWAWAY	X	
CHAR(1)	ACJ.TOWING	X	
CHAR(2)	ACJ.VALID-LICENSE	X	
CHAR(2)	ACJ.VEHIC-DIREC	X	
NUM(3)	ACJ.VEHIC-NUM	X	
CHAR(3)	ACJ.VEHIC-OCCUPIED	X	
CHAR(2)	ACJ.VEHIC-STATE	X	
CHAR(2)	ACJ.VEHIC-TYPE	X	

```
        CHAR(1)    ACJ.VIOLATIONS             X
        CHAR(1)    ACJ.WAIVED                 X
        CHAR(4)    ACJ.YEAR-MODEL             X
        CHAR(4)    ACJ.YEAR-MODEL-VIN         X
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ACJ - Descriptions of Data Elements
****

The ACJ data elements are generated from the ACP and ACV data elements. One ACJ record is generated for each ACP record. The following data elements are from the ACP file and are identical to the data elements as described under ACP:

- ACJ.ADDR-CORRECT
- ACJ.AGE
- ACJ.AIRBAG
- ACJ.ALCOHOL-RESULT
- ACJ.ALCOHOL-TEST
- ACJ.AMBULANCE-NUMBER
- ACJ.AMBULANCE-SERVICE
- ACJ.CORONER-REPORT
- ACJ.COUNTY
- ACJ.DATE-OF-BIRTH
- ACJ.DL-CLASS
- ACJ.DL-CLASS-2
- ACJ.DL-RESTRICTION-A
- ACJ.DL-RESTRICTION-B
- ACJ.DL-RESTRICTION-C
- ACJ.DL-STATE
- ACJ.DL-WITHDRAWAL

ACJ.DRUG-RESULT
ACJ.DRUG-TEST
ACJ.EJECTED
ACJ.ENDORSE-BUS
ACJ.ENDORSE-CYCLE
ACJ.ENDORSE-HAZARD
ACJ.ENDORSE-SCHOOL
ACJ.ENDORSE-TANK-HAZARD
ACJ.ENDORSE-TANKER
ACJ.ENDORSE-TRIPLE
ACJ.EQUIP-TYPE
ACJ.EQUIP-USED
ACJ.FAT-NUM
ACJ.FATAL-DATE
ACJ.HOSPITAL
ACJ.HOSPITAL-METHOD
ACJ.INJ-SEVERITY
ACJ.INJ-SEVERITY-B
ACJ.PER-NUM
ACJ.PERSON-AGE-GRP-1
ACJ.PERSON-AGE-GRP-2
ACJ.PERSON-TYPE
ACJ.PHYS-COND
ACJ.POSN-IN-VEHIC
ACJ.RECOMMENDATIONS
ACJ.RESTRICTIONS
ACJ.SEX
ACJ.VALID-LICENSE
ACJ.VEHIC-OCCUPIED
ACJ.VIOLATIONS

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The remaining data elements are obtained from the ACV file. For a given ACJ record, the ACV data elements are obtained from the ACV record that corresponds to the vehicle the person was riding in. If no corresponding ACV record is stored for a given ACP record, blanks appear in all CHAR fields and zeroes appear in all NUM fields. Otherwise, the fields contain the ACV data elements from the chosen ACV record. The data elements that correspond to ACV data elements are:

ACJ.AREA-DAMAGED
ACJ.BADGENO
ACJ.CAUSAL
ACJ.COLOR
ACJ.COLOR-1-VIN

ACJ.COLOR-2-VIN
ACJ.CONTRIB-FACTOR-1
ACJ.CONTRIB-FACTOR-2
ACJ.DAMAGE-SEVERITY
ACJ.EVENT1
ACJ.EVENT2
ACJ.EVENT3
ACJ.EVENT4
ACJ.FIRE
ACJ.INTRANSPORT
ACJ.MAKE
ACJ.MAKE-VIN
ACJ.MC-BODY-TYPE
ACJ.MC-HAZ-PLAC
ACJ.MOST-EVENT
ACJ.PRE-ACC-ACTION
ACJ.SERIES
ACJ.SERIES-VIN
ACJ.STYLE
ACJ.STYLE-VIN
ACJ.TOTAL-PERSONS
ACJ.TOWAWAY
ACJ.TOWING
ACJ.VEHIC-DIREC
ACJ.VEHIC-NUM
ACJ.VEHIC-STATE
ACJ.VEHIC-TYPE
ACJ.WAIVED
ACJ.YEAR-MODEL
ACJ.YEAR-MODEL-VIN

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ACP - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(2)	ACP.PER-NUM	X	
CHAR(8)	ACP.AMBULANCE-NUMBER	X	
CHAR(2)	ACP.POSN-IN-VEHIC	X	
CHAR(2)	ACP.EJECTED	X	
CHAR(1)	ACP.INJ-SEVERITY	X	
CHAR(1)	ACP.HOSPITAL	X	
CHAR(1)	ACP.HOSPITAL-METHOD	X	
CHAR(1)	ACP.SEX	X	
CHAR(2)	ACP.PHYS-COND	X	
CHAR(2)	ACP.DL-STATE	X	
NUM(2)	ACP.COUNTY	X	
CHAR(8)	ACP.DL-CLASS	X	
CHAR(2)	ACP.VALID-LICENSE	X	
CHAR(1)	ACP.DL-WITHDRAWAL	X	
CHAR(1)	ACP.ADDR-CORRECT	X	
CHAR(1)	ACP.CORONER-REPORT	X	
DATE	ACP.DATE-OF-BIRTH	X	
DATE	ACP.FATAL-DATE	X	
CHAR(2)	ACP.EQUIP-TYPE	X	
CHAR(2)	ACP.EQUIP-USED	X	
CHAR(2)	ACP.AIRBAG	X	
CHAR(3)	ACP.VEHIC-OCCUPIED	X	
CHAR(3)	ACP.AGE	X	
CHAR(1)	ACP.RECOMMENDATIONS	X	
CHAR(5)	ACP.FAT-NUM	X	
CHAR(1)	ACP.VIOLATIONS	X	
CHAR(2)	ACP.RESTRICTIONS	X	
CHAR(1)	ACP.ALCOHOL-TEST	X	
CHAR(1)	ACP.DRUG-TEST	X	
CHAR(20)	ACP.AMBULANCE-SERVICE	X	
CHAR(1)	ACP.PERSON-TYPE	X	
CHAR(3)	ACP.PERSON-AGE-GRP-1	X	
CHAR(2)	ACP.PERSON-AGE-GRP-2	X	
CHAR(1)	ACP.INJ-SEVERITY-B	X	
CHAR(1)	ACP.DL-CLASS-2	X	
CHAR(1)	ACP.DL-RESTRICTION-A	X	
CHAR(1)	ACP.DL-RESTRICTION-B	X	
CHAR(1)	ACP.DL-RESTRICTION-C	X	
CHAR(1)	ACP.ENDORSE-TRIPLE	X	
CHAR(1)	ACP.ENDORSE-TANKER	X	
CHAR(1)	ACP.ENDORSE-HAZARD	X	
CHAR(1)	ACP.ENDORSE-TANK-HAZARD	X	
CHAR(1)	ACP.ENDORSE-SCHOOL	X	
CHAR(1)	ACP.ENDORSE-BUS	X	
CHAR(1)	ACP.ENDORSE-CYCLE	X	
CHAR(2)	ACP.ALCOHOL-RESULT	X	
CHAR(2)	ACP.DRUG-RESULT	X	

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ACP - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(1)	ACP.ADDR-CORRECT	X	
CHAR(3)	ACP.AGE	X	
CHAR(2)	ACP.AIRBAG	X	
CHAR(2)	ACP.ALCOHOL-RESULT	X	
CHAR(1)	ACP.ALCOHOL-TEST	X	
CHAR(8)	ACP.AMBULANCE-NUMBER	X	
CHAR(20)	ACP.AMBULANCE-SERVICE	X	
CHAR(1)	ACP.CORONER-REPORT	X	
NUM(2)	ACP.COUNTY	X	
DATE	ACP.DATE-OF-BIRTH	X	
CHAR(8)	ACP.DL-CLASS	X	
CHAR(1)	ACP.DL-CLASS-2	X	
CHAR(1)	ACP.DL-RESTRICTION-A	X	
CHAR(1)	ACP.DL-RESTRICTION-B	X	
CHAR(1)	ACP.DL-RESTRICTION-C	X	
CHAR(2)	ACP.DL-STATE	X	
CHAR(1)	ACP.DL-WITHDRAWAL	X	
CHAR(2)	ACP.DRUG-RESULT	X	
CHAR(1)	ACP.DRUG-TEST	X	
CHAR(2)	ACP.EJECTED	X	
CHAR(1)	ACP.ENDORSE-BUS	X	
CHAR(1)	ACP.ENDORSE-CYCLE	X	
CHAR(1)	ACP.ENDORSE-HAZARD	X	
CHAR(1)	ACP.ENDORSE-SCHOOL	X	
CHAR(1)	ACP.ENDORSE-TANK-HAZARD	X	
CHAR(1)	ACP.ENDORSE-TANKER	X	
CHAR(1)	ACP.ENDORSE-TRIPLE	X	
CHAR(2)	ACP.EQUIP-TYPE	X	
CHAR(2)	ACP.EQUIP-USED	X	
CHAR(5)	ACP.FAT-NUM	X	
DATE	ACP.FATAL-DATE	X	
CHAR(1)	ACP.HOSPITAL	X	
CHAR(1)	ACP.HOSPITAL-METHOD	X	
CHAR(1)	ACP.INJ-SEVERITY	X	
CHAR(1)	ACP.INJ-SEVERITY-B	X	

```
        CHAR(2)    ACP.PER-NUM                X
        CHAR(3)    ACP.PERSON-AGE-GRP-1       X
        CHAR(2)    ACP.PERSON-AGE-GRP-2       X
        CHAR(1)    ACP.PERSON-TYPE            X
        CHAR(2)    ACP.PHYS-COND              X
        CHAR(2)    ACP.POSN-IN-VEHIC          X
        CHAR(1)    ACP.RECOMMENDATIONS        X
        CHAR(2)    ACP.RESTRICTIONS           X
        CHAR(1)    ACP.SEX                    X
        CHAR(2)    ACP.VALID-LICENSE          X
        CHAR(3)    ACP.VEHIC-OCCUPIED         X
        CHAR(1)    ACP.VIOLATIONS             X
```



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        ACP - Descriptions of Data Elements
        ***********************************

        ACP.ADDR-CORRECT - CHAR(1) - Address Correct

            'I'  Not applicable
            'N'  Otherwise
            'X'  Unknown
            'Y'  Driver address information is correct
            'Z'  Not specified

        ACP.AGE - CHAR(3) - Age of Person

             '000'   Less than 1 year old
             '001'   Between 1 and 2 years old
             '002'   Between 2 and 3 yeards old

                .              .
                .              .
                .              .

             '998'   Not specified
             '999'   Unknown

        ACP.AIRBAG - CHAR(2) - Airbag deployed

             '00'  Not specified
             '01'  Deployed--front
             '02'  Deployed--side
```

'03' Deployed -- front + side
'04' Not deployed--switch on
'05' Not deployed--switch off
'06' Not deployed--unknown if switch on or off
'90' Other
'98' Not applicable
'99' Unknown

ACP.ALCOHOL-RESULT - CHAR(2) - Blood Alcohol Test Result

'00' Negative (0 alcohol concentration)
'01' .01 (positive for alcohol at the .01% blood
alcohol concentration level -- BAC)
'02' .02 (positive for alcohol at the .02 BAC)

. .
. .
. .

'60' .60 (positive for alcohol at the .60 BAC)
'91' Person was not a driver and was not a non-motorist
'92' Person was a driver or non-motorist, but the
person was not tested, or it is not known if the person
was tested or not.
'99' Person was tested but the results of the test are
unknown ACP.COMPLY-LIC-RESTRN - CHAR(1) - Compliance
with License Restrictions

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ACP.ALCOHOL-TEST - CHAR(1) - Blood Alcohol Test Performed

'I' Not applicable
'N' No
'X' Unknown
'Y' Yes
'Z' Not specified

ACP.AMBULANCE-NUMBER - CHAR(8) - Ambulance Run Number to Hospital

'xxxxxxxx' Run number entered on crash report
'I' Not applicable
'X' Unknown
'Z' Not specified

ACP.AMBULANCE-SERVICE - CHAR(20) - Ambulance Service Name to Hospital

'xxxxxxxx' Name of ambulance service

'I' Not applicable
'X' Unknown
'Z' Not specified

ACP.CORONER-REPORT - CHAR(1) - Coroner Report Received

'I' Not applicable
'N' No
'X' Unknown
'Y' Yes
'Z' Not specified

ACP.COUNTY - NUM(2) - Driver Residence County

01-87 County number of driver residence
99 Unknown or out-of-state

ACP.DATE-OF-BIRTH - DATE - Person Date of Birth

mm/dd/yyyy Date of birth (mm=month, dd=day, yyyy= year)
00/00/0000 Unknown

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ACP.DL-CLASS - CHAR(8) - Driver License Classification

There are basically 4 classes: A, B, C, and D. However, DVS lists out 9 -classes- in its field named -class.- All 9 classes are listed below, though the last 5 are unlikely to appear. A valid value will (normally) be a value of A, B, C, or D, followed by any combination of the endorsement codes. It would be possible for a driver to have an -A- class driver license, and to have every single endorsement. In such a case, for example, a valid value

could be: ATNHXSPM. (In reality, most drivers will have a class D license with no endorsements.)

Classes:

- 'A' Commercial, highest level, valid for any vehicle or combination
- 'B' Commercial, valid for any basic single unit motor vehicle
- 'C' Commercial, valid (provided driver has the proper endorsement) for any class D vehicle transporting hazardous materials, and for school buses
- 'D' The normal (not commercial) driver license. Permits operation of up to two single units (motor vehicle and trailer) up to 26,000 GVWR (gross vehicle weight rating), fire trucks, and recreational vehicles. Not valid for a vehicle that required a hazardous materials endorsement. May tow trailers up to 10,000 pounds.
- 'I' ID card only
- 'T' Lifetime ID card only (65 and older)
- 'M' Moped license only
- 'R' Tracer record
- 'X' CONAX record

Endorsements:

- 'T' Double or triple trailers
- 'N' Tanker
- 'H' Hazardous materials
- 'X' Tanker with hazardous materials
- 'S' School bus
- 'P' Vehicle (other than school bus) transporting 16 or more passengers
- 'M' Motorcycle

Other:

- '8' Not applicable
- '0' Not specified

ACP.DL-CLASS-2 - CHAR(1) - Driver License Class

'A' Commercial, highest level, valid for any vehicle or combination
'B' Commercial, valid for any basic single unit motor vehicle
'C' Commercial, valid (provided driver has the proper endorsement) for any class D vehicle transporting hazardous materials, and for school buses
'D' The normal (not commercial) driver license. Permits operation of up to two single units (motor vehicle and trailer) up to 26,000 GVWR (gross vehicle weight rating), fire trucks, and recreational vehicles. Not valid for a vehicle that required a hazardous materials endorsement. May tow trailers up to 10,000 pounds.
'I' ID card only
'T' Lifetime ID card only (65 and older)
'M' Moped license only
'R' Tracer record
'X' CONAX record
'1' person was a non-motorist (person was not a driver)
'2' Person was a driver but was licensed outside Minnesota
'3' Person was a driver, but for unknown reasons, does not have a driver-s license.
'4' Dl number from accident report did not find any match in MN DL database
'5' Officer and / or citizen should have completed this field but failed to do so

ACP.DL-RESTRICTION-A - CHAR(1) - First Driver License Restriction
ACP.DL-RESTRICTION-B - CHAR(1) - Second Driver License Restriction
ACP.DL-RESTRICTION-C - CHAR(1) - Third Driver License Restriction

'A' Any use of alcohol or drugs invalidates license
'B' Hand-operated brakes
'C' Complete hand controls
'D' Prosthetic aid
'E' Automatic transmission
'F' Left outside mirror
'G' Daylight driving only
'I' Also valid for 3-wheeled motorcycle
'J' Farm work and driver education instruction permit
'K' Intrastate only
'L' Driving vehicle without airbrakes
'O' Valid for vehicles less than 2601 GVWR (gross vehicle weight rating)
'Q' Hand operated light beam control
'R' Elevated driver seat
'U' No freeway driving
'W' Valid for vehicles less than 2601 GVWR and buses with

passenger capacity under 24
'1' person was a non-motorist (person was not a driver)
'2' Person was a driver but was licensed outside Minnesota
'3' Person was a driver, but for unknown reasons, does not have a driver-s license.
'4' Dl number from accident report did not find any match in MN DL database
'5' Not specified

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ACP.DL-STATE - CHAR(2) - Driver License Issuing State

'AL' Alabama
'AK' Alaska
'AR' Arkansas
'AZ' Arizona
'CA' California
'CO' Colorado
'CT' Connecticut
'DC' District of Columbia
'DE' Delaware
'FL' Florida
'GA' Georgia
'HI' Hawaii
'ID' Idaho
'IL' Illinois
'IN' Indiana
'IA' Iowa
'KS' Kansas
'KY' Kentucky
'LA' Louisiana
'MA' Massachusetts
'MD' Maryland
'ME' Maine
'MI' Michigan
'MN' Minnesota
'MO' Missouri
'MS' Mississippi
'MT' Montana
'OK' Oklahoma
'OR' Oregon
'PA' Pennsylvania
'RI' Rhode Island
'ND' North Dakota
'NE' Nebraska
'NC' North Carolina

'NH' New Hampshire
'NJ' New Jersey
'NM' New Mexico
'NV' Nevada
'NY' New York
'OH' Ohio
'SC' South Carolina
'SD' South Dakota
'TN' Tennessee
'TX' Texas
'UT' Utah
'VA' Virginia
'VT' Vermont
'WA' Washington
'WI' Wisconsin
'WV' West Virginia
'WY' Wyoming

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(continued from previous page)

'IM' Indian res. (inside Minn)
'IO' Indian res (outside Minn)
'
'AB' Alberta
'BC' British Columbia
'MB' Manitoba
'NF' Newfoundland
'NK' New Brunswick
'NS' Nova Scotia
'NT' Northwest Territory
'ON' Ontario
'PE' Prince Edward Island
'PQ' Quebec
'SK' Saskatchewan
'YT' Yukon Territory
'CN' Canada (Other)
'
'Y' Other
'I' Inapplicable
'X' Officer and /or citizen reported that DLSTATE was unknown
'Z' Officer and citizen left field blank.

ACP.DL-WITHDRAWAL - CHAR(1) - Driver License Withdrawal

'I' Not applicable
'N' No
'X' Unknown
'Y' Yes
'Z' Not specified

ACP.DRUG-RESULT - CHAR(2) - Drug Test Result

Codes unknown

ACP.DRUG-TEST - CHAR(1) - Drug Test Performed

'I' Not applicable
'N' No
'X' Unknown
'Y' Yes
'Z' Not specified

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ACP.EJECTED - CHAR(2) - Ejection from Vehicle

'00' Not specified
'01' Trapped, extricated (by mechanical means)
'02' Trapped, freed by non- mechanical means
'03' Partially ejected
'04' Ejected
'05' Not ejected
'90' Other
'98' Not applicable
'99' Unknwon

ACP.ENDORSE-BUS - CHAR(1) - Endorsement for Bus

Is driver license endorsed to permit person to drive a vehicle

(other than a school bus) designed for transporting 16 or more passengers.

'I' Not applicable
'N' No
'X' Unknown
'Y' Yes
'Z' Not specified

ACP.ENDORSE-CYCLE - CHAR(1) - Endorsement for Motorcycle

Is driver license endorsed to permit person to drive a motorcycle.

'I' Not applicable
'N' No
'X' Unknown
'Y' Yes
'Z' Not specified

ACP.ENDORSE-HAZARD - CHAR(1) - Endorsement for Hazardous Materials

Is driver license endorsed to permit person to transport hazardous materials.

'I' Not applicable
'N' No
'X' Unknown
'Y' Yes
'Z' Not specified

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ACP.ENDORSE-SCHOOL - CHAR(1) - Endorsement for School Bus

Is driver license endorsed to permit person to drive a school bus.

'I' Not applicable
'N' No

'X' Unknown
'Y' Yes
'Z' Not specified

ACP.ENDORSE-TANK-HAZARD - CHAR(1) - Endorsement for Hazardous Tanker

Is driver license endorsed to permit person to drive a tanker
of hazardous materials.

'I' Not applicable
'N' No
'X' Unknown
'Y' Yes
'Z' Not specified

ACP.ENDORSE-TANKER - CHAR(1) - Endorsement for Tanker

Is driver license endorsed to permit person to drive a tanker.

'I' Not applicable
'N' No
'X' Unknown
'Y' Yes
'Z' Not specified

ACP.ENDORSE-TRIPLE - CHAR(1) - Endorsement for Multiple Trailers

Is driver license endorsed to permit person to drive with
double or triple trailers.

'I' Not applicable
'N' No
'X' Unknown
'Y' Yes
'Z' Not specified

ACP.EQUIP-TYPE - CHAR(2) - Type of Safety Equipment

'00'	Not specified
'01'	Not in place
'02'	Lap belt
'03'	Shoulder belt
'04'	Lap and shoulder belt
'05'	Child safety seat
'06'	Child booster seat
'90'	Other
'98'	Not applicable
'99'	Unknown

ACP.EQUIP-USED - CHAR(2) - Safety Equipment Used

'00'	Not specified
'01'	Belts not used
'02'	Lap belt only used
'03'	Shoulder belt only used
'04'	Lap and shoulder belt used
'05'	Child seat not used
'06'	Child set used improperly
'07'	Child seat used properly
'08'	Booster seat not used
'09'	Booster seat used improperly
'10'	Booster seat used properly
'11'	Helmet not used
'12'	Helmet used
'13'	Dark (non-light-reflective clothing)
'14'	Light-reflective clothing
'15'	No protective (elbow, knee, etc) pads
'16'	Protective pads
'90'	Other
'98'	Not applicable
'99'	Unknown

ACP.FAT-NUM - CHAR(5) - Fatality Number

'00000'	Not killed
'00001' - '99999'	Fatality number

ACP.FATAL-DATE - DATE - Date of Fatality

mm/dd/yyyy	Date of fatality (mm=month, dd=day, yyyy= year)
00/00/0000	Unknown

ACP.HOSPITAL - CHAR(1) - Injured Taken to Hospital

'I' Not applicable
'N' No
'X' Unknown
'Y' Yes
'Z' Not specified

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ACP.HOSPITAL-METHOD - CHAR(1) - Method Taken to Hospital

'A' Transported by ambulance
'O' Other
'I' Not applicable
'X' Unknown
'Z' Not specified

ACP.INJ-SEVERITY - CHAR(1) - Injury Severity

'K' Killed
'A' Injured - Incapacitating
'B' Injured - Non-incapacitating
'C' Injured - Possible injury
'N' No apparent injury

ACP.INJ-SEVERITY-B - CHAR(1) - Injury Severity

'K' Killed
'I' Injured
'N' No apparent injury

ACP.PER-NUM - CHAR(3) - Relative Person Number

'001' - '150' Number of person record in ACP file

ACP.PERSON-AGE-GRP-1 - CHAR(3) - Age Group of Person by Year

'000' less than 1 year old
'001' 1 year old
'002' 2 years old

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'998' Not specifed
'999' Unknown

ACP.PERSON-AGE-GRP-2 - CHAR(3) - Age Group of Person by 5-Year

'01' 0 - 4 years old
'02' 5 - 9 years old
'03' 10 - 14 years old
'04' 15 - 19 years old
'05' 20 - 24 years old
'06' 25 - 29 years old
'07' 30 - 34 years old
'08' 35 - 39 years old
'09' 40 - 44 years old
'10' 45 - 49 years old
'11' 50 - 54 years old
'12' 55 - 59 years old
'13' 60 - 64 years old
'14' 65 - 69 years old
'15' 70 - 74 years old
'16' 75 - 79 years old
'17' 80 - 84 years old
'18' 85 or older
'98' Not specified
'99' Unknown

ACP.PERSON-TYPE - CHAR(1) - Person Type

Motorists (1, 2, and 3)
'1' DRIVER -- (Motorist -- driver or operator of a motor vehicle in transport)
'2' PASSENGER -- (Motorist -- passenger of a motor vehicle

in transport. This person was a passenger or rider in or
on the motor vehicle.)
'3' Unknown Motorist -- (Motorist -- person was associated
with a motor vehicle in transport, but it is unknown whether
the person was a driver / operator of the motor vehicle or
was a passenger)
Non-motorists (4, 5, and 6)
'4' Occupant of a motor vehicle -- but the motor vehicle was
not in transport (This is a type of non-motorist)
'5' BICYCLIST -- (Non-motorist -- pedalcyclist -- the
person was riding a unicycle, bicycle, tricycle, etc.)
'6' PEDESTRIAN -- (Non-motorist -- pedestrian or other type
of non-motorist. Include here: pedestrian, skater,
horseback or other animal rider, horse-drawn cart occupant,
wheelchair--including motorized wheelchair--occupant, etc.

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ACP.PHYS-COND - CHAR(2) - Physical Condition

'00' Not specified
'01' Normal - No drugs or drinking
'02' Under the influence
'03' Had been drinking
'04' Commercial driver over .04 BAC
'05' Had been taking drugs
'06' Aggressive
'07' Asleep
'08' Physical disability
'09' Ill
'90' Other
'98' Not applicable
'99' Unknown

ACP.POSN-IN-VEHIC - CHAR(2) - Position in Vehicle

Positions for motorists

'01' Driver (include motorcycle operators)
'02' Front center
'03' Front right
'04' Second seat left
'05' Second seat center
'06' Second seat right
'07' Third seat left
'08' Third seat center
'09' Third seat right
'10' Outside of vehicle
'11' Trailing unit
'12' Pickup truck bed
'13' Truck cab sleeper section
'14' Passenger in other position (include motorcycle passenger)
'15' Passenger in unknown position
'16' Front left (non-driver)
'19' Not known if person was a driver or a passenger

Positions (locations) for non-motorists

'21' Crosswalk, marked, at intersection
'22' Crosswalk, not marked, at intersection
'23' Crosswalk, not at intersect
'24' Crosswalk--at driveway access
'25' In roadway
'26' Not in roadway
'27' Median (but not on shoulder)
'28' Island
'29' Shoulder
'30' Sidewalk
'31' Within 10 feet of roadway (but not on median, island, shoulder or sidewalk)
'32' Beyond 10 feet of roadway (but still in trafficway)
'33' Outside trafficway
'34' Shared-use path or trails
'35' Other non-motorist location
'36' Unknown non-motorist location

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ACP.RECOMMENDATIONS - CHAR(1) - Recommendations

'1' None
'2' Physical exam
'3' Drivers exam
'4' Driver and Physical exam
'8' Not applicable

'0' Not specified

ACP.RESTRICTIONS - CHAR(2) - Driver License Restrictions

'00' Not specified
'01' None
'02' Corrective lenses
'03' Mechanical devices
'04' Prosthetic aid
'05' Automatic transmission
'06' Outside mirror
'07' Limit to daylight hours
'08' Limit to employment only
'09' Limited -- other
'10' Learner-s permit
'11' CDL (commercial driver license) -- Intrastate only
'12' Vehicles without air brakes
'13' Except Class A bus
'14' Except Class A and Class B bus
'15' Except tractor trailer
'16' Farm waiver
'17' Multiple restrictions
'90' Other
'98' Not applicable
'99' Unknown

ACP.SEX - CHAR(1) - Sex of Person

'M' Male
'F' Female
'X' Unknown
'Z' Not specifed

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ACP.VALID-LICENSE - CHAR(2) - Valid Driver License

'00' Not specified
'01' Valid, and within all restrictions
'02' Violation -- beyond restrictions
'03' Violation -- not endorsed for this type of vehicle
'04' Violation -- license suspended
'05' Violation -- license revoked
'06' Violation -- license cancelled
'07' Violation of limited license provisions
'08' Violation -- expired license
'90' Other
'98' Not applicable
'99' Unknown

ACP.VEHIC-OCCUPIED - CHAR(3) - Vehicle Occupied by Person

'001' - '150' Number of vehicle

ACP.VIOLATIONS - CHAR(1) - Driver Cited for Violations

'I' Not applicable
'N' No
'X' Unknown
'Y' Yes
'Z' Not specified

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ACV - Listing of Names in File Order
****

Format	Name	Stored	Generated From
NUM(3)	ACV.VEHIC-NUM	X	
CHAR(2)	ACV.TOTAL-PERSONS	X	
CHAR(2)	ACV.VEHIC-TYPE	X	
CHAR(2)	ACV.VEHIC-STATE	X	
CHAR(2)	ACV.MOST-EVENT	X	
CHAR(2)	ACV.STYLE	X	
CHAR(4)	ACV.MAKE	X	
CHAR(3)	ACV.SERIES	X	
CHAR(1)	ACV.CAUSAL	X	
CHAR(1)	ACV.INTRANSPORT	X	
CHAR(4)	ACV.MAKE-VIN	X	
CHAR(2)	ACV.DAMAGE-SEVERITY	X	
CHAR(2)	ACV.AREA-DAMAGED	X	
CHAR(2)	ACV.PRE-ACC-ACTION	X	
CHAR(2)	ACV.VEHIC-DIREC	X	
CHAR(2)	ACV.CONTRIB-FACTOR-1	X	
CHAR(2)	ACV.CONTRIB-FACTOR-2	X	
CHAR(1)	ACV.TOWAWAY	X	
CHAR(1)	ACV.FIRE	X	
CHAR(1)	ACV.TOWING	X	
CHAR(3)	ACV.SERIES-VIN	X	
CHAR(2)	ACV.STYLE-VIN	X	
CHAR(2)	ACV.MC-BODY-TYPE	X	
CHAR(4)	ACV.YEAR-MODEL-VIN	X	
CHAR(1)	ACV.MC-HAZ-PLAC	X	
CHAR(1)	ACV.COLOR-1-VIN	X	
CHAR(1)	ACV.COLOR-2-VIN	X	
CHAR(2)	ACV.EVENT1	X	
CHAR(2)	ACV.EVENT2	X	
CHAR(2)	ACV.EVENT3	X	
CHAR(2)	ACV.EVENT4	X	
CHAR(4)	ACV.YEAR-MODEL	X	
CHAR(1)	ACV.WAIVED	X	
CHAR(8)	ACV.BADGENO	X	

CHAR(3)	ACV.COLOR	X
CHAR(2)	ACV.VEHIC-USE	X

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ACV - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(2)	ACV.AREA-DAMAGED	X	
CHAR(8)	ACV.BADGENO	X	
CHAR(1)	ACV.CAUSAL	X	
CHAR(3)	ACV.COLOR	X	
CHAR(1)	ACV.COLOR-1-VIN	X	
CHAR(1)	ACV.COLOR-2-VIN	X	
CHAR(2)	ACV.CONTRIB-FACTOR-1	X	
CHAR(2)	ACV.CONTRIB-FACTOR-2	X	
CHAR(2)	ACV.DAMAGE-SEVERITY	X	
CHAR(2)	ACV.EVENT1	X	
CHAR(2)	ACV.EVENT2	X	
CHAR(2)	ACV.EVENT3	X	
CHAR(2)	ACV.EVENT4	X	
CHAR(1)	ACV.FIRE	X	
CHAR(1)	ACV.INTRANSPORT	X	
CHAR(4)	ACV.MAKE	X	
CHAR(4)	ACV.MAKE-VIN	X	
CHAR(2)	ACV.MC-BODY-TYPE	X	
CHAR(1)	ACV.MC-HAZ-PLAC	X	
CHAR(2)	ACV.MOST-EVENT	X	
CHAR(2)	ACV.PRE-ACC-ACTION	X	
CHAR(3)	ACV.SERIES	X	
CHAR(3)	ACV.SERIES-VIN	X	
CHAR(2)	ACV.STYLE	X	

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        CHAR(2)    ACV.STYLE-VIN           X
        CHAR(2)    ACV.TOTAL-PERSONS       X
        CHAR(1)    ACV.TOWAWAY             X
        CHAR(1)    ACV.TOWING              X
        CHAR(2)    ACV.VEHIC-DIREC         X
        NUM(3)     ACV.VEHIC-NUM           X
        CHAR(2)    ACV.VEHIC-STATE         X
        CHAR(2)    ACV.VEHIC-TYPE          X
        CHAR(2)    ACV.VEHIC-USE           X
        CHAR(1)    ACV.WAIVED              X
        CHAR(4)    ACV.YEAR-MODEL          X
        CHAR(4)    ACV.YEAR-MODEL-VIN      X
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        ACV - Descriptions of Data Elements
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        ACV.AREA-DAMAGED - CHAR(2) - Area Damaged on Vehicle

             '00'  Not specified
             '01'  Front
             '02'  Right front
             '03'  Right center
             '04'  Right rear
             '05'  Rear
             '06'  Left rear
             '07'  Left center
             '08'  Left front
             '09'  Top
             '10'  Bottom--undercarriage
             '11'  Multiple areas
             '90'  Other
             '98'  Not applicable
             '99'  Unknown
```

ACV.BADGENO - CHAR(8) - Commercial Vehicle Inspector Badge Number

'CV1xxxxx' Badge number ("x"is any character)
'I' Not applicable
'X' Unknown
'Z' Not specified

ACV.CAUSAL - CHAR(1) - Causal Vehicle of the Crash?

'1' Single vehicle crash
'Y' Yes. This was a multi-vehicle crash (ie, there were 2 or more units), and this unit (vehicle or non-motorist) had causal responsibility for the crash, and the other unit did not.
'N' No. This was a multi-vehicle crash (2 or more units), and this unit (vehicle or non-motorist) did not have causal responsibility for the crash but one or more of the other units did.
'S' This unit shares causal responsibility for the crash with one or more other units involved in the crash.
'X' This was a multi-vehicle crash. It is not not known which vehicle or non-motorist in this crash had causal responsibility for this crash.
'5' This crash involved 5 or more units.

ACV.COLOR - CHAR(3) - Color of Vehicle from Report

'xxx' The first 3-letters of the color of the vehicle
'I' Not applicable
'Z' Not specified

ACV.COLOR-1-VIN - CHAR(1) - First Color of Vehicle from VIN
ACV.COLOR-2-VIN - CHAR(1) - Second Color of Vehicle from VIN

'A'	Red	'J'	Pink
'B'	Blue	'K'	Yellow
'C'	Gray	'L'	Maroon
'D'	Black	'M'	Lavender
'E'	Brown	'N'	Gold
'F'	White	'O'	Orange

'G' Green 'P' Silver
'H' Tan 'Q' unknown
'I' Ivory

ACV.CONTRIB-FACTOR-1 - CHAR(2) - Contributing Factors Field 1
ACV.CONTRIB-FACTOR-2 - CHAR(2) - Contributing Factors Field 2

'00' Not specified
'01' No clear contributing factor
'02' Failure to yield right of way
'03' Illegal or unsafe speed
'04' Following too closely
'05' Disregard traffic control device
'06' Driving left of roadway center - Not passing
'07' Improper passing or overtaking
'08' Improper or unsafe lane use
'09' Improper parking, starting, or stopping
'10' Improper turn
'11' Unsafe backing
'12' No signal or improper signal
'13' Over-correcting
'14' Impeding traffic
'15' Driver inattention or distraction
'16' Driver inexperience
'17' Pedestrian violation or error
'18' Chemical impairment
'19' Failure to use lights
'20' Driver on car phone, CB, or two-way radio
'21' Other human contributing factor
'31' Vision obscured - Windshield glass
'32' Vision obscured - Sun or headlights
'33' Vision obscured - Other
'41' Defective brakes
'42' Defective tire or tire failure
'43' Defective lights
'44' Inadequate windshield glass
'45' Oversize or overweight vehicle
'46' Skidding
'50' Other vehicle defects or factors
'61' Weather
'90' Other
'99' Unknown

ACV.DAMAGE-SEVERITY - CHAR(2) - Damage Severity

'00' Not specified
'01' None
'02' Light
'03' Moderate
'04' Severe
'05' Total
'90' Other
'98' Not applicable
'99' Unknown

ACV.EVENT1 - CHAR(2) - Sequence of Events Code 1
ACV.EVENT2 - CHAR(2) - Sequence of Events Code 2
ACV.EVENT3 - CHAR(2) - Sequence of Events Code 3
ACV.EVENT4 - CHAR(2) - Sequence of Events Code 4

Collision with
'01' Motor vehicle in transport
'02' Parked motor vehicle
'03' Roadway equipment--snowplow
'04' Roadway equipment--other
'05' Train
'06' Pedalcycle
'07' Pedestrian
'08' Deer
'09' Other animal
'10' Underride--rear
'11' Underride--side
'12' Other non-fixed object
'13' Other collision type*
'14' Unknown collision type
Collision with Fixed Object
'21' Construction equipment
'22' Traffic Signal
'23' RR crossing device
'24' Light pole
'25' Utility pole
'26' Sign structure or post
'27' Mailboxes and/or posts
'28' Other poles
'29' Hydrant
'30' Tree/shrubbery
'31' Bridge piers
'32' Median safety barrier
'33' Crash cushion
'34' Guardrail

'35' Fence (non-median barrier)
'36' Culvert / headwall
'37' Embankment / ditch / curb
'38' Building / wall
'39' Rock outcrops
'40' Parking meter
'41' Other fixed object*
'42' Unknown fixed object

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ACV.EVENT1 - CHAR(2) - Sequence of Events Code 1
ACV.EVENT2 - CHAR(2) - Sequence of Events Code 2
ACV.EVENT3 - CHAR(2) - Sequence of Events Code 3
ACV.EVENT4 - CHAR(2) - Sequence of Events Code 4

(continued from pervious page)
Non-Collision
'51' Overturn / rollover
'52' Submersion
'53' Fire / explosion
'54' Jackknife
'55' Loss/spillage non-haz mat
'56' Loss/spillage hazardous mat
'57' Ran off road--right
'58' Ran off road--left
'59' Equip Fail (tire, brake, etc.)
'60' Separation of units
'61' Downhill runaway
'62' Cross median / centerline
'63' Cargo / equipment shift
'64' Non-collision of other type*
'65' Non-collision of unknown type
Residual Categories
'90' Event of other type
'98' Not applicable
'99' Unknown
'00' Not specified

ACV.FIRE - CHAR(1) - Fire in Vehicle

'I' Not applicable
'N' No
'X' Unknown
'Y' Yes
'Z' Not specified

ACV.INTRANSPORT - CHAR(1) - Was Vehicle in Transport

'I' Not applicable
'N' No
'X' Unknown
'Y' Yes

ACV.MAKE - CHAR(4) - Make of Vehicle
ACV.MAKE-VIN - CHAR(4) - Make of Vehicle from VIN

Codes unknown at this time

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ACV.MC-BODY-TYPE - CHAR(2) - Cargo Body Type

'00' Not specified
'01' Van
'02' Dry bulk cargo tank
'03' Liquid bulk cargo tank
'04' Gas bulk cargo tank
'05' Flatbed or platform
'06' Dump
'07' Concrete mixer
'08' Auto transporter
'09' Garbage or refuse
'10' Combination
'11' Special permit load
'12' Grain/chips/gravel
'13' Pole
'90' Other
'98' Not applicable
'99' Unknown

ACV.MC-HAZ-PLAC - CHAR(1) - Hazardous Materials Placards Displayed

'I' Not applicable
'N' No
'X' Unknown

'Y' Yes
'Z' Not specified

ACV.MOST-EVENT - CHAR(2) - Event Causing the Greatest Harm to Vehicle

'00' Not specified
'nn' Event code (see ACV.EVENT1 for codes)

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ACV.PRE-ACC-ACTION - CHAR(2) - Action Prior to Accident

'01' VEHICLE - GOING STRAIGHT AHEAD OR FOLLOWING ROADWAY
'02' VEHICLE - WRONG WAY INTO OPPOSING TRAFFIC
'03' VEHICLE - RIGHT TURN ON RED
'04' VEHICLE - LEFT TURN ON RED
'05' VEHICLE - MAKING RIGHT TURN
'06' VEHICLE - MAKING LEFT TURN
'07' VEHICLE - MAKING U TURN
'08' VEHICLE - STARTING FROM PARKED POSITION
'09' VEHICLE - STARTING IN TRAFFIC
'10' VEHICLE - SLOWING IN TRAFFIC
'11' VEHICLE - STOPPED IN TRAFFIC
'12' VEHICLE - ENTERING PARKED POSITION
'13' VEHICLE - AVID UNIT/OBJECT IN ROAD
'14' VEHICLE - CHANGING LANES
'15' VEHICLE - OVERTAKING/PASSING

'16' VEHICLE - MERGING
'17' VEHICLE - BACKING
'18' VEHICLE - STALLED ON ROADWAY
'21' PARKED VEHICLE - PARKED LEGALLY
'22' PARKED VEHICLE - PARKED ILLEGALLY
'22' PARKED VEHICLE - STOPPED OFF ROADWAY
'31' PEDESTRIAN - CROSSING WITH SIGNAL
'32' PEDESTRIAN - CROSSING AGAINST SIGNAL
'33' PEDESTRIAN - DARTING INTO TRAFFIC
'34' PEDESTRIAN - OTHER IMPROPER CROSSING
'35' PEDESTRIAN - CROSSING IN A MARKED CROSSWALK
'36' PEDESTRIAN - CROSSING (NO SIGNAL OR CROSSWALK)
'37' PEDESTRIAN - FAIL TO YIELD R/W TO TRAFFIC
'38' PEDESTRIAN - INNATENTION/DISTRACTION
'39' PEDESTRIAN - WALKING/RUNNING IN ROAD WITH TRAFFIC
'40' PEDESTRIAN - WALKING/RUNNING IN ROAD AGAINST TRAFFIC
'41' PEDESTRIAN - STANDING/LYING IN ROAD
'42' PEDESTRIAN - EMERGING FROM BEHIND PARKED VEHICLE
'43' PEDESTRIAN - CHILD GETTTING ON/OFF SCHOOL BUS
'44' PEDESTRIAN - PERON GETTING ON/OFF VEHICLE
'45' PEDESTRIAN - PUSHING/WORKING ON VEHICLE
'46' PEDESTRIAN - WORKING IN ROADWAY
'47' PEDESTRIAN - PLAYING IN ROADWAY
'48' PEDESTRIAN - NOT IN ROADWAY
'51' BICYCLIST - RIDING WITH TRAFFIC
'52' BICYCLIST - RIDING AGAINST TRAFFIC
'53' BICYCLIST - MAKING RIGHT TURN
'54' BICYCLIST - MAKING LEFT TURN
'55' BICYCLIST - MAKING U TURN
'56' BICYCLIST - RIDING ACROSS ROAD
'57' BICYCLIST - SLOWING/STOPPING/STARTING
'90' OTHER ACTION
'99' UNKNOWN

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ACV.SERIES - CHAR(3) - Series of Vehicle
ACV.SERIES-VIN - CHAR(3) - Series of Vehicle from VIN

Codes unknown at this time

ACV.STYLE - CHAR(2) - Body Style of Vehicle

ACV.STYLE-VIN - CHAR(2) - Body Style of Vehicle from VIN

Codes unknown at this time

ACV.TOTAL-PERSONS - CHAR(2) - Total Persons in Vehicle

'00' - '99' Total number of occupants of the vehicle

ACV.TOWAWAY - CHAR(1) - Vehicle Towed Away

'Y' Yes
'N' No

ACV.TOWING - CHAR(1) - Towing Flag

'Y' Non-truck vehicle towing trailer, boat, etc.
'N' Otherwise

ACV.VEHIC-DIREC - CHAR(2) - Direction Vehicle Was Traveling

'01'	North	'05'	South
'02'	Northeast	'06'	Southwest
'03'	East	'07'	West
'04'	Southeast	'08'	Northwest
		'99'	Unknown or not applicable

ACV.VEHIC-NUM - NUM(3) - Relative Vehicle Number

001-150 Relative record number in vehicle file

ACV.VEHIC-STATE - CHAR(2) - Vehicle Registration State

'AL'	Alabama
'AK'	Alaska
'AR'	Arkansas
'AZ'	Arizona
'CA'	California
'CO'	Colorado
'CT'	Connecticut
'DC'	District of Columbia
'DE'	Delaware
'FL'	Florida
'GA'	Georgia
'HI'	Hawaii
'ID'	Idaho
'IL'	Illinois
'IN'	Indiana
'IA'	Iowa
'KS'	Kansas
'KY'	Kentucky
'LA'	Louisiana
'MA'	Massachusetts
'MD'	Maryland
'ME'	Maine
'MI'	Michigan
'MN'	Minnesota
'MO'	Missouri
'MS'	Mississippi
'MT'	Montana
'OK'	Oklahoma
'OR'	Oregon
'PA'	Pennsylvania
'RI'	Rhode Island
'ND'	North Dakota
'NE'	Nebraska
'NC'	North Carolina
'NH'	New Hampshire
'NJ'	New Jersey
'NM'	New Mexico
'NV'	Nevada
'NY'	New York
'OH'	Ohio
'SC'	South Carolina
'SD'	South Dakota
'TN'	Tennessee
'TX'	Texas
'UT'	Utah
'VA'	Virginia

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            'VT'  Vermont
            'WA'  Washington
            'WI'  Wisconsin
            'WV'  West Virginia
            'WY'  Wyoming



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            (state codes continued from previous page)

            'IM'  Indian res. (inside Minn)
            'IO'  Indian res (outside Minn)
            '
            'AB'  Alberta
            'BC'  British Columbia
            'MB'  Manitoba
            'NF'  Newfoundland
            'NK'  New Brunswick
            'NS'  Nova Scotia
            'NT'  Northwest Territory
            'ON'  Ontario
            'PE'  Prince Edward Island
            'PQ'  Quebec
            'SK'  Saskatchewan
            'YT'  Yukon Territory
            'CN'  Canada (Other)
            '
            'Y'  Other
            'I'  Inapplicable
            'X'  Unknown
            'Z'  Not specified
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ACV.VEHIC-TYPE - CHAR(2) - Type of Vehicle

'01' Passenger car
'02' Pickup
'03' Sport Utility Vehicle
'04' Van or minivan
'05' Motorhome, camper, RV
'06' Limousine
'07' Bus (7-15 seats)
'08' Bus (16+ seats)
'09' Snowmobile
'10' ATV
'11' Motorcycle
'12' Motorscooter, motorbike
'13' Moped, motorized bicycle
'14' Farm equipment
'31' 2axle,6tire 1unit truck
'32' 3+ axle 1unit truck
'33' 1 unit truck with trailer
'34' Truck tract. no trailer
'35' Truck tract. semitrailer
'36' Truck tract. 2 trailers
'37' Truck tract. 3 trailers
'38' Heavy truck unknown type
'51' Pedestrian
'52' Skater
'53' Bicyclist
'54' Other non-motorist
'90' Other motor vehicle type

'99' Unknown

ACV.VEHIC-USE - CHAR(2) - Special Vehicle Use

'01' normal
'02' taxicab
'03' school bus
'04' bus (non-school)
'05' military vehicle
'06' hit and run vehicle
'07' police no lights/sirens
'08' police with lights/sirens
'09' fire no lights/sirens
'10' fire with lights/sirens
'11' ambulance no lights/siren
'12' ambulance w/ lights/siren
'13' snowplow working
'14' snowplow in transit
'15' other maint. veh working
'16' other maint. veh in trans
'17' other public vehicle
'90' other vehicle use
'98' not applicable
'99' unknown

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ACV.WAIVED - CHAR(1) - Commercial Vehicle Inspection Waived

'I' Not applicable
'N' No
'X' Unknown
'Y' Yes
'Z' Not specified

ACV.YEAR-MODEL - CHAR(4) - Year of Vehicle Manufacture
ACV.YEAR-MODEL-VIN - CHAR(4) - Year of Vehicle Manufacture from VIN

'   '   Unknown
'0000' - '9999' Year of vehicle manufacture

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ADT - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(2)	ADT.ROUTE-SYSTEM	X	
CHAR(8)	ADT.ROUTE-NUMBER	X	
CHAR(10)	ADT.START-REF	X	
CHAR(8)	ADT.MILEPOINT		ADT.START-REF
CHAR(10)	ADT.END-REF	X	
DATE	ADT.START-DATE	X	
DATE	ADT.END-DATE	X	
CHAR(1)	ADT.TRAFFIC-BREAK	X	

NUM(7,3)	ADT.SECTION-LENGTH	X
NUM(6)	ADT.ADT	X
NUM(5)	ADT.HCADT	X
NUM(5)	ADT.NUM-DAYS	X
CHAR(2)	ADT.GROUP	X
NUM(5)	ADT.HC-FIVE-AXLE	X

ADT - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
NUM(6)	ADT.ADT	X	
DATE	ADT.END-DATE	X	
CHAR(10)	ADT.END-REF	X	
CHAR(2)	ADT.GROUP	X	
NUM(5)	ADT.HC-FIVE-AXLE	X	
NUM(5)	ADT.HCADT	X	
CHAR(8)	ADT.MILEPOINT		ADT.START-REF
NUM(5)	ADT.NUM-DAYS	X	
CHAR(8)	ADT.ROUTE-NUMBER	X	
CHAR(2)	ADT.ROUTE-SYSTEM	X	
NUM(7,3)	ADT.SECTION-LENGTH	X	
DATE	ADT.START-DATE	X	
CHAR(10)	ADT.START-REF	X	
CHAR(1)	ADT.TRAFFIC-BREAK	X	

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ADT - Descriptions of Data Elements
****

ADT.ADT - NUM(6) - Average Traffic Volume for All Years Specified

If the SELECT subcommand is used to choose only certain time intervals between START-DATE and END-DATE, then this value is the total volume for all selected intervals, divided by the number of days selected, i.e., it is always averaged by day. If only certain hours of the days are selected, then the volume represents on those hours of the day, but it is still averaged by day.

000000	Volume not available for all years specified.
000001 - 999999	Volume weighted over full time period.

ADT.END-DATE - DATE - Ending Date for ADT and HCADT

The ending date (mm/dd/yyyy) for the volumes. This is a constant value and is what was specified on the command.

ADT.END-REF - CHAR(10) - Ending Reference Point for ADT and HCADT

The ending reference point (ppp+dd.ddd) for the section to which these volumes apply.

ADT.GROUP - CHAR(2) - Traffic Volume Variation Group

****
this data element available with TRAFFIC-TIME-MATRIX command only.
****

'01'	Outstate Rural (Farm-market)
'02'	Outstate Rural (Some recreational)
'03'	Outstate Rural (Moderate recreational)
'04'	Outstate Rural (High recreational)
'05'	Outstate Municipal (Recreational > 5,000 population)
'06'	Outstate Municipal (Non-recreational > 5,000 population)
'07'	Outstate Municipal (Recreational < 5,000 population)
'08'	Outstate Municipal (Non-recreational < 5,000 population)
'09'	Metro - Urban commuter
'10'	Metro - Urban-suburban mix
'11'	Metro - Suburban commuter
'12'	Metro - Outlying commuter
'13'	Metro - Outlying mix
'14'	Metro - Outlying recreational
'15'	Metro - Urban-suburban shopping
'16'	Metro - Urban mix
'17'	Metro - Suburban mix

ADT.HC-FIVE-AXLE - NUM(5) - Number of Five Axle Vehicles

****
this data element available with TRAFFIC-MATRIX-SUMMARY command only.
****

00000 - 99999 Five-axle ADT. Computed from HCADT as follows:

Five-axle = HCADT x LN(HCADT) x 0.09084

LN is natural logarithm.

ADT.HCADT - NUM(5) - Heavy Commercial ADT for All Years

If the time period from START-DATE to END-DATE spans more than one year, this value is the weighted heavy commercial ADT for the time period.
This volume may also be adjusted if the SELECT or CATEGORIES subcommand refer to hours. If TIM.HOUR is not referenced, this volume will be the annual average daily value (i.e., it is not modelled).

00000	Heavy commercial ADT not available for all years specified.
00001 - 99999	Heavy commercial ADT weighted over full time period.

ADT.MILEPOINT - CHAR(8) - Milepoint

'0000.000' - '9999.999' True mileage computed from reference point.

ADT.NUM-DAYS - NUM(5) - Number of Selected Days

The number of days between START-DATE and END-DATE that are selected.

00001 - 99999 Number of selected days.

ADT.ROUTE-NUMBER - CHAR(8) - Route Number

'nnnnnnxx' Route number

n = 0-9 a = A-Z x = 0-9 or A-Z

cccc = City number cc = County number

Route systems '01','02','03': '00000nnn' or '0000nnna'

Route systems '05' and '10': 'ccccnnnx'

Other route systems: 'cc00nnxx'

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ADT.ROUTE-SYSTEM - CHAR(2) - Route System

'01'	ISTH	'09'	UTWN	'16'	MIL
'02'	USTH	'10'	MUN	'17'	NATM
'03'	MNTH	'11'	NATP	'18'	NATW
'04'	CSAH	'12'	NFD	'19'	FRNT
'05'	MSAS	'13'	IND	'20'	SGAM
'07'	CNTY	'14'	SFR	'23'	PRIV
'08'	TWNS	'15'	SPRK		

ADT.SECTION-LENGTH - NUM(7,3) - Section Length

Length of section for which the volumes are applicable (the true mileage distance from START-REF to END-REF).

0.000	True mileage data missing.
0.001 - 9999.999	Length of section.

ADT.START-DATE - DATE - Starting Date for ADT and HCADT

The starting date (mm/dd/yyyy) for the volumes. This is a constant value and is what was specified on the command.

ADT.START-REF - CHAR(10) - Starting Reference Point for ADT and HCADT

The starting reference point (ppp+dd.ddd) for the section to which these volumes apply.

ADT.TRAFFIC-BREAK - CHAR(1) - Traffic Section Break

Indicates whether or not the location of START-REF corresponds to a traffic record location:

"Y" Yes, this is a traffic record location.

"N" No, no traffic record here. May be a roadlog record, or
     a user-specified location.

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ASA - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(1)	ASA.RECORD-TYPE	X	
CHAR(2)	ASA.RECORD-NUMBER	X	
CHAR(2)	ASA.ROUTE-SYSTEM	X	
CHAR(8)	ASA.ROUTE-NUMBER	X	
CHAR(10)	ASA.START-REF-POINT	X	
CHAR(10)	ASA.END-REF-POINT	X	
CHAR(2)	ASA.SECTION-TYPE	X	
DATE	ASA.START-DATE	X	
NUM(4)	ASA.START-YEAR		ASA.START-DATE
NUM(2)	ASA.START-MONTH		ASA.START-DATE
NUM(2)	ASA.START-DAY		ASA.START-DATE
DATE	ASA.END-DATE	X	
NUM(4)	ASA.END-YEAR		ASA.END-DATE
NUM(2)	ASA.END-MONTH		ASA.END-DATE
NUM(2)	ASA.END-DAY		ASA.END-DATE
NUM(1)	ASA.CONSTR-DIST	X	
CHAR(2)	ASA.MAINT-AREA	X	
CHAR(4)	ASA.PTRL-STATION	X	
CHAR(2)	ASA.PTRL-DIST	X	
NUM(2)	ASA.COUNTY	X	
NUM(1)	ASA.DISTRICT-FROM-CNTY		ASA.COUNTY
CHAR(2)	ASA.RDC-FROM-CNTY		ASA.COUNTY
NUM(7)	ASA.POP-FROM-CNTY		ASA.COUNTY

NUM(4)	ASA.CITY	X	
NUM(7)	ASA.POP-FROM-CITY		ASA.CITY
NUM(1)	ASA.RUR-URB-FROM-CITY		ASA.CITY
NUM(1)	ASA.POP-GROUP-FROM-CITY		ASA.CITY
NUM(4)	ASA.CENSUS-YR-FROM-CITY		ASA.CITY
NUM(4)	ASA.URB-AREA	X	
CHAR(5)	ASA.CATEGORY	X	
NUM(2)	ASA.LEN-USER-CATEGORY	X	
CHAR(18)	ASA.USER-CATEGORY	X	
NUM(5)	ASA.TOT-NUM-ACC	X	
NUM(5)	ASA.NUM-FAT-ACC	X	
NUM(5)	ASA.NUM-A-ACC	X	
NUM(5)	ASA.NUM-B-ACC	X	
NUM(5)	ASA.NUM-C-ACC	X	
NUM(5)	ASA.NUM-INJ-ACC	X	
NUM(5)	ASA.NUM-PROP-ACC	X	
NUM(5)	ASA.NUM-WET-ACC	X	
NUM(5)	ASA.NUM-DRY-ACC	X	
NUM(3,1)	ASA.ACC-RATE	X	
NUM(3,1)	ASA.SEV-RATE	X	
NUM(3,1)	ASA.FAT-RATE	X	
NUM(4,1)	ASA.WET-TOTAL-PERCENT	X	
NUM(4,1)	ASA.WET-DRY-PERCENT	X	

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Format	Name	Stored	Generated From
NUM(5)	ASA.TOT-NUM-ACC-NJ	X	
NUM(5)	ASA.NUM-FAT-ACC-NJ	X	
NUM(5)	ASA.NUM-A-ACC-NJ	X	
NUM(5)	ASA.NUM-B-ACC-NJ	X	
NUM(5)	ASA.NUM-C-ACC-NJ	X	
NUM(5)	ASA.NUM-INJ-ACC-NJ	X	
NUM(5)	ASA.NUM-PROP-ACC-NJ	X	
NUM(5)	ASA.NUM-WET-ACC-NJ	X	
NUM(5)	ASA.NUM-DRY-ACC-NJ	X	
NUM(3,1)	ASA.ACC-RATE-NJ	X	
NUM(3,1)	ASA.SEV-RATE-NJ	X	
NUM(3,1)	ASA.FAT-RATE-NJ	X	
NUM(4,1)	ASA.WET-TOTAL-PERCENT-NJ	X	
NUM(4,1)	ASA.WET-DRY-PERCENT-NJ	X	

NUM(3,1)	ASA.AVG-ACC-RATE	X
NUM(3,1)	ASA.UPPER-LIMIT	X
NUM(3,1)	ASA.LOWER-LIMIT	X
NUM(3,1)	ASA.AMT-OUT-OF-SIG	X
NUM(3,1)	ASA.RATIO-OUT-OF-SIG	X
NUM(7,1)	ASA.SECTION-LENGTH	X
NUM(6)	ASA.ADT	X
NUM(12)	ASA.VEHICLE-MILES	X
CHAR(1)	ASA.EFFECTIVE-DATE-FLAG	X
NUM(4)	ASA.CNTL-SECT	X
NUM(2)	ASA.SPEED-LIMIT	X
CHAR(1)	ASA.GEN-ENVIRON	X
CHAR(1)	ASA.ROAD-DESIGN	X
CHAR(1)	ASA.THRU-LANE	X
CHAR(1)	ASA.GEN-MED-TYPE	X
CHAR(1)	ASA.LEFT-TURN	X
CHAR(2)	ASA.DIST-SEC-CAT	X
CHAR(2)	ASA.CENT-SEC-CAT	X
CHAR(1)	ASA.DEF-BY-SEC	X
CHAR(1)	ASA.MUN-RUR-IND	X
NUM(1)	ASA.CNTL-ACC	X
CHAR(1)	ASA.MED-TYPE	X
CHAR(1)	ASA.NUM-LANES-DM	X
CHAR(1)	ASA.NUM-LANES-IM	X
CHAR(51)	ASA.START-DESCR	X
CHAR(51)	ASA.END-DESCR	X

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ASA - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
NUM(6)	ASA.ADT	X	

NUM(3,1)	ASA.ACC-RATE	X	
NUM(3,1)	ASA.ACC-RATE-NJ	X	
NUM(3,1)	ASA.AMT-OUT-OF-SIG	X	
NUM(3,1)	ASA.AVG-ACC-RATE	X	
CHAR(5)	ASA.CATEGORY	X	
NUM(4)	ASA.CENSUS-YR-FROM-CITY		ASA.CITY
CHAR(2)	ASA.CENT-SEC-CAT	X	
NUM(4)	ASA.CITY	X	
NUM(1)	ASA.CNTL-ACC	X	
NUM(4)	ASA.CNTL-SECT	X	
NUM(1)	ASA.CONSTR-DIST	X	
NUM(2)	ASA.COUNTY	X	
CHAR(1)	ASA.DEF-BY-SEC	X	
CHAR(2)	ASA.DIST-SEC-CAT	X	
NUM(1)	ASA.DISTRICT-FROM-CNTY		ASA.COUNTY
CHAR(1)	ASA.EFFECTIVE-DATE-FLAG	X	
DATE	ASA.END-DATE	X	
NUM(2)	ASA.END-DAY		ASA.END-DATE
CHAR(51)	ASA.END-DESCR	X	
NUM(2)	ASA.END-MONTH		ASA.END-DATE
CHAR(10)	ASA.END-REF-POINT	X	
NUM(4)	ASA.END-YEAR		ASA.END-DATE
NUM(3,1)	ASA.FAT-RATE	X	
NUM(3,1)	ASA.FAT-RATE-NJ	X	
CHAR(1)	ASA.GEN-ENVIRON	X	
CHAR(1)	ASA.GEN-MED-TYPE	X	
CHAR(1)	ASA.LEFT-TURN	X	
NUM(2)	ASA.LEN-USER-CATEGORY	X	
NUM(3,1)	ASA.LOWER-LIMIT	X	
CHAR(2)	ASA.MAINT-AREA	X	
CHAR(1)	ASA.MED-TYPE	X	
CHAR(1)	ASA.MUN-RUR-IND	X	
NUM(5)	ASA.NUM-A-ACC	X	
NUM(5)	ASA.NUM-A-ACC-NJ	X	
NUM(5)	ASA.NUM-B-ACC	X	
NUM(5)	ASA.NUM-B-ACC-NJ	X	
NUM(5)	ASA.NUM-C-ACC	X	
NUM(5)	ASA.NUM-C-ACC-NJ	X	
NUM(5)	ASA.NUM-DRY-ACC	X	
NUM(5)	ASA.NUM-DRY-ACC-NJ	X	
NUM(5)	ASA.NUM-FAT-ACC	X	
NUM(5)	ASA.NUM-FAT-NJ	X	

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Format	Name	Stored	Generated From
NUM(5)	ASA.NUM-INJ-ACC	X	
NUM(5)	ASA.NUM-INJ-ACC-NJ	X	
CHAR(1)	ASA.NUM-LANES-DM	X	
CHAR(1)	ASA.NUM-LANES-IM	X	
NUM(5)	ASA.NUM-PROP-ACC	X	
NUM(5)	ASA.NUM-PROP-ACC-NJ	X	
NUM(5)	ASA.NUM-WET-ACC	X	
NUM(5)	ASA.NUM-WET-ACC-NJ	X	
NUM(7)	ASA.POP-FROM-CITY		ASA.CITY
NUM(7)	ASA.POP-FROM-CNTY		ASA.COUNTY
NUM(1)	ASA.POP-GROUP-FROM-CITY		ASA.CITY
CHAR(2)	ASA.PTRL-DIST	X	
CHAR(4)	ASA.PTRL-STATION	X	
NUM(3,1)	ASA.RATIO-OUT-OF-SIG	X	
CHAR(2)	ASA.RDC-FROM-CNTY		ASA.COUNTY
CHAR(2)	ASA.RECORD-NUMBER	X	
CHAR(1)	ASA.RECORD-TYPE	X	
CHAR(1)	ASA.ROAD-DESIGN	X	
CHAR(8)	ASA.ROUTE-NUMBER	X	
CHAR(2)	ASA.ROUTE-SYSTEM	X	
NUM(1)	ASA.RUR-URB-FROM-CITY		ASA.CITY
NUM(7,3)	ASA.SECTION-LENGTH	X	
CHAR(2)	ASA.SECTION-TYPE	X	
NUM(3,1)	ASA.SEV-RATE	X	
NUM(3,1)	ASA.SEV-RATE-NJ	X	
NUM(2)	ASA.SPEED-LIMIT	X	
DATE	ASA.START-DATE	X	
NUM(2)	ASA.START-DAY		ASA.START-DATE
CHAR(51)	ASA.START-DESCR	X	
NUM(2)	ASA.START-MONTH		ASA.START-DATE
CHAR(10)	ASA.START-REF-POINT	X	
NUM(4)	ASA.START-YEAR		ASA.END-DATE
CHAR(1)	ASA.THRU-LANE	X	
NUM(5)	ASA.TOT-NUM-ACC	X	
NUM(5)	ASA.TOT-NUM-ACC-NJ	X	
NUM(3,1)	ASA.UPPER-LIMIT	X	
NUM(4)	ASA.URB-AREA	X	
CHAR(18)	ASA.USER-CATEGORY	X	
NUM(12)	ASA.VEHICLE-MILES	X	
NUM(4,1)	ASA.WET-DRY-PERCENT	X	
NUM(4,1)	ASA.WET-DRY-PERCENT-NJ	X	

NUM(4,1) ASA.WET-TOTAL-PERCENT X
NUM(4,1) ASA.WET-TOTAL-PERCENT-NJ X

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ASA - Descriptions of Data Elements
****

ASA.ADT - NUM(6) - Average Daily Traffic

000000	Traffic data unavailable from traffic file.
000001 - 999999	Computed traffic volume weighted for specified time period.

ASA.ACC-RATE - NUM(3,1) - Accident Rate

00.0 - 99.9	Accident rate for all accidents in the section.

ASA.ACC-RATE-NJ - NUJM(3,1) - Accident Rate for Non-junction Accidents.

00.0 - 99.9	Accident rate for only the non-junction accidents.

ASA.AMT-OUT-OF-SIG - NUM(3,1) - Amount Out of Significance

-99.9 - 99.9 Amount out of significance

```
Let AR = ASA.ACC-RATE
    UL = ASA.UPPER-LIMIT
    LL = ASA.LOWER-LIMIT
    AO = ASA.AMT-OUT-OF-SIG

then   If LL <= AR <= UL, then AO = 00.0.
       If AR > UL, then AO = AR - UL (00.1 - 99.9).
       If AR > LL, then AO = AR - LL (-99.9 - -00.1).
```

ASA.AVG-ACC-RATE - NUM(3,1) - Average Accident Rate for the Group

00.0 - 99.9	Average accident for the group this section belongs to. Used in computing significance limits.

ASA.CATEGORY - CHAR(5) - Section Standard Category

'abcde' Depends upon method used to create the section:

If RLG-METHOD used then

a = Municipal/Rural Code (RLG.URBAN-MUNIC-CODE)
b = Control of Acess (RLG.CONTROL-OF-ACCESS)
c = General Median Type Code (RLG.MEDIAN-TYPE)
d = Number of Lanes Increasing MP (RLG.NUM-LANES-IM)
e = Number of Lanes Decreasing MP (RLG.NUM-LANES-DM)

Note: Municipal/rural code and general median type code are translated into fewer codes for categorization -- See page 8-171.

If SEC-METHOD used then

a = General Environment (SEC.GEN-ENVIRON)
b = Road Design (SEC.ROAD-DESIGN)
c = Thru Lane Description (SEC.THRU-LANE)
d = General Median Type (SEC.MEDIAN-TYPE)
e = Left Turn Lane Description (SEC.LEFT-TURN-LANE)

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ASA.CENSUS-YR-FROM-CITY - NUM(4) - Census Year.

0000 Nonmumicipal
0001-9999 Census year

ASA.CENT-SEC-CAT - CHAR(2) - Central Office Section Category.

' ' No category assigned
'00' - '99' Category assigned central office

ASA.CITY - NUM(4) - City Number

0000 Nonmunicipal
0001-9998 City number

Note: In select statements, cities may be identified by number (eg., ASA.CITY *EQ* 2585) or by name (eg., ASA.CITY *EQ* 'ST-PAUL').

ASA.CNTL-ACC - NUM(1) - Control of Access.

0 Unknown
1 No control of access
2 Partial control of access

3 Full control of access
4 Not a public road

ASA.CNTL-SECT - NUM(4) - Control Section Number.

xxyy Where xx is the county number and

yy is: 00 Not applicable
01-68 U.S. or Minnesota trunk highway control section
80-88 Interstate trunk highway control section

ASA.CONSTR-DIST - NUM(1) - Construction District Number.

1-9 Construction district number from the roadlog file

ASA.COUNTY - NUM(2) - County Number.

01-87 County number from the roadlog file

Note: In select statements, counties can be specified by number (eg., ASA.COUNTY *EQ* 39) or by name (ASA.COUNTY *EQ* 'LAKE-OF-THE-WOODS').

ASA.DEF-BY-SEC - CHAR(1) - Defined by Sections File Code.

'Y' Section was initiated by a record in the sections file (design break)

'N' Section was initiated by a record in the roadlog file (administrative break).

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ASA.DIST-SEC-CAT - CHAR(2) - District Section Category.

' ' No category assigned
'00' - '99' Category assigned by the district

ASA.DISTRICT-FROM-CNTY - NUM(1) - Construction District from County Number.

1-9 Construction district determined from county number and TIS county table (can differ from ASA.CONSTR-DIST).

ASA.EFFECTIVE-DATE-FLAG - CHAR(1) - Effective Date Warning Flag.

' ' All roadlog effective dates in section precede

ASA.START-DATE.

'*' One or more roadlog effective dates in section was at or beyond ASA.START-DATE.

ASA.END-DATE - DATE - End Date of Report.

mm/dd/yyyy END-DATE specified on the command for the analysis period.

ASA.END-DAY - NUM(2) - End Day of Report.

dd From the ASA.END-DATE

ASA.END-DESCR - CHAR(51) - Verbal Description at Endpoint of Section.

A verbal description taken from the record in the sections or roadlog file at the location in ASA.END-REF-POINT

ASA.END-MONTH - NUM(2) - End Month of Report.

mm From the ASA.END-DATE

ASA.END-REF-POINT - CHAR(10) - Ending Reference Point of Section.

'nnn+nn.nnn' nnn = reference post
+nn.nnn = distance from reference post

ASA.END-YEAR - NUM(2) - End Year of Report.

yyyy From the ASA.END-DATE

ASA.FAT-RATE - NUM(3,1) - Fatal Accident Rate.

00.0 - 99.9 Accident rate for all fatal accidents in the section

ASA.FAT-RATE-NJ - NUM(3,1) - Fatal Accident Rate for Nonjunction Accidents.

00.0 - 99.9 Accident rate for only the fatal non-junction accidents

ASA.GEN-ENVIRON - CHAR(1) - General Environment.

'U' Urban
'S' Suburban
'R' Rural

```
     'B'   City bypass

ASA.GEN-MED-TYPE - CHAR(1) - General Median Type from Roadlog File.
                             Condensed from RLG.MEDIAN-TYPE into:

          'U'  Unknown
          'R'  Raised
          'D'  Depressed
          'C'  One-way couplet

ASA.LEFT-TURN - CHAR(1) - Left Turn Lane Characteristics.

     ' '  Not applicable
     '1'  No left turn lanes
     '2'  Painted left turn lanes
     '3'  Physical left turn lanes

ASA.LEN-USER-CATEGORY- NUM(2) - Length of User Category Field.

     If +CATEGORIES was not included when the record was created, this
     field is 00.
     If +CATEGORIES was included when the record was created, this
     field contains the total length of the data elements specified:
     01-18.

ASA.LOWER-LIMIT - NUM(3,1) - Lower Significance Limit.

     -99.9 - 99.9   Lower significance limit

ASA.MAINT-AREA - CHAR(2) - Maintenance Area.

     '  '   Unknown or non-trunk
     'na'   Maintenance area (n = 1-9, a = A or B)

ASA.MED-TYPE - CHAR(1) - General Characteristics of Medians.

     From the sections file:

          'N'  Not divided - no median
          'R'  Divided - raised median
          'D'  Divided - depressed median
          'C'  One-way couplet

ASA.MUN-RUR-IND - CHAR(1) - Municipal/Rural Indicator.

     'M'   Municipal
     'R'   Rural

ASA.NUM-A-ACC - NUM(5) - Number of Injury Severity A Accidents.

