HPMS Field Manual & Software Updates

FHWA Highway Information Seminar
Arlington, VA
November 16, 2017
HPMS References & Resources
Field Manual
Summary of Updates

• General Discussions
• Data Items
  • Descriptions
  • Reporting Requirements
  • Coding Guidance
• References
  • Tables
  • Figures
HPMS 2010+
Field Manual Releases

• February & September 2010
• March 2012
• March 2013
• March 2014
• March 2015 (Addendum Only)
• April 2016 (Addendum Only)
• December 2016
HPMS Field Manual 2016

- Addresses updated data requirements needed to support the Pavement & Bridge Performance Measures (PM2) Final Rule
- Provides additional clarification on existing data collection and reporting guidance
HPMS Submission Timeline (Revised)

**Data Collection, Aggregation, and Quality Review**

- District Office #1
- District Office #2
- District Office #N
- MPOs
- Local Governments

**State Central Office**

- HPMS Data Dist #1
- HPMS Data Dist #2
- HPMS Data Dist #N
- HPMS Data MPOs
- HPMS Data Local Govts

**Year 1**

- Jan. 1, Year 2: Traffic Database
- April 15, Year 2: Pavement Database
- June 1, Year 2: Spatial Component
- June 15, Year 2: Road Inventory

**Year 2**

- Jan. 1, Year 2: Submittal to FHWA
- April 15, Year 2: Interstate Pavement and Related Data
- June 1, Year 2: Certified Public Road Mileage
- June 15, Year 2: Non-Interstate Pavement, Non-Pavement, Sample and Summary Data
- Data Distribution and Reporting

**Certified Public Road Mileage**

- FHWA Review and Certification

**Travel Time Metric Data**

**National Highway Datasets**

- Highway Statistics
- Conditions and Performance Report

**Performance Assessment**

- 1 Beginning April 15, 2019
- 2 Beginning June 15, 2021 (Non-IS NHS Pavement)
- 3 Beginning June 15, 2018
Revised ‘Metadata Type’, ‘Description’, and ‘Value Numeric’ information in Table 3.19

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Value Numeric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class_Pct_Actual</td>
<td>Percent of class AADTs (i.e., Single-unit Truck &amp; Bus, and Combination Truck AADT) reported that are based on actual counts for the reported data year</td>
<td>Enter value to the nearest whole percent.</td>
</tr>
<tr>
<td>Class_24</td>
<td>Number of permanent and portable classification count locations that were counted for a duration of 24 hours or more</td>
<td>Integer.</td>
</tr>
<tr>
<td>IRI_Equip_Type</td>
<td>Type of equipment used predominately for measuring the International Roughness Index (IRI)</td>
<td>Code</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Rutting_Interval</td>
<td>For manual rutting method: sampling interval. (Ref: AASHTO Designation R48-10(2013); 7.1.6) or For automatic rutting method: report interval—the travel distance between the reported data. (Ref: AASHTO Designation PP70-14 (2016); 4.2)</td>
<td>Report interval to the nearest foot.</td>
</tr>
<tr>
<td>Faulting_Interval</td>
<td>Sampling interval. (Ref: AASHTO Designation R36-13; 5.2.5)</td>
<td>Report interval to the nearest 0.1 inch.</td>
</tr>
</tbody>
</table>
Edits: Chapter 3 (cont’d)

• Revised ‘Metadata Type’, ‘Description’, and ‘Value Numeric’ information in Table 3.19

<table>
<thead>
<tr>
<th>METADATA TYPES AND VALUE NUMERIC SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Travel_Source</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

*Removed Cracking Length Equipment metadata item*
Edits: Chapter 4

- The following data items are required to be reported for rural minor collector and local roads:
  - Functional System
  - Facility Type
  - Ownership
Edits: Chapter 4

- The following data items are **required** to be reported for both directions of travel on divided highway sections
  - *Functional System*
  - *Facility Type*
  - *Ownership*
  - *NHS*
Edits: Chapter 4 (cont’d)

• Modified reporting extent requirements for *Speed Limit* data item
  
  • Required to be reported on a Full Extent (FE) basis for NHS roadways
  
  • Baseline data will be provided by FHWA; State will be required to validate and/or update this data annually

<table>
<thead>
<tr>
<th>Functional System</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHS Int OFE OPA MiA MaC MiC Local</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural FE FE</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td></td>
<td>SP</td>
<td>SP</td>
<td></td>
</tr>
<tr>
<td>Urban FE Fe</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td></td>
<td>SP</td>
<td>SP</td>
<td></td>
</tr>
</tbody>
</table>

