The Office of Highway Policy Information

Highway Information Seminar
September 2018
Office Organizational Chart

FHWA Office of Highway Policy Information
David Winter, PE

Motor Fuel and Highway Finance
Emiliano Lopez
Mike Dougherty
Clarissa Smith
Brian Lomax
Dawn Edwards
Helen Davidson
Vacant
Vacant

Highway System Performance
Chris Allen
Rob Rozycki
Tom Roff
Ron Erickson
Ronald Vaughn, PMP
Justin Clarke, AICP
Vacant
Seemeen Hashem\textsuperscript{1}

Travel Monitoring and Surveys
Dr. Tianjia Tang, PE
Steven Jessberger
Danny Jenkins, PE
Dr. Patrick Zhang, PE
Vacant
Vacant
Apara Banerjee\textsuperscript{1}

\textsuperscript{1} – Indicates contractor
Our Mission

1) To serve as the national source of surface transportation data.

2) Provide the U.S. DOT, Congress, and transportation community with accurate information products in a timely manner.

3) To inform the development and implementation of, and serve as the foundation for decisions, policies, legislation, programs, and performance goals.

4) Constantly strive to improve the quality, efficiency, and effectiveness of highway data collection and analysis on travelers and the physical, operational and financial condition of our transportation system.
Our Data Programs

• National Performance Management Research Data System
• Highway Performance Monitoring System
• National Household Travel Survey
• Certified Public Road Mileage
• Motor Vehicle Registration
• Heavy Vehicle Use Tax
• Traffic Monitoring
• Weigh-in-Motion
• Highway Finance
• Licensed Drivers
• Recovery Act
• Toll Facilities
• Tax Evasion
• Motor Fuel
Our Data Systems

• Fuels and Financial Analysis System-Highways (Fuels and FASH)
• Integrated Transportation Information System (ITIP)
• Highway Performance Monitoring System (HPMS)
• Travel Monitoring and Analysis System (TMAS)
• Vehicle Travel Information System (VTRIS)
• National Household Travel Survey (NHTS)
• Policy Information Data Portal (PIDP)
• Recovery Act Data System (RADS)
Key FHWA Business Uses

• Apportionment of Federal-aid Funds
• Performance Measurement
• FHWA Reports
• Development of new programs and initiatives
• Wide variety of information products
Apportionment

• Process for Distributing Highway Trust Fund (HTF) dollars to States
• Legislated by formula
• Driven by data submitted by State data providers, specifically:
  • Lane-miles
  • Annual VMT
  • Highway Trust Fund contributions
Performance Measures

- FHWA program offices are the “goal champions” responsible for determining performance measures
- OHPI role is to help determine availability, quality, and suitability of existing data for use
- For some measures OHPI analyzes the data
- Want to avoid multiple data collections of same data
- Our emphasis is “collect once, use often”
Agency Performance Measures

- Highway-Related Fatalities per 100 Million VMT
- Highway-Related Injuries per 100 Million VMT
- % of VMT on NHS with IRI ≤ 170
- % of STRAHNET Miles with IRI ≤ 170
- Annual Hours of Delay
- Congested Travel
FHWA Reports

- To Congress
- To U.S. DOT
- Office publications
- Monthly trend reports
- Special reports, briefs, and analysis
Reports to Congress

Conditions & Performance Report

• Extent of System
• Roadway Condition
• System Performance
• Funding Sources
  • Federal, State, Local, Other
• Expenditures by:
  • Improvement Type & Funding Source
Office Publications

Summary of Travel Trends
2017 National Household Travel Survey

Uses of Our Data
MONTHLY MOTOR FUEL REPORTED BY STATES

FEBRUARY 2018

NATIONAL GASOLINE SALES
JANUARY - FEBRUARY
2017 vs. 2018

CHANGE FOR U.S. 0.9%

TRAFFIC VOLUME TRENDS

August 2018

Travel on all roads and streets traveled by 3, 238 (12.9 million vehicle miles traveled) in August 2016 compared with
3,230 (12.5 million vehicle miles traveled) in August 2017. This in the month is estimated to be
3,230 (12.5 million vehicle miles traveled). The seasonally adjusted vehicle miles traveled for August 2018 is
24.2 billion miles, 1.6 billion miles traveled 1.6 billion miles higher than August 2017 of 22.6 billion (12.3 billion
vehicle miles traveled) compared with July 2018.