     00000 - 99999   Number of accidents with severity level "A".
```

ASA.NUM-A-ACC-NJ - NUM(5) - Number of Non-junction Severity A Accidents.

00000 - 99999 Number of non-junction only severity level "A" accidents.

ASA.NUM-B-ACC - NUM(5) - Number of Injury Severity B Accidents.

00000 - 99999 Number of accidents with severity level "B".

ASA.NUM-B-ACC-NJ - NUM(5) - Number of Non-junction Severity B Accidents.

00000 - 99999 Number of non-junction only severity level "B" accidents.

ASA.NUM-C-ACC - NUM(5) - Number of Injury Severity C Accidents.

00000 - 99999 Number of accidents with severity level "C" or "U".

ASA.NUM-C-ACC-NJ - NUM(5) - Number of Non-junction Severity C Accidents.

00000 - 99999 Number of non-junction only severity level "C" or "U" accidents.

ASA.NUM-DRY-ACC - NUM(5) - Number of Accidents on Dry Surface.

00000 - 99999 Total accidents that occurred on a dry surface

ASA.NUM-DRY-ACC-NJ - NUM(5) - Number of Non-junction Dry Surface Accidents.

00000 - 99999 Non-junction only accidents on a dry surface

ASA.NUM-FAT-ACC - NUM(5) - Number of Fatal Accidents.

00000 - 99999 Total number of accidents with severity level "K".

ASA.NUM-FAT-ACC-NJ - NUM(5) - Number of Non-junction Fatal Accidents.

00000 - 99999 Non-junction only accidents with severity level "K".

ASA.NUM-INJ-ACC - NUM(5) - Number of Accidents of Injury Severity.

00000 - 99999 Number of accidents with severity A, B, C, or U.

ASA.NUM-INJ-ACC-NJ - NUM(5) - Number of Non-junction Accidents of Injury Severity.

00000 - 99999 Number of non-junction only accidents with severity of A, B, C, or U.

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ASA.NUM-LANES-DM - CHAR(1) - Number of Lanes Toward Decreasing Mileposts.

' ' Not applicable (no lanes)
'1' - '5' Number of through lanes

ASA.NUM-LANES-IM - CHAR(1) - Number of Lanes Toward Increasing Milesposts.

' ' Not applicable (no lanes)
'1' - '5' Number of through lanes

ASA.NUM-PROP-ACC - NUM(5) = Number of Property Damage Accidents.

00000 - 99999 Number of accidents with severity leverl "P".

ASA.NUM-PROP-ACC-NJ - NUM(5) - Number of Non-junction Property Damage Accidents.

00000 - 99999 Number of non-junction only accidents with severity level "P".

ASA.NUM-WET-ACC - NUM(5) - Number of Accidents on a Wet Surface.

00000 - 99999 Number of accidents that occurred on a wet surface

ASA.NUM-WET-ACC-NJ - NUM(5) - Number of Non-juction Accidents on a Wet Surface.

00000 - 99999 Number of non-junction only accidents on a wet surface

ASA.POP-FROM-CITY - NUM(7) - Population of city.

0000000 Nonmunicipal
0000001 - 9999999 Population of city

ASA.POP-FROM-CNTY - NUM(7) - Population of county.

1-9999999 Population of county

ASA.POP-GROUP-FROM-CITY - NUM(1) - Population Group.

1 Urban - 250,000 and over
2 Urban - 100,000 - 249,999
3 Urban - 50,000 - 99,999
4 Urban - 25,000 - 49,999
5 Urban - 10,000 - 24,999
6 Urban - 5,000 - 9,999
7 Rural - 2,500 - 4,999
8 Rural - 1,000 - 2,499
9 Rural - 1 - 999 or nonmunicipal

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ASA.PTRL-DIST - CHAR(2) -Patrol District.

' ' Non-trunk or unknown
'00' Trunk - Not in a patrol district
'21' - '45' Trunk - Patrol district number

ASA.PTRL-STATION - CHAR(4) - Patrol Station.

' ' Non-trunk or unknown
'0000' Trunk - Not in a patrol station
'2110' - '4560' Trunk - patrol station number

ASA.RATIO-OUT-OF-SIG - NUM(3,1) - Ratio Out of Significance.

Let: AR = Accident rate for the section (ASA.ACC-RATE)
AAR = Average accident (ASA.AVG-ACC-RATE)
UL = Upper limit of significance (ASA.UPPER-LIMIT)
LL = Lower limit of significance (ASA.LOWER-LIMIT)
RO = Ratio out of significance

then:
RO = 1.1 to 99.9 means AR > UL
RO = 0.0 to 1.0 means AAR <= AR <= UL
RO = -1.0 to 0.0 means LL <= AR <= AAR
RO = -99.9 to -1.1 means AR < LL

ASA.RDC-FROM-CNTY - CHAR(2) - Regional Development Commission from
County Number.

' 1' - '11' Regional development commission determined from
ASA.COUNTY and the TIS county table.

ASA.RECORD-NUMBER - CHAR(2) - Record Number.

This field is used by the section accident analysis software to distinguish certain types of "header" records in the report file. For data records, this field is always blank.

ASA.RECORD-TYPE - CHAR(1) - Record Type.

'1' Command header (includes +SORT)
'2' +ROUTES header
'3' +CATEGORIES header
'4' +SELECT header
'9' Section analysis record

ASA.ROAD-DESIGN - CHAR(1) - Road Design (from Section File).

'F' Freeway
'E' Expressway
'C' Conventional

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ASA.ROUTE-NUMBER - CHAR(8) - Route Number.

'nnnnnnxx' Route number (n = 0-9, x = 0-9 or A-Z)

Route systems '01' throught '03': 00000nnn or 0000nnna (n = 0-9, a = A-Z)

Route systems '05' and '10': 'ccccnnnx' (cccc = city number, n = 0-9, x = 0-9 or A-Z)

Other route systems: 'cc00nnxx' (cc = county number, n = 0-9, x = 0-9 or A-Z)

ASA.ROUTE-SYSTEM - CHAR(2) - Route Stsyem

'01'	ISTH	'09'	UTWN	'16'	MIL
'02'	USTH	'10'	MUN	'17'	NATM
'03'	MNTH	'11'	NATP	'18'	NATW

'04' CSAH '12' NFD '19' FRNT
'05' MSAS '13' IND '20' SGAM
'07' CNTY '14' SFR '23' PRIV
'08' TWNS '15' SPRK

ASA.RUR-URB-FROM-CITY - NUM(1) - Rural or Urban.

1 Rural -- Nonmunicipal or less than 5,000
2 Urban -- 5,000 to 49,999
3 Urbanized -- 50,000 and up

ASA.SECTION-LENGTH - NUM(7,3) - Section Length.

0000.000 True mileage data missing
nnnn.nnn Length of section in miles

ASA.SECTION-TYPE - CHAR(2) - Section Type.

This field is used by section accident analysis software. It will always be blank in data records.

ASA.SEV-RATE - NUM(3,1) - Severity Rate.

00.0 - 99.9 Severity rate for the section

ASA.SEV-RATE-NJ - NUM(3,1) - Nonjunction Severity Rate.

00.0 - 99.9 Severity for only non-junction accidents

ASA.SPEED-LIMIT - NUM(2) - Speed Limit.

00 Speed limit not stated or unknown
01 - 99 Speed limit in miles per hour

ASA.START-DATE - DATE - Start Date of Report.

mm/dd/yyyy - START-DATE specified on the command for the analysis period

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ASA.START-DAY - NUM(2) - Start Day of Report.

dd from the ASA.START-DATE

ASA.START-DESCR - CHAR(51) - Verbal Description at Start of Section.

A verbal description taken from the sections or roadlog file at the location of ASA.START-REF-POINT

ASA.START-MONTH - NUM(2) - Start Month of Report.

mm From the ASA.START-DATE

ASA.START-REF-POINT - CHAR(10) - Starting Reference Point of Section.

'nnn+nn.nnn' nnn = reference post
              +nn.nnn = distance from reference post

ASA.START-YEAR - NUM(2) - Start Year of Report.

yyyy From the ASA.START-DATE

ASA.THRU-LANE - CHAR(1) - General Characteristics of Thru Lanes.

'1' 2-lane
'2' 4-lane
'3' 6-lane
'4' 8-lane or more
'5' 3-lane with 2-way left turn lane
'6' 5-lane with 2-way left turn lane
'7' One-way couplet
'8' One-way (non-couplet)
'9' Other

ASA.TOT-NUM-ACC - NUM(5) - Total Number of Accidnents.

00000 - 99999 Total number of accidents

ASA.TOT-NUM-ACC-NJ - NUM(5) - Total Number of Non-junction Acctidents.

00000 - 99999 Total of only the non-junction accidents

ASA.UPPER-LIMIT - NUM(3,1) - Upper Significance Limit.

-99.9 - 99.9 Upper significance limit

ASA.URB-AREA - NUM(4) - Urban Area Number.

0000   Rural
0001 - 9999   Urban area number

ASA.USER-CATEGORY - CHAR(18) - User Category Field.

If +CATEGORIES was used, this field contains the user category.
Otherwise this field is blank.

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ASA.VEHICLE-MILES - NUM(12) - Vehicle Miles.

000000000000 Missing true mileage or traffic data
000000000001 - 999999999999 Vehicle miles

ASA.WET-DRY-PERCENT - NUM(4,1) - Wet:wet+dry Percentage.

000.0 - 100.0 Computed as:

$$\frac{\text{ASA.NUM-WET-ACC} \times 100}{\text{ASA.NUM-WET-ACC} + \text{ASA.NUM-DRY-ACC}}$$

ASA.WET-DRY-PERCENT-NJ - NUM(4,1) - Wet:wet+dry Non-junction Percentage.

000.0 - 100.0 Computed as:

$$\frac{\text{ASA.NUM-WET-ACC-NJ} \times 100}{\text{ASA.NUM-WET-ACC-NJ} + \text{ASA.NUM-DRY-ACC-NJ}}$$

ASA.WET-TOTAL-PERCENT - NUM(4,1) - Wet:total Percentage.

000.0 - 100.0 Computed as:

$$\frac{\text{ASA.NUM-WET-ACC} \times 100}{\text{ASA.TOT-NUM-ACC}}$$

ASA.WET-TOTAL-PERCENT-NJ - NUM(4,1) - Wet:total Non-junction Percentage.

000.0 - 100.0 Computed as:

$$\frac{\text{ASA.NUM-WET-ACC-NJ} \times 100}{\text{ASA.TOT-NUM-ACC-NJ}}$$

ATM Record Format and Select Names

ATM - Listing of Names in File Order

Format	Name	Stored	Generated From
CHAR(4)	ATM.STATION	X	
CHAR(2)	ATM.GROUP	X	
CHAR(2)	ATM.ROUTE-SYSTEM	X	
CHAR(8)	ATM.ROUTE-NUMBER	X	
CHAR(10)	ATM.REF-POINT	X	
CHAR(47)	ATM.DESCRIPTION	X	

ATM - Listing of Names in Alphabetical Order

Format	Name	Stored	Generated From
CHAR(47)	ATM.DESCRIPTION	X	
CHAR(2)	ATM.GROUP	X	
CHAR(10)	ATM.REF-POINT	X	
CHAR(8)	ATM.ROUTE-NUMBER	X	
CHAR(2)	ATM.ROUTE-SYSTEM	X	
CHAR(4)	ATM.STATION	X	

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ATM - Descriptions of Data Elements
****

ATM.DESCRIPTION - CHAR(47) - Description of Station

Verbal description of station location and any other information.

ATM.GROUP - CHAR(2) - Volume Variation Group of Station

Category for station based on volume variation by month, day of week, season, etc.

'01' Outstate rural "blue". Farm-to-market.
'02' Outstate rural "green". Some recreational.
'03' Outstate rural "red". Moderate recreational.
'04' Outstate rural "yellow". High recreational.
'05' Outstate municipal. Recreational over 5000 population.
'06' Outstate municipal. Non-recreational over 5000 population.
'07' Outstate municipal. Recreational under 5000 population.
'08' Outstate municipal. Non-recreational under 5000 population.
'09' Metro. Urban commuter.
'10' Metro. Urban-suburban mix.
'11' Metro. Suburban commuter.
'12' Metro. Outlying commuter.
'13' Metro. Outlying mix.
'14' Metro. Outlying recreational.
'15' Metro. Urban-suburban shopping.
'16' Metro. Urban mix.
'17' Metro. Suburban mix.

ATM.REF-POINT - CHAR(10) - Reference Point

'000+00.000' - '999+99.999" Reference point location of station.

ATM.ROUTE-NUMBER - CHAR(8) - Route Number

The TIS route number code for the roadway where the station is located:

The route number uniquely identifies each roadway within a particular route system. The format of the route number depends upon the value of ATR.ROUTE-SYSTEM.

For trunk highways (systems 01-03), the route number is either (1) all numeric ranging from 00000001 through 00000999, or (2) seven numerics followed by an alphabetic ranging from 0000001A through 0000999Z.

For municipal non-trunk highways (system 05 and 10), the route number is in the format "ccccnnnx". "cccc" is the municipality census number for the city in which the roadway is located. Each "n" is a digit. "x" is either a digit or an alphabetic. "nnnx" cannot have the values 0000 nor 000a where "a" is an alphabetic.

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For non-municipal non-trunk highways (all other systems), the route number is in the format "cc00nnxx". "cc" is the county number of the county in which the roadway is located. Each "n" is a digit. "x" is either a digit or an alphabetic. "nnxx" cannot have the value 0000.

ATM.ROUTE-SYSTEM - CHAR(2) - Route System

The TIS route system code for the roadway where the station is located:

The route system codes are:

'01' Interstate trunk highway (ISTH)
'02' U.S. trunk highway (USTH)
'03' Minnesota trunk highway (MNTH)
'04' County state-aid highway (CSAH)
'05' Municipal state-aid street (MSAS)
'07' County roads (CNTY)
'08' Township roads (TWNS)
'09' Unorganized township roads (UTWN)
'10' Municipal street (MUN)
'11' National park road (NATP)
'12' National forest development road (NFD)

'13' Indian reservation road (IND)
'14' State forest road (SFR)
'15' State park road (SPRK)
'16' Military road (MIL)
'17' National monument road (NATM)
'18' National wildlife refuge road (NATW)
'19' Frontage road (FRNT)
'20' State game preserve road (SGAM)
'23' Private jurisdiction road (PRIV)

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ATR Record Format and Select Names

ATR - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(1)	ATR.GEN-EST	X	
CHAR(1)	ATR.AMPM	X	
CHAR(6)	ATR.DATE	X	
CHAR(2)	ATR.WEEK		ATR.DATE
CHAR(2)	ATR.MONTH	X	
CHAR(2)	ATR.DAY	X	
CHAR(2)	ATR.YEAR	X	
CHAR(1)	ATR.DAY-OF-WEEK	X	
CHAR(4)	ATR.STATION	X	

CHAR(5)	ATR.VOLUME-12-1	X
CHAR(5)	ATR.VOLUME-1-2	X
CHAR(5)	ATR.VOLUME-2-3	X
CHAR(5)	ATR.VOLUME-3-4	X
CHAR(5)	ATR.VOLUME-4-5	X
CHAR(5)	ATR.VOLUME-5-6	X
CHAR(5)	ATR.VOLUME-6-7	X
CHAR(5)	ATR.VOLUME-7-8	X
CHAR(5)	ATR.VOLUME-8-9	X
CHAR(5)	ATR.VOLUME-9-10	X
CHAR(5)	ATR.VOLUME-10-11	X
CHAR(5)	ATR.VOLUME-11-12	X
CHAR(2)	ATR.HOUR	X

ATR - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(1)	ATR.AMPM	X	
CHAR(6)	ATR.DATE	X	
CHAR(2)	ATR.DAY	X	
CHAR(1)	ATR.DAY-OF-WEEK	X	
CHAR(1)	ATR.GEN-EST	X	
CHAR(2)	ATR.HOUR	X	
CHAR(2)	ATR.MONTH	X	
CHAR(4)	ATR.STATION	X	
CHAR(5)	ATR.VOLUME-1-2	X	
CHAR(5)	ATR.VOLUME-10-11	X	
CHAR(5)	ATR.VOLUME-11-12	X	
CHAR(5)	ATR.VOLUME-12-1	X	
CHAR(5)	ATR.VOLUME-2-3	X	
CHAR(5)	ATR.VOLUME-3-4	X	
CHAR(5)	ATR.VOLUME-4-5	X	
CHAR(5)	ATR.VOLUME-5-6	X	
CHAR(5)	ATR.VOLUME-6-7	X	
CHAR(5)	ATR.VOLUME-7-8	X	
CHAR(5)	ATR.VOLUME-8-9	X	
CHAR(5)	ATR.VOLUME-9-10	X	
CHAR(2)	ATR.WEEK		ATR.DATE
CHAR(2)	ATR.YEAR	X	

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ATR - Descriptions of Data Elements
****

ATR.AMPM - CHAR(1) - AM/PM Indicator

'1' AM. Record contains data for hours 12 midnight to 12 noon.
'2' PM. Record contains data for hours 12 noon to 12 midnight.

ATR.DATE - CHAR(6) - Date of Data

MMDDYY Date: MM is month (01-12), DD is day (01-31), YY is year.

ATR.DAY - CHAR(2) - Day Portion of Date

DD Day (of the month) of data (01-31).

ATR.DAY-OF-WEEK - CHAR(1) - Day of Week Code

'1' Sunday
'2' Monday
'3' Tuesday
'4' Wednesday
'5' Thursday
'6' Friday
'7' Saturday

ATR.GEN-EST - CHAR(1) - Generated/Estimated Code

'1' Estimated volumes
'2' ATR generated volumes

ATR.HOUR - CHAR(2) - Hour of Volume

'00' - '23' Hour of volume (00 = 12 midnight to 1 a.m.,
23 = 11 p.m. to midnight).

***** NOTE: This data element may be used with CATEGORIES ONLY,
NOT with SELECT.

ATR.MONTH - CHAR(2) - Month Portion of Date

MM Month of data (01-12).

ATR.STATION - CHAR(4) - Station Number for Data

NNNX Station number. "NNN" is 001 - 999. "X" is 0,N,S,E, or W. If X is 0 the data is non-directional. Otherwise X is the direction of the data (north, south, east, or west).

Example: 0010 is station "one", 25S is station "25 south".

ATR.VOLUME-1-2 - CHAR(5) - Hourly Volume

Hourly count for the date in ATR.DATE. If ATR.AMPM is "1", then hours are 1 a.m. to 2 a.m. If ATR.AMPM is "2", then hours are 1 p.m. to 2 p.m.

ATR.VOLUME-10-11 - CHAR(5) - Hourly Volume

Hourly count for the date in ATR.DATE. If ATR.AMPM is "1", then hours are 10 a.m. to 11 a.m. If ATR.AMPM is "2", then hours are 10 p.m. to 11 p.m.

ATR.VOLUME-11-12 - CHAR(5) - Hourly Volume

Hourly count for the date in ATR.DATE. If ATR.AMPM is "1", then hours are 11 a.m. to 12 noon. If ATR.AMPM is "2", then hours are 11 p.m. to 12 midnight.

ATR.VOLUME-12-1 - CHAR(5) - Hourly Volume

Hourly count for the date in ATR.DATE. If ATR.AMPM is "1", then hours are 12 midnight to 1 a.m. If ATR.AMPM is "2", then hours are 12 noon to 1 p.m.

ATR.VOLUME-2-3 - CHAR(5) - Hourly Volume

Hourly count for the date in ATR.DATE. If ATR.AMPM is "1", then hours are 2 a.m. to 3 a.m. If ATR.AMPM is "2", then hours are 2 p.m. to 3 p.m.

ATR.VOLUME-3-4 - CHAR(5) - Hourly Volume

Hourly count for the date in ATR.DATE. If ATR.AMPM is "1", then hours are 3 a.m. to 4 a.m. If ATR.AMPM is "2", then hours are 3

p.m. to 4 p.m.

ATR.VOLUME-5-6 - CHAR(5) - Hourly Volume

Hourly count for the date in ATR.DATE. If ATR.AMPM is "1", then hours are 5 a.m. to 6 a.m. If ATR.AMPM is "2", then hours are 5 p.m. to 6 p.m.

ATR.VOLUME-6-7 - CHAR(5) - Hourly Volume

Hourly count for the date in ATR.DATE. If ATR.AMPM is "1", then hours are 6 a.m. to 7 a.m. If ATR.AMPM is "2", then hours are 6 p.m. to 7 p.m.

ATR.VOLUME-7-8 - CHAR(5) - Hourly Volume

Hourly count for the date in ATR.DATE. If ATR.AMPM is "1", then hours are 7 a.m. to 8 a.m. If ATR.AMPM is "2", then hours are 7 p.m. to 8 p.m.

ATR.VOLUME-8-9 - CHAR(5) - Hourly Volume

Hourly count for the date in ATR.DATE. If ATR.AMPM is "1", then hours are 8 a.m. to 9 a.m. If ATR.AMPM is "2", then hours are 8 p.m. to 9 p.m.

ATR.VOLUME-9-10 - CHAR(5) - Hourly Volume

Hourly count for the date in ATR.DATE. If ATR.AMPM is "1", then hours are 9 a.m. to 10 a.m. If ATR.AMPM is "2", then hours are 9 p.m. to 10 p.m.

ATR.WEEK - CHAR(2) - Week of Data

'01' - '53' Week of data computed from ATR.DATE. The first week of the year begins on the first weekday of the year.

Each Monday always starts a new week.

ATR.YEAR - CHAR(2) - Year Portion of Date

YY Year of data

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BDG - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(7)	BDG.BDG-NUM-&-MATCH		
CHAR(7)	BDG.BDG-NUM-AND-MATCH		
CHAR(6)	BDG.BRIDGE-NUMBER	X	
CHAR(1)	BDG.BRIDGE-MATCH	X	
CHAR(2)	BDG.COUNTY	X	
NUM(1)	BDG.DISTRICT-FROM-CNTY		BDG.COUNTY
CHAR(2)	BDG.RDC-FROM-CNTY		BDG.COUNTY
NUM(7)	BDG.POP-FROM-CNTY		BDG.COUNTY
CHAR(2)	BDG.CNTRL-SECTN	X	
CHAR(1)	BDG.CONSTR-DIST	X	
CHAR(2)	BDG.MAINT-AREA	X	
CHAR(4)	BDG.CITY	X	
NUM(7)	BDG.POP-FROM-CITY		BDG.CITY
NUM(1)	BDG.RUR-URB-FROM-CITY		BDG.CITY
NUM(1)	BDG.POP-GROUP-FROM-CITY		BDG.CITY
NUM(4)	BDG.CENSUS-YR-FROM-CITY		BDG.CITY
CHAR(25)	BDG.FEATURE-NAME	X	
CHAR(2)	BDG.DETOUR-LENGTH	X	
CHAR(1)	BDG.TOLL	X	
CHAR(2)	BDG.MAINT-RESPONS	X	
CHAR(2)	BDG.OWNER	X	
CHAR(1)	BDG.NHS	X	
CHAR(2)	BDG.FUNCT-CLASS	X	

CHAR(8)	BDG.SEC-TWN-RNG	X	
CHAR(2)	BDG.SECTION	X	
CHAR(3)	BDG.TOWNSHIP	X	
CHAR(3)	BDG.RANGE	X	
CHAR(2)	BDG.NUM-LANES	X	
CHAR(1)	BDG.FUNCT-USE	X	
CHAR(1)	BDG.ROADWAY-CLASS	X	
CHAR(1)	BDG.OVER-UNDER	X	
CHAR(17)	BDG.BDG-KEY-FIELD	X	
CHAR(2)	BDG.BDG-RTE-SYS	X	
CHAR(5)	BDG.BDG-RTE-NUM	X	
CHAR(10)	BDG.BDG-REF-POINT	X	
CHAR(10)	BDG.TIS-REF-POINT	X	
CHAR(3)	BDG.MAIN-SPAN-TYPE	X	
CHAR(1)	BDG.MAIN-SPAN-MATERIAL	X	
CHAR(2)	BDG.MAIN-SPAN-CONSTR	X	
CHAR(3)	BDG.APPR-SPAN-TYPE	X	
CHAR(1)	BDG.APPR-SPAN-MATERIAL	X	
CHAR(2)	BDG.APPR-SPAN-CONSTR	X	
CHAR(2)	BDG.NUM-MAIN-SPANS	X	
CHAR(2)	BDG.NUM-APPR-SPANS	X	
CHAR(3)	BDG.NUM-TOT-SPANS	X	
CHAR(4)	BDG.MAIN-SPAN-LEN	X	
CHAR(5)	BDG.STRUCT-LEN	X	
CHAR(3)	BDG.SDWK-WID-LFT	X	
CHAR(3)	BDG.SDWK-WID-RGT	X	
CHAR(3)	BDG.WID-RD1-OVER	X	

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Format	Name	Stored	Generated From
CHAR(3)	BDG.WID-RD2-OVER	X	
CHAR(3)	BDG.WID-RD1-UNDER	X	
CHAR(3)	BDG.WID-RD2-UNDER	X	
CHAR(4)	BDG.DECK-WIDTH	X	
CHAR(3)	BDG.APPR-SHLDR-WID	X	
CHAR(3)	BDG.APPR-SURF-WID	X	
CHAR(3)	BDG.VERT-CLR-OVER-RD1	X	
CHAR(3)	BDG.VERT-CLR-OVER-RD2	X	
CHAR(1)	BDG.UNDER-CLR-REF-FEAT	X	
CHAR(3)	BDG.VERT-CLR-UNDER-RD1	X	
CHAR(3)	BDG.VERT-CLR-UNDER-RD2	X	
CHAR(3)	BDG.LAT-CLR-UNDER-RGT	X	
CHAR(3)	BDG.LAT-CLR-UNDER-LFT	X	
CHAR(4)	BDG.YR-BUILT	X	

CHAR(4)	BDG.YR-REMOD	X	
CHAR(1)	BDG.DESIGN-LOAD	X	
CHAR(6)	BDG.POST-CAPAC	X	
CHAR(4)	BDG.INV-RATING	X	
CHAR(4)	BDG.OPR-RATING	X	
CHAR(2)	BDG.MO-CAP-RAT	X	
CHAR(1)	BDG.NEW-CAP-RAT	X	
CHAR(2)	BDG.MED-WID-OVER	X	
CHAR(1)	BDG.TYPE-MED-OVER	X	
CHAR(2)	BDG.MED-WID-UNDER	X	
CHAR(3)	BDG.ANGL-SKEW	X	
CHAR(1)	BDG.FLARED	X	
CHAR(1)	BDG.NAVG-CNTL	X	
CHAR(1)	BDG.NAVG-PROTECTION	X	
CHAR(3)	BDG.NAVG-VERT-CLR	X	
CHAR(4)	BDG.NAVG-HORZ-CLR	X	
CHAR(2)	BDG.TYPE-SVC	X	
CHAR(1)	BDG.TYPE-SVC-OVER	X	
CHAR(1)	BDG.TYPE-SVC-UNDER	X	
CHAR(1)	BDG.WEAR-SURF	X	
CHAR(4)	BDG.THK-WEAR-SURF	X	
CHAR(12)	BDG.CULV-ID	X	
CHAR(3)	BDG.CULV-LEN	X	
CHAR(25)	BDG.DESCR-LOCN	X	
CHAR(6)	BDG.LATITUDE	X	
CHAR(6)	BDG.LONGITUDE	X	
CHAR(1)	BDG.REPORT-JURIS	X	
CHAR(6)	BDG.ADT	X	
CHAR(5)	BDG.HCADT	X	
CHAR(1)	BDG.NATL-TRUCK-SYS	X	
CHAR(2)	BDG.MONTH-OPENED	X	
CHAR(6)	BDG.STRUCTURE-AREA	X	
CHAR(6)	BDG.ROADWAY-AREA	X	
CHAR(1)	BDG.DEFENSE-HGWY	X	
CHAR(1)	BDG.DECK-COND	X	
CHAR(1)	BDG.SUPER-COND	X	

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Format	Name	Stored	Generated From
CHAR(1)	BDG.SUBST-COND	X	
CHAR(1)	BDG.CHAN-COND	X	

CHAR(1)	BDG.CULV-COND	X
CHAR(1)	BDG.STRUCT-APSL	X
CHAR(1)	BDG.DECK-GEOM-APSL	X
CHAR(1)	BDG.UND-CLR-APSL	X
CHAR(1)	BDG.BDG-POSTING	X
CHAR(1)	BDG.WATER-APSL	X
CHAR(1)	BDG.APPR-ALIGN-COND	X
CHAR(2)	BDG.RTN-INSPEC-FREQ	X
CHAR(2)	BDG.RTN-INSPEC-PROC	X
CHAR(1)	BDG.LOAD-LIM-SIGN	X
CHAR(1)	BDG.TRAF-CNTL-SIGN	X
CHAR(1)	BDG.HORZ-CNTL-SIGN	X
CHAR(1)	BDG.VERT-CNTL-SIGN	X
CHAR(3)	BDG.WORK-PROPOSED	X
CHAR(2)	BDG.TYPE-WORK-PROP	X
CHAR(1)	BDG.WORK-PROP-ON	X
CHAR(5)	BDG.PROP-LENGTH	X
CHAR(3)	BDG.PROP-WIDTH	X
CHAR(6)	BDG.PROP-ADT	X
CHAR(1)	BDG.PROP-APPR-WORK	X
CHAR(5)	BDG.BDG-IMP-COST	X
CHAR(5)	BDG.APPR-IMP-COST	X
CHAR(5)	BDG.TOTL-IMP-COST	X
CHAR(1)	BDG.ESTIMATE-METH	X
CHAR(1)	BDG.DEF-STATUS	X
CHAR(1)	BDG.FHWA20	X
CHAR(3)	BDG.SUFF-RATG	X
CHAR(1)	BDG.TEMPORARY-STR	X
CHAR(2)	BDG.LEFT-RAIL-TYPE	X
CHAR(1)	BDG.LEFT-RAIL-COND	X
CHAR(3)	BDG.LEFT-RAIL-HGT	X
CHAR(2)	BDG.LEFT-CURB-HGT	X
CHAR(2)	BDG.RIGHT-RAIL-TYPE	X
CHAR(1)	BDG.RIGHT-RAIL-COND	X
CHAR(3)	BDG.RIGHT-RAIL-HGT	X
CHAR(2)	BDG.RIGHT-CURB-HGT	X
CHAR(1)	BDG.APPR-GUARD	X
CHAR(2)	BDG.TYPE-PAINT	X
CHAR(1)	BDG.TYPE-PAINT-PRIMER	X
CHAR(1)	BDG.TYPE-PAINT-FINISH	X
CHAR(6)	BDG.AREA-PAINTED	X
CHAR(2)	BDG.PCT-UNSND-PAINT	X
CHAR(3)	BDG.MAX-VRT-CLR-RD1	X
CHAR(3)	BDG.MAX-VRT-CLR-RD2	X
CHAR(6)	BDG.CNTY-BDG-NMBR	X

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Format	Name	Stored	Generated From
CHAR(2)	BDG.LOW-APPR-PANEL-TYPE	X	
CHAR(1)	BDG.LOW-APPR-PANEL-COND	X	
CHAR(2)	BDG.LOW-APPR-PANEL-LEN	X	
CHAR(2)	BDG.UPP-APPR-PANEL-TYPE	X	
CHAR(1)	BDG.UPP-APPR-PANEL-COND	X	
CHAR(2)	BDG.UPP-APPR-PANEL-LEN	X	
CHAR(1)	BDG.DECK-MATERIAL	X	
CHAR(4)	BDG.DECK-UNSOUND	X	
CHAR(1)	BDG.DECK-PROTECTION	X	
CHAR(1)	BDG.REBARS	X	
CHAR(1)	BDG.PLAN-AVAIL	X	
CHAR(1)	BDG.HISTORIC-SIG	X	
CHAR(20)	BDG.FIRST-KEY-FIELD	X	
CHAR(2)	BDG.FIRST-RTE-SYS	X	
CHAR(8)	BDG.FIRST-RTE-NUM	X	
CHAR(10)	BDG.FIRST-REF-POINT	X	
CHAR(3)	BDG.FIRST-INT-ELEM	X	
CHAR(5)	BDG.FIRST-LOW-END	X	
CHAR(5)	BDG.FIRST-UPP-END	X	
CHAR(2)	BDG.DIRECTION	X	
CHAR(3)	BDG.TOWNSHIP-NUM	X	
CHAR(1)	BDG.FRC-MEMBER-DEFN	X	
CHAR(1)	BDG.FRC-INSPEC-PROC	X	
CHAR(1)	BDG.FRC-INSPEC-RSLT	X	
CHAR(1)	BDG.UND-INSPEC-PROC	X	
CHAR(1)	BDG.SCOUR-ANAL	X	
CHAR(1)	BDG.ABUTMENT-MATERIAL	X	
CHAR(1)	BDG.ABUTMENT-FOUNDATION	X	
CHAR(1)	BDG.PIER-MATERIAL	X	
CHAR(1)	BDG.PIER-FOUNDATION	X	
CHAR(1)	BDG.TYPE-CONN	X	
CHAR(1)	BDG.TYPE-CANTL-BEARING	X	
CHAR(1)	BDG.ACTION-NEEDED	X	
CHAR(20)	BDG.SCND-KEY-FIELD	X	
CHAR(2)	BDG.SCND-RTE-SYS	X	
CHAR(8)	BDG.SCND-RTE-NUM	X	
CHAR(10)	BDG.SCND-REF-POINT	X	
CHAR(3)	BDG.SCND-INT-ELEM	X	
CHAR(5)	BDG.SCND-LOW-END	X	
CHAR(5)	BDG.SCND-UPP-END	X	

CHAR(5)	BDG.H2O-OPENING	X	

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Format	Name	Stored	Generated From
CHAR(6)	BDG.DRAIN-AREA	X	
CHAR(3)	BDG.BORDER-STRUCTURE	X	
CHAR(2)	BDG.RESPONSIBILITY	X	
CHAR(3)	BDG.MIN-VERT-CLEAR-LBDG	X	
CHAR(1)	BDG.BIRD-NESTS	X	
CHAR(3)	BDG.BUILDER	X	
CHAR(1)	BDG.MAIN-SPAN-DEF	X	
CHAR(1)	BDG.APPR-SPAN-DEF	X	
CHAR(1)	BDG.HISTORIC-RPT	X	
CHAR(3)	BDG.HORZ-CLR-RD1	X	
CHAR(3)	BDG.HORZ-CLR-RD2	X	
CHAR(1)	BDG.PARALLEL-STR	X	
CHAR(4)	BDG.BLANK2	X	
CHAR(1)	BDG.PERMIT-RESTR-L48K	X	
CHAR(1)	BDG.PERMIT-RESTR-L60K	X	
CHAR(1)	BDG.PERMIT-RESTR-L72K	X	
CHAR(1)	BDG.PERMIT-RESTR-LFUT	X	
CHAR(5)	BDG.REPL-PRTY	X	
CHAR(1)	BDG.USAGE	X	
CHAR(4)	BDG.YR-CAP-RAT	X	
CHAR(4)	BDG.YR-ADT	X	
CHAR(4)	BDG.YEAR-OPENED	X	
CHAR(4)	BDG.PROP-ADT-YR	X	
CHAR(4)	BDG.YR-IMP-EST	X	
CHAR(4)	BDG.YR-PAINTED	X	
CHAR(4)	BDG.DECK-PROT-YR	X	
CHAR(4)	BDG.YEAR-REBARRED	X	
CHAR(6)	BDG.FRC-INSPEC-DATE	X	
CHAR(6)	BDG.UND-INSPEC-DATE	X	
CHAR(4)	BDG.YR-SCOUR-ANAL	X	

CHAR(8)	BDG.RTN-INSPEC-DATE	X
CHAR(2)	BDG.RTN-INSPEC-MONTH	X
CHAR(2)	BDG.RTN-INSPEC-DAY	X
CHAR(4)	BDG.RTN-INSPEC-YEAR	X
CHAR(4)	BDG.FED-REHAB	X
CHAR(41)	BDG.FUTURE	X

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BDG - Listing of Names in Alphabetical Order

Format	Name	Stored	Generated From
CHAR(1)	BDG.ABUTMENT-FOUNDATION	X	
CHAR(1)	BDG.ABUTMENT-MATERIAL	X	
CHAR(1)	BDG.ACTION-NEEDED	X	
CHAR(6)	BDG.ADT	X	
CHAR(3)	BDG.ANGL-SKEW	X	
CHAR(1)	BDG.APPR-ALIGN-COND	X	
CHAR(1)	BDG.APPR-GUARD	X	
CHAR(5)	BDG.APPR-IMP-COST	X	
CHAR(3)	BDG.APPR-SHLDR-WID	X	
CHAR(2)	BDG.APPR-SPAN-CONSTR	X	
CHAR(1)	BDG.APPR-SPAN-DEF	X	
CHAR(1)	BDG.APPR-SPAN-MATERIAL	X	
CHAR(3)	BDG.APPR-SPAN-TYPE	X	
CHAR(3)	BDG.APPR-SURF-WID	X	
CHAR(6)	BDG.AREA-PAINTED	X	
CHAR(5)	BDG.BDG-IMP-COST	X	
CHAR(17)	BDG.BDG-KEY-FIELD	X	
CHAR(7)	BDG.BDG-NUM-&-MATCH		

CHAR(7)	BDG.BDG-NUM-AND-MATCH		
CHAR(1)	BDG.BDG-POSTING	X	
CHAR(10)	BDG.BDG-REF-POINT	X	
CHAR(5)	BDG.BDG-RTE-NUM	X	
CHAR(2)	BDG.BDG-RTE-SYS	X	
CHAR(1)	BDG.BIRD-NESTS	X	
CHAR(4)	BDG.BLANK2	X	
CHAR(3)	BDG.BORDER-STRUCTURE	X	
CHAR(1)	BDG.BRIDGE-MATCH	X	
CHAR(6)	BDG.BRIDGE-NUMBER	X	
CHAR(3)	BDG.BUILDER	X	
NUM(4)	BDG.CENSUS-YR-FROM-CITY		BDG.CITY
CHAR(1)	BDG.CHAN-COND	X	
CHAR(4)	BDG.CITY	X	
CHAR(2)	BDG.CNTRL-SECTN	X	
CHAR(6)	BDG.CNTY-BDG-NMBR	X	
CHAR(1)	BDG.CONSTR-DIST	X	
CHAR(2)	BDG.COUNTY	X	
CHAR(1)	BDG.CULV-COND	X	
CHAR(12)	BDG.CULV-ID	X	
CHAR(3)	BDG.CULV-LEN	X	
CHAR(1)	BDG.DECK-COND	X	
CHAR(1)	BDG.DECK-GEOM-APSL	X	
CHAR(1)	BDG.DECK-MATERIAL	X	
CHAR(4)	BDG.DECK-PROT-YR	X	
CHAR(1)	BDG.DECK-PROTECTION	X	
CHAR(4)	BDG.DECK-UNSOUND	X	
CHAR(4)	BDG.DECK-WIDTH	X	
CHAR(1)	BDG.DEF-STATUS	X	
CHAR(1)	BDG.DEFENSE-HGWY	X	
CHAR(25)	BDG.DESCR-LOCN	X	
CHAR(1)	BDG.DESIGN-LOAD	X	
CHAR(2)	BDG.DETOUR-LENGTH	X	
CHAR(2)	BDG.DIRECTION	X	

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Format	Name	Stored	Generated From
NUM(1)	BDG.DISTRICT-FROM-CNTY		BDG.COUNTY
CHAR(6)	BDG.DRAIN-AREA	X	
CHAR(1)	BDG.ESTIMATE-METH	X	
CHAR(25)	BDG.FEATURE-NAME	X	
CHAR(4)	BDG.FED-REHAB	X	
CHAR(1)	BDG.FHWA20	X	
CHAR(3)	BDG.FIRST-INT-ELEM	X	

CHAR(20)	BDG.FIRST-KEY-FIELD	X
CHAR(5)	BDG.FIRST-LOW-END	X
CHAR(10)	BDG.FIRST-REF-POINT	X
CHAR(8)	BDG.FIRST-RTE-NUM	X
CHAR(2)	BDG.FIRST-RTE-SYS	X
CHAR(5)	BDG.FIRST-UPP-END	X
CHAR(1)	BDG.FLARED	X
CHAR(6)	BDG.FRC-INSPEC-DATE	X
CHAR(1)	BDG.FRC-INSPEC-PROC	X
CHAR(1)	BDG.FRC-INSPEC-RSLT	X
CHAR(1)	BDG.FRC-MEMBER-DEFN	X
CHAR(2)	BDG.FUNCT-CLASS	X
CHAR(1)	BDG.FUNCT-USE	X
CHAR(41)	BDG.FUTURE	X
CHAR(5)	BDG.HCADT	X
CHAR(1)	BDG.HISTORIC-RPT	X
CHAR(1)	BDG.HISTORIC-SIG	X
CHAR(3)	BDG.HORZ-CLR-RD1	X
CHAR(3)	BDG.HORZ-CLR-RD2	X
CHAR(1)	BDG.HORZ-CNTL-SIGN	X
CHAR(5)	BDG.H2O-OPENING	X
CHAR(4)	BDG.INV-RATING	X
CHAR(3)	BDG.LAT-CLR-UNDER-LFT	X
CHAR(3)	BDG.LAT-CLR-UNDER-RGT	X
CHAR(6)	BDG.LATITUDE	X
CHAR(2)	BDG.LEFT-CURB-HGT	X
CHAR(1)	BDG.LEFT-RAIL-COND	X
CHAR(3)	BDG.LEFT-RAIL-HGT	X
CHAR(2)	BDG.LEFT-RAIL-TYPE	X
CHAR(1)	BDG.LOAD-LIM-SIGN	X
CHAR(6)	BDG.LONGITUDE	X
CHAR(1)	BDG.LOW-APPR-PANEL-COND	X
CHAR(2)	BDG.LOW-APPR-PANEL-LEN	X
CHAR(2)	BDG.LOW-APPR-PANEL-TYPE	X
CHAR(2)	BDG.MAIN-SPAN-CONSTR	X
CHAR(1)	BDG.MAIN-SPAN-DEF	X
CHAR(4)	BDG.MAIN-SPAN-LEN	X
CHAR(1)	BDG.MAIN-SPAN-MATERIAL	X
CHAR(3)	BDG.MAIN-SPAN-TYPE	X
CHAR(2)	BDG.MAINT-AREA	X
CHAR(2)	BDG.MAINT-RESPONS	X
CHAR(3)	BDG.MAX-VRT-CLR-RD1	X
CHAR(3)	BDG.MAX-VRT-CLR-RD2	X
CHAR(2)	BDG.MED-WID-OVER	X
CHAR(2)	BDG.MED-WID-UNDER	X
CHAR(3)	BDG.MIN-VERT-CLEAR-LBDG	X
CHAR(2)	BDG.MO-CAP-RAT	X

Format	Name	Stored	Generated From
CHAR(2)	BDG.MONTH-OPENED	X	
CHAR(1)	BDG.NATL-TRUCK-SYS	X	
CHAR(1)	BDG.NAVG-CNTL	X	
CHAR(4)	BDG.NAVG-HORZ-CLR	X	
CHAR(1)	BDG.NAVG-PROTECTION	X	
CHAR(3)	BDG.NAVG-VERT-CLR	X	
CHAR(1)	BDG.NEW-CAP-RAT	X	
CHAR(1)	BDG.NHS	X	
CHAR(2)	BDG.NUM-APPR-SPANS	X	
CHAR(2)	BDG.NUM-LANES	X	
CHAR(2)	BDG.NUM-MAIN-SPANS	X	
CHAR(3)	BDG.NUM-TOT-SPANS	X	
CHAR(4)	BDG.OPR-RATING	X	
CHAR(1)	BDG.OVER-UNDER	X	
CHAR(2)	BDG.OWNER	X	
CHAR(1)	BDG.PARALLEL-STR	X	
CHAR(2)	BDG.PCT-UNSND-PAINT	X	
CHAR(1)	BDG.PERMIT-RESTR-LFUT	X	
CHAR(1)	BDG.PERMIT-RESTR-L48K	X	
CHAR(1)	BDG.PERMIT-RESTR-L60K	X	
CHAR(1)	BDG.PERMIT-RESTR-L72K	X	
CHAR(1)	BDG.PIER-FOUNDATION	X	
CHAR(1)	BDG.PIER-MATERIAL	X	
CHAR(1)	BDG.PLAN-AVAIL	X	
NUM(7)	BDG.POP-FROM-CITY		BDG.CITY
NUM(7)	BDG.POP-FROM-CNTY		BDG.COUNTY
NUM(1)	BDG.POP-GROUP-FROM-CITY		BDG.CITY
CHAR(6)	BDG.POST-CAPAC	X	
CHAR(6)	BDG.PROP-ADT	X	
CHAR(4)	BDG.PROP-ADT-YR	X	
CHAR(1)	BDG.PROP-APPR-WORK	X	
CHAR(5)	BDG.PROP-LENGTH	X	
CHAR(3)	BDG.PROP-WIDTH	X	
CHAR(3)	BDG.RANGE	X	
CHAR(2)	BDG.RDC-FROM-CNTY		BDG.COUNTY
CHAR(1)	BDG.REBARS	X	
CHAR(5)	BDG.REPL-PRTY	X	
CHAR(1)	BDG.REPORT-JURIS	X	
CHAR(2)	BDG.RESPONSIBILITY	X	
CHAR(2)	BDG.RIGHT-CURB-HGT	X	
CHAR(1)	BDG.RIGHT-RAIL-COND	X	
CHAR(3)	BDG.RIGHT-RAIL-HGT	X	
CHAR(2)	BDG.RIGHT-RAIL-TYPE	X	

CHAR(6)	BDG.ROADWAY-AREA	X	
CHAR(1)	BDG.ROADWAY-CLASS	X	
CHAR(8)	BDG.RTN-INSPEC-DATE	X	
CHAR(2)	BDG.RTN-INSPEC-DAY	X	
CHAR(2)	BDG.RTN-INSPEC-FREQ	X	
CHAR(2)	BDG.RTN-INSPEC-MONTH	X	
CHAR(2)	BDG.RTN-INSPEC-PROC	X	
CHAR(4)	BDG.RTN-INSPEC-YEAR	X	
NUM(1)	BDG.RUR-URB-FROM-CITY		BDG.CITY
CHAR(3)	BDG.SCND-INT-ELEM	X	

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Format	Name	Stored	Generated From
CHAR(20)	BDG.SCND-KEY-FIELD	X	
CHAR(5)	BDG.SCND-LOW-END	X	
CHAR(10)	BDG.SCND-REF-POINT	X	
CHAR(8)	BDG.SCND-RTE-NUM	X	
CHAR(2)	BDG.SCND-RTE-SYS	X	
CHAR(5)	BDG.SCND-UPP-END	X	
CHAR(1)	BDG.SCOUR-ANAL	X	
CHAR(3)	BDG.SDWK-WID-LFT	X	
CHAR(3)	BDG.SDWK-WID-RGT	X	
CHAR(8)	BDG.SEC-TWN-RNG	X	
CHAR(2)	BDG.SECTION	X	
CHAR(1)	BDG.STRUCT-APSL	X	
CHAR(5)	BDG.STRUCT-LEN	X	
CHAR(6)	BDG.STRUCTURE-AREA	X	
CHAR(1)	BDG.SUBST-COND	X	
CHAR(3)	BDG.SUFF-RATG	X	
CHAR(1)	BDG.SUPER-COND	X	
CHAR(1)	BDG.TEMPORARY-STR	X	
CHAR(4)	BDG.THK-WEAR-SURF	X	
CHAR(10)	BDG.TIS-REF-POINT	X	
CHAR(1)	BDG.TOLL	X	
CHAR(5)	BDG.TOTL-IMP-COST	X	
CHAR(3)	BDG.TOWNSHIP	X	
CHAR(3)	BDG.TOWNSHIP-NUM	X	
CHAR(1)	BDG.TRAF-CNTL-SIGN	X	
CHAR(1)	BDG.TYPE-CANTL-BEARING	X	
CHAR(1)	BDG.TYPE-CONN	X	
CHAR(1)	BDG.TYPE-MED-OVER	X	
CHAR(2)	BDG.TYPE-PAINT	X	
CHAR(1)	BDG.TYPE-PAINT-FINISH	X	
CHAR(1)	BDG.TYPE-PAINT-PRIMER	X	

CHAR(2)	BDG.TYPE-SVC	X	
CHAR(1)	BDG.TYPE-SVC-OVER	X	
CHAR(1)	BDG.TYPE-SVC-UNDER	X	
CHAR(2)	BDG.TYPE-WORK-PROP	X	
CHAR(1)	BDG.UND-CLR-APSL	X	
CHAR(6)	BDG.UND-INSPEC-DATE	X	
CHAR(1)	BDG.UND-INSPEC-PROC	X	
CHAR(1)	BDG.UNDER-CLR-REF-FEAT	X	
CHAR(1)	BDG.UPP-APPR-PANEL-COND	X	
CHAR(2)	BDG.UPP-APPR-PANEL-LEN	X	
CHAR(2)	BDG.UPP-APPR-PANEL-TYPE	X	
CHAR(1)	BDG.USAGE	X	
CHAR(3)	BDG.VERT-CLR-OVER-RD1	X	
CHAR(3)	BDG.VERT-CLR-OVER-RD2	X	
CHAR(3)	BDG.VERT-CLR-UNDER-RD1	X	
CHAR(3)	BDG.VERT-CLR-UNDER-RD2	X	
CHAR(1)	BDG.VERT-CNTL-SIGN	X	
CHAR(1)	BDG.WATER-APSL	X	
CHAR(1)	BDG.WEAR-SURF	X	
CHAR(3)	BDG.WID-RD1-OVER	X	
CHAR(3)	BDG.WID-RD1-UNDER	X	
CHAR(3)	BDG.WID-RD2-OVER	X	

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Format	Name	Stored	Generated From
CHAR(3)	BDG.WID-RD2-UNDER	X	
CHAR(1)	BDG.WORK-PROP-ON	X	
CHAR(3)	BDG.WORK-PROPOSED	X	
CHAR(4)	BDG.YEAR-OPENED	X	
CHAR(4)	BDG.YEAR-REBARRED	X	
CHAR(4)	BDG.YR-ADT	X	
CHAR(4)	BDG.YR-BUILT	X	
CHAR(4)	BDG.YR-CAP-RAT	X	
CHAR(4)	BDG.YR-IMP-EST	X	
CHAR(4)	BDG.YR-PAINTED	X	
CHAR(4)	BDG.YR-REMOD	X	
CHAR(4)	BDG.YR-SCOUR-ANAL	X	

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BDG - Descriptions of Data Elements
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BDG.ABUTMENT-FOUNDATION CHAR(1) - Abutment Foundation

Type of abutment foundation.

blank	Unknown
N	Not applicable
0	Unknown
1	Spread footings on soil
2	Spread footings on bedrock
3	Footing on piling
4	Pile bent (timber, steel, etc.)
5	"U"-Type
6	Caisson

BDG.ABUTMENT-MATERIAL - CHAR(1) - Abutment Material

Material used to construct the bridge abutments:

blank	Unknown
1	Concrete
2	Timber
3	Steel
4	Masonry
5	Stone (not mortared)
6	Combination
7	Abutments differ
8	C.I.P.
9	Prestress-Concrete

BDG.ACTION-NEEDED - CHAR(6) - Action Needed

This field indicates whether special action is needed based on findings from the annual inspection.

blank	- Unknown.
Y	- Action needed
N	- Action not needed

BDG.ADT - CHAR(6) - Average Annual Daily Traffic

Annual average number of vehicles per day on the roadway. For an overpass, the ADT is the traffic on the bridge. For an underpass, the ADT is for the roadway under the structure.

blank	- unknown
000000 - 200000	vehicles per day

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BDG.ANGL-SKEW - CHAR(3) - Angle of Skew

The angle between the centerline of a pier/abutment and a line perpendicular to the roadway centerline.

blanks	Unknown.
nnx	nn = 00 - 89,

x = L, R, or blank.

BDG.APPR-ALIGN-COND - CHAR(1) - Approach Roadway Alignment Condition

Condition rating of the approach roadway alignment's effect on the use of the structure:

N	Not applicable.
9	Conditions superior to present desirable criteria.
8	Conditions equal to present desirable criteria.
7	Conditions better than present minimum criteria.
6	Conditions equal to present minimum criteria.
5	Conditions somewhat better than minimally adequate for tolerating being left in place as is.
4	Conditions minimally adequate for tolerating being left in place as is.
3	Conditions basically intolerable, requiring high priority of repair.
2	Conditions basically intolerable, requiring high priority of replacement.
1	Conditions require immediate repair to put bridge back in service.
0	Conditions require immediate replacement to put bridge back in service.
blank	Unknown.

BDG.APPR-GUARD - CHAR(1) - Approach Guardrail

Indicates the presence and type of guardrail treatment at structure approaches:

N	Not applicable.
0	None.
1	Cable.
2	Plate beam - not attached - end not turned down.
3	Plate beam - not attached - end turned down.
4	Plate beam - attached - end not turned down.
5	Plate beam - attached - end turned down.
6	Timber.
7	Other.
8	B.C.T. (Breakaway Cable Terminal)

BDG.APPR-IMP-COST - CHAR(5) - Approach Improvement Cost

Indicates the cost of the proposed approach roadway in thousands of dollars.

blanks	No improvements proposed.
00001 - 99999	Cost of improvements in thousands of dollars.

BDG.APPR-SHLDR-WID - CHAR(3) - Roadway Approach Shoulder Width

Minimum approach width found at either end of the structure from outside shoulder to outside shoulder:

blanks	Non-vehicular traffic on structure.
008 - 200	Minimum shoulder-to-shoulder approach width in feet.

BDG.APPR-SPAN-CONSTR - CHAR(2) - Approach Span - Type of Construction.

Second and third digits of APPR-SPAN-TYPE:

01	Beam span	13	Box culvert
02	Low truss	14	Pipe culvert - round
03	High truss	15	Pipe arch - arch type
04	Deck truss	16	Long span
05	Thru girder	17	Tunnel
06	Deck girder	18	Moveable
07	Box girder	19	Other
08	Rigid frame	20	Double tee
09	Slab span	21	Quad tee
10	Slab span - voided	22	Bulb tee
11	Channel span	23	Suspension
12	Arch	24	Tied Arch

BDG.APPR-SPAN-DEF - CHAR(1) - Approach Span Definition

Further defines the type of approach span design:

A	Parker	K	K truss
B	Pennsylvania	L	Baltimore
C	Camel back	M	Howe
D	Warren	N	Fink
E	Warren with verticals	O	King post
F	Warren with polygonal top chord	P	Queen post
		Q	Vierendeel
G	Pratt	R-T	(reserved)
H	Pratt half-hip	U	Spandrel filled arch
I	Double intersection pratt	V	Open spandrel arch
J	Bowstring arch truss	W	Rainbow arch
blank	Not applicable	X-Z	(reserved)

BDG.APPR-SPAN-MATERIAL - CHAR(1) - Approach Span Material

First digit of APPR-SPAN-TYPE. Indicates material used in approach span:

1	Concrete	6	Prestress concrete continuous
2	Concrete continuous	7	Timber
3	Steel	8	Masonry
4	Steel continuous	9	Cast Iron
5	Prestress concrete	0	Other
A	Aluminum	P	Post Tensioned

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BDG.APPR-SPAN-TYPE - CHAR(3) - Approach Span Type

"mcc" where:

m = materials used

1	Concrete	6	Prestress concrete continuous
2	Concrete continuous	7	Timber
3	Steel	8	Masonry
4	Steel continuous	9	Cast Iron
5	Prestress concrete	0	Other
A	Aluminum	P	Post Tensioned

cc = type of construction

01	Beam span	13	Box culvert
02	Low truss	14	Pipe culvert - round
03	High truss	15	Pipe arch - arch type
04	Deck truss	16	Long span
05	Thru girder	17	Tunnel
06	Deck girder	18	Moveable
07	Box girder	19	Other
08	Rigid frame	20	Double tee
09	Slab span	21	Quad tee
10	Slab span - voided	22	Bulb tee
11	Channel span	23	Suspension
12	Arch	24	Tied Arch

BDG.APPR-SURF-WID - CHAR(3) - Roadway Approach Surface Width

Minimum approach width found at either end of the structure from outside edge of surface to outside edge of surface:

blank Non-vehicular traffic on structure.
008 - 200 Minimum surface-to-surface approach width in feet.

BDG.AREA-PAINTED - CHAR(6) - Painted Area

Surface area on structure that is painted:

blank Not applicable or not painted.
000001 - 999999 Area in square feet.

BDG.BDG-IMP-COST - CHAR(5) - Cost of Bridge Improvements

blanks No improvements proposed.
00001 - 99999 Cost of proposed improvements ($nn,nnn,000).

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BDG.BDG-KEY-FIELD - CHAR(17) - Bridge Key Field

Consists of the following three fields:

BDG.BDG-RTE-SYS CHAR(2)
BDG.BDG-RTE-NUM CHAR(5)
BDG.BDG-REF-POINT CHAR(10)

BDG.BDG-NUM-&-MATCH - CHAR(7) - Bridge Number and Match

Combines two bridge data elements: Bridge Number and Bridge Match. The first six digits are the Bridge Number and the seventh digit of this field is the Bridge Match.

BDG.BDG-NUM-AND-MATCH - CHAR(7) - Bridge Number and Match

Combines two bridge data elements: Bridge Number and Bridge Match. The first six digits are the Bridge Number and the seventh digit of this field is the Bridge Match.

BDG.BDG-POSTING - CHAR(1) - Safe Load Capacity and Posting

Safe load capacity:

N	Non-vehicular traffic - Railroad, Ped, Buildings on structure.
9	Inventory rating HS20 or greater.
8	Inventory rating H20 or greater.
7	Operating rating HS20 or greater.
6	Operating rating H20 or greater.
5	Operating rating less than H or HS20 - not posted.

* SINGLE VEHICLE POSTING *

4	Posted 20 tons or more.
3	Posted 12 to 19.9 tons.
2	Posted 5 to 11.9 tons.
1	Posted less than 5 tons.
0	Posted closed.
blank	Unknown.

BDG.BDG-REF-POINT - CHAR(10) - Bridge Reference Point

blanks	No supplemental bridge key present.
000+00.000 - 999+99.999	Reference point of bridge.

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BDG.BDG-RTE-NUM - CHAR(5) - Bridge Route Number

nnnnx where nnnn = 0001-9999 and x = blank, A-Z.

For route system 07, counties 20 and 87,

00an where a = A-Z, n = 1-9 is also possible.

BDG.BDG-RTE-SYS - CHAR(2) - Bridge Route System

01	ISTH - Interstate trunk highway
02	USTH - U.S. trunk highway
03	MNTH - Minnesota trunk highway
04	CSAH - County state-aid highway
05	MSAS - Municipal state-aid street
06	CMSA - County municipal state aid

07 CNTY - County road
08 TWNS - Township road
09 UTWN - Unorganized township road
10 MUN - City streets
11 NATP - National park road
12 NFD - National forest development road
13 IND - Indian reservation road
14 SFR - State forest road
15 SPRK - State park road
16 MIL - Military road
17 NATM - National monument road
18 NATW - National wildlife refuge road
19 FRNT - Frontage road
20 SGAM - State game preserve road
23 PRIV - Private jurisdiction road

BDG.BIRD-NESTS - CHAR(1) - Bird Nests

This item indicates the presence of migratory birdnests on the structure.

blank Unknown
0 No nests are on the structure
1 Nests are on the structure

BDG.BORDER-STRUCTURE - CHAR(3) - Border Structure

This item indicates structures crossing borders of states or countries.

blanks Not a border structure or unknown.
197 On Minnesota-Iowa border.
388 On Minnesota-North Dakota border.
468 On Minnesota-South Dakota border.
555 On Minnesota-Wisconsin border.
CAN On Minnesota-Canada border.

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BDG.BRIDGE-MATCH - CHAR(1) - Bridge Match

Distinguishes between multiple records stored for a single structure when the same structure services more than one road. A record is stored in the file for each different route involved.

blank Only one road is involved.
1 This record is for the principle road involved.
2 This record is for the second priority road involved.

. .
. .
. .

9 This record is for the ninth priority road involved.

BDG.BRIDGE-NUMBER - CHAR(6) - Bridge Number

Provides a unique identification for each bridge. Several different numbering systems are in use (see chapter 10 in the Data Coding Manual). Leading blanks and/or zeroes are significant (eg., bridges " 1001 " and "01001 " are different bridge numbers).

If Bridge Number is two digits, the allowable numbers are:

12, 16, 55, 70, 77, 83, 84, 86, 87, 89, 95

BDG.BUILDER - CHAR(3) - Builder

Indicates the builder and/or designer's name, or contracting agency which built the structure:

blanks	Unknown.
001-087	County (identified by county number).
088	State highway department or DOT.
089-099	Other governmental agencies.
100-999	Number assigned to company or designer.

BDG.CENSUS-YR-FROM-CITY - NUM(4) - Census Year from City

Census year determined by looking in the TIS city table for the city number stored in the bridge record:

0000	Nonmunicipal or invalid city number.
0001-9999	Census year.

BDG.CHAN-COND - CHAR(1) - Channel & Protection Condition

Condition rating of the stream stability and rip rap, spur dike, etc:

N	Not applicable.
9	New condition.
8	Good condition - no repairs needed.
7	Generally good condition - potential exists for minor maintenance.
6	Fair condition - potential exists for major maintenance.
5	Generally fair condition - potential exists for minor rehabilitation.
4	Marginal condition - potential exists for major rehabilitation.
3	Poor condition - repair or rehabilitation required immediately.
2	Critical condition - need for repair or rehabilitation is urgent. Facility should be closed until the indicated repair is complete.
1	Critical condition - facility is closed. Study should determine the feasibility for repair.
0	Critical condition - facility is closed and beyond repair.
blank	Unknown.

BDG.CITY - CHAR(4) - City Number

0000	Nonmunicipal.
0001 - 9998	City number.

Note: Cities may be identified by number (eg., BDG.CITY *EQ* 2585) or by name (eg., BDG.CITY *EQ* 'ST-PAUL').

BDG.CNTRL-SECTN - CHAR(2) - Control Section

blanks	Not applicable (non-trunk structure).
01 - 75	Control section - U.S. and Minnesota trunk highways.
80 - 89	Control section - Interstate trunk highways.

BDG.CNTY-BDG-NMBR - CHAR(6) - County Bridge Number

NNNNNN	Any combination of numbers, letters, blanks, and dashes ("-") is allowed.

BDG.CONSTR-DIST - CHAR(1) - Construction District

blank	Non-trunk roadway - district determined from county number.
1 - 9	Construction district.

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BDG.COUNTY - CHAR(2) - County Number

01 - 87	County number.

BDG.CULV-COND - CHAR(1) - Culvert & Retaining Walls Condition

Condition rating of the culvert alignment, or settlement problems, retaining wall stability and structural integrity:

N	Not applicable.
9	New condition.
8	Good condition - no repairs needed.
7	Generally good condition - potential exists for minor maintenance.
6	Fair condition - potential exists for major maintenance.
5	Generally fair condition - potential exists for minor rehabilitation.
4	Marginal condition - potential exists for major rehabilitation.
3	Poor condition - repair or rehabilitation required immediately.
2	Critical condition - need for repair or rehabilitation is urgent. Facility should be closed until the indicated repair is complete.
1	Critical condition - facility is closed. Study should determine the feasibility for repair.
0	Critical condition - facility is closed and beyond repair.
blank	Unknown.

BDG.CULV-ID - CHAR(12) - Culvert Identification

Identifies the structure as a culvert and indicates the size (eg., C108D, W54DTIM, 12'10"x8'4").

BDG.CULV-LEN - CHAR(3) - Culvert Barrel Length

Pay length of the barrel for all culverts measured along the centerline:

blank	Structure is not a culvert.
010 - 999	Culvert barrel length in feet.

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BDG.DECK-COND - CHAR(1) - Deck Condition

Condition rating of the riding surface, deck slab or plate, wearing surface, railings, parapets, etc:

N	Not applicable.
9	New condition.
8	Good condition - no repairs needed.
7	Generally good condition - potential exists for minor maintenance.
6	Fair condition - potential exists for major maintenance.
5	Generally fair condition - potential exists for minor rehabilitation.
4	Marginal condition - potential exists for major rehabilitation.
3	Poor condition - repair or rehabilitation required immediately.
2	Critical condition - need for repair or rehabilitation is urgent. Facility should be closed until the indicated repair is complete.
1	Critical condition - facility is closed. Study should determine the feasibility for repair.
0	Critical condition - facility is closed and beyond repair.
blank	Unknown.

BDG.DECK-GEOM-APSL - CHAR(1) - Deck Geometry Appraisal

Appraisal of major structure deficiency:

N	Not applicable.
9	Conditions superior to present desirable criteria.
8	Conditions equal to present desirable criteria.
7	Conditions better than present minimum criteria.
6	Conditions equal to present minimum criteria.
5	Conditions somewhat better than minimally adequate for tolerating being left in place as is.
4	Conditions minimally adequate for tolerating being left in place as is.
3	Conditions basically intolerable, requiring high priority of repair.
2	Conditions basically intolerable, requiring high priority of replacement.
1	Conditions require immediate repair to put bridge back in service.
0	Conditions require immediate replacement to put bridge back in service.
blank	Unknown.

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BDG.DECK-MATERIAL - CHAR(1) - Deck Material

Type of deck material

blank	Unknown		
N	Not applicable	5	Steel plate
1	Concrete cast-in-place	6	Corrugated steel
2	Concrete precast panels	7	Aluminum
3	Open grate	8	Timber
4	Closed grate	9	Other

BDG.DECK-PROT-YR - CHAR(4) - Year Protection System Applied

blanks	No protection system added.
0000 - 9999	Year protection system added.

BDG.DECK-PROTECTION - CHAR(1) - Type of Protection System

Type of protection system added to bridge deck:

blank	No protection added.
A	P.C. concrete overlay on wearing surface (3-4" slump conc.).
B	P.C. concrete overlay on wearing surface (2" slump conc.).
C	Bituminous overlay on wearing surface.
D	Epoxy and sand.
E	Epi - top mortar - 3/8".
F	Dow latex mortar - 3/4".
G	Dow latex concrete - 1-1/4" and 1-1/2".
H	Uniroyal membrane and bituminous overlay.
I	Uniseal membrane and bituminous overlay.
J	Gacoflex membrane and bituminous overlay.
K	Bitithene membrane and bituminous overlay.
L	Carlisle sure seal membrane and bituminous overlay.
M	Protecto wrap membrane and bituminous overlay.
N	Adhesive engineering epoxy asphalt.
O	Linseed oil treatment.
P	Sinmast epoxy sealer.
Q	ARCO 60 Latex Mortar - 3/4"
R	Cathodic
S	Limited service low slump

BDG.DECK-UNSOUND - CHAR(4) - Percent Unsound Concrete

blanks	Not applicable.
0000 - 9999	Percent unsound concrete (00.00 - 99.99%).

BDG.DECK-WIDTH - CHAR(4) - Deck Width

Out-to-out width of the deck. If the structure is a through, this is the lateral clearance between the superstructure members.

blanks	Culverts.
0010 - 2500	Deck width in feet (to nearest tenth 1.0 - 250.0).

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BDG.DEF-STATUS - CHAR(1) - Deficient Status

Indicates the deficient status of the structure.

N	Not eligible	S	Structurally Deficient
A	Adequate	F	Functionally Obsolete

BDG.DEFENSE-HGWY - CHAR(1) - Defense Highway

This item indicates whether the inventory route is involved with the Defense Highway System or not.

0 The inventory route is not a defense highway.

1 The inventory route is a defense highway.

2 The inventory route is a defense highway that goes over or under a defense highway.

BDG.DESCR-LOCN - CHAR(25) - Descriptive Location

Narrative of the structure location.

BDG.DESIGN-LOAD - CHAR(1) - Design Load

The live load for which the structure was designed:

1	H10	6	HS20 + mod
2	H15	7	Pedestrian
3	HS15	8	Railroad
4	H20	9	HS25
5	HS20	0	Unknown or Other

BDG.DETOUR-LENGTH - CHAR(2) - Bypass Detour Length

00	Ground level bypass available at site.
01 - 97	Length of feasible detour in miles.
98	Length of feasible detour greater than 97 miles.
99	No detour is feasible.

BDG.DIRECTION - CHAR(2) - Direction

The direction of travel across the structure (if two-way traffic, the direction of increasing mileposts):

"N "	North	"NW"	Northwest
"S "	South	"SW"	Southwest
"E "	East	"SE"	Southeast
"W "	West	"NE"	Northeast
blanks	Unknown		

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BDG.DISTRICT-FROM-CNTY - NUM(1) - Construction District from county

1 - 9	Construction district determined from BDG.COUNTY and the TIS county table (can differ from BDG.CONSTR-DIST).

BDG.DRAIN-AREA - CHAR(6) - Drainage Area

This item for water structures only indicates the drainage area affected by the structure. Data is recorded in thenths of a square foot.

blanks	Not a drainage structure or unknown.
00000.0 - 99999.9	Drainage area affected by structure.

BDG.ESTIMATE-METH - CHAR(1) - Estimate Method

blank	Not applicable.
C	Data was obtained from a computer program.
P	Data was determined from preliminary design.
I	Data was furnished by the inspecting agency.

BDG.FEATURE-NAME - CHAR(25) - Name of Feature Crossed

Overpasses: Name of feature crossed.
Underpasses: Name of facility on the structure.
Critical Facility: Indicated by * in the 25th column.

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BDG.FED-REHAB - CHAR(4) - Federal Rehabilitation

Year the bridge was last rehabilitated using federal funds.

blanks	Unknown
0000-9999	Year of last rehabilitation using federal funds.

BDG.FHWA20 - CHAR(1) - FHWA20

The following codes indicate if a bridge is greater than or less than 20 feet in length when the length is determined using the FHWA definition of bridge length.

blank	Unknown
0	Length of structure less than 20 feet as per FHWA criteria.
1	Length of structure greater or equal to 20 feet as per FHWA criteria.

BDG.FIRST-INT-ELEM - CHAR(3) - First Interchange Element Code

blanks	Not in an interchange.
100 - 999	Interchange element number.
ann	Interchange element number (a = A-Z, nn = 00-99).

BDG.FIRST-KEY-FIELD - CHAR(20) - First Bridge Key

The first bridge key is used to locate the bridge record by route system, route number, and reference point. This data element name allows referencing all three of those data elements in a single name.

'0100000035000+00.000' - '2387009999999+99.999'	Key field

BDG.FIRST-LOW-END - CHAR(5) - First Lower Bridge End

Distance in feet from the BDG.FIRST-REF-POINT to the end of the structure toward lower-numbered reference posts:

blanks	Not applicable.
00000 - 99999	Distance in feet.

BDG.FIRST-REF-POINT - CHAR(10) - First Reference Point

blanks	No first bridge key present.
000+00.000 - 999+99.999	Reference point of bridge.

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BDG.FIRST-RTE-NUM - CHAR(8) - First Route Number

Trunk: 00000nnn or 0000nnna where nnn = 001-999 and a = A-Z.
MSAS, MUN: ccccnnnn or cc00nnna where cccc = census number,
nnnn = 0001-9999, nnn = 001-999, a = A-Z.

Other: cc00nnnn or cc00nnna where cc = county number (01-87),
nnnn = 0001-9999, nnn = 000-999, a = A-Z.

Note: Route system 07 in county 87:
870000an where an = A1 - Z9.

Route system 07 in county 20:
200000an where an = A1 - Z9.

BDG.FIRST-RTE-SYS - CHAR(2) - First Route System

01	ISTH - Interstate trunk highway
02	USTH - U.S. trunk highway
03	MNTH - Minnesota trunk highway
04	CSAH - County state-aid highway
05	MSAS - Municipal state-aid street
07	CNTY - County road
08	TWNS - Township road
09	UTWN - Unorganized township road
10	MUN - City streets
11	NATP - National park road
12	NFD - National forest development road
13	IND - Indian reservation road
14	SFR - State forest road
15	SPRK - State park road
16	MIL - Military road

17 NATM - National monument road
18 NATW - National wildlife refuge road
19 FRNT - Frontage road
20 SGAM - State game preserve road
23 PRIV - Private jurisdiction road

BDG.FIRST-UPP-END - CHAR(5) - First Upper Bridge End

Distance in feet from the BDG.FIRST-REF-POINT to the end of the structure toward higher-numbered reference posts:

blanks Not applicable.
00000 - 99999 Distance in feet.

BDG.FLARED - CHAR(1) - Structure Flared

1 Yes - structure is flared.
0 No - structure is not flared.

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BDG.FRC-INSPEC-DATE - CHAR(6) - Fracture Critical Inspection Date

Allowable codes are MMYYYY where:
MM Month = 01 - 12
YYYY Year
blanks Unknown

BDG.FRC-INSPEC-PROC - CHAR(1) - Fracture Critical Inspection Procedure

V Visual Inspection
D Dye Penetrant
U Ultrasonic
M Magnetic Particle
X X-ray and Gamma Ray
O Other
blank Unknown

BDG.FRC-INSPEC-RSLT - CHAR(1) - Fracture Critical Inspection Result

7 No repairs needed.
6 Minor maintenance needed.
5 Previously noted cracks in Non-critical areas have been

repaired and no new cracks evident.
4 Previously noted cracks in Critical areas have been repaired and no new cracks evident.
3 Structural cracks found in Non-critcal areas.
2 Structural cracks found in Critical areas.
1 Structural cracks found in Critical areas and structure is closed.
blank Unknown.

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BDG.FRC-MEMBER-DEFN - CHAR(1) - Fracture Critcal Member Definition

Code	Description	Component
blank	Unknown.	
N	Not Applicable.	
A	Two girder bridge, simple span.	Girder - tension zone.
B	Two girder bridge, continuous.	Girder - tension zone.
C	Two girder bridge, w/ suspended span.	Suspended hanger assembly plus plus girder tension zone.
D	Truss bridges. Through,pony & deck.	Tension members (includes eye bar if < 3 bars per member).
E	Tied arch.	Tension tie.
F	Cross-girder pier	Tension zone of steel pier cap.

	cap (steel).	
G	Truss span plus a two-girder simple span.	For the Truss - tension members For the Girder - tension zone of the girders
H	Truss span plus a two-girder continuous span(s).	For the Truss - tension members For the Girder - tension zone of the girders.
I	Tied Arch span plus a two-girder simple span(s).	For the Tied Arch - tension zone. For the Girder - tension zone of the girders.
J	Tied Arch span plus a two-girder continuous span(s).	For the Tied Arch - tension zone. For the Girder - tension zone of the girders.
K	Suspension bridge.	Suspension cables.

BDG.FUNCT-CLASS - CHAR(2) - Functional Classification

Rural:	01	Principal arterial - Interstate
	02	Principal arterial - Other
	06	Minor arterial
	07	Major collector
	08	Minor collector
	09	Local
Urban:	11	Principal arterial - Interstate
	12	Principal arterial - Other freeways or expressways
	14	Other Principal Arterials
	16	Minor arterial
	17	Collector
	19	Local

BDG.FUNCT-USE - CHAR(1) - Functional Use

1	Mainline
6	Business or farm entrance
7	Ramp or wye
8	Service and/or unclassified frontage road
9	Side road
0	Other

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BDG.FUTURE - CHAR(41) - Reserved for future use.

BDG.HCADT - CHAR(5) - Heavy Commercial Average Daily Traffic

blanks No commercial traffic.
00001 - 99999 Vehicles per day.

BDG.HISTORIC-RPT - CHAR(1) - Historic Report

Indicates a supplemental structure inventory report received by the bridge data section:

blank	No report received.
1	Received with no notations.
2	Received with remarks.
3	Received with unusual features.
4	Received with remarks and unusual features.

BDG.HISTORIC-SIG - CHAR(1) - Historical Signifigance

1	Bridge is on the national register of historic places
2	Bridge is eligible for the register
3	Bridge is possibly eligible for the register, or is on a state or local register, or is within a historic district.
4	Historical signifigance cannot be determined at this time
5	Bridge is not eligible for the register

BDG.HORZ-CLR-RD1 - CHAR(3) - Horizontal Clearance Roadway One

Indicates the largest available clearance for the movement of wide loads.

If the route is going over the structure, this will be the distance from face to face of the railing (bridge), or the width of the roadway (culvert).

If the route is going under the structure, this will be the total horizontal distance between substructure units (abutment, pier, rigid barrier, or toe of a slope steeper than 3:1).

For divided roadways, this shall be for the NB or EB roadways.

blanks	Unknown
080 - 999	Total horizontal clearance to the nearest tenth of a foot (8.0 - 99.9 feet).

BDG.HORZ-CLR-RD2 - CHAR(3) - Horizontal Clearance Roadway Two

This item is the same as BDG.HORZ-CLR-DR1 except it will indicate the SB or WB roadway of a divided highway.

blanks	Unknown
080 - 999	Total horizontal clearance to the nearest tenth

of a foot (8.0 - 99.9 feet).

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BDG.HORZ-CNTL-SIGN - CHAR(1) - Horizontal Control Signs

blank	Not applicable (no traffic on structure).
0	No horizontal restrictions.
1	Delineations (signs locating piers, railings, etc).
2	Width restrictions (narrow or 1-lane, etc).
3	Combination of 1 and 2.

BDG.H2O-OPENING - CHAR(5) - Area of Water Opening

blanks	Not a drainage structure.
00010 - 99998	Area of water opening in square feet.
99999	Area is not critical, large structure over river.

BDG.INV-RATING - CHAR(4) - Inventory Rating

Rating capacity of the lower design stress level of the structure based on standard loadings:

blanks	Unknown or not applicable.
8000	Pedestrian.
9000	Buildings, conveyors, etc.
xyyy	Inventory capacity rating, where:

x:

1	H truck
2	HS truck
3	Alternate intersate loading
4	3-axle truck (type 3)
5	3-S semi-trailer
6	3-3 trailer
7	Railroad loading
8	Pedestrian or special loading
9	Gross load only given

yyy: Gross loading in tons (0.0 - 99.9).

BDG.LAT-CLR-UNDER-LFT - CHAR(3) - Minimum Lateral Underclearance Left

Minimum distance from the left edge of the roadway to the nearest substructure unit or any median barrier.

blanks	Not a divided roadway under the structure.
000 - 700	Minimum lateral underclearance in feet to the nearest tenth of a foot (00.0 - 70.0).
999	No obstruction (pier) in the median area (99.9).

BDG.LAT-CLR-UNDER-RGT - CHAR(3) - Minumum Lateral Underclearance Right

Minimum distance from the right edge of the roadway to the nearest substructure unit or the toe of the slope:

blanks	Neither roadway nor railroad tracks under structure.
000 - 500	Minimum lateral underclearance in feet to the nearest tenth of a foot (00.0 - 50.0).

If the route under the structure is undivided then this represents the minimum clearance found on either the left or right sides.

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BDG.LATITUDE - CHAR(6) - Latitude

blanks	Not stated.
ddmmss	Latitude in degrees, minutes and seconds:

dd = degrees = 43 - 49
mm = minutes = 00 - 59
ss = seconds = 00 - 59

BDG.LEFT-CURB-HGT - CHAR(2) - Curb Height Left

00	No curbs present.
01 - 24	Left curb height in inches.

BDG.LEFT-RAIL-COND - CHAR(1) - Condition Left Railing

N	Not applicable.
9	New condition.
8	Good condition - no repairs needed.
7	Generally good condition - potential exists for minor maintenance.
6	Fair condition - potential exists for major maintenance.
5	Generally fair condition - potential exists for minor rehabilitation.
4	Marginal condition - potential exists for major rehabilitation.
3	Poor condition - repair or rehabilitation required immediately.
2	Critical condition - need for repair or rehabilitation is urgent. Facility should be closed until the indicated repair is complete.
1	Critical condition - facility is closed. Study should determine the feasibility for repair.

0 Critical condition - facility is closed and beyond repair.

BDG.LEFT-RAIL-HGT - CHAR(3) - Base Height Left Railing

Height of the railing from the top of curbing or roadway surface to the top of the railing base or post:

000	No railing present.
001 - 312	Height of railing (0 feet 01 inch to 3 feet 12 inches).

BDG.LEFT-RAIL-TYPE - CHAR(2) - Type Left Railing

NN	Not applicable.
00	No railings present.
01 - 50	Code for type of railing.

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BDG.LOAD-LIM-SIGN - CHAR(1) - Load Limit Sign

blank	Not applicable (no traffic on structure).
0	No posting.
1	Vehicle limit only posted.
2	Vehicle and semi-trailer limit posted.
3	Bridge closed

BDG.LONGITUDE - CHAR(6) - Longitude

blanks	Not stated.
ddmmss	Longitude in degrees, minutes and seconds:

dd = degrees = 89 - 97
mm = minutes = 00 - 59
ss = seconds = 00 - 59

BDG.LOW-APPR-PANEL-COND - CHAR(1) - Lower Approach Panel Condition

blank	Not applicable.
A - T	Code for lower approach panel condition.

BDG.LOW-APPR-PANEL-LEN - CHAR(2) - Lower Approach Panel Length

blank Not applicable.
01 - 99 Length of panel in feet.

BDG.LOW-APPR-PANEL-TYPE - CHAR(2) - Lower Approach Panel Type

NN Not applicable.
ab Code for approach panel type:

a = 0 - 3.
b = N or A - E.

BDG.MAIN-SPAN-CONSTR - CHAR(2) - Main Span - Type of Construction.

Second and third digits of MAIN-SPAN-TYPE:

01	Beam span	13	Box culvert
02	Low truss	14	Pipe culvert - round
03	High truss	15	Pipe arch - arch type
04	Deck truss	16	Long span
05	Thru girder	17	Tunnel
06	Deck girder	18	Moveable
07	Box girder	19	Other
08	Rigid frame	20	Double tee
09	Slab span	21	Quad tee
10	Slab span - voided	22	Bulb tee
11	Channel span	23	Suspension
12	Arch	24	Tied Arch

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BDG.MAIN-SPAN-DEF - CHAR(1) - Main Span Definition

Further defines the type of main span design:

A	Parker	K	K truss
B	Pennsylvania	L	Baltimore
C	Camel back	M	Howe
D	Warren	N	Fink
E	Warren with verticals	O	King post
F	Warren with polygonal top chord	P	Queen post
		Q	Vierendeel
G	Pratt	R-T	(reserved)
H	Pratt half-hip	U	Spandrel filled arch
I	Double intersection pratt	V	Open spandrel arch

J	Bowstring arch truss	W	Rainbow arch
blank	Not applicable	X	Steel arch
		Y-Z	(reserved)

BDG.MAIN-SPAN-LEN - CHAR(4) - Main Span Length

Length of the main or longest span:

0019 - 7000 Length in feet to the nearest tenth of a foot (1.9 - 700.0).

BDG.MAIN-SPAN-MATERIAL - CHAR(1) - Main Span Material

First digit of MAIN-SPAN-TYPE. Indicates material used in the main span:

1	Concrete	6	Prestress concrete continuous
2	Concrete continuous	7	Timber
3	Steel	8	Masonry
4	Steel continuous	9	Cast Iron
5	Prestress concrete	0	Other
A	Aluminum	P	Post Tensioned

1
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BDG.MAIN-SPAN-TYPE - CHAR(3) - Main Span Type

"mcc" where:

m = materials used

1	Concrete	6	Prestress concrete continuous
2	Concrete continuous	7	Timber
3	Steel	8	Masonry
4	Steel continuous	9	Cast Iron
5	Prestress concrete	0	Other
A	Aluminum	P	Post Tensioned

cc = type of construction

01	Beam span	13	Box culvert
02	Low truss	14	Pipe culvert - round
03	High truss	15	Pipe arch - arch type
04	Deck truss	16	Long span
05	Thru girder	17	Tunnel
06	Deck girder	18	Moveable
07	Box girder	19	Other
08	Rigid frame	20	Double tee
09	Slab span	21	Quad tee
10	Slab span - voided	22	Bulb tee
11	Channel span	23	Suspension
12	Arch	24	Tied Arch

BDG.MAINT-AREA - CHAR(2) - Maintenance Area

blanks	Unknown or non-trunk.
1A - 9A	Maintenance area.
1B - 4B & 6B - 8B	Maintenance area.

BDG.MAINT-RESPONS - CHAR(2) - Maintenance Responsibility

01	State Highway agency	31	State Toll Authority
02	County Highway agency	32	Local Toll Authority
03	Township Highway agency	60	Other Federal Agency
04	Municipal Highway agency	62	Bureau Indian Affairs
11	State Park, Forest	64	U.S. Forest Service
12	Local Park, Forest	66	Nat'l Park Service
21	Other State agency	68	Bureau Land Management
25	Other Local agency	69	Bureau Reclamation
26	Private	70	Military Reservation/ Corps of Engineers
27	Railroad	80	Unknown

BDG.MAX-VRT-CLR-RD1 - CHAR(3) - Maximum Vertical Clearance Road-1

Maximum height available to a 10' wide vehicle transversely positioned within the edges of the driving surface of road-1.

blanks	No roadway on structure or no vertical restrictions.
070 - 750	Minimum vertical clearance over the driving surface of the bridge deck in feet to the nearest tenth of a foot (7.0 - 75.0).

BDG.MAX-VRT-CLR-RD2 - CHAR(3) - Maximum Vertical Clearance Road-2

Maximum height available to a 10' wide vehicle transversely positioned within the edges of the driving surface of road-2.

blanks	Bridge does not carry divided roadway or no vertical restrictions.
070 - 750	Minimum vertical clearance over the driving surface of the bridge deck in feet to the nearest tenth of a foot (7.0 - 75.0).

BDG.MED-WID-OVER - CHAR(2) - Median Width Over

blanks	Structure does not carry divided roadway.
00 - 99	Median width in feet.

BDG.MED-WID-UNDER - CHAR(2) - Median Width Under

blanks	No divided roadway under structure.
00 - 99	Median width in feet.

BDG.MIN-VERT-CLEAR-LBDG - CHAR(3) - Minimum Vertical Clearance Lift Bridge

If the structure is a vertical lift bridge, record the minimum vertical clearance imposed at the site measured above a datum specified by a controlling agency and the structure. This will be with the structure in a dropped or closed position.

blanks	Not a vertical lift bridge or unknown
000 - 100	Vertical clearance to the nearest foot rounded down.

BDG.MO-CAP-RAT - CHAR(2) - Month of Capacity Rating

blanks	Unknown or no rating calculated.
01 - 12	Month of capacity rating.

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BDG.MONTH-OPENED - CHAR(2) - Month Opened to Traffic

blanks	Not open to traffic.
01 - 12	Month opened to traffic.

BDG.NATL-TRUCK-SYS - CHAR(1) - National Truck System

0	Route is not on the network.
1	Route is on the network.

BDG.NAVG-CNTL - CHAR(1) - Navigation Control

blank	Unknown
0	No navigation control.
1	Navigation control.
N	Not applicable, No waterway.

BDG.NAVG-HORZ-CLR - CHAR(4) - Navigation Horizontal Clearance

If BDG.NAVG-CNTL indicates navigation control:

blank	No navigation control.
0000 - 0600	Horizontal clearance in feet.

BDG.NAVG-PROTECTION CHAR(1) - Navigation Protection

Presence and adequacy of pier/abutment navigation protection.

1	Navigation protection not required.
2	Inplace and functioning.
3	Inplace but in a deteriorated condition.
4	Inplace but re-evaluation of design suggested.
5	None present but re-evaluation suggested.

BDG.NAVG-VERT-CLR - CHAR(3) - Navigation Vertical Clearance

If BDG.NAVG-CNTL indicates navigation control:

blank	No navigation control.
000 - 200	Vertical clearance in feet.

BDG.NEW-CAP-RAT - CHAR(1) - New Rating Needed

blank	Unknown.
0	New capacity rating not needed.
1	New capacity rating needed.

BDG.NHS - CHAR(1) - National Highway System

0	NOT on the NHS
1	on the NHS

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BDG.NUM-APPR-SPANS - CHAR(2) - Number of Approach Spans

blanks	No approach spans.
01 - 55	Number of spans in the approach unit(s) or of different material and/or design than the main unit of the structure.

BDG.NUM-LANES - CHAR(2) - Traffic Lanes

Overpass: Number of lanes on the structure.
Underpass: Number of lanes under the structure.

00 - 14	Number of through traffic lanes.

BDG.NUM-MAIN-SPANS - CHAR(2) - Number of Main Spans

Number of spans in the main or major unit of the structure:

01 - 55	Number of main spans

BDG.NUM-TOT-SPANS - CHAR(3) - Total Number of Spans

Equal to sum of BDG.NUM-APPR-SPANS and BDG.NUM-MAIN-SPANS:

1 - 110	Total number of spans

BDG.OPR-RATING - CHAR(4) - Operating Rating

Rating capacity of the upper design stress level of the structure
based on standard loadings:

blanks	Unknown or not applicable.
8000	Pedestrian.
9000	Buildings, conveyors, etc.
xyyy	Operating capacity rating, where:

x:
1	H truck
2	HS truck
3	Alternate intersate loading
4	3-axle truck (type 3)
5	3-S semi-trailer
6	3-3 trailer
7	Railroad loading
8	Pedestrian or special loading
9	Gross load only given

yyy: Gross loading in tons (0.0 - 99.9).

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BDG.OVER-UNDER - CHAR(1) - Over or Under

Indicates whether this record is for a roadway that crosses over
the structure or for a roadway that passes under the structure.

1	Over (or no roadways involved).
2	Under

BDG.OWNER - CHAR(2) - Owner

01	State Highway agency	31	State Toll Authority
02	County Highway agency	32	Local Toll Authority
03	Township Highway agency	60	Other Federal Agency
04	Municipal Highway agency	62	Bureau Indian Affairs
11	State Park, Forest	64	U.S. Forest Service
12	Local Park, Forest	66	Nat'l Park Service
21	Other State agency	68	Bureau Land Management
25	Other Local agency	69	Bureau Reclamation
26	Private	70	Military Reservation/

27 Railroad
Corps of Engineers
80 Unknown

BDG.PARALLEL-STR - CHAR(1) - Parallel Structure

Indicates situations where seperate structures carry the inventory route in opposite directions of travel over the same feature.

blank Unknown
R Right structure of parallel structures (normally NB or EB)
L Left structure of parallel structures (normally SB or WB)
N No parallel structure exists.

BDG.PCT-UNSND-PAINT - CHAR(2) - Percent Unsound Paint

blanks Not applicable.
00 - 99 Percent paint unsound.

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BDG.PERMIT-RESTR-48K - CHAR(1) - Permit Restrictions for 48K Load
BDG.PERMIT-RESTR-60K - CHAR(1) - Permit Restrictions for 60K Load
BDG.PERMIT-RESTR-72K - CHAR(1) - Permit Restrictions for 72K Load
BDG.PERMIT-RESTR-FUT - CHAR(1) - Permit Restrictions for load not yet determined.

Permit restrictions for various load categories:

blank Not applicable
X Denied
1 No restrictions
2 Vehicle shall travel down center of bridge

3	Maximum vehicle speed of 5 mph
4	Restrictions 2 & 3 combined
5	The bridge deck shall be planked
6	See special check
7	Need district engineer approval
8	usused
9	unused

BDG.PIER-FOUNDATION - CHAR(1) - Pier foundation

Type of pier.

blank	Unknown
N	Not applicable
0	Unknown
1	Spread footings on soil
2	Spread footings on bedrock
3	Footing on piling
4	Pile bent (timber, steel, etc.)
5	"U" - type abutments.
6	Caisson.

BDG.PIER-MATERIAL - CHAR(1) - Pier Material

Material used to construct the bridge pier(s):

blank	Unknown
1	Concrete
2	Timber
3	Steel
4	Masonry
5	Stone (not mortared)
6	Combination
7	Abutments differ
8	C.I.P.
9	Pre-Concrete

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BDG.PLAN-AVAIL - CHAR(1) - Plan Available

0 No plans available or unknown.
1 Plans available in central file.
2 Plans available in district office file.
3 Plans available in county office file.
4 Plans available in municipal office file.
5 Plans available in other than above.

BDG.POP-FROM-CITY - NUM(7) - Population of City

The TIS city table is accessed using BDG.CITY:

0000000 Non-municipal.
0000001 - 9999999 Population of city.

BDG.POP-FROM-CNTY - NUM(7) - Population of County

The TIS county table is accessed using BDG.COUNTY:

0000001 - 9999999 Population of county.

BDG.POP-GROUP-FROM-CITY - NUM(1) - Population Group

The TIS city table is accessed using BDG.CITY:

1 Urban - 250,000 and over.
2 Urban - 100,000 to 249,999.
3 Urban - 50,000 to 99,999.
4 Urban - 25,000 to 49,999.
5 Urban - 10,000 to 24,999.
6 Urban - 5,000 to 9,999.
7 Rural - 2,500 to 4,999.
8 Rural - 1,000 to 2,499.
9 Rural - 1 to 999 or non-municipal.

BDG.POST-CAPAC - CHAR(6) - Posting Capacity.

Does not indicate that a sign has been erected - see BDG.LOAD-LIM.

blanks Not applicable.
000000 Bridge recommended to be closed.
vvsstt Recommended posting capacities:

vv = Rating for single vehicle (blanks or 00-24).
ss = Rating for semi-trailer (blanks or 00-40).
tt = Rating for truck and full trailer (blanks or 00-40).

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BDG.PROP-ADT - CHAR(6) - Proposed ADT

The ADT (average annual daily traffic) that controls the design of the improvements:

blanks	No improvements proposed.
000001 - 200000	A.D.T. in tens (nnnnnn vehicles per day).

BDG.PROP-ADT-YR - CHAR(4) - Year of Proposed ADT

blanks	No improvement proposed.
1970 - 2030	Year of design ADT.

BDG.PROP-APPR-WORK - CHAR(1) - Type of Roadway Approach Improvements

blank	No roadway improvements proposed.
1	Resurface.
2	Reconstruct.
3	Widen.
4	Shoulder improvements.
5	Other.

BDG.PROP-LENGTH - CHAR(5) - Proposed Improvement Length

blanks	No improvements proposed.
00001 - 10000	Proposed improvement length in feet.

BDG.PROP-WIDTH - CHAR(3) - Proposed Roadway Width

blanks	No improvement proposed.
010 - 200	Proposed roadway width improvement in feet.

BDG.RANGE - CHAR(3) - Range

Last three characters of BDG.SEC-TWN-RNG:

01E - 51W	Range.

BDG.RDC-FROM-CNTY - CHAR(2) - RDC from County

The TIS county table is accessed using BDG.COUNTY:

' 1' - '11'	Regional development commission as determined from county number.

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BDG.REBARS - CHAR(1) - Type of Coated Rebars

blank	None.
A	Galvanized rebars.
B	Epoxy rebars.
C	Vinyl rebars.

BDG.REPL-PRTY - CHAR(5) - Replacement Priority

00000 - 99999	Replacement priority calculation (00.000-99.999).

BDG.REPORT-JURIS - CHAR(1) - Report Jurisdiction

1	District	5	City
2	County	6	City and misc. (FLR, SLR, etc.)
3	County and city	7	Misc.
4	County and misc.	8	District and city
blank	Unknown		

BDG.RESPONSIBILITY - CHAR(2) - Border Structure Responsibilty

For those structures identified as being a BORDER bridge, this item will indicate the % of total structure's area that the neighboring state/country is responsible for funding.

blank	Not a border structure or unknown.
00 - 99	Percent responsibility (00% - 99%)

BDG.RIGHT-CURB-HGT - CHAR(2) - Curb Height Right

00	No curbs present.
01 - 24	Right curb height in inches.

BDG.RIGHT-RAIL-COND - CHAR(1) - Condition Right Railing

N	Not applicable.
9	New condition.
8	Good condition - no repairs needed.
7	Generally good condition - potential exists for minor maintenance.
6	Fair condition - potential exists for major maintenance.
5	Generally fair condition - potential exists for minor rehabilitation.
4	Marginal condition - potential exists for major rehabilitation.
3	Poor condition - repair or rehabilitation required immediately.
2	Critical condition - need for repair or rehabilitation is urgent. Facility should be closed until the indicated repair is complete.
1	Critical condition - facility is closed. Study should determine the feasibility for repair.
0	Critical condition - facility is closed and beyond repair.

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BDG.RIGHT-RAIL-HGT - CHAR(3) - Base Height Right Railing

Height of the railing from the top of curbing or roadway surface to the top of the railing base or post:

000	No railing present.
001 - 312	Height of railing (0 feet 01 inch to 3 feet 12 inches).

BDG.RIGHT-RAIL-TYPE - CHAR(2) - Type Right Railing

NN	Not applicable.
00	No railings present.
01 - 50	Code for type of railing.

BDG.ROADWAY-AREA - CHAR(6) - Roadway Area

000000 - 999999 are only allowable codes.

BDG.ROADWAY-CLASS - CHAR(1) - Roadway Classification

1	Undivided two-way road or street.
2	One-way road or street.
3	One roadway of a divided road or street.

4 Divided road or street.
5 Two-way road with center pier.
6 One lane, two-way.
blank No roadway is involved.

BDG.RTN-INSPEC-DATE - CHAR(8) - Routine Inspection Date

Date of inspection MM/DD/YYYY where:

MM = month = 01 - 12,
DD = day = 01 - 31,
YYYY = year = 0000 - 9999.

blanks Unknown.

BDG.RTN-INSPEC-DAY - CHAR(2) - Routine Inspection Day

This element is the third and fourth characters of the element:
BDG.INSPEC-DATE.

01 - 31 are allowable codes.

BDG.RTN-INSPEC-FREQ - CHAR(2) - Routine Inspection Frequency

This element indicates the number of months between
designated inspections of the structure.

01 - 12 are allowable codes.

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BDG.RTN-INSPEC-MONTH - CHAR(2) - Routine Inspection Month

This element is the first and second characters of the element:
BDG.INSPEC-DATE.

01 - 12 are allowable codes.

BDG.RTN-INSPEC-PROC - CHAR(2) - Routine Inspection Procedure

This element indicates the procedure/method of inspection
to be made to the structure.

?? - ?? are allowable codes.

No code scheme has been devised.

BDG.RTN-INSPEC-YEAR - CHAR(4) - Routine Inspection Year

This element is the last four characters of the element: BDG.INSPEC-DATE.

0000 - 9999 are allowable codes.

BDG.RUR-URB-FROM-CITY - NUM(1) - Rural or Urban

The TIS city table is accessed using BDG.CITY:

1 Rural - Non-municipal or less than 5,000.
2 Urban - 5,000 to 49,999.
3 Urban - 50,000 and up.

BDG.SCND-INT-ELEM - CHAR(3) - Second Interchange Element Code

This data element is generally blank but is available if one bridge is divided into two interchange element areas.

blanks	Not in an interchange or only one interchange element area applies.
100 - 999	Interchange element number.
ann	Interchange element number (a = A-Z, nn = 00-99).

BDG.SCND-KEY-FIELD - CHAR(20) - Second Bridge Key

The second bridge key is used to locate the bridge record by route system, route number, and reference point. It is blank unless the route number changes on the bridge. This data element name allows referencing all three of those data elements in a single name.

'0100000035000+00.000' - '2387009999999+99.999' Key field

BDG.SCND-LOW-END - CHAR(5) - Second Lower Bridge End

Distance in feet from the BDG.SCND-REF-POINT to the end of the structure toward lower-numbered reference posts:

blanks	Not applicable.
00000 - 99999	Distance in feet.

BDG.SCND-REF-POINT - CHAR(10) - Second Reference Point

blanks	No second bridge key present.
000+00.000 - 999+99.999	Reference point of bridge.

BDG.SCND-RTE-NUM - CHAR(8) - Second Route Number

Trunk: 00000nnn or 0000nnna where nnn = 001-999 and a = A-Z.
MSAS, MUN: ccccnnnn or cc00nnna where cccc = census number,
nnnn = 0001-9999, nnn = 001-999, a = A-Z.

Other: cc00nnnn or cc00nnna where cc = county number (01-87),
nnnn = 0001-9999, nnn = 000-999, a = A-Z.

Note: Route system 07 in county 87:
870000an where an = A1 - Z9.

Route system 07 in county 20:
200000an where an = A1 - Z9.

BDG.SCND-RTE-SYS - CHAR(2) - Second Route System

01	ISTH	Interstate trunk highway
02	USTH	U.S. trunk highway
03	MNTH	Minnesota trunk highway
04	CSAH	County state-aid highway
05	MSAS	Municipal state-aid street
07	CNTY	County road
08	TWNS	Township road
09	UTWN	Unorganized township road
10	MUN	City streets
11	NATP	National park road
12	NFD	National forest development road
13	IND	Indian reservation road
14	SFR	State forest road
15	SPRK	State park road
16	MIL	Military road
17	NATM	National monument road
18	NATW	National wildlife refuge road
19	FRNT	Frontage road
20	SGAM	State game preserve road
23	PRIV	Private jurisdiction road

BDG.SCND-UPP-END - CHAR(5) - Second Upper Bridge End

Distance in feet from the BDG.SCND-REF-POINT to the end of the
structure toward higher-numbered reference posts:

blanks	Not applicable.
00000 - 99999	Distance in feet.

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BDG.SCOUR-ANAL - CHAR(1) - Scour Analysis

Identifies current status of the structure regarding it's vulnerability to scour.

CODE	LITERAL	Description
blank		Unknown or unavailable
A	NON-WATERWAY	Bridge is not over a waterway.
B	CLOSED-SCOUR	Bridge is closed to traffic; field review indicates that failure of piers and/or abutments due to scour is imminent or has occurred.
C	CLOSED-NOT SCOUR	Bridge is closed to traffic for reasons other than scour.
D	OBS SCOUR-IMM PROT REQ	Bridge is scour critical; field review indicates that extensive scour has occurred at bridge foundations. Immediate action is required to provide scour countermeasures.
E	CULVERT	Culvert structure. Scour calculation, evaluation, and/or screening has not been made.
F	NO EVAL-FOUND KNOWN	Bridge structure. Scour calculation, evaluation, and/or screening has not been made. All substructure foundations are known.
G	NO EVAL-FOUND UNKNOWN	Scour calculation, evaluation, and/or screening has not been made. Bridge on unknown foundations.
H	FOUND ABOVE WATER	Bridge foundations (including piles) well above flood water elevations.
I	SCREEN-LOW RISK	Bridge screened, determined to be low risk for failure due to scour.
J	SCREEN-SCOUR SUSC	Bridge screened, determined to be scour susceptible.
K	SCREEN-LIMITED RISK	Bridge screened, determined to be of limited risk to public, monitor in lieu of evaluation and close if necessary.
L	STABLE-EVAL	Scour evaluation complete, bridge judged to be low risk for failure due to scour.

CODE	LITERAL	Description
M	STABLE-SCOUR ABOVE FTG	Bridge foundations determined to be stable for calculated scour conditions; calculated scour depth from the scour prediction equations is above top of footing.
N	STABLE-SCOUR IN FTG/PILE	Bridge foundations determined to be stable for calculated scour conditions; calculated scour depth from the scour prediction equations is within limits of footing or piles

(continued on next page)

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CODE	LITERAL	Description
O	STABLE-ACTION REQ	Bridge foundations determined to be stable for calculated scour conditions; Scour action plan requires additional action.
P	STABLE DUE TO PROT	Countermeasures have been installed to correct a previously existing problem with scour. Bridge is no longer scour critical. Scour countermeasures should be inspected at least once every 4 years and after major flows, or as recommended in the scour action plan. Report any changes that have occurred to countermeasures.
R	CRITICAL-MONITOR	Bridge has been evaluated to be scour critical. Scour action plan recommends monitoring the bridge during high flows and closing if necessary.
U	CRITICAL-PROT REQ	Bridge has been evaluated to be scour critical. Scour action plan recommends this bridge as a priority for installation of countermeasures. Until countermeasures are installed, monitor bridge during high flows and close if necessary.

BDG.SDWK-WID-LFT - CHAR(3) - Sidewalk Width Left

Width of the left sidewalk ON the structure:

blanks	No sidewalk on left side.
001 - 250	Width of sidewalk in feet to the nearest tenth; (0.1 - 25.0).

BDG.SDWK-WID-RGT - CHAR(3) - Sidewalk Width Right

Width of the right sidewalk ON the structure:

blanks No sidewalk on right side.
001 - 250 Width of sidewalk in feet to the nearest tenth;
(0.1 - 25.0).

BDG.SEC-TWN-RNG - CHAR(8) - Section Township and Range

sstttrrd Section township and range:

where ss, section = 01-36.
where ttt, township = 026-071 or 101-168.
where rrd, range = 01 -51 and d = E or W.

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BDG.SECTION - CHAR(2) - Section

First two characters of BDG.SEC-TWN-RNG:

01 - 36 Section

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BDG.STRUCT-APSL - CHAR(1) - Structure Condition Appraisal

Appraisal of major structure deficiency:

N	Not applicable.
9	Conditions superior to present desirable criteria.
8	Conditions equal to present desirable criteria.
7	Conditions better than present minimum criteria.
6	Conditions equal to present minimum criteria.
5	Conditions somewhat better than minimally adequate for tolerating being left in place as is.
4	Conditions minimally adequate for tolerating being left in place as is.
3	Conditions basically intolerable, requiring high priority of repair.
2	Conditions basically intolerable, requiring high priority of replacement.
1	Conditions require immediate repair to put bridge back in service.
0	Conditions require immediate replacement to put bridge back in service.
blank	Unknown.

BDG.STRUCT-LEN - CHAR(5) - Structure Length

The total back-to-back or abutment length of the structure along the centerline:

00060 - 85000 Structure length in feet to the nearest tenth of a foot (6.0 - 8500.0).

BDG.STRUCTURE-AREA - CHAR(6) - Structure Area

The area in square feet for a bridge (total length x deck width), or a culvert (total length x barrel length). This element applies only to flared structures.

000000 - 999999 Square feet.

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BDG.SUBST-COND - CHAR(1) - Substructure Condition

Condition of the piers, abutments, piles, footings, fenders, etc:

N Not applicable.
9 New condition.
8 Good condition - no repairs needed.
7 Generally good condition - potential exists for minor maintenance.
6 Fair condition - potential exists for major maintenance.
5 Generally fair condition - potential exists for minor rehabilitation.
4 Marginal condition - potential exists for major rehabilitation.

3 Poor condition - repair or rehabilitation required immediately.
2 Critical condition - need for repair or rehabilitation is urgent. Facility should be closed until the indicated repair is complete.
1 Critical condition - facility is closed. Study should determine the feasibility for repair.
0 Critical condition - facility is closed and beyond repair.
blank Unknown.

BDG.SUFF-RATG - CHAR(3) - Sufficiency Rating

blanks Unknown.
000 - 999 Sufficiency rating

BDG.SUPER-COND - CHAR(1) - Superstructure Condition

Condition of all structural members, bearing devices, and drainage system:

N Not applicable.
9 New condition.
8 Good condition - no repairs needed.
7 Generally good condition - potential exists for minor maintenance.
6 Fair condition - potential exists for major maintenance.
5 Generally fair condition - potential exists for minor rehabilitation.
4 Marginal condition - potential exists for major rehabilitation.
3 Poor condition - repair or rehabilitation required immediately.
2 Critical condition - need for repair or rehabilitation is urgent. Facility should be closed until the indicated repair is complete.
1 Critical condition - facility is closed. Study should determine the feasibility for repair.
0 Critical condition - facility is closed and beyond repair.
blank Unknown.

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BDG.TEMPORARY-STR - CHAR(1) - Temporary Structure

Indicates where temporary structures or conditions exist.

blank - Unknown.
1 - Structure, turnaround, or bypass are temporary.
2 - Superstructure and deck only are temporary.
3 - Repairs made to keep structure open are temporary.
4 - Bridge is shored up, and supports are temporary.
5 - A substructure unit has been added to maintain legal load capacity.
6 - The deck is underpinned.
7 - Traffic lanes have been barricaded to keep the structure open.

BDG.THK-WEAR-SURF - CHAR(4,2) - Wearing Surface Thickness

0.00 - 50.00 Wearing surface thickness in feet.

BDG.TIS-REF-POINT - CHAR(10) - TIS Reference Point

TIS-REF-POINT is the reference point that appears on printed reports. (An exception is the PAGE format report of the LIST-BRIDGE-BY-BRIDGE-NUMBER command which lists all the reference points stored in a record of the bridge file, i.e. the reference points from the FIRST, SECOND, and BDG keys.) The TIS-REF-POINT is selected using the following rule:

If BDG.BDG.RTE-SYS = BDG.FIRST.RTE-SYS and
BDG.BDG.RTE-NUM = BDG.FIRST.RTE-NUM then
BDG.TIS.REF-POINT = BDG.FIRST.REF-POINT else
BDG.TIS.REF-POINT = blank.

BDG.TOLL - CHAR(1) - Toll

1 Toll bridge - Toll paid to use the structure.
3 Free bridge - No toll for bridge or roadway.

note: the following is reserved for future needs.
2 Toll road

BDG.TOTL-IMP-COST - CHAR(5) - Total Improvement Cost

Indicates the total cost of the improvement project in thousands of dollars.

blanks No improvements proposed.
00001 - 99999 Cost of improvements in thousands of dollars.

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BDG.TOWNSHIP - CHAR(3) - Township

Middle three characters of BDG.SEC-TWN-RNG:

ttt = township = 026-071 or 101-168.

BDG.TOWNSHIP-NUM - CHAR(3) - Township Number

blanks	Not applicable.
001 - 156	Township number unique within county

BDG.TRAF-CNTL-SIGN - CHAR(1) - Traffic Control Signs

blank	Not applicable (no traffic on structure).
0	No traffic control signs.
1	Speed limit signs (xx m.p.h on bridge).
2	Lanes (trucks must not meet on bridge.
3	Combination.
4	No stopping on bridge.

BDG.TYPE-CANTL-BEARING - CHAR(1) - Type Cantilever Bearing

Type of connection of the structural members of the bridge:

F	Friction Bearing
P	Pinned
S	Suspended Hanger
R	Rocker
N	Not Applicable - No cantilever
blank	Unknown

BDG.TYPE-CONN - CHAR(1) - Type Connection

Type of connection of the structural members of the bridge:

blank	Not applicable
1	Pinned
2	Riveted
3	Welded
4	Bolted
5	Huck bolt

BDG.TYPE-MED-OVER - CHAR(1) - Type Median Over

blank	Structure does not carry a divided roadway.
1	Open Median (or depressed).
2	Closed Median (no barrier).
3	Closed Median w/non-mountable barriers.

1
+

BDG.TYPE-PAINT - CHAR(2) - Type of Paint

The first position describes the primer coat and the second position describes the finish coat:

First digit			Second digit	
If type 3309 Steel	Primer Coat	If type Non-3309 Steel	Finish Coat	
blank	Unknown	blank	blank	Unknown
A	Red lead	1	A	Red lead
B	Red lead Iron Oxide	2	B	White lead
C	Lead Silica Chromate Chromate	3	C	Lead silica
D	Organic Zinc Rich Oxide	4	D	Alkyd Iron
E	Inorganic Zinc Rich Iron	5	E	Phenolic Resin
	Unpainted 3309 Steel Aluminum	6	F	Phenolic Resin
Z	Other	0	G	Chlorinated Rubber Aluminum
			H	Vinyl
			I	Latex
			J	Enamel
			K	Unpainted 3309 Steel
			L	Other
			M	Urethane

BDG.TYPE-PAINT-FINISH - CHAR(1) - Type of Finish Paint

Second character of BDG.TYPE-OF-PAINT:

	Finish Coat
blank	Unknown
A	Red lead
B	White lead
C	Lead silica chromate
D	Alkyd iron oxide
E	Phenolic resin iron
F	Phenolic resin aluminum
G	Chlorinated rubber aluminum
H	Vinyl
I	Latex
J	Enamel
K	Unpainted 3309 Steel
L	Other

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BDG.TYPE-PAINT-PRIMER - CHAR(1) - Type of Primer Paint

First character of BDG.TYPE-OF-PAINT:

If type 3309 steel	Primer Coat	If type Non-3309 steel
blank	Unknown	blank
A	Red lead	1
B	Red lead iron oxide	2
C	Lead silica chromate	3
D	Organic zinc rich	4
E	Inorganic zinc rich	5
	Unpainted 3309 steel	6
Z	Other	0

BDG.TYPE-SVC - CHAR(2) - Type of Service

The first digit gives the type of service over the bridge. The second digit gives the type of service under the bridge.

xy Type of service:

x - Type of Service OVER		y - Type of Service UNDER	
1	Highway	1	Highway
2	Railroad	2	Railroad
3	Pedestrian only	3	Pedestrian only
4	Highway & railroad	4	Highway & railroad
5	Highway & pedestrian	5	Waterway
6	2nd level of interchange	6	Highway & waterway
7	3rd level of interchange	7	Railroad & waterway
8	4th level of interchange	8	Highway & railroad & waterway
9	Building or plaza	9	Relief
0	Other	0	Other

BDG.TYPE-SVC-OVER - CHAR(1) - Type of Service Over

First digit of BDG.TYPE-SVC:

	Type of Service OVER
1	Highway
2	Railroad
3	Pedestrian only
4	Highway & railroad
5	Highway & pedestrian
6	2nd level of interchange
7	3rd level of interchange
8	4th level of interchange
9	Building or plaza
0	Other

1
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BDG.TYPE-SVC-UNDER - CHAR(1) - Type of Service Under

Second digit of BDG.TYPE-SVC:

	Type of Service UNDER
1	Highway
2	Railroad
3	Pedestrian only
4	Highway & railroad
5	Waterway

6 Highway & waterway
7 Railroad & waterway
8 Highway & railroad & waterway
9 Relief
0 Other

BDG.TYPE-WORK-PROP - CHAR(2) - Proposed Type of Work

First two characters of BDG.WORK-PROPOSED:

blanks No work proposed.
aa Proposed type of work:

aa: 31 Replace bridge/structure because of condition.
32 Replace bridge/structure because of road relocation.
33 Widening of existing structure without deck rehabilitation; includes culvert lengthening.
34 Widening of existing structure with deck rehabilitation; includes culvert lengthening.
35 Bridge Rehabilitation because of general deterioration.
36 Deck Rehabilitation with only incidental widening.
37 Deck Replacement with only incidental widening.
38 Other structural work. Removal, etc.

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BDG.UND-CLR-APSL - CHAR(1) - Underclearance Appraisal

Appraisal of vertical and horizontal underclearances from the through roadway to the superstructure or substructure units.

N Not applicable.
9 Conditions superior to present desirable criteria.
8 Conditions equal to present desirable criteria.
7 Conditions better than present minimum criteria.
6 Conditions equal to present minimum criteria.
5 Conditions somewhat better than minimally adequate for tolerating being left in place as is.
4 Conditions minimally adequate for tolerating being left in place as is.
3 Conditions basically intolerable, requiring high priority of repair.
2 Conditions basically intolerable, requiring high priority of replacement.
1 Conditions require immediate repair to put bridge back in service.
0 Conditions require immediate replacement to put bridge back in service.
blank Unknown.

BDG.UND-INSPEC-DATE - CHAR(6) - Underwater Inspection Date

Allowable codes are MMYYYY where:
MM Month = 01 - 12
YYYY Year.
blanks Unknown.

BDG.UND-INSPEC-PROC - CHAR(1) - Underwater Inspection Procedure

Indicates what type of wterway inspections if any shall be made of the stream bed.

blank Unknown.
A No underwater inspection required.
B Underwater inspection required, diver will be used.
C Underwater inspection required, sonar or similar equipment used.
D Underwater inspection required, weighted lines used.
E Underwater inspection required, other devices used.
F Inspection required. Not done in last four years.
N Not applicable (non-waterway).

BDG.UNDER-CLR-REF-FEAT - CHAR(3) - Underclearance Reference Feature

Indicates the reference feature from which the vertical Underclearance measurement is taken.

blanks Unknown.
H Highway beneath structure.

R   Railroad beneath structure.
N   Not applicable.

BDG.UPP-APPR-PANEL-COND - CHAR(1) - Upper Approach Panel Condition

blank   Not applicable.
A - T   Code for upper approach panel condition.

BDG.UPP-APPR-PANEL-LEN - CHAR(2) - Upper Approach Panel Length

blanks   Not applicable.
01 - 99   Length of panel in feet.

BDG.UPP-APPR-PANEL-TYPE - CHAR(2) - Upper Approach Panel Type

NN   Not applicable.
ab   Code for approach panel type:

a = 0 - 3.
b = N or A - E.

BDG.USAGE - CHAR(1) - Usage

Indicates which bridge key was used to return this bridge record:

1 First bridge key
2 Second bridge key
S Supplemental bridge key

This field only has meaning with commands including the +ROUTES subcommand. If no +ROUTES was used, USAGE will be blank.

BDG.VERT-CNTL-SIGN - CHAR(1) - Vertical Control Signs

Indicates the presence of any signs warning of vertical restrictions:

N   Not applicable.
0   No vertical clearance restrictions
1   Yes - Roadway clearance restrictions.
2   Yes - Shoulder clearance restrictions (arch type).

BDG.VERT-CLR-OVER-RD1 - CHAR(3) - Vertical Clearance Over Deck Road-1

Minimum vertical clearance over any transverse position within
the edges of the driving surface of road-1.

blanks	No roadway or no vertical restrictions.
080 - 750	Vertical clearance over deck in feet to the nearest tenth of a foot (8.0 - 75.0).

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BDG.VERT-CLR-OVER-RD2 - CHAR(3) - Vertical Clearance Over Deck Road-2

Minimum vertical clearance over any transverse position within
the edges of the driving surface of road-2.

blanks	No divided roadway or no vertical restrictions.
080 - 750	Vertical clearance over deck in feet to the nearest tenth of a foot (8.0 - 75.0).

BDG.VERT-CLR-UNDER-RD1 - CHAR(3) - Vertical Underclearance Road-1

Minimum vertical underclearance for the first or only roadway
under the structure:

blanks	No roadways under structure.
074 - 600	Minimum vertical underclearance in feet to the nearest tenth of a foot (7.4 - 60.0).

BDG.VERT-CLR-UNDER-RD2 - CHAR(3) - Vertical Underclearance Road-2

Minimum vertical underclearance for the second roadway under the
structure:

blanks	No divided roadway under the structure.
074 - 600	Minimum vertical underclearance in feet to the nearest tenth of a foot (7.4 - 60.0).

BDG.WATER-APSL - CHAR(1) - Waterway Adequacy Appraisal

Appraisal of waterway adequacies and all erosion, condition of
slope protection, stream capacity, etc.

N	Not applicable.

9 Conditions superior to present desirable criteria.
8 Conditions equal to present desirable criteria.
7 Conditions better than present minimum criteria.
6 Conditions equal to present minimum criteria.
5 Conditions somewhat better than minimally adequate for tolerating being left in place as is.
4 Conditions minimally adequate for tolerating being left in place as is.
3 Conditions basically intolerable, requiring high priority of repair.
2 Conditions basically intolerable, requiring high priority of replacement.
1 Conditions require immediate repair to put bridge back in service.
0 Conditions require immediate replacement to put bridge back in service.
blank Unknown.

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BDG.WEAR-SURF - CHAR(1) - Wearing Surface

0 Non-vehicular traffic on bridge.
1 Concrete.
2 Asphalt.
3 Block.
4 Open grate.
5 Wood planking.
6 Asphalt with known membrane.
7 Gravel.

BDG.WID-RD1-OVER - CHAR(3) - Roadway Width Road-1 Over

Width of first or only roadway over the structure. If curbs are present, width is the face to face distance between the curbs. Otherwise, width is the outside edge of shoulder to outside edge of shoulder distance.

blanks No roadway on structure.
050 - 999 Roadway width in feet to the nearest tenth of a foot (5.0 - 99.9).

BDG.WID-RD1-UNDER - CHAR(3) - Roadway Width Road-1 Under

Width of first or only roadway under the structure. If curbs are present, width is the face to face distance between the curbs. Otherwise, width is the outside edge of shoulder to outside edge of shoulder distance.

blanks	No roadway under structure.
080 - 999	Roadway width in feet to the nearest tenth of a foot (8.0 - 99.9).

BDG.WID-RD2-OVER - CHAR(3) - Roadway Width Road-2 Over

Width of second roadway over the structure. If curbs are present, width is the face to face distance between the curbs. Otherwise, width is shoulder to shoulder distance.

blanks	No divided roadway on structure.
050 - 999	Roadway width in feet to the nearest tenth of a foot (5.0 - 99.9).

BDG.WID-RD2-UNDER - CHAR(3) - Roadway Width Road-2 Under

Width of second roadway under the structure. If curbs are present, width is the face to face distance between the curbs. Otherwise, width is shoulder to shoulder distance.

blanks	No divided roadway under the structure.
080 - 999	Roadway width in feet to the nearest tenth of a foot (8.0 - 99.9).

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BDG.WORK-PROP-ON - CHAR(1) - Proposed Work On

Third character of BDG.WORK-PROPOSED:

blank	No work proposed.
1	Improvement work to be done on a bridge.
2	Improvement work to be done on a box culvert.
3	Improvement work to be done on a arch culvert.

BDG.WORK-PROPOSED - CHAR(3) - Proposed Work

blanks	No work proposed.
aab	Proposed work:

aa: 31 Replace bridge/structure because of condition.

