Washington State Department of Transportation

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An overview of bridge performance requirements for the Moving Ahead for Progress in the 21st Century Act

In January 2015, the U.S. Department of Transportation (U.S. DOT)published a Notice of Proposed Rule Making (NPRM) in the Federal Register, to propose performance management regulations related to assessing the condition of bridges on the National Highway System (NHS), pavements on the Interstate, and pavements on the non-Interstate NHS as required by Moving Ahead for Progress in the 21st Century Act (MAP-21). The bridge performance portion of that NPRM will be the focus of this folio.

Target setting and "significant progress"

- States must set targets for each of the proposed bridge performance measures.
- States must establish 2-year (midpoint) and 4-year (full performance period) targets as part of the Baseline Performance Report (due October 2016). Adjustment of the 4-year target is allowed at the target period's midpoint.
- Only statewide targets are required, but a state can opt to set additional urbanized/non-urbanized targets.
- State DOTs are required to coordinate with relevant Metropolitan Planning Organizations (MPOs) on the selection of targets.
- The MPOs have the option of setting their own respective 4-year targets or aligning with WSDOT targets. The MPOs must set their targets within six months of the state setting its targets.
- For NHS bridges in poor condition, states must set targets equal to or less than 10 percent (the required minimum condition level). States are allowed to set targets that are worse than baseline levels as long as the baseline is below 10 percent structurally deficient, which may occur due to lack of funding or changing priorities. For example, if 8 percent of a state's NHS bridges are rated as structurally deficient in the baseline report, the state is allowed to set a target of 9 percent. This target is worse than the baseline level, but does not exceed the required minimum condition level of no more than 10 percent of NHS bridges classified as structurally deficient.
- The Federal Highway Administration (FHWA) will assess whether the state has made "significant progress" toward meeting National Highway Performance Program (NHPP) targets after the midpoint and full performance periods. **"Significant progress" means bridge condition improved from the baseline level or its condition is better than the target.** A decline in condition can be considered significant progress if it is above the target.

Summary of required performance measures

The FHWA draft rules for MAP-21 require all states to report on the following bridge performance measures:

- Percentage of National Highway System (NHS) bridges classified in good condition
- Percentage of NHS bridges classified in poor condition
  - To maintain the minimum bridge condition level, no more than 10 percent of NHS bridges can be structurally deficient. See "Minimum condition..." on page 3 for more details.

On its way to Lake Washington Pontoon G, the 75th of 77 SR 520 pontoons needed to build the new floating bridge passes through the Montlake Cut and under the historic Montlake bridge.

MAP-21

Washington National Highway System bridge inventory and conditions

Washington's National Highway System includes 2,459 bridges, 92 percent of which are managed by WSDOT. The remaining 8 percent (200 bridges) are owned and managed by local agencies.

As of April 2015, 33 percent of the bridges on the NHS were classified as in good condition, and 9.3 percent in poor condition. For state-owned bridges, 3.6 percent were in poor condition; 11.5 percent of local agency-owned bridges were in poor condition as shown in the table at right.

Washington state bridge system inventory
As of December 2013; MAP-21 requirements pertain to NHS bridges only

	All bridges – statewide NHS and non-NHS	National Highway System – (NHS) bridges
State-owned	3,286	2,259
Locally-owned	4,027	200
Total	7,313	2,459

Data source: WSDOT Bridges & Structures Office.

Condition ratings for bridges on the National Highway System
As of April 2015

BRIDGE CONDITION	Good		Poor	
	Deck area	Percent	Deck area[1]	Percent
State-owned	12.5	32.0%	3.6	9.1%
Locally-owned	1.7	43.4%	0.4	11.5%
Total NHS	14.2	**33.0%**	4.0	**9.3%**

Data source: WSDOT Bridge & Structures Office.
Notes: MAP-21 procedures uses for condition rating (Good NBI 7 or 9 / Fair NBI 5 or 6 / Poor NBI 3 or 4). Deck areas in millions of square feet; rounding numbers may create slight variances. State-owned deck percentages based on 39.2 million square feet, locally-owned based on 3.9 million square feet, total deck area percentages based on 43.0 million square feet. Locally-owned bridges owned by counties and cities.

Bridge condition assessment

The MAP-21 rules propose that bridge condition be determined based on an assessment of the deck, superstructure and substructure. Culverts are also included and are only rated based on one item. The proposed method for classification would be the same method currently used under the Highway Bridge Program, as shown in the table at right.

National Bridge Inventory (NBI) condition rating thresholds for National Highway System bridges

	9 - 8 - 7	6 - 5	4 - 3 - 2 - 1 - 0
	Good	Fair	Poor
Deck	≥ 7	5 or 6	≤ 4
Superstructure	≥ 7	5 or 6	≤ 4
Sustructure	≥ 7	5 or 6	≤ 4
Culvert	≥ 7	5 or 6	≤ 4

Data source: Federal Highway Administration.

