FHWA Update for AASHTO CBS - T18

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Images Source: FHWA, Shay Burrows
Outline

• Bridge program language
• Asset/Performance Management
• NBIS/Coding Guide
• UAS for bridge inspection
• Critical findings
• Load rating and posting
• Tunnel inspection program
The Language of the F-A Bridge Program

- Sufficiency Rating
- Functionally Obsolete
- Structurally Deficient
- Fracture Critical

- Good/Fair/Poor

To avoid some of the same misuse or misinterpretation, illustrative language is needed.

National Bridge Inspection Standards (NBIS) Update?
Good

- A bridge classified as in Good condition has all primary bridge components rated in good condition or better. Good condition would indicate the structural elements of the bridge have no deterioration or some minor deterioration. A bridge in good condition may need preservation or cyclic maintenance activities.

<table>
<thead>
<tr>
<th>Component Condition Rating</th>
<th>Performance Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 Excellent Condition</td>
<td>Good</td>
</tr>
<tr>
<td>8 Very Good Condition</td>
<td>Good</td>
</tr>
<tr>
<td>7 Good Condition</td>
<td>Good</td>
</tr>
</tbody>
</table>
A bridge classified as in Fair condition has one or more primary bridge components rated in satisfactory or fair condition, and no components rated worse than fair condition. Fair condition would indicate that some structural elements of the bridge have minor deterioration that could include section loss, cracking, spalling, scour, or other defects of similar significance. Typical needs of a bridge in fair condition would include preservation, cyclic maintenance activities, or condition-based maintenance activities.

<table>
<thead>
<tr>
<th>Component Condition Rating</th>
<th>Performance Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Satisfactory Condition</td>
<td>Fair</td>
</tr>
<tr>
<td>5 Fair Condition</td>
<td>Fair</td>
</tr>
</tbody>
</table>
A bridge classified as in Poor condition has one or more primary bridge components rated in poor or worse condition. Poor condition would indicate that some structural elements of the bridge have advanced deterioration. Typical needs of a bridge in poor condition would include condition-based maintenance activities, rehabilitation, or replacement.

<table>
<thead>
<tr>
<th>Component Condition Rating</th>
<th>Performance Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Poor Condition</td>
<td>Poor</td>
</tr>
<tr>
<td>3 Serious Condition</td>
<td>Poor</td>
</tr>
<tr>
<td>2 Critical Condition</td>
<td>Poor</td>
</tr>
<tr>
<td>1 Imminent Failure Condition</td>
<td>Poor</td>
</tr>
<tr>
<td>0 Failed Condition</td>
<td>Poor</td>
</tr>
</tbody>
</table>
Asset Management

- Key dates
  - 10/2/2017 – Asset management regulation becomes effective
  - 4/30/2018 – Initial TAMPs due
  - 6/30/2019 – Final TAMPs due
- Update and resubmit TAMPs at least every 4 years

[TPM Performance Measures diagram with Baseline, 2-yr Target, and 4-yr Target values: Baseline: Poor 4.5, Fair 41.5, Good 41.7; 2-yr Target: Poor 5.9, Fair 41.7, Good 6.0; 4-yr Target: Poor 4.5, Fair 5.9, Good 6.0]
This new workshop is intended to help remedy a knowledge gap among the bridge community. A technical workshop about how fundamental BMS modeling and analyses can be used to support a bridge management program. Does not specifically address FHWA asset management requirements. Does not cover the details of any particular software. 2 or 3 days at choice of agency. Available starting in 2019 (announcement will be sent to State bridge management leads & FHWA Division Bridge Engineer).
FHWA BMS Workshop Modules

• Why/How
  • Purpose and Value of BMS
  • Features & Workflow

• Inputs
  • Inventory & Condition Data
  • Goals, Objectives, Measures
  • Deterioration Modeling
  • Actions, Costs, Effects Modeling
  • Life-Cycle & Agency Costs Modeling
  • Functional Improvement & User Costs Modeling
  • Risk Assessment & Mitigation Modeling

• Analysis
  • Benefit-Cost Analysis
  • Optimization & Prioritization

• Outputs
  • Investment Strategy Simulation
  • Project & Program Planning
  • Communication & Reporting

• Implementation
  • BMS Implementation Steps
  • Integrating Business Processes & BMS
  • Investment Strategy Development, Measures Validation & Selection, Target Setting
NBIS and Coding Guide Update

• MAP-21 requirements
  • Establish risk-based, data-driven frequency of inspections
  • Establish procedures for reporting critical findings and monitoring corrective actions
  • Requirement to conduct annual compliance reviews
  • Maintain a bridge inspection training program
  • Nationally Certified Bridge Inspectors
  • Make the NBIS and NTIS uniform
Proposed NBIS Details
UAS for Bridge Inspection

- Supplement vs. supplant
- Research at TFHRC
- Establish minimum standards for use