Cumulative Travel for all trips counted 26.3 billion (46.2
day vehicle miles traveled). The cumulative estimate for the year
is 26.3 billion vehicle miles traveled.
Traffic Volume Trends (TVT) Report
TVT Report

• Routinely covers over 6,500 counting sites around the US.
• Thanks to more states reporting on time and states continuing to add locations.
• Over 2,800 people that have subscribed to the TVT page in GovDelivery.
• All subscribers automatically get an e-mail once a new report has been posted.
• In August 2018
  • 2\textsuperscript{nd} highest number of hits (over 52,700)
  • 7\textsuperscript{th} highest number of visitors (over 6,300)
  Of all FHWA web pages, not including FHWA home page.
• 2016 Highway Statistics 62\textsuperscript{nd} w/ 1,840 visitors and 1,400 hits
Focus on Data...

- **Data Quality**
- Open Data
  - [https://data.transportation.gov/](https://data.transportation.gov/)
  - Data Dictionary
  - Data Visualizations
- National initiatives
  - Performance Measures
  - Safety Data
  - Data Quality
  - Data Integration
- National Data Groups
  - Federal Geographic Data Committee
  - DOT Open Data Working Group
  - AASHTO/SCOP Data Subcommittee
  - TRB Data Section
- FHWA Data Governance: [https://www.fhwa.dot.gov/datagov/](https://www.fhwa.dot.gov/datagov/)

National Perspective
Characteristics of Quality Data

- Accurate
- Timely
- Complete
- Meets expectations
- Consistent across States
Why is Timeliness Important?

- Data users require timely data
- Earlier is better
- Commitments to release data and data products:
  - August 15
    - Driver License tables
    - Motor Fuel data (MF-21)
    - Travel data (VM-3)
    - HPMS GIS files
  - October 1
    - ARNOLD network for FMIS
    - Travel data for Safety and NHTSA
    - Remaining tables
How do we improve data quality?

- Provide reporting guidance
  - Guide to Reporting Highway Statistics
  - Traffic Monitoring Guide
  - HPMS Field Manual
  - Federal Register
  - Notice of Proposed Rule Making
- Provide training and technical support
  - Onsite
  - Regional workshops
  - Remote
  - NHI Courses
- National Data QA Team
- New tools and resources
Data Quality - HPMS Pavement Report Cards

<table>
<thead>
<tr>
<th>FIPS CODE</th>
<th>STATE</th>
<th>DFS</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**HPMS DATA QUANTITY - PAVEMENT**

- **HM-60 TOTAL INTERSTATE LANE MILES**: 2192.382
- **TOTAL INTERSTATE LANE MILES BASED ON EXPANDED SAMPLES MISSING CRACKING PERCENT DATA**: 2176.374
- **TOTAL INTERSTATE LANE MILES BASED ON EXPANDED SAMPLES MISSING FAULTING DATA**: 0.000
- **TOTAL INTERSTATE LANE MILES BASED ON EXPANDED SAMPLES MISSING IRI DATA**: 0.000
- **TOTAL INTERSTATE LANE MILES BASED ON FULL EXTENT MISSING IRI DATA**: 0.442
- **TOTAL INTERSTATE LANE MILES BASED ON EXPANDED SAMPLES MISSING RUTTING DATA**: 27.892
- **TOTAL INTERSTATE LANE MILES BASED ON EXPANDED SAMPLES WHERE SURFACE TYPE IS NOT PROPERLY CODED. A CODING OF 1 FOR UNSURFACED OR BLANK IS NOT ACCEPTABLE ON THE INTERSTATE.**: 0.000
- **TOTAL INTERSTATE LANE MILES WHERE THROUGH LANES IS CODED AS A 1, 2, OR 3. ALTHOUGH THIS IS POSSIBLE AT INTERSTATE TERMINAL SECTION OR SOME INTERCHANGES THESE SECTIONS SHOULD BE VERIFIED.**: 0.000

**Cumulative Distribution of Interstate IRI**

**Cumulative Distribution of Interstate Rutting**
Data Quality - HPMS Scorecard

### Focus Areas

<table>
<thead>
<tr>
<th>Focus Area</th>
<th>Score</th>
<th>Key Data Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timeliness</td>
<td>10/10</td>
<td>PSR, Rutting, Surface Type</td>
</tr>
<tr>
<td>Completeness</td>
<td>14.7/20</td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td>12.2/20</td>
<td></td>
</tr>
</tbody>
</table>

The Score is the sum of points received from timeliness, completeness, and quality.