```
                32   Replace bridge/structure because of road relocation.
                33   Widen exisiting  bridge/structure without deck
                        rehabilitation; includes culvert lengthening.
                34   Widen existing bridge/structure with deck rehabilitation;
                        includes culvert lengthening.
                35   Rehabilitate bridge/structure because of general
                        deterioration.
                36   Rehabilitate deck with only incidental widening.
                37   Replace deck with only incidental widening.
                38   Other structural work.  Removal etc.

             b: 1    Improvement work needed on bridge.
                2    Improvement work needed on box culvert.
                3    Improvement work needed on arch culvert.

        BDG.YEAR-OPENED - CHAR(4) - Year Opened to Traffic

                blanks        Not open to traffic.
                0000          Opened in 1900 or earlier.
                0001 - 9999   Year opened to traffic.
                UC            Under Contract


        BDG.YEAR-REBARRED - CHAR(4) - Year Coated Rebars Installed

               blanks        No coated rebars or unknown.
               0000 - 9999   Year coated rebars installed.


        BDG.YR-ADT - CHAR(4) - Year of ADT

                blanks        Non-vehicular traffic over structure.
                0000 - 9999   Year of ADT.


        BDG.YR-BUILT - CHAR(4) - Year Built

                blanks    Unknown.
                1873 - Current year.



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        BDG.YR-CAP-RAT - CHAR(4) - Year of Capacity Rating

                blanks        Unknown or no rating calculated.
                0000 - 9999   Year of capacity rating.
                NA            Not applicable.
```

BDG.YR-IMP-EST - CHAR(4) - Year of Improvement Estimate

blanks	Unknown or not applicable.
0000 - 9999	Year of improvement estimate.

BDG.YR-PAINTED - CHAR(4) - Year Painted

blanks	Not applicable.
0000 - 9999	Year painted.

BDG.YR-REMOD - CHAR(4) - Year Remodeled

blanks	No major modification since construction.
1900 - Current year.	

BDG.YR-SCOUR-ANAL - CHAR(4) - Year of Scour Analysis

blanks	Unknown.
0000 - 9999	Year of analysis.

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BIK - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(2)	BIK.ROUTE-SYSTEM	X	
CHAR(8)	BIK.ROUTE-NUMBER	X	
CHAR(10)	BIK.START-REF-POINT	X	
CHAR(10)	BIK.END-REF-POINT	X	
CHAR(2)	BIK.REMARK-CODE	X	
NUM(2)	BIK.COUNTY	X	
CHAR(2)	BIK.RDC-FROM-CNTY		BIK.COUNTY
NUM(7)	BIK.POP-FROM-CNTY		BIK.COUNTY
NUM(4)	BIK.CITY	X	
NUM(7)	BIK.CITY-TOT-POP		BIK.CITY
NUM(4)	BIK.URB-AREA	X	
NUM(7)	BIK.URB-AREA-TOT-POP		BIK.URB-AREA
NUM(1)	BIK.URBAN-MUNIC-CODE	X	
NUM(1)	BIK.CONSTR-DIST	X	
CHAR(2)	BIK.MAINT-AREA	X	
NUM(4)	BIK.PTRL-STATION	X	
NUM(4)	BIK.CNTRL-SECTN	X	
NUM(2)	BIK.FUNCT-CLASS	X	
NUM(1)	BIK.CONTROL-OF-ACCESS	X	
NUM(2)	BIK.INTERSECT-CATEGORY	X	
CHAR(1)	BIK.DIVIDED-&-ONE-WAY	X	
NUM(1)	BIK.NUM-LANES-IM	X	
NUM(1)	BIK.NUM-LANES-DM	X	
CHAR(1)	BIK.TURN-LANES-IM	X	
CHAR(1)	BIK.TURN-LANES-DM	X	
NUM(1)	BIK.ADD-LANES-RD1	X	
NUM(1)	BIK.ADD-LANES-RD2	X	
CHAR(1)	BIK.CURBS-RD1	X	
CHAR(1)	BIK.CURBS-RD2	X	
NUM(1)	BIK.PARKING-RD1	X	
NUM(1)	BIK.PARKING-RD2	X	
CHAR(1)	BIK.SIDEWALKS	X	
CHAR(2)	BIK.SURF-TYPE-RD1	X	
CHAR(2)	BIK.SURF-TYPE-RD2	X	
CHAR(2)	BIK.SURF-WID-RD1	X	
CHAR(2)	BIK.SURF-WID-RD2	X	
CHAR(2)	BIK.SHOULD-WID-IM	X	
CHAR(2)	BIK.SHOULD-WID-DM	X	
CHAR(2)	BIK.SHOULD-TYPE-IM	X	
CHAR(2)	BIK.SHOULD-TYPE-DM	X	
NUM(3)	BIK.RIGHT-OF-WAY-WIDTH	X	
NUM(2)	BIK.DESIGN-SPEED	X	

DATE	BIK.EFFECTIVE-DATE	X
NUM(2)	BIK.LANE-WID-RD1	X
NUM(2)	BIK.LANE-WID-RD2	X

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Format	Name	Stored	Generated From
NUM(7)	BIK.SECTN-LENGTH	X	
CHAR(6)	BIK.ADT-SEASON	X	
CHAR(6)	BIK.ADT-ANNUAL	X	
CHAR(5)	BIK.HEAVY-ADT-ANNUAL	X	
NUM(3)	BIK.NUM-FAT-ACC	X	
NUM(3)	BIK.NUM-INJ-ACC	X	
NUM(3)	BIK.NUM-PROP-ACC	X	
NUM(3)	BIK.TOT-NUM-ACC	X	
NUM(3)	BIK.NUM-ACC-PER-MILE	X	
CHAR(4)	BIK.ACC-RATE	X	
CHAR(4)	BIK.SEV-RATE	X	
DATE	BIK.START-DATE	X	
DATE	BIK.END-DATE	X	
CHAR(3)	BIK.DESIGN-POINTS	X	
CHAR(2)	BIK.ACC-POINTS	X	
CHAR(2)	BIK.SEV-POINTS	X	
CHAR(3)	BIK.TOTAL-POINTS	X	

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BIK - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(2)	BIK.ACC-POINTS	X	
CHAR(4)	BIK.ACC-RATE	X	
NUM(1)	BIK.ADD-LANES-RD1	X	
NUM(1)	BIK.ADD-LANES-RD2	X	
CHAR(6)	BIK.ADT-ANNUAL	X	
CHAR(6)	BIK.ADT-SEASON	X	
NUM(4)	BIK.CITY	X	
NUM(7)	BIK.CITY-TOT-POP		BIK.CITY
NUM(4)	BIK.CNTRL-SECTN	X	
NUM(1)	BIK.CONSTR-DIST	X	
NUM(1)	BIK.CONTROL-OF-ACCESS	X	
NUM(2)	BIK.COUNTY	X	
CHAR(1)	BIK.CURBS-RD1	X	
CHAR(1)	BIK.CURBS-RD2	X	
CHAR(3)	BIK.DESIGN-POINTS	X	
NUM(2)	BIK.DESIGN-SPEED	X	
CHAR(1)	BIK.DIVIDED-&-ONE-WAY	X	
DATE	BIK.EFFECTIVE-DATE	X	
DATE	BIK.END-DATE	X	
CHAR(10)	BIK.END-REF-POINT	X	
NUM(2)	BIK.FUNCT-CLASS	X	
CHAR(5)	BIK.HEAVY-ADT-ANNUAL	X	
NUM(2)	BIK.INTERSECT-CATEGORY	X	
NUM(2)	BIK.LANE-WID-RD1	X	

NUM(2)	BIK.LANE-WID-RD2	X	
CHAR(2)	BIK.MAINT-AREA	X	
NUM(3)	BIK.NUM-ACC-PER-MILE	X	
NUM(3)	BIK.NUM-FAT-ACC	X	
NUM(3)	BIK.NUM-INJ-ACC	X	
NUM(1)	BIK.NUM-LANES-DM	X	
NUM(1)	BIK.NUM-LANES-IM	X	
NUM(3)	BIK.NUM-PROP-ACC	X	
NUM(1)	BIK.PARKING-RD1	X	
NUM(1)	BIK.PARKING-RD2	X	
NUM(7)	BIK.POP-FROM-CNTY		BIK.COUNTY
NUM(4)	BIK.PTRL-STATION	X	
CHAR(2)	BIK.RDC-FROM-CNTY		BIK.COUNTY
CHAR(2)	BIK.REMARK-CODE	X	
NUM(3)	BIK.RIGHT-OF-WAY-WIDTH	X	
CHAR(8)	BIK.ROUTE-NUMBER	X	
CHAR(2)	BIK.ROUTE-SYSTEM	X	
NUM(7)	BIK.SECTN-LENGTH	X	
CHAR(2)	BIK.SEV-POINTS	X	
CHAR(4)	BIK.SEV-RATE	X	
CHAR(2)	BIK.SHOULD-TYPE-DM	X	
CHAR(2)	BIK.SHOULD-TYPE-IM	X	
CHAR(2)	BIK.SHOULD-WID-DM	X	
CHAR(2)	BIK.SHOULD-WID-IM	X	

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Format	Name	Stored	Generated From
CHAR(1)	BIK.SIDEWALKS	X	
DATE	BIK.START-DATE	X	
CHAR(10)	BIK.START-REF-POINT	X	
CHAR(2)	BIK.SURF-TYPE-RD1	X	
CHAR(2)	BIK.SURF-TYPE-RD2	X	
CHAR(2)	BIK.SURF-WID-RD1	X	
CHAR(2)	BIK.SURF-WID-RD2	X	
NUM(3)	BIK.TOT-NUM-ACC	X	
CHAR(3)	BIK.TOTAL-POINTS	X	
CHAR(1)	BIK.TURN-LANES-DM	X	
CHAR(1)	BIK.TURN-LANES-IM	X	
NUM(4)	BIK.URB-AREA	X	
NUM(7)	BIK.URB-AREA-TOT-POP		BIK.URB-AREA
NUM(1)	BIK.URBAN-MUNIC-CODE	X	

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BIK - Descriptions of Data Elements
****

BIK.ACC-POINTS - CHAR(3) - Accident Points

Accident points:

' '	Not applicable (BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'NE', 'UN', 'CA', or NO-ACCIDENTS was specified)
'**'	Unable to compute

'00'-'30' Points assigned.

BIK.ACC-RATE - CHAR(4) - Accident Rate

'   ' Not applicable (BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'NE').
'****' Unable to compute (BIK.ADT-TIME-WEIGHT is '******')
'00.0'-'99.9' Accident rate

$$BIK.ACC\text{-}RATE = \frac{1{,}000{,}000 \times acc}{num\text{-}days \times time\text{-}adt \times sectn\text{-}len}$$

acc = BIK.TOT-NUM-ACC

num-days = Number of days (from BIK.START-DATE and BIK.END-DATE)

time-adt = BIK.ADT-TIME-WEIGHT

sectn-len = BIK.SECTN-LENGTH

BIK.ADD-LANES-RD1 - NUM(1) - Additional Lanes - Road-1

These fields indicate additional lanes on road-1.

0 Not applicable or no additional lanes
1 One or more climbing lanes on left side
2 One or more climbing lanes on right side
3 One or more climbing lanes on each side
4 Escape lane on left side
5 Acceleration lane on left side
6 Acceleration lane on right side
7 Acceleration lane on each side
8 Escape lane on right side
9 Other additional lanes

The code 0 is used for these values of BIK.DIVIDED-&-ONE-WAY:

BIK.ADD-LANES-RD1 ' ', 'X'

BIK.ADD-LANES-RD2 - NUM(1) - Additional Lanes - Road-2

These fields indicate additional lanes on road-2.

0	Not applicable or no additional lanes
1	One or more climbing lanes on left side
2	One or more climbing lanes on right side
3	One or more climbing lanes on each side
4	Escape lane on left side
5	Acceleration lane on left side
6	Acceleration lane on right side
7	Acceleration lane on each side
8	Escape lane on right side
9	Other additional lanes

The code 0 is used for these values of BIK.DIVIDED-&-ONE-WAY:

BIK.ADD-LANES-RD2 ' ', 'U', 'Z'

BIK.ADT-ANNUAL - CHAR(6) - ADT - Average Annual Daily Traffic

BIK.ADT-ANNUAL is the calculated ADT weighted over the entire year specified in END-DATE when the file was created.

' '	Not applicable (BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'NE').
'******'	Data not available
'000000'-'999999'	AADT

BIK.ADT-SEASON - CHAR(6) - ADT - Average Daily Traffic Between Start and End Dates

BIK.ADT-SEASON is the calculated ADT for the time period specified when the file was created.

BIK.ADT-SEASON is used in design points computations, and in computing accident and severity rates.

' '	Not applicable (BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'NE').
'******'	Data not available
'000000'-'999999'	ADT (for biking season)

BIK.CITY - NUM(4) - City Number

If BIK.REMARK-CODE is 'PV', 'UN', 'CA', 'NE':

0000	Non-municipal
0001-9998	Census number of municipality

If BIK.REMARK-CODE is 'CO', 'GP', 'EN':

0000	Not applicable

When selecting, either the number or the name may be specified:

```
BIK.CITY *EQ* 3425

BIK.CITY *EQ* 'ST-PAUL'
```

BIK.CITY-TOT-POP - NUM(7) - Population of City

Determined by accessing the TIS city table:

0000000	Non-municipal
0000001 - 9999999	Municipal - Population of City

BIK.CNTRL-SECTN - NUM(4) - Control Section

If BIK.REMARK-CODE is 'PV', 'UN', 'CA', 'NE':

0000	Non-trunk
ccnn	Interstate (nn = 80-88)
ccnn	U.S. or Minnesota trunk (nn = 01-68)

cc = county number

If BIK.REMARK-CODE is 'CO', 'GP', 'EN':

0000	Not applicable

BIK.CONSTR-DIST - NUM(1) - Construction District

If BIK.REMARK-CODE is 'PV', 'UN', 'CA', 'NE':

1-9 Construction district number (computed from county if

necessary)

If BIK.REMARK-CODE is 'CO', 'GP', 'EN':

0 Not applicable

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BIK.CONTROL-OF-ACCESS - NUM(1) - Control of Access

0 Not applicable (BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'NE')
1 No control of access
2 Partial control of access
3 Full control of access
4 Not a public road

BIK.COUNTY - NUM(2) - County Number

If BIK.REMARK-CODE is 'PV', 'UN', 'CA', 'NE':

01-87 County number

If BIK.REMARK-CODE is 'CO', 'GP', 'EN':

00 Not applicable

When selecting, either the number or the name may be specified:

BIK.COUNTY *EQ* 02

BIK.COUNTY *EQ* 'ANOKA'

BIK.CURBS-RD1 - CHAR(1) - Curbs - Road-1

These fields indicate the presence of curbs on road-1:

' '	Not applicable
'N'	No curbs
'L'	Curbs on left side
'R'	Curbs on right side
'B'	Curbs on both sides
'U'	Unknown

The code ' ' is used for these values of BIK.DIVIDED-&-ONE-WAY:

BIK.CURBS-RD1 ' ', 'X'

BIK.CURBS-RD2 - CHAR(1) - Curbs - Road-2

These fields indicate the presence of curbs on road-2:

' '	Not applicable
'N'	No curbs
'L'	Curbs on left side
'R'	Curbs on right side
'B'	Curbs on both sides
'U'	Unknown

The code ' ' is used for these values of BIK.DIVIDED-&-ONE-WAY:

BIK.CURBS-RD2 ' ', 'U', 'Z'

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BIK.DESIGN-POINTS - CHAR(3) - Design Points

Design points:

' '	Not applicable (BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'NE', 'UN', 'CA').
'***'	Unable to compute
'000' - '160'	Points assigned (for design points, maximum is '160')

If NO-ACCIDENTS was specified when the file was created, the design points field and total points field are identical. Otherwise, the total points field contains the sum of the other three fields (or '***' if one or more of the other fields contain asterisks).

BIK.DESIGN-SPEED - NUM(2) - Design Speed

00	Unknown or not applicable
01-99	Design speed in miles per hour

The code 00 is used for remark codes 'CO', 'GP', 'EN', 'NE'.

BIK.DIVIDED-&-ONE-WAY - CHAR(1) - Divided/One Way Code

```
                ' '          Not applicable (BIK.REMARK-CODE is 'CO', 'GP',
                              'EN','NE')
                'U'          Undivided 2-way
                'D'          Divided
                'O'          One-way couplet
                'X'          One-way towards decreasing reference posts
                'Z'          One-way towards increasing reference posts


        BIK.EFFECTIVE-DATE - DATE - Effective Date

             The effective date is the most recent date of a major roadway
             reconstruction.  00000000 is used when the effective date is
             unknown (as well as for remark codes 'CO', 'GP', 'EN', 'NE').  The
             date is stored as year-month-day (eg., 19780123 = Jan. 23, 1978).
             In select statements, use normal date specifications (eg.,
             BIK.EFFECTIVE-DATE *GE* 01/01/1978).  To select sections with
             00000000 stored, use BIK.EFFECTIVE-DATE *LT* 01/01/0001.


        BIK.END-DATE - DATE - Ending Date

             This field defines the time period specified for retrieving
             accident data.

             BIK.END-DATE is the more recent of (1) the END-DATE specified when
             the file was created, or (2) the effective date for the section.



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        BIK.END-REF-POINT - CHAR(10) - Reference Point at End of Section

             Each reference point is 'rrr+dd.ddd' where rrr is a reference post
             number and +dd.ddd is the distance in miles from the reference post
             to the end of the section.  Example:  027+00.356.


        BIK.FUNCT-CLASS - NUM(2) - Functional Classification

             If BIK.REMARK-CODE is 'PV', 'UN', 'CA', 'NE':

              01   Rural - Principal arterial - Interstate
              02   Rural - Principal arterial - Other
              06   Rural - Minor arterial
              07   Rural - Major collector
              08   Rural - Minor collector
              09   Rural - Local systems
```

11 Urban - Principal arterial - Interstate
12 Urban - Principal arterial - Other freeway - Expressway
14 Urban - Principal arterial - Other
16 Urban - Minor arterial
17 Urban - Collector
19 Urban - Local systems

If BIK.REMARK-CODE is 'CO', 'GP', 'EN':

00 Not applicable

BIK.HEAVY-ADT-ANNUAL - CHAR(5) - Heavy Commercial ADT (annual)

BIK.HEAVY-ADT-ANNUAL is the ADT of heavy commercial vehicles for the year specified in END-DATE when the file was created.

' '	Not applicable (BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'NE').
'*****'	Data not available
'00000'-'99999'	Heavy Commercial AADT

BIK.INTERSECT-CATEGORY - NUM(2) - Intersection Category

This field identifies the route system of the road that intersects the section at the beginning. The codes used are identical to the codes of BIK.ROUTE-SYSTEM (without the quotes) with these additions:

00	No intersection
21	Leg
22	Ramp

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BIK.LANE-WID-RD1 - NUM(2) - Lane Width - Road-1

00	Not applicable
08-99	Lane width in feet

(for route systems 01-07, minimum value is 10 instead of 08)

The code 00 is used for these values of BIK.DIVIDED-&-ONE-WAY:

BIK.LANE-WID-RD1 ' ','X'

BIK.LANE-WID-RD2 - NUM(2) - Lane Width - Road-2

00 Not applicable
08-99 Lane width in feet

(for route systems 01-07, minimum value is 10 instead of 08)

The code 00 is used for these values of BIK.DIVIDED-&-ONE-WAY:

BIK.LANE-WID-RD2 ' ','U','Z'

BIK.MAINT-AREA - CHAR(2) - Maintenance Area

If BIK.REMARK-CODE is 'PV', 'UN', 'CA', 'NE':

' ' Unknown (trunk) or not applicable (non-trunk)
'1A'-'9B' Maintenance area code

If BIK.REMARK-CODE is 'CO', 'GP', 'EN':

' ' Not applicable

BIK.NUM-ACC-PER-MILE - NUM(3) - Accidents per Mile

This field contains the number of accidents per mile in the section (BIK.TOT-NUM-ACC / BIK.SECTN-LENGTH). If either BIK.TOT-NUM-ACC or BIK.SECTN-LENGTH is zero, a zero is stored.

BIK.NUM-FAT-ACC - NUM(3) - Number of Fatal Accidents

This field contains the number of fatal accidents in the section(000-999). Records for which BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'or 'NE' always has 000 in this field.

In each field, 999 is stored if more than 999 accidents occurred.

The accidents counted are those that occurred during the time period specified when the file was created. Exception: for sections with an effective date more recent than the beginning of the time period specified, only those accidents that occurred on or after the effective date are included.

BIK.NUM-INJ-ACC - NUM(3) - Number of Injury Accidents

This field contains the number of injury accidents in the section(000-999). Records for which BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'or 'NE' always has 000 in this field.

In each field, 999 is stored if more than 999 accidents occurred.

The accidents counted are those that occurred during the time period specified when the file was created. Exception: for sections with an effective date more recent than the beginning of the time period specified, only those accidents that occurred on or after the effective date are included.

BIK.NUM-LANES-DM - NUM(1) - Number of Lanes - Decreasing Post Direction

0	Not applicable (BIK.DIVIDED-&-ONE-WAY is ' ', 'Z')
1-9	Number of lanes (BIK.DIVIDED-&-ONE-WAY is 'U', 'D', 'O', 'X')

This field is the number of driving lanes available to traffic traveling towards decreasing reference posts.

BIK.NUM-LANES-IM - NUM(1) - Number of Lanes - Increasing Post Direction

0	Not applicable (BIK.DIVIDED-&-ONE-WAY is ' ', 'X')
1-9	Number of lanes (BIK.DIVIDED-&-ONE-WAY is 'U', 'D', 'O', 'Z')

This field is the number of driving lanes available to traffic traveling towards increasing reference posts.

BIK.NUM-PROP-ACC - NUM(3) - Number of Property Damage Accidents

This field contains the number of property damage accidents in the section(000-999). Records for which BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'or 'NE' always has 000 in this field.

In each field, 999 is stored if more than 999 accidents occurred.

The accidents counted are those that occurred during the time period specified when the file was created. Exception: for sections with an effective date more recent than the beginning of the time period specified, only those accidents that occurred on or after the effective date are included.

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BIK.PARKING-RD1 - NUM(1) - Parking - Road-1

These fields indicate the presence of parking on road-1.

0	Not applicable or unknown	
1	Left-none	Right-none
2	Left-none	Right-parallel
3	Left-none	Right-diagonal
4	Left-parallel	Right-none
5	Left-parallel	Right-parallel
6	Left-parallel	Right-diagonal
7	Left-diagonal	Right-none
8	Left-diagonal	Right-parallel
9	Left-diagonal	Right-diagonal

The code 0 isused for these values of BIK.DIVIDED-&-ONE-WAY:

BIK.ADD-LANES-RD1 ' ', 'X'

BIK.PARKING-RD2 - NUM(1) - Parking - Road-2

These fields indicate the presence of parking on road-2.

0	Not applicable or unknown	
1	Left-none	Right-none
2	Left-none	Right-parallel
3	Left-none	Right-diagonal
4	Left-parallel	Right-none
5	Left-parallel	Right-parallel
6	Left-parallel	Right-diagonal
7	Left-diagonal	Right-none
8	Left-diagonal	Right-parallel
9	Left-diagonal	Right-diagonal

The code 0 isused for these values of BIK.DIVIDED-&-ONE-WAY:

BIK.ADD-LANES-RD2 ' ', 'U', 'Z'

BIK.POP-FROM-CNTY - NUM(7) - Population of County

The TIS county table is accessed using BIK.COUNTY:

0000001 - 9999999   Population of county.

BIK.PTRL-STATION - NUM(4) - Patrol Station

If BIK.REMARK-CODE is 'PV', 'UN', 'CA', 'NE':

0000   Not applicable
0001-9999   Patrol station number

If BIK.REMARK-CODE is 'CO', 'GP', 'EN':

0000   Not applicable

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BIK.RDC-FROM-CNTY - CHAR(2) - RDC from County

The TIS county table is accessed using BIK.COUNTY:

' 1' - '11'   Regional development commission as determined
from county number.

BIK.REMARK-CODE - CHAR(2) - Remark Code

'PV'   Paved section
'UN'   Unpaved section (no points are computed)
'CA'   Controlled-access section (no points are computed)
'NE'   Non-existent section (no points are computed)
'CO'   Coincident section (no points are computed)
'GP'   Gap in roadway (no points are computed)
'EN'   End of route record (no points are computed)

BIK.RIGHT-OF-WAY-WIDTH - NUM(3) - Right of Way Width

000   Unknown or not applicable
001-999   Right-of-way width in feet

The code 000 is used for remark codes 'CO', 'GP', 'EN', 'NE'.

BIK.ROUTE-NUMBER - CHAR(8) - Route Number

Trunk highways: '00000nnn' or '0000nnnx' where n is a digit and x
is an alphabetic. Eg., '00000035', '0000035E'.

Non-trunk numicipal (MSAS,MUN): 'ccccnnnx' where cccc is the city
number, n is a digit, and x is either a digit or
an alphabetic. Eg., '2585030A'.

Non-trunk non-municipal: 'cc00nnxx' where cc is the county number,
n is a digit, and x is either a digit or an alphabetic.
Eg., '87000048'.

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BIK.ROUTE-SYSTEM - CHAR(2) - Route System

Stored	Printed	Route System
'01'	ISTH	Interstate trunk highway
'02'	USTH	U.S. trunk highway
'03'	MNTH	Minnesota trunk highway
'04'	CSAH	County state-aid highway
'05'	MSAS	Municipal state-aid street
'07'	CNTY	County road
'08'	TWNS	Township road
'09'	UTWN	Unorganized township road
'10'	MUN	Municipal street
'11'	NATP	National park road
'12'	NFD	National forest development road
'13'	IND	Inidan reservation road
'14'	SFR	State forest road
'15'	SPRK	State park road
'16'	MIL	Military road
'17'	NATM	National monument road
'18'	NATW	National wildlife refuge road
'19'	FRNT	Frontage road
'20'	SGAM	State game preserve road

'23' PRIV Private jurisdiction road

BIK.SECTN-LENGTH - NUM(7) - Section Length

0000.000	Not applicable or unable to compute
0000.001-9999.999	Section length in miles

The code 0000.000 is used for these circumstances:

- Not applicable (BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'NE').

- Unable to compute due to insufficient data in the true mileage file (BIK.REMARK-CODE is 'PV', 'UN', 'CA').

BIK.SEV-POINTS - CHAR(3) - Severity Accident Points

Severity points:

' '	Not applicable (BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'NE', 'UN', 'CA', or NO-ACCIDENTS was specified)
'**'	Unable to compute
'00'-'10'	Points assigned.

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BIK.SEV-RATE - CHAR(4) - Severity Accident Rate

' '	Not applicable (BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'NE').
'****'	Unable to compute (BIK.ADT-TIME-WEIGHT is '******')
'00.0'-'99.9'	Severity rate

$$\text{BIK.SEV-RATE} = \frac{1{,}000{,}000 \times \text{sev}}{\text{num-days} \times \text{time-adt} \times \text{sectn-len}}$$

sev = (10 x BIK.NUM-FAT-ACC) + (4 x BIK.NUM-INJ-ACC) + BIK.NUM-PROP-ACC

num-days = Number of days (from BIK.START-DATE and BIK.END-DATE)

time-adt = BIK.ADT-TIME-WEIGHT

sectn-len = BIK.SECTN-LENGTH

BIK.SHOULD-TYPE-DM - CHAR(2) - Shoulder Type - Decreasing Direction

The codes used for this item is the same as for surface types with these additions:

'S ' Sod shoulder
'00' No shoulder

The code ' ' is used only for BIK.REMARK-CODE values of 'CO', 'GP', 'EN', 'NE'.

As with shoulder widths, four values are stored in the roadlog file. The two values stored are determined in the same manner as shoulder widths.

BIK.SHOULD-TYPE-IM - CHAR(2) - Shoulder Type - Increasing Direction

The codes used for this item is the same as for surface types with these additions:

'S ' Sod shoulder
'00' No shoulder

The code ' ' is used only for BIK.REMARK-CODE values of 'CO', 'GP', 'EN', 'NE'.

As with shoulder widths, four values are stored in the roadlog file. The two values stored are determined in the same manner as shoulder widths.

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BIK.SHOULD-WID-DM - CHAR(2) - Shoulder Width - Decreasing Direction

' ' Not applicable (BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'NE')

```
          'UN'  Unknown
          'VR'  Varies
          '00'  No shoulder
     '01'-'99'  Shoulder width in feet

     Four shoulder widths are stored in the roadlog file.  The value
     used depends on divided-&-one-way code:

        U,Z:  BIK.SHOULD-WID-DM = Left shoulder width road-1

        X:    BIK.SHOULD-WID-DM = Left shoulder width road-2

        D:    BIK.SHOULD-WID-DM = Right shoulder width road-2

        O:    On each roadway, the worst shoulder is determined
              (unpaved is worse than paved, and the smaller is
              worst if of the the same type).

                 BIK.SHOULD-WID-DM = Worst shoulder width road-2

BIK.SHOULD-WID-IM - CHAR(2) - Shoulder Width - Increasing Direction

          '  '  Not applicable (BIK.REMARK-CODE is 'CO', 'GP',
                 'EN', 'NE')
          'UN'  Unknown
          'VR'  Varies
          '00'  No shoulder
     '01'-'99'  Shoulder width in feet

     Four shoulder widths are stored in the roadlog file.  The value
     used depends on divided-&-one-way code:

        U,Z:  BIK.SHOULD-WID-IM = Right shoulder width road-1

        X:    BIK.SHOULD-WID-IM = Right shoulder width road-2

        D:    BIK.SHOULD-WID-IM = Right shoulder width road-1

        O:    On each roadway, the worst shoulder is determined
              (unpaved is worse than paved, and the smaller is
              worst if of the the same type).

                 BIK.SHOULD-WID-IM = Worst shoulder width road-1

BIK.SIDEWALKS - CHAR(1) - Sidewalks

     ' '          Not applicable (BIK.REMARK is 'CO', 'GP', 'EN', 'NE')
     'N'          No sidewalks on either/only roadway
     'L'          Sidewalks on left side of each/only roadway
     'R'          Sidewalks on right side of each/only roadway
     'B'          Sidewalks on both sides of each/only roadway
     'C'          Other combination (D/O) only)
```

'U' Unknown

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BIK.START-DATE - DATE - Starting Date

This field defines the time period specified for retrieving accident data.

BIK.START-DATE is the more recent of (1) the START-DATE specified when the file was created, or (2) the effective date for the section.

BIK.START-REF-POINT - CHAR(10) - Reference Point at Start of Section

Each reference point is 'rrr+dd.ddd' where rrr is a reference post number and +dd.ddd is the distance in miles from the reference post to the beginning of the section. Example: 027+00.356.

BIK.SURF-TYPE-RD1 - CHAR(2) - Surface Type - Road-1

' '	Not applicable
'A '	Primitive
'B '	Unimproved
'C '	Graded and drained
'D '	Soil-surfaced
'E '	Gravel or stone
'F '	Bituminous surface-traveled
'G '	Mixed bituminous - type unknown
'G1'	Mixed bituminous - low-type
'G2'	Mixed bituminous - high-type
'G3'	Mixed bituminous - resurfacing
'G4'	Mixed bituminous - new construction
'I '	Bituminous concrete
'I3'	Bituminous concrete - resurfacing
'I4'	Bituminous concrete - new construction
'J '	Portland cement concrete
'J3'	Portland cement concrete - resurfacing
'J4'	Portlane cement concrete - new construction
'K '	Brick
'L '	Block

The code ' ' is used for these values of BIK.DIVIDED-&-ONE-WAY:

BIK.SURF-WID-RD1 ' ', 'X'

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BIK.SURF-TYPE-RD2 - CHAR(2) - Surface Type - Road-2

' '	Not applicable
'A '	Primitive
'B '	Unimproved
'C '	Graded and drained
'D '	Soil-surfaced
'E '	Gravel or stone
'F '	Bituminous surface-traveled
'G '	Mixed bituminous - type unknown
'G1'	Mixed bituminous - low-type
'G2'	Mixed bituminous - high-type
'G3'	Mixed bituminous - resurfacing
'G4'	Mixed bituminous - new construction
'I '	Bituminous concrete
'I3'	Bituminous concrete - resurfacing
'I4'	Bituminous concrete - new construction
'J '	Portland cement concrete
'J3'	Portland cement concrete - resurfacing
'J4'	Portlane cement concrete - new construction
'K '	Brick
'L '	Block

The code ' ' is used for these values of BIK.DIVIDED-&-ONE-WAY:

BIK.SURF-WID-RD2 ' ', 'U', 'Z'

BIK.SURF-WID-RD1 - CHAR(2) - Surface Width - Road-1

' '	Not applicable
'UN'	Unknown
'VR'	Varies
'08'-'99'	Surface width in feet

The code ' ' is used for these values of BIK.DIVIDED-&-ONE-WAY:

BIK.SURF-WID-RD1 ' ', 'X'

BIK.SURF-WID-RD2 - CHAR(2) - Surface Width - Road-2

' '	Not applicable
'UN'	Unknown
'VR'	Varies
'08'-'99'	Surface width in feet

The code ' ' is used for these values of BIK.DIVIDED-&-ONE-WAY:

BIK.SURF-WID-RD2 ' ', 'U', 'Z'

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BIK.TOT-NUM-ACC - NUM(3) - Total Number of Accidents

This field contains the total number of accidents in the section(000-999). Records for which BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'or 'NE' always has 000 in this field.

In each field, 999 is stored if more than 999 accidents occurred.

The accidents counted are those that occurred during the time period specified when the file was created. Exception: for sections with an effective date more recent than the beginning of the time period specified, only those accidents that occurred on or after the effective date are included.

BIK.TOTAL-POINTS - CHAR(3) - Total Points

Total points:

' '	Not applicable (BIK.REMARK-CODE is 'CO', 'GP', 'EN', 'NE', 'UN', 'CA').
'***'	Unable to compute
'000' - '200'	Points assigned.

If NO-ACCIDENTS was specified when the file was created, the design points field and total points field are identical. Otherwise, the

total points field contains the sum of the other three fields (or '***' if one or more of the other fields contain asterisks).

BIK.TURN-LANES-DM - CHAR(1) - Number of Turning Lanes - Decreasing

' '	Not applicable (BIK.DIVIDED-&-ONE-WAY is ' ', 'Z').
'N'	No turning lanes
'L'	One or more turning lanes on left side
'R'	One or more turning lanes on right side
'B'	One or more turning lanes on each side

This field indicates turning lanes available to traffic traveling towards decreasing reference posts.

BIK.TURN-LANES-IM - CHAR(1) - Number of Turning Lanes - Increasing

' '	Not applicable (BIK.DIVIDED-&-ONE-WAY is ' ', 'X').
'N'	No turning lanes
'L'	One or more turning lanes on left side
'R'	One or more turning lanes on right side
'B'	One or more turning lanes on each side

This field indicates turning lanes available to traffic traveling towards increasing reference posts.

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BIK.URB-AREA - NUM(4) - Urban Area Number

If BIK.REMARK-CODE is 'PV'. 'UN', 'CA', 'NE':

0000	Rural
0001-9999	Urban area number

If BIK.REMARK-CODE is 'CO', 'GP', 'EN':

0000	Not applicable

Except for the Twin Cities Metropolitan Area, the urban area number is the same as that of the core city (eg., use the ST.Cloud census number for the urban area that surrounds St. Cloud). Use 9999 for the Twin Cities Metropolitan Area.

When selecting, either the number or the name may be specified:

BIK.URB-AREA *EQ* 3380

BIK.URB-AREA *EQ* 'ST-CLOUD'

BIK.URB-AREA-TOT-POP - NUM(7) - Population of Urban Area

Determined by accessing the TIS city table:

0000000	Not in urban area
0000001 - 9999999	Urban area population

BIK.URBAN-MUNIC-CODE - NUM(1) - Urban-Municipal Code

0 Not applicable (BIK.REMARK-CODE is 'CO', 'GP', 'EN')
1 Non-municipal - rural
2 Non-municipal - urban
3 Municipal - rural
4 Municipal - urban

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BNA - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(1)	BNA.RECORD-TYPE	X	

CHAR(2)	BNA.RECORD-NUMBER	X	
NUM(2)	BNA.COUNTY	X	
NUM(1)	BNA.DISTRICT-FROM-CNTY		BNA.COUNTY
CHAR(2)	BNA.RDC-FROM-CNTY		BNA.COUNTY
NUM(7)	BNA.POP-FROM-CNTY		BNA.COUNTY
NUM(4)	BNA.CITY	X	
NUM(7)	BNA.POP-FROM-CITY		BNA.CITY
NUM(1)	BNA.RUR-URB-FROM-CITY		BNA.CITY
NUM(1)	BNA.POP-GROUP-FROM-CITY		BNA.CITY
NUM(2)	BNA.CENSUS-YR-FROM-CITY		BNA.CITY
NUM(4)	BNA.URB-AREA	X	
CHAR(4)	BNA.PTRL-STATION	X	
CHAR(2)	BNA.PTRL-DIST		BNA.PTRL-STATION
NUM(1)	BNA.CONSTR-DIST	X	
CHAR(2)	BNA.MAINT-AREA	X	
CHAR(5)	BNA.CATEGORY	X	
CHAR(2)	BNA.LEN-USER-CAT	X	
CHAR(18)	BNA.USER-CATEGORY	X	
CHAR(1)	BNA.ACC-FILLED	X	
NUM(3)	BNA.TOT-NUM-ACC	X	
NUM(3)	BNA.NUM-FAT-ACC	X	
NUM(3)	BNA.NUM-A-ACC	X	
NUM(3)	BNA.NUM-B-ACC	X	
NUM(3)	BNA.NUM-C-ACC	X	
NUM(3)	BNA.NUM-INJ-ACC	X	
NUM(3)	BNA.NUM-PROP-ACC	X	
NUM(3,1)	BNA.ACC-RATE	X	
NUM(3,1)	BNA.SEV-RATE	X	
NUM(3)	BNA.NUM-WET-ACC	X	
NUM(3)	BNA.NUM-DRY-ACC	X	
NUM(4,1)	BNA.WET-DRY-PERCENT	X	
NUM(4,1)	BNA.WET-TOTAL-PERCENT	X	
NUM(5)	BNA.NUM-DAYS	X	
CHAR(1)	BNA.SIG-FILLED	X	
NUM(3,1)	BNA.AVG-ACC-RATE	X	
NUM(3,1)	BNA.LOWER-LIMIT	X	
NUM(3,1)	BNA.UPPER-LIMIT	X	
NUM(3,1)	BNA.AMT-OUT-OF-SIG	X	
NUM(3,1)	BNA.RATIO-OUT-OF-SIG	X	

Format	Name	Stored	Generated From
CHAR(6)	BNA.BRIDGE-NUMBER	X	
CHAR(1)	BNA.BRIDGE-MATCH	X	
CHAR(2)	BNA.ROUTE-SYSTEM	X	
CHAR(8)	BNA.ROUTE-NUMBER	X	
CHAR(10)	BNA.REF-POINT	X	
CHAR(3)	BNA.INT-ELEM	X	
CHAR(25)	BNA.DESCR-LOCN	X	
CHAR(25)	BNA.FEATURE-NAME	X	
CHAR(1)	BNA.FUNCT-USE	X	
CHAR(10)	BNA.START-REF-POINT	X	
CHAR(10)	BNA.END-REF-POINT	X	
NUM(2)	BNA.ADT	X	
DATE	BNA.EFFECTIVE-DATE	X	
NUM(2)	BNA.EFFECTIVE-YEAR		BNA.EFFECTIVE-DATE
NUM(2)	BNA.EFFECTIVE-MONTH		BNA.EFFECTIVE-DATE
NUM(2)	BNA.EFFECTIVE-DAY		BNA.EFFECTIVE-DATE

BNA - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(1)	BNA.ACC-FILLED	X	
NUM(3,1)	BNA.ACC-RATE	X	
NUM(2)	BNA.ADT	X	
NUM(3,1)	BNA.AMT-OUT-OF-SIG	X	
NUM(3,1)	BNA.AVG-ACC-RATE	X	
CHAR(1)	BNA.BRIDGE-MATCH	X	
CHAR(6)	BNA.BRIDGE-NUMBER	X	
CHAR(5)	BNA.CATEGORY	X	
NUM(2)	BNA.CENSUS-YR-FROM-CITY		BNA.CITY
NUM(4)	BNA.CITY	X	
NUM(1)	BNA.CONSTR-DIST	X	
NUM(2)	BNA.COUNTY	X	
CHAR(25)	BNA.DESCR-LOCN	X	
NUM(1)	BNA.DISTRICT-FROM-CNTY		BNA.COUNTY
DATE	BNA.EFFECTIVE-DATE	X	
NUM(2)	BNA.EFFECTIVE-DAY		BNA.EFFECTIVE-DATE
NUM(2)	BNA.EFFECTIVE-MONTH		BNA.EFFECTIVE-DATE
NUM(2)	BNA.EFFECTIVE-YEAR		BNA.EFFECTIVE-DATE
CHAR(10)	BNA.END-REF-POINT	X	
CHAR(25)	BNA.FEATURE-NAME	X	
CHAR(1)	BNA.FUNCT-USE	X	
CHAR(3)	BNA.INT-ELEM	X	
CHAR(2)	BNA.LEN-USER-CAT	X	
NUM(3,1)	BNA.LOWER-LIMIT	X	
CHAR(2)	BNA.MAINT-AREA	X	
NUM(3)	BNA.NUM-A-ACC	X	
NUM(3)	BNA.NUM-B-ACC	X	
NUM(3)	BNA.NUM-C-ACC	X	
NUM(5)	BNA.NUM-DAYS	X	
NUM(3)	BNA.NUM-DRY-ACC	X	
NUM(3)	BNA.NUM-FAT-ACC	X	
NUM(3)	BNA.NUM-INJ-ACC	X	
NUM(3)	BNA.NUM-PROP-ACC	X	

NUM(3)	BNA.NUM-WET-ACC	X	
NUM(7)	BNA.POP-FROM-CITY		BNA.CITY
NUM(7)	BNA.POP-FROM-CNTY		BNA.COUNTY
NUM(1)	BNA.POP-GROUP-FROM-CITY		BNA.CITY
CHAR(2)	BNA.PTRL-DIST		BNA.PTRL-STATION
CHAR(4)	BNA.PTRL-STATION	X	
NUM(3,1)	BNA.RATIO-OUT-OF-SIG	X	
CHAR(2)	BNA.RDC-FROM-CNTY		BNA.COUNTY

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Format	Name	Stored	Generated From
CHAR(2)	BNA.RECORD-NUMBER	X	
CHAR(1)	BNA.RECORD-TYPE	X	
CHAR(10)	BNA.REF-POINT	X	
CHAR(8)	BNA.ROUTE-NUMBER	X	
CHAR(2)	BNA.ROUTE-SYSTEM	X	
NUM(1)	BNA.RUR-URB-FROM-CITY		BNA.CITY
NUM(3,1)	BNA.SEV-RATE	X	
CHAR(1)	BNA.SIG-FILLED	X	
CHAR(10)	BNA.START-REF-POINT	X	
NUM(3)	BNA.TOT-NUM-ACC	X	
NUM(3,1)	BNA.UPPER-LIMIT	X	
NUM(4)	BNA.URB-AREA	X	
CHAR(18)	BNA.USER-CATEGORY	X	
NUM(4,1)	BNA.WET-DRY-PERCENT	X	
NUM(4,1)	BNA.WET-TOTAL-PERCENT	X	

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PAGE 1006

BNA - Description of data elements
****

BNA.ACC-FILLED - CHAR(1) - Accident Segment Presence Indicator

'Y' Yes -- Accident segment is present in record.
'N' No -- Accident segment is not present in record.

BNA.ACC-RATE - NUM(3,1) - Accident Rate

If BNA.ACC-FILLED = 'Y' then BNA.ACC-RATE contains accident rate
(0.0 - 99.9).
If BNA.ACC-FILLED = 'N' then BNA.ACC-RATE contains 0.0.

BNA.ADT - NUM(6) - Average Daily Traffic

Average number of vehicles per day on the bridge. BNA.ADT is not
necessarily taken directly from the traffic file or the bridge file.
Instead, it is determined in the following manner:

If BNA.FUNCT-USE is 1 (mainline) then do;

Use traffic file data for reference point of the bridge.
If BDG.ROADWAY-CLASS is 2 or 3, divide traffic file value
by 2.
end;

Else do; /* non-mainline bridge */

Use BDG.ADT.
end;

The possible range of values is 000000 - 200000 vehicles per day.

BNA.AMT-OUT-OF-SIG - NUM(3,1) - Amount Out of Significance

If BNA.SIG-FILLED = 'Y' then BNA.AMT-OUT-OF-SIG contains the amount out of significance.

Let Ri = accident rate at bridge.
Ui = upper significance limit.
Li = lower significance limit.
Ao = amount out of significance.

If Li <= Ri <= Ui, then Ao = 0.0.
If Ri > Ui, then Ao = Ri - Ui (0.1 to 99.9).
If Ri < Li, then Ao = Ri - Li (-99.9 to -0.1).

If BNA.SIG-FILLED = 'N' then BNA.AMT-OUT-OF-SIG contains 0.0.

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BNA.AVG-ACC-RATE - NUM(3,1) - Average Accident Rate

If BNA.SIG-FILLED = 'Y' then BNA.AVG-ACC-RATE contains Ra, the average accident rate used for computing significance limits.

If BNA.SIG-FILLED = 'N' then BNA.AVG-ACC-RATE contains 0.0.

BNA.BRIDGE-MATCH - CHAR(1) - Bridge Match

Distinguishes between multiple records stored for a single structure when the same structure services more than one road. A record is stored in the file for each different route involved.

blank Only one road is involved.

1 This record is for the principle road involved.
2 This record is for the second priority road involved.

. .
. .
. .

9 This record is for the ninth priority road involved.

BNA.BRIDGE-NUMBER - CHAR(6) - Bridge Number

Provides a unique identification for each bridge. Several different numbering systems are in use (see chapter 10 in the Data Coding Manual). Leading blanks and/or zeroes are significant (eg., bridges " 1001 " and "01001 " are different bridge numbers).

BNA.CATEGORY - CHAR(5) - Bridge Standard Category

'abcdd'

a = Bridge roadway classification (BDG.ROADWAY-CLASS)
b = Bridge functional use (BNA.FUNCT-USE)
c = Bridge wearing surface (BDG.WEAR-SURF)
dd = Number of traffic lanes (BDG.NUM-LANES)

BNA.CENSUS-YR-FROM-CITY - NUM(2) - Census Year from City

Census year determined by looking in the TIS city table for the city number stored in the bridge record:

00 Nonmunicipal or invalid city number.
01-99 Census year (19xx).

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BNA.CITY - NUM(4) - City Number

0000 Nonmunicipal.
0001 - 9998 City number.

Note: Cities may be identified by number (eg., BNA.CITY *EQ* 2585) or by name (eg., BNA.CITY *EQ* 'ST-PAUL').

BNA.CONSTR-DIST - NUM(1) - Construction District

0	Non-trunk roadway - district determined from county number.
1 - 9	Construction district.

BNA.COUNTY - NUM(2) - County Number

01 - 87	County number.

BNA.DESCR-LOCN - CHAR(25) - Descriptive Location

Narrative of the structure location.

BNA.DISTRICT-FROM-CNTY - NUM(1) - Construction District from County

1 - 9	Construction district determined from BNA.COUNTY and the TIS county table (can differ from BNA.CONSTR-DIST).

BNA.EFFECTIVE-DATE - DATE - Effective Date
BNA.EFFECTIVE-DAY - NUM(2) - Effective Day
BNA.EFFECTIVE-MONTH - NUM(2) - Effective Month
BNA.EFFECTIVE-YEAR - NUM(2) - Effective Year

00/00/00	Accidents have been geocoded since system start-up.
yy/mm/dd	Date from which accidents are geocoded.

BNA.EFFECTIVE-DAY refers to dd portion, always 01.
BNA.EFFECTIVE-MONTH refers to mm portion (00-12, 99).
BNA.EFFECTIVE-YEAR refers to yy portion (00-99).

The BNA.EFFECTIVE-DATE is determined from information contained in the bridge file record.

BNA.EFFECTIVE-YEAR contains the maximum value of: BDG.YR-OPENED, BDG.YR-BUILT, and BDG.YR-REMOD. If all three are blank, BNA.EFFECTIVE-YEAR contains 99.

If BDG.YR-OPENED is used for BNA.EFFECTIVE-YEAR and BDG.MO-OPENED is not blank, BNA.EFFECTIVE-MONTH receives the value of BDG.MO-OPENED. If BDG.MO-OPENED is blank, BNA.EFFECTIVE-MONTH contains 99. If BDG.YR-BUILD or BDG.YR-REMOD is used for BNA.EFFECTIVE-YEAR, BNA.EFFECTIVE-MONTH contains 01.

BNA.EFFECTIVE-DAY always contains 01.

BNA.END-REF-POINT - CHAR(10) - Ending Reference Point

'nnn+nn.nnn' nnn = Reference post
+nn.nnn = distance from reference post

Indicates reference point at upper bridge end plus accident scan (if accident scan was selected).

BNA.FEATURE-NAME - CHAR(25) - Name of Feature Crossed

Name of feature crossed.
Critical Facility: Indicated by * in the 25th column.

BNA.FUNCT-USE - CHAR(1) - Functional Use

1	Mainline
6	Business or farm entrance
7	Ramp or wye
8	Service and/or unclassified frontage road
9	Side road
0	Other

BNA.INT-ELEM - CHAR(3) - Interchange Element Code

blanks	Not in an interchange.
100 - 999	Interchange element code.
ann	Interchange element number (a = A-Z, nn = 00-99).

BNA.LEN-USER-CAT - NUM(2) - Length of User Category Field

If +CATEGORIES was not included when the file was created, this field contains 0.

If +CATEGORIES was included when the file was created, this field contains the total length of the data element(s) specified (1-18).

BNA.LOWER-LIMIT - NUM(2) - Lower Significance Limit

If BNA.SIG-FILLED = 'Y' then BNA.LOWER-LIMIT contains the lower significance limit (-99.9 - 99.9).

If BNA.SIG-FILLED = 'N' then BNA.LOWER-LIMIT contains 0.0.

BNA.MAINT-AREA - CHAR(2) - Maintenance Area

blanks	Unknown or non-trunk.
1A - 9B	Maintenance area.

BNA.NUM-A-ACC - NUM(3) - Number of A severity accidents.
BNA.NUM-B-ACC - NUM(3) - Number of B severity accidents.
BNA.NUM-C-ACC - NUM(3) - Number of C and U severity accidents.

These fields contain numbers of accidents occurring at the bridge. Only selected accidents are included. Each field ranges from 0-999.

When BNA.ACC-FILLED = 'N', each field contains 0.

BNA.NUM-DAYS - NUM(5) - Number of Days

1 - 99999 Number of SELECTED days between st-dat and en-dat.

st-dat is either START-DATE or the bridge's effective date, whichever is more recent.

days may be selected by "INCLUDE TIME IF:".

en-dat is END-DATE.

BNA.NUM-DRY-ACC - NUM(3) - Number of accidents occurring on dry surface.
BNA.NUM-FAT-ACC - NUM(3) - Number of fatal accidents (severity K).
BNA.NUM-INJ-ACC - NUM(3) - Number of injury accidents (severities A, B, C, and U).
BNA.NUM-PROP-ACC - NUM(3) - Number of property damage accidents (severity P).
BNA.NUM-WET-ACC - NUM(3) - Number of accidents occurring on wet surface.

These fields contain numbers of accidents at the bridge. Only selected accidents are included. Each field ranges from 0 - 999.

When BNA.ACC-FILLED = 'N', each field contains 0.

BNA.POP-FROM-CITY - NUM(7) - Population

The TIS city table is accessed using BNA.CITY:

0000000	Non-municipal.
0000001 - 9999999	Population of city.

BNA.POP-FROM-CNTY - NUM(7) - Population of County

The TIS county table is accessed using BNA.COUNTY:

0000001 - 9999999 Population of county.

BNA.POP-GROUP-FROM-CITY - NUM(1) - Population Group

The TIS city table is accessed using BNA.CITY:

1	Urban - 250,000 and over.	5	Urban - 10,000 to 24,999.
2	Urban - 100,000 to 249,999.	6	Urban - 5,000 to 9,999.
3	Urban - 50,000 to 99,999.	7	Rural - 2,500 to 4,999.
4	Urban - 25,000 to 49,999.	8	Rural - 1,000 to 2,499.

9 Rural - 1 to 999 or non-municipal.

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BNA.PTRL-DIST - CHAR(2) - Patrol District

blanks	Non-trunk or unknown.
00	Trunk - Not in patrol district.
21 - 45	Trunk - Patrol district.

BNA.PTRL-STATION - CHAR(4) - Patrol Station

blanks	Non-trunk or unknown.
0000	Trunk - Not in patrol station.
2110 - 4560	Trunk - Patrol station.

BNA.RATIO-OUT-OF-SIG - NUM(3,1) - Ratio Out of Significance

1.1 - 99.9	Above upper limit.
0.0 - 9.9	Ra <= Ri <= Ui.
-1.0 - 0.0	Li <= Ri <= Ra.
-99.9 - -1.1	Below lower limit.

Computed as:

$$\text{If } Ri \geq Ra \text{ then ratio} = \frac{Ri - Ra}{Ui - Ra}$$

$$\frac{Ri - Ra}{}$$

If Ri < Ra then ratio = -------
Ra - Li

When BNA.SIG-FILLED = 'N', BNA.RATIO-OUT-OF-SIG contains 0.0.

BNA.RDC-FROM-CNTY - CHAR(2) - RDC from County

The TIS county table is accessed using BNA.COUNTY:

' 1' - '11' Regional development commission as determined from county number.

BNA.RECORD-NUMBER - CHAR(2) - Record Number

For header records, this field distinguishes record types.

For non-header records, this field contains blanks.

BNA.RECORD-TYPE - CHAR(1) - Record Type

1 Command header (include +SORT).
2 +ROUTES header.
3 +CATEGORIES header.
4 +SELECT header.
9 Bridge record.

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BNA.REF-POINT - CHAR(10) - Reference Point

nnn+nn.nnn nnn = Reference post
+nn.nnn = Distance from reference post

BNA.ROUTE-NUMBER - CHAR(8) - Route Number

Trunk: 00000nnn or 0000nnna where nnn = 001-999 and a = A-Z.

MSAS,CMSA,MUN: ccccnnnn or cc00nnna where cccc = census number, nnnn = 0001-9999, nnn = 001-999, a = A-Z.

Other: cc00nnxx where cc = county number (01-87), nnxx = 0001-9999, or 00xx, xx = A1-Z9.

BNA.ROUTE-SYSTEM - CHAR(2) - Route System

01 ISTH - Interstate trunk highway
02 USTH - U.S. trunk highway
03 MNTH - Minnesota trunk highway
04 CSAH - County state-aid highway
05 MSAS - Municipal state-aid street
06 CMSA - County-municipal state-aid street
07 CNTY - County road
08 TWNS - Township road
09 UTWN - Unorganized township road
10 MUN - City streets
11 NATP - National park road
12 NFD - National forest development road
13 IND - Indian reservation road
14 SFR - State forest road
15 SPRK - State park road
16 MIL - Military road
17 NATM - National monument road
18 NATW - National wildlife refuge road
19 FRNT - Frontage road
20 SGAM - State game preserve road
23 PRIV - Private jurisdiction road

BNA.RUR-URB-FROM-CITY - NUM(1) - Rural or Urban

The TIS city table is accessed using BNA.CITY:

1 Rural - Non-municipal or less than 5,000.
2 Urban - 5,000 to 49,999.
3 Urban - 50,000 and up.

BNA.SEV-RATE - NUM(3,1) - Severity Rate

If BNA.ACC-FILLED = 'Y' then BNA.SEV-RATE contains severity rate (0.0 - 99.9).
If BNA.ACC-FILLED = 'N' then BNA.SEV-RATE CONTAINS 0.0.

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BNA.SIG-FILLED - CHAR(1) - Sig-limits Segment Presence Indicator

'Y' Yes - Sig-limits is present.
'N' No - Sig-limits is not present.

BNA.START-REF-POINT - CHAR(10) - Starting Reference Point

'nnn+nn.nnn' nnn = Reference post
              +nn.nnn = distance from reference post

Indicates reference point at lower bridge end plus accident scan (if accident scan selected).

BNA.TOT-NUM-ACC - NUM(3) - Total Number of Selected Accidents

0 - 999 Total number of selected accidents at bridge.

If BNA.ACC-FILLED = 'N', BNA.TOT-NUM-ACC contains 0.

BNA.UPPER-LIMIT - NUM(3,1) - Upper Significance Limit

If BNA.SIG-FILLED = 'Y' then BNA.UPPER-LIMIT contains the upper significance limit (-99.9 - 99.9).

If BNA.SIG_FILLED = 'N' then BNA.UPPER-LIMIT contains 0.0.

BNA.URB-AREA - NUM(4) - Urban Area

0000	Rural.
0001 - 9999	Urban area number.

BNA.USER-CATEGORY - CHAR(18) - User Category

If +CATEGORIES is used, this field contains the user category. Otherwise, this field contains blanks.

BNA.WET-DRY-PERCENT - NUM(4,1) - Wet:Wet+Dry Percent

If BNA.ACC-FILLED = 'Y' and BNA.NUM-WET-ACC (W) + BNA.NUM-DRY-ACC (D) is not zero, BNA.WET-DRY-PERCENT contains:

% = W / (D+W) x 100 (0.0 - 100.0)

Otherwise, BNA.WET-DRY-PERCENT contains 0.0.

BNA.WET-TOTAL-PERCENT - NUM(4,1) - Wet:Total Percent

If BNA.ACC-FILLED = 'Y' and BNA.TOT-NUM-ACC (T) is not zero,
BNA.WET-TOTAL-PERCENT contains:

% = W / T x 100   (0.0 - 100.0)

Otherwise, BNA.WET-TOTAL-PERCENT contains 0.0.

CIT - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(4)	CIT.CITY-NUMBER	X	
CHAR(2)	CIT.COUNTY-NUMBER	X	
CHAR(25)	CIT.CITY-NAMEX		
NUM(7)	CIT.CITY-TOT-POP	X	
NUM(7)	CIT.POP-THIS-CNTY	X	
CHAR(2)	CIT.YEAR-OF-CENSUS	X	
NUM(3)	CIT.URBAN-NUMBER	X	
CHAR(1)	CIT.CONSTR-DIST	X	

CIT - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(25)	CIT.CITY-NAME	X	
CHAR(4)	CIT.CITY-NUMBER	X	
NUM(7)	CIT.CITY-TOT-POP	X	
CHAR(1)	CIT.CONSTR-DIST	X	
CHAR(2)	CIT.COUNTY-NUMBER	X	
NUM(7)	CIT.POP-THIS-CNTY	X	
NUM(3)	CIT.URBAN-NUMBER	X	
CHAR(2)	CIT.YEAR-OF-CENSUS	X	

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PAGE 1016

CIT - Descriptions of Data Elements
****

CIT.CITY-NAME - CHAR(25) - City Name

Name of city or urban area.

CIT.CITY-NUMBER - CHAR(4) - City Number

'0000' - '9999' City census number.

CIT.CITY-TOT-POP - NUM(7) - Total Population

0000000 - 9999999 Total population of the city.

CIT.CONSTR-DIST - CHAR(1) - Construction District

'1' - '9' Construction district number.

CIT.COUNTY-NUMBER - CHAR(2) - County Number

'01' - '87' County number.

CIT.POP-THIS-CNTY - NUM(7) - Population in This County

0000000 - 9999999 Partial population in this county.

CIT.URBAN-NUMBER - NUM(3) - Urban Area Number

000 - 999 Urban area number.

CIT.YEAR-OF-CENSUS - CHAR(2) - Year of Census

'00' - '99' Year census was taken - 19nn

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CRD - Listing of Names in File Order
****

Format	Name
NUM(7,3)	CRD.LENGTH
CHAR(2)	CRD.ROUTE-SYSTEM
CHAR(8)	CRD.ROUTE-NUMBER
CHAR(10)	CRD.BEG-REF-POINT
CHAR(3)	CRD.BEG-REF-POST
CHAR(7)	CRD.BEG-DIST-FROM-POST
CHAR(1)	CRD.ROAD-ID
CHAR(10)	CRD.END-REF-POINT
CHAR(3)	CRD.END-REF-POST
CHAR(7)	CRD.END-DIST-FROM-POST
NUM(1)	CRD.CONSTR-DIST
CHAR(51)	CRD.START-DESCRIPTION
CHAR(51)	CRD.END-DESCRIPTION

CRD - Listing of Names in Alphabetical Order
****

Format	Name
CHAR(7)	CRD.BEG-DIST-FROM-POST
CHAR(10)	CRD.BEG-REF-POINT
CHAR(3)	CRD.BEG-REF-POST
NUM(1)	CRD.CONSTR-DIST
CHAR(51)	CRD.END-DESCRIPTION
CHAR(7)	CRD.END-DIST-FROM-POST
CHAR(10)	CRD.END-REF-POINT

