The Constant Pursuit of Quality Data: Feedback Loop

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Objective

► Compile experience over the past 25 years
► Identify understanding of pavement condition data errors
► Brief review of objectives and findings from three major FHWA studies
Major Studies

- Cumulative experience in specifying data collection since 1987
  - LTPP Technical Support Services
  - Improving FHWA’s Ability to Assess Highway Infrastructure Health
  - Interstate Pavement Condition Sampling
  - Interstate Highway Pavement Sampling
  - Maryland SHA Pavement Management Support
LTPP

► Developed data collection protocols
  ► Distress Identification Manual
  ► Longitudinal Profile
  ► Falling Weight Deflectometer
► Protocols include quality control procedures
  ► Rater certification
  ► Specifications for data collection equipment
► Analysis procedures
  ► Transverse profile
Infrastructure Health
Interstate Pavement Condition Sampling

- Further review of HPMS
- Improvements in data completeness

<table>
<thead>
<tr>
<th>Distress</th>
<th>Distress Mileage</th>
<th>Total Mileage</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRI</td>
<td>47,030</td>
<td>47,590</td>
<td>99%</td>
</tr>
<tr>
<td>Cracking %</td>
<td>24,295</td>
<td>47,500</td>
<td>51%</td>
</tr>
<tr>
<td>Rutting</td>
<td>19,778</td>
<td>22,870</td>
<td>86%</td>
</tr>
<tr>
<td>Faulting</td>
<td>5,267</td>
<td>7,117</td>
<td>74%</td>
</tr>
</tbody>
</table>

- Surface type identified as unpaved for 6 miles of interstate
MDSHA Pavement Management Support

► Support to MD SHA to improve pavement management practices

► Variety of task orders
  ► Review of transverse profile collection and rutting analysis
  ► Statistical relationship of pavement condition data
  ► Development of QMP
So what have we learned from these studies?
Cracking Data Anomalies

► Observed in only one area of the country

► Suspect that there aren’t other similar issues in other parts of the country

► Question – what is the best way to find these anomalies?
Profile / Roughness

- LCMS vs Inertial profiler
  - Standards addressing the use of these sensors
  - Approaches for certification / validation of profile using LCMS sensors
Faulting

- Joint misclassification when using profile-based data collection in comparison with LCMS data
- Difference in fault values

<table>
<thead>
<tr>
<th>Element</th>
<th>LCMS Fault</th>
<th>Profile-based Fault</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Fault</td>
<td>0.04 inch</td>
<td>0.02 inch</td>
</tr>
<tr>
<td>Standard Deviation Fault</td>
<td>0.05 inch</td>
<td>0.06 inch</td>
</tr>
<tr>
<td>Average Number of Faults</td>
<td>3.4 faults</td>
<td>0.4 faults</td>
</tr>
<tr>
<td>Average Number of Joints</td>
<td></td>
<td>3.6 joints</td>
</tr>
</tbody>
</table>
## Rutting

<table>
<thead>
<tr>
<th>Element</th>
<th>LCMS Rut</th>
<th>5-point Rut</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Rut Depth</td>
<td>0.15 inch</td>
<td>0.09 inch</td>
</tr>
<tr>
<td>Standard Deviation Rut</td>
<td>0.10 inch</td>
<td>0.12 inch</td>
</tr>
<tr>
<td>Percent Good</td>
<td>62%</td>
<td>64%</td>
</tr>
<tr>
<td>Percent Fair</td>
<td>37%</td>
<td>35%</td>
</tr>
<tr>
<td>Percent Poor</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>
Data Analysis

► Where is the wheelpath?
  ► Different definitions of the wheelpath in the transverse profile and cracking AASHTO protocols

► What do we do with transverse cracking?
  ► In the Interstate Condition Sampling project used several approaches

► Segment Length
  ► HPMS segments observed to range in length from 0.01 mile to over 10 miles in some prior years
  ► Observed improvement in consistency of segment length
  ► Segment length has a significant impact on the condition data
Issues

► Where do the errors in the collected data originate?

► How do we develop standards that are about data we obtain and not about how they are collected?

► How can we make quality assurance practices practical for State application?
Thanks for your attention!

Questions?