**Data Summary**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Data Items</th>
<th>Number of Routes</th>
<th>Pct. Unmatched Routes</th>
<th>Number of Sections</th>
<th>Pct. Unmatched Sections</th>
<th>Total Center Line Miles</th>
<th>Total Lane Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>77,000</td>
<td>2,664,000</td>
<td>1.81</td>
<td>3,669,000</td>
<td>2.21</td>
<td>13,432.18</td>
<td>17,283.02</td>
</tr>
<tr>
<td>2015</td>
<td>77,000</td>
<td>2,673,000</td>
<td>2.51</td>
<td>3,724,000</td>
<td>2.51</td>
<td>13,308.24</td>
<td>17,961.21</td>
</tr>
</tbody>
</table>

Key to data item status and completeness:
- Submitted and Complete
- Submitted and Incomplete
- Not Submitted

Key to data quality:
- High
- Medium
- Low
Data Quality - HPMS Scorecard
Data Quality - HPMS Scorecard

Total score

Score

Number of states

Number of states: 48
Data Quality - HPMS Scorecard

Focus Areas
Data Quality - HPMS Scorecard

Focus Areas
I-80 (WY-NE-IA)

- IRI
- % Trucks
- AADT
- Combo.
- Single
- Lanes
I-25 (NM-CO-WY)

- IRI
- % Trucks
- AADT
- Combo.
- Single
- Lanes
I-95(CT-RI-MA-NH-ME)

- IRI
- % Trucks
- AADT
- Combo.
- Single
- Lanes
Open Data

- Access to:
  - Data systems
  - Documentation
  - Visualizations/Analysis
  - Resources

- Coming soon:
  - Online FHWA Data Dictionary
  - Select data
  - Data visualizations
## Data Dictionary

### Focus Areas

### Highway Data Element Dictionary

This is a list of data elements and their attributes that are used by data assets at the Federal Highway Administration.

<table>
<thead>
<tr>
<th>Data Element</th>
<th>Preferred Name</th>
<th>Subject</th>
<th>Description</th>
<th>Data Type</th>
<th>Max Value</th>
<th>Precision</th>
<th>Pattern</th>
<th>Unit of</th>
<th>Value</th>
<th>Business</th>
<th>Data Asset</th>
<th>Data Asset Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Gram Lc</td>
<td>LOAD_100_Lc</td>
<td>Shear rate with...</td>
<td>Decimal</td>
<td>4</td>
<td>3</td>
<td>1/5</td>
<td>0.001 - 0.1</td>
<td>HRDI</td>
<td>LTPP</td>
<td>Long-Terr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 Gram Lc</td>
<td>LOAD_100_Vl</td>
<td>Viscosity of...</td>
<td>Decimal</td>
<td>7</td>
<td>3</td>
<td>Megapoise</td>
<td>0.9999</td>
<td>HRDI</td>
<td>LTPP</td>
<td>Long-Terr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000 Gram Lc</td>
<td>LOAD_1000_Lc</td>
<td>Shear rate with...</td>
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<td>3</td>
<td>1/5</td>
<td>0.001 - 0.1</td>
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<td>LTPP</td>
<td>Long-Terr</td>
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<td>LOAD_1000_Vl</td>
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<td>3</td>
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<td>0.9999</td>
<td>HRDI</td>
<td>LTPP</td>
<td>Long-Terr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10000 Gram Lc</td>
<td>LOAD_10000_Lc</td>
<td>Shear rate with...</td>
<td>Decimal</td>
<td>4</td>
<td>3</td>
<td>1/5</td>
<td>0.001 - 0.1</td>
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<td>LOAD_10000_Vl</td>
<td>Viscosity of...</td>
<td>Decimal</td>
<td>7</td>
<td>3</td>
<td>Megapoise</td>
<td>0.9999</td>
<td>HRDI</td>
<td>LTPP</td>
<td>Long-Terr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>102 Expenditi</td>
<td>EXPEND_102</td>
<td>Rights of Way</td>
<td>Money</td>
<td>15</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014 HPMS A...</td>
<td>HPMS14_CRA</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>2014 HPMS A...</td>
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</tbody>
</table>
Online Data