```
        CHAR(3)    CRD.END-REF-POST
        NUM(7,3)   CRD.LENGTH
        CHAR(1)    CRD.ROAD-ID
        CHAR(8)    CRD.ROUTE-NUMBER
        CHAR(2)    CRD.ROUTE-SYSTEM
        CHAR(51)   CRD.START-DESCRIPTION
```



```
        CRD - Descriptions of Data Elements
        ***********************************


        CRD.BEG-DIST-FROM-POST - CHAR(7) - Beginning Distance from Reference
                                           Post

             '+nn.nnn'  Distance from reference post portion of beginning
                        reference point.


        CRD.BEG-REF-POINT - CHAR(10) - Beginning Reference Point

             'ppp+nn.nnn'  Beginning reference point of segment. ppp is the
                           reference post number and +nn.nnn is the distance
                           from the post in miles.


        CRD.BEG-REF-POST - CHAR(3) - Beginning Reference Post

             'ppp'  Post number of beginning reference point.


        CRD.CONSTR-DIST - NUM(1) - Construction District Number
```

1-9 Construction district.

CRD.END-DESCRIPTION - CHAR(51) - End Verbal Description

Verbal description at the end of the segment, usually coded for "D" segments only, describing why the "D" segment exists, or the section of roadway from here to the next "D" segment.

'xxxx....' 51-character end verbal description.

CRD.END-DIST-FROM-POST - CHAR(7) - Ending Distance from Reference Post

'+nn.nnn' Distance from reference post portion of ending reference point.

CRD.END-REF-POINT - CHAR(10) - Ending Reference Point

'ppp+nn.nnn' Ending reference point of segment. ppp is the reference post number and +nn.nnn is the distance from the post in miles.

CRD.END-REF-POST - CHAR(3) - Ending Reference Post

'ppp' Post number of ending reference point.

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CRD.ROAD-ID - CHAR(1) - Roadway ID

Each segment in the condition rating file applies to a single roadway. For divided highways, there is a separate segment for each direction of travel:

'U' Undivided roadway
'I' Divided roadway - traffic travels in INcreasing milepost direction.
'D' Divided roadway - traffic travels in DEcreasing milepost direction.

NOTE: Divided roadway segments do not necessarily have the same beginning and ending reference points on each roadway.

CRD.ROUTE-NUMBER - CHAR(8) - Route Number

'0000nnnx' Route number, "n" is 0-9 and "x" is 0-9 or A-Z.

Examples: '00000494', '0000035E'.

CRD.ROUTE-SYSTEM - CHAR(2) - Route System

'01' Interstate
'02' U.S. trunk highway
'03' Minnesota trunk highway

CRD.START-DESCRIPTION - CHAR(51) - Start Verbal Description

Verbal description at the start of the segment, usually coded for "D" segments only, describing why the "D" segment exists, or the section of roadway from here to the next "D" segment.

'xxxx....' 51-character start verbal description.

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CRG - Listing of Names in File Order
****

Format	Name
CHAR(4)	CRG.YEAR
CHAR(1)	CRG.SURF-TYPE

```
NUM(2,1)   CRG.RQI-RD
NUM(2,1)   CRG.SR-RD
NUM(2,1)   CRG.CR-RD
NUM(2,1)   CRG.PQI-RD
NUM(2,1)   CRG.RQI-1
NUM(2,1)   CRG.SR-1
NUM(2,1)   CRG.CR-1
NUM(2,1)   CRG.PQI-1
NUM(2,1)   CRG.SR-2
NUM(2,1)   CRG.RQI-2
NUM(2,1)   CRG.CR-2
NUM(2,1)   CRG.PQI-2
```

CRG - Listing of Names in Alphabetical Order

Format	Name
NUM(2,1)	CRG.CR-1
NUM(2,1)	CRG.CR-2
NUM(2,1)	CRG.CR-RD
NUM(2,1)	CRG.PQI-1
NUM(2,1)	CRG.PQI-2
NUM(2,1)	CRG.PQI-RD
NUM(2,1)	CRG.RQI-1
NUM(2,1)	CRG.RQI-2
NUM(2,1)	CRG.RQI-RD
NUM(2,1)	CRG.SR-1
NUM(2,1)	CRG.SR-2
NUM(2,1)	CRG.SR-RD
CHAR(1)	CRG.SURF-TYPE
CHAR(4)	CRG.YEAR

CRG - Descriptions of Data Elements

The CRG data elements represent all the ratings for a particular year and a particular roadway (see CRD.ROAD-ID). Each CRD record may have 0-25 CRG segments.

The year (CRG.YEAR) and surface type (CRG.SURF-TYPE) apply to both lanes of the roadway i.e., both lanes must be coded as the same surface type, and both lanes must be sampled in the same year.

All other CRG data elements occur 3 times: once for each lane and once for the roadway as a whole. The suffix of the data element name indicates which place the data applies to:

```
...-RD  the entire roadway
...-1   the first lane
...-2   the second lane
```

The CRD.ROAD-ID data element can be used to exactly locate the data element as follows:

if CRD.ROAD-ID is "U" (undivided roadway), then

- -1 is the outside lane carrying traffic in the increasing milepost direction.
- -2 is the outside lane carrying traffic in the decreasing milepost direction.
- -RD is the average of the two lanes.

if CRD.ROAD-ID is "I" (divided roadway, increasing milepost direction of travel), then

- -1 is the outside lane of the roadway
- -2 is the inside lane of the roadway
- -RD is the same as -1 (the outside lane)

if CRD.ROAD-ID is "D" (divided roadway, decreasing milepost direction of travel), then

- -1 is the outside lane of the roadway
- -2 is the inside lane of the roadway
- -RD is the same as -1 (the outside lane)

CRG.CR-1 - NUM(2,1) - Condition Rating - First Lane

The condition rating (CR) for the first lane (use CRD.ROAD-ID to determine exact lane. CR is computed as (RQI+SR)/2.

0.0 Data not present.
0.1 - 4.5 Condition rating for this lane.

CRG.CR-2 - NUM(2,1) - Condition Rating - Second Lane

The condition rating (CR) for the second lane (use CRD.ROAD-ID to determine exact lane. CR is computed as (RQI+SR)/2.

0.0 Data not present.
0.1 - 4.5 Condition rating for this lane.

CRG.CR-RD - NUM(2,1) - Condition Rating - Roadway

The condition rating (CR) for the roadway (use CRD.ROAD-ID to determine exact road. CR is computed as (RQI+SR)/2.

0.0 Data not present.
0.1 - 4.5 Condition rating for the roadway.

'050' - '400' Inches per mile.

CRG.PQI-1 - NUM(2,1) - Pavement Quality Index, First Lane

The pavement quality index for the first lane (use CRD.ROAD-ID to determine exact lane).

0.1 - 5.0 Pavement Quality Index (5.0 is perfect).

CRG.PQI-2 - NUM(2,1) - Pavement Quality Index, Second Lane

The pavement quality index for the second lane (use CRD.ROAD-ID to determine exact lane).

0.1 - 5.0 Pavement Quality Index (5.0 is perfect).

CRG.PQI-RD - NUM(2,1) - Pavement Quality Index, Roadway

The pavement quality index for the roadway (use CRD.ROAD-ID to determine exact road).

0.1 - 5.0 Pavement Quality Index (5.0 is perfect).

CRG.RQI-1 - NUM(2,1) - Ride Rating, First Lane

The ride rating for the first lane (use CRD.ROAD-ID to determine exact lane).

0.1 - 5.0 RQI rating (5.0 is perfect).

CRG.RQI-2 - NUM(2,1) - Ride Rating, Second Lane

The ride rating for the second lane (use CRD.ROAD-ID to determine exact lane).

0.1 - 5.0 RQI rating (5.0 is perfect).

CRG.RQI-RD - NUM(2,1) - Ride Rating, Roadway

The ride rating for the roadway (use CRD.ROAD-ID to determine exact road).

0.1 - 5.0 RQI rating (5.0 is perfect).

CRG.SR-1 - NUM(2,1) - Surface Rating, First Lane

The surface rating for the first lane (use CRD.ROAD-ID to

determine exact lane).

0.1 - 4.0 SR rating (4.0 is perfect).

CRG.SR-2 - NUM(2,1) - Surface Rating, Second Lane

The surface rating for the second lane (use CRD.ROAD-ID to determine exact lane).

0.1 - 4.0 SR rating (4.0 is perfect).

CRG.SR-RD - NUM(2,1) - Surface Rating, Roadway

The surface rating for the roadway (use CRD.ROAD-ID to determine exact road).

0.1 - 4.0 SR rating (4.0 is perfect).

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CRG.SURF-TYPE - CHAR(1) - Surface Type

The type of surface for this year and this roadway (use CRD.ROAD-ID to determine exact road).

'X' Unratable (gravel).
'B' Bituminous.
'C' Jointed concrete.
'N' Continuous reinforced concrete.
'O' Bituminous overlaid concrete.

CRG.YEAR - CHAR(4) - Year of Sample Data

The year the data was taken in this roadway.

'1967' - 'nnnn' Year of data (nnnn is latest year on file).

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CRR - Listing of Names in File Order
****

Format	Name
CHAR(2)	CRR.ROUTE-SYSTEM
CHAR(8)	CRR.ROUTE-NUMBER
CHAR(10)	CRR.BEG-REF-POINT
CHAR(3)	CRR.BEG-REF-POST
CHAR(7)	CRR.BEG-DIST-FROM-POST
CHAR(1)	CRR.ROAD-ID
CHAR(10)	CRR.END-REF-POINT
CHAR(3)	CRR.END-REF-POST
CHAR(7)	CRR.END-DIST-FROM-POST
NUM(1)	CRR.CONSTR-DIST
CHAR(1)	CRR.RECORD-TYPE
CHAR(2)	CRR.DISTRICT-CATEGORY
CHAR(2)	CRR.CENT-OFF-CATEGORY
CHAR(51)	CRR.DESCRIPTION

DATE	CRR.DATE-OF-UPDATE
NUM(4)	CRR.YEAR-OF-UPDATE
NUM(2)	CRR.MONTH-OF-UPDATE
NUM(2)	CRR.DAY-OF-UPDATE
CHAR(2)	CRR.LAST-UPDATE-CODE
CHAR(4)	CRR.LAST-YR-UPDATED
NUM(2)	CRR.YRS-SPANNED
NUM(2)	CRR.YRS-ON-RECORD

CRR - Listing of Names in Alphabetical Order
****

Format	Name
CHAR(7)	CRR.BEG-DIST-FROM-POST
CHAR(10)	CRR.BEG-REF-POINT
CHAR(3)	CRR.BEG-REF-POST
CHAR(2)	CRR.CENT-OFF-CATEGORY
NUM(1)	CRR.CONSTR-DIST
DATE	CRR.DATE-OF-UPDATE
NUM(2)	CRR.DAY-OF-UPDATE
CHAR(51)	CRR.DESCRIPTION
CHAR(2)	CRR.DISTRICT-CATEGORY
CHAR(7)	CRR.END-DIST-FROM-POST
CHAR(10)	CRR.END-REF-POINT
CHAR(3)	CRR.END-REF-POST
CHAR(2)	CRR.LAST-UPDATE-CODE
CHAR(4)	CRR.LAST-YR-UPDATED
NUM(2)	CRR.MONTH-OF-UPDATE
CHAR(1)	CRR.RECORD-TYPE
CHAR(1)	CRR.ROAD-ID
CHAR(8)	CRR.ROUTE-NUMBER
CHAR(2)	CRR.ROUTE-SYSTEM
NUM(4)	CRR.YEAR-OF-UPDATE
NUM(2)	CRR.YRS-ON-RECORD
NUM(2)	CRR.YRS-SPANNED

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CRR - Descriptions of Data Elements
****

CRR.BEG-DIST-FROM-POST - CHAR(7) - Beginning Distance from Reference Post

'+nn.nnn' Distance from reference post portion of beginning
reference point.

CRR.BEG-REF-POINT - CHAR(10) - Beginning Reference Point

'ppp+nn.nnn' Beginning reference point of record. ppp is the
reference post number and +nn.nnn is the distance
from the post in miles.

CRR.BEG-REF-POST - CHAR(3) - Beginning Reference Post

'ppp' Post number of beginning reference point.

CRR.CENT-OFF-CATEGORY - CHAR(2) - Central Office Category

Free-format data element to be used by central office. Can be used
for additional information about the record, or to group records as
desired.

' ' No category assigned.
'xx' Assigned category (any characters are valid).

CRR.CONSTR-DIST - NUM(1) - Construction District Number

1-9 Construction district.

CRR.DATE-OF-UPDATE - DATE - Date Record was Updated

mm/dd/yy Date of most recent update to any portion of the record.
(mm=month, dd=day, yy=year).

CRR.DAY-OF-UPDATE - NUM(2) - Day of Update

01-31 Day portion of date of update field.

CRR.DESCRIPTION - CHAR(51) - Verbal Description

Verbal description of the segment, usually coded for "D" records
only, describing why the "D" record exists, or the section of
roadway from here to the next "D" record.

'xxxx....' 51-character verbal description.

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CRR.DISTRICT-CATEGORY - CHAR(2) - District Category

Free-format data element to be used by the district. Can be used for additional information about the record, or to group records as desired.

' '	No category assigned.
'xx'	Assigned category (any characters are valid).

CRR.END-DIST-FROM-POST - CHAR(7) - Ending Distance from Reference Post

'+nn.nnn'	Distance from reference post portion of ending reference point.

CRR.END-REF-POINT - CHAR(10) - Ending Reference Point

'ppp+nn.nnn'	Ending reference point of record. ppp is the reference post number and +nn.nnn is the distance from the post in miles.

CRR.END-REF-POST - CHAR(3) - Ending Reference Post

'ppp'	Post number of ending reference point.

CRR.LAST-UPDATE-CODE - CHAR(2) - Last Update Code

The update code of the last successful transaction that updated this record. Useful to those maintaining the file.

'IR'	Record inserted.	'IS'	Sample inserted.
'RR'	Record revised.	'RS'	Sample revised.
'DR'	Record deleted.	'DS'	Sample deleted.
'ol'	Online update.		

CRR.LAST-YR-UPDATED - CHAR(4) - Last Year Updated

The year of the sample updated in the last transaction for this record. Useful to those maintaining the file.

' '	Last transaction applied to record as a whole.
'nnnn'	Year of data affected by last update.

CRR.MONTH-OF-UPDATE - NUM(2) - Month of Update

01-12	Month portion of date of update field.

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CRR.RECORD-TYPE - CHAR(1) - Record Type

Record type indicates why the record exists.

'D' Design break record. The record indicates a change in the design of the roadway (such as surface type or number of lanes, etc.).

'M' Mileage record. Data is required in the file at 1-mile intervals.

CRR.ROAD-ID - CHAR(1) - Roadway ID

Each record in the condition rating file applies to a single roadway. For divided highways, there is a separate record for each direction of travel:

'U' Undivided roadway
'I' Divided roadway - traffic travels in INcreasing milepost direction.
'D' Divided roadway - traffic travels in DEcreasing milepost direction.

NOTE: Divided roadway records do not necessarily have the same beginning and ending reference points on each roadway.

CRR.ROUTE-NUMBER - CHAR(8) - Route Number

'0000nnnx' Route number, "n" is 0-9 and "x" is 0-9 or A-Z.

Examples: '00000494', '0000035E'.

CRR.ROUTE-SYSTEM - CHAR(2) - Route System

'01' Interstate
'02' U.S. trunk highway
'03' Minnesota trunk highway

CRR.YEAR-OF-UPDATE - NUM(4) - Year of Update

1984-cccc Year from date of update field (cccc=current year).

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CRR.YRS-ON-RECORD - NUM(2) - Years of Data on Record

The number of generations of sample data. Data may be present for any years from 1967 to the present.

00 - 25 Up to 25 generations of data.

CRR.YRS-SPANNED - NUM(2) - Number of Years Spanned in this Record

The number of years between the earliest year of data and the most recent on this record.

00 - nn Number of years spanned, as of 1988, the maximum may be 22 (1988 - 1967).

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CRS - Listing of Names in File Order
****

Format	Name
NUM(2,1)	CRS.SR
NUM(2,1)	CRS.RQI
NUM(2,1)	CRS.CR
NUM(2,1)	CRS.PQI
CHAR(4)	CRS.IRI-LEFT
CHAR(4)	CRS.IRI-RIGHT
NUM(3)	CRS.BIT:SLT-TRN
NUM(3)	CRS.BIT:MED-TRN
NUM(3)	CRS.BIT:SEV-TRN
NUM(3)	CRS.BIT:SLT-LNG
NUM(3)	CRS.BIT:MED-LNG
NUM(3)	CRS.BIT:SEV-LNG
NUM(3)	CRS.BIT:SLT-LNG-JNT
NUM(3)	CRS.BIT:MED-LNG-JNT
NUM(3)	CRS.BIT:SEV-LNG-JNT
NUM(3)	CRS.BIT:MUL
NUM(3)	CRS.BIT:ALL
NUM(3)	CRS.BIT:RUT
NUM(3)	CRS.BIT:RVL
NUM(3)	CRS.BIT:PAT
NUM(3)	CRS.BIT:AVG-RUT-LEFT
NUM(3)	CRS.BIT:AVG-RUT-RIGHT

Format	Name
NUM(3)	CRS.BIT:SAW-SEAL
NUM(3)	CRS.BOC:SLT-TRN
NUM(3)	CRS.BOC:MED-TRN
NUM(3)	CRS.BOC:SEV-TRN
NUM(3)	CRS.BOC:SLT-LNG
NUM(3)	CRS.BOC:MED-LNG
NUM(3)	CRS.BOC:SEV-LNG
NUM(3)	CRS.BOC:SLT-LNG-JNT
NUM(3)	CRS.BOC:MED-LNG-JNT
NUM(3)	CRS.BOC:SEV-LNG-JNT
NUM(3)	CRS.BOC:MUL
NUM(3)	CRS.BOC:ALL
NUM(3)	CRS.BOC:RUT
NUM(3)	CRS.BOC:RVL
NUM(3)	CRS.BOC:PAT
NUM(3)	CRS.BOC:AVG-RUT-LEFT
NUM(3)	CRS.BOC:AVG-RUT-RIGHT
NUM(3)	CRS.BOC:SAW-SEAL

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Format	Name
NUM(3)	CRS.CONC:TOT-JNT
NUM(3)	CRS.CONC:SLT-SPA-TRN
NUM(3)	CRS.CONC:SEV-SPA-TRN
NUM(3)	CRS.CONC:FLT-JNT
NUM(3)	CRS.CONC:TOT-PNL
NUM(3)	CRS.CONC:CRK-PNL
NUM(3)	CRS.CONC:BRK-PNL
NUM(3)	CRS.CONC:FLT-PNL
NUM(3)	CRS.CONC:100-OVR
NUM(3)	CRS.CONC:5SF-PAT
NUM(3)	CRS.CONC:D-CRK
NUM(3)	CRS.CONC:SLT-SPA-LNG
NUM(3)	CRS.CONC:SEV-SPA-LNG
NUM(3)	CRS.CRCP:PAT

Format	Name
NUM(3)	CRS.CRCP:LCL
NUM(3)	CRS.CRCP:D-CRK
NUM(3)	CRS.CRCP:TRN

CRS - Listing of Names in Alphabetical Order
****

Format	Name
NUM(3)	CRS.BIT:ALL
NUM(3)	CRS.BIT:AVG-RUT-LEFT
NUM(3)	CRS.BIT:AVG-RUT-RIGHT
NUM(3)	CRS.BIT:MED-LNG
NUM(3)	CRS.BIT:MED-LNG-JNT
NUM(3)	CRS.BIT:MED-TRN
NUM(3)	CRS.BIT:MUL
NUM(3)	CRS.BIT:PAT
NUM(3)	CRS.BIT:RUT
NUM(3)	CRS.BIT:RVL
NUM(3)	CRS.BIT:SAW-SEAL
NUM(3)	CRS.BIT:SEV-LNG
NUM(3)	CRS.BIT:SEV-LNG-JNT
NUM(3)	CRS.BIT:SEV-TRN
NUM(3)	CRS.BIT:SLT-LNG
NUM(3)	CRS.BIT:SLT-LNG-JNT
NUM(3)	CRS.BIT:SLT-TRN

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Format	Name
NUM(3)	CRS.BOC:ALL
NUM(3)	CRS.BOC:AVG-RUT-LEFT
NUM(3)	CRS.BOC:AVG-RUT-RIGHT
NUM(3)	CRS.BOC:MED-LNG

NUM(3)	CRS.BOC:MED-LNG-JNT
NUM(3)	CRS.BOC:MED-TRN
NUM(3)	CRS.BOC:MUL
NUM(3)	CRS.BOC:PAT
NUM(3)	CRS.BOC:RUT
NUM(3)	CRS.BOC:RVL
NUM(3)	CRS.BOC:SAW-SEAL
NUM(3)	CRS.BOC:SEV-LNG
NUM(3)	CRS.BOC:SEV-LNG-JNT
NUM(3)	CRS.BOC:SEV-TRN
NUM(3)	CRS.BOC:SLT-LNG
NUM(3)	CRS.BOC:SLT-LNG-JNT
NUM(3)	CRS.BOC:SLT-TRN
NUM(3)	CRS.CONC:100-OVR
NUM(3)	CRS.CONC:5SF-PAT
NUM(3)	CRS.CONC:BRK-PNL
NUM(3)	CRS.CONC:CRK-PNL
NUM(3)	CRS.CONC:D-CRK
NUM(3)	CRS.CONC:FLT-JNT
NUM(3)	CRS.CONC:FLT-PNL
NUM(3)	CRS.CONC:SEV-SPA-LNG
NUM(3)	CRS.CONC:SLT-SPA-LNG
NUM(3)	CRS.CONC:SEV-SPA-TRN
NUM(3)	CRS.CONC:SLT-SPA-TRN
NUM(3)	CRS.CONC:TOT-JNT
NUM(3)	CRS.CONC:TOT-PNL
NUM(2,1)	CRS.CR
NUM(3)	CRS.CRCP:D-CRK
NUM(3)	CRS.CRCP:LCL
NUM(3)	CRS.CRCP:PAT
NUM(3)	CRS.CRCP:TRN
CHAR(4)	CRS.IRI-LEFT
CHAR(4)	CRS.IRI-RIGHT
NUM(2,1)	CRS.PQI
NUM(2,1)	CRS.RQI
NUM(2,1)	CRS.SR

CRS - Descriptions of Data Elements
****

The CRS data elements represent the sample data for a single lane.

The following data element names are only valid if CRY.SURF-TYPE-RD
is 'B' (bituminous).

CRS.BIT:ALL - Bituminous - Alligator Cracking

CRS.BIT:MED-LNG - Bituminous - Medium Longitudinal Cracking

CRS.BIT:MED-LNG-JNT - Bituminous - Medium Longitudinal Joint Cracking

CRS.BIT:MED-TRN - Bituminous - Medium Transverse Cracking

CRS.BIT:MUL - Bituminous - Multiple Cracking

CRS.BIT:PAT - Bituminous - Patching

CRS.BIT:RUT - Bituminous - Rutting

CRS.BIT:RVL - Bituminous - Ravelling and Weathering

CRS.BIT:SEV-LNG - Bituminous - Severe Longitudinal Cracking

CRS.BIT:SEV-LNG-JNT - Bituminous - Severe Longitudinal Joint Cracking

CRS.BIT:SEV-TRN - Bituminous - Severe Transverse Cracking

CRS.BIT:SLT-LNG - Bituminous - Slight Longitudinal Cracking

CRS.BIT:SLT-LNG-JNT - Bituminous - Slight Longitudinal Joint Cracking

CRS.BIT:SLT-TRN - Bituminous - Slight Transverse Cracking

NUM(3) - The percentage of defects of the particular type:

000 No defects.
001 - 100 (%) Percentage of this type of defect.

CRS.BIT:SAW-SEAL - Bituminous - Saw and seal:

000 = no
111 = yes

CRS.BIT:AVG-RUT-LEFT - Bituminous - Average Rutting Left Wheelpath

000 - 999 in hundredths of inches

CRS.BIT:AVG-RUT-RIGHT - Bituminous - Average Rutting Right Wheelpath

000 - 999 in hundredths of inches

The following data element names are only valid if CRY.SURF-TYPE-RD is 'O' (bituminous overlay).

CRS.BOC:ALL - Bit Overlay - Alligator Cracking

CRS.BOC:MED-LNG - Bit Overlay - Medium Longitudinal Cracking

CRS.BOC:MED-LNG-JNT - Bit Overlay - Medium Longitudinal Joint Cracking

CRS.BOC:MED-TRN - Bit Overlay - Medium Transverse Cracking

CRS.BOC:MUL - Bit Overlay - Multiple Cracking

CRS.BOC:PAT - Bit Overlay - Patching

CRS.BOC:RUT - Bit Overlay - Rutting

CRS.BOC:RVL - Bit Overlay - Ravelling and Weathering

CRS.BOC:SEV-LNG - Bit Overlay - Severe Longitudinal Cracking

CRS.BOC:SEV-TRN - Bit Overlay - Severe Transverse Cracking

CRS.BOC:SEV-LNG-JNT - Bit Overlay - Severe Longitudinal Joint Cracking

CRS.BOC:SLT-LNG - Bit Overlay - Slight Longitudinal Cracking

CRS.BOC:SLT-LNG-JNT - Bit Overlay - Slight Longitudinal Joint Cracking

CRS.BOC:SLT-TRN - Bit Overlay - Slight Transverse Cracking

NUM(3) - The percentage of defects of the particular type:

000 No defects.
001 - 100 (%) Percentage of this type of defect.

CRS.BOC:SAW-SEAL - Bit Overlay - Saw and seal:

000 = no
111 = yes

CRS.BOC:AVG-RUT-LEFT - Bit Overlay - Average Rutting Left Wheelpath

000 - 999 in hundredths of inches

CRS.BOC:AVG-RUT-RIGHT - Bit Overlay - Average Rutting Right Wheelpath

000 - 999 in hundredths of inches

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The following data element names are only valid if CRY.SURF-TYPE-RD is 'C' (concrete).

CRS.CONC:BRK-PNL - Concrete - Broken Panels

CRS.CONC:CRK-PNL - Concrete - Cracked Panels

CRS.CONC:D-CRK - Concrete - D-Cracked Panels

CRS.CONC:FLT-JNT - Concrete - Faulted Joints

CRS.CONC:FLT-PNL - Concrete - Faulted Panels

CRS.CONC:SEV-SPA-LNG - Concrete - Severe Spalled Longitudinal Joints

CRS.CONC:SLT-SPA-LNG - Concrete - Slight Spalled Longitudinal Joints

CRS.CONC:SEV-SPA-TRN - Concrete - Severe Spalled Transverse Joints

CRS.CONC:SLT-SPA-TRN - Concrete - Slight Spalled Transverse Joints

CRS.CONC:TOT-JNT - Concrete - Total Joints

CRS.CONC:TOT-PNL - Concrete - Total Panels

CRS.CONC:100-OVR - Concrete - 100% Overlaid Panels

CRS.CONC:5SF-PAT - Concrete - Over 5 Sq. ft Patched Panels

NUM(3) - The percentage of defects of the particular type:

000 No defects.

001 - 100 (%) Percentage of this type of defect.

CRS.CR - NUM(2,1) - Condition Rating

The condition rating (CR) for the lane. CR is computed as (RQI+SR)/2.

0.0 Data not present.
0.1 - 4.5 Condition rating for this lane.

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The following data element names are only valid if CRY.SURF-TYPE-RD is 'N' (CRCP).

CRS.CRCP:D-CRK - CRCP - D-Cracking

CRS.CRCP:LCL - CRCP - Localized Distress

CRS.CRCP:PAT - CRCP - Patch Deterioration

CRS.CRCP:TRN - CRCP - Transverse Cracking

NUM(3) - The percentage of defects of the particular type:

000 No defects.
001 - 100 (%) Percentage of this type of defect.

CRS.IRI-LEFT - CHAR(4) - International Roughness Index

The international roughness index for the left wheelpath.

'0150' - '2540' inches per mile (15 - 254).

CRS.IRI-RIGHT - CHAR(4) - International Roughness Index

The international roughness index for the right wheelpath.

'0150' - '2540' inches per mile (15 - 254).

CRS.PQI - NUM(2,1) - Pavement Quality Index, Lane

The pavement quality index for the lane.

0.1 - 5.0 Pavement Quality Index (5.0 is perfect).

CRS.RQI - NUM(2,1) - Ride Rating

The ride rating for the lane.

0.1 - 5.0 RQI rating (5.0 is perfect).

CRS.SR - NUM(2,1) - Surface Rating

The surface rating for the lane.

0.1 - 4.0 SR rating (4.0 is perfect).

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CRY - Listing of Names in File Order

****

Format	Name
CHAR(4)	CRY.YEAR-RD
CHAR(1)	CRY.SURF-TYPE-RD
NUM(2,1)	CRY.SR-RD
NUM(2,1)	CRY.RQI-RD
NUM(2,1)	CRY.CR-RD
NUM(2,1)	CRY.PQI-RD
CHAR(4)	CRY.IRI-RD
NUM(2,1)	CRY.SR-1
NUM(2,1)	CRY.RQI-1
NUM(2,1)	CRY.CR-1

NUM(2,1)	CRY.PQI-1
CHAR(4)	CRY.IRI-LEFT-1
CHAR(4)	CRY.IRI-RIGHT-1
NUM(3)	CRY.BIT:SLT-TRN-1
NUM(3)	CRY.BIT:MED-TRN-1
NUM(3)	CRY.BIT:SEV-TRN-1
NUM(3)	CRY.BIT:SLT-LNG-1
NUM(3)	CRY.BIT:MED-LNG-1
NUM(3)	CRY.BIT:SEV-LNG-1
NUM(3)	CRY.BIT:SLT-LNG-JNT-1
NUM(3)	CRY.BIT:MED-LNG-JNT-1
NUM(3)	CRY.BIT:SEV-LNG-JNT-1
NUM(3)	CRY.BIT:MUL-1
NUM(3)	CRY.BIT:ALL-1
NUM(3)	CRY.BIT:RUT-1
NUM(3)	CRY.BIT:RVL-1
NUM(3)	CRY.BIT:PAT-1
NUM(3)	CRY.BIT:AVG-RUT-LEFT-1
NUM(3)	CRY.BIT:AVG-RUT-RIGHT-1
NUM(3)	CRY.BIT:SAW-SEAL-1
NUM(3)	CRY.BOC:SLT-TRN-1
NUM(3)	CRY.BOC:MED-TRN-1
NUM(3)	CRY.BOC:SEV-TRN-1
NUM(3)	CRY.BOC:SLT-LNG-1
NUM(3)	CRY.BOC:MED-LNG-1
NUM(3)	CRY.BOC:SEV-LNG-1
NUM(3)	CRY.BOC:SLT-LNG-JNT-1
NUM(3)	CRY.BOC:MED-LNG-JNT-1
NUM(3)	CRY.BOC:SEV-LNG-JNT-1
NUM(3)	CRY.BOC:MUL-1
NUM(3)	CRY.BOC:ALL-1
NUM(3)	CRY.BOC:RUT-1
NUM(3)	CRY.BOC:RVL-1
NUM(3)	CRY.BOC:PAT-1
NUM(3)	CRY.BOC:AVG-RUT-LEFT-1
NUM(3)	CRY.BOC:AVG-RUT-RIGHT-1
NUM(3)	CRY.BOC:SAW-SEAL-1

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Format	Name
NUM(3)	CRY.CONC:TOT-JNT-1
NUM(3)	CRY.CONC:SLT-SPA-TRN-1

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NUM(3)     CRY.CONC:SEV-SPA-TRN-1
NUM(3)     CRY.CONC:FLT-JNT-1
NUM(3)     CRY.CONC:TOT-PNL-1
NUM(3)     CRY.CONC:CRK-PNL-1
NUM(3)     CRY.CONC:BRK-PNL-1
NUM(3)     CRY.CONC:FLT-PNL-1
NUM(3)     CRY.CONC:100-OVR-1
NUM(3)     CRY.CONC:5SF-PAT-1
NUM(3)     CRY.CONC:D-CRK-1
NUM(3)     CRY.CONC:SLT-SPA-LNG-1
NUM(3)     CRY.CONC:SEV-SPA-LNG-1
NUM(3)     CRY.CRCP:PAT-1
NUM(3)     CRY.CRCP:LCL-1
NUM(3)     CRY.CRCP:D-CRK-1
NUM(3)     CRY.CRCP:TRN-1
NUM(2,1)   CRY.SR-2
NUM(2,1)   CRY.RQI-2
NUM(2,1)   CRY.CR-2
NUM(2,1)   CRY.PQI-2
CHAR(4)    CRY.IRI-2
NUM(3)     CRY.BIT:SLT-TRN-2
NUM(3)     CRY.BIT:MED-TRN-2
NUM(3)     CRY.BIT:SEV-TRN-2
NUM(3)     CRY.BIT:SLT-LNG-2
NUM(3)     CRY.BIT:MED-LNG-2
NUM(3)     CRY.BIT:SEV-LNG-2
NUM(3)     CRY.BIT:SLT-LNG-JNT-2
NUM(3)     CRY.BIT:MED-LNG-JNT-2
NUM(3)     CRY.BIT:SEV-LNG-JNT-2
NUM(3)     CRY.BIT:MUL-2
NUM(3)     CRY.BIT:ALL-2
NUM(3)     CRY.BIT:RUT-2
NUM(3)     CRY.BIT:RVL-2
NUM(3)     CRY.BIT:PAT-2
NUM(3)     CRY.BIT:AVG-RUT-LEFT-2
NUM(3)     CRY.BIT:AVG-RUT-RIGHT-2
NUM(3)     CRY.BIT:SAW-SEAL-2
NUM(3)     CRY.BOC:SLT-TRN-2
NUM(3)     CRY.BOC:MED-TRN-2
NUM(3)     CRY.BOC:SEV-TRN-2
NUM(3)     CRY.BOC:SLT-LNG-2
NUM(3)     CRY.BOC:MED-LNG-2
NUM(3)     CRY.BOC:SEV-LNG-2
NUM(3)     CRY.BOC:SLT-LNG-JNT-2
NUM(3)     CRY.BOC:MED-LNG-JNT-2
NUM(3)     CRY.BOC:SEV-LNG-JNT-2
NUM(3)     CRY.BOC:MUL-2
NUM(3)     CRY.BOC:ALL-2
NUM(3)     CRY.BOC:RUT-2
```

Format	Name
NUM(3)	CRY.BOC:RVL-2
NUM(3)	CRY.BOC:PAT-2
NUM(3)	CRY.BOC:AVG-RUT-LEFT-2
NUM(3)	CRY.BOC:AVG-RUT-RIGHT-2
NUM(3)	CRY.BOC:SAW-SEAL-2

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Format	Name
NUM(3)	CRY.CONC:TOT-JNT-2
NUM(3)	CRY.CONC:SLT-SPA-TRN-2
NUM(3)	CRY.CONC:SEV-SPA-TRN-2
NUM(3)	CRY.CONC:FLT-JNT-2
NUM(3)	CRY.CONC:TOT-PNL-2
NUM(3)	CRY.CONC:CRK-PNL-2
NUM(3)	CRY.CONC:BRK-PNL-2
NUM(3)	CRY.CONC:FLT-PNL-2
NUM(3)	CRY.CONC:100-OVR-2
NUM(3)	CRY.CONC:5SF-PAT-2
NUM(3)	CRY.CONC:D-CRK-2
NUM(3)	CRY.CONC:SLT-SPA-LNG-2
NUM(3)	CRY.CONC:SEV-SPA-LNG-2
NUM(3)	CRY.CRCP:PAT-2
NUM(3)	CRY.CRCP:LCL-2
NUM(3)	CRY.CRCP:D-CRK-2
NUM(3)	CRY.CRCP:TRN-2

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CRY - Listing of Names in Alphabetical Order
****

Format	Name
NUM(3)	CRY.BIT:ALL-1
NUM(3)	CRY.BIT:ALL-2
NUM(3)	CRY.BIT:AVG-RUT-LEFT-1
NUM(3)	CRY.BIT:AVG-RUT-LEFT-2
NUM(3)	CRY.BIT:AVG-RUT-RIGHT-1
NUM(3)	CRY.BIT:AVG-RUT-RIGHT-2
NUM(3)	CRY.BIT:MED-LNG-JNT-1
NUM(3)	CRY.BIT:MED-LNG-JNT-2
NUM(3)	CRY.BIT:MED-LNG-1
NUM(3)	CRY.BIT:MED-LNG-2
NUM(3)	CRY.BIT:MED-TRN-1
NUM(3)	CRY.BIT:MED-TRN-2
NUM(3)	CRY.BIT:MUL-1
NUM(3)	CRY.BIT:MUL-2
NUM(3)	CRY.BIT:PAT-1
NUM(3)	CRY.BIT:PAT-2
NUM(3)	CRY.BIT:RUT-1
NUM(3)	CRY.BIT:RUT-2
NUM(3)	CRY.BIT:RVL-1
NUM(3)	CRY.BIT:RVL-2
NUM(3)	CRY.BIT:SAW-SEAL-1
NUM(3)	CRY.BIT:SAW-SEAL-2
NUM(3)	CRY.BIT:SEV-LNG-JNT-1
NUM(3)	CRY.BIT:SEV-LNG-JNT-2
NUM(3)	CRY.BIT:SEV-LNG-1
NUM(3)	CRY.BIT:SEV-LNG-2
NUM(3)	CRY.BIT:SEV-TRN-1
NUM(3)	CRY.BIT:SEV-TRN-2

Format	Name
NUM(3)	CRY.BIT:SLT-LNG-JNT-1
NUM(3)	CRY.BIT:SLT-LNG-JNT-2
NUM(3)	CRY.BIT:SLT-LNG-1
NUM(3)	CRY.BIT:SLT-LNG-2
NUM(3)	CRY.BIT:SLT-TRN-1
NUM(3)	CRY.BIT:SLT-TRN-2

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Format	Name
NUM(3)	CRY.BOC:ALL-1
NUM(3)	CRY.BOC:ALL-2
NUM(3)	CRY.BOC:AVG-RUT-LEFT-1
NUM(3)	CRY.BOC:AVG-RUT-LEFT-2
NUM(3)	CRY.BOC:AVG-RUT-RIGHT-1
NUM(3)	CRY.BOC:AVG-RUT-RIGHT-2
NUM(3)	CRY.BOC:MED-LNG-JNT-1
NUM(3)	CRY.BOC:MED-LNG-JNT-2
NUM(3)	CRY.BOC:MED-LNG-1
NUM(3)	CRY.BOC:MED-LNG-2
NUM(3)	CRY.BOC:MED-TRN-1
NUM(3)	CRY.BOC:MED-TRN-2
NUM(3)	CRY.BOC:MUL-1
NUM(3)	CRY.BOC:MUL-2
NUM(3)	CRY.BOC:PAT-1
NUM(3)	CRY.BOC:PAT-2
NUM(3)	CRY.BOC:RUT-1
NUM(3)	CRY.BOC:RUT-2
NUM(3)	CRY.BOC:RVL-1
NUM(3)	CRY.BOC:RVL-2
NUM(3)	CRY.BOC:SAW-SEAL-1

Format	Name
NUM(3)	CRY.BOC:SAW-SEAL-2
NUM(3)	CRY.BOC:SEV-LNG-JNT-1
NUM(3)	CRY.BOC:SEV-LNG-JNT-2
NUM(3)	CRY.BOC:SEV-LNG-1
NUM(3)	CRY.BOC:SEV-LNG-2
NUM(3)	CRY.BOC:SEV-TRN-1
NUM(3)	CRY.BOC:SEV-TRN-2
NUM(3)	CRY.BOC:SLT-LNG-JNT-1
NUM(3)	CRY.BOC:SLT-LNG-JNT-2
NUM(3)	CRY.BOC:SLT-LNG-1
NUM(3)	CRY.BOC:SLT-LNG-2
NUM(3)	CRY.BOC:SLT-TRN-1
NUM(3)	CRY.BOC:SLT-TRN-2

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Format	Name
NUM(3)	CRY.CONC:BRK-PNL-1
NUM(3)	CRY.CONC:BRK-PNL-2
NUM(3)	CRY.CONC:CRK-PNL-1
NUM(3)	CRY.CONC:CRK-PNL-2
NUM(3)	CRY.CONC:D-CRK-1
NUM(3)	CRY.CONC:D-CRK-2
NUM(3)	CRY.CONC:FLT-JNT-1
NUM(3)	CRY.CONC:FLT-JNT-2
NUM(3)	CRY.CONC:FLT-PNL-1
NUM(3)	CRY.CONC:FLT-PNL-2
NUM(3)	CRY.CONC:SEV-SPA-LNG-1
NUM(3)	CRY.CONC:SEV-SPA-LNG-2

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        NUM(3)     CRY.CONC:SLT-SPA-LNG-1
        NUM(3)     CRY.CONC:SLT-SPA-LNG-2
        NUM(3)     CRY.CONC:SEV-SPA-TRN-1
        NUM(3)     CRY.CONC:SEV-SPA-TRN-2
        NUM(3)     CRY.CONC:SLT-SPA-TRN-1
        NUM(3)     CRY.CONC:SLT-SPA-TRN-2
        NUM(3)     CRY.CONC:TOT-JNT-1
        NUM(3)     CRY.CONC:TOT-JNT-2
        NUM(3)     CRY.CONC:TOT-PNL-1
        NUM(3)     CRY.CONC:TOT-PNL-2
        NUM(3)     CRY.CONC:100-OVR-1
        NUM(3)     CRY.CONC:100-OVR-2
        NUM(3)     CRY.CONC:5SF-PAT-1
        NUM(3)     CRY.CONC:5SF-PAT-2
        NUM(2,1)   CRY.CR-RD
        NUM(2,1)   CRY.CR-1
        NUM(2,1)   CRY.CR-2
        NUM(3)     CRY.CRCP:D-CRK-1
        NUM(3)     CRY.CRCP:D-CRK-2
        NUM(3)     CRY.CRCP:LCL-1
        NUM(3)     CRY.CRCP:LCL-2
        NUM(3)     CRY.CRCP:PAT-1
        NUM(3)     CRY.CRCP:PAT-2
        NUM(3)     CRY.CRCP:TRN-1
        NUM(3)     CRY.CRCP:TRN-2
        CHAR(4)    CRY.IRI-LEFT-1
        CHAR(4)    CRY.IRI-RD
        CHAR(4)    CRY.IRI-RIGHT-1
        CHAR(4)    CRY.IRI-2
        NUM(2,1)   CRY.PQI-RD
        NUM(2,1)   CRY.PQI-1
        NUM(2,1)   CRY.PQI-2
        NUM(2,1)   CRY.RQI-RD
        NUM(2,1)   CRY.RQI-1
        NUM(2,1)   CRY.RQI-2
        NUM(2,1)   CRY.SR-RD
        NUM(2,1)   CRY.SR-1
        NUM(2,1)   CRY.SR-2
        CHAR(1)    CRY.SURF-TYPE-RD
        CHAR(4)    CRY.YEAR-RD
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        CRY - Descriptions of Data Elements
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The CRY data elements represent all the sample data for a particular year and a particular roadway (see CRR.ROAD-ID). Each CRR record may have 0-25 CRY segments. Use the CR1 data element names to specify the most recent year of sample data for a roadway.

The year (CRY.YEAR-RD) and surface type (CRY.SURF-TYPE-RD) apply to both lanes of the roadway i.e., both lanes must be coded as the same surface type, and both lanes must be sampled in the same year.

All other CRY data elements occur 3 times: once for each lane and once for the roadway as a whole. The suffix of the data element name indicates which place the data applies to:

...-RD the entire roadway
...-1 the first lane
...-2 the second lane

The CRR.ROAD-ID data element can be used to exactly locate the data element as follows:

if CRR.ROAD-ID is "U" (undivided roadway), then

-1 is the outside lane carrying traffic in the increasing milepost direction.
-2 is the outside lane carrying traffic in the decreasing milepost direction.
-RD is the average of the two lanes.

if CRR.ROAD-ID is "I" (divided roadway, increasing milepost direction of travel), then

-1 is the outside lane of the roadway
-2 is the inside lane of the roadway
-RD is the same as -1 (the outside lane)

if CRR.ROAD-ID is "D" (divided roadway, decreasing milepost direction of travel), then

-1 is the outside lane of the roadway
-2 is the inside lane of the roadway
-RD is the same as -1 (the outside lane)

The following data element names are only valid if CRY.SURF-TYPE-RD is 'B' (bituminous):

CRY.BIT:ALL-1 - Bituminous - Alligator Cracking - First Lane
CRY.BIT:ALL-2 - Bituminous - Alligator Cracking - Second Lane

CRY.BIT:MED-LNG-1 - Bituminous - Medium Longitudinal Cracking - 1st Lane
CRY.BIT:MED-LNG-2 - Bituminous - Medium Longitudinal Cracking - 2nd Lane
CRY.BIT:MED-LNG-JNT-1 - Bit. - Medium Long. Joint Cracking - 1st Lane
CRY.BIT:MED-LNG-JNT-2 - Bit. - Medium Long. Joint Cracking - 2nd Lane

CRY.BIT:MED-TRN-1 - Bituminous - Medium Transverse Cracking - 1st Lane
CRY.BIT:MED-TRN-2 - Bituminous - Medium Transverse Cracking - 2nd Lane

CRY.BIT:MUL-1 - Bituminous - Multiple Cracking - First Lane
CRY.BIT:MUL-2 - Bituminous - Multiple Cracking - Second Lane

CRY.BIT:PAT-1 - Bituminous - Patching - First Lane
CRY.BIT:PAT-2 - Bituminous - Patching - Second Lane

CRY.BIT:RVL-1 - Bituminous - Ravelling and Weathering - First Lane
CRY.BIT:RVL-2 - Bituminous - Ravelling and Weathering - Second Lane

CRY.BIT:SEV-LNG-1 - Bituminous - Severe Longitudinal Cracking - 1st Lane
CRY.BIT:SEV-LNG-2 - Bituminous - Severe Longitudinal Cracking - 2nd Lane
CRY.BIT:SEV-LNG-JNT-1 - Bit. - Severe Long. Joint Cracking - 1st Lane
CRY.BIT:SEV-LNG-JNT-2 - Bit. - Severe Long. Joint Cracking - 2nd Lane

CRY.BIT:SEV-TRN-1 - Bituminous - Severe Transverse Cracking - 1st Lane
CRY.BIT:SEV-TRN-2 - Bituminous - Severe Transverse Cracking - 2nd Lane

CRY.BIT:SLT-LNG-1 - Bituminous - Slight Longitudinal Cracking - 1st Lane
CRY.BIT:SLT-LNG-2 - Bituminous - Slight Longitudinal Cracking - 2nd Lane
CRY.BIT:SLT-LNG-JNT-1 - Bit. - Slight Long. Joint Cracking - 1st Lane
CRY.BIT:SLT-LNG-JNT-2 - Bit. - Slight Long. Joint Cracking - 2nd Lane

CRY.BIT:SLT-TRN-1 - Bituminous - Slight Transverse Cracking - 1st Lane
CRY.BIT:SLT-TRN-2 - Bituminous - Slight Transverse Cracking - 2nd Lane

NUM(3) - The percentage of defects of the particular type:

000 No defects.
001 - 100 (%) Percentage of this type of defect.

CRY.BIT:RUT-1 - Bituminous - Rutting - First Lane

CRY.BIT:RUT-2 - Bituminous - Rutting - Second Lane

000 - 999   In meters per kilometer.

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CRY.BIT:AVG-RUT-LEFT-1 - Bit. - Average Rut Left Wheelpath - 1st lane
CRY.BIT:AVG-RUT-LEFT-2 - Bit. - Average Rut Left Wheelpath - 2nd lane
CRY.BIT:AVG-RUT-RIGHT-1 - Bit. - Average Rut Right Wheelpath - 1nd lane
CRY.BIT:AVG-RUT-RIGHT-2 - Bit. - Average Rut Right Wheelpath - 2nd lane

000 - 999 in hundredths of inches per mile

CRY.BIT:SAW-SEAL-1
CRY.BIT:SAW-SEAL-2

000 = no
001 = yes

The following data element names are only valid if CRY.SURF-TYPE-RD
is 'O' (bituminous overlay):

CRY.BOC:ALL-1 - Bit Overlay - Alligator Cracking - First Lane
CRY.BOC:ALL-2 - Bit Overlay - Alligator Cracking - Second Lane

CRY.BOC:MED-LNG-1 - Bit Overlay - Medium Longitudinal Cracking - 1st Ln
CRY.BOC:MED-LNG-2 - Bit Overlay - Medium Longitudinal Cracking - 2nd Ln

CRY.BOC:MED-TRN-1 - Bit Overlay - Medium Transverse Cracking - 1st Lane
CRY.BOC:MED-TRN-2 - Bit Overlay - Medium Transverse Cracking - 2nd Lane

CRY.BOC:MUL-1 - Bit Overlay - Multiple Cracking - First Lane
CRY.BOC:MUL-2 - Bit Overlay - Multiple Cracking - Second Lane

CRY.BOC:PAT-1 - Bit Overlay - Patching - First Lane
CRY.BOC:PAT-2 - Bit Overlay - Patching - Second Lane

CRY.BOC:RUT-1 - Bit Overlay - Rutting - First Lane
CRY.BOC:RUT-2 - Bit Overlay - Rutting - Second Lane

CRY.BOC:RVL-1 - Bit Overlay - Ravelling and Weathering - First Lane

CRY.BOC:RVL-2 - Bit Overlay - Ravelling and Weathering - Second Lane

CRY.BOC:SEV-LNG-1 - Bit Overlay - Severe Longitudinal Cracking - 1st Ln
CRY.BOC:SEV-LNG-2 - Bit Overlay - Severe Longitudinal Cracking - 2nd Ln

CRY.BOC:SEV-TRN-1 - Bit Overlay - Severe Transverse Cracking - 1st Lane
CRY.BOC:SEV-TRN-2 - Bit Overlay - Severe Transverse Cracking - 2nd Lane

CRY.BOC:SLT-LNG-1 - Bit Overlay - Slight Longitudinal Cracking - 1st Ln
CRY.BOC:SLT-LNG-2 - Bit Overlay - Slight Longitudinal Cracking - 2nd Ln

CRY.BOC:SLT-TRN-1 - Bit Overlay - Slight Transverse Cracking - 1st Lane
CRY.BOC:SLT-TRN-2 - Bit Overlay - Slight Transverse Cracking - 2nd Lane

NUM(3) - The percentage of defects of the particular type:

000 No defects.
001 - 100 (%) Percentage of this type of defect.

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CRY.BOC:RUT-1 - Bit. Ovly - Rutting - First Lane
CRY.BOC:RUT-2 - Bit. Ovly - Rutting - Second Lane

000 - 999 In meters per kilometer.

CRY.BOC:AVG-RUT-LEFT-1 - Bit. Ovly - Avg. Rut Left Wheelpath - 1st lane
CRY.BOC:AVG-RUT-LEFT-2 - Bit. Ovly - Avg. Rut Left Wheelpath - 2nd lane
CRY.BOC:AVG-RUT-RIGHT-1 - Bit. OL - Avg. Rut Right Wheelpath - 1nd lane
CRY.BOC:AVG-RUT-RIGHT-2 - Bit. OL - Avg. Rut Right Wheelpath - 2nd lane

000 - 999 in hundredths of inches per mile

CRY.BOC:SAW-SEAL-1
CRY.BOC:SAW-SEAL-2

000 = no
001 = yes

The following data element names are only valid if CRY.SURF-TYPE-RD
is 'C' (concrete):

CRY.CONC:BRK-PNL-1 - Concrete - Broken Panels - First Lane
CRY.CONC:BRK-PNL-2 - Concrete - Broken Panels - Second Lane

CRY.CONC:CRK-PNL-1 - Concrete - Cracked Panels - First Lane
CRY.CONC:CRK-PNL-2 - Concrete - Cracked Panels - Second Lane

CRY.CONC:D-CRK-1 - Concrete - D-Cracked Panels - First Lane
CRY.CONC:D-CRK-2 - Concrete - D-Cracked Panels - Second Lane

CRY.CONC:FLT-JNT-1 - Concrete - Faulted Joints - First Lane
CRY.CONC:FLT-JNT-2 - Concrete - Faulted Joints - Second Lane

CRY.CONC:FLT-PNL-1 - Concrete - Faulted Panels - First Lane
CRY.CONC:FLT-PNL-2 - Concrete - Faulted Panels - Second Lane

CRY.CONC:SEV-SPA-LNG-1 - Concrete - Severe Spalled Joints - First Lane
CRY.CONC:SEV-SPA-LNG-2 - Concrete - Severe Spalled Joints - Second Lane

CRY.CONC:SLT-SPA-LNG-1 - Concrete - Slight Spalled Joints - First Lane
CRY.CONC:SLT-SPA-LNG-2 - Concrete - Slight Spalled Joints - Second Lane

CRY.CONC:SEV-SPA-TRN-1 - Concrete - Severe Spalled Joints - First Lane
CRY.CONC:SEV-SPA-TRN-2 - Concrete - Severe Spalled Joints - Second Lane

CRY.CONC:SLT-SPA-TRN-1 - Concrete - Slight Spalled Joints - First Lane
CRY.CONC:SLT-SPA-TRN-2 - Concrete - Slight Spalled Joints - Second Lane

CRY.CONC:TOT-JNT-1 - Concrete - Total Joints - First Lane
CRY.CONC:TOT-JNT-2 - Concrete - Total Joints - Second Lane

CRY.CONC:TOT-PNL-1 - Concrete - Total Panels - First Lane
CRY.CONC:TOT-PNL-2 - Concrete - Total Panels - Second Lane

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CRY.CONC:100-OVR-1 - Concrete - 100% Overlaid Panels - First Lane
CRY.CONC:100-OVR-2 - Concrete - 100% Overlaid Panels - Second Lane

CRY.CONC:5SF-PAT-1 - Concrete - Over 5 Sq. ft Patched Panels - 1st Lane
CRY.CONC:5SF-PAT-2 - Concrete - Over 5 Sq. ft Patched Panels - 2nd Lane

NUM(3) - The percentage of defects of the particular type:

000 No defects.
001 - 100 (%) Percentage of this type of defect.

CRY.CR-1 - NUM(2,1) - Condition Rating - First Lane

The condition rating (CR) for the first lane (use CRR.ROAD-ID to determine exact lane. CR is computed as (RQI+SR)/2.

0.0 Data not present.
0.1 - 4.5 Condition rating for this lane.

CRY.CR-2 - NUM(2,1) - Condition Rating - Second Lane

The condition rating (CR) for the second lane (use CRR.ROAD-ID to determine exact lane. CR is computed as (RQI+SR)/2.

0.0 Data not present.
0.1 - 4.5 Condition rating for this lane.

CRY.CR-RD - NUM(2,1) - Condition Rating - Roadway

The condition rating (CR) for the roadway (use CRR.ROAD-ID to determine exact road. CR is computed as (RQI+SR)/2.

0.0 Data not present.
0.1 - 4.5 Condition rating for the roadway.

The following data element names are only valid if CRY.SURF-TYPE-RD is 'N' (CRCP):

CRY.CRCP:D-CRK-1 - CRCP - D-Cracking - First Lane
CRY.CRCP:D-CRK-2 - CRCP - D-Cracking - Second Lane

CRY.CRCP:LCL-1 - CRCP - Localized Distress - First Lane
CRY.CRCP:LCL-2 - CRCP - Localized Distress - Second Lane

CRY.CRCP:PAT-1 - CRCP - Patch Deterioration - First Lane
CRY.CRCP:PAT-2 - CRCP - Patch Deterioration - Second Lane

CRY.CRCP:TRN-1 - CRCP - Transverse Cracking - First Lane
CRY.CRCP:TRN-2 - CRCP - Transverse Cracking - Second Lane

NUM(3) - The percentage of defects of the particular type:

000 No defects.
001 - 100 (%) Percentage of this type of defect.

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CRY.IRI-LEFT-1 - CHAR(4) - International Roughness Index, First Left

The international roughness index for the first left lane (use CRR.ROAD-ID to determine exact lane).

'0150' - '2540' Inches per mile (15 - 254).

CRY.IRI-LEFT-2 - CHAR(4) - International Roughness Index, Second Left

The international roughness index for the second left lane (use CRR.ROAD-ID to determine exact lane).

'0150' - '2540' Inches per mile (15 - 254).

CRY.IRI-RIGHT-1 - CHAR(4) - International Roughness Index, First Right

The international roughness index for the first right lane (use CRR.ROAD-ID to determine exact lane).

'0150' - '2540' Inches per mile (15 - 254).

CRY.IRI-RIGHT-2 - CHAR(4) - International Roughness Index, Second Right

The international roughness index for the second right lane (use CRR.ROAD-ID to determine exact lane).

'0150' - '2540' Inches per mile (15 - 254).

CRY.IRI-RD - CHAR(4) - International Roughness Index, Roadway

The international roughness index for the roadway (use CRR.ROAD-ID to determine exact road).

'0150' - '2540' Inches per mile (15 - 254).

CRY.PQI-1 - NUM(2,1) - Pavement Quality Index, First Lane

The pavement quality index for the first lane (use CRR.ROAD-ID to determine exact lane).

0.1 - 5.0 Pavement Quality Index (5.0 is perfect).

CRY.PQI-2 - NUM(2,1) - Pavement Quality Index, Second Lane

The pavement quality index for the second lane (use CRR.ROAD-ID to determine exact lane).

0.1 - 5.0 Pavement Quality Index (5.0 is perfect).

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CRY.PQI-RD - NUM(2,1) - Pavement Quality Index, Roadway

The pavement quality index for the roadway (use CRR.ROAD-ID to determine exact road).

0.1 - 5.0 Pavement Quality Index (5.0 is perfect).

CRY.RQI-1 - NUM(2,1) - Ride Rating, First Lane

The ride rating for the first lane (use CRR.ROAD-ID to determine exact lane).

0.1 - 5.0 RQI rating (5.0 is perfect).

CRY.RQI-2 - NUM(2,1) - Ride Rating, Second Lane

The ride rating for the second lane (use CRR.ROAD-ID to determine exact lane).

0.1 - 5.0 RQI rating (5.0 is perfect).

CRY.RQI-RD - NUM(2,1) - Ride Rating, Roadway

The ride rating for the roadway (use CRR.ROAD-ID to determine exact road).

0.1 - 5.0 RQI rating (5.0 is perfect).

CRY.SR-1 - NUM(2,1) - Surface Rating, First Lane

The surface rating for the first lane (use CRR.ROAD-ID to determine exact lane).

0.1 - 4.0 SR rating (4.0 is perfect).

CRY.SR-2 - NUM(2,1) - Surface Rating, Second Lane

The surface rating for the second lane (use CRR.ROAD-ID to determine exact lane).

0.1 - 4.0 SR rating (4.0 is perfect).

CRY.SR-RD - NUM(2,1) - Surface Rating, Roadway

The surface rating for the roadway (use CRR.ROAD-ID to determine exact road).

0.1 - 4.0   SR rating (4.0 is perfect).

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CRY.SURF-TYPE-RD - CHAR(1) - Surface Type

The type of surface for this year and this roadway (use CRR.ROAD-ID to determine exact road).

'X'   Unratable (gravel).
'B'   Bituminous.
'C'   Jointed concrete.
'N'   Continuous reinforced concrete.
'O'   Bituminous overlaid concrete.

CRY.YEAR-RD - CHAR(4) - Year of Sample Data

The year the data was taken in this roadway.

'1967' - 'nnnn'   Year of data (nnnn is latest year on file).

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CR1 - Names
****
The data element names for CR1 data elements are exactly the same as those for CRY. CR1 refers to the most recent year of data only.

DTU - Description of Record
****

A DTU record exists for each TIS user. It contains information about the user.

DTU - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(7)	DTU.USER-ID	X	
CHAR(2)	DTU.DIVISION	X	
CHAR(4)	DTU.OFFICE	X	
CHAR(4)	DTU.SECTION	X	
CHAR(24)	DTU.NAME	X	
CHAR(14)	DTU.LOCATION	X	
CHAR(12)	DTU.PHONE-NUM	X	

DTU - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(2)	DTU.DIVISION	X	
CHAR(14)	DTU.LOCATION	X	
CHAR(24)	DTU.NAME	X	
CHAR(4)	DTU.OFFICE	X	
CHAR(12)	DTU.PHONE-NUM	X	

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        CHAR(4)    DTU.SECTION                  X
        CHAR(7)    DTU.USER-ID                  X
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DTU - Descriptions of Data Elements
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DTU.DIVISION - CHAR(2) - Division

- 'AE' Aeronautics
- 'FI' Finance & administration
- 'HP' Highway program implementation
- 'NM' Non-MNDOT
- 'OP' Operations
- 'PM' Program management
- 'TS' Technical services

DTU.LOCATION - CHAR(14) - Location of User

DTU.NAME - CHAR(24) - Name of User

DTU.OFFICE - CHAR(4) - Office of User

'AIRD' AIRPORT DEVELOPMENT & ASSISTANCE
'AIRO' AERONAUTICS OPERATIONS
'ARRO' ARROWHEAD REGIONAL DEVELOPMENT COMMISSION
'BRDG' BRIDGES & STRUCTURES
'CENS' CONSULTANT ENGINEERING SERVICES
'CONS' CONSTRUCTION
'DESG' DESIGN SERVICES
'DIS1' DISTRICT 1
'DIS2' DISTRICT 2
'DIS3' DISTRICT 3
'DIS4' DISTRICT 4
'DIS5' DISTRICT 5
'DIS6' DISTRICT 6
'DIS7' DISTRICT 7
'DIS8' DISTRICT 8
'DIS9' DISTRICT 9
'DOPS' DEPARTMENT OF PUBLIC SAFETY
'ECRD' EAST CENTRAL REGIONAL DEVELOPMENT COMMISSION
'EDEN' EDEN PRAIRIE
'ELEC' ELECTRONIC COMMUNICATIONS
'ENGS' ENGINEERING STANDARDS
'ENVR' ENVIRONMENTAL SERVICES
'FINM' FINANCIAL MANAGEMENT
'HIGH' HIGHWAY PROGRAMS
'LMIC' LAND MANAGEMENT INFORMATION CENTER
'MAIN' MAINTENANCE
'MATL' MATERIALS ENGINEERING
'METC' MET COUNCIL
'MONT' MONTANA STATE UNIVERSITY

(continued on next page)

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DTU.OFFICE - CHAR(4) - Office of User (continued)

'MOTO' MOTOR CARRIER & SAFETY COMPLIANCE
'MWPM' MIDWEST PAVEMENT MANAGEMENT
'OPAD' OPERATIONS ADMINISTRATION
'ORGD' ORGANIZATIONAL DEVELOPMENT
'OSSS' SYSTEMS & SUPPORT SERVICES
'PERS' PERSONNEL
'RAIL' RAILROADS & WATERWAYS
'RAMS' RAMSEY COUNTY
'RAND' RESEARCH & DEVELOPMENT
'RDC5' FIFTH REGIONAL DEVELOPMENT COMMISSION

'ROCO' ROCHESTER-OLMSTEAD COUNCIL OF GOVERNMENT
'ROFW' RIGHT OF WAY
'SAID' STATE AID
'STCL' SAINT CLOUD AREA PLANNING ORGANIZATION
'STPL' SAINT PAUL
'SURV' SURVEYING & MAPPING
'TDRA' TRANSPORTATION DATA, RESEARCH & ANALYSIS
'TRAF' TRAFFIC ENGINEERING
'TRNS' TRANSIT

DTU.PHONE-NUM - CHAR(12) - Phone Number of User

DTU.SECTION - CHAR(4) - Section of User

'ACCT' ACCOUNTING AND FINANCE
'ACNG' ACCOUNTING & FINANCE
'ACQU' ACQUISITIONS
'ADMN' ADMINISTRATIVE PROCEDURES & DOCUMENTATION
'AFFR' AFFIRMATIVE ACTION
'AIRD' AIRPORT DEVELOPMENT
'AIRR' AIRCRAFT REGISTRATION
'AIRT' AIR TRANSPORTATION
'AVEC' AVIATION ECONOMICS, DEVELOPMENT
'BDGC' BRIDGE CONSTRUCTION & MAINTENANCE
'BDGD' BRIDGE DESIGN
'BDGP' BRIDGE DESIGN PLANNING
'BITU' BITUMINOUS ENGINEERING
'BUDG' BUDGET
'BUIL' BUILDING
'CAES' COMPUTER AIDES ENGINEERING SERVICES
'CART' CARTOGRAPHIC
'CLAM' CLAIMS
'CNAD' CONTRACT ADMINISTRATION
'CNTR' CONTRACT PRE-LETTING
'COMM' COMMUNICATION & PUBLICATION SERVICES
'CONC' CONCRETE ENGINEERING
'COOR' RESEARCH COORDINATION
'DESE' DESIGN ENGINEERING
'DESI' DESIGN STANDARDS

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DTU.SECTION - CHAR(4) - Section of User (continued)

'DIS1' DISTRICT 1
'DIS2' DISTRICT 2
'DIS3' DISTRICT 3
'DIS4' DISTRICT 4
'DIS5' DISTRICT 5
'DIS6' DISTRICT 6
'DIS7' DISTRICT 7
'DIS8' DISTRICT 8
'DIS9' DISTRICT 9
'DRAD' DATA RESEARCH & DEVELOPMENT
'EEOC' EEO CONTRACT COMPLIANCE
'EMPD' EMPLOYEE DEVELOPMENT
'ENFO' ENFORCEMENT, INSPECTION, & SAFETY
'ENFR' ENFORCEMENT
'ENGR' ENGINEERING
'ENVI' ENVIRONMENTAL STUDIES, DEVELOPMENT, & BIKEWAYS
'ENVQ' ENVIRONMENTAL QUALITY
'EQUI' EQUIPMENT
'ESSS' ELECTRICAL SYSTEMS & SERVICES
'FLDS' FIELD SVCS & DATA MAINTENANCE
'GEOD' GEODETIC
'HIST' HIGHWAY STUDIES
'HYAP' HIGHWAY & AREA PLANNING
'HYDR' HYDRAULICS
'HYPR' HIGHWAY PROGRAMMING
'INTR' INTERMODAL COORDINATION
'INVE' INVENTORY MANAGEMENT
'LABI' LABOR INVESTIGATION
'LABR' LABOR RELATIONS
'LAMA' LIAISON & MAINTENANCE ADMINISTRATION
'LAND' LAND SURVEYS
'LIBR' LIBRARY & INFORMATION SERVICES
'MAIN' MAINTENANCE OPERATIONS
'MGTP' MANAGEMENT PLANNING PROGRAMS
'MSTN' MAINTENANCE STANDARDS
'MUNI' MUNICIPAL AGREEMENTS
'NEWS' NEWS & PUBLIC AFFAIRS SUPPORT SERVICES
'NREL' NATIONAL RELATIONS
'PANR' PLANNING & RESEARCH
'PAVE' PAVEMENT MANAGEMENT
'PAWW' PORTS & WATERWAYS
'PERS' PERSONNEL SERVICES
'PHOT' PHOTOGRAMMETRIC
'PHYS' PHYSICAL RESEARCH
'PLAN' PLANS & COORDINATION
'PLAS' PLANS & SPECIFICATIONS
'PMSS' PROJECT LIAISON & PMSS
'PREA' PREACQUISITIONS

'PREL' PRELIMINARY DESIGN
'PROF' OFFICE AUTOMATION

(continued on next page)

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DTU.SECTION - CHAR(4) - Section of User (continued)

'RADM' RAILROAD ADMINISTRATION
'RADO' RADIO & VISUAL NAVIGATION AIDS
'RAMA' RADIO MAINTENANCE
'RATE' RATES
'REPT' REPORTING & FINANCIAL ANALYSIS
'RPAD' RAIL PLANNING & DEVELOPMENT
'SAAS' SYSTEMS & ANALYSIS
'SAFE' EMPLOYEE SAFETY
'SAPS' SYSTEMS & APPLICATIONS SUPPORT
'SGNL' SIGNALS
'SITE' SITE DESIGN
'SOIL' SOILS AND FOUNDATIONS ENGINEERING
'SPEC' SPECIFICATIONS
'STAN' CONSTRUCTION STANDARDS
'STRU' STRUCTURAL METALS
'STSE' STRUCTURAL SERVICES
'SUPP' ADMINISTRATIVE SUPPORT SERVICES
'SYSR' SYSTEMS & RESEARCH
'TECH' TECHNICAL DATA SYSTEMS
'TEST' TESTS & INSPECTION
'TORT' TORT CLAIMS
'TRAF' TRAFFIC CONTROL
'TRDA' TRAFFIC DATA & ANALYSIS
'TRFC' TRAFFIC FORECASTS
'TRNS' TRANSIT PROGRAM
'UNDE' UNDEFINED
'UTIL' UTILITIES
'VALE' VALUE ENGINEERING
'VALU' VALUATION

DTU.USER-ID - CHAR(7) - TSO User ID

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ESL - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(1)	ESL.TYPE	X	
CHAR(6)	ESL.SURF-DATE	X	
NUM(9)	ESL.CURRENT-ESALS	X	
NUM(9)	ESL.SURFACE-ESALS	X	
CHAR(6)	ESL.PAVE-DATE	X	
NUM(9)	ESL.PAVEMENT-ESALS	X	
CHAR(5)	ESL.GROWTH-RATE	X	

ESL - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
NUM(9)	ESL.CURRENT-ESALS	X	
CHAR(5)	ESL.GROWTH-RATE	X	
CHAR(6)	ESL.PAVE-DATE	X	
NUM(9)	ESL.PAVEMENT-ESALS	X	
CHAR(6)	ESL.SURF-DATE	X	
NUM(9)	ESL.SURFACE-ESALS	X	
CHAR(1)	ESL.TYPE	X	

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ESL - Descriptions of Data Elements
****

ESL.CURRENT-ESALS - NUM(9) - Current Year ESALS

000000000 - 999999999 ESALS for the latest year (from 01/01/yy through mm/dd/yy, where "mm/dd/yy" is the ESAL-END-DATE parameter).

