FHWA Federal Funding and Performance Measures Update

Jason M. Dietz
Pavement & Materials Engineer
FHWA Resource Center – Lakewood, CO

Rocky Mountain West Pavement Preservation Partnership
Bozeman, MT – Oct. 19, 2015
National Highway System

- Expanded by MAP-21
  - Interstate System and Other Principle Arterials
  - Strategic Highway Network and Major Connectors
  - Intermodal Connectors

- Facts
  - 223,000 miles
  - 771,000 lane-miles
  - 88% State owned
  - 5.4% US mileage
  - 55.0% total travel
Most Recent Resurfacing

<table>
<thead>
<tr>
<th>Years Since Last Resurfacing</th>
<th>Percent of National Highway System</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td>26%</td>
</tr>
<tr>
<td>6-10</td>
<td>31%</td>
</tr>
<tr>
<td>11-15</td>
<td>20%</td>
</tr>
<tr>
<td>16-20</td>
<td>12%</td>
</tr>
<tr>
<td>&gt; 20</td>
<td>11%</td>
</tr>
</tbody>
</table>

- Flexible: 69%
- Composite: 19%
- Rigid: 12%
2014 NHS Improvement Types by Federal Funding

- Pavement Improvement, 29.7%
- Pavement Widening, 23.8%
- New Construction, 8.2%
- Bridge Improvements, 7.3%
- Bridge Replacement, 12.9%
- New Bridge Construction, 3.1%
- Transportation Enhancements, 4.0%
- Safety/traffic Management, 5.0%
- Other, 6.0%
Importance of Preservation and Improvement of the NHS

• Preserving and improving the NHS’s pavements and bridges through a risk based asset management approach keeps America’s infrastructure safer, increases mobility, improves the U.S. economy and improves U.S. competitiveness in world trade.

• The implementation of MAP-21 performance measures will focus federal transportation investments on the NHS leading to improved pavement conditions and bridges.
Presentation Outline

• Implementing MAP-21 National performance management program.
  ✓ Evolving Federal Program, NPRM schedule
  ✓ Core Programs and funding
  ✓ Performance elements
  ✓ Challenges and opportunities
  ✓ National Goals
  ✓ Measures for assessing
Evolution of the Federal Program

Fed-Aid Program

ISTEA

Build

Project Oversight

Expand

Process Review

MAP-21

Manage

Outcome Performance
## Past USDOT Performance Reporting

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014 Target</th>
<th>2014 Actual</th>
<th>Met?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent NHS Good Pavements</td>
<td>55.0</td>
<td>54.3</td>
<td>57.1</td>
<td>57.6</td>
<td>58.4</td>
<td>59.0</td>
<td>Met</td>
</tr>
<tr>
<td>Percent NHS Structurally Deficient Bridges</td>
<td>8.3</td>
<td>7.8</td>
<td>7.1</td>
<td>6.7</td>
<td>6.6</td>
<td>6.0</td>
<td>Met</td>
</tr>
</tbody>
</table>
MAP-21
Four “Core” Programs

- 58% National Highway Performance Program
- 27% Surface Transportation Program
- 6% Highway Safety Improvement Program
- 6% Congestion Mitigation and Air Quality Program
$37.7 Billion/Year in formula funding

National Highway Performance Program ($21.8)

Surface Transportation Program ($10.0)

HSIP ($2.4)

CMAQ ($2.4)

Transportation Alternatives ($0.8)

Metro Planning ($0.3)

Ferry ($0.07)

Note: Amounts in $ billions
Performance Elements

- National Goals
- Measures
- Targets
- Plans
- Reports
- Accountability and Transparency

http://www.fhwa.dot.gov/map21
Challenges and Opportunities

- Providing both consistency and flexibility
- Finding the right balance of national measures
- Managing performance across jurisdictions
- Data requirements and management
- Linking performance measures to investments
- Advancing technologies
Principles Behind Proposals

• Minimize the Number of Measures
• Phase in Requirements
• Increase Accountability and Transparency
• Consider Risk
• Understand that Priorities Differ
• Recognize Fiscal Constraints
### MAP-21 National Goals

<table>
<thead>
<tr>
<th>Goal Area</th>
<th>National Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>Reduce fatalities &amp; serious injuries on all public roads</td>
</tr>
<tr>
<td>Infrastructure condition</td>
<td>Maintain a state of good repair</td>
</tr>
<tr>
<td>Congestion reduction</td>
<td>Significantly reduce congestion on the NHS</td>
</tr>
<tr>
<td>System reliability</td>
<td>Improve the efficiency of the surface system</td>
</tr>
<tr>
<td>Freight movement &amp; economic vitality</td>
<td>Improve the national freight network, access of rural communities to markets, &amp; economic development</td>
</tr>
<tr>
<td>Environmental sustainability</td>
<td>Enhance system performance while protecting and enhancing the environment</td>
</tr>
<tr>
<td>Reduced project delivery delays</td>
<td>Accelerate project completion by eliminating delays in the project delivery process</td>
</tr>
</tbody>
</table>
USDOT Performance Measure Areas