Bridge condition assessment based on minimum values

The FHWA proposes that for each applicable bridge, the performance measures for determining condition be based on the minimum values for deck, superstructure, substructure and culverts. The FHWA further proposes to weight this condition by the respective deck area of each bridge and express condition totals as a percentage of the total deck area of bridges in a state. This method for calculating bridge condition is illustrated below.

Calculating NHS bridge condition performance measures

	Structure Type		
	Bridges	Culverts	
Overall bridge condition rating	3 metric classification (Deck, Superstructure, Substructure)	1 metric classification (Culverts)	Measures
Good	All metrics rated "good"	Metric rated "good"	Percentage of deck area classified in good condition
Poor	Any metrics rated "poor"	Metric rated "poor"	Percentage of deck area classified in poor condition
Fair	Minimum rated metric "fair"	Metric rated "fair"	

Data source: Federal Highway Administration.

The percentage of total NHS bridge deck area for each classification (good, fair and poor) would be calculated as the ratio of the total deck area of NHS bridges in a classification to the total deck area of NHS bridges in the state:

$$\text{\% of NHS bridges in good condition} = 100.0 * \frac{\text{Total deck area of NHS bridges in good condition}}{\text{Total deck area of NHS bridges in a state}}$$

$$\text{\% of NHS bridges in poor condition} = 100.0 * \frac{\text{Total deck area of NHS bridges in poor condition}}{\text{Total deck area of NHS bridges in a state}}$$

Reporting on National Highway System bridge conditions

For the Baseline Performance Report, states will be required to collect annual condition data of the superstructure, substructure, deck area and culverts for the National Bridge Inventory (NBI). The existing NBI data from 2013, 2014 and 2015 will be used for the baseline report. WSDOT currently collects and reports on this data, so this will not be a change. The Mid Performance Period Report will cover NBI data for 2016-2017, and the Full Performance Period Report will include 2018-2019.

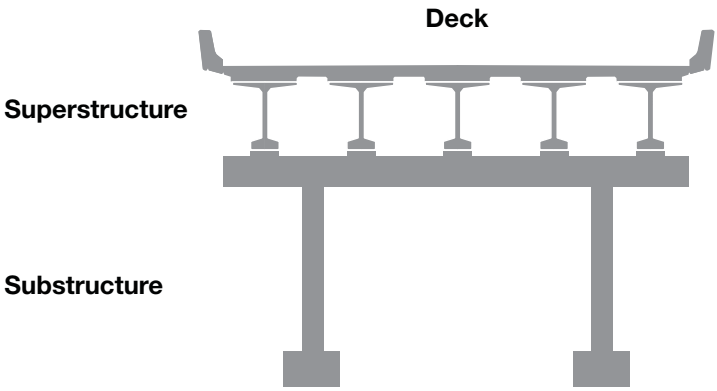
The FHWA proposes that state DOTs coordinate with all relevant bridge owners, such as federal agencies that own NHS bridges and other state DOTs that share NHS bridges that cross state borders, in order to meet the proposed requirements and to ensure consistency. This differs from certain established requirements of the National Bridge Inspection Standards (NBIS), such as the NBI data submittal process under which states are not responsible for federally- or tribally-owned bridges.

The FHWA will make minimum condition level determinations annually based on data finalizeded in the NBI as of June 15. The FHWA proposes that state DOTs submit their most current NBI data on highway bridges to FHWA no later than March 15 annually (up from the current deadline of April 1). State DOTs will have 90 days after submitting their inventory to the NBI to conduct data checks to ensure quality and completeness. The FHWA will make its compliance determination and notify all state DOTs of their findingss prior to October 1 of the year in which the determination was made.

Reports are structured by a 4-year reporting cycle, with midpoint (2-year) reports. Between October 2016 and October 2020, state DOTs will be required to submit three performance reports to FHWA:

- Baseline Performance Report: In this report, states must establish 2-year and 4-year targets, describe baseline conditions, urbanized area boundaries and population data, NHS limits, and relationship with other performance expectations.
- Mid Performance Period Progress Report: States must report on 2-year conditions and performance, investment strategy effectiveness and discuss progress in achieving targets. States have the option to adjust 4-year targets at this time. In this report, states can also include a discussion of target achievement and extenuating circumstances.
- Full Performance Period Progress Report: This report includes the same content as the Mid Performance Period Progress Report, but reports on the 4-year targets. If a state has not made significant progress toward achieving the NHPP targets in two consecutive biennial determinations, then the state DOT will include a description of the actions they will undertake to better achieve the targets in the next performance period.
    - As part of the Full Performance Period Progress Report, MPOs will report targets and progress toward the achievement of targets. They will report their established targets, performance, progress, and achievement of the targets to their respective state DOT in a manner that is agreed upon by both parties and documented in the Metropolitan Planning Agreement.