Focus Areas
Major Initiatives

- National Household Travel Survey (NHTS)
- HPMS Reassessment
- Highway Finance Reassessment
- Performance Management (TPM)
- Safety Data Initiative (SDI)
- NPMRDS
- Special Tabulations
  - VMT Forecasts
  - Transportation Analysis Framework
  - TMAS Data
  - Performance Network
- Integrated Transportation Information System (ITIP)
- Policy Information Data Portal (PIDP)
- Data Visualization Center (DVC)
- Factoids
- Knowledge Center
Observed Speed – National Average on Rural and Urban Interstate System

<table>
<thead>
<tr>
<th>Speed (mph)</th>
<th>Rural Posted Speed Limit</th>
<th>Rural Observed Speed</th>
<th>Urban Posted Speed Limit</th>
<th>Urban Observed Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>69.6</td>
<td>60.3</td>
<td>63.4</td>
<td>53.8</td>
<td></td>
</tr>
</tbody>
</table>
Observed Speed by Hour of the Day

Focus Areas

Speed (mph)

12 am  1 am  2 am  3 am  4 am  5 am  6 am  7 am  8 am  9 am  10 am  11 am  12 pm  1 pm  2 pm  3 pm  4 pm  5 pm  6 pm  7 pm  8 pm  9 pm  10 pm  11 pm

Urban, Weekday  Urban, Weekend  Rural, Weekday  Rural, Weekend
Observed Peak Hour Speed by Month

- Rural, AM Peak Hour
- Rural, PM Peak Hour
- Urban, AM Peak Hour
- Urban, PM Peak Hour
Annual Average Speed on Interstate during PM Peak Hour 5:00 pm – 6:00 pm

Annual Average Speed on Interstate during PM Peak Hour 5:00-6:00 PM (Virginia)

<table>
<thead>
<tr>
<th>Speed</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 35 mph</td>
<td>Red</td>
</tr>
<tr>
<td>35-50</td>
<td>Orange</td>
</tr>
<tr>
<td>50-60</td>
<td>Yellow</td>
</tr>
<tr>
<td>&gt;60</td>
<td>Green</td>
</tr>
</tbody>
</table>
Percent of Interstate Miles within Various Speed Bins

Urban Interstate in PM Peak Hour

- S ≤ 15 mph
- 15 < S ≤ 35
- 35 < S ≤ 45
- 45 < S ≤ 50
- 50 < S ≤ 55
- S > 55
VMT Forecasts

- Updated earlier this year
  http://www.fhwa.dot.gov/policyinformation/tables/vmt/vmt_forecast_sum.cfm

<table>
<thead>
<tr>
<th>Vehicle Class</th>
<th>Compound Annual Growth Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low Economic Growth Outcome*</td>
</tr>
<tr>
<td></td>
<td>Baseline Economic Growth Outcome*</td>
</tr>
<tr>
<td></td>
<td>High Economic Growth Outcome*</td>
</tr>
<tr>
<td>2016 - 2036 (20 Year)</td>
<td>2016 - 2046 (30 Year)</td>
</tr>
<tr>
<td>Light-Duty Vehicles</td>
<td>0.9%</td>
</tr>
<tr>
<td>Single-Unit Trucks</td>
<td>1.4%</td>
</tr>
<tr>
<td>Combination Trucks</td>
<td>1.2%</td>
</tr>
<tr>
<td>Total</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

Table 1. Projected Growth in Vehicle Miles Traveled (VMT): Spring 2018
Long Distance Travel

http://www.fhwa.dot.gov/policyinformation/analysisframework/

Website includes:
- Traffic Analysis Framework – Final Report
- 2008 and 2040 Trip Tables for:
  - Bus
  - Rail
  - Air
  - Auto (business)
  - Auto (non-business)
- Trips greater than 100 miles
- County (or equivalent) to county level
Data Integration