ESL.GROWTH-RATE - CHAR(5) - ESAL Growth Rate

'-99.9' - '+99.9' Percent annual growth rate of esals over the last three years.

ESL.PAVE-DATE - CHAR(6) - Pavement Date

'yymmdd' Date of bottommost roadway history layer in the driving surface pavement that meets the following criteria:

Work Item	Definition

B	Bituminous layer
BO	Bituminous overlay
C	Concrete slab
N	CRCP non-jointed concrete slab
CR	Concrete (recycled)
CO	Concrete overlay

and transverse direction is "C" (centerline passes through layer) and depth is non-zero.

ESL.PAVEMENT-ESALS - NUM(9) - ESALS on Pavement

000000000 - 999999999 ESALS between ESAL-END-DATE and either ESAL-START-DATE or PAVE-DATE (whichever is later).

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ESL.SURF-DATE - CHAR(6) - Surface Date

'yymmdd' Date of topmost roadway history layer in the driving surface that meets the following criteria:

Work Item	Definition
B	Bituminous layer
BO	Bituminous overlay
C	Concrete slab
N	CRCP non-jointed concrete slab
CR	Concrete (recycled)
CO	Concrete overlay

and transverse direction is "C" (centerline passes

through layer) and depth is non-zero.

ESL.SURFACE-ESALS - NUM(9) - ESALS on Surface

000000000 - 999999999 ESALS between ESAL-END-DATE and either ESAL-START-DATE or PAVE-DATE (whichever is later).

ESL.TYPE - CHAR(1) - Type of ESALS

'B' BESALS (bituminous surface)
'C' CESALS (concrete surface)

NOTE: SURFACE-ESALS and PAVEMENT-ESALS are always the same type, which is determined by the surface layer (as chosen for SURF-date).

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INA - Listing of Names in File Order

Format	Name	Stored	Generated From
CHAR(1)	INA.RECORD-TYPE	X	
CHAR(2)	INA.RECORD-NUMBER	X	
NUM(1)	INA.CONSTR-DIST	X	

CHAR(2)	INA.MAINT-AREA	X	
CHAR(4)	INA.PTRL-STATION	X	
CHAR(2)	INA.PTRL-DIST	X	INA.PTRL-STATION
NUM(2)	INA.COUNTY	X	
NUM(1)	INA.DISTRICT-FROM-CNTY	X	INA.COUNTY
CHAR(2)	INA.RDC-FROM-CNTY	X	INA.COUNTY
NUM(7)	INA.POP-FROM-CNTY	X	INA.COUNTY
NUM(4)	INA.CITY	X	
NUM(7)	INA.POP-FROM-CITY	X	INA.CITY
NUM(1)	INA.RUR-URB-FROM-CITY	X	INA.CITY
NUM(1)	INA.POP-GROUP-FROM-CITY	X	INA.CITY
NUM(4)	INA.CENSUS-YR-FROM-CITY	X	INA.CITY
NUM(4)	INA.URB-AREA	X	
CHAR(5)	INA.CATEGORY	X	
NUM(2)	INA.LEN-USER-CATEGORY	X	
CHAR(18)	INA.USER-CATEGORY	X	
CHAR(1)	INA.ACC-FILLED	X	
NUM(5)	INA.TOT-NUM-ACC	X	
NUM(5)	INA.NUM-FAT-ACC	X	
NUM(5)	INA.NUM-A-ACC	X	
NUM(5)	INA.NUM-B-ACC	X	
NUM(5)	INA.NUM-C-ACC	X	
NUM(5)	INA.NUM-PROP-ACC	X	
NUM(3,1)	INA.ACC-RATE	X	
NUM(3,1)	INA.SEV-RATE	X	
NUM(3,1)	INA.FATAL-RATE	X	
NUM(5)	INA.NUM-WET-ACC	X	
NUM(5)	INA.NUM-DRY-ACC	X	
NUM(4,1)	INA.WET-DRY-PERCENT	X	
NUM(4,1)	INA.WET-TOTAL-PERCENT	X	
NUM(5)	INA.NUM-DAYS	X	
NUM(5)	INA.SPEC-NUM-DAYS	X	
CHAR(1)	INA.SIG-FILLED	X	
NUM(3,1)	INA.AVG-ACC-RATE	X	
NUM(3,1)	INA.LOWER-LIMIT	X	
NUM(3,1)	INA.UPPER-LIMIT	X	
NUM(3,1)	INA.AMT-OUT-OF-SIG	X	
NUM(3,1)	INA.RATIO-OUT-OF-SIG	X	
NUM(6)	INA.APPR-VOLUME	X	
CHAR(2)	INA.ROUTE-SYSTEM	X	
CHAR(8)	INA.ROUTE-NUMBER	X	
CHAR(10)	INA.REF-POINT	X	
CHAR(3)	INA.INTCHANGE-ELEM	X	
NUM(1)	INA.INTSECT-TYPE	X	
NUM(1)	INA.INTSECT-DESCR	X	

Format	Name	Stored	Generated From
CHAR(8)	INA.RR-XING-NUM	X	
NUM(1)	INA.TRAF-CNTRL-DEV	X	
NUM(1)	INA.TRAFSIG-PROGRESSION	X	
NUM(1)	INA.TRAFSIG-TIMING	X	
NUM(1)	INA.TRAFSIG-CONSTR	X	
NUM(1)	INA.TRAFSIG-HEAD	X	
NUM(1)	INA.TRAFSIG-PEDES-SIG	X	
CHAR(2)	INA.TRAFSIG-TIME-ON	X	
CHAR(2)	INA.TRAFSIG-TIME-OFF	X	
NUM(1)	INA.TRAFSIG-NUM-PHASES	X	
NUM(1)	INA.TRAFSIG-PREEMPT	X	
NUM(1)	INA.ROADWAY-LIGHTING	X	
NUM(1)	INA.GEN-ENVIRON	X	
NUM(2)	INA.SPEC-ENVIRON	X	
CHAR(2)	INA.CATEGORY-DIST	X	
CHAR(2)	INA.CATEGORY-OFFICE	X	
CHAR(4)	INA.SAFETY-YEAR	X	
CHAR(1)	INA.SAFETY-DIST	X	
CHAR(2)	INA.SAFETY-PROJ-NUM	X	
CHAR(2)	INA.SAFETY-CLASS	X	
DATE	INA.EFFECTIVE-DATE	X	
NUM(4)	INA.EFFECTIVE-YEAR		INA.EFFECTIVE-DATE
NUM(2)	INA.EFFECTIVE-MONTH		INA.EFFECTIVE-DATE
NUM(2)	INA.EFFECTIVE-DAY		INA.EFFECTIVE-DATE
CHAR(30)	INA.DESCRIPTION	X	
DATE	INA.DATE-OF-UPDATE	X	
NUM(4)	INA.YEAR-OF-UPDATE		INA.DATE-OF-UPDATE
NUM(2)	INA.MONTH-OF-UPDATE		INA.DATE-OF-UPDATE
NUM(2)	INA.DAY-OF-UPDATE		INA.DATE-OF-UPDATE
NUM(1)	INA.NUM-ROUTES	X	
NUM(1)	INA.NUM-LEGS	X	

INA - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(1)	INA.ACC-FILLED	X	
NUM(3,1)	INA.ACC-RATE	X	
NUM(3,1)	INA.AMT-OUT-OF-SIG	X	
NUM(6)	INA.APPR-VOLUME	X	
NUM(3,1)	INA.AVG-ACC-RATE	X	
CHAR(5)	INA.CATEGORY	X	
CHAR(2)	INA.CATEGORY-DIST	X	
CHAR(2)	INA.CATEGORY-OFFICE	X	
NUM(4)	INA.CENSUS-YR-FROM-CITY		INA.CITY
NUM(4)	INA.CITY	X	
NUM(1)	INA.CONSTR-DIST	X	
NUM(2)	INA.COUNTY	X	
DATE	INA.DATE-OF-UPDATE	X	
NUM(2)	INA.DAY-OF-UPDATE		INA.DATE-OF-UPDATE
CHAR(30)	INA.DESCRIPTION	X	
NUM(1)	INA.DISTRICT-FROM-CNTY		INA.COUNTY
DATE	INA.EFFECTIVE-DATE	X	
NUM(2)	INA.EFFECTIVE-DAY		INA.EFFECTIVE-DATE
NUM(2)	INA.EFFECTIVE-MONTH		INA.EFFECTIVE-DATE
NUM(4)	INA.EFFECTIVE-YEAR		INA.EFFECTIVE-DATE
NUM(3,1)	INA.FATAL-RATE	X	
NUM(1)	INA.GEN-ENVIRON	X	
CHAR(3)	INA.INTCHANGE-ELEM	X	
NUM(1)	INA.INTSECT-DESCR	X	
NUM(1)	INA.INTSECT-TYPE	X	
NUM(2)	INA.LEN-USER-CATEGORY	X	
NUM(3,1)	INA.LOWER-LIMIT	X	
CHAR(2)	INA.MAINT-AREA	X	
NUM(2)	INA.MONTH-OF-UPDATE		INA.DATE-OF-UPDATE
NUM(5)	INA.NUM-A-ACC	X	
NUM(5)	INA.NUM-B-ACC	X	

NUM(5)	INA.NUM-C-ACC	X	
NUM(5)	INA.NUM-DAYS	X	
NUM(5)	INA.NUM-DRY-ACC	X	
NUM(5)	INA.NUM-FAT-ACC	X	
NUM(1)	INA.NUM-LEGS	X	
NUM(5)	INA.NUM-PROP-ACC	X	
NUM(1)	INA.NUM-ROUTES	X	
NUM(5)	INA.NUM-WET-ACC	X	
NUM(7)	INA.POP-FROM-CITY		INA.CITY
NUM(7)	INA.POP-FROM-CNTY		INA.COUNTY
NUM(1)	INA.POP-GROUP-FROM-CITY		INA.CITY
CHAR(2)	INA.PTRL-DIST		INA.PTRL-STATION
CHAR(4)	INA.PTRL-STATION	X	

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Format	Name	Stored	Generated From
NUM(3,1)	INA.RATIO-OUT-OF-SIG	X	
CHAR(2)	INA.RDC-FROM-CNTY		INA.COUNTY
CHAR(2)	INA.RECORD-NUMBER	X	
CHAR(1)	INA.RECORD-TYPE	X	
CHAR(10)	INA.REF-POINT	X	
NUM(1)	INA.ROADWAY-LIGHTING	X	
CHAR(8)	INA.ROUTE-NUMBER	X	
CHAR(2)	INA.ROUTE-SYSTEM	X	
CHAR(8)	INA.RR-XING-NUM	X	
NUM(1)	INA.RUR-URB-FROM-CITY		INA.CITY
CHAR(2)	INA.SAFETY-CLASS	X	
CHAR(1)	INA.SAFETY-DIST	X	
CHAR(2)	INA.SAFETY-PROJ-NUM	X	
CHAR(4)	INA.SAFETY-YEAR	X	
NUM(3,1)	INA.SEV-RATE	X	
CHAR(1)	INA.SIG-FILLED	X	
NUM(2)	INA.SPEC-ENVIRON	X	
NUM(5)	INA.SPEC-NUM-DAYS	X	
NUM(5)	INA.TOT-NUM-ACC	X	
NUM(1)	INA.TRAF-CNTRL-DEV	X	
NUM(1)	INA.TRAFSIG-CONSTR	X	
NUM(1)	INA.TRAFSIG-HEAD	X	
NUM(1)	INA.TRAFSIG-NUM-PHASES	X	

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        NUM(1)     INA.TRAFSIG-PEDES-SIG        X
        NUM(1)     INA.TRAFSIG-PROGRESSION      X
        CHAR(2)    INA.TRAFSIG-TIME-OFF         X
        CHAR(2)    INA.TRAFSIG-TIME-ON          X
        NUM(1)     INA.TRAFSIG-TIMING           X
        NUM(3,1)   INA.UPPER-LIMIT              X
        NUM(4)     INA.URB-AREA                 X
        CHAR(18)   INA.USER-CATEGORY            X
        NUM(4,1)   INA.WET-DRY-PERCENT          X
        NUM(4,1)   INA.WET-TOTAL-PERCENT        X
        NUM(4)     INA.YEAR-OF-UPDATE                 INA.DATE-OF-UPDATE
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INA - Descriptions of Data Elements

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INA.ACC-FILLED - CHAR(1) - Accident Segment Presence Indicator.

'Y' Yes -- Accident segment is present in record.
'N' No -- Accident segment is not present in record.

INA.ACC-RATE - NUM(3,1) - Accident Rate.

If INA.ACC-FILLED = 'Y' then INA.ACC-RATE contains accident rate (0.0 - 99.9).

If INA.ACC-FILLED = 'N' then INA.ACC-RATE contains 0.0.

INA.AMT-OUT-OF-SIG - NUM(3,1) - Amount out of significance.

```
             If INA.SIG-FILLED = 'Y' then INA.AMT-OUT-OF-SIG contains the
                                          amount out of significance:

                  Let Ri = accident rate at intersection.
                      Ui = upper significance limit.
                      Li = lower significance limit.
                      Ao = amount out of significance.

                      If Li <= Ri <= Ui, then Ao = 0.0.
                      If Ri > Ui, then Ao = Ri - Ui (0.1 - 99.9)
                      If Ri < Li, then Ao = Ri - Li (-99.9 - -0.1)

             If INA.SIG-FILLED = 'N' then INA.AMT-OUT-OF-SIG contains 0.0.

        INA.APPR-VOLUME - NUM(6) - Approach Volume.

             0-999999  Number of vehicles entering intersection per day.

        INA.AVG-ACC-RATE - RATE - NUM(3,1) - Average Accident Rate.

             If INA.SIG-FILLED = 'Y' then INA.AVE-ACC-RATE contains Ra, the
             average accident rate used for computing significance limits.

             If INA.SIG-FILLED = 'N' then INA.AVG-ACC-RATE contains 0.0.

        INA.CATEGORY - CHAR(5) - Intersection Category.

             'abcde'

             a = Intersection type (INA.INTSECT-TYPE)
             b = Intersection description (INA.INTSECT-DESCR)
             c = Traffic control devices (INA.TRAF-CNTRL-DEV)
             d = General environment (INA.GEN-ENVIRON)
             e = Roadway description (INL.ROAD-DESCR)

        INA.CATEGORY-DIST - CHAR(2) - Category Assigned by District.
        INA.CATEGORY-OFFICE - CHAR(2) - Category Assigned by Central Office.

             '  '          No category has been assigned
             '01' - '99'   Category assigned to intersection
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        INA.CENSUS-YR-FROM-CITY - NUM(4) - Census Year.

             0000        Nonmunicipal
             0001-9999   Census year

        INA.CITY - NUM(4) - City Number.
```

0000 Nonmunicipal
0001-9998 City number

Note: In select statement, cities may be identified by number (eg., INA.CITY *EQ* 2585) or by name (eg., INA.CITY *EQ* 'ST-PAUL').

INA.CONSTR-DIST - NUM(1) - Construction District.

0 Unknown or non-trunk
1-9 Construction district

INA.COUNTY - NUM(2) - County Number.

01-87 County number.

Note: In select statements, counties may be identified by number (eg., INA.COUNTY *EQ* 39) or by name (eg.,INA.COUNTY *EQ* 'LAKE-OF-THE-WOODS').

INA.DATE-OF-UPDATE - DATE - Date of Update.

00/00/0000 Record has not been updated since initial load.
mm/dd/yyyy Date on which record was most recently updated.

Note: This date is the date on which the corresponding INT record was updated. INA records have no update capabilities.

INA.DAY-OF-UPDATE - NUM(2) - Day of update.

00-31 day portion of INA.DATE-OF-UPDATE.

INA.DESCRIPTION - CHAR(30) - Verval Description.

This field contains a 30-character verbal description.

INA.DISTRICT-FROM-CNTY - NUM(1) - Construction District.

0 Unknown
1-9 Construction district as determined from county number.

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INA.EFFECTIVE-DATE - DATE - Effective date.
INA.EFFECTIVE-DAY - NUM(2) - Effective day.
INA.EFFECTIVE-MONTH - NUM(2) - Effective month.
INA.EFFECTIVE-YEAR - NUM(4) - Effective year.

00/00/0000 Accidents have been geocoded since system start-up.
mm/dd/yyyy Date from which accidents are geocoded.

INA.EFFECTIVE-DAY refers to dd portion (00-31).
INA.EFFECTIVE-MONTH refers to mm portion (00-12).
INA.EFFECTIVE-YEAR refers to YYYY portion (0000-9999).

INA.FATAL-RATE - NUM(3,1) - Fatal Accident Rate

If INA.ACC-FILLED = 'Y' then INA.FATAL-RATE contains fatal accident (0.0 - 99.9).

If INA.ACC-FILLED = 'N' then INA.FATAL-RATE contains 0.0.

Computed as: $\frac{10{,}000{,}000 \times (\text{number of persons killed})}{(\text{approach volume}) \times (\text{number of days})}$

INA.GEN-ENVIRON - NUM(1) - General Environment.

1	Urban	3	Non-interstate city bypass
2	Suburban	4	Rural

INA.INTCHANGE-ELEM - CHAR(3) - Interchange element code.

' '	Not intersection within interchange.
'100' - '999'	Interchange element code.
'A00' - 'Z99'	INterchange element code.

INA.INTSECT-DESCR - NUM(1) - Intersection Description.

0-9 Description -- See INT.INTSECT-DESCR for codes.

INA.INTSECT-TYPE - NUM(1) - Intersection Type.

1	Interchange	4	Mid-block pedestrian crossing
2	Intersection within interchange	5	Railroad crossing
3	Intersection	6	Recreational crossing

INA.LEN-USER-CATEGORY - NUM(2) - Length of User Category Field.

If +CATEGORIES was not included when the file was created, this field contains 0.

If +CATEGORIES was included when the file was created, this field contains the total length of the data element(s) specified (1-18).

INA.LOWER-LIMIT - NUM(3,1) - Lower Significance Limit.

If INA.SIG-FILLED = 'Y' then INA.LOWER-LIMIT contains the lower significance limit (-99.9 - 99.9).

If INA.SIG-FILLED = 'N' then INA.LOWER-LIMIT contains 0.0.

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INA.MAINT-AREA - CHAR(2) - Maintenance Area.

' ' Unknown or non-trunk
'na' Maintenance are (n=1,9, a=A/B)

INA.MONTH-OF-UPDATE - NUM(2) - Month of Update.

INA.MONTH-OF-UPDATE contains the mm portion of the date of update (INA.DATE-OF-UPDATE).

INA.NUM-A-ACC - NUM(5) - Number of A severity accidents.
INA.NUM-B-ACC - NUM(5) - Number of B severity accidents.
INA.NUM-C-ACC - NUM(5) - Number of C and U severity accidents.

These fields contain numbers of accidetns occurring at the intersection. Only selected accidents are included. Each field ranges from 0-99999.

When INA.ACC-FILLED = 'N', each field contains 0.

INA.NUM-DAYS - NUM(5) - Number of Days.

1-99999 Number of days between st-dat and en-dat.

st-dat is either START-DATE or the intersection's effective date, whichever is more recent.

en-dat is END-DATE.

INA.NUM-DRY-ACC - NUM(5) - Number of accidents occurring on dry surfaces.
INA.NUM-FAT-ACC - NUM(5) - Number of fatal accidents (severity K).

These fields contian numbers of accidents at the intersection. Only selected accidents are included. Each field ranges from 0-99999.

When INA.ACC-FILLED = 'N', each field contains 0.

INA.NUM-LEGS - NUM(1) - Number of legs.

1-9 Number of legs in this intersection.

INA.NUM-PROP-ACC - NUM(5) - Number of property damage accidents (severity P).

This field contains the number of property damage accidents that occurred at the intersection. Only selected accidents are included.

When INA.ACC-FILLED = 'N', this field contains 0.

INA.NUM-ROUTES - NUM(1) - Number of Intersecting Routes.

1-9 Number of routes intersecting at this intersection (each route contributes one or two legs to the intersection).

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INA.NUM-WET-ACC - NUM(5) - Number of Wet Accidents.

This field contains the number of accidents that occurred on wet surfaces. Only selected accidents are included.

When INA.ACC-FILLED = 'N', this field contains 0.

INA.POP-FROM-CITY - NUM(7) - Population of city.

0	Nonmunicipal
1-9999999	Population of city

INA.POP-FROM-CNTY - NUM(7) - Population of county.

1-9999999	Population of county

INA.POP-GROUP-FROM-CITY - NUM(1) - Population Group.

1	Urban - 250,000 and over
2	Urban - 100,000 - 249,999
3	Urban - 50,000 - 99,999
4	Urban - 25,000 - 49,999
5	Urban - 10,000 - 24,999
6	Urban - 5,000 - 9,999
7	Rural - 2,500 - 4,999
8	Rural - 1,000 - 2,499
9	Rural - 1 - 999 or nonmunicipal

INA.PTRL-DIST - CHAR(2) - Patrol District

' '	Unknown or non-trunk

```
          '00'          Trunk - Not in patrol station
          '21' - '45'   Trunk - Patrol district

        INA.PTRL-STATION - CHAR(4) - Patrol Station

          '    '              Unknown or non-trunk
          '0000'              Trunk - Not in patrol station
          '2110' - '4560'     Trunk - Patrol station

        INA.RATIO-OUT-OF-SIG - NUM(3,1) - Ratio out of significance.

          1.1 - 99.9     Above upper limit
          0.0 - 1.0      Ra <= Ri <= Ui
         -1.0 - 0.0      Li <= Ri <= Ra
        -99.9 - -1.1     Below lower limit

          Computed as:

                                    Ri - Ra
             If Ri >= Ra then ratio -------
                                    Ui - Ra

                                    Ri - Ra
             If Ri < Ra then ratio -------
                                    Ra - Li

          When INA.SIG-FILLED = 'N', INA.RATIO-OUT-OF-SIG contains 0.0.
 PAGE E-INA-9 OF 12
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        INA.RECORD-NUMBER - CHAR(2) - Record Number.

          For header records, this field distinguishes record types.

          For non-header records, this field contains blanks.

        INA.RECORD-TYPE - CHAR(1) - Record Type.

          '1'   Command header (includes +SORT)
          '2'   +ROUTES header
          '3'   +CATEGORIES header
          '4'   +SELECT header
          '9'   Intersection record

        INA.REF-POINT - CHAR(10) - Reference Point.

          'nnn+nn.nnn'   nnn = Reference post
                         +nn.nnn = distance from reference post

        INA.ROADWAY-LIGHTING - NUM(1) - Roadway lighting.
```

See INT.ROADWAY-LIGHTING for listing of codes.

INA.ROUTE-NUMBER - CHAR(8) - Route Number.
INA.ROUTE-SYSTEM - CHAR(2) - Route System.
INA.RR-XING-NUM - CHAR(8) - Railroad Crossing Number.

See corresponding INT.name data elements.

INA.RUR-URB-FROM-CITY - NUM(1) - Rural/Urban.

1 Rural -- Nonmunicipal or less than 5,000.
2 Urban -- 5,000 - 49,999.
3 Urbanized -- 50,000 and up.

INA.SAFETY-CLASS - CHAR(2) - Safety Improvement Classification.
INA.SAFETY-DIST - CHAR(1) - Safety Improvement District.
INA.SAFETY-PROJ-NUM - CHAR(2) - Safety Improvement Project Number.
INA.SAFETY-YEAR - CHAR(4) - Safety Improvement Year.

See corresponding INT.name data elements.

INA.SEV-RATE - NUM(3,1) - Severity Rate.

If INA.ACC-FILLED = 'Y' then INA.SEV-RATE contains severity rate
(0.0 - 99.9).
If INA.ACC-FILLED = 'N' then INA.SEV-RATE contains 0.0.

INA.SIG-FILLED - CHAR(1) - Sig-limits Segment Presence Indicator.

'Y' Yes -- Sig-limits segment is present.
'N' No -- Sig-limits segment is not present.

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INA.SPEC-ENVIRON - NUM(2) - Specific Environment.

See INT.SPEC-ENVIRON for codes.

INA.SPEC-NUM-DAYS - NUM(5) - Specified Number of Days.

1-99999 Number of days between START-DATE and END-DATE.
0 Accident segment not present (INA.ACC-FILLED = 'N').

INA.TOT-NUM-ACC - NUM(5) - Total Number of Selected Accidents.

0-99999   Total number of selected accidents at intersection.

If INA.ACC-FILLED = 'N', INA.TOT-NUM-ACC contains 0.

INA.TRAF-CNTRL-DEV - NUM(1) - Traffic Control Devices.
INA.TRAFSIG-CONSTR - NUM(1) - Traffic Signals Construction.
INA.TRAFSIG-HEAD - NUM(1) - Traffic Signals Head Placement.
INA.TRAFSIG-NUM-PHASES - NUM(1) - Traffic Signals Number of Phases.
INA.TRAFSIG-PEDES-SIG - NUM(1) - Traffic Signals Pedestrian Signals.
INA.TRAFSIG-PREEMPT - NUM(1) - Traffice Signals Preemption.
INA.TRAFSIG-PROGRESSION - NUM(1) - Traffic Signals Progression.
INA.TRAFSIG-TIME-OFF - CHAR(2) - Traffic Signals Time Off.
INA.TRAFSIG-TIME-ON - CHAR(2) - Traffic Signals Time On.
INA.TRAFSIG-TIMING - NUM(1) - Traffic Signals Timing.

See corresponding INT.name data elements.

INA.UPPER-LIMIT - NUM(3,1) - Upper Significance Limit.

If INA.SIG-FILLED = 'Y' then INA.UPPER-LIMIT contains the upper significance limit (-99.9 - 99.9).

If INA.SIG-FILLED = 'N' then INA.UPPER-LIMIT contains 0.0.

INA.URB-AREA - NUM(4) - Urban Area.

0000   Rural
0001-9999   Urban area number

INA.USER-CATEGORY - CHAR(18) - User Category

If +CATEGORIES is used, this field contains the user category. Otherwise, this field contains blanks.

INA.WET-DRY-PERCENT - NUM(4,1) - Wet:wet+dry Percent.

If INA.ACC-FILLED = 'Y' and INA.NUM-WET-ACC (W) + INA.NUM-DRY-ACC (D) is not zero, INA.WET-DRY-PERCENT contains:

$$\% = W / (D+W) \times 100 \qquad (0.0 - 100.0)$$

Otherwise, INA.WET-DRY-PERCENT contains 0.0.

INA.WET-TOTAL-PERCENT - NUM(4,1) - Wet:total Percent.

If INA.ACC-FILLED = 'Y' and INA.TOT-NUM-ACC (T) is not zero,
INA.WET-TOTAL-PERCENT contains:

% = W / T x 100 (0.0 - 100.0)

Otherwise, INA.WET-TOTAL-PERCENT contains 0.0.

INA.YEAR-OF-UPDATE - NUM(4) - Year of Update.

This field contains the yyyy portion of INA.DATE-OF-UPDATE.

INL - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(2)	INL.ROUTE-SYSTEM	X	
CHAR(8)	INL.ROUTE-NUMBER	X	
CHAR(10)	INL.REF-POINT	X	
NUM(1)	INL.ROAD-DESCR	X	
NUM(4)	INL.LOWER-LIMIT	X	
NUM(4)	INL.UPPER-LIMIT	X	
NUM(1)	INL.NUM-LEGS	X	
NUM(1)	INL.LEG-NUM-1	X	
NUM(1)	INL.DIRECTION-1	X	
NUM(6)	INL.ADT-1	X	
CHAR(4)	INL.YR-ADT-1	X	
NUM(2)	INL.APPR-SPEED-1	X	
NUM(1)	INL.APPR-TRAF-CNTRL-1	X	
NUM(1)	INL.APPR-LANES-OP-1	X	
NUM(1)	INL.APPR-LANES-P-1	X	
NUM(1)	INL.LEAVE-LANES-OP-1	X	
NUM(1)	INL.LEAVE-LANES-P-1	X	
NUM(1)	INL.APPR-TURN-LANES-1	X	
CHAR(7)	INL.APPR-COMMENTS-1	X	
NUM(1)	INL.LEG-NUM-2	X	
NUM(1)	INL.DIRECTION-2	X	
NUM(6)	INL.ADT-2	X	
CHAR(4)	INL.YR-ADT-2	X	
NUM(2)	INL.APPR-SPEED-2	X	
NUM(1)	INL.APPR-TRAF-CNTRL-2	X	
NUM(1)	INL.APPR-LANES-OP-2	X	
NUM(1)	INL.APPR-LANES-P-2	X	
NUM(1)	INL.LEAVE-LANES-OP-2	X	
NUM(1)	INL.LEAVE-LANES-P-2	X	
NUM(1)	INL.APPR-TURN-LANES-2	X	
CHAR(7)	INL.APPR-COMMENTS-2	X	

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INL - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
NUM(6)	INL.ADT-1	X	
NUM(6)	INL.ADT-2	X	
CHAR(7)	INL.APPR-COMMENTS-1	X	
CHAR(7)	INL.APPR-COMMENTS-2	X	
NUM(1)	INL.APPR-LANES-OP-1	X	
NUM(1)	INL.APPR-LANES-OP-2	X	
NUM(1)	INL.APPR-LANES-P-1	X	
NUM(1)	INL.APPR-LANES-P-2	X	
NUM(2)	INL.APPR-SPEED-1	X	
NUM(2)	INL.APPR-SPEED-2	X	
NUM(1)	INL.APPR-TRAF-CNTRL-1	X	
NUM(1)	INL.APPR-TRAF-CNTRL-2	X	
NUM(1)	INL.TURN-LANES-1	X	
NUM(1)	INL.TURN-LANES-2	X	
NUM(1)	INL.DIRECTION-1	X	
NUM(1)	INL.DIRECTION-2	X	
NUM(1)	INL.LEAVE-LANES-OP-1	X	
NUM(1)	INL.LEAVE-LANES-OP-2	X	
NUM(1)	INL.LEAVE-LANES-P-1	X	
NUM(1)	INL.LEAVE-LANES-P-2	X	
NUM(1)	INL.LEG-NUM-1	X	
NUM(1)	INL.LEG-NUM-2	X	
NUM(4)	INL.LOWER-LIMIT	X	
NUM(1)	INL.NUM-LEGS	X	
CHAR(10)	INL.REF-POINT	X	
NUM(1)	INL.ROAD-DESCR	X	
CHAR(8)	INL.ROUTE-NUMBER	X	
CHAR(2)	INL.ROUTE-SYSTEM	X	
NUM(4)	INL.UPPER-LIMIT	X	
CHAR(4)	INL.YR-ADT-1	X	
CHAR(4)	INL.YR-ADT-2	X	

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INL - Descriptions of Data Elements
****

INL.ADT-1 - NUM(6) - Average Daily Traffic on First Leg

000000	Not applicable or no traffic
000001-999999	2-way volume on leg (most recent year)

INL.ADT-2 - NUM(6) - Average Daily Traffic on Second Leg

000000	Not applicable, no second leg or no traffic
000001-999999	2-way volume on leg (most recent year)

INL.APPR-COMMENTS-1 - CHAR(7) - Approach Comments for First Leg
INL.APPR-COMMENTS-2 - CHAR(7) - Approach Comments for Second Leg

' '	Not applicable
'xxxxxxx'	Up to 7 comments codes

Note: The comments codes are in alphabetical order.
Non-blank codes are left-justified (eg., 'EGK '
can be stored but 'EG K ' cannot).

' '	Not applicable
'A'	Rumble strips
'B'	Limited visibility
'C'	Tangent
'D'	Curve left

'E' Curve right
'F' Steep downgrade
'G' Raised median channelization
'H' Painted median channelization
'I' Depressed median channelization
'J' Raised islands - Non-median
'K' Painted islands - Non-median
'L' Depressed islands - Non-median
'M' Bus stop - Near side
'N' Bus stop - Far side
'O' One-way - Entering
'P' One-way - Leaving
'Q' Braided ramp and frontage road
'R' Combined ramp and frontage road
'S' Frontage road or driveway close to intersection
'T' Skewed
'U' No passing zone
'V' Span wire pole with 30 foot setback
'W' Elderly pedestrian activity
'X' No right turn on red
'Y' (reserved for future use)
'Z' (reserved for future use)

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INL.APPR-LANES-OP-1 - NUM(1) - Off-peak Approach Lanes on First Leg
INL.APPR-LANES-OP-2 - NUM(1) - Off-peak Approach Lanes on Second Leg
INL.APPR-LANES-P-1 - NUM(1) - Peak Approach Lanes on First Leg
INL.APPR-LANES-P-2 - NUM(1) - Peak Approach Lanes on Second Leg

0-9 Number of through lanes

INL.APPR-SPEED-1 - NUM(2) - Approach Speed Limit on First Leg
INL.APPR-SPEED-2 - NUM(2) - Approach Speed Limit on Second Leg

00 Not applicable
01-99 Approach speed limit in miles per hour

INL.APPR-TRAF-CNTRL-1 - NUM(1) - Approach Traffic Controls on First Leg
INL.APPR-TRAF-CNTRL-2 - NUM(1) - Approach Traffic Controls on Second Leg

If INT.INTSECT-TYPE does not contain a 5:

0 Not applicable
1 Thru or one-way leaving intersection
2 Yield sign
3 Stop sign
4 Flasher - Amber
5 Flasher - Red
6 Signal

If INT.INTSECT-TYPE contains a 5:

0 Not applicable
1 Crossbuck plus RXR
2 Crossbuck plus RXR plus other warning sign(s)
3 Crossbuck plus stop sign
4 Railroad crossing signal w/o gates - Pedestal mount
5 Railroad crossing signal w/o gates - Cantilever
6 Railroad crossing signal with gates - Pedestal mount
7 Railroad crossing signal with gates - Cantilever
8 Other or none

INL.APPR-TURN-LANES-1 - NUM(1) - Approach Turn Lanes on First Leg
INL.APPR-TURN-LANES-2 - NUM(1) - Approach Turn Lanes on Second Leg

0 Not applicable
1 Bypass lane
2 Free right turn lane only
3 Right turn lane only
4 Left turn lane only
5 Left and right turn lanes
6 Left and free right turn lanes
7 Truck stop/start lane
8 None

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INL.DIRECTION-1 - NUM(1) - Direction From Intersection of First Leg
INL.DIRECTION-2 - NUM(1) - Direction From Intersection of Second Leg

0 Not applicable
1 North
2 Northeast
3 East

4 Southeast
5 South
6 Southwest
7 West
8 Northwest

INL.LEAVE-LANES-OP-1 - NUM(1) - Off-peak Leaving Lanes on First Leg
INL.LEAVE-LANES-OP-2 - NUM(1) - Off-peak Leaving Lanes on Second Leg
INL.LEAVE-LANES-P-1 - NUM(1) - Peak Leaving Lanes on First Leg
INL.LEAVE-LANES-P-2 - NUM(1) - Peak Leaving Lanes on Second Leg

0-9 Number of through lanes

INL.LEG-NUM-1 - NUM(1) - Leg Number of First Leg
INL.LEG-NUM-2 - NUM(1) - Leg Number of Second Leg

0 Not applicable
1-9 Leg number assigned to this leg

INL.LOWER-LIMIT - NUM(4) - Lower Reference Point Limit

0000-9999 Distance in feet from intersection towards beginning of route used as lower search limit for accident occurrences

INL.NUM-LEGS - NUM(1) - Number of Legs Described in This INL Record

1-2 Number of legs described

INL.REF-POINT - CHAR(10) - Reference Point on This Intersecting Route

'000+00.000' - '999+99.999' Reference point

INL.ROAD-DESCR - NUM(1) - Road Description

1	2 lanes 2-way
2	3/5 lanes undivided (2-way with left turn lane)
3	4/6 lanes undivided (No left turn lanes)
4	4/6 lanes undivided (with left turn lanes)
5	4/6 lanes divided (no left turn lanes)
6	4/6 lanes divided (with left turn lanes)
7	One-way
8	Freeway
9	Other

INL.ROUTE-NUMBER - CHAR(8) - Route Number of This Intersecting Route

'nnnnnnnx' Route number (n = 0-9, x = 0-9 or A-Z)

Route systems '01','02','03': '00000nnn' or '0000nnna' (a = A-Z)

Route systems '05' and '10': 'ccccnnnx' (cccc = city number)

Other route systems: 'cc00nnnx' (cc = county number)

INL.ROUTE-SYSTEM - CHAR(2) - Route Stsyem of this Intersecting Route

'01'	ISTH	'09'	UTWN	'16'	MIL
'02'	USTH	'10'	MUN	'17'	NATM
'03'	MNTH	'11'	NATP	'18'	NATW
'04'	CSAH	'12'	NFD	'19'	FRNT
'05'	MSAS	'13'	IND	'20'	SGAM
'07'	CNTY	'14'	SFR	'23'	PRIV
'08'	TWNS	'15'	SPRK		

INL.UPPER-LIMIT - NUM(4) - Upper Reference Point Limit

0000-9999 Distance in feet from intersection towards end of route used as upper search limit for accident occurrences

INL.YR-ADT-1 - CHAR(4) - Year of ADT on First Leg

'0000' - 'nnnn'	Year of ADT on the first leg (where nn is the current year). Most recent year of data only.
' '	(blanks) No ADT available for this leg

INL.YR-ADT-2 - CHAR(4) - Year of ADT on Second Leg

'0000' - 'nnnn'	Year of ADT on the second leg (where nn is the current year). Most recent year of data only.
' '	(Blank) No ADT available for this leg, or no leg

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INT - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(2)	INT.ROUTE-SYSTEM	X	
CHAR(8)	INT.ROUTE-NUMBER	X	
CHAR(10)	INT.REF-POINT	X	
CHAR(3)	INT.INTCHANGE-ELEM	X	
NUM(1)	INT.INTSECT-TYPE	X	
NUM(1)	INT.INTSECT-DESCR	X	
CHAR(8)	INT.RR-XING-NUM	X	
NUM(1)	INT.TRAF-CNTRL-DEV	X	
NUM(1)	INT.TRAFSIG-PROGRESSION	X	
NUM(1)	INT.TRAFSIG-TIMING	X	
NUM(1)	INT.TRAFSIG-CONSTR	X	
NUM(1)	INT.TRAFSIG-HEAD	X	
NUM(1)	INT.TRAFSIG-PEDES-SIG	X	
CHAR(2)	INT.TRAFSIG-TIME-ON	X	
CHAR(2)	INT.TRAFSIG-TIME-OFF	X	
NUM(1)	INT.TRAFSIG-NUM-PHASES	X	
NUM(1)	INT.TRAFSIG-PREEMPT	X	
NUM(1)	INT.ROADWAY-LIGHTING	X	
NUM(1)	INT.GEN-ENVIRON	X	
NUM(2)	INT.SPEC-ENVIRON	X	
CHAR(2)	INT.CATEGORY-DIST	X	
CHAR(2)	INT.CATEGORY-OFFICE	X	
CHAR(4)	INT.SAFETY-YEAR	X	
CHAR(1)	INT.SAFETY-DIST	X	
CHAR(2)	INT.SAFETY-PROJ-NUM	X	
CHAR(2)	INT.SAFETY-CLASS	X	
DATE	INT.EFFECTIVE-DATE	X	
NUM(4)	INT.EFFECTIVE-YEAR		INT.EFFECTIVE-DATE
NUM(2)	INT.EFFECTIVE-MONTH		INT.EFFECTIVE-DATE
NUM(2)	INT.EFFECTIVE-DAY		INT.EFFECTIVE-DATE
CHAR(30)	INT.DESCRIPTION	X	
DATE	INT.DATE-OF-UPDATE	X	
NUM(4)	INT.YEAR-OF-UPDATE		INT.DATE-OF-UPDATE
NUM(2)	INT.MONTH-OF-UPDATE		INT.DATE-OF-UPDATE

NUM(2)	INT.DAY-OF-UPDATE		INT.DATE-OF-UPDATE
NUM(1)	INT.NUM-ROUTES	X	
NUM(1)	INT.NUM-LEGS	X	
NUM(6)	INT.TOTAL-APPR-VOL		Sum of INL ADT's

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INT - Listing of Names in Alphabetical Order

Format	Name	Stored	Generated From
CHAR(2)	INT.CATEGORY-DIST	X	
CHAR(2)	INT.CATEGORY-OFFICE	X	
DATE	INT.DATE-OF-UPDATE	X	
NUM(2)	INT.DAY-OF-UPDATE		INT.DATE-OF-UPDATE
CHAR(30)	INT.DESCRIPTION	X	
DATE	INT.EFFECTIVE-DATE	X	
NUM(2)	INT.EFFECTIVE-DAY		INT.EFFECTIVE-DATE
NUM(2)	INT.EFFECTIVE-MONTH		INT.EFFECTIVE-DATE
NUM(4)	INT.EFFECTIVE-YEAR		INT.EFFECTIVE-DATE
NUM(1)	INT.GEN-ENVIRON	X	
CHAR(3)	INT.INTCHANGE-ELEM	X	
NUM(1)	INT.INTSECT-DESCR	X	
NUM(1)	INT.INTSECT-TYPE	X	
NUM(2)	INT.MONTH-OF-UPDATE		INT.DATE-OF-UPDATE
NUM(1)	INT.NUM-LEGS	X	
NUM(1)	INT.NUM-ROUTES	X	
CHAR(10)	INT.REF-POINT	X	
NUM(1)	INT.ROADWAY-LIGHTING	X	
CHAR(8)	INT.ROUTE-NUMBER	X	
CHAR(2)	INT.ROUTE-SYSTEM	X	
CHAR(8)	INT.RR-XING-NUM	X	
CHAR(2)	INT.SAFETY-CLASS	X	
CHAR(1)	INT.SAFETY-DIST	X	
CHAR(2)	INT.SAFETY-PROJ-NUM	X	

CHAR(4)	INT.SAFETY-YEAR	X	
NUM(2)	INT.SPEC-ENVIRON	X	
NUM(6)	INT.TOTAL-APPR-VOL		Sum of INL ADT's
NUM(1)	INT.TRAF-CNTRL-DEV	X	
NUM(1)	INT.TRAFSIG-CONSTR	X	
NUM(1)	INT.TRAFSIG-HEAD	X	
NUM(1)	INT.TRAFSIG-NUM-PHASES	X	
NUM(1)	INT.TRAFSIG-PEDES-SIG	X	
NUM(1)	INT.TRAFSIG-PREEMPT	X	
NUM(1)	INT.TRAFSIG-PROGRESSION	X	
CHAR(2)	INT.TRAFSIG-TIME-OFF	X	
CHAR(2)	INT.TRAFSIG-TIME-ON	X	
NUM(1)	INT.TRAFSIG-TIMING	X	
NUM(4)	INT.YEAR-OF-UPDATE		INT.DATE-OF-UPDATE

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INT - Descriptions of Data Elements
****

INT.CATEGORY-DIST - CHAR(2) - Category Assigned by District
INT.CATEGORY-OFFICE - CHAR(2) - Category Assigned by Central Office

' '	No category has been assigned
'01' - '99'	Category assigned

INT.DATE-OF-UPDATE - DATE - Most Recent Date on Which Record Was Updated

00/00/0000	Record has not been updated since initial file load
mm/dd/yyyy	Most recent date on which record was updated

mm=month dd=day yyyy=year

INT.DAY-OF-UPDATE - NUM(2) - Day of Most Recent Date on Which Record Was Updated

00	Record has not been updated since initail file load

01-31 Day of month of most recent date on which record was updated

INT.DESCRIPTION - CHAR(30) - Verbal Description

This field contains a verbal description of the inrersection.

INT.EFFECTIVE-DATE - DATE - Date the intersection major changes

00/00/0000	No changes since intersection constructed
01/01/1976 - 12/31/9999	Date the intersection came into existence or most recent major geometric (add turn lanes, realign, etc.) or traffic control device revision.

INT.EFFECTIVE-DAY - NUM(2) - Day (dd) Portion of Effective Date

00	No effective date
01-31	Day of month of effective date

INT.EFFECTIVE-MONTH - NUM(2) - Month (mm) Portion of Effective Date

00	No effective date
01-12	Month of effective date

INT.EFFECTIVE-YEAR - NUM(4) - Year (yyyy) Portion of Effective Date

0000	No effective date
1976-9999	Year of effective date.

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INT.GEN-ENVIRON - NUM(1) - General Environment

1	Urban
2	Suburban
3	City bypass (not for interstate system)
4	Rural

INT.INTCHANGE-ELEM - CHAR(3) - Interchange Element Code

' '	Not intersection within interchange
'100' - '999'	Intersection within interchange -- Interchange

element code
'A00' - 'Z99' Intersection within interchange -- Interchange
element code

INT.INTSECT-DESCR - NUM(1) - Intersecton Description

If INT.INTSECT-TYPE contains 1 or 2:

1 Diamond	6 Cloverleaf
2 Half diamond	7 Partial directional (4+ legs)
3 Folded diamond	8 Full directional
4 Other diamond	9 Complex
5 Partial Directional (3 legs)	0 Other

If INT.INTSECT-TYPE contains 3:

1	"Tee"	3	Crossing at right angles
2	"Wye"	4	Crossing skewed
		5	Greater than 4 legs

If INT.INTSECT-TYPE contains 4:

1	School crossing
2	Central business district crossing
3	Other crossing

If INT.INTSECT-TYPE contains 5:

1	Single track - Right angle
2	Single track - Skewed
3	Multi-track - Right angle
4	Multi-track - Skewed

If INT.INTSECT-TYPE contains 6:

0	Not applicable

INT.INTSECT-TYPE - NUM(1) - Intersection Type

1	Interchange
2	Intersection within interchange
3	Intersection
4	Mid-block pedestrian crossing
5	Railroad crossing
6	Recreational crossing

INT.MONTH-OF-UPDATE - NUM(2) - Month of Update

00 Record has not been updated since system start-up
01-12 Month portion of most recent date record was updated

INT.NUM-LEGS - NUM(1) - Number of Legs

1-9 Number of legs in intersection

INT.NUM-ROUTES - NUM(1) - Number of Routes Involved in Intersection

1-9 Number of routes involved

Note: This value equals the number of INL segments that correspond to the INT record.

INT.REF-POINT - CHAR(10) - Reference Point

'000+00.000' - '999+99.999' Reference point on controlling route

INT.ROADWAY-LIGHTING - NUM(1) - Roadway Lighting

1	None	5	Partial (energy conservation program)
2	Partial	6	Full (energy conservation program)
3	Full	7	Continuous (energy conservation program)
4	Continuous	8	Point lighting

INT.ROUTE-NUMBER - CHAR(8) - Route Number

'nnnnnnnx' Route number (n = 0-9, x = 0-9 or A-Z) on controlling route

Route systems '01' through '03': '0000nnn' or '0000nnna' (a = A-Z)

Route systems '05' and '10': 'ccccnnnx' (cccc = city number)

Other route systems: 'cc00nnnx' (cc = county number)

INT.ROUTE-SYSTEM - CHAR(2) - Route System

'01'	ISTH	'09'	UTWN	'16'	MIL
'02'	USTH	'10'	MUN	'17'	NATM
'03'	MNTH	'11'	NATP	'18'	NATW
'04'	CSAH	'12'	NFD	'19'	FRNT
'05'	MSAS	'13'	IND	'20'	SGAM
'07'	CNTY	'14'	SFR	'23'	PRIV
'08'	TWNS	'15'	SPRK		

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INT.RR-XING-NUM - CHAR(8) - Railroad Crossing Number

' '	Not a railroad crossing ornumber not stated
'nnnnnnna'	Railroad crossing number (n=0-9, a = A-Z or blank)

INT.SAFETY-CLASS - CHAR(2) - Safety Improvement Classification

' '	No safety improvement
'01' - '99'	Safety classification code

INT.SAFETY-DIST - CHAR(1) - Safety Improvement District

' '	No safety improvement
'1' - '9'	District responsible for improvement

INT.SAFETY-PROJ-NUM - CHAR(2) - Safety Improvement Project Number

' '	No safety improvement
'01' - '99'	Project number assigned to safety improvement

INT.SAFETY-YEAR - CHAR(4) - Safety Improvement Year

' '	No safety improvement
'1970' - '9999'	Year of safety improvement

INT.SPEC-ENVIRON - NUM(2) - Specific Environment

01	Central business district
02	Strip commercial area
03	Shopping center
04	Industrial area
05	Residential area
06	School or school crossing
07	Agriculture and isolated business/school
08	Agriculture
09	Emergency services (hospital, fire station, or police)
10	Forest
11	Park or campground
12	Other recreational area (eg., golf course)
13	Elderly or handicapped
14	Other

INT.TOTAL-APPR-VOL - NUM(6) - Total approach volume

000000 No traffic
000001-999999 Sum of approach volumes for all legs divided by 2. Uses most recent year volumes for each leg.

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INT.TRAF-CNTRL-DEV - NUM(1) - Traffic Control Devices

If INT.INTSECT-TYPE contains 1:

1 Unsignalized ramp terminals
2 Signalized ramp terminals
0 Not applicable

If INT.INTSECT-TYPE contains 2 or 3:

1 None
2 Thru/yield
3 Thru/stop
4 All stop
5 Flashers - Amber/red
6 Flashers - Red/red
7 Signals
8 Other

If INT.INTSECT-TYPE contains 4:

1 Pavement marking and signing
2 Flasher - Pedestal mount
3 Flasher - Overhead
4 Signal

If INT.INTSECT-TYPE contains 5:

1 Crossbuck plus R X R
2 Crossbuck plus R X R plus other warning signs
3 Crossbuck plus stop sign
4 Railroad crossing signal w/o gates - Pedestal mount
5 Railroad crossing signal w/o gates - Cantilever
6 Railroad crossing signal with gates - Pedestal mount
7 Railroad crossing signal with gates - Cantilever
8 Other or none

If INT.INTSECT-TYPE contains 6:

0 Not applicable

INT.TRAFSIG-CONSTR - NUM(1) - Traffic Signals Construction

0 Not applicable
1 Temporary (includes wood poles)
2 Permanent

INT.TRAFSIG-HEAD - NUM(1) - Traffic Signals Head Placement

0 Not applicalbe
1 Pedestal mount only
2 Overhead

INT.TRAFSIG-NUM-PHASES - NUM(1) - Traffic Signals Number of Phases

0   Not applicable
2-8   Number of phases

INT.TRAFSIG-PEDES-SIG - NUM(1) - Traffic Signals Pedestrian Signals

0 Not applicable
1 No pedestrian signals
2 Pedestrian signals - Not pedestrian actuated
3 Pedestrian signals - Pedestrian actuated - Walk with green
4 Pedestrian signals - Pedestrian actuated - Scramble system

INT.TRAFSIG-PREEMPT - NUM(1) - Traffic Signals Preemption

0 Not applicable
1 No preemption
2 Railroad only
3 Emergency vehicle only - Vehicle actuated
4 Emergency vehicle only - Hard wire
5 Bus only
6 Railroad and emergency vehicle
7 Railroad and bus
8 Emergency vehicle and bus
9 Railraod & emergency vehicle & bus

INT.TRAFSIG-PROGRESSION - NUM(1) - Traffic Signals Progression

0 Not applicable

1 Not in progression system
2 In progression system

INT.TRAFSIG-TIME-OFF - CHAR(2) - Time Flash Off
INT.TRAFSIG-TIME-ON - CHAR(2) - Time Flash On

' ' Not applicable
'00' Not on parttime flash system
'01' - '24' Time parttime flash system termimates/begins

INT.TRAFSIG-TIMING - NUM(1) - Traffic Signals Timing

0 Not applicable
1 Fixed time
2 Actuated

INT.YEAR-OF-UPDATE - NUM(4) - Most Recent Year of Update

0000 Record has not been updated since initial load
0001-9999 Most recent year in which record was updated

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INX - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(2)	INX.ROUTE-SYSTEM	X	
CHAR(8)	INX.ROUTE-NUMBER	X	
CHAR(10)	INX.REF-POINT	X	
CHAR(2)	INX.INT-ROUTE-SYSTEM	X	
CHAR(8)	INX.INT-ROUTE-NUMBER	X	
CHAR(10)	INX.INT-REF-POINT	X	
CHAR(3)	INX.INTCHANGE-ELEM	X	
NUM(1)	INX.CONSTR-DIST	X	
CHAR(2)	INX.MAINT-AREA	X	
CHAR(4)	INX.PTRL-STATION	X	

CHAR(2)	INX.PTRL-DIST		INX.PTRL-STATION
CHAR(2)	INX.COUNTY	X	
NUM(2)	INX.DISTRICT-FROM-CNTY		INX.COUNTY
NUM(7)	INX.POP-FROM-CNTY		INX.COUNTY
NUM(2)	INX.CITY	X	
NUM(7)	INX.POP-FROM-CITY		INX.CITY
NUM(1)	INX.RUR-URB-FROM-CITY		INX.CITY
NUM(1)	INX.POP-GROUP-FROM-CITY		INX.CITY
NUM(4)	INX.CENSUS-YR-FROM-CITY		INX.CITY
NUM(4)	INX.URB-AREA	X	

INX - Listing of Names in Alphabetical Order

Format	Name	Stored	Generated From
NUM(4)	INX.CENSUS-YR-FROM-CITY		INX.CITY
NUM(4)	INX.CITY	X	
NUM(1)	INX.CONSTR-DIST	X	
NUM(2)	INX.COUNTY	X	
NUM(1)	INX.DISTRICT-FROM-CNTY		INX.COUTNY
CHAR(10)	INX.INT-REF-POINT	X	
CHAR(8)	INX.INT-ROUTE-NUMBER	X	
CHAR(2)	INX.INT-ROUTE-SYSTEM	X	
CHAR(3)	INX.INTCHANGE-ELEM	X	
CHAR(2)	INX.MAINT-AREA	X	
NUM(7)	INX.POP-FROM-CITY		INX.CITY
NUM(7)	INX.POP-FROM-CNTY		INX.COUNTY
NUM(1)	INX.POP-GROUP-FROM-CITY		INX.CITY
CHAR(2)	INX.PTRL-DIST		INX.PTRL-STATION
CHAR(4)	INX.PTRL-STATION	X	
CHAR(10)	INX.REF-POINT	X	
CHAR(8)	INX.ROUTE-NUMBER	X	
CHAR(2)	INX.ROUTE-SYSTEM	X	
NUM(1)	INX.RUR-URB-FROM-CITY		INX.CITY
NUM(4)	INX.URB-AREA	X	

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INX - Descriptions of Data Elements

INX.CENSUS-YR-FROM-CITY - NUM(4) - Census Year Computed From INX.CITY

```
     0000         Nonmunicipal (INX.CITY contains 0000)
     0001-9999    Census year

INX.CITY - NUM(4) - City Number

     0000        Nonmunicipal
     0001-9998   City number

     Note:  In select statements, cities can be identified by number
            (eg., INX.CITY *EQ* 2585) or by name (eg., INX.CITY *EQ*
            'ST-PAUL').

INX.CONSTR-DIST - NUM(1) - Construction District

     0      Unknown or non-trunk
     1-9    Construction district (trunk only)

INX.COUNTY - NUM(2) - County Number

     01-87   County number

     Note:  In select statement, counties can be identified by number
            (eg., INX.COUNTY *EQ* 39) or by name (eg., INX.COUNTY *EQ*
            'LAKE-OF-THE-WOODS').

INX.DISTRICT-FROM-CNTY - NUM(1) - Construction District Computed
                                  From INX.COUNTY

     0     Unknown
     1-9   Construction district computed from county number

     Note:  For trunk highways, this computed value may differ from
            INX.CONSTR-DIST.

INX.INT-REF-POINT - CHAR(10) - Reference Point Assigned to Intersection

     '000+00.000' - '999+99.999'   Reference point of controlling route
```

INX.INT-ROUTE-NUMBER - CHAR(8) - Route Number Assigned to Intersection

'nnnnnnxx' Route number of controlling route

Note: In the following, the following codes are used:

n = 0-9
a = A-Z
x = 0-9 or A-Z

cccc = City number
cc = County number

Route systems '01','02','03': '00000nnn' or '0000nnna'.

Route systems '05' and '10': 'ccccnnnx'.

Other route systems: 'cc00nnxx'.

INX.INT-ROUTE-SYSTEM - CHAR(2) - Route Stsyem Assigned to Intersection

'nn' Route sytem of controlling route

'01'	ISTH	'09'	UTWN	'16'	MIL
'02'	USTH	'10'	MUN	'17'	NATM
'03'	MNTH	'11'	NATP	'18'	NATW
'04'	CSAH	'12'	NFD	'19'	FRNT
'05'	MSAS	'13'	IND	'20'	SGAM
'07'	CNTY	'14'	SFR	'23'	PRIV
'08'	TWNS	'15'	SPRK		

INX.INTCHANGE-ELEM - CHAR(3) - Interchange Element Code

' ' Not intersection within interchange
'100' - '999' Intersection within interchange - Interchange element code
'A00' - 'Z99' Intersection within interchange - Interchange element code

INX.MAINT-AREA - CHAR(2) - Maintenance Area

' ' Unknown or non-trunk
'na' Maintenance area - Trunk only

n = 1-9 a = A or B 5B and 9B do not exist

INX.POP-FROM-CITY - NUM(7) - Population Computed From City

```
             00000000            Nonmunicipal
             00000001-99999999   Populaiton of city

        INX.POP-FROM-CNTY - NUM(7) - Population Computed from INX.COUNTY

             0000000            County unknown
             0000001-9999999    Population of county

             This field is computed by accessing the county table.
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        INX.POP-GROUP-FROM-CITY - NUM(1) - Population Group Computed From City

             1  Urban - 250,000 and over
             2  Urban - 100,000 - 249,999
             3  Urban -  50,000 -  99,999
             4  Urban -  25,000 -  49,999
             5  Urban -  10,000 -  24,999
             6  Urban -   5,000 -   9,999
             7  Rural -   2,500 -   4,999
             8  Rural -   1,000 -   2,499
             9  Rural -       1 -     999 or nonmunicipal

        INX.PTRL-DIST - CHAR(2) - Patrol District

             '  '          Unknown or non-trunk
             '00'          Trunk - Not in patrol station
             '21' - '45'   Trunk - Patrol district

        INX.PTRL-STATION - CHAR(4) - Patrol Station

             '    '              Unknown or non-trunk
             '0000'              Trunk - Not in patrol station
             '2110' - '4560'     Trunk - Patrol station

        INX.REF-POINT - CHAR(10) - Reference Point of This Intersecting Route

             '000+00.000' - 999+99.999'   Reference point

        INX.ROUTE-NUMBER - CHAR(8) - Route Number of This Intersecting Route
        INX.ROUTE-SYSTEM - CHAR(2) - Route Number of This Intersecting Route

             See INX.INT-ROUTE-NUMBER and INX.INT-ROUTE-SYSTEM for codes.

        INX.RUR-URB-FROM-CITY - NUM(1) - Rural-Urban-Urbanized Code From City

            1  Rural (nonmunicipal or municipal less than 5,000)
            2  Urban (numicipal 5,000 - 49,999)
            3  Urbanized (municipal 50,000 and up)
```

INX.URB-AREA - NUM(4) - Urban Area Number

0000	Rural
0001-9999	Urban - City number of corresponding municipality
9999	Urban - Twin cities metropolitan area

Note: In select statements, cities can be identified by number (eg., INX.URB-AREA *EQ* 2885) or by name (eg., INX.URB-AREA *EQ* 'ST-CLOUD').

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RDD - DATA ELEMENT NAMES

The data element names for RDD data elements are the same as those for RDY. The RDD names apply to the topmost layer in the driving surface. (The topmost selected layer that does not have cross-section position "S"). For details, see the RDY data element names.

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RDH - Listing of Names in File Order

Format	Name	Stored	Generated From
CHAR(10)	RDH.ROUTE-SYS-&-NUM	X	
CHAR(2)	RDH.ROUTE-SYSTEM	X	
CHAR(8)	RDH.ROUTE-NUMBER	X	
CHAR(10)	RDH.BEG-REF-POINT	X	
CHAR(3)	RDH.BEG-REF-POST	X	
CHAR(7)	RDH.BEG-DIST-FROM-POST	X	
CHAR(8)	RDH.BEG-MILEPOINT		RDH.BEG-REF-POINT
CHAR(10)	RDH.END-REF-POINT	X	
CHAR(3)	RDH.END-REF-POST	X	
CHAR(7)	RDH.END-DIST-FROM-POST	X	
CHAR(8)	RDH.END-MILEPOINT		RDH.END-REF-POINT
CHAR(1)	RDH.ROAD-ID	X	
CHAR(6)	RDH.CONTRACT-NUMBER	X	
CHAR(4)	RDH.CARD	X	
CHAR(10)	RDH.SP-NUMBER	X	
CHAR(8)	RDH.DESIGN-ESAL	X	
CHAR(1)	RDH.DESIGN-SUBG-TYPE	X	
CHAR(3)	RDH.DESIGN-SUBG-STREN	X	
CHAR(8)	RDH.DATE-AWARD	X	

CHAR(8)	RDH.DATE-BEGAN	X
CHAR(8)	RDH.DATE-ENDED	X
CHAR(8)	RDH.DATE-OPENED	X
CHAR(1)	RDH.PROJ-TYPE	X
CHAR(2)	RDH.NUM-LAYERS	X

RDH - Listing of Names in Alphabetical Order

Format	Name	Stored	Generated From
CHAR(7)	RDH.BEG-DIST-FROM-POST	X	
CHAR(8)	RDH.BEG-MILEPOINT		RDH.BEG-REF-POINT
CHAR(10)	RDH.BEG-REF-POINT	X	
CHAR(3)	RDH.BEG-REF-POST	X	
CHAR(4)	RDH.CARD	X	
CHAR(6)	RDH.CONTRACT-NUMBER	X	
CHAR(8)	RDH.DATE-AWARD	X	
CHAR(8)	RDH.DATE-BEGAN	X	
CHAR(8)	RDH.DATE-ENDED	X	
CHAR(8)	RDH.DATE-OPENED	X	
CHAR(8)	RDH.DESIGN-ESAL	X	
CHAR(3)	RDH.DESIGN-SUBG-STREN	X	
CHAR(1)	RDH.DESIGN-SUBG-TYPE	X	
CHAR(7)	RDH.END-DIST-FROM-POST	X	
CHAR(8)	RDH.END-MILEPOINT		RDH.END-REF-POINT
CHAR(10)	RDH.END-REF-POINT	X	
CHAR(3)	RDH.END-REF-POST	X	
CHAR(2)	RDH.NUM-LAYERS	X	
CHAR(1)	RDH.PROJ-TYPE	X	
CHAR(1)	RDH.ROAD-ID	X	
CHAR(8)	RDH.ROUTE-NUMBER	X	
CHAR(2)	RDH.ROUTE-SYSTEM	X	
CHAR(10)	RDH.ROUTE-SYS-&-NUM	X	
CHAR(10)	RDH.SP-NUMBER	X	

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RDH - Descriptions of Data Elements

RDH.BEG-DIST-FROM-POST - CHAR(7) - Distance from Beginning Reference Post

'+00.000' - '+99.999' Distance (in miles) from the reference post used in locating the beginning of the section.

RDH.BEG-MILEPOINT - CHAR(8) - Milepoint at Beginning of Section

'0000.000' - '9999.999' Milepoint at beginning of section
(computed true mileage for beginning
reference point).

RDH.BEG-REF-POINT - CHAR(10) - Beginning Reference Point

'000+00.000' - '999+99.999' Reference point at beginning of
section.

RDH.BEG-REF-POST - CHAR(3) - Beginning Reference Post

'000' - '999' Reference post number used in locating the beginning
of the section.

RDH.CARD - CHAR(4) - Card

The Card Number identifies the line number on the Roadway History project log which represents the project(contract). Project logs are created with either one or two sets of pages per control section. On those with two sets of pages, the card number begins with either "A" or "B" and ends with a three digit line number. On those with one set of pages per control section, the card number begins with the three digit line number followed by one blank. The line number consists of a one digit page number and a two digit line number. Page number will range from 1 to 9 and line number ranges from 01 to 14.

RDH.CONTRACT-NUMBER - CHAR(6) - Contract Number

'C00001' - 'C99999' State Construction Projects:

For this type of project, the numeric portion of the Project ID is the contract number assigned by the Contract Award/Pre-letting Section.

'D00001' - 'D99999' District Maintenance Projects:

For this type of project, the numeric portion of the Project ID is a sequential number, unique to the file, assigned by Roadway Data Unit personnel.

'M00001' - 'M99999' State Maintenance Projects:

For this type of project, the numeric portion of the Project ID is the contract number assigned by the Maintenance Coordination Section.

'S00001' - 'S99999' State Aid Projects:

For this type of project, the numeric portion of the Project ID is a sequential number, unique to the file, assigned by Roadway Data Unit personnel.

'U00001' - 'U99999' Unknown project number:

For this type of project, the numeric portion of the Project ID is a sequential number, unique to the file, assigned by the Roadway History software.

RDH.DATE-AWARDED - CHAR(8) - Date Contract Awarded

'mmddyyyy' (month, day, year).
'NA' Not applicable.

The date on which a construction or maintenance contract has been approved and the contract awarded to the successful bidder.

The award date must be "NA " if contract number begins with D.

RDH.DATE-BEGAN - CHAR(8) - Date Contract Began

'mmddyyyy' (month, day, year).

The date on which construction for a contract or maintenance project began.

RDH.DATE-ENDED - CHAR(8) - Date Contract Ended

'mmddyyyy' (month, day, year).

The date on which construction for a contract or maintenance project ended. (semi-finaled or finaled date on Contract Status Report(MN/DOT 2911))

RDH.DATE-OPENED - CHAR(8) - Date Roadway Opened

'mmddyyyy' (month, day, year).
'NA' Not applicable or not available.

The date on which a roadway section was opened to traffic after being closed by a construction or maintenance project.

RDH.DESIGN-ESAL - CHAR(8) - Design ESALs

'00010000' - '40000000' Design ESALs.

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RDH.DESIGN-SUBG-STREN - CHAR(3) - Design Subgrade Strength

XNN where "X" is a digit or R, "N" is a digit.

-- For concrete, units are pounds per square inch, ranging '001' - '500'.
-- For bituminous, units are resistance, ranging 'R01' - 'R75'.

RDH.DESIGN-SUBG-TYPE - CHAR(1) - Design Subgrade Type

'N' - nonplastic
'S' - semiplastic
'P' - plastic

RDH.END-DIST-FROM-POST - CHAR(7) - Distance from Endin Reference Post

'+00.000' - '+99.999' Distance (in miles) from the reference post used in locating the end of the section.

RDH.END-MILEPOINT - CHAR(8) - Milepoint at End of Section
'0000.000' - '9999.999' Milepoint at end of section (computed true mileage for end reference point).

RDH.END-REF-POINT - CHAR(10) - Ending Reference Point

'000+00.000' - '999+99.999' Reference point at end of section.

RDH.END-REF-POST - CHAR(3) - Ending Reference Post

'000' - '999' Reference post number used in locating the end of the section.

RDH.NUM-LAYERS - CHAR(2) - Number of Layers in Section

'00' - '50' Number of layers. This is computed after selection of layers (INCLUDE ROADDATA-LAYERS IF:), so may be zero.

RDH.PROJ-TYPE - CHAR(1) - Project Type

Project Type contains a classification of the entire project. The lowest lettered classification which is applicable to the project should be coded.

'A' - New Route
'B' - New Location of an existing route.
'C' - Reconstruction
'D' - Major Widening
'E' - Minor Widening
'F' - Restoration and Rehabilitation(Reconditioning)
'G' - Resurfacing
'H' - Bridge Replacement
'I' - Bridge Rehabilitation
'J' - Safety and Traffic Engineering Improvements
'K' - Other Highway Improvements

* HPMS codes refer to HPMS item 73 - Type of Improvement
See pp.IV-41,42 of the HPMS field manual for descriptions.

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RDH.ROAD-ID - CHAR(1) - Roadway ID

Roadway/Centerline ID identifies the roadway of a route to which the project work applies.

'U' - The project work occurs on an undivided route.
'1' - The project work occurs on roadway 1 of a divided route. Roadway 1 carries traffic in the direction of increasing reference point.
'2' - The project work occurs on roadway 2 of a divided route. Roadway 2 carries traffic in the direction of decreasing reference point.
'B' - The project work occurs on both roadways of a divided route.

RDH.ROUTE-NUMBER - CHAR(8) - Route Number

'0000nnnx' Route number (n = 0-9, x = 0-9 or A-Z).

RDH.ROUTE-SYSTEM - CHAR(2) - Route System

'01' - Interstate Trunk Highway
'02' - U.S. Trunk Highway
'03' - Minnesota Trunk Highway

RDH.ROUTE-SYS-&-NUM - CHAR(10) - Route System and Number

Route system (columns 1-2) followed by route number (columns 3-10).

RDH.SP-NUMBER - CHAR(10) - State Project Number

The State Project number consists of two parts:

'ccccttttttt' where cccc is control section number, or county number followed by 00, or 88 followed by 01-99, and ttttttt is the "tail number".

"cccc" is the four character control section number which was in effect at the time the SP number was assigned. "ttttttt" is a six character tail number which uniquely identifies the job within the control section. The control section number used in the state project number is generally the CS number assigned by the control section committee to existing and proposed sections of trunk highway.

For jobs which apply to many CS's in a county a CS number in the form of cc00 is used. For jobs which apply to many CS's in the state, the CS# takes the form of 88nn. These CS numbers are reserved for special statewide studies, inventories, and projects.

The tail number is assigned, depending on the type of project, by either the Preliminary Design Section or the Bridge Design Planning Section. For non-bridge projects the SP tail number is assigned sequentially by the Preliminary Design Section. For bridge projects the SP tail number is the same as the bridge number assigned to the project bridge.

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RDL - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(2)	RDL.WORK-ITEM	X	
CHAR(2)	RDL.MATL-ID	X	
CHAR(1)	RDL.XSCTN-POSN	X	
CHAR(1)	RDL.MODE	X	
CHAR(1)	RDL.TRAN-DIRECT	X	
CHAR(4)	RDL.TRAN-OFFSET	X	
CHAR(4)	RDL.WIDTH	X	
CHAR(1)	RDL.VARIABLE-WIDTH	X	
CHAR(1)	RDL.VERT-POSN	X	
CHAR(4)	RDL.DEPTH	X	

RDL - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(4)	RDL.DEPTH	X	
CHAR(2)	RDL.MATL-ID	X	
CHAR(1)	RDL.MODE	X	
CHAR(1)	RDL.TRAN-DIRECT	X	
CHAR(4)	RDL.TRAN-OFFSET	X	
CHAR(1)	RDL.VARIABLE-WIDTH	X	
CHAR(1)	RDL.VERT-POSN	X	
CHAR(4)	RDL.WIDTH	X	
CHAR(2)	RDL.WORK-ITEM	X	
CHAR(1)	RDL.XSCTN-POSN	X	

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RDL - Descriptions of Data Elements
****

RDL.DEPTH - CHAR(4) - Depth of Layer

This field contains the depth of the roadway section layer described by the work item and material data. If the depth is variable in the transverse dimension, then the largest depth in the layer(except for 9-7-9 concrete slabs).

'nnnn' - The depth, in units of hundredths of inches, of

the layer width at the beginning of the section.
'0979' - The depth of the layer varies from 9 to 7 to 9
inches in the transverse dimension.

RDL.MATL-ID - CHAR(2) - Material ID

Aggregate base(AB) or Cement treated soil base(CT) materials:

'Cn' - Gravel class number,where n is 3,4,5, or 6

Bituminous (B ,BO,SO) materials:
(nn - indicates the last two digits of the specification number)

'21', '31', '32', '41', '50', '51', '56', '60', '61', '71', or
'SM' - stonematrix, '**' - unknown.

Bituminous (BB) materials:
(nn - indicates the last two digits of the specification number)

'04', '08', or
'**' - unknown.

Bituminous (BS) materials:
(nn - indicates the last two digits of the specification number)

'07'

Concrete (CU, CD, CR) materials:
(nn - indicates contraction joint spacing in feet)

Year built	Material ID
1900-33	40
34-41	30
42-45	20
46-56	15
57-69	20 or 39
70-75	20 or 27
76-82	16 or 27
83-99	15 or 27

(continued on next page)

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Concrete overlay (CO, CB, CP) materials:
(nn - indicates contraction joint spacing in feet)

Work Item	Material ID
CB	blank
CO	15
CP	15

Drainage or open-graded course work item:

Work Item	Matl ID	Base	
DL	blank		
DL	OG	OGAB	Open-graded aggregate base
DL	PA	PASB	Permeable asphalt stabilized base
DL	PC	PCSB	Permeable cement stabilized base

Gravel surface(GS) materials: C1, C2, or **

'C1', 'C2', or '**'.

Aggregate seal(AS) materials:

'Fn' - Fine aggregate number, where n is 1,2,3,4, or 5.

Rut repair(RR) codes:

'TB' - Tight Blade
'WP' - Wheel Path
'**' - unknown

All other work items:
(BK, BR, CC, CI, C1, C2, DL, FS, ED, ES, GC, GD, GL, GR,
JR, JS, MI, MC, Nb, PY, RC, RB, RD, RU, SL, US, WP, WT):

' ' - not applicable.

RDL.MODE - CHAR(1) - Mode.

This code describes the relation between this layer and other layers in the road.

'N' - New, indicates
1) the addition of a full cross section(driving or shoulder) width layer which is either a)the addition of a layer in new construction or b)the addition of a layer above an existing layer and a cross section widening layer, or
2) the addition of a partial cross section width layer either in new construction or above part of an existing layer.

'I' - Inplace, indicates that the layer is a treatment applied to an existing layer, or the addition of a layer above an

existing layer of the same or narrower width.

'W' - Widening, indicates that the layer is a part of a transverse extension of an existing cross section.

RDL.TRAN-DIRECT - CHAR(1) - Transverse Direction

This code indicates on which side of the roadway centerline the described layer lies. A layer straddling the centerline but not centered on the centerline must be described by a "C" in this field and a "Lnnn" or "Rnnn" in the transverse distance field.

'L' - Layer lies wholly to the left of the centerline of the roadway.

'R' - Layer lies wholly to the right of the centerline of the roadway.

'C' - The roadway centerline lies within the layer.

RDL.TRAN-OFFSET - CHAR(4) - Transverse Offset

This field contains the distance from the roadway centerline to the layer edge nearest the roadway centerline.

' ' - transverse direction is C and layer is centered over the roadway centerline.
'Lnnn' - The nearest edge of the layer is nn.n feet left of the roadway centerline.
'Rnnn' - The nearest edge of the layer is nn.n feet right of the roadway centerline.
'nnnn' - The distance, in units of tenths of feet, from the centerline to the nearest edge of the layer.

RDL.VARIABLE-WIDTH - CHAR(1) - Variable Layer Width Indicator

This field indicates whether the layer width is constant, increases, or decreases in the direction of increasing reference point.

'C' - Layer width is constant in the roadway section
'I' - Layer width increases in the direction of increasing reference point.
'D' - Layer width decreases in the direction of increasing reference point.
' ' - does not apply

RDL.VERT-POSN - CHAR(1) - Vertical Position

This field indicates the relative vertical position of each layer within either the driving or the right or left shoulder cross section. Vertical position is relative only to layers constructed by the contract being coded and not previously constructed layers. Two layers within the same contract, roadway section, and cross-section(driving or shoulders) may have the same vertical position only if they lie on the same horizontal plane. Layers are numbered from 0 to 9 from the bottom up. Layers which span the entire roadway are considered part of the driving cross- section for the pupose of determining the vertical position.

'n' - indicates the relative vertical position of the layer - i.e. 1 - lowest, 2 - on top of #1, 3 - on top on #2, etc. Grading must be 0.

RDL.WIDTH - CHAR(4) - Width of Layer

This field contains the width, at the beginning of the section, of the roadway layer described by the work item and material data.

'nnnn' - The width, in units of tenths of feet, of the layer width at the beginning of the section.

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RDL.WORK-ITEM - CHAR(2) - Work Item

Work Item contains a code which describes the nature of a particular layer of a roadway structure.

NEW CONSTRUCTION OR RECONSTRUCTION CODES

- 'AB' - Aggregate base
- 'SA' - Salvaged Aggregate base
- 'B ' - Bituminous layer(binder,leveling,surface)
- 'BK' - Brick
- 'BB' - Bituminous base(bit. & gravel mixed) - adds depth
- 'BS' - Bituminous stabilized subgrade
- 'CD' - Concrete doweled
- 'CU' - Concrete undoweled
- 'CT' - Cement treated soil base
- 'GR' - Grading
- 'GL' - Grading with lime admixture
- 'GS' - Gravel or crushed rock surface
- 'PY' - Polystyrene
- 'N ' - CRCP Non-jointed concrete slab

RECONDITIONING CODES

- 'SR' - Subgrade recondition(cut,fill)
- 'CR' - Concrete(recycled)

'DL' - Drainage or open-graded course
'CC' - Crack concrete
'ED' - Edge drain
'ES' - Longitudinal edge seal
'RA' - Remove Aggregate Base
'GD' - Grind concrete
'JS' - Concrete pavement joint sealant removal and replacement
'GC' - Groove concrete
'SC' - Shift roadway centerline
'MI' - Mill Bituminous
'JR' - Concrete joint repair
'BR' - Base Reconditioning
'MC' - Major Crack Repair
'RC' - Remove Concrete
'RB' - Remove Bituminous
'RR' - Rut Repair
'US' - Undersealing
'WP' - Shoulder Wedge Paving
'SA' - Salvaged Aggregate Base
'SB' - Spot Subgrade recondition(cut,fill)
'SW' - Spot Shoulder Wedge Paving
'ST' - Spot Lift
'C1' - Minor Concrete Repair
'C2' - Major Concrete Repair
'CS' - Crack Sealing
'RD' - Retro-Fit Dowels
'RU' - Rubblize Concrete
'CI' - Cold-In-Place Recycling
'RE' - Reclaiming

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RESURFACING CODES

'FS' - Fog seal
'AS' - Aggregate seal
'SL' - Slurry Seal
'MS' - Micro-surfacing
'SO' - Spot Overlay(Net length in State Project Number field)
'CB' - Concrete overlay - bonded or unknown
'CO' - Concrete overlay - unbonded
'CP' - Concrete overlay - partially bonded
'BO' - Bituminous overlay
'WT' - Whitetopping (Concrete Overlay on Bituminous)
'SS' - Spot Seal

RDL.XSCTN-POSN - CHAR(1) - Cross-section position

This code describes the position of the layer within the roadway cross section.