FE = Full Extent  SP = Sample Panel Sections
Edits: Chapter 4 (cont’d)

• Revised guidance for intersection-based data items (*No. of Signalized*, *No. of Stop Sign-Controlled*, and *No. of At-grade Other Intersections*)
  
  • Intersection counting approach is to be applied to all 3 data items
  
  • Intersections where non stop sign or multi-phase signals traffic control devices are present must be reported as part of *No. of At-grade Other Intersections*
HPMS Field Manual Errata

• Contains revisions to various HPMS Field Manual contents
• Awaiting FHWA Office of Chief Counsel approval
  • Release Date: TBD
HPMS Field Manual Errata (cont’d)

• Revised the definitions for the following coverage specifications used in Table 4.2 (“Data Items, Related Submission Deadlines and Required Reporting Formats”)
  • Full Extent (FE), FE*, FE**, FE+R (Ramps), Sample Panel (SP), SP*
• Clarified extent reporting requirements for:
  • Urban Code, Through Lanes, and County Code
• Clarified sample section reporting requirements for:
  • PSR, Rutting, Faulting, and Cracking Percent
Software
Topics

• Submission 2017 Review
• Recent Software Updates
• Changes for TPM
2017 Submissions

- Total # of Submissions & Resubmissions
- Submitted by June 15*

Data through September 7, 2017

- 2012: 19
- 2013: 12
- 2014: 18
- 2015: 15
- 2016: 40
- 2017: 39

- 2012 Total: 120
- 2013 Total: 86
- 2014 Total: 100
- 2015 Total: 85
- 2016 Total: 88
- 2017 Total: 120

Data through September 7, 2017.
2016 Data Analysis

<table>
<thead>
<tr>
<th>Year</th>
<th>Submitted Routes</th>
<th>Submitted Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>6.01</td>
<td>30.57</td>
</tr>
<tr>
<td>2014</td>
<td>6.65</td>
<td>45.79</td>
</tr>
<tr>
<td>2015</td>
<td>6.89</td>
<td>58.18</td>
</tr>
<tr>
<td>2016</td>
<td>8.23</td>
<td>90.75</td>
</tr>
</tbody>
</table>
Count of Successful HPMS Jobs  
April 2016 - September 2017

- May 16: 430
- June 14: 546
- June 28: 241
- May 30: 422
- June 8: 423
- May 19: 345

Count of Successful HPMS Jobs April 2016 - September 2017

April 2016 - September 2017

21
Cancelled and Failed HPMS Jobs
April 2016 - September 2017

- Failed Jobs: May 9 (35), May 2 (14), July 27 (13), May 2 (11), May 26 (11), June 14 (8)
- Cancelled Jobs: May 9 (35), May 2 (14), July 27 (13), May 2 (11), May 26 (11), June 14 (8)
Software Updates
Recent Software Updates

- Fix for section map slowness
- Remove report creation in Review and National Pavement Report Card update for 2016 data
- Sample Validation fix
- Interstate and NHS Report updates (two year comparison)
- Urban Area updates
- Metadata Update for 2016 Field Manual
- Capacity Module updates
- Sample Adequacy fix for large sample sets
- Implement sample export tool with spatial output
Recent Software Updates

• Fix for section map slowness
• Remove report creation in Review and National
• Pavement Report Card update for 2016 data
• Sample Validation fix
• Interstate and NHS Report updates (two year comparison)
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• Implement sample export tool with spatial output
Existing Sample “Drill” Tool

Sample Review Tool
Need for Additional Features

- Assist with Division Office Sample Review
- Facilitate review of samples with missing data
- Spatial output
- Make an easy option
Automatic Report Output

30 Tops and 30 Sample Sections

Sample Review Tool
New Tool (Interactive Option)
New Tool

Sample Review Tool
New Tool

Filter for Missing Data Items
Filter/Select UAs or Counties

Adjust # of Samples/TOPS Sections
Example Report Output

Output (As zip file – )

- **PDF** report for Samples and TOPS
- **.csv** files for Samples and TOPS
- **Shapefile** for Samples and TOPS
- **.kml** for Samples and TOPS for Google Earth
Example Report Output
Example KML View
Example KML View
Guidance Documentation

• Workflow diagrams
• More Screen shots
• Available 2018
• Future integration with Software Guide