- Highway Safety
- Pavement Condition
- Bridge Condition
- System Performance
- Traffic Congestion
- On-road Mobile Source Emissions
- Freight Movement on the Interstate
- Transit State of Good Repair
- Transit Safety Criteria
Changing Circumstances Required Us to Embrace Performance Management

- Infrastructure condition and resource constraints
- Public expectations
- Performance management has been proven in other industries
10 Inter-related Rulemakings

- Highway Safety Grant Programs
  - NHTSA: 1 Rule
- Federal-aid Highway Programs
  - FHWA: 6 Rules
- Public Transportation Programs
  - FTA: 3 Rules
<table>
<thead>
<tr>
<th>Performance Areas</th>
<th>NPRM</th>
<th>Comments Due</th>
<th>Anticipated Final Rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Performance Measures</td>
<td>March 11, 2014</td>
<td><strong>Closed June 30, 2014</strong></td>
<td>September 2015</td>
</tr>
<tr>
<td>Highway Safety Improvement Program</td>
<td>March 28, 2014</td>
<td><strong>Closed June 30, 2014</strong></td>
<td>August 2015</td>
</tr>
<tr>
<td>Statewide and Metro Planning; Non-Metro Planning</td>
<td>June 2, 2014</td>
<td><strong>Closed October 2, 2014</strong></td>
<td>September 2015</td>
</tr>
<tr>
<td>Pavement and Bridge Performance Measures</td>
<td>January 5, 2015</td>
<td><strong>Closed May 8, 2015</strong></td>
<td>n/a</td>
</tr>
<tr>
<td>Highway Asset Management Plan</td>
<td>February 20, 2015</td>
<td><strong>Closed May 29, 2015</strong></td>
<td>n/a</td>
</tr>
<tr>
<td>System Performance Measures</td>
<td><em>Projected</em> October, 2015</td>
<td>120 days</td>
<td>n/a</td>
</tr>
</tbody>
</table>
System Performance - Input from Stakeholders

- Measure movement of people or vehicles?
- Performance perspective of the user or the planner/designer/operator?
- Speed vs. travel time
- Capturing impact of increased transportation choices
- Ability to tell a local, regional, and national story
- Data availability and technology advancements
- Impact of NHS expansion to arterials
Proposed Pavement Measures (490.307)

<table>
<thead>
<tr>
<th>Pavement Condition Measures</th>
<th>Interstate System</th>
<th>Non-Interstate NHS System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of pavements in “Good” condition</td>
<td>Percentage of pavements in “Good” condition</td>
<td></td>
</tr>
<tr>
<td>Percentage of pavements in “Poor” condition</td>
<td>Percentage of pavements in “Poor” condition</td>
<td></td>
</tr>
</tbody>
</table>
Proposed Pavement Reporting Req.

- Baseline Performance Period Report – two- & four-year targets, baseline conditions, relationship with other performance expectations

- Mid Performance Period Progress Report – two-year condition/ performance, investment strategy effectiveness, progress discussion, target adjustment*, extenuating circumstances*, target achievement discussion if fail to demonstrate significant progress (* = optional)

- Full Performance Period Report – Same content as Mid Period report but reporting on four year targets

- MPOs report targets and progress to State DOTs per the Metropolitan Planning Agreement
Proposed Pavement Target Setting

• All State DOTs and MPOs establish targets for each performance measure, aligned with biennial reports.
• Targets to be established for the entire NHS network, regardless of ownership.
• State DOTs may adjust four-year targets at the performance period midpoint.
• State targets are statewide.
• State DOTs have the option to set additional urbanized/non-urbanized targets.
• MPOs establish four-year targets by committing to support the State target or by setting a quantifiable target when applicable.
• If State adjusts target, any MPO adjustments must occur within 180 days.
• If MPO changes a quantifiable target, must be done in a manner agreed upon and documented in Metropolitan Planning Agreement.
Proposed Pavement Data Requirements

- Pavement data provided to the Highway Performance Monitoring System (HPMS), 0.1 mile uniform pavement sections
- Pavement metrics are IRI, cracking, rutting and faulting with thresholds corresponding to “Good/Fair/Poor”
- Measures are % lane miles “Good/Poor”
Better Outcomes!

