Chapter 6

Twin Cities Travel Demand Forecast Model and Forecast Guidelines

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Twin Cities Travel Demand Forecast Model

- History
- Current Model
- Soon to be (2004 and 2005)
History of Twin Cities Travel Demand Forecast Model

• Four Generations to Date: 1964, 1974, 1986, 1994

• Each Successive Version Updated the Model and Added Upgrades

• Most Significant Upgrades
  • 1974…Expanded Model Area to 7 County Boundary
  • 1986…Enhanced Transit and HOV Features
  • 1994…Incorporated Temporal Distribution and Induced Demand
Current Twin Cities Travel Demand Forecast Model

• “Four” Step Travel Forecast Process
  • Trip Generation
  • Trip Distribution
  • Mode Choice
  • Assignment
Current Twin Cities Travel Demand Forecast Model

- Exogenous Models (Socio-Economic Forecasts)
- Trip Generation Model
- Trip Distribution Model
- Mode Choice Model
- Temporal Distribution Model
- Assignment Models
- Network Models
Trip Generation Model

- USES….Income, Household Size, Vehicle Availability, Employment Type and Number, Locations, Travel Times, and Travel Distances

- DEVELOPS….Person Trip Ends (Expressed as Productions and Attractions) For Use in Trip Distribution
Trip Distribution Model

• USES.... Person Trip Productions and Attractions From Trip Generation Model, Travel Times/Costs, and Scales of Development Activity

• DEVELOPS....Trips and an Estimate of Where They Will Start and End
Mode Choice Model

- USES… Distributed Person Trips, Travel Times/Costs, Income, Auto Ownership, and Parking Costs

- DEVELOPS… Estimates of Mode by Which Trips Will be Made
  - Single Occupant Vehicle (SOV)
  - High Occupancy Vehicle (HOV)
  - Transit
Assignment Models

• USE….Travel Times/Costs

• DEVELOPS….Assignments of SOV and HOV Vehicle Trips to Road Segments and Transit Trips to Transit Route Segments (For Each of Six Daily Time Periods… 2 AM Hours, 3 PM Hours, Remaining Hours)
Future Twin Cities Travel Demand Forecast Model

- First Quarter 2004….Updated Model Based on 2000 Travel Behavior Inventory and 2000 Census

- Later in 2004….Vehicle Assignment Peak Spreading on Congested Corridors/Links

- 2005….Model Extended to Include Adjacent Counties and Freight
Forecast Guidelines

• Forecast Models Produce Precise Assignments of Vehicles

• BUT….They May Not be Very Accurate
Forecast Guidelines

- A Review of Forecasts Used to Design the Interstate System in the Twin Cities Relative to Actual Volumes in the Forecasted Year Revealed

- Forecasts Low on About 50% of Segments
- Forecasts High on About 50% of Segments
- Forecasts Within 20% High or Low on About 50% of Segments
- Forecasts More Than 20% High or Low on About 50% of Segments
Common Sources of Errors in Travel Demand Forecasts

• Inflated or Discounted Population, Household, and or Employment Forecasts
• Misallocated Population, Household and or Employment Forecasts
• Overstated or Understated Future Built Network (Road Expansions, Frequency of Service)
• Unreasonable Peak Hour Percentages
• Unreasonable Directional Splits
Mn/DOT Metro District Travel Demand Forecast Guidelines

• Developed Working With NCITE Planning and Methods Committee
• Adopted by Metro District, November 6, 2003
• Will be Included/Referenced in Requests For Proposals and Consultant Contracts
• Required For Forecasts Prepared For the Metro District, Best Practice For Forecasts Prepared For Others
Forecast Guidelines
Implementation/Enforcement

• Focused Through Area Managers and Area Engineers
• Review of Draft Forecast and Methodology with Directions For Adjustments
• Assessment of Final Forecast....High, Low, How Much, and Why
Major Messages

• Forecast Volumes Which Are Developed Consistent With the Guidelines Have a Confidence/Error Range of Plus or Minus 15%

• Forecast Volumes Which Are Not Developed Consistent With the Guidelines May Be High or Low by Much More Than 15%
Implications for Operational Modeling/Modelers

• Model More Than One Future Scenario….Perhaps the Limits of the Confidence/Error Range

• Model One Future Scenario and Provide Professional Assessments of Likely Operational Characteristics if Forecast Values Were Higher or Lower