'E' - The layer lies under the cross sections of one or more entire roadway(s).

'D' - The layer lies within the cross section designed to carry the driving traffic. Note: Driving section base layers usually extend into the shoulder section. These extensions are considered part of the driving cross section.

'S' - The layer lies within the cross section designed to carry shoulder traffic.

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RDX - Listing of Names in File Order

Format	Name	Stored	Generated From
CHAR(10)	RDX.ROUTE-SYS-&-NUM	X	

CHAR(2)	RDX.ROUTE-SYSTEM	X	
CHAR(8)	RDX.ROUTE-NUMBER	X	
CHAR(10)	RDX.BEG-REF-POINT	X	
CHAR(3)	RDX.BEG-REF-POST	X	
CHAR(7)	RDX.BEG-DIST-FROM-POST	X	
CHAR(8)	RDX.BEG-MILEPOINT		RDX.BEG-REF-POINT
CHAR(10)	RDX.END-REF-POINT	X	
CHAR(3)	RDX.END-REF-POST	X	
CHAR(7)	RDX.END-DIST-FROM-POST	X	
CHAR(8)	RDX.END-MILEPOINT		RDX.END-REF-POINT
CHAR(1)	RDX.ROAD-ID	X	
CHAR(2)	RDX.NUM-LAYERS	X	
NUM(7,3)	RDX.LENGTH	X	
CHAR(4)	RDX.DRIVE-WIDTH	X	
CHAR(6)	RDX.DRIVE-AREA	X	
CHAR(4)	RDX.DRIVE-PAVE-DEPTH	X	
CHAR(4)	RDX.DRIVE-TOTAL-DEPTH	X	
CHAR(4)	RDX.DRIVE-GRAN-EQUIV	X	
CHAR(2)	RDX.LSHOUL-TYPE	X	
CHAR(4)	RDX.LSHOUL-WIDTH	X	
CHAR(6)	RDX.LSHOUL-AREA	X	
CHAR(4)	RDX.LSHOUL-PAVE-DEPTH	X	
CHAR(4)	RDX.LSHOUL-TOTAL-DEPTH	X	
CHAR(2)	RDX.RSHOUL-TYPE	X	
CHAR(4)	RDX.RSHOUL-WIDTH	X	
CHAR(6)	RDX.RSHOUL-AREA	X	
CHAR(4)	RDX.RSHOUL-PAVE-DEPTH	X	
CHAR(4)	RDX.RSHOUL-TOTAL-DEPTH	X	
CHAR(4)	RDX.TOTAL-WIDTH	X	
CHAR(6)	RDX.TOTAL-PAVED-AREA	X	
CHAR(4)	RDX.YEAR-GRADE	X	
CHAR(4)	RDX.YEAR-PAVED	X	
CHAR(4)	RDX.YEAR-SEALED	X	
CHAR(4)	RDX.YEAR-LAST-REHAB	X	
CHAR(4)	RDX.DEPTH-LAST-REHAB	X	
CHAR(3)	RDX.PERCENT-PREDOM	X	
CHAR(2)	RDX.WKITEM-LAST-REHAB	X	
CHAR(1)	RDX.EDGE-DRAIN	X	

RDX - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(7)	RDX.BEG-DIST-FROM-POST	X	
CHAR(8)	RDX.BEG-MILEPOINT		RDX.BEG-REF-POINT
CHAR(10)	RDX.BEG-REF-POINT	X	
CHAR(3)	RDX.BEG-REF-POST	X	
CHAR(4)	RDX.DEPTH-LAST-REHAB	X	
CHAR(6)	RDX.DRIVE-AREA	X	
CHAR(4)	RDX.DRIVE-GRAN-EQUIV	X	
CHAR(4)	RDX.DRIVE-PAVE-DEPTH	X	
CHAR(4)	RDX.DRIVE-TOTAL-DEPTH	X	
CHAR(4)	RDX.DRIVE-WIDTH	X	
CHAR(2)	RDX.EDGE-DRAIN	X	
CHAR(7)	RDX.END-DIST-FROM-POST	X	
CHAR(8)	RDX.END-MILEPOINT		RDX.END-REF-POINT
CHAR(10)	RDX.END-REF-POINT	X	
CHAR(3)	RDX.END-REF-POST	X	
NUM(7,3)	RDX.LENGTH	X	
CHAR(6)	RDX.LSHOUL-AREA	X	
CHAR(4)	RDX.LSHOUL-PAVE-DEPTH	X	
CHAR(4)	RDX.LSHOUL-TOTAL-DEPTH	X	
CHAR(2)	RDX.LSHOUL-TYPE	X	
CHAR(4)	RDX.LSHOUL-WIDTH	X	
CHAR(2)	RDX.NUM-LAYERS	X	
CHAR(3)	RDX.PERCENT-PREDOM	X	
CHAR(1)	RDX.ROAD-ID	X	
CHAR(8)	RDX.ROUTE-NUMBER	X	
CHAR(10)	RDX.ROUTE-SYS-&-NUM	X	
CHAR(2)	RDX.ROUTE-SYSTEM	X	
CHAR(6)	RDX.RSHOUL-AREA	X	
CHAR(4)	RDX.RSHOUL-PAVE-DEPTH	X	
CHAR(4)	RDX.RSHOUL-TOTAL-DEPTH	X	
CHAR(2)	RDX.RSHOUL-TYPE	X	
CHAR(4)	RDX.RSHOUL-WIDTH	X	
CHAR(6)	RDX.TOTAL-PAVED-AREA	X	
CHAR(4)	RDX.TOTAL-WIDTH	X	
CHAR(2)	RDX.WKITEM-LAST-REHAB	X	
CHAR(4)	RDX.YEAR-GRADE	X	
CHAR(4)	RDX.YEAR-LAST-REHAB	X	
CHAR(4)	RDX.YEAR-PAVED	X	
CHAR(4)	RDX.YEAR-SEALED	X	

RDX - Descriptions of Data Elements
****

RDX.BEG-DIST-FROM-POST - CHAR(7) - Distance from Beginning Reference Post

'+00.000' - '+99.999' Distance (in miles) from the reference post used in locating the beginning of the section.

RDX.BEG-MILEPOINT - CHAR(8) - Milepoint at Beginning of Section

'0000.000' - '9999.999' Milepoint at beginning of section (computed true mileage for beginning reference point).

RDX.BEG-REF-POINT - CHAR(10) - Beginning Reference Point

'000+00.000' - '999+99.999' Reference point at beginning of section.

RDX.BEG-REF-POST - CHAR(3) - Beginning Reference Post

'000' - '999' Reference post number used in locating the beginning of the section.

RDX.DEPTH-LAST-REHAB - CHAR(4) - Depth of Last Rehabilitation

'nnnn' Decimal assumed "nn.nn" inches.
The total depth of all the layers in the last rehabilitation(i.e., the most recent contract). To be included in the total depth, a layer must include the centerline and must have a work item from the following list:

B , BO, BB, N , CR, CU, CD, CO, CB, CP, BK

RDX.DRIVE-AREA - CHAR(6) - Driving Surface Area

'nnnnnn' Total area of the driving surface in square yards.
Computed for the topmost layer in the driving section.

RDX.DRIVE-GRAN-EQUIV - CHAR(4) - Granular Equivalents

'nnnn' Decimal assumed "nn.nn" granular equivalents.
Computed from driving section layers:

Work Item	Material ID	Granular Equivalent
B,BO	71,61,51,41	2.25
	32,31,**	2.00
	21	1.50
AB,CB	C3,C4	0.75
	C5,C6,**	1.00
BB	04,08,**	1.50

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RDX.DRIVE-PAVE-DEPTH - CHAR(4) - Driving Surface Pavement Depth

'nnnn' Decimal assumed "nn.nn" inches.

The total pavement depth of all layers in the driving section which include the centerline and which have one of the following work items: B , BO, BB, N , CR, CU, CD, CO, CB, CP, BK

RDX.DRIVE-TOTAL-DEPTH - CHAR(4) - Driving Surface Total Depth

'nnnn' Decimal assumed "nn.nn" inches.
The total depth of all layers in the driving section which include the centerline EXCEPT those layers with one of the following work items:

GR,GL,SR,SB,GD,MI,RC,RB,RA

RDX.DRIVE-WIDTH - CHAR(4) - Driving Surface Width

'nnnn' Decimal assumed "nnn.n" feet.
The width of the topmost layer in the driving section.

RDX.EDGE-DRAIN - CHAR(2) - Indicates presence or absence of edge drains

'0' No edge drains are present in cross section.
'1' Edge drains are present in cross section.

RDX.END-DIST-FROM-POST - CHAR(7) - Distance from Ending Reference Post

'+00.000' - '+99.999' Distance (in miles) from the reference post
used in locating the end of the section.

RDX.END-MILEPOINT - CHAR(8) - Milepoint at End of Section

'0000.000' - '9999.999' Milepoint at end of section (computed true
mileage for end reference point).

RDX.END-REF-POINT - CHAR(10) - Ending Reference Point

'000+00.000' - '999+99.999' Reference point at end of section.

RDX.END-REF-POST - CHAR(3) - Ending Reference Post

'000' - '999' Reference post number used in locating the end of
the section.

RDX.LENGTH - NUM(7,3) - Length of Section

0000.000 - 9999.999 Miles.

RDX.LSHOUL-AREA - CHAR(6) - Left Shoulder Area

'nnnnnn' Total area of the left shoulder in square yards.
Computed for the topmost layers in the left shoulder.

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RDX.LSHOUL-PAVE-DEPTH - CHAR(4) - Left Shoulder Pavement Depth

'nnnn' Decimal assumed "nn.nn" inches.
The total depth of the pavement layers
in the left shoulder.
Pavement layers include those with the following
work items:

B , BO, BB, N , CR, CU, CD, CO, CB, CP, BK

RDX.LSHOUL-TOTAL-DEPTH - CHAR(4) - Left Shoulder Total Depth

'nnnn' Decimal assumed "nn.nn" inches.
The depth of all layers in the left shoulder.

RDX.LSHOUL-TYPE - CHAR(2) - Left Shoulder Type

The work item (see RDY.WORK-ITEM) of the topmost layer of the
left shoulder which has a work item from the following list:

B , BO, BB, N , CR, CU, CD, CO, CB, CP, BK, GS, AB

LSHOUL-TYPE can also be 'CS' for composite shoulder.

RDX.LSHOUL-WIDTH - CHAR(4) - Left Shoulder Width

'nnnn' Decimal assumed "nnn.n" feet.
The width of the surface layers in the left shoulder.

RDX.NUM-LAYERS - CHAR(2) - Number of Layers in Section

'00' - '50' Number of layers. This is computed after selection of
layers (INCLUDE ROADDATA-LAYERS IF:), so may be zero.

RDX.PERCENT-PREDOM - CAHR(3) - Percent Predominant Section

'001' - '100' Percent of predominant section. The percentage of
the total section that is identical to the
"predominant" section (driving sextion layers only).

***** This data element only has meaning with EXTRACTION. *****

RDX.ROAD-ID - CHAR(1) - Roadway ID

Roadway/Centerline ID identifies the roadway of a route to which
the project work applies.

'U' - The project work occurs on an undivided route.
'1' - The project work occurs on roadway 1 of a divided route.
Roadway 1 carries traffic in the direction of increasing
reference point.
'2' - The project work occurs on roadway 2 of a divided route.
Roadway 2 carries traffic in the direction of decreasing
reference point.
'B' - The project work occurs on both roadways of a divided
route. "B" can only happen with LIST-ROADWAY-HISTORY-FILE
listing by CONTROL-SECTION.

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RDX.ROUTE-NUMBER - CHAR(8) - Route Number

'0000nnnx' Route number (n = 0-9, x = 0-9 or A-Z).

RDX.ROUTE-SYS-&-NUM - CHAR(10) - Route System and Number

Route system (columns 1-2) followed by route number (columns 3-10).

RDX.ROUTE-SYSTEM - CHAR(2) - Route System

'01' - Interstate Trunk Highway
'02' - U.S. Trunk Highway
'03' - Minnesota Trunk Highway

RDX.RSHOUL-AREA - CHAR(6) - Right Shoulder Area

'nnnnnn' Total area of the right shoulder in square yards.
Computed for the topmost layers in the right shoulder.

RDX.RSHOUL-PAVE-DEPTH - CHAR(4) - Right Shoulder Pavement Depth

'nnnn' Decimal assumed "nn.nn" inches.
The total depth of the pavement layers
in the right shoulder.
Pavement layers include those with the following
work items:

RDX.RSHOUL-TOTAL-DEPTH - CHAR(4) - Right Shoulder Total Depth

'nnnn' Decimal assumed "nn.nn" inches.
The depth of all layers in the right shoulder.

RDX.RSHOUL-TYPE - CHAR(2) - Right Shoulder Type

The work item (see RDY.WORK-ITEM) of the topmost layer of the
right shoulder which has a work item from the following list:

B , BO, BB, N , CR, CU, CD, CO, CB, CP, BK, GS, AB

RSHOUL-TYPE can also be 'CS' for composite shoulder.

RDX.RSHOUL-WIDTH - CHAR(4) - Right Shoulder Width

'nnnn' Decimal assumed "nnn.n" feet.
The width of the surface layers in the right shoulder.

RDX.TOTAL-PAVED-AREA - CHAR(6) - Total Paved Surface Area

'nnnnnn' Total paved surface area in square yards.
Includes driving section, right and left shoulders.

RDX.TOTAL-WIDTH - CHAR(4) - Total Width

'nnnn' Decimal assumed "nnn.n" feet.
The width of the topmost layers in the section.
Includes driving section, right and left shoulders.

RDX.WKITEM-LAST-REHAB - CHAR(2) - Work Item of last rehabilitation

The work item (see RDY.WORK-ITEM) of the topmost layer which includes the centerline and which has a work item from the following list:

B , BO, BB, N , CR, CU, CD, CO, CB, CP, BK

RDX.YEAR-GRADE - CHAR(4) - Year of Grading

'0000' - '9999' Year of grading in driving section.

RDX.YEAR-LAST-REHAB - CHAR(4) - Year of Last Rehabilitation

'0000' - '9999' Year of the topmost layer which includes the centerline and which has a work item from the following list:

B , BO, BB, N , CR, CU, CD, CO, CB, CP, BK

RDX.YEAR-PAVED - CHAR(4) - Year of Paving

'0000' - '9999' Year of the first pavement layer after the most recent grading. The pavement layer and the grading layer must both include the centerline. Pavement layers include those with the following work items:

B , BO, BB, N , CR, CU, CD, CO, CB, CP, BK

RDX.YEAR-SEALED - CHAR(4) - Year of Sealing

'0000' - '9999' Year of the most recent concrete or sealant-type layer. The layer must include the centerline and have one of the following work items.

CU, CD, CB, CP, CR, CO, JR, JS

Note that a concrete layer with a work item of 'N ' has no joints and is not sealed. Therefore such a concrete layer is not considered for determining YEAR-SEALED.

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RDY - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(2)	RDY.WORK-ITEM	X	
CHAR(2)	RDY.MATL-ID	X	
CHAR(1)	RDY.XSCTN-POSN	X	
CHAR(1)	RDY.MODE	X	
CHAR(1)	RDY.TRAN-DIRECT	X	
CHAR(4)	RDY.TRAN-OFFSET	X	
CHAR(4)	RDY.WIDTH	X	
CHAR(1)	RDY.VARIABLE-WIDTH	X	
CHAR(1)	RDY.VERT-POSN	X	
CHAR(4)	RDY.DEPTH	X	
CHAR(8)	RDY.DATE	X	
CHAR(6)	RDY.CONTRACT-NUMBER	X	
CHAR(10)	RDY.SP-NUMBER	X	

RDY - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(6)	RDY.CONTRACT-NUMBER	X	
CHAR(8)	RDY.DATE	X	
CHAR(4)	RDY.DEPTH	X	
CHAR(2)	RDY.MATL-ID	X	
CHAR(1)	RDY.MODE	X	
CHAR(10)	RDY.SP-NUMBER	X	
CHAR(1)	RDY.TRAN-DIRECT	X	
CHAR(4)	RDY.TRAN-OFFSET	X	
CHAR(1)	RDY.VARIABLE-WIDTH	X	
CHAR(1)	RDY.VERT-POSN	X	
CHAR(4)	RDY.WIDTH	X	

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        CHAR(2)    RDY.WORK-ITEM                X
        CHAR(1)    RDY.XSCTN-POSN               X
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        RDY - Descriptions of Data Elements
        ***********************************


        RDY.CONTRACT-NUMBER - CHAR(6) - Contract Number

             'C00001' - 'C99999'  State Construction Projects:

                 For these type of projects, the numeric portion of the Project
                 ID is the contract number assigned by the Contract
                 Award/Pre-letting Section.

             'D00001' - 'D99999'  District Maintenance Projects:

                 For these type of projects, the numeric portion of the Project
                 ID is a sequential number, unique to the file, assigned by
                 Roadway Data Unit personnel.

             'M00001' - 'M99999'  State Maintenance Projects:

                 For these type of projects, the numeric portion of the Project
                 ID is the contract number assigned by the Maintenance
                 Coordination Section.

             'S00001' - 'S99999'  State Aid Projects:

                 For this type of project, the numeric portion of the Project
                 ID is a sequential number, unique to the file, assigned by
                 Roadway Data Unit personnel.

             'U00001' - 'U99999'  Unknown project number:
```

For this type of project, the numeric portion of the Project ID is a sequential number, unique to the file, assigned by the Roadway History software.

RDY.DATE - CHAR(8) - Date of Layer

'mmddyyyy' (month, day, year)

The date the layer was added to the cross-section.

RDY.DEPTH - CHAR(4) - Depth of Layer

This field contains the depth of the roadway section layer described by the work item and material data. If the depth is variable in the transverse dimension, then the largest depth in the layer(except for 9-7-9 concrete slabs).

'nnnn' - The depth, in units of hundredths of inches, of the layer width at the beginning of the section.
'0979' - The depth of the layer varies from 9 to 7 to 9 inches in the transverse dimension.

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RDY.MATL-ID - CHAR(2) - Material ID

Aggregate base(AB) or Cement treated soil base(CT) materials:

'Cn' - Gravel class number,where n is 3,4,5, or 6

Bituminous (B ,BO,SO) materials:
(nn - indicates the last two digits of the specification number)

'21', '31', '32', '41', '50', '51', '56', '60', '61', '71', or
'SM' - stonematrix, '**' - unknown.

Bituminous (BB) materials:
(nn - indicates the last two digits of the specification number)

'04', '08', or
'**' - unknown.

Bituminous (BS) materials:
(nn - indicates the last two digits of the specification number)

'07'

Concrete (CU, CD, CR) materials:
(nn - indicates contraction joint spacing in feet)

Year built	Material ID
1900-33	40
34-41	30
42-45	20
46-56	15
57-69	20 or 39
70-75	20 or 27
76-82	16 or 27
83-99	15 or 27

Concrete overlay (CO, CB, CP) materials:
(nn - indicates contraction joint spacing in feet)

Work Item	Material ID
CB	blank
CO	15
CP	15

(continued on next page)

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Drainage or open-graded course work item:

Work Item	Matl ID	Base	
DL	blank		
DL	OG	OGAB	Open-graded aggregate base
DL	PA	PASB	Permeable asphalt stabilized base
DL	PC	PCSB	Permeable cement stabilized base

Gravel surface(GS) materials: C1, C2, or **

'C1', 'C2', or '**'.

Aggregate seal(AS) materials:

'Fn' - Fine aggregate number, where n is 1,2,3,4, or 5.

Rut repair(RR) codes:

'TB' - Tight Blade
'WP' - Wheel Path
'**' - unknown

All other work items(BK, BR, CC, DL, FS, ED, ES, GC, GD, GL, GR, JR, JS, MI, MC, Nb, PY, RC, RB, SL, US, WP):

' ' - not applicable.

RDY.MODE - CHAR(1) - Mode.

This code describes the relation between this layer and other layers in the road.

'N' - New, indicates
1) the addition of a full cross section(driving or shoulder) width layer which is either a)the addition of a layer in new construction or b)the addition of a layer above an existing layer and a cross section widening layer, or
2) the addition of a partial cross section width layer either in new construction or above part of an existing layer.

'I' - Inplace, indicates that the layer is a treatment applied to an existing layer, or the addition of a layer above an existing layer of the same or narrower width.

'W' - Widening, indicates that the layer is a part of a transverse extension of an existing cross section.

RDY.SP-NUMBER - CHAR(10) - State Project Number

see RDH.SP-NUMBER

RDY.TRAN-DIRECT - CHAR(1) - Transverse Direction

This code indicates on which side of the roadway centerline the described layer lies. A layer straddling the centerline but not centered on the centerline must be described by a "C" in this field and a "Lnnn" or "Rnnn" in the transverse distance field.

'L' - Layer lies wholly to the left of the centerline of the roadway.

'R' - Layer lies wholly to the right of the centerline of the roadway.

'C' - The roadway centerline lies within the layer.

RDY.TRAN-OFFSET - CHAR(4) - Transverse Offset

This field contains the distance from the roadway centerline to the layer edge nearest the roadway centerline.

'   ' - transverse direction is C and layer is centered over the roadway centerline.
'Lnnn' - The nearest edge of the layer is nn.n feet left of the roadway centerline.
'Rnnn' - The nearest edge of the layer is nn.n feet right of the roadway centerline.
'nnnn' - The distance, in units of tenths of feet, from the centerline to the nearest edge of the layer.

RDY.VARIABLE-WIDTH - CHAR(1) - Variable Layer Width Indicator

This field indicates whether the layer width is constant, increases, or decreases in the direction of increasing reference point.

'C' - Layer width is constant in the roadway section
'I' - Layer width increases in the direction of increasing reference point.
'D' - Layer width decreases in the direction of increasing reference point.
' ' - does not apply

RDY.VERT-POSN - CHAR(1) - Vertical Position

This field indicates the relative vertical position of each layer within either the driving or the right or left shoulder cross section. Vertical position is relative only to layers constructed by the contract being coded and not previously constructed layers. Two layers within the same contract, roadway section, and cross-section(driving or shoulders) may have the same vertical position only if they lie on the same horizontal plane. Layers are numbered from 0 to 9 from the bottom up. Layers which span the entire roadway are considered part of the driving cross- section for the pupose of determining the vertical position.

'n' - indicates the relative vertical position of the layer - i.e. 1 - lowest, 2 - on top of #1, 3 - on top on #2, etc. Grading must be 0.

RDY.WIDTH - CHAR(4) - Width of Layer

This field contains the width, at the beginning of the section, of the roadway layer described by the work item and material data.

'nnnn' - The width, in units of tenths of feet, of the layer width at the beginning of the section.

RDY.WORK-ITEM - CHAR(2) - Work Item

Work Item contains a code which describes the nature of a particular layer of a roadway structure.

NEW CONSTRUCTION OR RECONSTRUCTION CODES

- 'AB' - Aggregate base
- 'SA' - Salvaged Aggregate base
- 'B ' - Bituminous layer(binder,leveling,surface)
- 'BK' - Brick
- 'BB' - Bituminous base(bit. & gravel mixed) - adds depth
- 'BS' - Bituminous stabilized subgrade
- 'CD' - Concrete doweled
- 'CU' - Concrete undoweled
- 'CT' - Cement treated soil base
- 'GR' - Grading
- 'GL' - Grading with lime admixture
- 'GS' - Gravel or crushed rock surface
- 'PY' - Polystyrene
- 'N ' - CRCP Non-jointed concrete slab

RECONDITIONING CODES

- 'SR' - Subgrade recondition(cut,fill)
- 'CR' - Concrete(recycled)
- 'DL' - Drainage or open-graded course
- 'CC' - Crack concrete
- 'ED' - Edge drain
- 'ES' - Longitudinal edge seal
- 'RA' - Remove Aggregate Base
- 'GD' - Grind concrete
- 'JS' - Concrete pavement joint sealant removal and replacement
- 'GC' - Groove concrete
- 'SC' - Shift roadway centerline
- 'MI' - Mill Bituminous

'JR' - Concrete joint repair
'BR' - Base Reconditioning
'MC' - Major Crack Repair
'RC' - Remove Concrete
'RB' - Remove Bituminous
'RR' - Rut Repair
'US' - Undersealing
'WP' - Shoulder Wedge Paving
'SA' - Salvaged Aggregate Base
'SB' - Spot Subgrade recondition(cut,fill)
'SW' - Spot Shoulder Wedge Paving
'ST' - Spot Lift
'C1' - Minor Concrete Repair
'C2' - Major Concrete Repair
'CS' - Crack Sealing
'RD' - Retro-Fit Dowels
'RU' - Rubblize Concrete
'CI' - Cold-In-Place Recycling
'RE' - Reclaiming

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RESURFACING CODES

'FS' - Fog seal
'AS' - Aggregate seal
'SL' - Slurry Seal
'MS' - Micro-surfacing
'SO' - Spot Overlay(Net length in State Project Number field)
'CB' - Concrete overlay - bonded or unknown
'CO' - Concrete overlay - unbonded
'CP' - Concrete overlay - partially bonded
'BO' - Bituminous overlay
'WT' - Whitetopping (Concrete Overlay on Bituminous)
'SS' - Spot Seal

RDY.XSCTN-POSN - CHAR(1) - Cross-section position

This code describes the position of the layer within the roadway cross section.

'E' - The layer lies under the cross sections of one or more entire roadway(s).

'D' - The layer lies within the cross section designed to carry

the driving traffic. Note: Driving section base layers usually extend into the shoulder section. These extensions are considered part of the driving cross section.

'S' - The layer lies within the cross section designed to carry shoulder traffic.

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RGC - Listing of Names in File Order

Format	Name	Stored	Generated From
CHAR(8)	RGC.CROSSING-ID	X	
CHAR(2)	RGC.ID-CNTY	X	
CHAR(2)	RGC.ID-RR-SYS	X	
CHAR(4)	RGC.ID-REF-NUM	X	
CHAR(2)	RGC.ROUTE-SYSTEM	X	
CHAR(8)	RGC.ROUTE-NUMBER	X	
CHAR(10)	RGC.REF-POINT	X	
CHAR(7)	RGC.NAT-SURV-NUM	X	
CHAR(7)	RGC.SEC-TWNSHP-RANGE	X	
CHAR(2)	RGC.SEC-TWNSHP-RANGE-SEC	X	
CHAR(3)	RGC.SEC-TWNSHP-RANGE-TWN	X	

CHAR(2)	RGC.SEC-TWNSHP-RANGE-RNG	X	
CHAR(1)	RGC.DEVELOPMENT	X	
CHAR(31)	RGC.DESCRIPTION	X	
CHAR(4)	RGC.PLAT-NUM	X	
CHAR(2)	RGC.DIR-INCR-RP	X	
CHAR(6)	RGC.ADV-WARN-SIGN-NEAR	X	
CHAR(6)	RGC.ADV-WARN-SIGN-FAR	X	
CHAR(6)	RGC.PROT-DEV-NEAR	X	
CHAR(6)	RGC.PROT-DEV-FAR	X	
CHAR(2)	RGC.TOT-TRACKS	X	
NUM(3,1)	RGC.TOT-TRAINS	X	
CHAR(1)	RGC.STOP-SIGN-AUTH-NEAR	X	
CHAR(1)	RGC.STOP-SIGN-AUTH-FAR	X	
CHAR(1)	RGC.STOPPING-LANES	X	
CHAR(2)	RGC.RD-WID-NEAR	X	
CHAR(2)	RGC.RD-WID-FAR	X	
CHAR(1)	RGC.APPR-SURF-NEAR	X	
CHAR(1)	RGC.APPR-SURF-FAR	X	
CHAR(3)	RGC.APPR-GRADE-NEAR	X	
CHAR(3)	RGC.APPR-GRADE-FAR	X	
CHAR(1)	RGC.RD-INTSECT-NEAR	X	
CHAR(1)	RGC.RD-INT-DIST-NEAR	X	
CHAR(1)	RGC.RD-INTSECT-FAR	X	
CHAR(1)	RGC.RD-INT-DIST-FAR	X	
CHAR(1)	RGC.HWY-ALIGNMENT	X	
CHAR(1)	RGC.RR-ALIGNMENT	X	
CHAR(3)	RGC.ANGL-SKEW	X	
CHAR(1)	RGC.XING-SURFACE	X	
CHAR(1)	RGC.XING-SURFACE-COND	X	
CHAR(2)	RGC.XING-SURF-WID	X	
CHAR(3)	RGC.XING-SURF-LEN	X	
CHAR(1)	RGC.NUM-MAIN-TRX	X	
CHAR(2)	RGC.NUM-OTHER-TRX	X	
CHAR(1)	RGC.LIGHTED	X	
CHAR(4)	RGC.MIN-SIT-DIST-NR	X	
CHAR(1)	RGC.SIT-OBST-CODE-NR	X	
CHAR(4)	RGC.MIN-SIT-DIST-NL	X	

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Format	Name	Stored	Generated From
CHAR(1)	RGC.SIT-OBST-CODE-NL	X	
CHAR(4)	RGC.MIN-SIT-DIST-FR	X	

CHAR(1)	RGC.SIT-OBST-CODE-FR	X	
CHAR(4)	RGC.MIN-SIT-DIST-FL	X	
CHAR(1)	RGC.SIT-OBST-CODE-FL	X	
NUM(6)	RGC.AADT	X	
CHAR(2)	RGC.LEGAL-SPD-LIMIT	X	
CHAR(2)	RGC.HWY-SPEED	X	
CHAR(1)	RGC.LEGAL-SPD-SIGN	X	
NUM(3,1)	RGC.DAY-THRU-TRNS	X	
NUM(3,1)	RGC.DAY-SWITCH-TRNS	X	
NUM(3,1)	RGC.NIT-THRU-TRNS	X	
NUM(3,1)	RGC.NIT-SWITCH-TRNS	X	
CHAR(2)	RGC.PSGR-MVMNTS	X	
CHAR(2)	RGC.MAX-TTBL-SPEED	X	
CHAR(3)	RGC.ACC-SCAN-NEAR	X	
CHAR(3)	RGC.ACC-SCAN-FAR	X	
CHAR(1)	RGC.PROT-DEV-ACT	X	
CHAR(3)	RGC.OBSTR-TIME	X	
NUM(5)	RGC.HAZARD-RATING	X	
NUM(5)	RGC.CURRENT-HI-RANK	X	
CHAR(4)	RGC.PRIOR-YR-HI-RANK-1	X	
NUM(5)	RGC.PRIOR-HI-RANK-1	X	
CHAR(4)	RGC.PRIOR-YR-HI-RANK-2	X	
NUM(5)	RGC.PRIOR-HI-RANK-2	X	
CHAR(4)	RGC.PRIOR-YR-HI-RANK-3	X	
NUM(5)	RGC.PRIOR-HI-RANK-3	X	
CHAR(4)	RGC.PRIOR-YR-HI-RANK-4	X	
NUM(5)	RGC.PRIOR-HI-RANK-4	X	
CHAR(1)	RGC.ADV-WARN-COND-NEAR	X	
CHAR(1)	RGC.ADV-WARN-COND-FAR	X	
CHAR(1)	RGC.PROT-DEV-COND-NEAR	X	
CHAR(1)	RGC.PROT-DEV-COND-FAR	X	
CHAR(4)	RGC.CITY	X	
CHAR(1)	RGC.METHOD-AADT	X	
CHAR(8)	RGC.RAIL-POINT	X	
CHAR(1)	RGC.VENDOR	X	
NUM(8)	RGC.EXPOSURE		AADT x TOT-TRAINS
CHAR(2)	RGC.ADVISORY-SPEED	X	
CHAR(3)	RGC.XING-SURF-LEN-MAT	X	
CHAR(4)	RGC.INV-YEAR	X	
DATE	RGC.SIGNAL-INST-DATE	X	
NUM(2)	RGC.SIGNAL-INST-MONTH		RGC.SIGNAL-INST-DATE
NUM(2)	RGC.SIGNAL-INST-DAY		RGC.SIGNAL-INST-DATE
NUM(4)	RGC.SIGNAL-INST-YEAR		RGC.SIGNAL-INST-DATE
CHAR(4)	RGC.YR-AADT	X	
CHAR(4)	RGC.OBSTR-TIME-YR	X	
CHAR(5)	RGC.STATUS	X	
CHAR(4)	RGC.HAZARD-RTG-YEAR	X	
CHAR(4)	RGC.VENDOR-YEAR	X	
DATE	RGC.ACTIVATION-DATE	X	

RGC - Listing of Names in Alphabetical Order

Format	Name	Stored	Generated From
DATE	RGC.DATE-OF-UPDATE	X	
NUM(4)	RGC.YEAR-OF-UPDATE	X	
NUM(2)	RGC.MONTH-OF-UPDATE	X	
NUM(2)	RGC.DAY-OF-UPDATE	X	
NUM(6)	RGC.AADT	X	
CHAR(3)	RGC.ACC-SCAN-FAR	X	
CHAR(3)	RGC.ACC-SCAN-NEAR	X	
DATE	RGC.ACTIVATION-DATE	X	
CHAR(2)	RGC.ADVISORY-SPEED	X	
CHAR(1)	RGC.ADV-WARN-COND-FAR	X	
CHAR(1)	RGC.ADV-WARN-COND-NEAR	X	
CHAR(6)	RGC.ADV-WARN-SIGN-FAR	X	
CHAR(6)	RGC.ADV-WARN-SIGN-NEAR	X	
CHAR(3)	RGC.ANGL-SKEW	X	
CHAR(3)	RGC.APPR-GRADE-FAR	X	
CHAR(3)	RGC.APPR-GRADE-NEAR	X	
CHAR(1)	RGC.APPR-SURF-FAR	X	
CHAR(1)	RGC.APPR-SURF-NEAR	X	
CHAR(4)	RGC.CITY	X	
CHAR(8)	RGC.CROSSING-ID	X	
NUM(5)	RGC.CURRENT-HI-RANK	X	
DATE	RGC.DATE-OF-UPDATE	X	
NUM(2)	RGC.DAY-OF-UPDATE		RGC.DATE-OF-UPDATE
NUM(3,1)	RGC.DAY-SWITCH-TRNS	X	
NUM(3,1)	RGC.DAY-THRU-TRNS	X	
CHAR(31)	RGC.DESCRIPTION	X	
CHAR(1)	RGC.DEVELOPMENT	X	
CHAR(2)	RGC.DIR-INCR-RP	X	
NUM(8)	RGC.EXPOSURE		AADT x TOT-TRAINS
NUM(5)	RGC.HAZARD-RATING	X	
CHAR(2)	RGC.HAZARD-RTG-YEAR	X	
CHAR(1)	RGC.HWY-ALIGNMENT	X	
CHAR(2)	RGC.HWY-SPEED	X	
CHAR(2)	RGC.ID-CNTY	X	
CHAR(4)	RGC.ID-REF-NUM	X	
CHAR(2)	RGC.ID-RR-SYS	X	
CHAR(2)	RGC.INV-YEAR	X	
CHAR(2)	RGC.LEGAL-SPD-LIMIT	X	
CHAR(1)	RGC.LEGAL-SPD-SIGN	X	

Format	Name	Stored	Generated From
CHAR(1)	RGC.LIGHTED	X	
CHAR(2)	RGC.MAX-TTBL-SPEED	X	
CHAR(1)	RGC.METHOD-AADT	X	
CHAR(4)	RGC.MIN-SIT-DIST-FL	X	
CHAR(4)	RGC.MIN-SIT-DIST-FR	X	
CHAR(4)	RGC.MIN-SIT-DIST-NL	X	
CHAR(4)	RGC.MIN-SIT-DIST-NR	X	
NUM(2)	RGC.MONTH-OF-UPDATE		RGC.DATE-OF-UPDATE
CHAR(7)	RGC.NAT-SURV-NUM	X	
NUM(3,1)	RGC.NIT-SWITCH-TRNS	X	
NUM(3,1)	RGC.NIT-THRU-TRNS	X	
CHAR(1)	RGC.NUM-MAIN-TRX	X	

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Format	Name	Stored	Generated From
CHAR(2)	RGC.NUM-OTHER-TRX	X	
CHAR(3)	RGC.OBSTR-TIME	X	
CHAR(2)	RGC.OBSTR-TIME-YR	X	
CHAR(4)	RGC.PLAT-NUM	X	
NUM(5)	RGC.PRIOR-HI-RANK-1	X	
NUM(5)	RGC.PRIOR-HI-RANK-2	X	
NUM(5)	RGC.PRIOR-HI-RANK-3	X	
NUM(5)	RGC.PRIOR-HI-RANK-4	X	
CHAR(2)	RGC.PRIOR-YR-HI-RANK-1	X	
CHAR(2)	RGC.PRIOR-YR-HI-RANK-2	X	
CHAR(2)	RGC.PRIOR-YR-HI-RANK-3	X	
CHAR(2)	RGC.PRIOR-YR-HI-RANK-4	X	
CHAR(1)	RGC.PROT-DEV-ACT	X	
CHAR(1)	RGC.PROT-DEV-COND-FAR	X	
CHAR(1)	RGC.PROT-DEV-COND-NEAR	X	
CHAR(6)	RGC.PROT-DEV-FAR	X	
CHAR(6)	RGC.PROT-DEV-NEAR	X	
CHAR(2)	RGC.PSGR-MVMNTS	X	
CHAR(8)	RGC.RAIL-POINT	X	
CHAR(1)	RGC.RD-INT-DIST-FAR	X	
CHAR(1)	RGC.RD-INT-DIST-NEAR	X	
CHAR(1)	RGC.RD-INTSECT-FAR	X	
CHAR(1)	RGC.RD-INTSECT-NEAR	X	
CHAR(2)	RGC.RD-WID-FAR	X	
CHAR(2)	RGC.RD-WID-NEAR	X	
CHAR(10)	RGC.REF-POINT	X	
CHAR(8)	RGC.ROUTE-NUMBER	X	

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        CHAR(2)    RGC.ROUTE-SYSTEM             X
        CHAR(1)    RGC.RR-ALIGNMENT             X
        CHAR(7)    RGC.SEC-TWNSHP-RANGE         X
        CHAR(2)    RGC.SEC-TWNSHP-RANGE-RNG     X
        CHAR(2)    RGC.SEC-TWNSHP-RANGE-SEC     X
        CHAR(3)    RGC.SEC-TWNSHP-RANGE-TWN     X
        DATE       RGC.SIGNAL-INST-DATE         X
        NUM(2)     RGC.SIGNAL-INST-DAY                RGC.SIGNAL-INST-DATE
        NUM(2)     RGC.SIGNAL-INST-MONTH              RGC.SIGNAL-INST-DATE
        NUM(2)     RGC.SIGNAL-INST-YEAR               RGC.SIGNAL-INST-DATE
        CHAR(1)    RGC.SIT-OBST-CODE-FL         X
        CHAR(1)    RGC.SIT-OBST-CODE-FR         X
        CHAR(1)    RGC.SIT-OBST-CODE-NL         X
        CHAR(1)    RGC.SIT-OBST-CODE-NR         X
        CHAR(3)    RGC.STATUS                   X
        CHAR(1)    RGC.STOP-SIGN-AUTH-FAR       X
        CHAR(1)    RGC.STOP-SIGN-AUTH-NEAR      X
        CHAR(1)    RGC.STOPPING-LANES           X
        CHAR(2)    RGC.TOT-TRACKS                     RGC.track numbers
        NUM(3,1)   RGC.TOT-TRAINS                     RGC.train numbers
        CHAR(1)    RGC.VENDOR                   X
        CHAR(2)    RGC.VENDOR-YEAR              X
        CHAR(3)    RGC.XING-SURF-LEN            X
        CHAR(3)    RGC.XING-SURF-LEN-MAT        X
        CHAR(2)    RGC.XING-SURF-WID            X
        CHAR(1)    RGC.XING-SURFACE             X
        CHAR(1)    RGC.XING-SURFACE-COND        X
        NUM(2)     RGC.YEAR-OF-UPDATE                 RGC.DATE-OF-UPDATE
        CHAR(2)    RGC.YR-AADT                  X
 PAGE E-RGC-4 OF 24
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PAGE 1122
        RGC - Descriptions of Data Elements
        **********************************


        RGC.AADT - NUM(6) - AADT

            Annual average number of vehicles per day on the roadway.

                        000000  Unknown
                000001 - 200000  Vehicles per day


        RGC.ACC-SCAN-FAR - CHAR(3) - Accident Scan Limit - Far Side

            Distance in feet to be converted to miles and added to the reference
            point of the crossing when searching for accidents.  (See
            RGC.DIR-INCR-RP for explanation of NEAR/FAR).
```

'000' - '300' Accident scan distance in feet (far side).

RGC.ACC-SCAN-NEAR - CHAR(3) - Accident Scan Limit - Near Side

Distance in feet to be converted to miles and subtracted from the reference point of the crossing when searching for accidents. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'000' - '300' Accident scan distance in feet (near side).

RGC.ACTIVE-DATE - DATE - date of activation change

Date when the circuitry of a crossing protection device was upgraded or activated.

blanks	not applicable or information unavailable
mmddyyyy	Date of activation

mm = month = 01-12.
dd = day = 01-DD, where DD is the last day of month mm.
yyyy 0000-YYYY, where YYYY is the current year.

RGC.ADVISORY-SPEED - CHAR(2) - Advisory speed

Speed as listed on an "Advisory speed" plate.

'05' - '50'

RGC.ADV-WARN-COND-FAR - CHAR(1) - Advance Warning Sign Condition - Far Side

Indicates the condition of the advance warning sign(s) on the far approach to the crossing. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

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Code	Advance Warning Sign Condition
	(blank). No sign.
A	Sign is in good shape.
B	Sign is missing.
C	Sign is down.

D	Sign is bent.
E	Sign is defaced.
F	Sign is obscured.
G	Sign is in poor condition.
H	Condition unknown.
I	Faded pavement marking
J	Rumble strip is worn

RGC.ADV-WARN-COND-NEAR - CHAR(1) - Advance Warning Sign Condition - Near Side

Indicates the condition of the advance warning sign(s) on the near approach to the crossing. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR). See RGC.ADV-WARN-COND-FAR for codes and meanings.

RGC.ADV-WARN-SIGN-FAR - CHAR(6) - Advanced Warning Signs - Far Side

Up to six codes describing the type(s) of advanced warning signs present on the far approach to the crossing. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'xxxxxx' where x may be any of the following:

Code	Advanced Warning Sign
	(blank) - None
A	RxR pavement markings
B	Stop lines
C	Standard RxR sign
D	"Advisory speed" plate
E	"Track angle" sign
F	"Blind crossing" sign
G	"Look for trains" sign
H	"Stop ahead" sign
I	Rumble strip
J	"No passing" pennant
K	Parallel track warning sign
L	No passing pavement stripe
X	Exempt

RGC.ADV-WARN-SIGN-NEAR - CHAR(6) - Advanced Warning Signs - Near Side

Up to six codes describing the type(s) of advanced warning signs present on the near approach to the crossing. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'xxxxxx' See RGC.ADV-WARN-SIGN-FAR for possible codes and meanings.

RGC.ANGL-SKEW - CHAR(3) - Angle of Skew

Angle formed by the roadway and the railroad.

'001' - '179' Skew angle in degrees.

RGC.APPR-GRADE-FAR - CHAR(3) - Approach Grade - Far Side

Maximum grade within 150 feet on the far approach. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'-20' - '+20' Percent approach grade - far side.

RGC.APPR-GRADE-NEAR - CHAR(3) - Approach Grade - Near Side

Maximum grade within 150 feet on the near approach. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'-20' - '+20' Percent approach grade - near side.

RGC.APPR-SURF-FAR - CHAR(1) - Approach Surface - Far Side

Surface type of the roadway on the far approach. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

Code	Surface Type
'A'	Primitive
'B'	Unimproved
'C'	Graded and drained
'D'	Soil surfaced
'E'	Gravel or stone
'F'	Bituminous surface - treated
'G'	Mixed bituminous
'I'	Bituminous concrete and sheet asphalt
'J'	Portland cement concrete
'K'	Brick
'L'	Block

RGC.APPR-SURF-NEAR - CHAR(1) - Approach Surface - Near Side

Surface type of the roadway on the near approach. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

Code	Surface Type
'A'	Primitive

'B' Unimproved
'C' Graded and drained
'D' Soil surfaced
'E' Gravel or stone
'F' Bituminous surface - treated
'G' Mixed bituminous
'I' Bituminous concrete and sheet asphalt
'J' Portland cement concrete
'K' Brick
'L' Block

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RGC.CITY - CHAR(4) - City number

City in which crossing is located.

'0000' - '9999'

RGC.CROSSING-ID - CHAR(8) - Crossing ID Number

Unique identification for each crossing record. Formed as follows:

'ccrrmmmx' where:
cc is the county number (01-87).
rr is the railroad company number, (01-16, 21-31).
mmmx is the county reference number, (000 -999Z).

RGC.CURRENT-HI-RANK - NUM(5) - Current Hazard Index Rank

Ranking based on latest hazard index rating (#1 is highest).

00000 Rank not calculated.
00001-99999 Current hazard index rank.

RGC.DATE-OF-UPDATE - DATE - Date of Update

Most recent date record was modified:

blanks No update since original file creation.
mmddyyyy Date of update.

mm = month = 01-12.
dd = day = 01-31.
yyyy = year = 1982-9999.

RGC.DAY-OF-UPDATE - NUM(2) - Day Portion of Date of Update

00 No update since original file creation.
01-31 Day of month of date of update.

RGC.DAY-SWITCH-TRNS - NUM(3,1) - Number of Daily Switch Trains

'00.0' - '99.9' Average number of switch trains crossing between 6 AM and 6 PM.

RGC.DAY-THRU-TRNS - NUM(3,1) - Number of Daily Through Trains

'00.0' - '99.9' Average number of through trains crossing between 6 AM and 6 PM.

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RGC.DESCRIPTION - CHAR(31) - Verbal Description

Street name or other location of crossing. Also contains a second national survey number assigned to the crossing (if any).

RGC.DEVELOPMENT - CHAR(1) - Development

General description of the type of development in the area of the crossing:

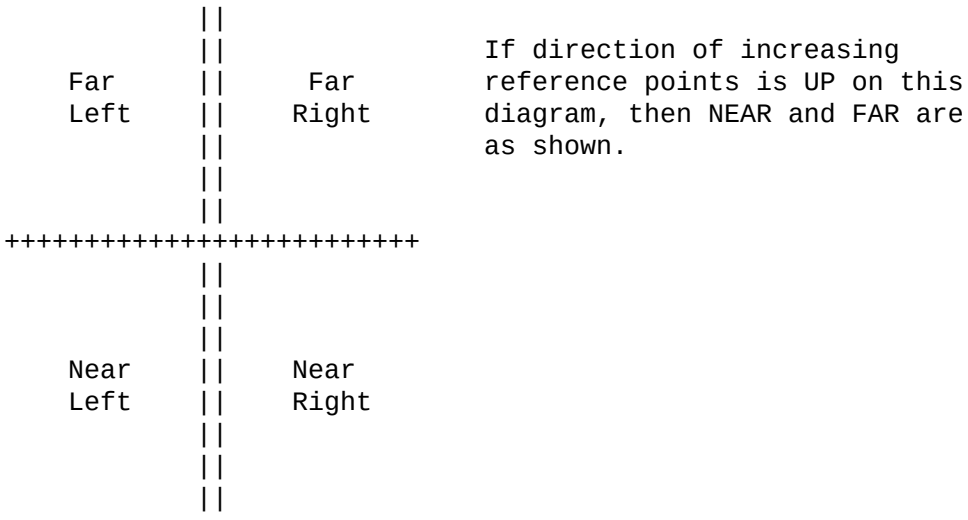
Code	Development
'0'	Unknown
'1'	Open space
'2'	Residential
'3'	Commercial
'4'	Industrial
'5'	Institutional

RGC.DIR-INCR-RP - CHAR(2) - Direction of Increasing Reference Points

Direction of travel when traversing the crossing toward increasing reference points. Determines NEAR/FAR sides:

' ' Unknown

'N ' North   'NE' Northeast
'S ' South   'SE' Southeast
'E ' East   'NW' Northwest
'W ' West   'SW' Southwest



RGC.EXPOSURE - NUM(8) - Exposure Factor

Product of RGC.AADT and RGC.TOT-TRAINS

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RGC.HAZARD-RATING - NUM(5) - Hazard Rating

Hazard index rating computed from AADT, train traffic, accident history, and types of protection.

00000 - 99999 Hazard index rating.

RGC.HAZARD-RTG-YR - CHAR(4) - Year of Hazard Rating

Indicates the year of the current hazard index rating (see RGC.HAZARD-RATING).

'   ' (blank) - No rating computed.
'1963' - '9999' Year of current hazard index rating.

RGC.HWY-ALIGNMENT - CHAR(1) - Highway Alignment

Describes curvature of roadway approaches within 300 feet:

'1' Tangent.
'2' Curved.

RGC.HWY-SPEED - CHAR(2) - Highway Speed

Speed at which traffic actually travels.

'01' - '??' Highway speed.

RGC.ID-CNTY - CHAR(2) - County Number portion of Crossing ID

The first two digits of the crossing ID number, which is the county that the crossing is located in:

'01' - '87' County number.

RGC.ID-REF-NUM - CHAR(4) - Map Reference Number portion of Crossing ID

The last four positions of the crossing ID number, which is the county map reference number:

'000 ' - '999Z' County map reference number.

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RGC.ID-RR-SYS - CHAR(2) - Railroad System Code portion of Crossing ID

The third and fourth positions of the crossing ID number, which is the railroad system code:

'01' BURLINGTON NORTHERN SANTA FE	'31' CAN. PACIFIC / MINN. COMM.
'02' UNION PACIFIC RAILROAD	'32' CAN. PAC. / DAK., MN & EAST.
'05' CANADIAN PACIFIC RAILWAY	'41' MINNESOTA TRNSPTN. MUSEUM
'06' DULUTH, MISSABE & IRON RANGE	'42' OTTER TAIL VALLEY RAILROAD

'07' CEDAR RIVER RAILROAD
'08' CANADIAN NATIONAL RAILWAYS
'09' DULUTH, WINNIPEG & PACIFIC
'10' DULUTH & NORTHEASTERN
'12' MINN., DAKOTA AND WESTERN
'13' MINNESOTA COMMERCIAL RWY.
'14' LTV STEEL MINING CO.
'15' NORTHSHORE MINING CO.
'17' MINNESOTA CENTRAL RAILROAD
'18' LAC QUI PARLE REGIONAL
'19' DAKOTA RAIL, INC.
'20' DAKOTA, MINN & EASTERN
'23' BURLINGTON NORTHERN SF / CPR
'27' UNION PACIFIC / CAN. PACIFIC
'30' CAN. PACIFIC / CEDAR RIVER
'43' WISCONSIN CENTRAL LTD.
'44' RED RIVER VALLEY & WESTERN
'45' NOBLES ROCK RAILROAD
'51' BURL. NORTH. SF / NOBLES ROCK
'52' ST. LOUIS & LAKE COS. REGIONAL
'53' TWIN CITIES & WESTERN RAILROAD
'55' CITY OF DULUTH
'56' MINNESOTA ZEPHYR, LTD.
'57' HENNEPIN CO REGIONAL RAIL AUTH
'58' MINNESOTA NORTHERN RAILROAD
'59' NORTHERN PLAINS RAILROAD
'60' I & M RAIL LINK, LLD
'61' ST. CROIX VALLEY RAILROAD

RGC.INV-YEAR - CHAR(4) - Year of Inventory

Year of latest data inventory, or Status Report:

'0000' - 'nnnn' Year of inventory (nnnn is current year).

RGC.LEGAL-SPD-LIMIT - CHAR(2) - Legal Speed Limit

Legal speed limit: '05' - '55'.

RGC.LEGAL-SPD-SIGN - CHAR(1) - Legal Speed Limit Signing

Indicates legal speed limit is posted:

'1' Posted.
'2' Not posted.

RGC.LIGHTED - CHAR(1) - Lighted Crossing

Street light within 50 feet of the crossing:

'Y' Lighted.
'N' Not lighted.

RGC.MAX-TTBL-SPEED - CHAR(2) - Maximum Timetable Speed

Maximum allowable speed for trains:

'01' - '99' Maximum allowable train speed.

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RGC.METHOD-AADT - CHAR(1) - Method AADT

Method used to determine the annual average number of vehicles per day on the roadway.

'C' - Counted by the district traffic engineer.
'E' - Estimated by the local road authority.
'D' - Default value for non-designated roads used.
blank - Information not available.

RGC.MIN-SIT-DIST-FL - CHAR(4) - Minimum Sight Distance - Far Left

Distance along tracks between the crossing and the first visual obstruction of the driver's view of the tracks in the far left quadrant (see RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'0000' - '2000' Sight distance in feet.

RGC.MIN-SIT-DIST-FR - CHAR(4) - Minimum Sight Distance - Far Right

Distance along tracks between the crossing and the first visual obstruction of the driver's view of the tracks in the far right quadrant (see RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'0000' - '2000' Sight distance in feet.

RGC.MIN-SIT-DIST-NL - CHAR(4) - Minimum Sight Distance - Near Left

Distance along tracks between the crossing and the first visual obstruction of the driver's view of the tracks in the far right quadrant (see RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'0000' - '2000' Sight distance in feet.

RGC.MIN-SIT-DIST-NR - CHAR(4) - Minimum Sight Distance - Near Right

Distance along tracks between the crossing and the first visual obstruction of the driver's view of the tracks in the far right quadrant (see RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'0000' - '2000' Sight distance in feet.

RGC.MONTH-OF-UPDATE - NUM(2) - Month Portion of Date of Update

00 No update since original file creation.
01-12 Month of date of update.

RGC.NAT-SURV-NUM - CHAR(7) - National Survey Number

National survey number assigned to the crossing:

'nnnnnna' Where: nnnnnn = 000001 - 999999.
                   a = A - Z.

RGC.NIT-SWITCH-TRNS - NUM(3,1) - Number of Nightly Switch Trains

'00.0' - '99.9' Average number of switch trains crossing between
                 6 PM and 6 AM.

RGC.NIT-THRU-TRNS - NUM(3,1) - Number of Nightly Through Trains

'00.0' - '99.9' Average number of through trains crossing between
                 6 PM and 6 AM.

RGC.NUM-MAIN-TRX - CHAR(1) - Number of Mainline Tracks

Number of mailine tracks: '0' - '3'.

RGC.NUM-OTHER-TRX - CHAR(2) - Number of Other Tracks

Number of auxiliary tracks (spurs, siding, wye, etc.):

'00' - '30' Number of other tracks.

RGC.OBSTR-TIME - CHAR(3) - Obstruction Time

Total time for the latest available year, that the crossing was
blocked by a train:

'000' Not applicable.
'001' - '999' Obstruction time (00.1 - 99.9 in hours).

RGC.OBSTR-TIME-YR - CHAR(4) - Obstruction Time - Year Monitored

The year obstruction time was monitored:

'   ' Not applicable.
'0001' - 'nnnn' Year obstruction time monitored.

RGC.PLAT-NUM - CHAR(4) - Plat Number

File number of the Plat map: '0000' - '9999'.

RGC.PRIOR-HI-RANK-1 - NUM(5) - First Prior Hazard Index Rank

Hazard index ranking for the first year prior to the current ranking. See RGC.PRIOR-YR-HI-RANK-1 for year of ranking.

00000 - 99999 Prior hazard index rank.

RGC.PRIOR-HI-RANK-2 - NUM(5) - Second Prior Hazard Index Rank

Hazard index ranking for the second year prior to the current ranking. See RGC.PRIOR-YR-HI-RANK-2 for year of ranking.

00000 - 99999 Prior hazard index rank.

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RGC.PRIOR-HI-RANK-3 - NUM(5) - Third Prior Hazard Index Rank

Hazard index ranking for the third year prior to the current ranking. See RGC.PRIOR-YR-HI-RANK-3 for year of ranking.

00000 - 99999 Prior hazard index rank.

RGC.PRIOR-HI-RANK-4 - NUM(5) - Fourth Prior Hazard Index Rank

Hazard index ranking for the fourth year prior to the current ranking. See RGC.PRIOR-YR-HI-RANK-4 for year of ranking.

00000 - 99999 Prior hazard index rank.

RGC.PRIOR-YR-HI-RANK-1 - CHAR(4) - First Year of Prior Hazard Index Rank

First most recent year (before current) that the crossing was ranked by hazard index. Associated with RGC.PRIOR-HI-RANK-1.

' ' Not applicable.
'0001' - 'nnnn-1' First most recent year of hazard index rank (nnnn-1 = current year - 1).

RGC.PRIOR-YR-HI-RANK-2 - CHAR(4) - Second Year of Prior Hazard Index Rank

Second most recent year (before current) that the crossing was ranked by hazard index. Associated with RGC.PRIOR-HI-RANK-2.

```
                    '    '  Not applicable.
           '0001' - 'nnnn-1'  Second most recent year of hazard index rank
                              (nnnn-1 = current year - 1).

        RGC.PRIOR-YR-HI-RANK-3 - CHAR(2) - Third Year of Prior Hazard Index Rank

            Third most recent year (before current) that the crossing was
            ranked by hazard index.  Associated with RGC.PRIOR-HI-RANK-3.

                    '    '  Not applicable.
           '0001' - 'nnnn-1'  Third most recent year of hazard index rank
                              (nnnn-1 = current year - 1).


        RGC.PRIOR-YR-HI-RANK-4 - CHAR(2) - Fourth Year of Prior Hazard Index
                                           Rank

            Fourth most recent year (before current) that the crossing was
            ranked by hazard index.  Associated with RGC.PRIOR-HI-RANK-4.

                    '    '  Not applicable.
           '0001' - 'nnnn-1'  Fourth most recent year of hazard index rank
                              (nnnn-1 = current year - 1).


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        RGC.PROT-DEV-ACT - CHAR(1) - Protection Device Activation

            Timing of protection device activation:

                '0'  Not applicable.        '3'  Motion sensor.
                '1'  Fixed.                 '4'  Speed and Motion.
                '2'  Speed dependent.

        RGC.PROT-DEV-COND-FAR - CHAR(1) - Protection Devices Condition - Far
                                          Side

            Indicates the condition of the protection device(s) on the far
            approach to the crossing.  (See RGC.DIR-INCR-RP for explanation of
            NEAR/FAR).

               Code   Protection Device Condition
               ----   --------------------------
                      (blank).  No sign.
                 A    Sign is in good shape.
                 B    Sign is missing.
                 C    Sign is down.
```

D Sign is bent.
E Sign is defaced.
F Sign is obscured.
G Sign is in poor condition.
H Condition unknown.

RGC.PROT-DEV-COND-NEAR - CHAR(1) - Protection Devices Condition - Near Side

Indicates the condition of the protection device(s) on the near approach to the crossing. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR). See RGC.PROT-DEV-COND-FAR for codes and meanings.

RGC.PROT-DEV-FAR - CHAR(6) - Protection Devices - Far Side

Up to six codes describing types of protection devices present on the far approach to the crossing. Each installation is delineated from others present by a zero (0). (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'xxxxxx' where x can be:

' ' None.
'A' Crossbuck - plain.
'B' Crossbuck - reflectorized.
'C' Stop sign - plain.
'D' Stop sign - reflectorized.
'E' Watchman.
'F' Bells.
'G' Wig wag (w/crossbuck).
'H' Flashing light installation (w/crossbuck).
'I' Signal bridge installation (w/flashing lights).
'J' Cantilever installation (w/crossbuck & flashing lights).
'K' Minnesota standard signal

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'L' Gate installation (w/crossbuck & flashing lights).
'M' Gate/cantilever installation (w/crossbuck & flashing lights).
'N' 12 inch lenses
'P' Multiple track sign.
'T' Tracks Out of Service
'X' Exempt
'0' (zero) - Installation delineator.

RGC.PROT-DEV-NEAR - CHAR(6) - Protection Devices - Near Side

Up to six codes describing types of protection devices present on

the near approach to the crossing. Each installation is delineated from others present by a zero (0). (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'xxxxxx' See RGC.PROT-DEV-FAR for possible codes and meanings.

RGC.PSGR-MVMNTS - CHAR(2) - Passenger Movements

Number of passenger trains per week: '00' - '21'.

RGC.RAIL-POINT - CHAR(8) - Rail point

Reference point on the railroad of the crossing..

blanks	No rail point present.
'000+0.00' - '999+9.99'	Rail point of crossing.

RGC.RD-INT-DIST-FAR - CHAR(1) - Road Intersection Distance - Far Side

Distance from the nearest track to the closest intersection on the far approach. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

' '	Not applicable (no intersection within 300 feet).
'0'	0 to 24 feet.
'1'	25 to 74 feet.
'2'	75 to 124 feet.
'3'	125 to 174 feet.
'4'	175 to 224 feet.
'5'	225 to 274 feet.
'6'	275 to 300 feet.

RGC.RD-INT-DIST-NEAR - CHAR(1) - Road Intersection Distance - Near Side

Distance from the nearest track to the closest intersection on the near approach. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

' '	Not applicable (no intersection within 300 feet).
'0'	0 to 24 feet.
'1'	25 to 74 feet.
'2'	75 to 124 feet.
'3'	125 to 174 feet.
'4'	175 to 224 feet.
'5'	225 to 274 feet.
'6'	275 to 300 feet.

RGC.RD-INTSECT-FAR - CHAR(1) - Road Intersection - Far Side

Intersection type and traffic control device for the closest intersection within 300 feet on the far approach. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'0' No intersection within 300 feet.
'1' Intersection - stop sign - side road.
'2' Intersection - stop sign - crossing road.
'3' Intersection - semaphore - side road.
'4' Intersection - semaphore - crossing road.
'5' Intersection - synchronized - side road.
'6' Intersection - synchronized - crossing road.
'7' Intersection - no traffic control - side road.
'8' Intersection - no traffic control - crossing road.
'9' Road begins or ends within 300 feet.

RGC.RD-INTSECT-NEAR - CHAR(1) - Road Intersection - Near Side

Intersection type and traffic control device for the closest intersection within 300 feet on the near approach. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'0' No intersection within 300 feet.
'1' Intersection - stop sign - side road.
'2' Intersection - stop sign - crossing road.
'3' Intersection - semaphore - side road.
'4' Intersection - semaphore - crossing road.
'5' Intersection - synchronized - side road.
'6' Intersection - synchronized - crossing road.
'7' Intersection - no traffic control - side road.
'8' Intersection - no traffic control - crossing road.
'9' Road begins or ends within 300 feet.

RGC.RD-WID-FAR - CHAR(2) - Roadway Width - Far Side

Width of roadway driving surface (excluding shoulders) on the far approach. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'08' - '99' Roadway width (in feet).

RGC.RD-WID-NEAR - CHAR(2) - Roadway Width - Near Side

Width of roadway driving surface (excluding shoulders) on the near approach. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'08' - '99' Roadway width (in feet).

RGC.REF-POINT - CHAR(10) - Reference Point

```
                    '          '  No reference point present.
          '000+00.000' - '999+99.999'  Reference point of crossing.


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        RGC.ROUTE-NUMBER - CHAR(8) - Route Number

            Trunk:  '00000nnn' or '0000nnna' where nnn = 001-999 and a = A-Z.

            MSAS,MUN: 'ccccnnnn' or 'cc00nnna' where cccc = census number,
                           nnnn = 0001-9999, nnn = 001-999, a = A-Z.

            Other:  'cc00nnxx' where cc = county number (01-87),
                    nnxx = 0001-9999, or 00xx, where xx = A1 - Z9.


        RGC.ROUTE-SYSTEM - CHAR(2) - Route System

               '02'  USTH - U.S. trunk highway
               '03'  MNTH - Minnesota trunk highway
               '04'  CSAH - County state-aid highway
               '05'  MSAS - Municipal state-aid street
               '07'  CNTY - County road
               '08'  TWNS - Township road
               '09'  UTWN - Unorganized township road
               '10'  MUN  - City streets
               '11'  NATP - National park road
               '12'  NFD  - National forest development road
               '13'  IND  - Indian reservation road
               '14'  SFR  - State forest road
               '15'  SPRK - State park road
               '16'  MIL  - Military road
               '17'  NATM - National monument road
               '18'  NATW - National wildlife refuge road
               '19'  FRNT - Frontage road
               '20'  SGAM - State game preserve road
               '23'  PRIV - Private jurisdiction road


        RGC.RR-ALIGNMENT - CHAR(1) - Railroad Alignment

            Describes curvature of railroad approaches within 2000 feet:

               '1'  Tangent.
               '2'  Curved.
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RGC.SEC-TWNSHP-RANGE - CHAR(7) - Section Township and Range

'sstttrr' Section township and range:

ss = section = 01-36.
ttt = township = 026-071 or 101-168.
rr = range = 01-51.

RGC.SEC-TWNSHP-RANGE-RNG - CHAR(2) - Range of Crossing

Last two characters of RGC.SEC-TWNSHP-RANGE:

'01' - '51' Range.

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RGC.SEC-TWNSHP-RANGE-SEC - CHAR(2) - Section of Crossing

First two characters of RGC.SEC-TWNSHP-RANGE:

'01' - '36' Section.

RGC.SEC-TWNSHP-RANGE-TWN - CHAR(2) - Township of Crossing

Second, third, and fourth characters of RGC.SEC-TWNSHP-RANGE:

'026' - '071', or '101' - '168' Township.

RGC.SIGNAL-INST-DATE - DATE - Date of Signal Installation.

Date of installation of train-activated signal:

blanks No train activated signal.
mmddyyyy Date of signal installation:

mm = month = 01-12.
dd = day = 01-31.
yyyy = year = 0001-9999.

RGC.SIGNAL-INST-DAY - NUM(2) - Day Portion of Signal Installation Date

00 No train activated signal.
01-31 Day of month of signal installation

RGC.SIGNAL-INST-MONTH - NUM(2) - Month Portion of Signal Installation Date

00 No train activated signal.
01-12 Month of year of signal installation

RGC.SIGNAL-INST-YEAR - NUM(4) - Year Portion of Signal Installation Date

0000 No train activated signal.
0001-nnnn Year of signal installation (nnnn = current year).

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RGC.SIT-OBST-CODE-FL - CHAR(1) - Sight Obstruction Code - Far Left

Describes type of object causing sight distance restriction in the far left quadrant. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

' ' Not applicable.
'A' Hill.
'B' Depression.
'C' Outcropping - rock formation.
'D' Trees.
'E' Crops.
'F' Brush - bushes, wild vegetation.
'G' Building - one story.
'H' Building - multi-story.
'I' Storage structures.
'J' Wall or sign.
'K' Utilities.
'L' Monuments.
'M' Bridges.
'N' Box cars on siding.
'O' Trucks, cars in parking lot.

RGC.SIT-OBST-CODE-FR - CHAR(1) - Sight Obstruction Code - Far Right

Describes type of object causing sight distance restriction in the far right quadrant. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

' ' Not applicable.
'A' Hill.
'B' Depression.
'C' Outcropping - rock formation.
'D' Trees.
'E' Crops.
'F' Brush - bushes, wild vegetation.
'G' Building - one story.
'H' Building - multi-story.
'I' Storage structures.
'J' Wall or sign.
'K' Utilities.
'L' Monuments.
'M' Bridges.
'N' Box cars on siding.
'O' Trucks, cars in parking lot.

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RGC.SIT-OBST-CODE-NL - CHAR(1) - Sight Obstruction Code - Near Left

Decribes type of object causing sight distance restriction in the near left quadrant. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

' ' Not applicable.
'A' Hill.
'B' Depression.
'C' Outcropping - rock formation.
'D' Trees.
'E' Crops.

'F' Brush - bushes, wild vegetation.
'G' Building - one story.
'H' Building - multi-story.
'I' Storage structures.
'J' Wall or sign.
'K' Utilities.
'L' Monuments.
'M' Bridges.
'N' Box cars on siding.
'O' Trucks, cars in parking lot.

RGC.SIT-OBST-CODE-NR - CHAR(1) - Sight Obstruction Code - Near Right

Decribes type of object causing sight distance restriction in the near right quadrant. (See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

' ' Not applicable.
'A' Hill.
'B' Depression.
'C' Outcropping - rock formation.
'D' Trees.
'E' Crops.
'F' Brush - bushes, wild vegetation.
'G' Building - one story.
'H' Building - multi-story.
'I' Storage structures.
'J' Wall or sign.
'K' Utilities.
'L' Monuments.
'M' Bridges.
'N' Box cars on siding.
'O' Trucks, cars in parking lot.

RGC.STATUS - CHAR(5) - Status

Indicates status of railway

'   ' (BLANKS) Railway is active
'7nnnn' Railway inactive since nnnn.
'8nnnn' Railway abandoned since nnnn.
'9nnnn' Railway or crossing removed in nnnn.

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RGC.STOP-SIGN-AUTH-FAR - CHAR(1) - Stop Sign Authorization - Far Side

Indicates stop sign authorization on the far side of the crossing:
(See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'N' Not applicable.
'A' Authorized.
'U' Unauthorized.

RGC.STOP-SIGN-AUTH-NEAR - CHAR(1) - Stop Sign Authorization - Near Side

Indicates stop sign authorization on the near side of the crossing:
(See RGC.DIR-INCR-RP for explanation of NEAR/FAR).

'N' Not applicable.
'A' Authorized.
'U' Unauthorized.

RGC.STOPPING-LANES - CHAR(1) - Stopping Lanes

Presence of stopping lanes on the roadway approaches:

'1' None.
'2' Near side only.
'3' Far side only.
'4' Both sides.

RGC.TOT-TRACKS - CHAR(2) - Toal Number of Tracks.

The sum of RGC.NUM-MAIN-TRX and RGC.NUM-OTHER-TRX:

'00' - '99' Total number of tracks.

RGC.TOT-TRAINS - NUM(3,1) - Total Number of Trains

The sum of RGC.DAY-SWITCH-TRNS, RGC.DAY-THRU-TRNS,
RGC.NIT-SWITCH-TRNS, and RGC.NIT-THRU-TRNS:

'00.0' - '99.9' Total number of trains.

RGC.VENDOR - CHAR(1) - Vendor

The vendor of a rubber or plastic crossing surface.

blank - not applicable or information not available
'A' - COBRA X
'B' - FAB-RA-CAST
'C' - GENERAL TIRE GENTRAC I
'D' - GENERAL TIRE GENTRAC II
'E' - GOODYEAR SUPER CUSHION
'F' - GOODYEAR DIAMOND
'G' - GOODYEAR HEAVY DUTY
'H' - R.R CROSSINGS, INC. STEEL - EPOXY COAT
'I' - RED HAWK RUBBER COMPANY.
'J' - STRUCTURAL RUBBER SAFNDRI MOD C
'K' - STRUCTURAL RUBBER SAFNDRI MOD S
'L' - KRALBURG "HI-RAIL"
'M' - PREMIER CONCRETE PRECAST CONCRETE
'N' - OMNI RUBBER PRODUCTS INC.
'O' - PARK RUBBER COMPANY PARKCO NEW
'P' - PARK RUBBER COMPANY PARKCO OLD
'Q' - KOPPERS WEAR GUARD
'R' - TRUE TEMPER
'S' - OMNI CONCRETE AND RUBBER.

RGC.VENDOR-YEAR - CHAR(4) - Vendor year

The year a rubber or plastic crossing surface was installed.

'0001' - 'nnnn' (nnnn = current year).
blank - not applicable or information not available

RGC.XING-SURF-LEN - CHAR(3) - Crossing Surface Length

Length of the crossing surface as measured along the centerline of the roadway from outside surface edge to outside surface edge:

'001' - '999' Crossing surface length (in feet).

RGC.XING-SURF-LEN-MAT - CHAR(3) - Length of Crossing Surface Material

Length of the crossing surface material as measured along the centerline of the tracks.

blanks unknown or not available
'001' - '999' Length of crossing surface material (in feet).

RGC.XING-SURF-WID - CHAR(2) - Crossing Surface Width

Width of the crossing surface measured at a right angle to the roadway centerline:

'01' - '99' Crossing surface width (in feet).

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RGC.XING-SURFACE - CHAR(1) - Crossing Surface

Type of roadway surface at the crossing:

'B' Unimproved.
'E' Gravel or stone.
'G' Mixed bituminous.
'J' Portland cement concrete.
'K' Rubber and concrete.
'P' Plastic.
'R' Rubber.
'S' Steel rails.
'X' Plank.
'Y' Plank and bituminous.
'Z' Plank and gravel.

RGC.XING-SURFACE-COND - CHAR(1) - Crossing Surface Condition

Condition of crossing surface:

'1' Good. Can be driven at roadway speed limit.
'2' Fair. Slight speed reduction necessary.
'3' Poor. Drastic speed reduction necessary.

RGC.YEAR-OF-UPDATE - NUM(4) - Year Portion of Date of Update

0000 No update since original file creation.
0001-nnnn Year of update (nnnn = current year).

RGC.YR-AADT - CHAR(4) - Year of AADT

Indicates the year of RGC.AADT:'0001' - 'nnnn'

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RLG - Listing of Names in File Order

Format	Name	Stored	Generated From
CHAR(20)	RLG.KEY-FIELD	X	
CHAR(10)	RLG.ROUTE-SYS-&-NUM	X	
CHAR(2)	RLG.ROUTE-SYSTEM	X	
CHAR(8)	RLG.ROUTE-NUMBER	X	
CHAR(10)	RLG.REF-POINT	X	
CHAR(8)	RLG.MILEPOINT		RLG.REF-POINT
CHAR(3)	RLG.REFERENCE-POST	X	
CHAR(7)	RLG.DIST-FROM-REF-POST	X	
CHAR(51)	RLG.DESCRIPTION	X	
CHAR(2)	RLG.REMARK-CODE	X	
NUM(1)	RLG.BREAK-CODE	X	
NUM(1)	RLG.INTERSECT-CATEGORY	X	
DATE	RLG.DATE-OF-UPDATE	X	
NUM(2)	RLG.MONTH-OF-UPDATE		RLG.DATE-OF-UPDATE
NUM(2)	RLG.DAY-OF-UPDATE		RLG.DATE-OF-UPDATE
NUM(4)	RLG.YEAR-OF-UPDATE		RLG.DATE-OF-UPDATE
CHAR(8)	RLG.SEC-TWNSHP-RANGE	X	
CHAR(2)	RLG.SEC-TWNSHP-RANGE-SEC		RLG.SEC-TWNSHP-RANGE
CHAR(3)	RLG.SEC-TWNSHP-RANGE-TWN		RLG.SEC-TWNSHP-RANGE
CHAR(3)	RLG.SEC-TWNSHP-RANGE-RNG		RLG.SEC-TWNSHP-RANGE
CHAR(2)	RLG.DIRECTION-CODE	X	

NUM(1)	RLG.CONTROL-OF-ACCESS	X	
CHAR(2)	RLG.RGT-SHOULD-WID-RD2	X	
CHAR(2)	RLG.RGT-SHOULD-TYPE-RD2	X	
CHAR(2)	RLG.SURF-WID-RD2	X	
CHAR(2)	RLG.SURF-TYPE-RD2	X	
CHAR(2)	RLG.LEFT-SHOULD-WID-RD2	X	
CHAR(2)	RLG.LEFT-SHOULD-TYPE-RD2	X	
CHAR(2)	RLG.MEDIAN-WIDTH	X	
CHAR(1)	RLG.MEDIAN-TYPE	X	
CHAR(2)	RLG.LEFT-SHOULD-WID-RD1	X	
CHAR(2)	RLG.LEFT-SHOULD-TYPE-RD1	X	
CHAR(2)	RLG.SURF-WID-RD1	X	
CHAR(2)	RLG.SURF-TYPE-RD1	X	
CHAR(2)	RLG.RGT-SHOULD-WID-RD1	X	
CHAR(2)	RLG.RGT-SHOULD-TYPE-RD1	X	
CHAR(1)	RLG.NUM-LANES-DM	X	
CHAR(1)	RLG.NUM-LANES-IM	X	
CHAR(2)	RLG.TOTAL-THRU-LANES		NUM-LANES-DM + NUM-LANES-IM
CHAR(1)	RLG.TURN-LANES-DM	X	
CHAR(1)	RLG.TURN-LANES-IM	X	
CHAR(1)	RLG.ADD-LANES-RD2	X	
CHAR(1)	RLG.ADD-LANES-RD1	X	
CHAR(1)	RLG.SIDEWALKS	X	
CHAR(1)	RLG.DIVIDED-&-ONE-WAY	X	
CHAR(1)	RLG.CURBS-RD2	X	
CHAR(1)	RLG.CURBS-RD1	X	
CHAR(1)	RLG.PARKING-RD2	X	
CHAR(1)	RLG.PARKING-RD1	X	
NUM(2)	RLG.COUNTY	X	
NUM(1)	RLG.DISTRICT-FROM-CNTY		RLG.COUNTY

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Format	Name	Stored	Generated From
CHAR(2)	RLG.RDC-FROM-CNTY		RLG.COUNTY
NUM(7)	RLG.POP-FROM-CNTY		RLG.COUNTY
CHAR(3)	RLG.RIGHT-OF-WAY-WIDTH	X	
NUM(2)	RLG.CNTRL-SECTN	X	
CHAR(4)	RLG.PTRL-STATION	X	
NUM(2)	RLG.FUNCT-CLASS	X	
CHAR(2)	RLG.MAINT-AREA	X	
NUM(1)	RLG.CONSTR-DIST	X	
NUM(4)	RLG.CITY	X	
NUM(7)	RLG.POP-FROM-CITY		RLG.CITY
NUM(1)	RLG.RUR-URB-FROM-CITY		RLG.CITY

NUM(1)	RLG.POP-GROUP-FROM-CITY		RLG.CITY
NUM(4)	RLG.CENSUS-YR-FROM-CITY		RLG.CITY
NUM(4)	RLG.CITY-FAUA	X	
CHAR(1)	RLG.FED-AID-SYS	X	
CHAR(4)	RLG.FED-AID-RTE	X	
CHAR(1)	RLG.FED-AID-SYS-DESIG	X	
CHAR(1)	RLG.FED-AID-SYS-REG	X	
CHAR(3)	RLG.LEGIS-RTE-NUM	X	
CHAR(3)	RLG.TWNSHP-NUM	X	
CHAR(5)	RLG.TWNSHP-BY-NAME		RLG.COUNTY & TWNSHP-NUM
CHAR(1)	RLG.STORM-SEWERS	X	
NUM(2)	RLG.LOCN-CODE-1	X	
NUM(2)	RLG.AREA-NAME-CODE-1	X	
NUM(2)	RLG.LOCN-CODE-2	X	
NUM(2)	RLG.AREA-NAME-CODE-2	X	
NUM(2)	RLG.LOCN-CODE-3	X	
NUM(2)	RLG.AREA-NAME-CODE-3	X	
NUM(1)	RLG.SPECIAL-SYSTEMS	X	
CHAR(2)	RLG.CORRIDOR	X	
CHAR(4)	RLG.SURF-SPEC-NUM-RD2	X	
CHAR(3)	RLG.SURF-THICK-RD2	X	
CHAR(4)	RLG.BASE-SPEC-NUM-RD2	X	
CHAR(3)	RLG.BASE-THICK-RD2	X	
CHAR(2)	RLG.TRUCK-ROUTE-CLASS	X	
CHAR(4)	RLG.SURF-SPEC-NUM-RD1	X	
CHAR(1)	RLG.FED-FUNC-CODE	X	
CHAR(1)	RLG.TRANS-SUBSYS	X	
CHAR(1)	RLG.BIKE-PLAN	X	
CHAR(4)	RLG.BASE-SPEC-NUM-RD1	X	
CHAR(3)	RLG.BASE-THICK-RD1	X	
CHAR(2)	RLG.BASE-WIDTH-RD1	X	
CHAR(5)	RLG.STATE-PROJ-NUM	X	
CHAR(3)	RLG.FED-PROJ-NUM	X	
NUM(2)	RLG.DESIGN-SPEED	X	

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Format	Name	Stored	Generated From

NUM(2)	RLG.ALT-FUNCT-CLASS	X	
CHAR(1)	RLG.ALT-FED-AID-SYS	X	
CHAR(4)	RLG.ALT-FED-AID-RTE	X	
DATE	RLG.DATE-OF-INVENTORY	X	
NUM(2)	RLG.MONTH-OF-INVENTORY		RLG.DATE-OF-INVENTORY
NUM(2)	RLG.DAY-OF-INVENTORY		RLG.DATE-OF-INVENTORY
NUM(4)	RLG.YEAR-OF-INVENTORY		RLG.DATE-OF-INVENTORY
DATE	RLG.EFFECTIVE-DATE	X	
NUM(2)	RLG.EFFECTIVE-MONTH		RLG.EFFECTIVE-DATE
NUM(2)	RLG.EFFECTIVE-DAY		RLG.EFFECTIVE-DATE
NUM(4)	RLG.EFFECTIVE-YEAR		RLG.EFFECTIVE-DATE
NUM(4)	RLG.YEAR-BUILT-RD2	X	
NUM(4)	RLG.YEAR-IMPROVED-RD2	X	
NUM(4)	RLG.YEAR-BUILT-RD1	X	
NUM(4)	RLG.YEAR-IMPROVED-RD1	X	

RLG - Listing of Names in Alphabetical Order

Format	Name	Stored	Generated From
CHAR(1)	RLG.ADD-LANES-RD1	X	
CHAR(1)	RLG.ADD-LANES-RD2	X	
CHAR(4)	RLG.ALT-FED-AID-RTE	X	
CHAR(1)	RLG.ALT-FED-AID-SYS	X	
NUM(2)	RLG.ALT-FUNCT-CLASS	X	
NUM(2)	RLG.AREA-NAME-CODE-1	X	
NUM(2)	RLG.AREA-NAME-CODE-2	X	
NUM(2)	RLG.AREA-NAME-CODE-3	X	
CHAR(4)	RLG.BASE-SPEC-NUM-RD1	X	
CHAR(4)	RLG.BASE-SPEC-NUM-RD2	X	
CHAR(3)	RLG.BASE-THICK-RD1	X	
CHAR(3)	RLG.BASE-THICK-RD2	X	
CHAR(2)	RLG.BASE-WIDTH-RD1	X	
CHAR(1)	RLG.BIKE-PLAN	X	
NUM(1)	RLG.BREAK-CODE	X	
NUM(4)	RLG.CENSUS-YR-FROM-CITY		RLG.CITY
NUM(4)	RLG.CITY	X	
NUM(4)	RLG.CITY-FAUA	X	
NUM(2)	RLG.CNTRL-SECTN	X	
NUM(1)	RLG.CONSTR-DIST	X	
NUM(1)	RLG.CONTROL-OF-ACCESS	X	
CHAR(2)	RLG.CORRIDOR	X	
NUM(2)	RLG.COUNTY	X	
CHAR(1)	RLG.CURBS-RD1	X	
CHAR(1)	RLG.CURBS-RD2	X	
DATE	RLG.DATE-OF-INVENTORY	X	
DATE	RLG.DATE-OF-UPDATE	X	
NUM(2)	RLG.DAY-OF-INVENTORY		RLG.DATE-OF-INVENTORY
NUM(2)	RLG.DAY-OF-UPDATE		RLG.DATE-OF-UPDATE
CHAR(51)	RLG.DESCRIPTION	X	
NUM(2)	RLG.DESIGN-SPEED	X	
CHAR(2)	RLG.DIRECTION-CODE	X	
CHAR(7)	RLG.DIST-FROM-REF-POST	X	
NUM(1)	RLG.DISTRICT-FROM-CNTY		RLG.COUNTY
CHAR(1)	RLG.DIVIDED-&-ONE-WAY	X	
DATE	RLG.EFFECTIVE-DATE	X	
NUM(2)	RLG.EFFECTIVE-DAY		RLG.EFFECTIVE-DATE
NUM(2)	RLG.EFFECTIVE-MONTH		RLG.EFFECTIVE-DATE
NUM(4)	RLG.EFFECTIVE-YEAR		RLG.EFFECTIVE-DATE
CHAR(4)	RLG.FED-AID-RTE	X	

CHAR(1)	RLG.FED-AID-SYS	X	
CHAR(1)	RLG.FED-AID-SYS-DESIG	X	
CHAR(1)	RLG.FED-AID-SYS-REG	X	
CHAR(1)	RLG.FED-FUNC-CODE	X	
CHAR(3)	RLG.FED-PROJ-NUM	X	

Format	Name	Stored	Generated From
NUM(2)	RLG.FUNCT-CLASS	X	
NUM(1)	RLG.INTERSECT-CATEGORY	X	
CHAR(20)	RLG.KEY-FIELD	X	
CHAR(2)	RLG.LEFT-SHOULD-TYPE-RD1	X	
CHAR(2)	RLG.LEFT-SHOULD-TYPE-RD2	X	
CHAR(2)	RLG.LEFT-SHOULD-WID-RD1	X	
CHAR(2)	RLG.LEFT-SHOULD-WID-RD2	X	
CHAR(3)	RLG.LEGIS-RTE-NUM	X	
NUM(2)	RLG.LOCN-CODE-1	X	
NUM(2)	RLG.LOCN-CODE-2	X	
NUM(2)	RLG.LOCN-CODE-3	X	
CHAR(2)	RLG.MAINT-AREA	X	
CHAR(1)	RLG.MEDIAN-TYPE	X	
CHAR(2)	RLG.MEDIAN-WIDTH	X	
CHAR(8)	RLG.MILEPOINT		RLG.REF-POINT
NUM(2)	RLG.MONTH-OF-INVENTORY		RLG.DATE-OF-INVENTORY
NUM(2)	RLG.MONTH-OF-UPDATE		RLG.DATE-OF-UPDATE
CHAR(1)	RLG.NUM-LANES-DM	X	
CHAR(1)	RLG.NUM-LANES-IM	X	
CHAR(1)	RLG.PARKING-RD1	X	
CHAR(1)	RLG.PARKING-RD2	X	
NUM(7)	RLG.POP-FROM-CITY		RLG.CITY
NUM(7)	RLG.POP-FROM-CNTY		RLG.COUNTY
NUM(1)	RLG.POP-GROUP-FROM-CITY		RLG.CITY
CHAR(4)	RLG.PTRL-STATION	X	
CHAR(2)	RLG.RDC-FROM-CNTY		RLG.COUNTY
CHAR(10)	RLG.REF-POINT	X	
CHAR(3)	RLG.REFERENCE-POST	X	
CHAR(2)	RLG.REMARK-CODE	X	
CHAR(2)	RLG.RGT-SHOULD-TYPE-RD1	X	
CHAR(2)	RLG.RGT-SHOULD-TYPE-RD2	X	

CHAR(2)	RLG.RGT-SHOULD-WID-RD1	X	
CHAR(2)	RLG.RGT-SHOULD-WID-RD2	X	
CHAR(3)	RLG.RIGHT-OF-WAY-WIDTH	X	
CHAR(8)	RLG.ROUTE-NUMBER	X	
CHAR(10)	RLG.ROUTE-SYS-&-NUM	X	
CHAR(2)	RLG.ROUTE-SYSTEM	X	
NUM(1)	RLG.RUR-URB-FROM-CITY		RLG.CITY
CHAR(8)	RLG.SEC-TWNSHP-RANGE	X	
CHAR(3)	RLG.SEC-TWNSHP-RANGE-RNG		RLG.SEC-TWNSHP-RANGE
CHAR(2)	RLG.SEC-TWNSHP-RANGE-SEC		RLG.SEC-TWNSHP-RANGE
CHAR(3)	RLG.SEC-TWNSHP-RANGE-TWN		RLG.SEC-TWNSHP-RANGE
CHAR(1)	RLG.SIDEWALKS	X	
NUM(1)	RLG.SPECIAL-SYSTEMS	X	
CHAR(5)	RLG.STATE-PROJ-NUM	X	
CHAR(1)	RLG.STORM-SEWERS	X	

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Format	Name	Stored	Generated From
CHAR(4)	RLG.SURF-SPEC-NUM-RD1	X	
CHAR(4)	RLG.SURF-SPEC-NUM-RD2	X	
CHAR(3)	RLG.SURF-THICK-RD2	X	
CHAR(2)	RLG.SURF-TYPE-RD1	X	
CHAR(2)	RLG.SURF-TYPE-RD2	X	
CHAR(2)	RLG.SURF-WID-RD1	X	
CHAR(2)	RLG.SURF-WID-RD2	X	
CHAR(2)	RLG.TOTAL-THRU-LANES		NUM-LANES-DM + NUM-LANES-IM
CHAR(1)	RLG.TRANS-SUBSYS	X	
CHAR(2)	RLG.TRUCK-ROUTE-CLASS	X	
CHAR(1)	RLG.TURN-LANES-DM	X	
CHAR(1)	RLG.TURN-LANES-IM	X	
CHAR(5)	RLG.TWNSHP-BY-NAME		RLG.COUNTY & TWNSHP-NUM
CHAR(3)	RLG.TWNSHP-NUM	X	
NUM(4)	RLG.YEAR-BUILT-RD1	X	
NUM(4)	RLG.YEAR-BUILT-RD2	X	
NUM(4)	RLG.YEAR-IMPROVED-RD1	X	
NUM(4)	RLG.YEAR-IMPROVED-RD2	X	
NUM(4)	RLG.YEAR-OF-INVENTORY		RLG.DATE-OF-INVENTORY
NUM(4)	RLG.YEAR-OF-UPDATE		RLG.DATE-OF-UPDATE

RLG - Descriptions of Data Elements
****

RLG.ADD-LANES-RD1 - CHAR(1) - Additional Lanes Road-1
RLG.ADD-LANES-RD2 - CHAR(1) - Additional Lanes Road-2

Remark codes 'CO', 'EN', 'GP', 'NE', or 'DS':

' ' Not applicable

Remark code ' ':

' ' Not applicable
'0' No additional lanes
'1' Climbing lane(s) on left
'2' Climbing lane(s) on right

'3' Climbing lanes on both sides
'4' Escape lane on left
'5' Acceleration lane(s) on left
'6' Acceleration lane(s) on right
'7' Acceleration lanes on both sides
'8' Escape lanes on right
'9' Other additional lanes

RLG.ALT-FUNCT-CLASS - NUM(2) - Alternate Functional Classification

Any numeric value or blank

RLG.ALT-FED-AID-RTE - CHAR(4) - Alternate Federal Aid Route Number

Any alphanumeric value or blank

RLG.ALT-FED-AID-SYS - CHAR(1) - Alternate Federal Aid System

Any alphanumeric value or blank

RLG.AREA-NAME-CODE-1 - NUM(2) - Area Name Code 1
RLG.AREA-NAME-CODE-2 - NUM(2) - Area Name Code 2
RLG.AREA-NAME-CODE-3 - NUM(2) - Area Name Code 3

00 Not applicable
01-99 Area name code

Each field is non-zero only if the corresponding location code (RLG.LOCN-CODE-x) is non-zero.

The individual area name codes are too numerous to list in this appendix. A complete list can be found in the TIS Data Coding Manual.

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RLG.BASE-SPEC-NUM-RD1 - CHAR(4) - Base Specification Number Road-1
RLG.BASE-SPEC-NUM-RD2 - CHAR(4) - Base Specification Number Road-2

' ' Unknown or not applicable
'2201' Concrete base
'2204' Bituminous treated base
'2206' Soil-cement base

