WVDOH Pavement Management Status Report

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Pavement Group – Materials Division
WV Road Network

- WVDOH owns and maintains 92% of the roadway network
  - Interstate – 555 miles
  - US Routes – 1,810 miles
  - WV Routes – 3,640 miles
  - County Routes – 28,900 miles

*centerline miles, primary direction*
Pavement Condition Data Collection

- Network-level automated collection since 1998
- Automated collection every year on a varying system basis
  - Interstate, NHS, & Corridors every year
  - All US and WV routes every other year
  - All County routes every 5 years
- Collected in both directions where designated
  - Interstates, US, & some WV routes
- Delivered in tenth-mile segments
- Transitioning from Fugro Roadware to Michael Baker
Pavement Condition Data Collection

- Laser Crack Measuring (LCMS)
- Inertial Profiler for IRI
- 3D Cameras for Pavement Profile
  - Right-of-Way Cameras
    - 360 degree camera
  - GPR and LiDar capability
Pavement Condition Data Collection

- WVDOH in-house data collection
- Smoothness & Rutting
- Project-level
- QA/QC of automated collection data
Pavement Condition Data Collection

• QA/QC
  • Performed both by contractor and in-house
  • Follow Data Quality Management Plan in the future
    • FHWA requirement
• Missing or Null condition data
  • Wet
  • Construction
  • Speed
  • Lane Deviation
  • Debris
• Bridge decks marked and noted
Pavement Condition Data Collection

- Roadway geometry collected in accordance with HPMS
  - Pavement/Lane Width
  - Surface Type
  - Shoulder Width
  - Shoulder Type
  - Horizontal Curves
  - Vertical Curves
  - Cross-slope
Pavement Condition Fields

• Asphalt
  • IRI
  • Rutting
  • Block Cracking Severity
  • Transverse Cracking Severity
  • Longitudinal Cracking Severity
  • Cracking Percent
  • Crack Length
  • Alligator Cracking Severity

• Concrete
  • IRI
  • Cracking Percent
  • Broken Slabs Percentage
  • Longitudinal Joint Distress
  • Transverse Joint Distress
  • Transverse Cracking Severity
  • Longitudinal Cracking Severity
Pavement Condition Indexes

- **PSI** – *Present Serviceability Index* – Function of IRI
- **NCI** – *Net Cracking Index* – Function of SCI & ECI
- **SCI** – *Structural Cracking Index* – Alligator & Longitudinal Cracking
- **ECI** – *Environmental Cracking Index* – Transverse & Block Cracking
- **RDI** – *Rut Depth Index* – Function of Mean Rutting
- **JCI** – *Joint Condition Index* – Faulting & Distressed Joints
- **CSI** – *Concrete Slab Index* – Transverse & Longitudinal Cracking (Concrete)
- **CCI** – *Composite Condition Index* – Function of 6 indexes
Analysis

• Pavement Management Software
  • Deighton dTIMS Version 9.5
  • Transitioning to dTIMS Business Analytics (BA)
  • Utilized Deighton for over 25 years

• Analysis Types
  • Fixed Budget
    • Forced division of dollars between Preservation and Rehabilitation treatments
    • Allow dTIMS to best allocate funds for greatest overall condition improvement
Analysis – Performance Curves

• Deighton Regression Application
• Utilizes condition and historical data from dTIMS
  • Determines the age of the pavement
• User defined limits for outlier data points
• Builds best-fit curves based on acceptable data points
  • Polynomial, Log, Sigmoid, Power, Linear
• Outputs results to a spreadsheet which is then used by dTIMS
  • User has ability to choose or override curves within the spreadsheet
Analysis – Performance Curves
Analysis - Strategies
Analysis - Strategies
Analysis - Strategies

Treatment Cost Analysis for Interstate: IM_2017_NC_35M_35R
Total Length: 823.21 mi

- Reconstruction
- Thick Overlay
- Thin Overlay
Analysis - Strategies

Condition Distribution for Interstate: IM_2017_NC_35M_35R: nAAV_PSI
Total Length: 823.21 mi

- Years: 2017 to 2031
- Categories: Category 1 to Category 5
- Length in Backlog: Various lengths for different years and categories.
Analysis

• Federal construction programs
  • Interstates
  • Major Corridors
  • NHS Routes
PMS Usage

Cracking Index

Start 3.55

S1 – dTIMS
4.28

S2 – 50/50
4.25

S3 – Rehab
3.94
TAMP Development

- Developed by Mott-Mcdonald, Kercher Group, & Deighton
- Pavement Management System Refinements
  - Treatment triggers
  - Treatment resets
  - Decision making processes within dTIMS
  - MAP-21 reporting
  - MAP-21 projections
- Bridges added to dTIMS
## MAP-21 Reporting Statistics

<table>
<thead>
<tr>
<th>Year</th>
<th>% GOOD</th>
<th>% FAIR</th>
<th>% POOR</th>
<th>% MISSING</th>
<th>Total Mileage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>70.51%</td>
<td>22.08%</td>
<td>1.95%</td>
<td>5.46%</td>
<td>1003.34</td>
</tr>
<tr>
<td>2015</td>
<td>80.56%</td>
<td>15.10%</td>
<td>1.21%</td>
<td>3.14%</td>
<td>1002.79</td>
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<tr>
<td>2016</td>
<td>85.20%</td>
<td>14.67%</td>
<td>0.20%</td>
<td>0.00%</td>
<td>1003.85</td>
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<tr>
<td>2017</td>
<td>73.41%</td>
<td>23.76%</td>
<td>0.05%</td>
<td>2.52%</td>
<td>1002.95</td>
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</tbody>
</table>
# MAP-21 Reporting Statistics

## Non-Interstate NHS

<table>
<thead>
<tr>
<th>Year</th>
<th>% GOOD</th>
<th>% FAIR</th>
<th>% POOR</th>
<th>% MISSING</th>
<th>Total Mileage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>54.62%</td>
<td>42.58%</td>
<td>1.58%</td>
<td>1.22%</td>
<td>1446.71</td>
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<td>2015</td>
<td>44.09%</td>
<td>52.80%</td>
<td>1.65%</td>
<td>1.45%</td>
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<tr>
<td>2016</td>
<td>49.72%</td>
<td>49.06%</td>
<td>0.64%</td>
<td>0.57%</td>
<td>2223.72</td>
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<tr>
<td>2017</td>
<td>40.87%</td>
<td>55.84%</td>
<td>1.20%</td>
<td>2.09%</td>
<td>1270.83</td>
</tr>
</tbody>
</table>
MAP-21 Targets*

- Interstate % Poor – 2%
- Interstate % Good – 75%
- Non-IS NHS % Poor – 2.5%
- Non-IS NHS % Good – 50%