Highway Information Seminar
October 31, 2018

New FHWA AADT Method
TRB Paper: 16-2477 (also part of TRR)

FHWA Technical Leader:
Steven Jessberger
Office of Highway Policy Information
Travel Monitoring and Surveys Sections
Problem of Accurate AADT

• True AADT is the simple average of traffic covering every day of a year.
• Data is often collected in other than daily increments.
• Data is often missing due to daylight savings time (DST), weather, construction, site calibration, site maintenance, equipment issues and processing methods.
• When data is missing how can we best mitigate these issues?
How we can handle missing data?

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<td>573</td>
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New FHWA AADT Method

\[ M_{FHWAM} = \frac{\sum_{j=1}^{7} w_{jm} \left[ \frac{1}{n_{hjm}} \sum_{i=1}^{n_{hjm}} V_{OLihjm} \right]}{\sum_{j=1}^{7} w_{jm}} \]

\[ AADT_{FHW} = \frac{\sum_{m=1}^{12} d_{m} \cdot M_{ADTHPm}}{\sum_{m=1}^{12} d_{m}} \]

Where:
- \( V_{OLihjm} \) = total traffic volume for \( i \)th occurrence of the \( h \)th hour of day within \( j \)th day of week during the \( m \)th month
- \( i \) = occurrence of a particular hour of day within a particular day of the week in a particular month (\( i = 1, ..., n_{hjm} \)) for which traffic volume is available
- \( h \) = hour of the day (\( h = 1, 2, ..., 24 \)) or smaller time increment
- \( j \) = day of the week (\( j = 1, 2, ..., 7 \))
- \( m \) = month (\( m = 1, ..., 12 \))
- \( n_{hjm} \) = the number of times the \( h \)th hour of day within the \( j \)th day of week during the \( m \)th month has available traffic volume (\( n_{hjm} \) ranges from 1 to 5 depending on hour of day, day of week, month, and data availability)
- \( W_{jm} \) = the weighting for the number of times the \( j \)th day of week occurs during the \( m \)th month (either 4 of 5); the sum of the weights in the denominator is the number of calendar days in the month (i.e., 28, 29, 30, or 31)
- \( d_{m} \) = the weighting for the number of days (i.e., 28, 29, 30, or 31) for the \( m \)th month in the particular year

TRB Paper Number: 16-2477
How was this new method tested?

- Pooled Fund ran from April 2014 - February 2016
- 14 years of data from FHWA Travel Monitoring Analysis System (TMAS)
- 48 million volume records
- 4 AADT volume ranges <1k, 1K-<10k, 10k-<100k and ≥ 100k
- 12 current functional classification of roadways
- 43 states and DC
- Over 6,000 site year combinations had complete data (365 days per year) for consideration in the analysis
- Publication Number for the report:
Limitations/Disadvantage/Advantages

• Limitations
  • Requires at least 1 time increment for each time increment of day of week in each month of the year.
  • Disadvantage – MADT not as consistent from year to year as the currently used AASHTO method.

• Advantages
  • More accurately provides AADT estimates when data are missing and provides better estimates than the other 3 methods analyzed.
  • Allows for partial day data to be utilized.
  • Removes the known bias in the AASHTO method.
  • Provides for any time increment of data for AADT estimates: 1 min, 5 min, 15 minute, hourly ... (any time increment)
  • Allows for ITS and other non-traditional sources of data for seamless AADT estimates provided every time increment is present for every day of the week for a given month.
## 4 Method Comparison

<table>
<thead>
<tr>
<th>Days Excluded</th>
<th>Method 1 – Simple Average</th>
<th>Method 2 - AASHTO</th>
<th>Method 3 – AASHTO Adjusted</th>
<th>Method 4 – FHWA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median Percent Bias</td>
<td>% Increase on Method 2</td>
<td>Median Percent Bias</td>
<td>95% CI on % Bias</td>
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<tr>
<td>1/month</td>
<td>0.00</td>
<td>3.07</td>
<td>-0.05 (-0.42, 0.25)</td>
<td>0.00</td>
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<tr>
<td>3/month</td>
<td>0.00</td>
<td>25.54</td>
<td>-0.05 (-0.57, 0.42)</td>
<td>0.00</td>
</tr>
<tr>
<td>7/month</td>
<td>0.00</td>
<td>27.44</td>
<td>-0.04 (-0.86, 0.68)</td>
<td>0.00</td>
</tr>
<tr>
<td>14/month</td>
<td>0.02</td>
<td>22.79</td>
<td>-0.04 (-1.38, 1.17)</td>
<td>0.00</td>
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<tr>
<td>All But 7 per month</td>
<td>-0.03</td>
<td>0.00</td>
<td>-0.03 (-2.24, 1.99)</td>
<td>0.00</td>
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<tr>
<td>30 days per year</td>
<td>-0.11</td>
<td>86.75</td>
<td>-0.08 (-1.30, 1.06)</td>
<td>-0.02</td>
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</tbody>
</table>
National Bias of AADT Methods

Median and 95% Range from True AADT (%)

Method
- Simple Average
- AASHTO
- AASHTO with Adjustment
- FHWA Method

Missing Days per Month||Year
- 1
- 3
- 7
- 14
- All but 7
- 30
Uses of the new AADT Method

- Annualization from permanent counters
- ITS Data – any time increment
- Other sources such as “your speed is” signs
- MPO’s
- Cities and towns
- Corridor and signalized intersection loop counts – any time increment

The 2016 TMG recommends this new formula but it is not required
Any questions?

Steven Jessberger
1200 New Jersey Ave. SE
Washington DC 20590
202-366-5052
steven.jessberger@dot.gov

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