FHWA Pavement Surface Characteristics Program And Research Update

Southeastern States Pavement Management and Design Conference
May 11, 2009
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Focus Area Leadership and Coordination (FALCON) Teams

1. Pavement Design & Analysis
2. Materials & Construction Technology
3. Pavement Management & Preservation
4. Pavement Surface Characteristics
5. Construction Quality Assurance
6. Environmental Stewardship

U.S. Department of Transportation
Federal Highway Administration
FALCON Team 4

Pavement Surface Characteristics
Where the public meets the road

Co-Chairs: Larry Wiser
Bob Orthmeyer

Secretary: Joe Gregory
Vision: Safe, smooth, and quiet pavements.

Mission

To provide insight and applications that assist FHWA leadership in assuring that pavement surfaces meet and/or exceed our client’s expectations.

Scope

The SC FALCON Team will provide a multi-year strategic plan that coordinates the activities within FHWA that are concentrated in delivering an effective pavement surface characteristics program.
National Performance Objectives

4.1 – Smoothness
Pavements are designed, constructed and maintained to meet users’ expectations relative to ride quality.

4.2 – Friction
Pavements are designed, constructed and maintained to reduce friction-related crashes.

4.3 – Noise
Highway agencies use quiet pavement systems in noise-sensitive areas.

4.4 – Splash and Spray
Pavements are designed, constructed and maintained to reduce the potential for splash and spray.
Performance Measures

4.1 – Smoothness

- **Good Ride Quality**
  Percent of VMT on NHS with IRI less than 95 in/mi.
  - From HPMS

- **Acceptable Ride Quality**
  Percent of VMT on NHS with IRI less than 170 in/mi.
  - From HPMS
2007 Pavement Condition on the National Highway System (NHS)
National Average = 56.7%, Target 57% in 2009
Good/Very Good (IRI of <95”/mile)

Source: HPMS
Compiled By: Office of Pavement Technology
Federal Highway Administration
March 2008
4.2 – Friction

- **Friction Improvement Consideration Factor**
  Extent to which highway agencies consider friction in the pavement design, construction, management, and maintenance processes.
  - Rating by agency (self assessment)
  - Number of Agencies

- **Friction Related Crash Rate**
  Friction-related crash rate (related to wet-weather and pavement).
  - Number of agencies
  - Extent of National Highway Network
Performance Measures

4.3 – Noise

- **Quiet Pavement System Consideration Factor**
  Extent to which highway agencies consider quiet pavement systems in the pavement design, construction, management, and maintenance processes for noise-sensitive areas.
  - Quiet pavement systems (initially defined by states in the self-assessments)
  - Noise-sensitive areas (defined by states in the self-assessments)
Performance Measures

4.4 – Splash and Spray

- Splash/Spray Consideration Factor
  Extent to which highway agencies consider splash and spray in the pavement design, construction, management, and maintenance processes.
  - Rating by agency (self assessment)
  - Number of Agencies

- Rutting Condition
  Average rutting depth per sample unit.
  - From HPMS
National Strategies

- Develop, promote, and deploy assessment capabilities and technologies to improve highway systems.
- Demonstrate the benefits of using pavement surface characteristics as a highway system performance indicator.
- Develop and implement policy guidance to align with quality assurance, environmental policy, and safety policy.
- Develop a national management program.
Funded FY09 Activities

- AASHTO Smoothness Standards Refinement/Deployment
- Advanced Texture/High Friction Demonstration Project
- Friction/Texture Test Equipment Loan Program
- Sound Intensity Test Method Refinement/Validation
FY09 Activities (continued)

- Integrated Texture-Noise Model Development
- Traffic Noise Model (TNM) Pavement Effects Project
- ProVAL Deployment and Enhancement
- Splash/Spray Potential Assessment Tool Development
FY09 Activities (continued)

- Relationship between Pavement Surface Characteristics & Vehicle Crash Rates on US Highways
- Pavement Surface Characteristics Relationship to Crashes Overview
- Relating Ride Quality And Structural Adequacy For Pavements
FY09 Activities (continued)

