HPMS Field Manual & Software Updates

FHWA Highway Information Seminar
Arlington, VA
October 30, 2018
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*

*Errata Sheet disseminated in 2017
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 Field Manual Errata Sheet

• Contains revisions to various HPMS Field Manual contents

• Releases:
  • Version 1: 2/2018
  • Version 2: 11/2018 (Target)
• 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*
• Revised dataset reporting requirements, data item reporting requirements, guidance, and appendices
NAAQS Summary Requirement Removal

- Shapes Catalog (Geospatial Data)
  - Urban Area Boundaries
  - Soil Type Boundaries
  - Routes
  - NAAQS Area Boundaries
- Summaries Catalog (Summary Data)
  - Statewide Summaries
  - Vehicle Summaries
  - Urban Summaries
  - County Summaries
- Sections Catalog (HPMS Section Data)
  - Sections
  - Sample Panel Identification
- Performance Metrics Catalog (Performance Metrics Data)
  - Travel Time Metrics
- Estimates Catalog (Estimates Data)
  - Estimates
- Metadata Catalog (Metadata)
  - Metadata

Chapter 3 Edits
## Special Networks Requirement Removal

<table>
<thead>
<tr>
<th>Data Item Type</th>
<th>Data Item No.</th>
<th>Database-Specific Data Item Name</th>
<th>Data Item Name</th>
<th>Extent</th>
<th>Due Date</th>
<th>LRS Reporting Req. for Divided Highways</th>
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<td>I</td>
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<td>NHS</td>
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<td>-  April 15#</td>
<td>I&amp;NI</td>
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<td>-  15-Jun</td>
<td>I</td>
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<tr>
<td></td>
<td>66</td>
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<td>FE**</td>
<td>-  15-Jun</td>
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<td>FE</td>
<td>15-Jun</td>
<td>I</td>
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<tr>
<td>Traffic</td>
<td>69</td>
<td>Capacity</td>
<td>Capacity</td>
<td>SP</td>
<td>15-Jun</td>
<td>I</td>
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<tr>
<td>Inventory</td>
<td>70</td>
<td>Dir_Through_Lanes</td>
<td>Directional Through Lanes</td>
<td>FE**** #</td>
<td>15-Apr</td>
<td>I or I&amp;NI*</td>
</tr>
</tbody>
</table>
Speed Limit (Data Item 14) Guidance Update

• Sections with minimum and maximum posted speed limits (PSLs) shall be coded per maximum PSL
• Sections with variable speed limits shall be coded per the PSL, or the peak period speed limit (PPSL) (when PPSL < PSL)
No. of Intersections (Data Items 31-33) Guidance Update

• At-grade crossings where pedestrian-activated signals are present shall be excluded from the count for these data items, unless a cross-street is present
Right and Left Shoulder Width (Data Items 38-39) Guidance Update

- Zero (0) values shall only be reported for sections where shoulders do not exist
Widening Potential (Data Item 42) Guidance Update

• Code the number of lanes (0-9) for which it is feasible to widen the existing road, in each direction

https://www.fhwa.dot.gov/publications/publicroads/02mar/images/03img02.jpg
Percent Passing Sight Distance (Data Item 46) Guidance Update

- This data item shall be coded based on the extent to which passing is permitted in the inventory direction.

Source: http://cjonline.com/sites/default/files/imagecache/superphoto/14111984.jpg
Year of Last Improvement (Data Item 54) Guidance Update

- Code for resurfacing treatments of at least 0.5 inch that impact the wheelpath/traveled way
- If only certain lanes have been resurfaced, code in cases where one of those lanes is the right-most outer lane(s)

Source: http://www.apao.org/images/pringlecrew.jpg
Appendix D (Toll ID Table) Updates

• Toll Facility IDs
  • Additions
  • Deletions
  • Facility Name Changes
Software
Topics

- Ongoing Software Updates
- TPM Development
  - PM2 Submission and Review
  - PM3 Review
Software Updates
Validations are a Major hurdle for states to complete submission.

On average –
Two of the top 10 most time consuming jobs are validation related.

Coverage Validation jobs take more than 80 minutes to complete.
Silverlight = Frenemy

Keep Microsoft Silverlight up to date?

Microsoft Silverlight is not configured to update automatically. Microsoft recommends that you enable automatic updates to ensure you are using the latest and most secure version of Silverlight.

- Yes! I want to keep Silverlight up to date. (Recommended)
  This will enable Microsoft Update and the Silverlight updater to keep Silverlight and other Microsoft products up to date.

