National Bridge Performance Measures

Bruce Johnson
State Bridge Engineer
Oregon DOT

SCOPM recommendations from Dr. Matthew Hardy, AASHTO
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Various Measures for Various Purposes

- AASHTO is developing a limited number of national performance measures to meet MAP-21 requirements
  - Including issues related to the recommended performance measures
    [http://scopm.transportation.org](http://scopm.transportation.org)
- FHWA is developing national measures to satisfy MAP-21 Requirements
- FHWA developed existing measures based on NBI component condition data for managing the old Highway Bridge Program
- States have developed specific measures to manage and communicate their preservation programs that could lead to more preservation based national measures
Overarching Principles

1. **There is a Difference**—National-level performance measures are not necessarily the same performance measures State DOTs will use for planning and programming of transportation projects and funding.

2. **Specificity and Simplicity**—National-level performance measures should follow the SMART and KISS principles:
   - **SMART**: Specific, Measurable, Attainable, Realistic, Timely
   - **KISS**: Keep it Short and Simple

3. **Possession is 9/10ths of the Law**—National-level performance measures should focus on areas and assets that States DOTs have control over.
4. **Reduce and Re-use**—The initial set of national-level performance measures should build upon existing performance measures, management practices, data sets and reporting processes.

5. **Ever Forward**—National-level measures should be forward thinking to allow continued improvement over time.

6. **Communicate, Communicate, Communicate**—Messaging the impact and meaning of the national-level measures to the public and other audiences is vital to the success of this initiative.
The first measure is required in MAP-21 and AASHTO supports this as an initial measure. However, this measure could steer a State DOT to implement a worst-first approach for maintaining bridge condition. Therefore, AASHTO is exploring the second measure.

- FHWA had input on this recommendation and will publish a NPRM in 2014.
Bridge Measure Update

- Expand first measure to include non-NHS bridges
  1. NHS bridge deck area on structurally deficient bridges as a percentage of total NHS bridge deck area.
  2. Non-NHS bridge deck area on structurally deficient bridges as a percentage of total NHS bridge deck area.
- Modify the second measure to the following:
  - NHS Bridges in need of:
    - Cyclic Maintenance: NBI 7-9 (Sub for Good)
    - Preventive Maintenance: NBI 5-6 (Sub for Fair)
    - Replacement or Rehab: NBI 0-4 (Sub for Poor)
  - Overall condition is the lowest of the major component
- Reported by:
  1. Count of Bridges
  2. Bridge Deck Area
Pavement
Recommended Measures

- **Interstate Pavement in Good, Fair and Poor Condition based on the International Roughness Index (IRI)**—Percentage of 0.1 mile segments of Interstate pavement mileage in good, fair and poor condition based on the following criteria: good if IRI<95, fair if IRI is between 95 and 170, and poor if IRI is greater than 170.

- **Non-Interstate NHS Pavement in Good, Fair and Poor Condition based on the International Roughness Index (IRI)**—Percentage of 0.1 mile segments of non-Interstate NHS pavement mileage in good, fair and poor condition based on the following criteria: good if IRI<95, fair if IRI is between 95 and 170, and poor if IRI is greater than 170.

- **Pavement Structural Heath Index**—Percentage of pavement which meet minimum criteria for pavement faulting, rutting and cracking.
• FHWA Long Term Bridge Program has contracted with Pennoni Assoc. Inc. to develop a Long Term Bridge Performance Index
  – Intended to be a single number representing the overall performance of the bridge
  – There are three sub-categories of performance
    • Element Condition Index
    • Service level Index
    • Maintenance/preservation level Index
  – Seeking input from LTBP State Coordinators
  – Final Measure Due by end of the year
System Performance
Recommended Measures

• **Annual Hours of Delay (AHD)**—Travel time above a congestion threshold (defined by State DOTs and MPOs) in units of vehicle-hours of delay on Interstate and NHS corridors.

• **Reliability Index (RI$_{80}$)**—The Reliability Index is defined as the ratio of the 80th percentile travel time to the agency-determined threshold travel time.

• Recommended Freight measures are the same, subdivided into truck traffic only
Possible LTBP Bridge System Measure

**Long Term Bridge Performance Rating**

- **Functionality & Utility Index**
  - User Safety & Service, Cost to Agency and Users
  - Weighted Combination
  - FUI$_F$  
  - FUI$_U$

- **Serviceability & Durability Index**
  - Level of Service, Condition
  - Weighted Combination
  - SDI$_S$  
  - SDI$_D$

- **System Integrity & Resilience Index**
  - Safety, Stability & Robustness
  - Weighted Combination
  - SIRI$_S$  
  - SIRI$_{GH}$

Data-driven metrics (model and experiment), heuristic-based metrics, qualitatively assessed metrics
Thank you

• National Bridge Measures are Coming Your Way Soon