Field Observations for Modeling

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1.0 Overview

The purpose of the field observation is two fold, one to verify the roadway geometric and the other to document unique operational characteristics to ensure that the calibrated model accurately reflects the existing condition. The field observations should verify the roadway geometric and traffic control data for all arterial intersections and freeway segments within the modeling limits. Additionally, the modeler observes how drivers behave in the roadway system.

There are two levels of modeling that come from observations in the field:

<table>
<thead>
<tr>
<th>Geometrical Layout</th>
<th>Operational Characteristics</th>
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<td>• Physical design of the roadway system</td>
<td>• Traffic congestion locations throughout the model</td>
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<tr>
<td>• Programmed timing of intersection and meter signals</td>
<td>• Driver behavior unique to the roadway design</td>
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Technical Memo of field observations

Model correctly representing the existing roadway

1.1 Selection of days for field observation is also important to the validity of the data.
- Pick a day that is not a holiday, or the day before or after a holiday.
- Strive to do most observations Tuesday-Thursday: Mondays or Fridays do not represent typical weekday traffic since drivers may vary their schedule on these days.
- Avoid observing on a day with inclement weather; drivers will not operate the same as they would on a typical dry pavement day.
- If the project allows, do observations in the Fall. This is when few people are on vacation and drivers are in their “typical” driving pattern.
2.0 Geometric Layout Observations

2.1 Roadway Layout – The modeler should field verify that the road design plans being used to set up the model correctly show:
  - Number of lanes
  - Location and length of add, drop, and auxiliary lanes
  - Grades > 2%
  - Curves with limited stopping sight distance
  - Intersection Geometry
    - Type and number of lanes (i.e. Left, Right, Thru, shared, etc.)
    - Length of storage bays
  - Traffic control devices (yield, stop, no turn on red, exit warning, etc.) and locations to provide an initial placement of signs in the model
  - Speed limits

2.2 Traffic Control Data – The modeler should field verify the signal timing and control information along with the ramp meter operations.
  - Note traffic signal head layout (permissive left, protected/permissive left, etc.)
  - Request timing and phasing information for arterial intersections
  - Verify which ramps are in operation during AM & PM peak periods and the ramp control predominately used during this timeframe.

3.0 Operational Observations

3.1 Freeway behavior – The modeler should drive the corridor several times during both peak periods and remark on:
  - The locations of hotspots and clearly document what the operating conditions are. These locations include bottlenecks and other road operational issue locations. This can be presented using digital photos that capture the situation. When looking for hotspots, ensure they are due to geometric issues and not incidents or weather.
  - Exit and Entrance ramps with long queues. Describe how far down the ramp traffic is queued (i.e. the queue backs up ¼ the length of the ramp, the ramp queue fills the entire length of the ramp, etc.) and indicate if it is impacting the freeway or arterial system.
  - In a corridor with multiple closely spaced entrances/exits, watch to see if cars enter at and exit at the next exit, as this will affect the model’s O-D matrix.
  - Identify the end limits of congestion, as these may affect the end boundary of the model. Adjustments may need to be made to model boundaries to ensure the congestion doesn’t go beyond the model limits, unless specifically addressed in the kickoff meeting.
  - Travel speed data
    - Perform driven speed runs of the corridor to ensure that the model accurately represents the existing operating conditions.

3.2 Arterial behavior – Along with driving the freeway corridor, the arterials in the model should be driven during the peaks.
• Left and right turn bay queue lengths. Report queue backup for left and right turn bays by indicating if the queue extends back ¼, ½, ¾ or all of the bay length. If the queues backup into the through travel lanes, indicate whether or not this is causing operational problems at the signal.
• Note any cycle failures of the signalized intersections. And what percent of the queue makes it through the signal.

3.3 Driver behavior
• Document unusual or unique driver behavior due to roadway, geometric or human factor issues. Below are just some of the most common factors that may influence drive behavior:
  o Sight distance limitations
  o Low speed curves
  o Grades > 2%
  o Obstructed view due to landscape or signage objects
  o Bridges with height or width restriction
  o Substandard shoulders
  o Locations where car following distances are shorter or larger than normal
  o Reaction to lane drop or add
  o Etc.
• Observe how drivers respond to distractions
  o Scenery
  o Billboards
  o Overpass that blocks sight distance
• Observe how drivers use the roadway out of the normal.
  o Non-observance of signage (yield, no turn on red, etc.)
  o Use the shoulder as an additional lane
  o Where drivers start moving over to exit
  o Where drivers start queuing for an exit
  o Weave and merging behavior
  o Other unique driver behavior

4.0 Technical Memo
The technical memorandum, which summarizes the field observations, is a deliverable as part of the modeling process. The basic outline of sections is provided below followed by a brief overview of what should be covered under each section.

4.1 Technical Memo format
• Project Overview
• Field Observations Overview
• Freeway Observations
• Arterial Observations
4.2 Project Overview

- Provide a summary of the project that contains what type of project this is (i.e. new access, new interchange, etc.) and what roadway improvements are the basis of the model. Also, indicate the roadway improvements already funded that will be in place for the design and opening year models.

4.3 Field Observations Overview

- State what week(s) the observations were made and what they included (general observations, traffic counts, both).
- List the locations where traffic counts were made, if any, and identify from where any additional count or signal timing data was obtained.

4.4 Freeway Observations

- For AM and PM peak period, in both directions, on all of the freeways involved note what the traffic conditions are and areas where congestion is the heaviest. Digital photographs are an excellent way to quickly and easily depict a unique operational condition. Below are just a few examples of ways to capture and describe freeway congestion or unique situations:
  - Example 1: At the 5th street exit, the ramp queues into the right lane of the freeway. The long ramp queue does not affect freeway congestion because drivers on the freeway avoid the exit-only right lane.
  - Example 2: Between CSAH 5 and TH 89 consisted of heavy congestion and slow speeds (aver. 20-30mph) north of CSAH 5 with only minor congestion south of TH 89.
Example 3: The common section of TH 10/I-694 had the worst AM congestion. The primary cause was the short weaving section of I-694/TH 10 and lane drop at the Snelling Avenue exit. Most vehicles were using the left lane because of the right lane drop.

4.5 Arterial Observations

- For the arterial segments involved in the model area, describe the intersection conditions along the roadway. Some examples:
  - Example 1: The CR 19 interchange in Stacy is a diamond type interchange with a stop control at the ramp terminal intersections. Traffic queuing is minimal, and there are no significant traffic operations problems.
  - Example 2: During the AM peak period, the east approach of the west TH 95 ramp queues back 200 to 300 feet due to a high number of left turning vehicles that fill the 75 foot turning bay and spill into the through lane.
  - Example 3: The four TH 95 signals are part of a coordinated system. However, the signal timings at the Oakview Ave intersection were manually changed approximately a year ago, thus pulling the intersection out of coordination, it was given a higher cycle length than the others, and the coordinated system never gets into sync.
- Taking a picture of the queues at the signals provide an objective view of what the congestion is.