- Profiler calibration, regional verification testing and operator certification
- Development of Investigatory & Intervention Threshold Values for Friction & Macrotexture
FALCON Coordination

- TPF 5(063) “Improving the Quality of Pavement Profiler Measurement”
- TPF 5(135) “Tire/Pavement Noise Research Consortium”
TPF 5(063) Pooled Fund Study

“Improving the Quality of Pavement Profiler Measurement

- 21 State Highway Agencies
- $1.4 Million Study
- Extended through September 2011
- Priorities include develop reference device
- Benchmark testing of device in June 2009
TPF 5(063) Priorities

- Build a reference device
- Define requirements for reference
- Profile Viewer and Analysis Software
- Regional certification sites
- Limits of a single accelerometer
- Emerging technologies
TPF 5(063) Pooled Fund
Participating Agencies
Potential Reference Devices
FHWA Toolkit

- Smoothness
  - ProVAL software & workshops (www.roadprofile.com)
  - NHI 131100 “Pavement Smoothness”
  - Contract to implement AASHTO Provisional Standard PP49 & MP17
  - ASTM E2560-07: Standard Specification for Data Format for Pavement Profile
The Graphical User Interface (GUI) of ProVAL 3.0 is completely redesigned.

ProVAL 3.0 is very intuitive and easy-to-use.

ProVAL 3.0 includes a lot of powerful new features.

It takes the profile viewing and analysis experiences to the next level.
Files import and profiles selection

Powerful viewing options

Manage profile data using thumb nails

Easy access of analyses
Powerful chart controls
Better Input settings management
Grinding strategy management
Better reports and charting
<table>
<thead>
<tr>
<th>Features</th>
<th>ProVAL 2.7</th>
<th>ProVAL 3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 File and Project Management</strong></td>
<td>Separated project analysis file (<em>.pv2) and imported data files (</em>.ppf) are used to store analysis settings and profile data, respectively.</td>
<td>An all-in-one single compressed file (*.pv3) is used to combine all imported profile data and analysis settings while imported data can be exported.</td>
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<td><strong>2 Sections Handling</strong></td>
<td>The features of “point reset” and/or “cropping” tools facilities are used to define and handle a single section of interest. Can only use lead-in and lead-out to define one section of interest.</td>
<td>“Sections” facility in the Editor can be used to define multiple sections of various categories (e.g. generic, exclusions). Therefore, lead-in and lead-outs can be handled more gracefully.</td>
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<td><strong>3 Ride Statistics</strong></td>
<td>Separated modules are used for Ride Stats, Ride Stats at Interval, and Ride Stats Continuous analyses. A limit of one file to be analyzed is imposed in the latter two analysis modules.</td>
<td>A single Ride Quality module is used to provide all three types of ride quality analyses. Also, multiple files are allowed to be analyzed for all three analysis types.</td>
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<td><strong>4 Input Settings</strong></td>
<td>Input set is used to handle input settings.</td>
<td>An improved analysis template is used to manage input settings.</td>
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<td><strong>5 File selection</strong></td>
<td>Users need to manually select files for analysis. Only limited numbers of files are allowed.</td>
<td>A file selector facility is used to speed up files and profiles selection. No limitation on number of file selections!</td>
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<td><strong>6 Milepost Display</strong></td>
<td>Mileposts can only be in increasing manner.</td>
<td>Allow display of profile charts in terms of mileposts and in proper increasing or decreasing manner.</td>
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<td><strong>7 Charts</strong></td>
<td>Limited functions for chart controls. No charts for fixed interval reports and histograms.</td>
<td>Now all charts come with zooming, scrolling, panning, and zoom history support. Charts also are added for fixed interval reports and histograms. Grinding charts are added to highlight grinding locations.</td>
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<td><strong>8 Report</strong></td>
<td>Save reports in HTML format.</td>
<td>Generate reports in secured PDF format.</td>
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Inertial Profiler Changes
Inertial Profiler