- Most FHWA data systems are moving to the MS Azure cloud
- Including the FHWA data warehouse (ITIP)
- Expanding integration with other FHWA and US DOT data systems
- SQL Server based, includes:
  - Informatica
  - 1Spatial
  - ArcGIS
  - Alteryx
  - Power BI
  - Tableau
  - R
  - SQL
- Forthcoming web portal for accessing, analyzing, and visualizing data
- Possibly use Socrata to make data available through data.transportation.gov website
Safety Data Initiative

- Solving for Safety Data Visualization Challenge
- Rural Speed Pilot Project
- Waze Data Pilot
- FARS Visualization
- SDI Social Media Factoids
- Rural Non-Occupants Pilot

Focus Areas
Data Visualization Center (DVC)

Top U.S. Interstates By Length and Travel

**DISTANCE CONTEXT:**
- If you traced all the interstate lane miles along the equator, the distance would almost circle the Earth nine times.

**TRAFFIC CONTEXT:**
- To travel the total annual vehicle miles traveled, one person would need to travel to the moon and back 3,608 times.

TOTAL INTERSTATE MILES 41,432
TOTAL ANNUAL INTERSTATE TRAVEL 728 BILLION VEHICLE MILES

SAFER PEOPLE, SAFER STREETS
US DOT Pedestrian and Bicycle Safety Initiative

The DOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems. Transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes.

**Fatalities at intersections vs non-intersections**
A large percentage of pedestrian and bicycle fatalities occur in mid-block locations.

**Case Study: Implementing a Road Diet To Improve Safety for Everyone, Including Pedestrians and Bicyclists**
After implementing a road diet that added a turn lane and bike lanes on Lawyers Road in Fairfax County, the Virginia Department of Transportation documented a 69% reduction in overall crashes.

**Fatalities in rural vs urban areas**
The majority of pedestrian and bicyclist fatalities occur in urban areas.
Factoids

**Watch Out for Wildlife**

While animal-vehicle collisions account for less than 1 percent of all highway fatalities, 189 people lost their lives in 2016 when a vehicle struck a live animal. Please be alert when driving at dawn or dusk, when many animals are active, and when driving near wooded areas.

**Fatalities in Collisions Involving Live Animals**

- 2017: 211, 210, 214, 196, 186, 179, 190, 192, 189, 189
- 2016: 223
- 2015: 210
- 2014: 194
- 2013: 213
- 2012: 199
- 2011: 176
- 2010: 192
- 2009: 166
- 2008: 199
- 2007: 189

**Battle of Interstate Titans**

Which interstate is bigger: West Coast’s I-5 or East Coast’s I-95?

- I-5: 1,906 miles
- I-95: 1,300 miles

**Cities over 1 Million**

- I-5: 5
- I-95: 7

**Vehicle Fuel Economy Slowly Improving**

Data from the Federal Highway Administration for the past 20 years shows that vehicle miles per gallon is nearing a high of 18 miles per gallon. Passenger car economy is leading the increase - 2016 data shows that passenger car fuel economy is nearing 24 miles per gallon.

**America’s National TurkeyPike 2017**

This month, two turkeys traveled from Minnesota to the White House for a Presidential pardon. Their journey, lasting more than 18 hours and covering roughly 1,230 miles to the Nation’s capital, included all sorts of public roads – from county roads and city streets, to state and U.S. highways, and seven interstates.

**Holiday Season Means Faster Commutes**

Data collected for FHWA during last year’s holiday season indicates that travelers on urban interstates could dash home as much as 7 miles per hour faster on work day afternoons between Christmas and New Year’s Day.

**Vehicle Fuel Economy Slowly Improving**

- 1981: 21.50 mpg
- 1991: 17.95 mpg
- 2016: 23.96 mpg

https://www.flickr.com/photos/fhwa/albums/72157649163936650
Knowledge Center

http://www.fhwa.dot.gov/policyinformation/knowledgecenter/

- Staff created reference and training videos
  - Motor Fuel Reporting (1)
  - Vehicle Registrations (3)
  - Highway Travel (6)
  - Heavy Vehicle Use Tax (1)

- Coming Soon
  - Highway Finance
  - Driver Registration
  - HPMS
  - Talking Traffic
Office Website

http://www.fhwa.dot.gov/policyinformation/
Thank You!