- No. Do not keep Silverlight up to date.
  This setting may put your computer at risk

View the Microsoft Update Privacy Statement
View the Silverlight Privacy Statement

[OK]  [Remind me later]
PM2 Updates
PM2 Data Checks

1. Missing Invalid or Unresolved (MIU) Data
   1. 5% Limit
   2. Definitions
2. Through Lanes and Surface Type
3. Value Date Field
4. Section Length and Spatial Coincidence
5. Missing Metric Data for Record Keeping
6. Rounding Metric Values for Measure Computation
What is MIU Data?

- **Missing**
  - Determined with validations – *reported in Report Card*
  - Unreported data e.g. Surface Type, distress/IRI metric value, value date, etc.
What is MIU Data?

**Missing**
- Determined with validations – **reported in Report Card**
- Unreported data e.g. Surface Type, distress/IRI metric value, value date, etc.

**Invalid**
- Determined with validations – **reported in Report Card**
- Invalid values on any one of the required items, e.g. data collection year
- **Length or coincidence violations for distresses and IRI**
What is MIU Data?

- **Missing**
  - Determined with validations – **reported in Report Card**
  - Unreported data e.g. Surface Type, distress/IRI metric value, value date, etc.

- **Invalid**
  - Determined with validations – **reported in Report Card**
  - Invalid values on any one of the required items, e.g. data collection year
  - Length or coincidence violations for distresses and IRI

- **Unresolved**
  - Data that FHWA determines is unreasonable
  - Suspected default metric values, excessive or no structure type data, unpaved/other surface types on NHS
  - **Reported in Report Card after review**
MIU Limit = 5%

The HPMS Pavement Report Card's purpose is to provide feedback to divisions and states on their HPMS pavement submittal data in response to requirements of 23 CFR 490. The report card is for information only and should not be considered the official calculation of measures or missing or invalid data for a state.

Based on 23 CFR 490 the report card is analyzing full extent, not sample-based, pavement data. States are encouraged to submit full extent data prior to its requirement so they can better assess their data submission.

Items shaded orange are HPMS pavement performance data improvement zones where data should be verified or corrected.

Report Generated On - 06/01/2016 6:27:21 PM

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SL and SC Checks

- **Section Length**
  - IRI, Cracking Percent, Rutting, Faulting and PSR
  - >0.11 Miles = Invalid
- **Section Level Check**
- **Spatial Coincidence**
  - Cracking Percent, Rutting and Faulting sections must align with IRI sections
  - Does not relate to PSR sections
  - Where SC violation exists, data will be marked Invalid
Through Lanes & Surface Type

- **Through Lanes**
  - If any one of the segments on the Interstate or non-Interstate NHS is missing a Through Lanes Value, the entire system will be flagged as **invalid**.

- **Surface Type**
  - If a **segment** has a missing surface type, that entire segment will be considered **invalid** regardless of any IRI or distress data that may be reported on that section.
Value Date Reporting

- If Value_Date is not reported = Missing Data
  - Interstates IRI and distress data – collected and reported in the data year
  - Non-Interstate NHS IRI and distress data – collected and reported in two year cycles
- Coding where data can’t be collected
  - Construction, closure, disaster, deterioration
  - Use Value_Text codes
  - Report latest available data with appropriate data year
  - Data will be identified as Invalid
Rounding of Metric Values

• Done to ensure consistency in pavement condition rating
• HPMS data model precision does not match the Pavement Performance Rule requirements
  • IRI – nearest inch per mile
  • Cracking Percent – nearest whole percent
  • Rutting – nearest hundredth (0.01) inch
  • Faulting - nearest hundredth (0.01) inch
  • PSR – nearest tenth
• FHWA will not alter data stored in the HPMS database
  Rounding of state submitted data will only be used for pavement measure computation
PM2 Data Checks

- Incorporated into the Dual Submission Process
- Reported in the Pavement Report Card...
- ...and the FHWA review
- Determined using
  - HPMS sections data and
  - Intersected HPMS sections data
- **Must be resolved or corrected by:**
  - June 15 for the Interstate System and
  - August 15 for the non-Interstate NHS
**Pavement Report Card**

**HPMS 8.0.1**

**FULL EXTENT LANE MILES RATING**

(INTERSTATE)

<table>
<thead>
<tr>
<th>Category</th>
<th>Miles</th>
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<tbody>
<tr>
<td>Lane miles full extent good</td>
<td>2,688.137</td>
</tr>
<tr>
<td>Lane miles full extent fair</td>
<td>1,414.729</td>
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<tr>
<td>Lane miles full extent poor</td>
<td>9.081</td>
</tr>
<tr>
<td>Total</td>
<td>4,111.947</td>
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</tbody>
</table>

**Estimated total Interstate lane miles missing or invalid data**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Miles</th>
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<tbody>
<tr>
<td>Limit 5.0%</td>
<td>0.25 %</td>
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<tr>
<td>Sample size</td>
<td>38.32 %</td>
</tr>
<tr>
<td>% Surface type between 2 and 10 rated as G-F-P</td>
<td>99.75 %</td>
</tr>
</tbody>
</table>

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The HPMS PAVEMENT REPORT CARD’s purpose is to provide feedback to divisions and states on their HPMS PAVEMENT SUBMITTAL DATA in response to requirements of 23 CFR 490. The report card is for information only and should not be considered the official calculation of measures or missing or invalid data for a state.