• Improved communication of the link between investments and results
  ✓ Depict future scenarios under varying funding levels

• Increased consistency across the country

• Increased coordination across agencies and jurisdictions

• Greater understanding of what works
Improved Measures of Performance

- Synergies between National and other measures used by agencies
- Further refinement of the National measures
- Spur discussions on the value of future areas for performance management
- Improved data collection, integration, mining, reporting, and visualization
Challenges and Considerations

• National Data Source
• Consistency in Collection
• Link to Decisions
• Element Level Data
• Advancing Technologies
• Target Setting
Relationship between Data Requirements, Pavement Metrics, and Performance Measures

**Data Requirements**
- Type of data to be collected
- Methods of data collection
- Extent and frequency of collection
- Data Quality

**Pavement Metrics**
- Calculated using collected data
- Based on sections of highway pavement
- Reported in the HPMS

**Pavement Measures**
- Calculated using metrics reported in the HPMS
- Used by States to report the condition of Interstate System and non-Interstate NHS
**HPMS Data Collection and Reporting Requirements (490.309)**

**Interstate Pavements**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Now</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Due Date</strong></td>
<td>June 15</td>
<td>April 15</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td><strong>Coverage</strong></td>
<td>Full Extent</td>
<td>Full Extent</td>
</tr>
<tr>
<td></td>
<td>1 Lane</td>
<td>1 Lane</td>
</tr>
<tr>
<td></td>
<td>1 Direction</td>
<td>2 Directions</td>
</tr>
</tbody>
</table>

- **International Roughness Index**
- **Cracking, Rutting, Faulting**

Infrastructure Condition PM NPRM: Part 2
HPMS Data Collection and Reporting Requirements (490.309)

Non-Interstate NHS Pavements

**International Roughness Index**

Now
- **Due Date**: June 15
- **Frequency**: 1 year
- **Coverage**: Full Extent, 1 Lane, 1 Direction

Proposed
- **Due Date**: June 15
- **Frequency**: 2 years*
- **Coverage**: Full Extent, 1 Lane, 1 Direction

**Cracking, Rutting, Faulting**

Now
- **Due Date**: June 15
- **Frequency**: 2 years
- **Coverage**: Samples, 1 Lane, 1 Direction

Proposed
- **Due Date**: June 15
- **Frequency**: 2 years
- **Coverage**: Full Extent*, 1 Lane, 1 Direction

*Beginning 2018/2019

Infrastructure Condition PM NPRM: Part 2
Data Quality Management

• In § 490.319(c), FHWA proposes Data Quality Management program requirements to implement 23 U.S.C. 150(c)(3)(A)(iv) for pavement condition data.

• The FHWA proposes that each State DOT must have a data quality management program for the data required to assess pavement conditions. This proposal would require State DOTs to submit their Data Quality Management Programs to FHWA for approval.

• The design of the data quality management program is left to discretion of State DOTs, as long as it includes the following items:
  • Data Collection equipment, calibration, and certification;
  • Certification process for persons performing manual data collection, if used;
  • Data quality control measures conducted both before data collection begins and periodically during the data collection program;
  • Data sampling, review, and checking processes; and
  • Error resolution procedures and data acceptance criteria.

## Pavement Condition Thresholds

<table>
<thead>
<tr>
<th>Metric</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRI (inches/mile)</td>
<td>&lt;95</td>
<td>95-170</td>
<td>&gt;170</td>
</tr>
<tr>
<td></td>
<td></td>
<td>95-220*</td>
<td>&gt;220*</td>
</tr>
<tr>
<td>Cracking (%)</td>
<td>&lt;5</td>
<td>5-10</td>
<td>&gt;10</td>
</tr>
<tr>
<td>Rutting (inches)</td>
<td>&lt;0.20</td>
<td>0.20-0.40</td>
<td>&gt;0.40</td>
</tr>
<tr>
<td>Faulting (inches)</td>
<td>&lt;0.05</td>
<td>0.05-0.15</td>
<td>&gt;0.15</td>
</tr>
</tbody>
</table>

*Urban Areas with population > 1 million
## Composite Data Element Comparison

<table>
<thead>
<tr>
<th>Element</th>
<th>Confidence in Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRI</td>
<td>High</td>
</tr>
<tr>
<td>Cracking %</td>
<td>Low/Med</td>
</tr>
<tr>
<td>Cracking Length</td>
<td>Low</td>
</tr>
<tr>
<td>Rutting</td>
<td>High</td>
</tr>
<tr>
<td>Faulting</td>
<td>Low</td>
</tr>
</tbody>
</table>

- **State Data or HPMS Data**
- **Field Collected Data**
# Calculation of Pavement Measures (490.313)