```
     '2207'   Bituminous stabilized sub-grade
     '2211'   Aggregate base
     '2221'   Aggregate shouldering
     '2231'   Base reconditioning
RLG.BASE-THICK-RD1 - CHAR(3) - Base Thickness Road-1
RLG.BASE-THICK-RD2 - CHAR(3) - Base Thickness Road-2

     '   '           Not applicable
     'UN '           Unknown
     '010' - '999'   Base thickness to nearest tenth of an inch (eg.,
                       9.4 inches is represented as '094')

RLG.BASE-WIDTH-RD1 - CHAR(2) - Base Width Road-1

     '  '         Not applicable
     'UN'         Unknown
     'VR'         Varies
     '08' - '99'  Base width in feet

RLG.BIKE-PLAN - CHAR(1) - Bike Plan

     '0'          Not included in state Bike Plan
     '1'          Included in state Bike Plan

RLG.BREAK-CODE - NUM(1) - Break Code

     1   Roadlog reports
     2   Control section book
     3   Logpoint listings
     4   Logpoint listings & control section book
     5   Roadlog report and control section book
     6   Roadlog reports and logpoint listings
     7   Roadlog reports & logpoint listings & control section book

RLG.CENSUS-YR-FROM-CITY - NUM(4) - Census Year of Population

     0000       Non-municipal
     0001-9999  Census year

     The census year is determined by accessing the city name file.

RLG.CITY - NUM(4) - City Number

     0000        Non-municipal
     0001-9998   Municipality census number

     In select statements, cities can be identified either by number
     (eg., RLG.CITY *EQ* 3380) or by name (eg., RLG.CITY *EQ*
     'ST-CLOUD').
```

RLG.CITY-FAUA - NUM(4) - City Number Federal Aid Urban Area

0000	Rural
0001-9998	Municipality census number corresponding to urban area
9999	Twin Cities Metropolitan Area

In select statements, cities can be identified either by number (eg., RLG.CITY-FAUA *EQ* 3380) or by name (eg., RLG.CITY-FAUA *EQ* 'ST-CLOUD').

RLG.CNTRL-SECTN - NUM(2) - Control Section Number

00	Not applicable
01-75	U.S. or Minnesota trunk highway control section number
80-88	Interstate trunk highway control section number

RLG.CONTROL-OF-ACCESS - NUM(1) - Control of Access

0	Not applicable (remark codes 'CO','GP','EN','NE','DS')
1	No control of access
2	Partial control of access
3	Full control of access
4	Not a public road

RLG.CONSTR-DIST - NUM(1) - Construction District Number

0	Not applicable (remark codes 'CO','GP','EN','DS' or non-trunk roadway)
1-9	Construction district number

RLG.CORRIDOR - CHAR(2) - Interregional Corridor

'01'	Interregional Corridor - High Priority
'02'	Interregional Corridor - Medium Priority
'03'	Regional Corridor
' '	Not applicable or unknown

RLG.COUNTY - NUM(2) - County Number

00	Not applicable (remark codes 'CO','GP','EN','DS')
01-87	County number

In select statements, counties can be identified by name (eg., RLG.COUNTY *EQ* 'LAKE-OF-THE-WOODS') or by number (eg., RLG.COUNTY *EQ* 39).

RLG.CURBS-RD1 - CHAR(1) - Curbs Road-1
RLG.CURBS-RD2 - CHAR(1) - Curbs Road-2

' '	Not applicable	'R'	Curbs on right side
'N'	No curbs	'B'	Curbs on both sides
'L'	Curbs on left side	'U'	Unknown

RLG.DATE-OF-INVENTORY - DATE - Date of Inventory

00/00/0000	Date of inventory unknown
mm/dd/yyyy	Date of most recent inventory (mm=month, dd=day, yyyy=year)

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RLG.DATE-OF-UPDATE - DATE - Date Record Was Updated

00/00/0000	Record has not been updated since initial file load
mm/dd/yyyy	Most recent date on which record was updated

RLG.DAY-OF-INVENTORY - NUM(2) - Day of Month of Inventory

00	Date of inventory unknown
01-31	Day of month

RLG.DAY-OF-UPDATE - NUM(2) - Day of Month Record Was Most Recently Updated

00	Record has not been updated since initial file load
01-31	Day of month of most recent date on which record was updated

RLG.DESCRIPTION - CHAR(51) - Verbal Description

This data elemetns contains a 51-character verbal description.

RLG.DESIGN-SPEED - NUM(2) - Design Speed

00	Unknown or not applicable
01-70	Design speed in miles per hour

RLG.DIRECTION-CODE - CHAR(2) - Direction of Road

' '	Not stated		
'N '	North	'NE'	Northeast
'S '	South	'NW'	Northwest
'E '	East	'SE'	Southeast
'W '	West	'SW'	Southwest

RLG.DIST-FROM-REF-POST - CHAR(7) - Distance from Reference Post

'+00.000' - '+99.999'	Distance from reference post in miles

RLG.DISTRICT-FROM-CNTY - NUM(1) - Construction District from County Number

0	RLG.COUNTY contains 00
1-9	Construction district determined from county number (can differ from RLG.CONSTR-DIST)

RLG.DIVIDED-&-ONE-WAY - CHAR(1) - Divided and One-Way Code (Roadway Type)

' '	Not applicable (remark codes 'CO','GP','DS','EN','NE')
'D'	Divided roadway - Road-1 & road-2 present
'O'	One-way couplet - Road-1 & road-2 present
'U'	Undivided 2-way - Road-1 present
'X'	One-way street towards decreasing reference posts - Road-2 present
'Z'	One-way street towards increasing reference posts - Road-1 present

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RLG.EFFECTIVE-DATE - DATE - Effective Date

00/00/0000	Effective date unknown
mm/dd/yyyy	Date of most recent major roadway alteration

RLG.EFFECTIVE-DAY - NUM(2) - Day of Month of Effective Date

00	Effective date unknown
01-31	Day of month

RLG.EFFECTIVE-MONTH - NUM(2) - Month of Effective Date

00	Effective date unknown
01-12	Month of effective date

RLG.EFFECTIVE-YEAR - NUM(4) - Year of Effective Date

0000	Effective date unknown
1901-9999	Year of effective date

RLG.FED-AID-RTE - CHAR(4) - Federal Aid Route Number

' '	Not federal aid or not applicable
'0001' - '9999'	Federal aid route number

RLG.FED-AID-SYS - CHAR(1) - Federal Aid System

' '	Not applicalbe (remark codes 'DS','CO','EN','GP')

'N' Not on federal aid system
'I' Federal aid interstate
'P' Federal aid primary
'S' Federal aid secondary
'U' Federal aid urban

RLG.FED-AID-SYS-DESIG - CHAR(1) - Federal Aid System Designated

' ' No travelled way or projected way involved
'D' Projected way
'T' Travelled way

RLG.FED-AID-SYS-REG - CHAR(1) - Federal Aid System Regular

' ' No travelled way involved
'I' Travelled way of interstate system
'P' Travelled way of primary system
'S' Travelled way of secondary system
'U' Travelled way of urban system
'N' Travelled way of non-federal system

RLG.FED-FUNC-CODE - CHAR(1) - Federal Functional Code

'1' Urban Principal Arterial, connecting link to
     Rural Principal Arterial
'2' Urban Principal Arterial, connecting link to
     Rural Minor Arterial
'7' National Highway System
'9' Urban Principal Arterial, not a connecting link
blank All non urban Principal Arterials

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RLG.FED-PROJ-NUM - CHAR(3) - Federal Project Number

' ' Not applicable
'001' - '999' Federal project number

RLG.FUNCT-CLASS - NUM(2) - Functional Classification

00 Not applicable (remark codes 'DS','CO','GP','EN')

Rural
-----
01 Principal arterial - Interstate
02 Principal arterial - Other
06 Minor arterial
07 Major collector
08 Minor collector

09 Local systems

Urban
---
11 Principal arterial - Interstate
12 Principal arterial - Other freeway - Connecting
14 Principal arterial - Other connecting link
16 Minor arterial
17 Collector
19 Local systems

RLG.INTERSECT-CATEGORY - NUM(2) - Intersection Category

00	No intersection	13	IND
01	ISTH	14	SFR
02	USTH	15	SPRK
03	MNTH	16	MIL
04	CSAH	17	NATM
05	MSAS	18	NATW
07	CNTY	19	FRNT
08	TWNS	20	SGAM
09	UTWN	21	Leg
10	MUN	22	Ramp
11	NATP	23	Priv
12	NFD		

RLG.KEY-FIELD - CHAR(20) - Key of Roadlog Record

The roadlog (and logpoint) file is sorted in increasing order of route system, route number (9-character format), and reference point. This data element name allows referencing all three of those data elements in a single name.

'0100000035000+00.000' - '2387009999999+99.999' Key field

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RLG.LEFT-SHOULD-TYPE-RD1 CHAR(2) - Left Shoulder Type Road-1
RLG.LEFT-SHOULD-TYPE-RD2 CHAR(2) - Left Shoulder Type Road-2

' ' Not applicable
'A ' Primitive
'B ' Unimproved

```
      'C '   Graded and drained
      'D '   Soil-surfaced
      'E '   Gravel or stone
      'F '   Bituminous surface-traveled
      'G '   Mixed bituminous road - type unknown
      'G1'   Mixed bituminous road - low-type
      'G2'   Mixed bituminous road - high-type
      'G3'   Mixed bituminous surface - resurfacing
      'G4'   Mixed bituminous surface - new construction
      'I '   Bituminous concrete or asphalt road
      'I3'   Bituminous concrete or asphalt resurfacing
      'I4'   Bituminous concrete or asphalt new construction
      'J '   Portland cement concrete road
      'J3'   Portland cement concrete resurfacing
      'J4'   Portland cement concrete new construction
      'K '   Brick
      'L '   Block
      'Mn'   Bituminous composite shoulder.  n is the width in feet
             of the bituminous, inside portion of the composite shoulder.
             n can be any number, 1 - 9.
      'Nn'   Concrete composite shoulder.  n is the width in feet of the
             concrete, inside portion of the composite shoulder.  n can
             be any number, 1 - 9.
      'S '   Sod shoulder
      '00'   No shoulder

RLG.LEFT-SHOULD-WID-RD1 - CHAR(2) - Left Shoulder Width Road-1
RLG.LEFT-SHOULD-WID-RD2 - CHAR(2) - Left Shoulder Width Road-2

      '  '           Not applicable
      'UN'           Unknown
      'VR'           Varies
      '00' - '99'    Shoulder width in feet ('00' = no shoulder)

RLG.LEGIS-RTE-NUM - CHAR(3) - Legislative Route Number

      '   '           Not applicable
      '001' - '999'   Legislative route number
      '000'           Not applicable
```

RLG.LOCN-CODE-1 - NUM(2) - Location Code 1
RLG.LOCN-CODE-2 - NUM(2) - Location Code 2
RLG.LOCN-CODE-3 - NUM(2) - Location Code 3

00	Not applicalbe
01	Indian reservation
02	National forest
03	National monument
04	National park
05	National wildlife refuge
06	Military reservation
07	State forest
08	State park
09	State game preserve
10	Economic development region

RLG.MAINT-AREA - CHAR(2) - Maintenance Area

' '	Not applicable (remark codes 'DS','CO','EN','GP', or non-trunk)
'1A' - '9B'	Maintenance area

'na' where n = 1-9 and a = A-C. '5B' and '9B' do not exist. 'C' is only valid for '8C'.

RLG.MEDIAN-TYPE - CHAR(1) - Median Type

' '	Not applicable
'0'	Median type unknown
'1'	No median barrier, raise median
'2'	No median barrier, depressed median
'3'	Plate beam barrier
'4'	City block (one-way couplet)
'5'	Box beam barrier
'6'	Concrete barrier
'7'	Chain link barrier, raise median
'8'	Chain link barrier, Depressed median

RLG.MEDIAN-WIDTH - CHAR(2) - Median Width

' '	Not applicable
'UN'	Unknown
'VR'	Varies
'00' - '99'	Median width

RLG.MILEPOINT - CHAR(8) - Milepoint

'0000.000' - '9999.999' Milepoint (true mileage at reference point).

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RLG.MONTH-OF-INVENTORY - NUM(2) - Month of Inventory

00	Date of inventory unknown
01-12	Month of inventory

RLG.MONTH-OF-UPDATE - NUM(2) - Month Record Was Most Recently Updated

00	Record has not been updated since initial file load
01-12	Month of most recent date on which record was updated

RLG.NUM-LANES-DM - CHAR(1) - Number of Through Lanes Towards Decreasing Milepoints
RLG.NUM-LANES-IM - CHAR(1) - Number of Through Lanes Towards Increasing Milepoints

' '	Not applicable (no lanes)
'1' - '5'	Number of through lanes

RLG.PARKING-RD1 - CHAR(1) - Parking on Road-1
RLG.PARKING-RD2 - CHAR(1) - Parking on Road-2

' '	Not applicable	
'0'	Unknown	
'1'	Left-none	Right-none
'2'	Left-none	Right-parallel
'3'	Left-none	Right-diagonal
'4'	Left-parallel	Right-none
'5'	Left-parallel	Right-parallel
'6'	Left-parallel	Right-diagonal
'7'	Left-diagonal	Right-none
'8'	Left-diagonal	Right-parallel
'9'	Left-diagonal	Right-diagonal

RLG.POP-FROM-CITY - NUM(7) - Population Computed from RLG.CITY

0000000	Non-municipal
0000001-9999999	Municipal - Population of municipality

This field is computed by accessing the city name file.

RLG.POP-FROM-CNTY - NUM(7) - Population Computed from RLG.COUNTY

0000000	County unknown
0000001-9999999	Population of county

This field is computed by accessing the county table.

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RLG.POP-GROUP-FROM-CITY - NUM(1) - Population Group from RLG.CITY

1 Urban - 250,000 and over
2 Urban - 100,000 - 249,999
3 Urban - 50,000 - 99,999
4 Urban - 25,000 - 49,999
5 Urban - 10,000 -24,999
6 Urban - 5,000 - 9,999
7 Rural - 2,500 - 4,999
8 Rural - 1,000 - 2,499
9 Rural - 1 - 999 or non-municipal

This field is computed by accessing the city name file.

RLG.PTRL-STATION - CHAR(4) - Patrol Station

' '	Not applicable (remark codes 'CO','EN','GP', 'DS' or non-trunk highways)
'0000'	Trunk highway - Not in patrol station
'2110' - '4560'	Trunk highway - patrol station number

RLG.RDC-FROM-CNTY - CHAR(2) - Regional Development Commission from County Number

' '	RLG.COUNTY contains 00
' 1' - '11'	Regional Development Commission determined from County Number

RLG.REF-POINT - CHAR(10) - Reference Point

'000+00.000' - '999+99.999' Reference point

RLG.REFERENCE-POST - CHAR(3) - Reference Post

'000' - '999'   Reference post number

RLG.REMARK-CODE - CHAR(2) - Remark Code

' '	Mileage record - Normal section (roadlog file)
'NE'	Mileage record - Non-existent section (roadlog file)
'CO'	Descriptor record - Coincident (roadlog file)
'EN'	Descriptor record - End-of-route record (roadlog file)
'GP'	Descriptor record - Gap (roadlog file)
'DS'	Descriptor record - Intersection description (logpoint file)

RLG.RGT-SHOULD-TYPE-RD1 - CHAR(2) - Right Shoulder Type Road-1
RLG.RGT-SHOULD-TYPE-RD2 - CHAR(2) - Right Shoulder Type Road-2

See RLG.LEFT-SHOULD-TYPE-RD1 for codes.

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RLG.RGT-SHOULD-WID-RD1 - CHAR(2) - Right Shoulder Width Road-1
RLG.RGT-SHOULD-WID-RD2 - CHAR(2) - Right Shoulder Width Road-2

' '	Not applicable
'UN'	Unknown
'VR'	Varies
'00'	No shoulder
'01' - '99'	Shoulder width in feet

RLG.RIGHT-OF-WAY-WIDTH - CHAR(3) - Right of Way Width

' '	Not applicable (remark codes 'DS','CO','EN','GP', 'NE')
'001' - '999'	Average right of way width in feet

RLG.ROUTE-NUMBER - CHAR(8) - Route Number

'nnnnnnxx'   Route number (n = 0-9, x = 0-9 or A-Z)

Route systems '01' through '03': 00000nnn or 0000nnna (n=0-9,a=A-Z)

Route systems '05' and '10': ccccnnnx (ccc = city number, n = 0-9,
x = 0-9 or A-Z)

Other route systems: cc00nnxx (cc = county number, n = 0-9,
x = 0-9 or A-Z)

RLG.ROUTE-SYS-&-NUM - CHAR(10) - Route system and route number

Concatenation of RLG.ROUTE-SYSTEM and RLG.ROUTE-NUMBER:

'ssnnnnnnnn' where: ss = route system code
nnnnnnnn = route number

RLG.ROUTE-SYSTEM - CHAR(2) - Route system

'01'	ISTH	'09'	UTWN	'16'	MIL
'02'	USTH	'10'	MUN	'17'	NATM
'03'	MNTH	'11'	NATP	'18'	NATW
'04'	CSAH	'12'	NFD	'19'	FRNT
'05'	MSAS	'13'	IND	'20'	SGAM
'07'	CNTY	'14'	SFR	'23'	PRIV
'08'	TWNS	'15'	SPRK		

RLG.RUR-URB-FROM-CITY - NUM(1) - Rural-Urban-Urbanized Code Computed
From City

1 Rural (municipal or non-municipal)
2 Urban (5,000 - 49,999)
3 Urbanized (50,000 and greater)

This field is computed by accessing the city name file.

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RLG.SEC-TWNSHIP-RANGE - CHAR(8) - Section Township and Range
RLG.SEC-TWNSHIP-RANGE-RNG - CHAR(3) - Range
RLG.SEC-TWNSHIP-RANGE-SEC - CHAR(2) - Section
RLG.SEC-TWNSHIP-RANGE-TWN - CHAR(3) - Township

'sstttrrr' Section township and range (ss=section ttt=township
rrr=range)
' ' Not applicable or not stated

Section codes:

' '	Not applicable or not stated
'01' - '36'	Section

Township codes:

' '	Not applicable or not stated
'026' - '071'	Township
'101' - '168'	Township

Range codes:

' '	Not applicable or not stated
'01W' - '51W'	Range
'01E' - '08E'	Range

RLG.SIDEWALKS - CHAR(1) - Sidewalks

' '	Not applicable (remark codes 'CO','EN','GP','DS','NE')
'N'	No sidewalks
'L'	Sidewalks on left side
'R'	Sidewalks on right side
'B'	Sidewalks on both sides
'C'	Combination (divided roadways and one-way couplets only)
'U'	Unknown

RLG.SPECIAL-SYSTEMS - NUM(1) - Special Systems

0	Not applicable
1	National forest highway
2	CMSAS
3	Primary township road (route systems 08 and 09 only)
4	Secondary township road (route systems 08 and 09 only)
5	Great river road

RLG.STATE-PROJ-NUM - CHAR(5) - State Project Number

' '	Not applicable or not stated
'00001' - '99999'	State project number

RLG-STORM-SEWERS - CHAR(1) - Storm Sewers

' '	Not applicable or not stated
'Y'	Yes - Storm sewers present
'N'	No - Storm sewers not present
'U'	Unknown

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RLG.SURF-SPEC-NUM-RD1 - CHAR(4) - Surface Type Specification Number Road-1
RLG.SURF-SPEC-NUM-RD2 - CHAR(4) - Surface Type Specification Number Road-2

' '	Not applicable or not stated
'0000'	Gravel (aggregate) surface
'2301'	Concrete pavement
'2321'	Road-mixed bituminous surface
'2331'	Plant-mixed bituminous pavement
'2341'	Plant-mixed bituminous surface
'2351'	Asphaltic concrete surface
'2361'	Asphaltic concrete surface (fine mix)

RLG.SURF-THICK-RD2 - CHAR(3) - Surface Thickness Road-2

' '	Not applicable or not stated
'UN '	Unknown
'010' - '999'	Thickness to nearest tenth of an inch ('094' = 9.4 inches)

RLG.SURF-TYPE-RD1 - CHAR(2) - Surface Type Road-1
RLG.SURF-TYPE-RD2 - CHAR(2) - Surface Type Road-2

See RLG.LEFT-SHOULD-TYPE-RD1 ('M1','M2','M3','M4','S ', and '00' are not used).

RLG.SURF-WID-RD1 - CHAR(2) - Surface Width Road-1
RLG.SURF-WID-RD2 - CHAR(2) - Surface Width Road-2

' '	Not applicable	'VR'	Varies
'UN'	Unknown	'08' - '99'	Surface width in feet

RLG.TOTAL-THRU-LANES - CHAR(2) - Total through lanes

' '	Not applicable (no lanes)
'01' - '18'	Sum of NUM-LANES-IM and NUM-LANES-DM

RLG.TRANS-SUBSYS - CHAR(1) - Transportation Subsystem

'1'	Market Artery Route
'2'	Commercial Access Route
blank	Not applicable

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RLG.TRUCK-ROUTE-CLASS - CHAR(2) - Truck route classification

'1 ' Designated National Truck Network Federal authority.

'2 ' Designated National Truck Network State authority.

'6 ' Designated Minnesota Twin Trailer Route, on trunk highway
'7 ' Designated Truck Route, off trunk highway
' ' Not a designated Truck Route.

RLG.TURN-LANES-DM - CHAR(1) - Turning Lanes Toward Decreasing Mileposts
RLG.TURN-LANES-IM - CHAR(1) - Turning Lanes Toward Increasing Mileposts

' ' Not applicable
'N ' No turning lanes
'L ' Turning lanes on left side
'R ' Turning lanes on right side
'B ' Turning lanes on both sides

RLG.TWNSHP-BY-NAME - CHAR(5) - Township Name from County and Township Number

The county number followed by the township number.

'01000' - '87999'

NOTE: ROADLOG-MATRIX-SUMMARY formats this category into township name for printing.

RLG.TWNSHP-NUM - CHAR(3) - Township Number

' ' Not applicable
'000' Not applicable
'001' - '156' Township number

RLG.UNUSED - CHAR(1) - This space is not used at present

RLG.URBAN-MUNIC-CODE - NUM(1) - Urban-municipal Code

0 Not applicable (remark codes 'CO', 'GP', 'EN', 'EN', 'DS')
1 Nonmunicipal - rural

2 Nonmunicipal - urban
3 Municipal - rural
4 Municipal - urban

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RLG.YEAR-BUILT-RD1 - NUM(4) - Year Built Road-1

RLG.YEAR-BUILT-RD2 - NUM(4) - Year Built Road-2

RLG.YEAR-IMPROVED-RD1 - NUM(4) - Year Improved Road-1

RLG.YEAR-IMPROVED-RD2 - NUM(4) - Year Improved Road-2

0000 Not applicable or not stated
1901-9999 Year built (graded) or improved (surfaced)

RLG.YEAR-OF-INVENTORY - NUM(4) - Year of Inventory

0000 Date of inventory unknown
1901-9999 Year of most recent inventory

RLG.YEAR-OF-UPDATE - NUM(4) - Year Record Was Updated

0000 Record has not been updated since initial file load
1901-9999 Most recent year in which record was updated

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RLS - DATA ELEMENT NAMES
****

The data element names for RLS data elements are the same as those for RDY. The RLS names apply to the topmost layer of the left shoulder. (The topmost selected layer with cross-section position "S" and transverse direction "L"). For details, see the RDY data element names.

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RPT - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(2)	RPT.RR-SYS	X	
CHAR(2)	RPT.RR-LINE	X	
CHAR(8)	RPT.REF-PNT	X	
CHAR(5)	RPT.FSAC	X	
CHAR(8)	RPT.RGC-NUMBER	X	
CHAR(6)	RPT.BDG-NUMBER	X	
CHAR(45)	RPT.DESCR	X	
DATE	RPT.DATE-OF-UPDATE	X	

RPT - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From

CHAR(6)	RPT.BDG-NUMBER	X
DATE	RPT.DATE-OF-UPDATE	X
CHAR(45)	RPT.DESCR	X
CHAR(5)	RPT.FSAC	X
CHAR(8)	RPT.REF-PNT	X
CHAR(8)	RPT.RGC-NUMBER	X
CHAR(2)	RPT.RR-LINE	X
CHAR(2)	RPT.RR-SYS	X

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RPT - Descriptions of Data Elements
****

RPT.BDG-NUMBER - CHAR(6) - Bridge Number

If there is a bridge at the location of this railpoint record, the bridge number is coded in the record. Otherwise, this element is blank.

RPT.DATE-OF-UPDATE - DATE - Date of Update

Most recent date railpoint record was modified:

blanks No update since original file creation.
mm/dd/yy Date of update:

mm = month = 01-12.
dd = day = 01-31.
yy = year = 81-99.

RPT.DESCR - CHAR(45) - Verbal Description

Free-format verbal description of the railpoint.

RPT.FSAC - CHAR(5) - FSAC Number

If a station is located at this railpoint, the FSAC number for the station is coded. Otherwise, this element is blank.

RPT.REF-PNT - CHAR(8) - Reference Point

000+0.00 - 999+9.99 Reference point of record.

RPT.RGC-NUMBER - CHAR(8) - Rail Grade Crossing Number

If a grade crossing is located at this railpoint, the Rail Grade Crossing (RGC) Number is coded to identify it. Otherwise, this element is blank.

RPT.RR-LINE - CHAR(2) - Railroad Line Number

01 - 99 Railroad line number.

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RPT.RR-SYS - CHAR(2) - Railroad System Code

Code	Abbr	Railroad Company
01	BNSF	BURLINGTON NORTHERN SANTA FE
02	UP	UNION PACIFIC RAILROAD

05	CPR	CANADIAN PACIFIC RAILWAY
06	DMIR	DULUTH, MISSABE & IRON RANGE
07	CEDR	CEDAR RIVER RAILROAD
08	CN	CANADIAN NATIONAL RAILWAYS
09	DWP	DULUTH, WINNIPEG & PACIFIC
10	DNE	DULUTH & NORTHEASTERN
12	MDW	MINN., DAKOTA AND WESTERN
13	MC	MINNESOTA COMMERCIAL RWY.
14	LTVS	LTV STEEL MINING CO.
15	NSM	NORTHSHORE MINING CO.
17	MNCR	MINNESOTA CENTRAL RAILROAD
18	LQPR	LAC QUI PARLE REGIONAL
19	DAKR	DAKOTA RAIL, INC.
20	DME	DAKOTA, MINN & EASTERN
23	BNCP	BURLINGTON NORTHERN SF / CPR
27	UPCP	UNION PACIFIC / CAN. PACIFIC
30	CPCR	CAN. PACIFIC / CEDAR RIVER
31	CPMC	CAN. PACIFIC / MINN. COMM.
32	CPDM	CAN. PAC. / DAK., MN & EAST.
41	MNTM	MINNESOTA TRNSPTN. MUSEUM
42	OTVR	OTTER TAIL VALLEY RAILROAD
43	WC	WISCONSIN CENTRAL LTD.
44	RRVW	RED RIVER VALLEY & WESTERN
45	NRR	NOBLES ROCK RAILROAD
51	BNNR	BURL. NORTH. SF / NOBLES ROCK
52	SLLC	ST. LOUIS & LAKE COS. REGIONAL
53	TCWR	TWIN CITIES & WESTERN RAILROAD
55	COD	CITY OF DULUTH
56	MZL	MINNESOTA ZEPHYR, LTD.
57	HCRR	HENNEPIN CO REGIONAL RAIL AUTH
58	MNN	MINNESOTA NORTHERN RAILROAD
59	NPR	NORTHERN PLAINS RAILROAD
60	IMRL	I & M RAIL LINK, LLD
61	SCXY	ST. CROIX VALLEY RAILROAD

RRS - DATA ELEMENT NAMES

The data element names for RRS data elements are the same as those for RDY. The RRS names apply to the topmost layer of the right shoulder. (The topmost selected layer with cross-section position "S" and transverse direction "R"). For details, see the RDY data element names.

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RTM - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(2)	RTM.RR-SYS	X	
CHAR(2)	RTM.RR-LINE	X	
CHAR(3)	RTM.REF-POST	X	
NUM(5,2)	RTM.TRUE-MILEAGE	X	
CHAR(1)	RTM.ESTIMATED-ACTUAL	X	
DATE	RTM.EFFECTIVE-DATE	X	
DATE	RTM.DATE-OF-UPDATE	X	

RTM - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
DATE	RTM.DATE-OF-UPDATE	X	
DATE	RTM.EFFECTIVE-DATE	X	
CHAR(1)	RTM.ESTIMATED-ACTUAL		
CHAR(3)	RTM.REF-POST	X	
CHAR(2)	RTM.RR-LINE	X	
CHAR(2)	RTM.RR-SYS	X	
NUM(5,2)	RTM.TRUE-MILEAGE	X	

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RTM - Descriptions of Data Elements
****

RTM.DATE-OF-UPDATE - DATE - Date of Update

Most recent date railway true mileage record was modified:

blanks	No update since original file creation.
mm/dd/yy	Date of update:

mm = month = 01-12.
dd = day = 01-31.
yy = year = 81-99.

RTM.EFFECTIVE-DATE - DATE - Effective Date

00/00/00	Date unknown,initialized to zeros.
mm/dd/yy	Effective date:

mm = month = 01-12.
dd = day = 01-31.
yy = year = 01-99.

RTM.ESTIMATED-ACTUAL - CHAR(1) - Estimated/Actual Code

E	True mileage is an estimated value.
A	True mileage is an actual value.

RTM.REF-POST - CHAR(3) - Railway Reference Post

001 - 999 Railway reference post.

RTM.RR-LINE - CHAR(2) - Railroad Line Number

01 - 99 Railroad line number.

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RTM.RR-SYS - CHAR(2) - Railroad System Code

Code	Abbr	Railroad Company
01	BNSF	BURLINGTON NORTHERN SANTA FE
02	UP	UNION PACIFIC RAILROAD
05	CPR	CANADIAN PACIFIC RAILWAY
06	DMIR	DULUTH, MISSABE & IRON RANGE
07	CEDR	CEDAR RIVER RAILROAD
08	CN	CANADIAN NATIONAL RAILWAYS
09	DWP	DULUTH, WINNIPEG & PACIFIC
10	DNE	DULUTH & NORTHEASTERN
12	MDW	MINN., DAKOTA AND WESTERN
13	MC	MINNESOTA COMMERCIAL RWY.
14	LTVS	LTV STEEL MINING CO.
15	NSM	NORTHSHORE MINING CO.
17	MNCR	MINNESOTA CENTRAL RAILROAD
18	LQPR	LAC QUI PARLE REGIONAL
19	DAKR	DAKOTA RAIL, INC.
20	DME	DAKOTA, MINN & EASTERN
23	BNCP	BURLINGTON NORTHERN SF / CPR
27	UPCP	UNION PACIFIC / CAN. PACIFIC
30	CPCR	CAN. PACIFIC / CEDAR RIVER
31	CPMC	CAN. PACIFIC / MINN. COMM.
32	CPDM	CAN. PAC. / DAK., MN & EAST.
41	MNTM	MINNESOTA TRNSPTN. MUSEUM
42	OTVR	OTTER TAIL VALLEY RAILROAD
43	WC	WISCONSIN CENTRAL LTD.

44	RRVW	RED RIVER VALLEY & WESTERN
45	NRR	NOBLES ROCK RAILROAD
51	BNNR	BURL. NORTH. SF / NOBLES ROCK
52	SLLC	ST. LOUIS & LAKE COS. REGIONAL
53	TCWR	TWIN CITIES & WESTERN RAILROAD
55	COD	CITY OF DULUTH
56	MZL	MINNESOTA ZEPHYR, LTD.
57	HCRR	HENNEPIN CO REGIONAL RAIL AUTH
58	MNN	MINNESOTA NORTHERN RAILROAD
59	NPR	NORTHERN PLAINS RAILROAD
60	IMRL	I & M RAIL LINK, LLD
61	SCXY	ST. CROIX VALLEY RAILROAD

RTM.TRUE-MILEAGE - NUM(5,2) - Railway True Mileage

000.00 - 999.99 Railway true mileage.

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RWY - Listing of Names in File Order

Format	Name	Stored	Generated From
CHAR(12)	RWY.LOCATION	X	
CHAR(2)	RWY.RR-SYS	X	
CHAR(2)	RWY.RR-LINE	X	
CHAR(8)	RWY.REF-PNT	X	
CHAR(1)	RWY.OWNER	X	
CHAR(1)	RWY.ABAN-STATUS	X	
CHAR(2)	RWY.YEAR-DEN-1	X	
NUM(5,2)	RWY.TOT-DEN-1	X	
NUM(4,2)	RWY.INC-DEN-1	X	
NUM(4,2)	RWY.DEC-DEN-1	X	
CHAR(2)	RWY.YEAR-DEN-2	X	
NUM(5,2)	RWY.TOT-DEN-2	X	

NUM(4,2)	RWY.INC-DEN-2	X	
NUM(4,2)	RWY.DEC-DEN-2	X	
CHAR(2)	RWY.YEAR-DEN-3	X	
NUM(5,2)	RWY.TOT-DEN-3	X	
NUM(4,2)	RWY.INC-DEN-3	X	
NUM(4,2)	RWY.DEC-DEN-3	X	
CHAR(2)	RWY.DIVISION	X	
CHAR(3)	RWY.SUBDIVISION	X	
CHAR(5)	RWY.FRA-LINE-ID	X	
CHAR(6)	RWY.TRACK-RIGHTS	X	
CHAR(2)	RWY.TRACK-RGTS-SUB-1	X	
CHAR(2)	RWY.TRACK-RGTS-SUB-2	X	
CHAR(2)	RWY.TRACK-RGTS-SUB-3	X	
CHAR(1)	RWY.TRACK-CLASS	X	
CHAR(6)	RWY.MAX-WEIGHT	X	
CHAR(8)	RWY.MAX-HGT-WIDTH	X	
CHAR(8)	RWY.MAX-WIDTH-HGT	X	
CHAR(1)	RWY.NUM-TRACKS	X	
CHAR(1)	RWY.SIGNAL-1	X	
CHAR(3)	RWY.INC-SPEED-1	X	
CHAR(3)	RWY.DEC-SPEED-1	X	
CHAR(3)	RWY.WEIGHT-RAIL-1	X	
CHAR(1)	RWY.SIGNAL-2	X	
CHAR(3)	RWY.INC-SPEED-2	X	
CHAR(3)	RWY.DEC-SPEED-2	X	
CHAR(3)	RWY.WEIGHT-RAIL-2	X	
CHAR(2)	RWY.REMARK	X	
CHAR(3)	RWY.LEGIS-DIST	X	
CHAR(1)	RWY.CONGRESS-DIST	X	
NUM(4)	RWY.CITY	X	
NUM(7)	RWY.POP-FROM-CITY		RWY.CITY
NUM(1)	RWY.RUR-URB-FROM-CITY		RWY.CITY
NUM(1)	RWY.POP-GROUP-FROM-CITY		RWY.CITY
NUM(2)	RWY.CENSUS-YR-FROM-CITY		RWY.CITY
NUM(2)	RWY.COUNTY	X	
NUM(1)	RWY.DISTRICT-FROM-CNTY		RWY.COUNTY
CHAR(2)	RWY.RDC-FROM-CNTY		RWY.COUNTY
NUM(7)	RWY.POP-FROM-CNTY		RWY.COUNTY

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Format	Name	Stored	Generated From
CHAR(2)	RWY.FUNCT-CLASS	X	
CHAR(45)	RWY.DESCR	X	
DATE	RWY.DATE-OF-UPDATE	X	

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NUM(2)      RWY.YEAR-OF-UPDATE              RWY.DATE-OF-UPDATE
NUM(2)      RWY.MONTH-OF-UPDATE             RWY.DATE-OF-UPDATE
NUM(2)      RWY.DAY-OF-UPDATE               RWY.DATE-OF-UPDATE
```

RWY - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(1)	RWY.ABAN-STATUS	X	
NUM(2)	RWY.CENSUS-YR-FROM-CITY		RWY.CITY
NUM(4)	RWY.CITY	X	
CHAR(1)	RWY.CONGRESS-DIST	X	
NUM(2)	RWY.COUNTY	X	
DATE	RWY.DATE-OF-UPDATE	X	
NUM(2)	RWY.DAY-OF-UPDATE		RWY.DATE-OF-UPDATE
NUM(4,2)	RWY.DEC-DEN-1	X	
NUM(4,2)	RWY.DEC-DEN-2	X	
NUM(4,2)	RWY.DEC-DEN-3	X	
CHAR(3)	RWY.DEC-SPEED-1	X	
CHAR(3)	RWY.DEC-SPEED-2	X	
CHAR(45)	RWY.DESCR	X	
NUM(1)	RWY.DISTRICT-FROM-CNTY		RWY.COUNTY
CHAR(2)	RWY.DIVISION	X	
CHAR(5)	RWY.FRA-LINE-ID	X	
CHAR(2)	RWY.FUNCT-CLASS	X	
NUM(4,2)	RWY.INC-DEN-1	X	
NUM(4,2)	RWY.INC-DEN-2	X	
NUM(4,2)	RWY.INC-DEN-3	X	
CHAR(3)	RWY.INC-SPEED-1	X	
CHAR(3)	RWY.INC-SPEED-2	X	
CHAR(3)	RWY.LEGIS-DIST	X	
CHAR(12)	RWY.LOCATION	X	
CHAR(8)	RWY.MAX-HGT-WIDTH	X	
CHAR(6)	RWY.MAX-WEIGHT	X	
CHAR(8)	RWY.MAX-WIDTH-HGT	X	
NUM(2)	RWY.MONTH-OF-UPDATE		RWY.DATE-OF-UPDATE
CHAR(1)	RWY.NUM-TRACKS	X	
CHAR(1)	RWY.OWNER	X	
NUM(7)	RWY.POP-FROM-CITY		RWY.CITY
NUM(7)	RWY.POP-FROM-CNTY		RWY.COUNTY
NUM(1)	RWY.POP-GROUP-FROM-CITY		RWY.CITY
CHAR(2)	RWY.RDC-FROM-CNTY		RWY.COUNTY
CHAR(8)	RWY.REF-PNT	X	
CHAR(2)	RWY.REMARK	X	
CHAR(2)	RWY.RR-LINE	X	
CHAR(2)	RWY.RR-SYS	X	
NUM(1)	RWY.RUR-URB-FROM-CITY		RWY.CITY
CHAR(1)	RWY.SIGNAL-1	X	
CHAR(1)	RWY.SIGNAL-2	X	
CHAR(3)	RWY.SUBDIVISION	X	
NUM(5,2)	RWY.TOT-DEN-1	X	

NUM(5,2)	RWY.TOT-DEN-2	X
NUM(5,2)	RWY.TOT-DEN-3	X
CHAR(1)	RWY.TRACK-CLASS	X
CHAR(2)	RWY.TRACK-RGTS-SUB-1	X
CHAR(2)	RWY.TRACK-RGTS-SUB-2	X
CHAR(2)	RWY.TRACK-RGTS-SUB-3	X
CHAR(6)	RWY.TRACK-RIGHTS	X

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Format	Name	Stored	Generated From
CHAR(3)	RWY.WEIGHT-RAIL-1	X	
CHAR(3)	RWY.WEIGHT-RAIL-2	X	
CHAR(2)	RWY.YEAR-DEN-1	X	
CHAR(2)	RWY.YEAR-DEN-2	X	
CHAR(2)	RWY.YEAR-DEN-3	X	
NUM(2)	RWY.YEAR-OF-UPDATE		RWY.DATE-OF-UPDATE

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RWY - Descriptions of Data Elements
****

RWY.ABAN-STATUS - CHAR(1) - Abandonment Status

Abandonment status categorizes rail lines based on their potential for their being abandoned or their status as abandoned lines. This includes the identification of abandoned lines that continue to be used by the carrier but are not accessible to shippers, and also lines that are part of a state rail bank.

1 Anticipated subject of abandonment application within 3 years.
2 Potentially subject to abandonment.
3 Application presently pending before commission.
4 Operated under subsidy 49 USC.
5 Other lines owned or operated indirectly or directly.
6 State rail bank.
7 Abandonment transition.
8 Abandoned, but still carried on file. NOTE--> Records with this code are NOT seen by reports unless the keyword ABANDONED=YES is included on the command.

RWY.CENSUS-YR-FROM-CITY - NUM(2) - Census Year from City

Census year determined by looking in the TIS city table for the city number stored in the railway record:

00 Nonmunicipal or invalid city number.
01-99 Census year (19xx).

RWY.CITY - NUM(4) - City Number

U.S. census numbers are used:

0000	Nonmunicipal.
0001 - 9999	City number.

Note: Cities may be identified by number (eg., RWY.CITY *EQ* 2585) or by name (eg., RWY.CITY *EQ* 'ST-PAUL').

RWY.CONGRESS-DIST - CHAR(1) - Congressional District

Identifies the federal congressional district in which the line segment is located:

1 - 8	Congressional district.

RWY.COUNTY - NUM(2) - County Number

01 - 87	County number.

Note: Counties may be identified by number (eg., RYW.COUNTY *EQ* 69) or by name (eg., RWY.COUNTY *EQ* 'ST-LOUIS').

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RWY.DATE-OF-UPDATE - DATE - Date of Update

Most recent date record was modified:

blanks	No update since original file creation.
mm/dd/yy	Date of update.

mm = month = 01-12.
dd = day = 01-31.
yy = year = 81-99.

RWY.DAY-OF-UPDATE - NUM(2) Day Portion of Date of Update

00	Record has not been modified since file creation.
01-31	Day of month from date of update.

RWY.DEC-DEN-1 - NUM(4,2) - Directional Density - Decreasing Mileposts - (Current Year - 1)

Annual gross tons (in millions) per mile of road moving over the segment of track in the direction of decreasing mileposts for the most recent year minus one year.

00.00 - 99.99 Directional density (million gross tons/year).

RWY.DEC-DEN-2 - NUM(4,2) - Directional Density - Decreasing Mileposts - (Current Year - 2)

Annual gross tons (in millions) per mile of road moving over the segment of track in the direction of decreasing mileposts for the most recent year minus two years.

00.00 - 99.99 Directional density (million gross tons/year).

RWY.DEC-DEN-3 - NUM(4,2) - Directional Density - Decreasing Mileposts - (Current Year - 3)

Annual gross tons (in millions) per mile of road moving over the segment of track in the direction of decreasing mileposts for the most recent year minus three years.

00.00 - 99.99 Directional density (million gross tons/year).

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RWY.DEC-SPEED-1 - CHAR(3) - Maximum Freight Speed - Track 1 - Decreasing Mileposts

Encompasses both the so-called "maximum speed", or highest speed authorized on the line segment, and what are called restrictions, exceptions, and lower speeds, which supercede the maximum speed at defined places on the line. It does not consider restrictions based on commodity types, vehicle types, or weather conditions. Pertains to the sole track where number of tracks is one, or to the so designated track number 1 where the number of tracks is 2.

blank Not available.
001 - 999 Maximum speed in miles per hour.

RWY.DEC-SPEED-2 - CHAR(3) - Maximum Freight Speed - Track 2 - Decreasing Mileposts

Encompasses both the so-called "maximum speed", or highest speed authorized on the line segment, and what are called restrictions, exceptions, and lower speeds, which supercede the maximum speed at defined places on the line. It does not consider restrictions based on commodity types, vehicle types, or weather conditions. Pertains to the track designated as track number 2.

blank	Not available.
000	No second track.
001 - 999	Maximum speed in miles per hour.

RWY.DESCR - CHAR(45) - Verbal Description

Free-format verbal description of the segment defined by this record.

RWY.DISTRICT-FROM-CNTY - NUM(1) - Construction District from County

1 - 9	Construction district determined from RWY.COUNTY and the TIS county table.

RWY.DIVISION - CHAR(2) - Division

Organizes railroad lines into manageable segments for operational and jurisdictional purposes:

01	Central
02	Chicago

03 Dakota
04 Iowa
05 Iron Range
06 Minnesota
07 Southern
08 Missabe
09 Northern
10 Prairie
11 Twin Cities
12 Western
13 Whitehall
14 Wisconsin

RWY.FRA-LINE-ID - CHAR(5) - FRA Line Identification Code

The Federal Railroad Administration has assigned to rail line segments owned by class I railroads (those earning $10 million in annual revenues) a five digit code incorporating the railroad's abbreviation and a sequence number:

AA000 - ZZ999 or AAAA0 - ZZZZ9 FRA Line Identification Code.

RWY.FUNCT-CLASS - CHAR(2) - Functional Class

Usage of this field has yet to be determined.

RWY.INC-DEN-1 - NUM(4,2) - Directional Density - Increasing Mileposts - (Current Year - 1)

Annual gross tons (in millions) per mile of road moving over the segment of track in the direction of increasing mileposts for the most recent year minus one year.

00.00 - 99.99 Directional density (million gross tons/year).

RWY.INC-DEN-2 - NUM(4,2) - Directional Density - Increasing Mileposts - (Current Year - 2)

Annual gross tons (in millions) per mile of road moving over the segment of track in the direction of increasing mileposts for the most recent year minus two years.

00.00 - 99.99 Directional density (million gross tons/year).

RWY.INC-DEN-3 - NUM(4,2) - Directional Density - Increasing Mileposts - (Current Year - 3)

Annual gross tons (in millions) per mile of road moving over the segment of track in the direction of increasing mileposts for the most recent year minus three years.

00.00 - 99.99	Directional density (million gross tons/year).

RWY.INC-SPEED-1 - CHAR(3) - Maximum Freight Speed - Track 1 - Increasing Mileposts

Encompasses both the so-called "maximum speed", or highest speed authorized on the line segment, and what are called restrictions, exceptions, and lower speeds, which supercede the maximum speed at defined places on the line. It does not consider restrictions based on commodity types, vehicle types, or weather conditions. Pertains to the sole track where number of tracks is one, or to the so designated track number 1 where the number of tracks is 2.

blank	Not available.
001 - 999	Maximum speed in miles per hour.

RWY.INC-SPEED-2 - CHAR(3) - Maximum Freight Speed - Track 2 - Increasing Mileposts

Encompasses both the so-called "maximum speed", or highest speed authorized on the line segment, and what are called restrictions, exceptions, and lower speeds, which supercede the maximum speed at defined places on the line. It does not consider restrictions based on commodity types, vehicle types, or weather conditions. Pertains to the track designated as track number 2.

blank	Not available.
000	No second track.
001 - 999	Maximum speed in miles per hour.

RWY.LEGIS-DIST - CHAR(3) - Legislative District

Identifies state legislative districts for the segment. The senate district is identified in the first and second positions, and the house district is the first, second, and third positions.

01A - 67B	Legislative district.

RWY.LOCATION - CHAR(12) - Location of Start of Segment

This is the combined railroad system, railroad line number, and reference point fields (comprising the key of the record).

ssnnppp+p.pp where: ss = 01-99 Railroad system code.
nn = 01-99 Railroad line number.
ppp+p.pp = 000+0.00-999+9.99 Reference point.

RWY.MAX-HGT-WIDTH - CHAR(8) - Maximum Allowable Height and Corresponding Maximum Width

Permissible dimensions of car and lading on this section. For any height of car and lading above the top of the rail is an allowable width. Identifies maximum height allowed for load clearance, and at the same time the maximum width the load can be at this height.

hhhhwwww Maximum height and corresponding width:

hhhh = ffii = 0001-9998 Height in feet (ff) and inches (ii).
wwww = ffii = 0001-9998 Width in feet (ff) and inches (ii).

blanks Not available.
99999999 No limits.

RWY.MAX-WEIGHT - CHAR(6) - Maximum Weight on Rail

Weight limitation in pounds of car and lading on a section on line.

000001 - 999998 Weight limitation in pounds.
999999 No limit.
blanks Not available

RWY.MAX-WIDTH-HGT - CHAR(8) - Maximum Allowable Width and Corresponding Maximum Height

Permissible dimensions of car and lading on this section.
Identifies maximum width allowed for load clearance, and at the same time the maximum height the load can be at this width.

wwwwhhhh Maximum width and corresponding height:

wwww = ffii = 0001-9998 Width in feet (ff) and inches (ii).
hhhh = ffii = 0001-9998 Height in feet (ff) and inches (ii).

blanks Not available.

99999999 No limits.

RWY.MONTH-OF-UPDATE - NUM(2) Month Portion of Date of Update

00 Record has not been modified since file creation.
01-12 Month from date of update.

RWY.NUM-TRACKS - CHAR(1) - Number of Tracks

Main, as opposed to auxiliary, tracks extend through yards and between stations. Number of tracks indicates how many main tracks are used for each section of numbered line.

1 - 9 Number of tracks.
blank Not available.

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RWY.OWNER - CHAR(1) - Ownership

Ownership of this segment:

1 Railroad ownership.
2 State ownership.
3 Other public ownership.
4 Private non-railroad ownership.

RWY.POP-FROM-CITY - NUM(7) - Population of City

The TIS city table is accessed using RWY.CITY:

0000000 Non-municipal.
0000001 - 9999999 Population of city.

RWY.POP-FROM-CNTY - NUM(7) - Population of County

The TIS county table is accessed using RWY.COUNTY:

0000001 - 9999999 Population of county.

RWY.POP-GROUP-FROM-CITY - NUM(1) - Population Group

The TIS city table is accessed using RWY.CITY:

1 Urban - 250,000 and over.
2 Urban - 100,000 to 249,999.
3 Urban - 50,000 to 99,999.

4 Urban - 25,000 to 49,999.
5 Urban - 10,000 to 24,999.
6 Urban - 5,000 to 9,999.
7 Rural - 2,500 to 4,999.
8 Rural - 1,000 to 2,499.
9 Rural - 1 to 999 or non-municipal.

RWY.RDC-FROM-CNTY - CHAR(2) - RDC from County

The TIS county table is accessed using RWY.COUNTY:

' 1' - '11' Regional development commission as determined from county number.

RWY.REF-PNT - CHAR(8) - Reference Point

000+0.00 - 999+9.99 Reference point of record.

RWY.REMARK - CHAR(2) - Remark Code

The remark code indicates the type of segment record:

blank Mileage record.
GP Gap record. In-place railway suspended.
CO Coincident record. Rail data is stored on another rail line (the "base line").
EN End of line. Terminates last segment of a rail line.

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RWY.RR-LINE - CHAR(2) - Railroad Line Number

01 - 99 Railroad line number.

RWY.RR-SYS - CHAR(2) - Railroad System Code

Code	Abbr	Railroad Company
01	BNSF	BURLINGTON NORTHERN SANTA FE
02	UP	UNION PACIFIC RAILROAD
05	CPR	CANADIAN PACIFIC RAILWAY
06	DMIR	DULUTH, MISSABE & IRON RANGE
07	CEDR	CEDAR RIVER RAILROAD
08	CN	CANADIAN NATIONAL RAILWAYS
09	DWP	DULUTH, WINNIPEG & PACIFIC
10	DNE	DULUTH & NORTHEASTERN
12	MDW	MINN., DAKOTA AND WESTERN
13	MC	MINNESOTA COMMERCIAL RWY.

14	LTVS	LTV STEEL MINING CO.
15	NSM	NORTHSHORE MINING CO.
17	MNCR	MINNESOTA CENTRAL RAILROAD
18	LQPR	LAC QUI PARLE REGIONAL
19	DAKR	DAKOTA RAIL, INC.
20	DME	DAKOTA, MINN & EASTERN
23	BNCP	BURLINGTON NORTHERN SF / CPR
27	UPCP	UNION PACIFIC / CAN. PACIFIC
30	CPCR	CAN. PACIFIC / CEDAR RIVER
31	CPMC	CAN. PACIFIC / MINN. COMM.
32	CPDM	CAN. PAC. / DAK., MN & EAST.
41	MNTM	MINNESOTA TRNSPTN. MUSEUM
42	OTVR	OTTER TAIL VALLEY RAILROAD
43	WC	WISCONSIN CENTRAL LTD.
44	RRVW	RED RIVER VALLEY & WESTERN
45	NRR	NOBLES ROCK RAILROAD
51	BNNR	BURL. NORTH. SF / NOBLES ROCK
52	SLLC	ST. LOUIS & LAKE COS. REGIONAL
53	TCWR	TWIN CITIES & WESTERN RAILROAD
55	COD	CITY OF DULUTH
56	MZL	MINNESOTA ZEPHYR, LTD.
57	HCRR	HENNEPIN CO REGIONAL RAIL AUTH
58	MNN	MINNESOTA NORTHERN RAILROAD
59	NPR	NORTHERN PLAINS RAILROAD
60	IMRL	I & M RAIL LINK, LLD
61	SCXY	ST. CROIX VALLEY RAILROAD

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RWY.RUR-URB-FROM-CITY - NUM(1) - Rural or Urban

The TIS city table is accessed using RWY.CITY:

1 Rural - Non-municipal or less than 5,000.
2 Urban - 5,000 to 49,999.
3 Urban - 50,000 and up.

RWY.SIGNAL-1 - CHAR(1) - Signal Type - Track 1

Describes type of signalling used on the only track or track designated number 1.

blank	Not available.
1	Centralized traffic control.
2	Automatic block signalling.
3	Other block signalling.
4	Unspecified.

RWY.SIGNAL-2 - CHAR(1) - Signal Type - Track 2

Describes type of signalling used on the second track.

blank	Not available.
0	No second track.
1	Centralized traffic control.
2	Automatic block signalling.
3	Other block signalling.
4	Unspecified.

RWY.SUBDIVISION - CHAR(3) - Subdivision

Divisions are generally broken down into subdivisions, consisting of contiguous track equal to part of a line or one or more whole lines.

000	Not applicable.
01(blank) - 99Z	Subdivision.

Some subdivision numbers have corresponding names:

51	- Albert Lea	70	- Red Wing
52	- Alborn	71	- Redwood Falls
53	- Altoona	72	- Robinsdale Line
54	- Biwabik	73	- Roseport
55	- Cedar Lake	74	- St. James
56	- Fairmont	75	- Sioux Falls
57	- Golden Valley	76	- Slayton
58	- Hi-Line	77	- Spirit Lake
59	- Huron	78	- Sprague
60	- Interstate	79	- Stillwater
61	- Le Mars	80	- Superior
62	- Main Line	81	- Twin Cities Terminal
63	- Marshall	82	- Virginia
64	- Mason City	83	- Wales
65	- Merriam	84	- Waseca
66	- Morton	85	- Western Mesaba
67	- Oelwein	86	- Winona
68	- Plainview	87	- Woodbridge
69	- Rainy	88	- Z-Line

RWY.TOT-DEN-1 - NUM(5,2) - Total Density - (Current year - 1)

Annual gross tons (in millions) per mile of road moving over the segment of track for the most recent year minus one year.

000.00 - 300.00	Total density (million gross tons/year).

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RWY.TOT-DEN-2 - NUM(5,2) - Total Density - (Current year - 2)

Annual gross tons (in millions) per mile of road moving over the segment of track for the most recent year minus two years.

000.00 - 300.00 Total density (million gross tons/year).

RWY.TOT-DEN-3 - NUM(5,2) - Total Density - (Current year - 3)

Annual gross tons (in millions) per mile of road moving over the segment of track for the most recent year minus three years.

000.00 - 300.00 Total density (million gross tons/year).

RWY.TRACK-CLASS - CHAR(1) - FRA Track Class

The Federal Railroad Administration has established minimum safety standards for tracks. A section of track will fall into one of the classes depending on the maximum freight speed in miles per hour permitted on it. Speed restrictions are not considered in determining track classes.

blank	Not available.
1	10 mph.
2	25 mph.
3	40 mph.
4	60 mph.
5	80 mph.
6	110 mph.

RWY.TRACK-RGTS-SUB-1 - CHAR(2) - Trackage Rights Subfield 1

Consists of the first two-character subfield of RWY.TRACK-RIGHTS. See RWY.TRACK-RIGHTS for details.

RWY.TRACK-RGTS-SUB-2 - CHAR(2) - Trackage Rights Subfield 2

Consists of the second two-character subfield of RWY.TRACK-RIGHTS. See RWY.TRACK-RIGHTS for details.

RWY.TRACK-RGTS-SUB-3 - CHAR(2) - Trackage Rights Subfield 3

Consists of the third two-character subfield of RWY.TRACK-RIGHTS.
See RWY.TRACK-RIGHTS for details.

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RWY.TRACK-RIGHTS - CHAR(6) - Trackage Rights

A railroad system (herein called a tenant railroad) operating over
a line owned by another railroad has trackage rights over that line.
Up to three tenant railroads may be coded.

xxyyzz Where xx, yy, and zz identify tenant railroad:

00	Not applicable.
01	Burlington Northern.
02	Chicago Northwestern Transportation Company.
03	Chicago, Milwaukee, St. Paul and Pacific Railroad.
04	Chicago, Rock Island and Pacific Railroad.
05	Soo Line Railroad.
06	Duluth, Missabe and Iron Range Railway.
07	Illinois Central Gulf Railroad.
08	Canadian National Railway.
09	Duluth, Winnipeg and Pacific Railway.
10	Duluth and Northeastern Railroad.
11	Minneapolis, Northfield and Southern Railway.
12	Minnesota, Dakota and Western Railway.
13	Minnesota Transfer Railway.
14	Erie Mining Company Railroad.
15	Reserve Mining Company Railroad.
16	Green Bay and Western Railroad.

RWY.WEIGHT-RAIL-1 - CHAR(3) - Weight of Rail - Track 1

Weight of rail of only track or track designated number 1.

blank	Not available.
001 - 200	Weight of rail in pounds per yard.

RWY.WEIGHT-RAIL-2 - CHAR(3) - Weight of Rail - Track 2

Weight of rail on second track in this segment.

blank	Not available.
000	No second track.
001 - 200	Weight of rail in pounds per yard.

RWY.YEAR-DEN-1 - CHAR(2) - Density Year (Current Year - 1)

Indicates year of density data stored in the Density-1 subfields.
Will be most recent year of the three density subfields.

00 - 99	Year of densities RWY.TOT-DEN-1, RWY.INC-DEN-1, and RWY.DEC-DEN-1.
blanks	Data not available.

NOTE: This data element should be used to test if densities are
---- available or not. Otherwise it is not possible to
distinguish density of 0 from "not available" situation.

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RWY.YEAR-DEN-2 - CHAR(2) - Density Year (Current Year - 2)

Indicates year of density data stored in the Density-2 subfields.
Will be second most recent year of the three density subfields.

00 - 99	Year of densities RWY.TOT-DEN-2, RWY.INC-DEN-2, and RWY.DEC-DEN-2.
blanks	Data not available.

NOTE: This data element should be used to test if densities are
---- available or not. Otherwise it is not possible to
distinguish density of 0 from "not available" situation.

RWY.YEAR-DEN-3 - CHAR(2) - Density Year (Current Year - 3)

Indicates year of density data stored in the Density-3 subfields.
Will be oldest year of the three density subfields.

00 - 99	Year of densities RWY.TOT-DEN-3, RWY.INC-DEN-3, and RWY.DEC-DEN-3.
blanks	Data not available.

NOTE: This data element should be used to test if densities are

---- available or not. Otherwise it is not possible to
distinguish density of 0 from "not available" situation.

RWY.YEAR-OF-UPDATE - NUM(2) Year Portion of Date of Update

00 Record has not been modified since file creation.
81-99 Year from date of update.

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SEC - Listing of Names in File Order

Format	Name	Stored	Generated From
CHAR(2)	SEC.ROUTE-SYSTEM	X	
CHAR(8)	SEC.ROUTE-NUMBER	X	
CHAR(10)	SEC.REF-POINT	X	
NUM(1)	SEC.CONSTR-DIST	X	
CHAR(1)	SEC.GEN-ENVIRON	X	
CHAR(1)	SEC.ROAD-DESIGN	X	
CHAR(1)	SEC.THRU-LANE	X	
CHAR(1)	SEC.MEDIAN-TYPE	X	
CHAR(1)	SEC.LEFT-TURN-LANE	X	
CHAR(2)	SEC.DISTRICT-CATEGORY	X	
CHAR(2)	SEC.CENT-OFF-CATEGORY	X	

CHAR(2)	SEC.SPEED-LIMIT	X
CHAR(51)	SEC.VERBAL-DESCR	X
DATE	SEC.DATE-OF-UPDATE	X

SEC - Listing of Names in Alphabetical Order

Format	Name	Stored	Generated From
CHAR(2)	SEC.CENT-OFF-CATEGORY	X	
NUM(1)	SEC.CONSTR-DIST	X	
DATE	SEC.DATE-OF-UPDATE	X	
CHAR(2)	SEC.DISTRICT-CATEGORY	X	
CHAR(1)	SEC.GEN-ENVIRON	X	
CHAR(1)	SEC.LEFT-TURN-LANE	X	
CHAR(1)	SEC.MEDIAN-TYPE	X	
CHAR(10)	SEC.REF-POINT	X	
CHAR(1)	SEC.ROAD-DESIGN	X	
CHAR(8)	SEC.ROUTE-NUMBER	X	
CHAR(2)	SEC.ROUTE-SYSTEM	X	
CHAR(2)	SEC.SPEED-LIMIT	X	
CHAR(1)	SEC.THRU-LANE	X	
CHAR(51)	SEC.VERBAL-DESCR	X	

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SEC - Descriptions of Data Elements

SEC.CENT-OFF-CATEGORY - CHAR(2) - Category Assigned by Central Office

' '	No category has been assigned
'00' - '99'	Assigned category

SEC.CONSTR-DIST - NUM(1) - Construction District Number

1-9	Number of the construction district the section is located in.

SEC.DATE-OF-UPDATE - DATE - Date Record Was Updated

00/00/0000	Record has not been updated since initial file load.
mm/dd/yyyy	Most recent date on which records was updated.

SEC.DISTRICT-CATEGORY - CHAR(2) - Category Assigned by Construction District

' '	No category has been assigned.
'00' - '99'	Category assigned by the district maintaining the record.

SEC.GEN-ENVIRON - CHAR(1) - General Environment of the Section

'U'	Urban
'S'	Suburban
'R'	Rural
'B'	City bypass

SEC.LEFT-TURN-LANE - CHAR(1) - Left Turn Lane CHaracteristics of the Section

' '	Not applicable
'1'	No left turn lanes
'2'	Painted left turn lanes
'3'	Physical left turn lanes

SEC.MEDIAN-TYPE - CHAR(1) - General Characteristics of Median in the Section

'N'	No divided - no median
'D'	Divided - depressed median
'B'	Barrier
'C'	Curb
'1'	One-way couplet

SEC.REF-POINT - CHAR(10) - Reference Point at Start of Section

'000+00.000' - '999+99.999'	TIS reference point locating the beginning of the section.

SEC.ROAD-DESIGN - CHAR(1) - Road Design of the Section

'F'	Freeway
'E'	Expressway
'C'	Conventional

SEC.ROUTE-NUMBER - CHAR(8) - Route Number

'nnnnnnxx' Route number (n = 0-9, x = 0-9 or A-Z)

Route systems '01' throught '03': 00000nnn or 0000nnna (n = 0-9, a = A-Z)

Route systems '05' and '10': 'ccccnnnx' (cccc = city number, n = 0-9, x = 0-9 or A-Z)

Other route systems: 'cc00nnxx' (cc = county number, n = 0-9, x = 0-9 or A-Z)

SEC.ROUTE-SYSTEM - CHAR(2) - Route Stsyem

'01'	ISTH	'09'	UTWN	'16'	MIL
'02'	USTH	'10'	MUN	'17'	NATM
'03'	MNTH	'11'	NATP	'18'	NATW
'04'	CSAH	'12'	NFD	'19'	FRNT
'05'	MSAS	'13'	IND	'20'	SGAM
'07'	CNTY	'14'	SFR	'23'	PRIV
'08'	TWNS	'15'	SPRK		

SE.SPEED-LIMIT - CHAR(2) - Speed Limit in the Section

'00'	Speed limit not stated or unknown
'01' - '99'	Speed limit in miles per hour

SEC.THRU-LANE - CHAR(1) - General Characteristics of Thru Lanes in the Section

'2'	2-lane
'3'	3-lane with 2-way left turn lane
'4'	4-lane
'5'	5-lane with 2-way left turn lane
'6'	6-lane
'8'	8-lane or more
'1'	One-way
'0'	Other

SEC.VERBAL-DESCR - CHAR(51) - Verbal Description Describing the Section

Any applicable verbal description of the section or of intersecting features of the section.

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STA - Listing of Names in File Order
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Format	Name	Stored	Generated From
CHAR(2)	STA.RR-SYS	X	
CHAR(5)	STA.FSAC	X	
CHAR(6)	STA.SPLC	X	
CHAR(20)	STA.STATION-NAME	X	
CHAR(1)	STA.FRT-PSGR-SRV	X	
CHAR(6)	STA.INT-MODE-TRANS	X	
CHAR(1)	STA.TOFC-LOCATION	X	
CHAR(1)	STA.SIDE-LOADING	X	
CHAR(1)	STA.CRANE-ONLY	X	
CHAR(1)	STA.CRANE-&-RAMP	X	
CHAR(1)	STA.CONTAINERS	X	
CHAR(1)	STA.SHORT-CARS-ONLY	X	
CHAR(10)	STA.INTERCHANGE	X	
CHAR(1)	STA.YARD	X	
CHAR(1)	STA.AGENT-OPER	X	
NUM(5)	STA.SIDING-LEN	X	
DATE	STA.DATE-OF-UPDATE	X	

STA - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(1)	STA.AGENT-OPER	X	
CHAR(1)	STA.CONTAINERS	X	
CHAR(1)	STA.CRANE-ONLY	X	
CHAR(1)	STA.CRANE-&-RAMP	X	
DATE	STA.DATE-OF-UPDATE	X	
CHAR(1)	STA.FRT-PSGR-SRV	X	
CHAR(5)	STA.FSAC	X	

```
CHAR(6)    STA.INT-MODE-TRANS             X
CHAR(10)   STA.INTERCHANGE                X
CHAR(2)    STA.RR-SYS                     X
CHAR(1)    STA.SHORT-CARS-ONLY            X
CHAR(1)    STA.SIDE-LOADING               X
NUM(5)     STA.SIDING-LEN                 X
CHAR(6)    STA.SPLC                       X
CHAR(20)   STA.STATION-NAME               X
CHAR(1)    STA.TOFC-LOCATION              X
CHAR(1)    STA.YARD                       X
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STA - Descriptions of Data Elements
****

STA.AGENT-OPER - CHAR(1) - Agent or Operator

1 - Yes
2 - No

STA.CONTAINERS - CHAR(1) - Containers Handled

Fifth position of intermodal transfer data element:

1 - Yes
2 - No

STA.CRANE-ONLY - CHAR(1) - Crane Only

Third position of intermodal transfer data element:

1 - Yes
2 - No

STA.CRANE-&-RAMP - CHAR(1) - Crane and Ramp

Fourth position of intermodal transfer data element:

1 - Yes
2 - No

STA.DATE-OF-UPDATE - DATE - Date of Update

Most recent date station record was modified:

blanks No update since original file creation.
mm/dd/yy Date of update:

mm = month = 01-12.
dd = day = 01-31.
yy = year = 81-99.

STA.FRT-PSGR-SRV - CHAR(1) - Freight/Passenger Service

1 - Freight service.
2 - Passenger service.
3 - Freight and passenger service.

STA.FSAC - CHAR(5) - FSAC Number

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STA.INT-MODE-TRANS - CHAR(6) - Intermodal Transfer

Six 1-digit subfields: 1 - Yes. 2 - No.

Pos	Meaning	Pos	Meaning
1	TOFC location	4	Crane and ramp
2	Side loading device	5	Containers also handled
3	Crane only	6	Limited to cars not over 60 feet in length

STA.INTERCHANGE - CHAR(10) - Interchanges

Five 2-digit subfields coded with railroad systems of other lines interchanging at this station. See STA.RR-SYS for codes.

STA.RR-SYS - CHAR(2) - Railroad System of the Station

Code Abbr Railroad Company

01	BNSF	BURLINGTON NORTHERN SANTA FE
02	UP	UNION PACIFIC RAILROAD
05	CPR	CANADIAN PACIFIC RAILWAY
06	DMIR	DULUTH, MISSABE & IRON RANGE
07	CEDR	CEDAR RIVER RAILROAD
08	CN	CANADIAN NATIONAL RAILWAYS
09	DWP	DULUTH, WINNIPEG & PACIFIC
10	DNE	DULUTH & NORTHEASTERN
12	MDW	MINN., DAKOTA AND WESTERN
13	MC	MINNESOTA COMMERCIAL RWY.
14	LTVS	LTV STEEL MINING CO.
15	NSM	NORTHSHORE MINING CO.
17	MNCR	MINNESOTA CENTRAL RAILROAD
18	LQPR	LAC QUI PARLE REGIONAL
19	DAKR	DAKOTA RAIL, INC.
20	DME	DAKOTA, MINN & EASTERN
23	BNCP	BURLINGTON NORTHERN SF / CPR
27	UPCP	UNION PACIFIC / CAN. PACIFIC
30	CPCR	CAN. PACIFIC / CEDAR RIVER
31	CPMC	CAN. PACIFIC / MINN. COMM.
32	CPDM	CAN. PAC. / DAK., MN & EAST.
41	MNTM	MINNESOTA TRNSPTN. MUSEUM
42	OTVR	OTTER TAIL VALLEY RAILROAD
43	WC	WISCONSIN CENTRAL LTD.
44	RRVW	RED RIVER VALLEY & WESTERN
45	NRR	NOBLES ROCK RAILROAD
51	BNNR	BURL. NORTH. SF / NOBLES ROCK
52	SLLC	ST. LOUIS & LAKE COS. REGIONAL
53	TCWR	TWIN CITIES & WESTERN RAILROAD
55	COD	CITY OF DULUTH
56	MZL	MINNESOTA ZEPHYR, LTD.
57	HCRR	HENNEPIN CO REGIONAL RAIL AUTH
58	MNN	MINNESOTA NORTHERN RAILROAD
59	NPR	NORTHERN PLAINS RAILROAD
60	IMRL	I & M RAIL LINK, LLD
61	SCXY	ST. CROIX VALLEY RAILROAD

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STA.SHORT-CARS-ONLY - CHAR(1) - Short Cars Handled Only

Sixth position of intermodal transfer data element. Short car is defined as equal to or less than 60 feet in length:

1 - Yes
2 - No

STA.SIDE-LOADING - CHAR(1) - Side Loading Device

Second position of intermodal transfer data element:

1 - Yes
2 - No

STA.SIDING-LEN - NUM(5) - Length of Siding

Total length of siding at station in feet: 00000 - 99999.

STA.SPLC - CHAR(6) - SPLC

Allowable codes are: 500000 - 509999.

STA.STATION-NAME - CHAR(20) - Station Name

Verbal name of the station.

STA.TOFC-LOCATION - CHAR(1) - TOFC Location

First position of intermodal transfer data element:

1 - Yes
2 - No

STA.YARD - CHAR(1) - Yard

Indication of yard at station: 1 - Yes.
2 - No.

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STR - Listing of Names in File Order

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**********************************

 Format           Name                Stored    Generated From
--------   -------------------------  ------  -------------------
CHAR(20)   STR.KEY-FIELD                X
CHAR(10)   STR.ROUTE-SYS-&-NUM          X
CHAR(2)    STR.ROUTE-SYSTEM             X
CHAR(8)    STR.ROUTE-NUMBER             X
CHAR(10)   STR.START-REF-POINT          X
CHAR(3)    STR.START-REFERENCE-POST     X
CHAR(8)    STR.MILEPOINT                     STR.START-REF-POINT
CHAR(10)   STR.END-REF-POINT            X
CHAR(3)    STR.END-REFERENCE-POST       X
CHAR(4)    STR.CITY                     X
NUM(4)     STR.CITY-NUMBER                   STR.CITY
NUM(7)     STR.POP-FROM-CITY                 STR.CITY
NUM(1)     STR.RUR-URB-FROM-CITY             STR.CITY
NUM(1)     STR.POP-GROUP-FROM-CITY           STR.CITY
NUM(2)     STR.CENSUS-YR-FROM-CITY           STR.CITY
CHAR(2)    STR.COUNTY                   X
NUM(2)     STR.COUNTY-NUM                    STR.COUNTY
NUM(1)     STR.DISTRICT-FROM-CNTY            STR.COUNTY
CHAR(2)    STR.RDC-FROM-CNTY                 STR.COUNTY
NUM(7)     STR.POP-FROM-CNTY                 STR.COUNTY
CHAR(25)   STR.STREET-NAME              X
```

STR - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
NUM(2)	STR.CENSUS-YR-FROM-CITY		STR.CITY
CHAR(4)	STR.CITY	X	
NUM(4)	STR.CITY-NUMBER		STR.CITY
CHAR(2)	STR.COUNTY	X	
NUM(2)	STR.COUNTY-NUM		STR.COUNTY
NUM(1)	STR.DISTRICT-FROM-CNTY		STR.COUNTY
CHAR(10)	STR.END-REF-POINT	X	
CHAR(3)	STR.END-REFERENCE-POST	X	
CHAR(20)	STR.KEY-FIELD	X	
CHAR(8)	STR.MILEPOINT		STR.START-REF-POINT
NUM(7)	STR.POP-FROM-CITY		STR.CITY
NUM(7)	STR.POP-FROM-CNTY		STR.COUNTY
NUM(1)	STR.POP-GROUP-FROM-CITY		STR.CITY
CHAR(2)	STR.RDC-FROM-CNTY		STR.COUNTY
CHAR(8)	STR.ROUTE-NUMBER	X	
CHAR(10)	STR.ROUTE-SYS-&-NUM	X	
CHAR(2)	STR.ROUTE-SYSTEM	X	
NUM(1)	STR.RUR-URB-FROM-CITY		STR.CITY
CHAR(10)	STR.START-REF-POINT	X	
CHAR(3)	STR.START-REFERENCE-POST	X	
CHAR(25)	STR.STREET-NAME	X	

STR - Descriptions of Data Elements
****

STR.CENSUS-YR-FROM-CITY - NUM(1) - Census Year of City Population

00	Non-municipal
01 - 99	Census year 19nn

This field is computed by accessing the TIS city table with STR.CITY.