Based on 23 CFR 490, the report card is analyzing full extent, not sample based, pavement data. States are encouraged to submit full extent data prior to its requirement so they can better assess their data submission.

三种未填橙色的区域为HPMS Pavement Performance Data Improvement Zones，应进行验证或纠正。

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Submit Data


Summary Validation
- County Summary
- Demography Summary
- NAAQS Summary
- Pavement Summary
- Travel Summary
- Urban Summary
- Vehicle Summary - Rural
- Vehicle Summary - Urban

Data Editor Validation
- Coverage Validation
- Crosscheck Validation
- LRS Validation
- Sample Validation

Travel Time Performance Metrics
- Travel Time Code Data Item
- Travel Time Metrics Specifications Dataset
- Travel Time Metrics Validations

Certified Miles
- HPMS Calculated Miles: 88819.014
- State Certified Miles: 88819.000

Submittal Comment (Required)
- Comment: 2017 HPMS Submittal Comments will be sent by email

Save Comments Without Submitting

Save  Cancel
Submit Data


Summary Validation
- County Summary
- Demography Summary
- NAAQS Summary
- Pavement Summary
- Travel Summary
- Urban Summary
- Vehicle Summary - Rural
- Vehicle Summary - Urban

Data Editor Validation
- Coverage Validation
- Crosscheck Validation
- LRS Validation
- Sample Validation

Travel Time Performance Metrics
- Travel Time Code Data Item
- Travel Time Metrics Specifications Dataset
- Travel Time Metrics Validations

Pavement Metrics

- Metadata
- PM2 Validation

<table>
<thead>
<tr>
<th>Sections</th>
<th>Length Violation</th>
<th>Spatial Coincidence</th>
<th>Unresolved</th>
<th>Locked</th>
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<td>Interstate NHS</td>
<td>0</td>
<td>61</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Non-Interstate NHS</td>
<td>0</td>
<td>65</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

Submit Interstate NHS Pavement Metrics Only

Summary end/or Data Editor that need to be validated before submitting.

Certified Miles

HPMS Calculated Miles: 66818.014
State Certified Miles: 66818.000

Submittal Comment (Required)

Comment: 2017 HPMS Submittal Comments will be sent by email
PM3 Updates
Travel Time Metrics

- Travel Time Metric Validations
- Feedback/Review
  - Missing Segments
  - Directional AADT
  - Segment Lengths
  - NULL LOTTR and TTTR Metric Values
  - Missing PHED metrics for “applicable” reporting segments
TPM Guidance

Reporting
- Performance Management Form (PMF) Input Fields
- Initial State Performance Report (03/31/2016)

Measure Computation Procedures
- FHWA Computation Procedure for the Bridge Condition Measure April 2018
- FHWA Computation Procedure for the Pavement Condition Measure May 2018
- FHWA Computation Procedure for Travel Time Based and Percent Non-Single Occupancy Vehicle (non-SOV) Travel Performance Measures

Metric Calculation
- Average Vehicle Occupancy Factor for Computing Travel Time Reliability Measures and Total Peak Hour Excessive Delay Matrix April 2018

HPMS Guidance
- HPMS Field Manual Supplemental Guidance, Travel Time Metric Data Reporting Requirements & Specifications (updated 4/26/2018)
- Highway Performance Monitoring System Travel Time Based Metric Data Validation May 2018

Pavements
- Non-Interstate NHS Pavement Target Reporting Options for First Performance Period (09/27/16)
- The “Phase-in” Requirements and the “Transition” Provision for the Pavement Condition Measure (06/06/2018)

Asset Management
- November 20: 2018 Penalty Decision Pursuant to MAP-21 Section 1106(b) and 23 CFR 655.15(b)

Freight

https://www.fhwa.dot.gov/tpm/guidance/

SOPs, validations, FAQs
HPMS Support
HPMS Services Offered

- Custom Training Delivery
- On-site Program/Field Review Support
- Technical Assistance Visits
- Web conferencing
- National Highway Institute (NHI) HPMS Workshop Delivery
HPMS 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
ANY QUESTIONS?
Contacts

• Ronald Vaughn, PMP
  FHWA / Office of Highway Policy Information
  Office: (202) 366-9248
  Email: ronald.vaughn@dot.gov

• Justin Clarke, AICP
  FHWA / Office of Highway Policy Information
  Office: (202) 366-9245
  Email: justin.clarke@dot.gov