

# 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?

Day	DOW	Hr 0	Hr 1	Hr 2	Hr 3	Hr 4	Hr 5	Hr 6	Hr 7	Hr 8	Hr 9
1	Tue	78	35	37	70	180	512	599	620	624	641
2	Wed	56	38	33	71	165	428	562	582	658	664
3	Thu	50	39	30	63	174	483	596	629	644	596
4	Fri	22	24	15	56	147	415	431	537	666	624
5	Sat	136	78	47	63	98	208	303	451	641	770
6	Sun	89	48	34	25	29	34	81	168	226	307
7	Mon	65	39	25	56	188	495	615	614	622	642
8	Tue	56	32	26	70	167	535	584	Maintenance		595
9	Wed	16	12	15	46	142	419	444	404	392	334
10	Thu	57	31	22	61	165	485	593	624	644	586
11	Fri	16	21	16	60	150	398	422	383	374	391
12	Sat	118	67	56	68	107	201	301	446	611	669
13	Sun	92	39	DST	30	18	41	81	118	195	243
14	Mon	42	26	16	20	17	65	158	195	218	216
15	Tue	39	37	30	65	159	514	597	608	629	660
16	Wed	76	31	36	61	182	496	563	573	620	684



# New FHWA AADT Method

$$\bullet \text{ } MADT_{FHWA_m} = \frac{\sum_{j=1}^7 w_{jm} \sum_{h=1}^{24} \left[ \frac{1}{n_{hjm}} \sum_{i=1}^{n_{hjm}} VOL_{ihjm} \right]}{\sum_{j=1}^7 w_{jm}}$$

$$\bullet \text{ } AADT_{FHWA} = \frac{\sum_{m=1}^{12} d_m * MADT_{HP_m}}{\sum_{m=1}^{12} d_m}$$

- Where:
- $VOL_{ihjm}$  = 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 ( $i=1, \dots, n_{hjm}$ ) for which traffic volume is available
- $h$  = hour of the day ( $h=1, 2, \dots, 24$ ) **or smaller time increment**
- $j$  = day of the week ( $j=1, 2, \dots, 7$ )
- $m$  = month ( $m=1, \dots, 12$ )
- $N_{hjm}$  = 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 or 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  $\geq 100k$
- 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

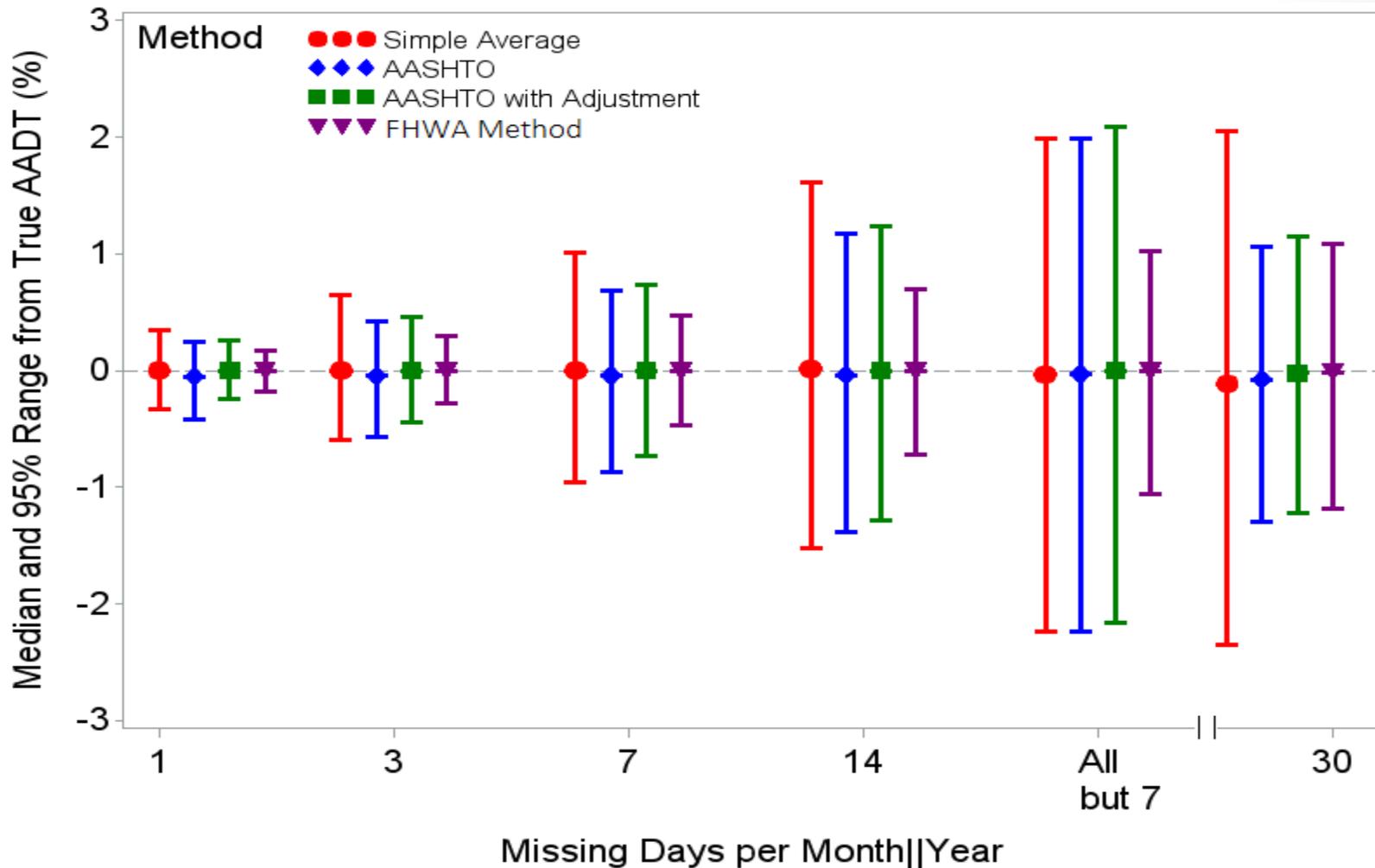


# 4 Method Comparison

Days Excluded	Method 1 – Simple Average		Method 2 - AASHTO		Method 3 – AASHTO Adjusted		Method 4 – FHWA	
	Median Percent Bias	% Increase on Method 2 % Bias CI	Median Percent Bias	95% CI on % Bias	Median Percent Bias	% Increase on Method 2 % Bias CI	<b>Median Percent Bias</b>	<b>% Increase on Method 2 % Bias CI</b>
1/month	0.00	3.07	-0.05	(-0.42, 0.25)	0.00	-23.86	0.00	-46.84
3/month	0.00	25.54	-0.05	(-0.57, 0.42)	0.00	-8.81	0.00	-41.65
7/month	0.00	27.44	-0.04	(-0.86, 0.68)	0.00	-5.10	0.00	-39.16
14/month	0.02	22.79	-0.04	(-1.38, 1.17)	0.00	-1.07	0.00	-44.64
All But 7 per month	-0.03	0.00	-0.03	(-2.24, 1.99)	0.00	0.74	0.00	-50.78
30 days per year	-0.11	86.75	-0.08	(-1.30, 1.06)	-0.02	1.03	-0.01	-3.41



# National Bias of AADT Methods



# 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](mailto:steven.jessberger@dot.gov)

TRB Paper: 16-2477 (also part of TRR)