“...a solid introduction to the tool, truly a great read.”
- Chris Allen, Division Chief, FHWA
• PM3 – Travel Time Data Reporting
  • New Data Item
  • New ‘Summary’ Table
  • Validations

• PM2 – Pavement Condition
  • Submission Related Updates
  • Pavement Report Card
  • Validations
PM3 Updates
Travel Time Reporting Segments

- **New Data Item: Travel_Time_Code**
- State-generated unique identifier for a reporting segment
- Used when states are not reporting data using FHWA provided travel time segment data (NPMRDS)
Travel Time Metrics

• New ‘Summary’ Data Table for Travel Time Metrics
• Fields for metric data e.g. AADT, Truck AADT, etc.
• One record for each travel time segment
Travel Time Metrics

Input and Export via existing procedures for other data sets
Travel Time Metrics

• Requirement for valid submissions
• Validations in development
PM2 Updates
Dual Submissions

Data Collection, Aggregation, and Quality Review

- District Office #1
- District Office #2
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HPMS Data
- Dist #1
- Dist #2
- Dist #N
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- Local Govts

Traffic Database
Pavement Database
Spatial Component
Road Inventory

State Central Office

Submittal to FHWA

1. Interstate Pavement and Related Data
2. Certified Public Road Mileage
3. Travel Time Metric Data

FHWA Review and Certification

Data Distribution and Reporting

- Highway Statistics
- National Highway Datasets
- Conditions and Performance Report

Road Inventory

Conditions and Performance Report

1. Beginning April 15, 2019
2. Beginning June 15, 2021 (Non-IS NHS Pavement)
3. Beginning June 15, 2018
Dual Submissions

- Interstate pavement condition data April 15
- Non-Interstate NHS pavement condition data June 15
- Data locked for review after each submission date
- Changes to Submit Screen e.g. Certified Mileage Check
Validations for Inventory Data

Coverage Validations
• NHS – based on approved NHS
• Facility Type
• Through lanes*
• Functional system
• Surface type
• Structure type
• Urban code

*Directional through lanes for dual-carriage reporting for Interstates
Validations for Condition Data

Coverage and Cross Validations

• Roughness (IRI) (MRI) – Collection Date
• Rutting (asphalt pavements only)
• Cracking Percent – by surface type
• Faulting (concrete pavements only)
• Can use Present Serviceability Rating (PSR) only where speed limit < 40 mph
Pavement Report Card

- Missing, Invalid and Unresolved Data – max limit, include Unresolved
- PSR - other distress data not required unless it is on a sample
- Dates for rutting/cracking/faulting (like IRI)

**FULL EXTENT LANE MILES RATING (INTERSTATE)**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane Miles Full Extent Good</td>
<td>1,101.684</td>
</tr>
<tr>
<td>Lane Miles Full Extent Fair</td>
<td>355.130</td>
</tr>
<tr>
<td>Lane Miles Full Extent Poor</td>
<td>1,600</td>
</tr>
<tr>
<td>Total</td>
<td>1,438.414</td>
</tr>
<tr>
<td>% Estimated Total Lane Miles Missing or Invalid Data - Limit 5.0%</td>
<td>69.40%</td>
</tr>
<tr>
<td>Sample Size</td>
<td>30.57%</td>
</tr>
<tr>
<td>% Surface Type Between 2 and 10 Rated as G.F.P</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Item shaded orange are HPMS Pavement Performance Data Improvement Zones where data should be verified or corrected.
Pavement Report Card

• More up to date bridge data? - connection to NBI
• Flags for submission scenarios - e.g. data complete but not in the year required…
• Cracking - change the percentage from 54% to 54.2%
• Spatial alignment – use IRI as base
NHS and Urban Area Modules
NHS

- In Production
- Incremental Approach
- Working through process with Planning Office
- Performance Improvements Underway
Urban Boundaries

- In Production
- Incremental Approach
- Loading approved updates from Planning Office
- Changes to Spatial Validation required
- May also incorporate other boundaries, e.g. MPO, in the future
NHI HPMS Workshop/Training
Workshop Structure

• Instructor-led (2 total)
• Two days
• Class size: 20-30 participants
• Cost: $425/participant

Target Audience

• HPMS Program Coordinators
• Data Program Managers/Providers (Road Inventory, Traffic, Pavement)
• IT / GIS Managers/Specialists
• MPO and Local Agency Staff
Workshop Participation (since 2/2016)

Counts -
- Hosted: 10
- State DOTs: 16
- Division Offices: 15
as of November 2017
Questions / Comments?
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