<table>
<thead>
<tr>
<th>Pavement Type</th>
<th>Overall Section Condition Rating</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asphalt and Jointed Concrete</strong></td>
<td>3 metric ratings (IRI, cracking and rutting/faulting)</td>
<td>percentage of lane-miles in “Good” condition</td>
</tr>
<tr>
<td><strong>Continuous Concrete</strong></td>
<td>2 metric ratings (IRI and cracking)</td>
<td>percentage of lane-miles in “Poor” condition</td>
</tr>
<tr>
<td><strong>Good</strong></td>
<td>All three metrics rated “Good”</td>
<td></td>
</tr>
<tr>
<td><strong>Poor</strong></td>
<td>≥ 2 metrics rated “Poor”</td>
<td></td>
</tr>
<tr>
<td><strong>Fair</strong></td>
<td>All other combinations</td>
<td></td>
</tr>
<tr>
<td><strong>Continuous Concrete</strong></td>
<td>Both metrics rated “Good”</td>
<td></td>
</tr>
<tr>
<td><strong>Jointed Concrete</strong></td>
<td>Both metrics rated “Poor”</td>
<td></td>
</tr>
<tr>
<td><strong>All other combinations</strong></td>
<td>All other combinations</td>
<td></td>
</tr>
</tbody>
</table>

Subpart C (490.300s)
Minimum Condition and Penalties for Pavements
(490.315 and 490.317)

Minimum Condition Level: Percentage of lane-miles of Interstate System in Poor condition would not exceed 5.0%

FHWA is committed to reassessing the minimum condition level after completion of the first full performance period

Penalty: If minimum not met for two consecutive years, State must obligate NHPP & transfer STP funds
• § 1108. SURFACE TRANSPORTATION PROGRAM.
  • (a) Eligible Projects.--Section 133(b) of title 23, United States Code, is amended–
  • (a)(4)“(1) Construction... and (2) Replacement... preservation included.
FHWA Pavement Preservation Program...

Emerging Activities
Pavement Preservation Direction

- New PP ETG
- ETF?
- AASHTO TSP2
- PP Regional Partnerships
- Research Roadmap
NHI Pavement Preservation Training Series

- FHWA-NHI-131110 TCCC Pavement Preservation Treatments Web-based Series
- FHWA-NHI-131127 TCCC Concrete Pavement Preservation and Rehabilitation Web-based Series
1. Crack Seal Application
2. Chip Seal Application
3. Thin Hot-Mix Asphalt Overlay
4. Fog Seal Application
5. Microsurfacing Application
6. Joint Sealing Portland Cement Concrete Pavements
7. Diamond Grinding of Portland Cement Concrete Pavements
8. Dowel-Bar Retrofit for Portland Cement Concrete Pavements
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Home</strong></td>
<td><strong>Thin Hot-Mix Asphalt Overlay</strong></td>
</tr>
<tr>
<td>1)</td>
<td>Thin Hot-Mix Asphalt Overlay Checklist</td>
</tr>
<tr>
<td>2)</td>
<td>Preliminary Responsibilities</td>
</tr>
<tr>
<td>3)</td>
<td>Pre-overlay Inspection Responsibilities</td>
</tr>
<tr>
<td>4)</td>
<td>Project Operational Considerations</td>
</tr>
<tr>
<td>5)</td>
<td>Opening to Traffic</td>
</tr>
<tr>
<td>6)</td>
<td>Common Problems and Solutions</td>
</tr>
<tr>
<td>7)</td>
<td>Sources</td>
</tr>
</tbody>
</table>
TACK COAT
Best Practices WORKSHOP

CALANDER YEAR
Starting in 2014

LENGTH
1/2 Day

CEU
Potentially Offered

FEE
FREE

CLASS SIZE: Minimum: 20; Maximum: 140

DESCRIPTION
The Federal Highway Administration (FHWA) and Asphalt Institute present Tack Coat Best Practices Workshop. The workshop offers owners and contractors the opportunity to find out more about the latest in tack coat technologies and best practices. The workshop provides the most current information on tack coats and emphasizes the importance of providing a long lasting bond between asphalt layers.

OUTCOMES
At the conclusion of the workshop, participants will be able to:
• Identify best practices for constructing tack coats.
• List strategies that could be employed by agency decision-makers to improve the usage of tack coats.
• Identify resources for implementing best practices into standard practice.

Who Can Benefit?
• Specification writers
• Project inspectors
• Contractors & Staff
• Material Suppliers
The successful adoption of these improvements will need to be a team effort; therefore both agencies and contractors are the target audience.

TOPICS INCLUDE
• The importance of tack coats
• Common Tack coat grades
• New materials
• Application rate and temperatures
• Field testing
• Tack coat specifications
• Construction best practices
• Surface preparation and traffic control

For more information about the workshop in your area, please contact:

Jason M. Dietz
Pavement & Materials Engineer
FHWA Resource Center Lakewood, CO
jason.dietz@dot.gov

Dave Johnson, P.E.
Regional Engineer
Asphalt Institute
djohnson@asphaltinstitute.org
Tack Coat Workshops

- 2014 – Pilot, VA
- Completed (25)
- Scheduled (15)
- Requested (13)
Questions?
Thank You