Image Source: Getty Images
Critical Findings

• Bridge and tunnel safety first
• Reporting timeliness
• FHWA future database

Image Source: FHWA, Tom Drda
Changing Truck Weights

- Special Hauling Vehicles
- Emergency Vehicles
- Heavy Duty Tow and Recovery Vehicles

Images Source: FHWA
Table 3-8. Trucks and Truck Miles by Average Weight: 1987, 1992, 1997, and 2002

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number (thousands)</td>
<td>VMT (millions)</td>
<td>Number (thousands)</td>
<td>VMT (millions)</td>
<td>Number (thousands)</td>
</tr>
<tr>
<td>Total</td>
<td>3,624</td>
<td>89,972</td>
<td>4,008</td>
<td>104,987</td>
<td>4,701</td>
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<tr>
<td>Light-heavy</td>
<td>1,030</td>
<td>10,768</td>
<td>1,259</td>
<td>14,012</td>
<td>1,436</td>
</tr>
<tr>
<td>10,001 to 14,000</td>
<td>525</td>
<td>5,440</td>
<td>694</td>
<td>8,000</td>
<td>819</td>
</tr>
<tr>
<td>14,001 to 16,000</td>
<td>242</td>
<td>2,738</td>
<td>282</td>
<td>2,977</td>
<td>316</td>
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<tr>
<td>16,001 to 19,500</td>
<td>263</td>
<td>2,590</td>
<td>282</td>
<td>3,035</td>
<td>301</td>
</tr>
<tr>
<td>Medium-heavy</td>
<td>766</td>
<td>7,581</td>
<td>732</td>
<td>8,143</td>
<td>729</td>
</tr>
<tr>
<td>19,501 to 26,000</td>
<td>766</td>
<td>7,581</td>
<td>732</td>
<td>8,143</td>
<td>729</td>
</tr>
<tr>
<td>Heavy-heavy</td>
<td>1,829</td>
<td>71,623</td>
<td>2,017</td>
<td>82,832</td>
<td>2,536</td>
</tr>
<tr>
<td>26,001 to 33,000</td>
<td>377</td>
<td>5,411</td>
<td>387</td>
<td>5,694</td>
<td>428</td>
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<tr>
<td>33,001 to 40,000</td>
<td>209</td>
<td>4,113</td>
<td>233</td>
<td>5,285</td>
<td>257</td>
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<tr>
<td>40,001 to 50,000</td>
<td>292</td>
<td>7,625</td>
<td>339</td>
<td>9,622</td>
<td>400</td>
</tr>
<tr>
<td>50,001 to 60,000</td>
<td>188</td>
<td>7,157</td>
<td>227</td>
<td>8,699</td>
<td>311</td>
</tr>
<tr>
<td>60,001 to 80,000</td>
<td>723</td>
<td>45,439</td>
<td>781</td>
<td>51,044</td>
<td>1,070</td>
</tr>
<tr>
<td>80,001 to 100,000</td>
<td>28</td>
<td>1,254</td>
<td>33</td>
<td>1,528</td>
<td>46</td>
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<tr>
<td>100,001 to 130,000</td>
<td>8</td>
<td>440</td>
<td>12</td>
<td>734</td>
<td>18</td>
</tr>
<tr>
<td>130,001 or more</td>
<td>4</td>
<td>185</td>
<td>5</td>
<td>227</td>
<td>6</td>
</tr>
</tbody>
</table>
Challenges with Connected and Automated Vehicles

Image Source: https://www.transportation.gov/av/3
Bridge Engineering Must Adapt

• Increasing truck volumes, and new technology such as automated and connected vehicles requires our practice to change the way we do business

• Safety and mobility depend on it
Timeframe for Installing Load Postings

- Public safety issue
- NBIS is silent
- NTIS says, “…as soon as possible but no later than 30 days…”
- The law says to “…ensure uniformity…”
- October 1, 2019
- Consider risk during metric review?
Oversight of the Programs

• Bridge inspection
  • Completed 8th year with bridges
  • Load rating metric is most challenging

NBIS Metrics (2011)

- Satisfactory: 70%
- Actively Improving: 28%
- Unsatisfactory: 1%
- Other: 1%
Oversight of the Programs

• Bridge inspection
  • Completed 8\textsuperscript{th} year with bridges
  • Load rating metric is most challenging

NBIS Metrics (2019)

- 92% Satisfactory
- 8% Actively Improving
- 0% Unsatisfactory
NTIP Implementation and Review Cycle

- Initial baseline review starting this year with a 2-year implementation period

  1st year (2019)
  - Metrics 1-4 & 15 at Intermediate Assessment Level
  - Metrics 5-14 at Minimum Assessment Level
    - Discuss with State for knowledge and awareness
    - One field review
    - No compliance determinations yet

  2nd year (2020)
  - Metrics 5-14 at Intermediate Assessment Level
Thank you!

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