Traffic Forecasting with 2016 HCM Methods

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Traffic Forecasting with 2016 HCM

Safety Moment

Computer Safety

- Devote at least five minutes of every hour to a non-computer related task
- Stand up while on the phone
- Blink your eyes multiple times during computer breaks to avoid eyestrain
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Agenda

1. What is Traffic Forecasting?
2. Traffic Forecasting Application to 2016 HCM
3. 2016 HCM Components of Traffic Forecasting
4. Traffic Forecasting Standard Operating Procedure
5. Tools for Traffic Forecasting
6. Questions?
Traffic forecasting is the attempt to estimate the number of vehicles that will use a roadway in the future.
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Traffic Forecasting Application to 2016 Highway Capacity Manual (HCM)

Operational Analysis
- Current or Near-Term Conditions

Design Analysis
- Mid-to Long-Term Implementations

Planning and Preliminary Engineering Analysis
- Long-Range Analyses

Traffic Forecast Application Level
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2016 HCM Components of Traffic Forecasting

- Historical Count Data
  - Historical counts as far back as you are forecasting forward
- Identify growth trends
- Travel Demand Model
  - Changes in demographics and land use
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2016 HCM Components of Traffic Forecasting

- Planned Development and Land Use
2016 HCM Components of Traffic Forecasting

- Variations in Demand – Monthly, Daily, and Hourly
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2016 HCM Components of Traffic Forecasting

- Uninterrupted Flow vs. Interrupted Flow

Freeway

Urban Streets
Demand Volumes **NOT** Observed Volumes

“Observed volumes may reflect capacity constraints rather than true demand. Demand is usually the desired input to HCM analyses, although it is not always easy to determine.”

—2016 HCM, page 4-2
2016 HCM Components of Traffic Forecasting

- What will the traffic forecasts be used for?
  - Pavement Design
  - Air and Noise Analysis
  - Operational Analysis
  - Toll Analysis
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Traffic Forecasting Standard Operating Procedure

- Lessons Learned from Previous Projects
- Tools & Innovation
- Schedule
- Multi-disciplinary/practice Collaboration
- Implement Corridor Analysis SOP
- Multiple types of corridors
- Training

Implement Corridor Analysis SOP
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Traffic Forecasting Standard Operating Procedure

B. Straight Line Diagram Analysis

The two basic types of straight line analyses are three-legged and four-legged intersection movements. Both analyses require known AADTs or counts, the same data the better.

(Note: A leg represents the flow of traffic by direction associated with a line diagram, schematic and/or an intersection.)

1) Three-Legged Intersection. The basis for a three-legged intersection can be derived by first determining the known AADTs then applying the following equation:

\[ a = \frac{(A - B - C)}{2} \]

\[ b = A - a \]

\[ c = B - a \]

(Capital letters represent known AADTs, the small letters are calculated based on the AADTs)

2) Four-Legged Intersection. The following series of diagrams depict a basic formula to calculate turning movements for a typical four-legged intersection.

Diagram illustrates an example of a four legged intersection. The known AADTs are depicted in gold.

By estimating, then removing the turning movements for one of the four legs of the intersection, preferably the low leg, the project can be reduced to a three legged intersection.

In this case the east leg is lowest.

Continuing with the project exercise, see how the growth rates are applied to the SH 218 project below:

(Note that this illustration represents a working map and is usually hand written)

\[ 27,300 \times 1.10 = 30,030 \]
\[ 27,300 \times 1.15 = 31,345 \]
\[ 27,300 \times 1.20 = 32,760 \]
\[ 27,300 \times 1.25 = 34,175 \]
\[ 27,300 \times 1.30 = 35,590 \]

* The estimated 2018 count is 29,300 or 30,300 rounded; however, when balancing the count is calculated to be 29,300. This is an example of a count that although accurately rounded, will need to be lowered to 29,300 in order to traffic to balance. Note the other instances where it was deemed better to lower the turning movements in order to achieve balancing. Apply professional judgement to determine which counts should be altered in order to achieve balancing.

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Traffic Forecasting Standard Operating Procedure
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Tools for Traffic Forecasting

**List of Tools**

- GIS
- Sharepoint with Excel
- Diversion and Adjustments
- Line Diagram Layout and Set-up

![Diagram showing tools for traffic forecasting](image-url)
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- Standard GIS
  - TxDOT Statewide Planning Map
  - Show type of TxDOT counts used from Database Management Systems
  - Project Location or Limits Line
  - Count Locations
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SharePoint Excel

- MS Teams collaboration suite
  - Integrates with SharePoint, OneNote, Skype for Business
- Access to Excel Online

<table>
<thead>
<tr>
<th>Normalized Volume Year</th>
<th>Year</th>
<th>Growth Rate %</th>
<th>Growth Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>2017</td>
<td>2.7%</td>
<td>1.05</td>
</tr>
<tr>
<td>Forecast</td>
<td>2025</td>
<td>2.7%</td>
<td>1.28</td>
</tr>
<tr>
<td>Forecast</td>
<td>2045</td>
<td>2.0%</td>
<td>1.79</td>
</tr>
</tbody>
</table>
“The accuracy of the performance evaluation may be adversely affected if volumes are not balanced.”

-2016 HCM, Page 18-25
Excel Method

- Flexible
- Minimizes calculation errors
- Enhances efficiency by linking to other sheets
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Line Diagrams

Straight Line Analysis

Complete Corridor Analysis
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CAD Import
Questions?

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Thank You!