STR.CITY - CHAR(4) - City Number

'0000' - '9998'	Census number of the city. '0000' means non-municipal.

STR.CITY-NUMBER - NUM(4) - City Number (numeric format)

0000 - 9998	City number in numeric format. Allows comparison to RLG.CITY in SELECT statements. Also will provide formatting with city name on matrix summaries.

STR.COUNTY - CHAR(2) - County Number

'01' - '87'	County number.

STR.COUNTY-NUM - NUM(2) - County Number (numeric format)

01 - 87	County number in numeric format. Allows comparison to RLG.COUNTY in SELECT statements. Also will provide formatting with county name on matrix summaries.

STR.DISTRICT-FROM-CNTY - NUM(1) - District Number from County Number

1 - 9 District number determined from STR.COUNTY and TIS county table.

STR.END-REF-POINT - CHAR(10) - Ending Reference Point

'000+00.000' - '999+99.999' Reference point at end of section.

STR.END-REF-POST - CHAR(3) - Ending Reference Post

'000' - '999' Reference post number used in locating the end of the section.

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STR.KEY-FIELD - CHAR(20) - Key Field of Section

'0100000035000+00.000' - '0300009999999+99.999'

Composed of route system, route number, and beginning reference point of section. This is the record key and sort order of the street name file.

STR.MILEPOINT - CHAR(8) - Milepoint at Beginning of Section

'0000.000' - '9999.999' Milepoint at beginning of section (computed true mileage for beginning reference point).

STR.POP-FROM-CITY - NUM(7) - Population from City Number

0000001 - 9999999 City population determined from STR.CITY-NUMBER TIS city table.

STR.POP-FROM-CNTY - NUM(7) - Population from County Number

0000001 - 9999999 County population determined from STR.COUNTY and TIS county table.

STR.POP-GROUP-FROM-CITY - NUM(1) - Population Group from City

1 Urban - 250,000 and over
2 Urban - 100,000 - 249,999
3 Urban - 50,000 - 99,999
4 Urban - 25,000 - 49,999
5 Urban - 10,000 - 24,999
6 Urban - 5,000 - 9,999
7 Rural - 2,500 - 4,999
8 Rural - 1,000 - 2,499
9 Rural - 1 - 999 or non-municipal

This field is computed by accessing the TIS city table with STR.CITY-NUMBER.

STR.RDC-FROM-CNTY - CHAR(2) - Regional Development Commission from County Number

'01','02','03','04','05','6E','6W','7E','7W','08','09','10','11'

Regional development commission number determined from STR.COUNTY and TIS county table.

STR.ROUTE-NUMBER - CHAR(8) - Route Number

'0000nnxx' Route number (n = 0-9, x = 0-9 or A-Z).

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STR.ROUTE-SYS-&-NUM - CHAR(10) - Route System and Number

Route system (columns 1-2) followed by route number (columns 3-10).

STR.ROUTE-SYSTEM - CHAR(2) - Route System

'01' ISTH - Interstate trunk highway
'02' USTH - U.S. trunk highway
'03' MNTH - Minnesota trunk highway
'04' CSAH - County state-aid highway
'05' MSAS - Municipal state-aid street
'07' CNTY - County road
'08' TWNS - Township road
'09' UTWN - Unorganized township road
'10' MUN - City streets
'11' NATP - National park road
'12' NFD - National forest development road
'13' IND - Indian reservation road

'14' SFR - State forest road
'15' SPRK - State park road
'16' MIL - Military road
'17' NATM - National monument road
'18' NATW - National wildlife refuge road
'19' FRNT - Frontage road
'20' SGAM - State game preserve road
'23' PRIV - Private jurisdiction road

STR.RUR-URB-FROM-CITY - NUM(1) - Rural-Urban-Urbanized Code from City

1 Rural (municipal or non-municipal)
2 Urban (5,000 - 49,000)
3 Urbanized (50,000 and greater)

This field is computed by accessing the TIS city table with STR.CITY-NUMBER.

STR.START-REF-POINT - CHAR(10) - Beginning Reference Point

'000+00.000' - '999+99.999' Reference point at beginning of section.

STR.START-REF-POST - CHAR(3) - Beginning Reference Post

'000' - '999' Reference post number used in locating the beginning of the section.

STR.STREET-NAME - CHAR(25) - Street Name

Street name.

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SUF - Description of Record
****

The Sufficiency Rating (SUF) record contains the following data elements:

Location data elements

Route system

Route number
Begin reference point
End reference point
Length of section

Jurisdictional data elements

County
Control section
District
Maintenance area
Regional development commission
Control of access
Functional classification
Federal aid system
Municipal/non-municipal lengths (up to 3):
   Length
   Urban classification
   Census number

Descriptive data elements

Termini
Special messages (up to 3)

Roadway design data elements

Existing
   Design
   Number of lanes
   Divided or one-way
   Terrain
   Spring load limit
   Summer load limit
   Service level
Proposed
   Design
   Number of lanes
   Divided or one-way
   Terrain
   Spring load limit
   Summer load limit
   Service level

Physical data elements

Road-1 (or undivided roadway)
- Direction
- Surface type
- Surface width
- Surface year
- Left shoulder
  - Type
  - Width
- Right shoulder
  - Type
  - Width
- Grade year

Road-2 (divided roadways only)
- Direction
- Surface type
- Surface width
- Surface year
- Left shoulder
  - Type
  - Width
- Right shoulder
  - Type
  - Width
- Grade year

Traffic data elements

Present ADT
Year of present ADT
Projected ADT
Year of projected ADT
Percent heavy commercial (of present ADT)
Percent 30th peak hour
Volume to capacity ratio

Hazards data elements

Number of deficient intersections
Number of deficient rail grade crossings
Number of deficient bridges
Number of deficient curves
Number of stopping sight distance restrictions
No passing length

Condition rating data elements

Road-1 (or undivided roadway)
- Most recent
  - Present servicability rating
  - Surface rating
  - Pavement quality index
  - Year of condition rating
- Second most recent

Road-2 (divided roadways only)
- Most recent
  - Present servicability rating
  - Surface rating
  - Pavement quality index
  - Year of condition rating
- Second most recent

Present servicability rating
Surface rating
Pavement quality index
Year of condition rating
Third most recent
Present servicability rating
Surface rating
Pavement quality index
Year of condition rating

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Sufficiency rating data elements

Spring load points
Surface width points
Hazards points
Stopping sight distance restrictions points
Control of access points
Passing opportunity points
Volume/capacity ratio points
Road-1 (or undivided roadway)
Structure points
Shoulder points
Ride quality points
Basic rating points
Adjusted rating points
Road-2 (divided roadways only)
Structure points
Shoulder points
Ride quality points
Basic rating points
Adjusted rating points

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SUF - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(20)	SUF.KEY-FIELD	X	
CHAR(10)	SUF.ROUTE-SYS-&-NUM	X	
CHAR(2)	SUF.ROUTE-SYSTEM	X	
CHAR(8)	SUF.ROUTE-NUMBER	X	
CHAR(10)	SUF.BEG-REF-POINT	X	
CHAR(3)	SUF.BEG-REF-POST	X	
CHAR(7)	SUF.BEG-DIST-FROM-POST	X	
CHAR(8)	SUF.BEG-MILEPOINT		SUF.BEG-REF-POINT
CHAR(10)	SUF.END-REF-POINT	X	
CHAR(3)	SUF.END-REF-POST	X	
CHAR(7)	SUF.END-DIST-FROM-POST	X	
CHAR(8)	SUF.END-MILEPOINT		SUF.END-REF-POINT
CHAR(2)	SUF.COUNTY	X	
NUM(2)	SUF.COUNTY-NUM		SUF.COUNTY
NUM(1)	SUF.DISTRICT-FROM-CNTY		SUF.COUNTY
CHAR(2)	SUF.RDC-FROM-CNTY		SUF.COUNTY
NUM(7)	SUF.POP-FROM-CNTY		SUF.COUNTY
CHAR(4)	SUF.CNTRL-SECTN	X	
CHAR(1)	SUF.DISTRICT	X	
CHAR(2)	SUF.MAINT-AREA	X	
CHAR(2)	SUF.REG-DEV-COMM	X	
CHAR(1)	SUF.ACCESS-CONTROL	X	
CHAR(2)	SUF.FUNCT-CLASS	X	

CHAR(1)	SUF.FED-AID-SYS	X	
CHAR(5)	SUF.CITY1-LENGTH	X	
CHAR(1)	SUF.CITY1-URBAN-CLASS	X	
CHAR(4)	SUF.CITY1-NUMBER	X	
NUM(4)	SUF.CITY1-NUMBER-NUM		SUF.CITY1-NUMBER
NUM(7)	SUF.POP-FROM-CITY1		SUF.CITY1-NUMBER
NUM(1)	SUF.RUR-URB-FROM-CITY1		SUF.CITY1-NUMBER
NUM(1)	SUF.POP-GROUP-FROM-CITY1		SUF.CITY1-NUMBER
NUM(4)	SUF.CENSUS-YR-FROM-CITY1		SUF.CITY1-NUMBER
CHAR(5)	SUF.CITY2-LENGTH	X	
CHAR(1)	SUF.CITY2-URBAN-CLASS	X	
CHAR(4)	SUF.CITY2-NUMBER	X	
NUM(4)	SUF.CITY2-NUMBER-NUM		SUF.CITY2-NUMBER
NUM(7)	SUF.POP-FROM-CITY2		SUF.CITY2-NUMBER
NUM(1)	SUF.RUR-URB-FROM-CITY2		SUF.CITY2-NUMBER
NUM(1)	SUF.POP-GROUP-FROM-CITY2		SUF.CITY2-NUMBER
NUM(4)	SUF.CENSUS-YR-FROM-CITY2		SUF.CITY2-NUMBER
CHAR(5)	SUF.CITY3-LENGTH	X	
CHAR(1)	SUF.CITY3-URBAN-CLASS	X	
CHAR(4)	SUF.CITY3-NUMBER	X	
CHAR(56)	SUF.TERMINI	X	
CHAR(6)	SUF.LENGTH	X	

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Format	Name	Stored	Generated From
CHAR(1)	SUF.RD1-DIRECTION	X	
CHAR(1)	SUF.RD1-SURF-TYPE	X	
CHAR(2)	SUF.RD1-SURF-WIDTH	X	
CHAR(4)	SUF.RD1-SURF-YEAR	X	
CHAR(1)	SUF.RD1-LEFT-SHL-TYPE	X	
CHAR(2)	SUF.RD1-LEFT-SHL-WIDTH	X	
CHAR(1)	SUF.RD1-RIGHT-SHL-TYPE	X	
CHAR(2)	SUF.RD1-RIGHT-SHL-WIDTH	X	
CHAR(4)	SUF.RD1-GRADE-YEAR	X	
CHAR(1)	SUF.RD2-DIRECTION	X	
CHAR(1)	SUF.RD2-SURF-TYPE	X	
CHAR(2)	SUF.RD2-SURF-WIDTH	X	
CHAR(4)	SUF.RD2-SURF-YEAR	X	
CHAR(1)	SUF.RD2-LEFT-SHL-TYPE	X	

CHAR(2)	SUF.RD2-LEFT-SHL-WIDTH	X	
CHAR(1)	SUF.RD2-RIGHT-SHL-TYPE	X	
CHAR(2)	SUF.RD2-RIGHT-SHL-WIDTH	X	
CHAR(4)	SUF.RD2-GRADE-YEAR	X	
CHAR(4)	SUF.PRESENT-ADT-YR	X	
CHAR(6)	SUF.PRESENT-ADT	X	
CHAR(4)	SUF.PROJECTED-ADT-YR	X	
CHAR(6)	SUF.PROJECTED-ADT	X	
CHAR(3)	SUF.PCT-HEAVY-COMM	X	
CHAR(3)	SUF.PCT-30TH-HOUR	X	
CHAR(4)	SUF.VOL-CAP-RATIO	X	
CHAR(2)	SUF.HAZ-INTSECTS	X	
CHAR(2)	SUF.HAZ-CROSSINGS	X	
CHAR(2)	SUF.HAZ-BRIDGES	X	
CHAR(2)	SUF.HAZ-CURVES	X	
CHAR(2)	SUF.SIGHT-DIST-RESTR	X	
CHAR(5)	SUF.NO-PASS-LENGTH	X	
CHAR(2)	SUF.SP-RD1-STRUCTURE	X	
CHAR(2)	SUF.SP-RD1-SHOULDER	X	
CHAR(1)	SUF.SP-RD1-RIDE-QUAL	X	
CHAR(3)	SUF.SP-RD1-BASIC	X	
CHAR(3)	SUF.SP-RD1-ADJUSTED	X	
CHAR(2)	SUF.SP-RD2-STRUCTURE	X	
CHAR(2)	SUF.SP-RD2-SHOULDER	X	
CHAR(1)	SUF.SP-RD2-RIDE-QUAL	X	
CHAR(3)	SUF.SP-RD2-BASIC	X	
CHAR(3)	SUF.SP-RD2-ADJUSTED	X	
CHAR(2)	SUF.SP-SPRING-LOAD	X	
CHAR(2)	SUF.SP-SURF-WIDTH	X	
CHAR(2)	SUF.SP-HAZARDS	X	
CHAR(1)	SUF.SP-STOP-SIGHT-DIST	X	
CHAR(1)	SUF.SP-ACCESS-CNTL	X	
CHAR(2)	SUF.SP-PASSING-OPP	X	
CHAR(2)	SUF.SP-VOL-CAP-RATIO	X	

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Format	Name	Stored	Generated From
CHAR(2)	SUF.RD1-1-PSR	X	
CHAR(2)	SUF.RD1-1-SR	X	

```
CHAR(2)    SUF.RD1-1-PQI                X
CHAR(4)    SUF.RD1-1-YEAR               X
CHAR(2)    SUF.RD1-2-PSR                X
CHAR(2)    SUF.RD1-2-SR                 X
CHAR(2)    SUF.RD1-2-PQI                X
CHAR(4)    SUF.RD1-2-YEAR               X
CHAR(2)    SUF.RD1-3-PSR                X
CHAR(2)    SUF.RD1-3-SR                 X
CHAR(2)    SUF.RD1-3-PQI                X
CHAR(4)    SUF.RD1-3-YEAR               X
CHAR(2)    SUF.RD2-1-PSR                X
CHAR(2)    SUF.RD2-1-SR                 X
CHAR(2)    SUF.RD2-1-PQI                X
CHAR(4)    SUF.RD2-1-YEAR               X
CHAR(2)    SUF.RD2-2-PSR                X
CHAR(2)    SUF.RD2-2-SR                 X
CHAR(2)    SUF.RD2-2-PQI                X
CHAR(4)    SUF.RD2-2-YEAR               X
CHAR(2)    SUF.RD2-3-PSR                X
CHAR(2)    SUF.RD2-3-SR                 X
CHAR(2)    SUF.RD2-3-PQI                X
CHAR(4)    SUF.RD2-3-YEAR               X
CHAR(1)    SUF.EXIST-DESIGN             X
CHAR(2)    SUF.EXIST-NUM-LANES          X
CHAR(1)    SUF.EXIST-DIV-ONE-WAY        X
CHAR(1)    SUF.EXIST-TERRAIN            X
CHAR(2)    SUF.EXIST-SPRING-LOAD        X
CHAR(2)    SUF.EXIST-SUMMER-LOAD        X
CHAR(1)    SUF.EXIST-SVC-LVL            X
CHAR(1)    SUF.PROP-DESIGN              X
CHAR(2)    SUF.PROP-NUM-LANES           X
CHAR(1)    SUF.PROP-DIV-ONE-WAY         X
CHAR(1)    SUF.PROP-TERRAIN             X
CHAR(2)    SUF.PROP-SPRING-LOAD         X
CHAR(2)    SUF.PROP-SUMMER-LOAD         X
CHAR(1)    SUF.PROP-SVC-LVL             X
CHAR(1)    SUF.NUMBER-MSGS              X
CHAR(68)   SUF.MESSAGE-1                X
CHAR(68)   SUF.MESSAGE-2                X
CHAR(68)   SUF.MESSAGE-3                X
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SUF - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(1)	SUF.ACCESS-CONTROL	X	
CHAR(7)	SUF.BEG-DIST-FROM-POST	X	
CHAR(8)	SUF.BEG-MILEPOINT		SUF.BEG-REF-POINT
CHAR(10)	SUF.BEG-REF-POINT	X	
CHAR(3)	SUF.BEG-REF-POST	X	
NUM(4)	SUF.CENSUS-YR-FROM-CITY1		SUF.CITY1-NUMBER
NUM(4)	SUF.CENSUS-YR-FROM-CITY2		SUF.CITY2-NUMBER
NUM(4)	SUF.CENSUS-YR-FROM-CITY3		SUF.CITY3-NUMBER
CHAR(5)	SUF.CITY1-LENGTH	X	
CHAR(4)	SUF.CITY1-NUMBER	X	
NUM(4)	SUF.CITY1-NUMBER-NUM		SUF.CITY1-NUMBER
CHAR(1)	SUF.CITY1-URBAN-CLASS	X	
CHAR(5)	SUF.CITY2-LENGTH	X	
CHAR(4)	SUF.CITY2-NUMBER	X	
NUM(4)	SUF.CITY2-NUMBER-NUM		SUF.CITY2-NUMBER
CHAR(1)	SUF.CITY2-URBAN-CLASS	X	
CHAR(5)	SUF.CITY3-LENGTH	X	
CHAR(4)	SUF.CITY3-NUMBER	X	
NUM(4)	SUF.CITY3-NUMBER-NUM		SUF.CITY3-NUMBER
CHAR(1)	SUF.CITY3-URBAN-CLASS	X	
CHAR(4)	SUF.CNTRL-SECTN	X	
CHAR(2)	SUF.COUNTY	X	
NUM(2)	SUF.COUNTY-NUM	X	SUF.COUNTY
CHAR(1)	SUF.DISTRICT	X	
NUM(1)	SUF.DISTRICT-FROM-CNTY		SUF.COUNTY
CHAR(7)	SUF.END-DIST-FROM-POST	X	
CHAR(8)	SUF.END-MILEPOINT		SUF.END-REF-POINT
CHAR(10)	SUF.END-REF-POINT	X	
CHAR(3)	SUF.END-REF-POST	X	
CHAR(1)	SUF.EXIST-DESIGN	X	
CHAR(1)	SUF.EXIST-DIV-ONE-WAY	X	
CHAR(2)	SUF.EXIST-NUM-LANES	X	
CHAR(2)	SUF.EXIST-SPRING-LOAD	X	
CHAR(2)	SUF.EXIST-SUMMER-LOAD	X	
CHAR(1)	SUF.EXIST-SVC-LVL	X	
CHAR(1)	SUF.EXIST-TERRAIN	X	
CHAR(1)	SUF.FED-AID-SYS	X	
CHAR(2)	SUF.FUNCT-CLASS	X	

CHAR(2)	SUF.HAZ-BRIDGES	X	
CHAR(2)	SUF.HAZ-CROSSINGS	X	
CHAR(2)	SUF.HAZ-CURVES	X	
CHAR(2)	SUF.HAZ-INTSECTS	X	
CHAR(20)	SUF.KEY-FIELD	X	
CHAR(6)	SUF.LENGTH	X	
CHAR(2)	SUF.MAINT-AREA	X	

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Format	Name	Stored	Generated From
CHAR(68)	SUF.MESSAGE-1	X	
CHAR(68)	SUF.MESSAGE-2	X	
CHAR(68)	SUF.MESSAGE-3	X	
CHAR(5)	SUF.NO-PASS-LENGTH	X	
CHAR(1)	SUF.NUMBER-MSGS	X	
CHAR(3)	SUF.PCT-HEAVY-COMM	X	
CHAR(3)	SUF.PCT-30TH-HOUR	X	
NUM(7)	SUF.POP-FROM-CNTY		SUF.COUNTY
NUM(7)	SUF.POP-FROM-CITY1		SUF.CITY1-NUMBER
NUM(7)	SUF.POP-FROM-CITY2		SUF.CITY2-NUMBER
NUM(7)	SUF.POP-FROM-CITY3		SUF.CITY3-NUMBER
NUM(1)	SUF.POP-GROUP-FROM-CITY1		SUF.CITY1-NUMBER
NUM(1)	SUF.POP-GROUP-FROM-CITY2		SUF.CITY2-NUMBER
NUM(1)	SUF.POP-GROUP-FROM-CITY3		SUF.CITY3-NUMBER
CHAR(6)	SUF.PRESENT-ADT	X	
CHAR(2)	SUF.PRESENT-ADT-YR	X	
CHAR(6)	SUF.PROJECTED-ADT	X	
CHAR(2)	SUF.PROJECTED-ADT-YR	X	
CHAR(1)	SUF.PROP-DESIGN	X	
CHAR(1)	SUF.PROP-DIV-ONE-WAY	X	
CHAR(2)	SUF.PROP-NUM-LANES	X	
CHAR(2)	SUF.PROP-SPRING-LOAD	X	
CHAR(2)	SUF.PROP-SUMMER-LOAD	X	
CHAR(1)	SUF.PROP-SVC-LVL	X	
CHAR(1)	SUF.PROP-TERRAIN	X	
CHAR(2)	SUF.RDC-FROM-CNTY		SUF.COUNTY
CHAR(1)	SUF.RD1-DIRECTION	X	
CHAR(4)	SUF.RD1-GRADE-YEAR	X	
CHAR(1)	SUF.RD1-LEFT-SHL-TYPE	X	

CHAR(2)	SUF.RD1-LEFT-SHL-WIDTH	X	
CHAR(1)	SUF.RD1-RIGHT-SHL-TYPE	X	
CHAR(2)	SUF.RD1-RIGHT-SHL-WIDTH	X	
CHAR(1)	SUF.RD1-SURF-TYPE	X	
CHAR(2)	SUF.RD1-SURF-WIDTH	X	
CHAR(4)	SUF.RD1-SURF-YEAR	X	
CHAR(2)	SUF.RD1-1-PQI	X	
CHAR(2)	SUF.RD1-1-PSR	X	
CHAR(2)	SUF.RD1-1-SR	X	
CHAR(4)	SUF.RD1-1-YEAR	X	
CHAR(2)	SUF.RD1-2-PQI	X	
CHAR(2)	SUF.RD1-2-PSR	X	
CHAR(2)	SUF.RD1-2-SR	X	
CHAR(4)	SUF.RD1-2-YEAR	X	
CHAR(2)	SUF.RD1-3-PQI	X	
CHAR(2)	SUF.RD1-3-PSR	X	
CHAR(2)	SUF.RD1-3-SR	X	
CHAR(4)	SUF.RD1-3-YEAR	X	

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Format	Name	Stored	Generated From
CHAR(1)	SUF.RD2-DIRECTION	X	
CHAR(4)	SUF.RD2-GRADE-YEAR	X	
CHAR(1)	SUF.RD2-LEFT-SHL-TYPE	X	
CHAR(2)	SUF.RD2-LEFT-SHL-WIDTH	X	
CHAR(1)	SUF.RD2-RIGHT-SHL-TYPE	X	
CHAR(2)	SUF.RD2-RIGHT-SHL-WIDTH	X	
CHAR(1)	SUF.RD2-SURF-TYPE	X	
CHAR(2)	SUF.RD2-SURF-WIDTH	X	
CHAR(4)	SUF.RD2-SURF-YEAR	X	
CHAR(2)	SUF.RD2-1-PQI	X	
CHAR(2)	SUF.RD2-1-PSR	X	
CHAR(2)	SUF.RD2-1-SR	X	
CHAR(4)	SUF.RD2-1-YEAR	X	
CHAR(2)	SUF.RD2-2-PQI	X	
CHAR(2)	SUF.RD2-2-PSR	X	
CHAR(2)	SUF.RD2-2-SR	X	
CHAR(4)	SUF.RD2-2-YEAR	X	
CHAR(2)	SUF.RD2-3-PQI	X	

CHAR(2)	SUF.RD2-3-PSR	X	
CHAR(2)	SUF.RD2-3-SR	X	
CHAR(4)	SUF.RD2-3-YEAR	X	
CHAR(2)	SUF.REG-DEV-COMM	X	
CHAR(8)	SUF.ROUTE-NUMBER	X	
CHAR(10)	SUF.ROUTE-SYS-&-NUM	X	
CHAR(2)	SUF.ROUTE-SYSTEM	X	
NUM(1)	SUF.RUR-URB-FROM-CITY1		SUF.CITY1-NUMBER
NUM(1)	SUF.RUR-URB-FROM-CITY2		SUF.CITY2-NUMBER
NUM(1)	SUF.RUR-URB-FROM-CITY3		SUF.CITY3-NUMBER
CHAR(2)	SUF.SIGHT-DIST-RESTR	X	
CHAR(1)	SUF.SP-ACCESS-CNTL	X	
CHAR(2)	SUF.SP-HAZARDS	X	
CHAR(2)	SUF.SP-PASSING-OPP	X	
CHAR(3)	SUF.SP-RD1-ADJUSTED	X	
CHAR(3)	SUF.SP-RD1-BASIC	X	
CHAR(1)	SUF.SP-RD1-RIDE-QUAL	X	
CHAR(2)	SUF.SP-RD1-SHOULDER	X	
CHAR(2)	SUF.SP-RD1-STRUCTURE	X	
CHAR(3)	SUF.SP-RD2-ADJUSTED	X	
CHAR(3)	SUF.SP-RD2-BASIC	X	
CHAR(1)	SUF.SP-RD2-RIDE-QUAL	X	
CHAR(2)	SUF.SP-RD2-SHOULDER	X	
CHAR(2)	SUF.SP-RD2-STRUCTURE	X	
CHAR(2)	SUF.SP-SPRING-LOAD	X	
CHAR(1)	SUF.SP-STOP-SIGHT-DIST	X	
CHAR(2)	SUF.SP-SURF-WIDTH	X	
CHAR(2)	SUF.SP-VOL-CAP-RATIO	X	
CHAR(56)	SUF.TERMINI	X	
CHAR(4)	SUF.VOL-CAP-RATIO	X	

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SUF - Descriptions of Data Elements
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SUF.ACCESS-CONTROL - CHAR(1) - Control of Access

'1' Full control of access
'2' Partial control of access

'3' No control of access

SUF.BEG-DIST-FROM-POST - CHAR(7) - Distance from Beginning Reference Post

'+00.000' - '+99.999' Distance (in miles) from the reference post used in locating the beginning of the section.

SUF.BEG-MILEPOINT - CHAR(8) - Milepoint at Beginning of Section

'0000.000' - '9999.999' Milepoint at beginning of section (computed true mileage for beginning reference point).

SUF.BEG-REF-POINT - CHAR(10) - Beginning Reference Point

'000+00.000' - '999+99.999' Reference point at beginning of section.

SUF.BEG-REF-POST - CHAR(3) - Beginning Reference Post

'000' - '999' Reference post number used in locating the beginning of the section.

SUF.CENSUS-YR-FROM-CITY1 - NUM(4) - Census Year of First City Population

0000 Non-municipal
0001 - 9999 Census year

This field is computed by accessing the TIS city table with SUF.CITY1-NUMBER.

SUF.CENSUS-YR-FROM-CITY2 - NUM(4) - Census Year of Second City Population

0000 Non-municipal
0001 - 9999 Census year

This field is computed by accessing the TIS city table with SUF.CITY2-NUMBER.

SUF.CENSUS-YR-FROM-CITY3 - NUM(4) - Census Year of Third City Population

0000	Non-municipal
0001 - 9999	Census year

This field is computed by accessing the TIS city table with SUF.CITY3-NUMBER.

SUF.CITY1-LENGTH - CHAR(5) - First City Length

'00000' - '99999'	Length in miles (decimal assumed NN.NNN) between corporate limits for the first city in the section. If section is entirely non-municipal, will be the length of the entire section. Upper limit is always the total length of the section.

SUF.CITY1-NUMBER - CHAR(4) - First City Number

'0000' - '9998'	Census number of the first city in the section. '0000' means non-municipal.

SUF.CITY1-NUMBER-NUM - NUM(4) - First City Number (numeric format)

0000 - 9998	First city number in numeric format. Allows comparison to RLG.CITY in SELECT statements. Also will provide formatting with city name on matrix summaries.

SUF.CITY1-URBAN-CLASS - CHAR(1) - First City Urban Classification

Urban classification of the first city in the section:

'1'	Nonmunicipal - rural
'2'	Nonmunicipal - urban
'3'	Municipal - rural
'4'	Municipal - urban

SUF.CITY2-LENGTH - CHAR(5) - Second City Length

' '	Section is entirely described by the first city fields.
'00000' - '99999'	Length in miles (decimal assumed NN.NNN) between corporate limits for the second city in the section.

SUF.CITY2-NUMBER - CHAR(4) - Second City Number

' ' Section is entirely described by the first city fields.

'0000' - '9998' Census number of the second city in the section. '0000' means non-municipal.

SUF.CITY2-NUMBER-NUM - NUM(4) - Second City Number (numeric format)

0000 - 9998 Second city number in numeric format. Allows comparison to RLG.CITY in SELECT statements. Also will provide formatting with city name on matrix summaries.

SUF.CITY2-URBAN-CLASS - CHAR(1) - Second City Urban Classification

' ' Section is entirely described by the first city fields.

Urban classification of the second city in the section:

'1' Nonmunicipal - rural
'2' Nonmunicipal - urban
'3' Municipal - rural
'4' Municipal - urban

SUF.CITY3-LENGTH - CHAR(5) - Third City Length

' ' Section is entirely described by the first and second city fields.

'00000' - '99999' Length in miles (decimal assumed NN.NNN) between corporate limits for the third city in the section.

SUF.CITY3-NUMBER - CHAR(4) - Third City Number

' ' Section is entirely described by the first and second city fields.

'0000' - '9998' Census number of the third city in the section.

'0000' means non-municipal.

SUF.CITY3-NUMBER-NUM - NUM(4) - Third City Number (numeric format)

0000 - 9998 Third city number in numeric format. Allows comparison to RLG.CITY in SELECT statements. Also will provide formatting with city name on matrix summaries.

SUF.CITY3-URBAN-CLASS - CHAR(1) - Third City Urban Classification

' Section is entirely described by the first and second city fields.

Urban classification of the third city in the section:

'1' Nonmunicipal - rural
'2' Nonmunicipal - urban
'3' Municipal - rural
'4' Municipal - urban

SUF.CNTRL-SECTN - CHAR(4) - Control Section

'xxyy' Control section number where:

"xx" is the county number (01-87).
"yy" is the control section number (01-89).

SUF.COUNTY - CHAR(2) - County Number

'01' - '87' County number.

SUF.COUNTY-NUM - NUM(2) - County Number (numeric format)

01 - 87 County number in numeric format. Allows comparison to RLG.COUNTY in SELECT statements. Also will provide formatting with county name on matrix summaries.

SUF.DISTRICT - CHAR(1) - District Number

'1' - '9' District number.

SUF.DISTRICT-FROM-CNTY - NUM(1) - District Number from County Number

'1 - 9 District number determined from SUF.COUNTY and TIS county table (can differ from SUF.DISTRICT).

SUF.END-DIST-FROM-POST - CHAR(7) - Distance from Ending Reference Post

'+00.000' - '+99.999' Distance (in miles) from the reference post used in locating the end of the section.

SUF.END-MILEPOINT - CHAR(8) - Milepoint at End of Section

'0000.000' - '9999.999' Milepoint at end of section (computed true mileage for end reference point).

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SUF.END-REF-POINT - CHAR(10) - Ending Reference Point

'000+00.000' - '999+99.999' Reference point at end of section.

SUF.END-REF-POST - CHAR(3) - Ending Reference Post

'000' - '999' Reference post number used in locating the end of the section.

SUF.EXIST-DESIGN - CHAR(1) - Existing Roadway Design

'1' Rural geometric design
'2' Urban geometric design

SUF.EXIST-DIV-ONE-WAY - CHAR(1) - Existing Roadway Divided/One-way

'1' Not divided
'2' Divided
'3' One-way pair

SUF.EXIST-NUM-LANES - CHAR(2) - Existing Roadway Number of Lanes

'02' - '09' lanes

SUF.EXIST-SPRING-LOAD - CHAR(2) - Existing Roadway Spring Load

'04' - '10' Existing roadway springtime load

SUF.EXIST-SUMMER-LOAD - CHAR(2) - Existing Roadway Summer Load

'04' - '10' Existing roadway summertime load

SUF.EXIST-SVC-LVL - CHAR(1) - Existing Roadway Service Level

'1' Freeway
'2' Expressway
'3' Major trunk
'4' Trunk highway
'5' Turnback

SUF.EXIST-TERRAIN - CHAR(1) - Existing Roadway Terrain

'1' Flat
'2' Rolling
'3' Rugged

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SUF.FED-AID-SYS - CHAR(1) - Federal Aid System

'1' Interstate
'2' Urban
'3' Primary
'4' Secondary
'5' Non-federal

SUF.FUNCT-CLASS - CHAR(2) - Functional Classification

'01' Rural principal arterial
'02' Rural minor arterial
'05' Rural collector
'07' Rural minor collector
'09' Rural local
'41' Urban principal arterial

'42' Urban minor arterial
'45' Urban collector
'49' Urban local

SUF.HAZ-BRIDGES - CHAR(2) - Number of Deficient Bridges

'00' - '99' Number of deficient bridges in section

SUF.HAZ-CROSSINGS - CHAR(2) - Number of Deficient Crossings

'00' - '99' Number of deficient crossings in section

SUF.HAZ-CURVES - CHAR(2) - Number of Deficient Curves

'00' - '99' Number of deficient curves in section

SUF.HAZ-INTSECTS - CHAR(2) - Number of Deficient Intersections

'00' - '99' Number of deficient intersections in section

SUF.KEY-FIELD - CHAR(20) - Key Field of Section

'0100000035000+00.000' - '0300009999999+99.999'

Composed of route system, route number, and beginning reference point of section. This is the record key and sort order of the sufficiency rating file.

SUF.LENGTH - CHAR(6) - Length of Section

'000000' - '999999' Total length of section in miles (decimal assumed 000.000).

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SUF.MAINT-AREA - CHAR(2) - Maintenance Area

'1A' - '9B' Maintenance area

"na" where n = 1-9 and a = A or B. '5B' and '9B' do not exist.

SUF.MESSAGE-1 - CHAR(68) - First Special Message

Additional description of section or exceptions to other data elements within section.

SUF.MESSAGE-2 - CHAR(68) - Second Special Message

Additional description of section or exceptions to other data elements within section.

SUF.MESSAGE-3 - CHAR(68) - Third Special Message

Additional description of section or exceptions to other data elements within section.

SUF.NO-PASS-LENGTH - CHAR(5) - No Passing Length

'00000' - '99999' Length of no passing (in feet).

SUF.NUMBER-MSGS - CHAR(1) - Number of Special Messages

'0' - '3' Number of special messages for section.

SUF.PCT-HEAVY-COMM - CHAR(3) - Percent Heavy Commercial Traffic

'000' - '500' Percent heavy commercial traffic (decimal assumed 00.0).

SUF.PCT-30TH-HOUR - CHAR(3) - Percent 30th Peak Hour Traffic

'000' - '500' Percent 30th peak hour traffic (decimal assumed 00.0).

SUF.POP-FROM-CITY1 - NUM(7) - Population from First City Number

0000001 - 9999999 First city population determined from SUF.CITY1-NUMBER TIS city table.

SUF.POP-FROM-CITY2 - NUM(7) - Population from Second City Number

0000001 - 9999999 Second city population determined from SUF.CITY1-NUMBER TIS city table.

SUF.POP-FROM-CITY3 - NUM(7) - Population from Third City Number

0000001 - 9999999 Third city population determined from SUF.CITY1-NUMBER TIS city table.

SUF.POP-FROM-CNTY - NUM(7) - Population from County Number

0000001 - 9999999 County population determined from SUF.COUNTY and TIS county table.

SUF.POP-GROUP-FROM-CITY1 - NUM(1) - Population Group from First City

1 Urban - 250,000 and over
2 Urban - 100,000 - 249,999
3 Urban - 50,000 - 99,999
4 Urban - 25,000 - 49,999
5 Urban - 10,000 - 24,999
6 Urban - 5,000 - 9,999
7 Rural - 2,500 - 4,999
8 Rural - 1,000 - 2,499
9 Rural - 1 - 999 or non-municipal

This field is computed by accessing the TIS city table with SUF.CITY1-NUMBER.

SUF.POP-GROUP-FROM-CITY2 - NUM(1) - Population Group from Second City

1 Urban - 250,000 and over
2 Urban - 100,000 - 249,999
3 Urban - 50,000 - 99,999
4 Urban - 25,000 - 49,999
5 Urban - 10,000 - 24,999
6 Urban - 5,000 - 9,999
7 Rural - 2,500 - 4,999
8 Rural - 1,000 - 2,499
9 Rural - 1 - 999 or non-municipal

This field is computed by accessing the TIS city table with SUF.CITY2-NUMBER.

SUF.POP-GROUP-FROM-CITY3 - NUM(1) - Population Group from Third City

1 Urban - 250,000 and over
2 Urban - 100,000 - 249,999
3 Urban - 50,000 - 99,999
4 Urban - 25,000 - 49,999
5 Urban - 10,000 - 24,999
6 Urban - 5,000 - 9,999
7 Rural - 2,500 - 4,999
8 Rural - 1,000 - 2,499
9 Rural - 1 - 999 or non-municipal

This field is computed by accessing the TIS city table with SUF.CITY3-NUMBER.

SUF.PRESENT-ADT - CHAR(6) - Present Average Daily Traffic

'000001' - '999999' Present Average Daily Traffic

SUF.PRESENT-ADT-YR - CHAR(4) - Year of Present Average Daily Traffic

'1970' - '9999' Year of present average daily traffic.

SUF.PROJECTED-ADT - CHAR(6) - Projected Average Daily Traffic

'000001' - '999999' Projected Average Daily Traffic

SUF.PROJECTED-ADT-YR - CHAR(4) - Year of Projected Average Daily Traffic

'0000' - '9999' Year of projected average daily traffic.

SUF.PROP-DESIGN - CHAR(1) - Proposed Roadway Design

'1' Rural geometric design
'2' Urban geometric design
'3' Same as existing design

SUF.PROP-DIV-ONE-WAY - CHAR(1) - Proposed Roadway Divided/One-way

' ' Same as existing divided/one-way
'1' Not divided
'2' Divided
'3' One-way pair

SUF.PROP-NUM-LANES - CHAR(2) - Proposed Roadway Number of Lanes

' ' Same as existing number of lanes
'02' - '09' lanes

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SUF.PROP-SPRING-LOAD - CHAR(2) - Proposed Roadway Spring Load

' ' Same as existing springtime load
'09' - '10' Proposed roadway springtime load

SUF.PROP-SUMMER-LOAD - CHAR(2) - Proposed Roadway Summer Load

' ' Same as existing summertime load
'09' - '10' Proposed roadway summertime load

SUF.PROP-SVC-LVL - CHAR(1) - Proposed Roadway Service Level

' ' Same as existing service level
'1' Freeway
'2' Expressway
'3' Major trunk
'4' Trunk highway

SUF.PROP-TERRAIN - CHAR(1) - Proposed Roadway Terrain

' ' Same as existing terrain
'1' Flat
'2' Rolling
'3' Rugged

SUF.RDC-FROM-CNTY - CHAR(2) - Regional Development Commission from
County Number

'01','02','03','04','05','6E','6W','7E','7W','08','09','10','11'

Regional development commission number determined from
SUF.COUNTY and TIS county table (can differ from
SUF.REG-DEV-COMM).

SUF.RD1-DIRECTION - CHAR(1) - Road-1 Direction of Travel

' '	Undivided roadway
'N'	North
'S'	South
'E'	East
'W'	West

SUF.RD1-GRADE-YEAR - CHAR(4) - Road-1 Year Graded

'NR'	Not recorded
'0001' - '9999'	Year road-1 graded.

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SUF.RD1-LEFT-SHL-TYPE - CHAR(1) - Road-1 Left Shoulder Type

' '	No shoulder or unknown
'D'	Sod
'E'	Gravel
'F'	Bituminous treated gravel
'G'	Bituminous
'H'	Bituminous stabilized
'I'	Plant mixed bituminous
'J'	Concrete gutter
'R'	Concrete curb and gutter
'S'	Bituminous curb

SUF.RD1-LEFT-SHL-WIDTH - CHAR(2) - Road-1 Left Shoulder Width

' '	Curb or no shoulder
'01' - '20'	Road-1 left shoulder width in feet

SUF.RD1-RIGHT-SHL-TYPE - CHAR(1) - Road-1 Right Shoulder Type

' '	No shoulder or unknown

'D' Sod
'E' Gravel
'F' Bituminous treated gravel
'G' Bituminous
'H' Bituminous stabilized
'I' Plant mixed bituminous
'J' Concrete gutter
'R' Concrete curb and gutter
'S' Bituminous curb

SUF.RD1-RIGHT-SHL-WIDTH - CHAR(2) - Road-1 Right Shoulder Width

' ' Curb or no shoulder
'01' - '20' Road-1 right shoulder width in feet

SUF.RD1-SURF-TYPE - CHAR(1) - Road-1 Surface Type

'C' Graded and drained only
'D' Soil
'E' Gravel
'F' Bituminous treated gravel
'G' Bituminous, spec. 2331 or 2341
'H' Bituminous stabilized
'I' Asphaltic concrete (bituminous spce. 2351)
'J' Portland cement concrete
'K' Brick
'L' Block

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SUF.RD1-SURF-WIDTH - CHAR(2) - Road-1 Surface Width

'00' - '99' Surface width road-1 in feet

SUF.RD1-SURF-YEAR - CHAR(4) - Road-1 Surface Year

'NR' Not recorded
'0001' - '9999' Surface year road-1.

SUF.RD1-1-PQI - CHAR(2) - Road-1 Most Recent Pavement Quality Index

' ' No most-recent pavement quality index available
for road-1.

'00' - '50' Road-1 most-recent pavement quality index
(decimal assumed, 0.0).

SUF.RD1-1-PSR - CHAR(2) - Road-1 Most Recent Present Servicability Rating

' ' No most recent present servicability rating available for road-1.
'00' - '50' Road-1 most recent present servicability rating (decimal assumed 0.0).

SUF.RD1-1-SR - CHAR(2) - Road-1 Most Recent Surface Rating

' ' No most recent surface rating available for road-1.
'00' - '40' Road-1 most recent surface rating (decimal assumed 0.0).

SUF.RD1-1-YEAR - CHAR(4) - Road-1 Most Recent Condition Rating Year

'   ' No condition rating.
'NR' Condition rating year not reported.
'NNNN' Year of condition rating.

SUF.RD1-2-PQI - CHAR(2) - Road-1 Second-Most-Recent Pavement Quality Index

' ' No second-most-recent pavement quality index available for road-1.
'00' - '50' Road-1 second-most-recent pavement quality index (decimal assumed, 0.0)

SUF.RD1-2-PSR - CHAR(2) - Road-1 Second Most Recent Present Servicability Rating

' ' No second most recent present servicability rating available for road-1.
'00' - '50' Road-1 second most recent present servicability rating (decimal assumed 0.0).

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SUF.RD1-2-SR - CHAR(2) - Road-1 Second Most Recent Surface Rating

' ' No second most recent surface rating available for road-1.
'00' - '40' Road-1 second most recent surface rating (decimal

assumed 0.0).

SUF.RD1-2-YEAR - CHAR(4) - Road-1 Second Most Recent Condition Rating Year

' '	No condition rating.
'NR'	Condition rating year not reported.
'NNNN'	Year of condition rating.

SUF.RD1-3-PQI - CHAR(2) - Road-1 Third-Most-Recent Pavement Quality Index

' '	No third-most-recent pavement quality index available for road-1.
'00' - '50'	Road-1 third-most-recent pavement quality index (decimal assumed, 0.0).

SUF.RD1-3-PSR - CHAR(2) - Road-1 Third Most Recent Present Servicability Rating

' '	No third most recent present servicability rating available for road-1.
'00' - '50'	Road-1 third most recent present servicability rating (decimal assumed 0.0).

SUF.RD1-3-SR - CHAR(2) - Road-1 Third Most Recent Surface Rating

' '	No third most recent surface rating available for road-1.
'00' - '40'	Road-1 third most recent surface rating (decimal assumed 0.0).

SUF.RD1-3-YEAR - CHAR(4) - Road-1 Third Most Recent Condition Rating Year

' '	No condition rating.
'NR'	Condition rating year not reported.
'NNNN'	Year of condition rating.

SUF.RD2-DIRECTION - CHAR(1) - Road-2 Direction of Travel

' '	Undivided roadway (no road-2 present)
'N'	North
'S'	South
'E'	East
'W'	West

SUF.RD2-GRADE-YEAR - CHAR(4) - Road-2 Year Graded

' '	No road-2
'NR'	Not recorded
'0001' - '9999'	Year road-2 graded.

SUF.RD2-LEFT-SHL-TYPE - CHAR(1) - Road-2 Left Shoulder Type

' '	No shoulder or unknown or no road-2
'D'	Sod
'E'	Gravel
'F'	Bituminous treated gravel
'G'	Bituminous
'H'	Bituminous stabilized
'I'	Plant mixed bituminous
'J'	Concrete gutter
'R'	Concrete curb and gutter
'S'	Bituminous curb

SUF.RD2-LEFT-SHL-WIDTH - CHAR(2) - Road-2 Left Shoulder Width

' '	Curb or no shoulder or no road-2
'01' - '20'	Road-2 left shoulder width in feet

SUF.RD2-RIGHT-SHL-TYPE - CHAR(1) - Road-2 Right Shoulder Type

' '	No shoulder or unknown or no road-2
'D'	Sod
'E'	Gravel
'F'	Bituminous treated gravel
'G'	Bituminous
'H'	Bituminous stabilized
'I'	Plant mixed bituminous
'J'	Concrete gutter
'R'	Concrete curb and gutter
'S'	Bituminous curb

SUF.RD2-RIGHT-SHL-WIDTH - CHAR(2) - Road-2 Right Shoulder Width

' '	Curb or no shoulder or no road-2
'01' - '20'	Road-1 right shoulder width in feet

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SUF.RD2-SURF-TYPE - CHAR(1) - Road-2 Surface Type

' '	No road-2
'C'	Graded and drained only
'D'	Soil
'E'	Gravel
'F'	Bituminous treated gravel
'G'	Bituminous, spec. 2331 or 2341
'H'	Bituminous stabilized
'I'	Asphaltic concrete (bituminous spce. 2351)
'J'	Portland cement concrete
'K'	Brick
'L'	Block

SUF.RD2-SURF-WIDTH - CHAR(2) - Road-2 Surface Width

' '	No road-2
'00' - '99'	Surface width road-2 in feet

SUF.RD2-SURF-YEAR - CHAR(4) - Road-2 Surface Year

' '	No road-2
'NR'	Not recorded
'0001' - '9999'	Surface year road-2.

SUF.RD2-1-PQI - CHAR(2) - Road-2 Most Recent Pavement Quality Index

' '	No most-recent pavement quality index available for road-2.
'00' - '50'	Road-2 most-recent pavement quality index (decimal assumed, 0.0).

SUF.RD2-1-PSR - CHAR(2) - Road-2 Most Recent Present Servicability Rating

```
                '  '  No most recent present servicability rating available
                      for road-2.
          '00' - '50'  Road-2 most recent present servicability rating
                      (decimal assumed 0.0).


       SUF.RD2-1-SR - CHAR(2) - Road-2 Most Recent Surface Rating

                '  '  No most recent surface rating available for road-2.
          '00' - '40'  Road-2 most recent surface rating (decimal assumed
                      0.0).


       SUF.RD2-1-YEAR - CHAR(4) - Road-2 Most Recent Condition Rating Year

            '    '  No condition rating.
              'NR'  Condition rating year not reported.
            'NNNN'  Year of condition rating.

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       SUF.RD2-2-PQI - CHAR(2) - Road-2 Second-Most-Recent Pavement
                                 Quality Index

                '  '  No second-most-recent pavement quality index
                         available for road-2.
          '00' - '50'  Road-2 second-most-recent pavement quality index
                         (decimal assumed, 0.0)


       SUF.RD2-2-PSR - CHAR(2) - Road-2 Second Most Recent Present
                                 Servicability Rating

                '  '  No second most recent present servicability rating
                      available for road-2.
          '00' - '50'  Road-2 second most recent present servicability rating
                      (decimal assumed 0.0).


       SUF.RD2-2-SR - CHAR(2) - Road-2 Second Most Recent Surface Rating

                '  '  No second most recent surface rating available for
                      road-2.
          '00' - '40'  Road-2 second most recent surface rating (decimal
                      assumed 0.0).


       SUF.RD2-2-YEAR - CHAR(4) - Road-2 Second Most Recent Condition Rating
                                  Year
```

```
          '    '  No condition rating.
            'NR'  Condition rating year not reported.
          'NNNN'  Year of condition rating.


        SUF.RD2-3-PQI - CHAR(2) - Road-2 Third-Most-Recent Pavement
                                  Quality Index

                  '  '  No third-most-recent pavement quality index
                        available for road-2.
          '00' - '50'  Road-2 third-most-recent pavement quality index
                        (decimal assumed, 0.0).


        SUF.RD2-3-PSR - CHAR(2) - Road-2 Third Most Recent Present Servicability
                                  Rating

                  '  '  No third most recent present servicability rating
                        available for road-2.
          '00' - '50'  Road-2 third most recent present servicability rating
                        (decimal assumed 0.0).


        SUF.RD2-3-SR - CHAR(2) - Road-2 Third Most Recent Surface Rating

                  '  '  No third most recent surface rating available for
                        road-2.
          '00' - '40'  Road-2 third most recent surface rating (decimal
                        assumed 0.0).
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        SUF.RD2-3-YEAR - CHAR(4) - Road-2 Third Most Recent Condition Rating
                                   Year

          '    '  No condition rating.
            'NR'  Condition rating year not reported.
          'NNNN'  Year of condition rating.


        SUF.REG-DEV-COMM - CHAR(2) - Regional Development Commission

          '01','02','03','04','05','6E','6W','7E','7W','08','09','10','11'


        SUF.ROUTE-NUMBER - CHAR(8) - Route Number

          '0000nnnx'  Route number (n = 0-9, x = 0-9 or A-Z).
```

SUF.ROUTE-SYS-&-NUM - CHAR(10) - Route System and Number

Route system (columns 1-2) followed by route number (columns 3-10).

SUF.ROUTE-SYSTEM - CHAR(2) - Route System

'01' - Interstate Trunk Highway
'02' - U.S. Trunk Highway
'03' - Minnesota Trunk Highway

SUF.RUR-URB-FROM-CITY1 - NUM(1) - Rural-Urban-Urbanized Code from First City

1 Rural (municipal or non-municipal)
2 Urban (5,000 - 49,000)
3 Urbanized (50,000 and greater)

This field is computed by accessing the TIS city table with SUF.CITY1-NUMBER.

SUF.RUR-URB-FROM-CITY2 - NUM(1) - Rural-Urban-Urbanized Code from Second City

1 Rural (municipal or non-municipal)
2 Urban (5,000 - 49,000)
3 Urbanized (50,000 and greater)

This field is computed by accessing the TIS city table with SUF.CITY2-NUMBER.

SUF.RUR-URB-FROM-CITY3 - NUM(1) - Rural-Urban-Urbanized Code from Third City

1 Rural (municipal or non-municipal)
2 Urban (5,000 - 49,000)
3 Urbanized (50,000 and greater)

This field is computed by accessing the TIS city table with SUF.CITY3-NUMBER.

SUF.SIGHT-DIST-RESTR - CHAR(2) - Sight Distance Restrictions

'00' - '99' Number of stopping sight distance restrictions

SUF.SP-ACCESS-CNTL - CHAR(1) - Sufficiency Rating Points - Access Control

'0' - '5' Rating formula points assigned for control of access

SUF.SP-HAZARDS - CHAR(2) - Sufficiency Rating Points - Hazards

'00' - '15' Rating formula points assigned for hazards

SUF.SP-PASSING-OP - CHAR(2) - Sufficiency Rating Points - Passing Opportunity

'00' - '10' Rating formula points assigned for passing opportunity

SUF.SP-RD1-ADJUSTED - CHAR(3) - Road-1 Sufficiency Rating Points - Adjusted

'000' - '100' Total points assigned to road-1 AFTER adjustment for traffic

SUF.SP-RD1-BASIC - CHAR(3) - Road-1 Sufficiency Rating Points - Basic

'000' - '100' Total points assigned to road-1 BEFORE adjustment for traffic

SUF.SP-RD1-RIDE-QUAL - CHAR(1) - Road-1 Sufficiency Points -Ride Quality

'0' - '5' Rating formula points assigned to road-1 for ride quality

SUF.SP-RD1-SHOULDER - CHAR(2) - Road-1 Sufficiency Points - Shoulder

'00' - '10' Rating formula points assigned to road-1 for shoulder width

SUF.SP-RD1-STRUCTURE - CHAR(2) - Road-1 Sufficiency Points - Structure

'00' - '15' Rating formula points assigned to road-1 for structure

SUF.SP-RD2-ADJUSTED - CHAR(3) - Road-2 Sufficiency Rating Points - Adjusted

'000' - '100' Total points assigned to road-2 AFTER adjustment for traffic

SUF.SP-RD2-BASIC - CHAR(3) - Road-2 Sufficiency Rating Points - Basic

'000' - '100' Total points assigned to road-2 BEFORE adjustment for traffic

SUF.SP-RD2-RIDE-QUAL - CHAR(1) - Road-2 Sufficiency Points -Ride Quality

'0' - '5' Rating formula points assigned to road-2 for ride quality

SUF.SP-RD2-SHOULDER - CHAR(2) - Road-2 Sufficiency Points - Shoulder

'00' - '10' Rating formula points assigned to road-2 for shoulder width

SUF.SP-RD2-STRUCTURE - CHAR(2) - Road-2 Sufficiency Points - Structure

'00' - '15' Rating formula points assigned to road-2 for structure

SUF.SP-SPRING-LOAD - CHAR(2) - Sufficiency Points - Spring Load

'00' - '15' Rating formula points assigned for spring load

SUF.SP-STOP-SIGHT-DIST - CHAR(1) - Sufficiency Points - Stopping Sight Distance Restrictions

'0' - '5' Rating formula points assigned for stopping sight distance restrictions

SUF.SP-SURF-WIDTH - CHAR(2) - Sufficiency Points - Surface Width

'00' - '10' Rating formula points assigned for surface width

SUF.SP-VOL-CAP-RATIO - CHAR(2) - Sufficiency Points - Volume/Capacity Ratio

'00' - '10' Rating formula points assigned for volume/capacity ratio

SUF.TERMINI - CHAR(56) - Termini

Verbal description of the section

SUF.VOL-CAP-RATIO - CHAR(4) - Volume/Capacity Ratio

'0000' - '9999' Ratio of actual traffic volume to segment capacity (decimal assumed 00.00).

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SUH - Description of Record
****

Each Sufficiency Hazards (SUH) record identifies the location of one of four types of hazards along trunk highways. The hazard type is part of the record key, so it is possible to have more than one hazard at the same reference point. The hazards record contains the following data elements:

Route system
Route number
Begin reference point
Hazard type
End reference point
Length

SUH - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(21)	SUH.KEY-FIELD	X	
CHAR(10)	SUH.ROUTE-SYS-&-NUM	X	
CHAR(2)	SUH.ROUTE-SYSTEM	X	
CHAR(8)	SUH.ROUTE-NUMBER	X	
CHAR(10)	SUH.BEG-REF-POINT	X	
CHAR(3)	SUH.BEG-REF-POST	X	
CHAR(7)	SUH.BEG-DIST-FROM-POST	X	
CHAR(8)	SUH.BEG-MILEPOINT		SUH.BEG-REF-POINT
CHAR(1)	SUH.HAZARD-TYPE	X	
CHAR(10)	SUH.END-REF-POINT	X	
CHAR(3)	SUH.END-REF-POST	X	
CHAR(7)	SUH.END-DIST-FROM-POST	X	
CHAR(8)	SUH.END-MILEPOINT		SUH.END-REF-POINT
CHAR(5)	SUH.LENGTH	X	

SUH - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
CHAR(7)	SUH.BEG-DIST-FROM-POST	X	
CHAR(8)	SUH.BEG-MILEPOINT		SUH.BEG-REF-POINT
CHAR(10)	SUH.BEG-REF-POINT	X	
CHAR(3)	SUH.BEG-REF-POST	X	
CHAR(7)	SUH.END-DIST-FROM-POST	X	
CHAR(8)	SUH.END-MILEPOINT		SUH.END-REF-POINT
CHAR(10)	SUH.END-REF-POINT	X	
CHAR(3)	SUH.END-REF-POST	X	
CHAR(1)	SUH.HAZARD-TYPE	X	
CHAR(21)	SUH.KEY-FIELD	X	
CHAR(5)	SUH.LENGTH	X	
CHAR(8)	SUH.ROUTE-NUMBER	X	
CHAR(10)	SUH.ROUTE-SYS-&-NUM	X	
CHAR(2)	SUH.ROUTE-SYSTEM	X	

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SUH - Descriptions of Data Elements
****

SUH.BEG-DIST-FROM-POST - CHAR(7) - Distance from Beginning Reference Post

'+00.000' - '+99.999' Distance (in miles) from the reference post used in locating the beginning of hazard.

SUH.BEG-MILEPOINT - CHAR(8) - Milepoint at Beginning of Hazard

'0000.000' - '9999.999' Milepoint at beginning of hazard (computed true mileage for beginning reference point).

SUH.BEG-REF-POINT - CHAR(10) - Beginning Reference Point

'000+00.000' - '999+99.999' Reference point at beginning of hazard.

SUH.BEG-REF-POST - CHAR(3) - Beginning Reference Post

'000' - '999' Reference post number used in locating the beginning
of the hazard.

SUH.END-DIST-FROM-POST - CHAR(7) - Distance from Ending Reference Post

'+00.000' - '+99.999' Distance (in miles) from the reference post
used in locating the end of the hazard.

SUH.END-MILEPOINT - CHAR(8) - Milepoint at End of Hazard

'0000.000' - '9999.999' Milepoint at end of hazard (computed true
mileage for end reference point).

SUH.END-REF-POINT - CHAR(10) - Ending Reference Point

'000+00.000' - '999+99.999' Reference point at end of hazard.

SUH.END-REF-POST - CHAR(3) - Ending Reference Post

'000' - '999' Reference post number used in locating the end of
the hazard.

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SUH.HAZARD-TYPE - CHAR(1) - Type of Hazard

'C' Deficient curve
'P' Passing sight distance restriction
'S' Stopping sight distance restriction
'Z' No passing zone

SUH.KEY-FIELD - CHAR(21) - Key Field of Hazard

'0100000035C000+00.000' - '0300009999Z999+99.999'

Composed of route system, route number, beginning reference point,
and hazard type. This is the record key and sort order of the
sufficiency hazards file.

SUH.LENGTH - CHAR(5) - Length of Hazard

'00000' - '99999' Length of hazard in feet.

SUH.ROUTE-NUMBER - CHAR(8) - Route Number

'0000nnnx' Route number (n = 0-9, x = 0-9 or A-Z).

SUH.ROUTE-SYS-&-NUM - CHAR(10) - Route System and Number

Route system (columns 1-2) followed by route number (columns 3-10).

SUH.ROUTE-SYSTEM - CHAR(2) - Route System

'01' - Interstate Trunk Highway
'02' - U.S. Trunk Highway
'03' - Minnesota Trunk Highway

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TIM - Listing of Names in Alphabetical Order

Format	Name	Stored	Generated From
CHAR(1)	TIM.DAY	X	
CHAR(2)	TIM.DAY-OF-MONTH	X	
CHAR(2)	TIM.HOUR	X	
CHAR(1)	TIM.HOUR-DAYLIGHT		TIM.HOUR
CHAR(2)	TIM.MONTH	X	
CHAR(4)	TIM.YEAR	X	

CHAR(8) TIM.YYYYMMDD X

TIM - Descriptions of Data Elements
****

TIM.YEAR - CHAR(4) - Year

'nnnn' runs from the year of START-DATE through the year of END-DATE.

TIM.MONTH - CHAR(2) - Month of Year

Month ('01'-'12'). '01' = January, '02' = February, etc.

TIM.DAY-OF-MONTH - CHAR(2) - Day of Month

Day of month ('01'-'31').

TIM.DAY - CHAR(1) - Day of Week

'1' - Sunday
'2' - Monday
'3' - Tuesday
'4' - Wednesday
'5' - Thursday
'6' - Friday
'7' - Saturday

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TIM.HOUR - CHAR(2) - Hour of Day

'00' - Midnite - 12:59 AM

'01' - 1:00 - 1:59 AM
'02' - 2:00 - 2:59 AM
'03' - 3:00 - 3:59 AM
'04' - 4:00 - 4:59 AM
'05' - 5:00 - 5:59 AM
'06' - 6:00 - 6:59 AM
'07' - 7:00 - 7:59 AM
'08' - 8:00 - 8:59 AM
'09' - 9:00 - 9:59 AM
'10' - 10:00 - 10:59 AM
'11' - 11:00 - 11:59 AM
'12' - Noon - 12:59 PM
'13' - 1:00 - 1:59 PM
'14' - 2:00 - 2:59 PM
'15' - 3:00 - 3:59 PM
'16' - 4:00 - 4:59 PM
'17' - 5:00 - 5:59 PM
'18' - 6:00 - 6:59 PM
'19' - 7:00 - 7:59 PM
'20' - 8:00 - 8:59 PM
'21' - 9:00 - 9:59 PM
'22' - 10:00 - 10:59 PM
'23' - 11:00 - 11:59 PM

TIM.HOUR-DAYLIGHT - CHAR(1) - Hour Daylight

Computed for each day of the year as follows:

The hour of sunrise is simply the hour the sun rises.

The hour of sunset is defined as:
1) "nn" if the sun sets between nn:00 and nn:15.
2) "nn+1" if the sun sets between nn:16 and nn:59.

Hours from the hour of sunrise until the hour BEFORE the hour of sunset are light. Others are dark.

Codes: 'L' - Light.
'D' - Dark.

TIM.YYYYMMDD - CHAR(8) - Year, Month, and Day

Date, YYYY=year, MM=month (01-12), DD=day (01-31).

Useful with +CATEGORIES subcommand and graphics output, where it will categorize data in order by day of the year.

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TRF - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(2)	TRF.ROUTE-SYSTEM	X	
CHAR(9)	TRF.ROUTE-NUMBER	X	
CHAR(10)	TRF.REF-POINT	X	
DATE	TRF.DATE-OF-UPDATE	X	
NUM(4)	TRF.YEAR-OF-UPDATE		TRF.DATE-OF-UPDATE
NUM(2)	TRF.MONTH-OF-UPDATE		TRF.DATE-OF-UPDATE
NUM(2)	TRF.DAY-OF-UPDATE		TRF.DATE-OF-UPDATE
NUM(2)	TRF.TOTAL-VOLUMES	X	
NUM(2)	TRF.FULL-VOLUMES	X	
NUM(2)	TRF.BLANK-VOLUMES	X	

TRF - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
NUM(2)	TRF.BLANK-VOLUMES	X	
DATE	TRF.DATE-OF-UPDATE	X	
NUM(2)	TRF.DAY-OF-UPDATE		TRF.DATE-OF-UPDATE
NUM(2)	TRF.FULL-VOLUMES	X	
NUM(2)	TRF.MONTH-OF-UPDATE		TRF.DATE-OF-UPDATE
CHAR(10)	TRF.REF-POINT	X	
CHAR(9)	TRF.ROUTE-NUMBER	X	
CHAR(2)	TRF.ROUTE-SYSTEM	X	
NUM(2)	TRF.TOTAL-VOLUMES	X	
NUM(4)	TRF.YEAR-OF-UPDATE		TRF.DATE-OF-UPDATE

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TRF - Descriptions of Data Elements
****

TRF.BLANK-VOLUMES - NUM(2) - Blank Volumes

00 - 29 The number of volume fields present in the record that are unused.

TRF.DATE-OF-UPDATE - DATE - Most Recent Date of Update

00/00/0000 Record has not been modified since initial file load.
mm/dd/yYYy Most recent date on which record was modified.

TRF.DAY-OF-UPDATE NUM(2) - Day Portion of Date of Update

00 Record has not been updated since initial file load.
01-31 Day of month of date of update.

TRF.FULL-VOLUMES - NUM(2) - Full Volumes

01 - 30 The number of volume fields present in the record containing AADT values.

TRF.MONTH-OF-UPDATE - NUM(2) - Month Portion of Date of Update

00 Record has not been updated since initial file load.
01-12 Month portion of date of update.

TRF.REF-POINT - CHAR(10) - Reference Point

'000+00.000' - '999+99.999' Reference Point

TRF.ROUTE-NUMBER - CHAR(9) - Route Number

**** NOTE: This is not the same format as the route number used elsewhere in TIS. This is the format as actually stored on file.

'nnnnnnnxx' Route number

n = 0-9   a = A-Z x = blank, 0-9, or A-Z

cccc = City number   cc = County number

Route systems '01','02','03': '00000nnn ' or '00000nnna'

Route systems '05' and '10': 'cccc0nnn ' or 'cccc0nnna'

Other route systems: 'cc00nnxx '

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TRF.ROUTE-SYSTEM - CHAR(2) - Route System

'01'	ISTH	'09'	UTWN	'16'	MIL
'02'	USTH	'10'	MUN	'17'	NATM
'03'	MNTH	'11'	NATP	'18'	NATW
'04'	CSAH	'12'	NFD	'19'	FRNT
'05'	MSAS	'13'	IND	'20'	SGAM
'07'	CNTY	'14'	SFR	'23'	PRIV
'08'	TWNS	'15'	SPRK		

TRF.TOTAL-VOLUMES - NUM(2) - Total Volumes

01 - 30   The total number of volume fields in the record (= BLANK-VOLUMES + FULL-VOLUMES).

TRF.YEAR-OF-UPDATE - NUM(2) - Year Portion of Date of Update

0000   Record has not been updated since initial file load.
0001-9999 Most recent year in which record was updated.

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TRV - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(4)	TRV.YEAR	X	
CHAR(1)	TRV.VOLUME-TYPE	X	
CHAR(2)	TRV.GROUP	X	
NUM(6)	TRV.AADT	X	
NUM(5)	TRV.COMM-AADT	X	

TRV - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From
NUM(6)	TRV.AADT	X	
NUM(5)	TRV.COMM-AADT	X	
CHAR(2)	TRV.GROUP	X	

```
        CHAR(1)    TRV.VOLUME-TYPE              X
        CHAR(4)    TRV.YEAR                     X
```


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TRV - Descriptions of Data Elements
****

TRV.AADT - NUM(6) - Annual Average Daily Traffic

000000 - 999999 Annual average daily traffic.

TRV.COMM-AADT - NUM(5) - Heavy Commercial Annual Average Daily Traffic

00000 - 99999 Heavy commercial annual average daily traffic.

-1 Unknown

TRV.GROUP - CHAR(2) - Model Variation Group

The group the section is assigned to for the year. Used to match factors in modelling volume variation during the year.

' ' - (blanks) - group unknown or unassigned
'01' - Outstate rural - blue (farm to market)
'02' - Outstate rural - green (some recreational)
'03' - Outstate rural - red (moderate recreational)
'04' - Outstate rural - yellow (high recreational)
'05' - Outstate municipal - recreational over 5000
'06' - Outstate municipal - non-recreational over 5000
'07' - Outstate municipal - recreational under 5000
'08' - Outstate municipal - non-recreational under 5000
'09' - Metro - urban commuter
'10' - Metro - urban-suburban mix
'11' - Metro - suburban commuter
'12' - Metro - outlying commuter
'13' - Metro - outlying mix
'14' - Metro - outlying recreational
'15' - Metro - urban-suburban shopping
'16' - Metro - urban mix
'17' - Metro - suburban mix

TRV.VOLUME-TYPE - CHAR(1) - Volume Type

'A' Actual
'C' Computer-generated
'E' Estimated

TRV.YEAR - CHAR(2) - Year of Traffic

'0001' - '9999' Year of traffic volume

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TRX - Listing of Names in File Order
****

Format	Name	Stored	Generated From

Format	Name	Stored	Generated From
CHAR(2)	TRX.ROUTE-SYSTEM	X	
CHAR(9)	TRX.ROUTE-NUMBER	X	
CHAR(10)	TRX.START-REF-POINT	X	
CHAR(10)	TRX.END-REF-POINT	X	
CHAR(6)	TRX.SEQUENCE-NUMBER	X	

TRX - Listing of Names in Alphabetical Order

Format	Name	Stored	Generated From
CHAR(10)	TRX.END-REF-POINT	X	
CHAR(9)	TRX.ROUTE-NUMBER	X	
CHAR(2)	TRX.ROUTE-SYSTEM	X	
CHAR(6)	TRX.SEQUENCE-NUMBER	X	
CHAR(10)	TRX.START-REF-POINT	X	

TRX - Descriptions of Data Elements
****

TRX.END-REF-POINT - CHAR(10) - Ending Reference Point

'000+00.000' - '999+99.999' End Reference Point

TRX.ROUTE-NUMBER - CHAR(9) - Route Number

'nnnnnnxx' Route number (n = 0-9, x = 0-9 or A-Z)

Route systems '01' through '03': 00000nnn or 0000nnna (n=0-9,a=A-Z)

Route systems '05' and '10': ccccnnnx (ccc = city number, n = 0-9,
x = 0-9 or A-Z)

Other route systems: cc00nnxx (cc = county number, n = 0-9,
x = 0-9 or A-Z)

TRX.ROUTE-SYSTEM - CHAR(2) - Route System

'01'	ISTH	'09'	UTWN	'16'	MIL
'02'	USTH	'10'	MUN	'17'	NATM
'03'	MNTH	'11'	NATP	'18'	NATW
'04'	CSAH	'12'	NFD	'19'	FRNT
'05'	MSAS	'13'	IND	'20'	SGAM
'07'	CNTY	'14'	SFR	'23'	PRIV
'08'	TWNS	'15'	SPRK		

TRX.SEQUENCE-NUMBER - CHAR(6) - Sequence Number

'   1' - '999999' Sequence number assigned to this road segment.

TRX.START-REF-POINT - CHAR(10) - Starting Reference Point

'000+00.000' - '999+99.999' Start Reference Point

USG - Description of Record
****

Every time a TIS command is run, a record is added to the usage tracking file. The records are stored in order of occurrence. The file is periodically archived, and usually contains tracking records for the current month and the three prior full months. Cost data is not immediately available, but is computed at a later date (minimum of one day later, typically at the beginning of each week).

USG - Listing of Names in File Order
****

Format	Name	Stored	Generated From
CHAR(8)	USG.JOBNAME	X	
CHAR(7)	USG.USER-ID	X	
DATE	USG.DATE	X	
NUM(2)	USG.MONTH		USG.DATE
NUM(2)	USG.DAY		USG.DATE
NUM(4)	USG.YEAR		USG.DATE
NUM(8)	USG.START-TIME	X	
NUM(8)	USG.END-TIME	X	
CHAR(8)	USG.LOAD-MODULE	X	
CHAR(30)	USG.COMMAND	X	
CHAR(8)	USG.PROC-STEP	X	
NUM(1)	USG.MAX-PRT-LEVEL	X	
NUM(2)	USG.MAX-RC	X	
NUM(2)	USG.CMD-NUM	X	
NUM(2)	USG.NUM-CMDS	X	
CHAR(8)	USG.JOB-STEP	X	
NUM(7,2)	USG.COST	X	

USG - Listing of Names in Alphabetical Order
****

Format	Name	Stored	Generated From

NUM(2)	USG.CMD-NUM	X	
CHAR(30)	USG.COMMAND	X	
NUM(7,2)	USG.COST	X	
DATE	USG.DATE	X	
NUM(2)	USG.DAY		USG.DATE
NUM(8)	USG.END-TIME	X	
CHAR(8)	USG.JOB-STEP	X	
CHAR(8)	USG.JOBNAME	X	
CHAR(8)	USG.LOAD-MODULE	X	
NUM(1)	USG.MAX-PRT-LEVEL	X	
NUM(2)	USG.MAX-RC	X	
NUM(2)	USG.MONTH		USG.DATE
NUM(2)	USG.NUM-CMDS	X	
CHAR(8)	USG.PROC-STEP	X	
NUM(8)	USG.START-TIME	X	
CHAR(7)	USG.USER-ID	X	
NUM(4)	USG.YEAR		USG.DATE

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USG - Descriptions of Data Elements

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USG.CMD-NUM - NUM(2) - Command Number

01-99 Command number, assigned sequentially within each TIS job step.

USG.COMMAND - CHAR(30) - Command Name

The TIS command name.

USG.COST - NUM(7,2) - Cost of Command

00000.00	Cost unknown or not yet computed.
00000.01-99999.99	Cost of running command. This is an estimate computed from the IMB cost of the job. If the job contained multiple commands, this value is interpolated from the ratio of USG.TIME and the total elapsed time of the job.

USG.DATE - DATE - Date Run

mm/dd/yyyy Date the command was run.

USG.DAY - NUM(2) - Day of Month of Date Run

01-31 Day of month.

USG.END-TIME - NUM(8) - Time Command Finished

'hhmmssff' where: hh is hour (00-23).
mm is minute (00-59).
ss is second (00-59).
ff is hundreth of second (00-99).

USG.JOB-STEP - CHAR(8) - Job Step Name

'xxxxxxxx' where xxxxxxxx is from the //xxxxxxxx EXEC ..... in the job setup (may be blank). Usually 'RIS' or 'TIS'.

USG.JOBNAME - CHAR(8) - Jobname

'uuuuuuui' where uuuuuuu is usually the TSO user-id and i is the one-character suffix.

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USG.LOAD-MODULE - CHAR(8) - Load Module Name

'DTRInnnn' The internal name of the program (the name used in the load module library). nnnn is a number from 0001 to 9999.

USG.MAX-PRT-LEVEL - NUM(1) - Maximum Printed Message Level

Highest level of printed messages.
Non-zero levels are the value "n" in the message format:

***** A0-000-n ....

0 Normal message
1 Informatory message
2 Data edit check - warning
3 Data edit check - severe
7 Command diagnostic - warning
8 Command diagnostic - severe

9 Command diagnostic - termination

USG.MAX-RC - NUM(2) - Maximum Return Code

0 No errors detected during execution.
4 One or more messages printed with level 1-7.
8 One or more message printed with level 8-9.
12 Error occurred during linkage to begin program execution.
16 Error detected by or occurred in TIS command decoder.

The maximum return code from all commands in the job step will be found the the job step condition code.

USG.MONTH - NUM(2) - Month of Date Run

01-12 Month of date run.

USG.NUM-CMDS - NUM(2) - Number of TIS Commands in Step

01-99 Total commands in the job step (>= USG.CMD-NUM).

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USG.PROC-STEP - CHAR(8) - Procedure Name

The name of the catalogued procedure used to run TIS, comes from the JCL line:

//... EXEC procstep ......

'DTRIB   ' Most TIS commands (batch jobs with no output to TSO).
'DTRIBA ' Same as DTRIB but includes DD statements for DPS accident records files.
'DTRIC   ' Used for control-section commands.
'DTRIH   ' Used for HPMS commands.

'DTRIMIN ' Minimum JCL needed to run TIS commands.
'DTRIPGF ' Used when IBM GDDM graphics needed.
'DTRIPM ' Used for pavement management and sufficiency commands.
'DTRIRB ' Rail commands (no TSO output).
'DTRIRR ' Rail commands without roadway files.
'DTRIRT ' Rail commands with TSO output.
'DTRIT ' Most TIS commands with TSO output.
'DTRITA ' Same as DTRIT but includes DD statements for DPS accident records files.

USG.START-TIME - NUM(8) - Time Command Began

'hhmmssff' where: hh is hour (00-23).
mm is minute (00-59).
ss is second (00-59).
ff is hundreth of second (00-99).

USG.USER-ID - CHAR(7) - User ID

The TSO user-id of the person who submitted the job. Actually the first seven characters of the jobname.

USG.YEAR - NUM(4) - Year of Date Run

1984-cccc Year of date run ("cccc" is the current year).