Anatomy of a bridge



For MAP-21's Baseline Performance Report, states will be required to collect annual condition data of the superstructure, substructure, deck area and culverts for the National Bridge Inventory (NBI).

Minimum condition level requirements

As a minimum condition level, MAP-21 proposes that no more than 10 percent of NHS bridges measured by deck area be classified as structurally deficient. A structurally deficient bridge is deteriorated structurally, as indicated by a superstructure, deck, and/or substructure rating of four or less, or when the appraisal ratings for structural evaluation or waterway adequacy are two or less, on a scale of zero to nine. Except for structural evaluation or waterway adequacy, WSDOT's poor condition category uses the same data, criteria, and rating scale as that required for MAP-21 (see *Gray Notebook* 50, p. 14). The minimum condition level is applicable to bridges on the NHS, to bridges on ramps connecting to the NHS within a state, and to bridges on the NHS that cross a state border.

The FHWA will carry out the first determination of compliance with the minimum condition requirements in 2016 (based on bridge condition data for 2013, 2014 and 2015), and annually thereafter. Following this schedule, any penalties resulting from the minimum condition compliance determination would not be in effect until after October 1, 2016.

The MAP-21 legislation proposes that the FHWA's National Bridge Inventory (NBI) be the source of data for classifying a bridge as structurally deficient. Currently, the NBI is the primary source for national bridge information and has been used for many years to classify bridges as structurally deficient, determine eligibility for the Highway Bridge Program, and apportion federal-aid funds.

Bridge data collection for MAP-21

WSDOT is required to report data to FHWA annually on the condition, functional adequacy and essentiality for the public for all bridges statewide. The bridge data determines sufficiency ratings and if a bridge is structurally deficient and/or functionally obsolete. The same bridges that are rated for WSDOT's condition rating are also rated in the federal system, in addition to local agency owned bridges across the state.

The good, fair, and poor classification of bridges on the NHS utilizes data elements from the NBI database. State DOTs measure and classify a number of standard features for bridges (such as condition and geometric information) in their jurisdiction, which they are required to report to FHWA on an annual basis. These requirements include bridges on ramps connecting to the NHS.

Penalties

The FHWA will evaluate annually whether a state meets the minimum condition requirement for the preceding 3-year period. If a state is not in compliance with the minimum condition requirement (no more than 10 percent structurally deficient), a penalty will be assessed during the fiscal year following the FHWA's determination. States that do not meet the minimum condition requirement will be required to obligate 50 percent of the NHPP funds allocated to the state to carry out the Highway Bridge Program for fiscal year 2009 only for eligible NHS bridge projects. Implementation of this requirement would not result in states losing funds. States would lose some flexibility in determining how they use NHPP funds because they would be required to designate funds to address NHS bridge deficiencies. This requirement will remain in effect until less than 10 percent of a state's NHS bridges deck area is classified as structurally deficient.

What is the current distribution of funds?

Bridge: The Local Federal Bridge Program provides approximately $45 million ($23 million from NHPP and $22 million from STP) annually to improve the condition of bridges through replacement, rehabilitation and preventive maintenance. WSDOT prioritizes and selects local bridge projects for funding based on the condition of the structures.

The distribution of federal funding is currently split with 66 percent to WSDOT and 34 percent to local agencies, based on the Governor's MAP-21 steering committee for federal highway funds distribution agreement.

For more information

State bridge condition information: DeWayne Wilson, WSDOT Bridge Management Engineer, at (360) 705-7214 or WilsonD@wsdot.wa.gov.
Local bridge condition information: Roman Peralta, WSDOT Local Programs Bridge Engineer, at (360) 705-7870 or PeraltR@wsdot.wa.gov.

Available Data

- Bridge condition assessment of the National Highway System (NHS) [National Bridge Inventory (NBI) item ratings of bridge deck, superstructure, substructure, and/or culverts for all federally reportable state and local bridges][1]

Notes: Data is available for county and city levels and can be provided by the MPO boundaries. 1 Bridge condition data for tribally-owned and federally-owned bridges is provided to WSDOT by the bridge owner.

Purpose of reporting requirements

In July 2012, the Moving Ahead for Progress in the 21st Century Act (MAP-21) became law. Included in the law was a Declaration of Policy: "Performance management will transform the Federal-aid highway program and provide a means to the most efficient investment of Federal transportation funds …."

The primary objectives of MAP-21 are to increase the transparency and accountability of states for their investment of federal taxpayer dollars into transportation infrastructure and services nationwide, and to ensure that states invest money in transportation projects that collectively make progress toward the achievement of national goals. The new rules will require reporting performance on the following areas: Safety; Pavement and Bridge; System Performance/Congestion; Freight, and Congestion Mitigation and Air Quality (CMAQ).

Prior to MAP-21, there were no explicit requirements to demonstrate how transportation programs supported national performance outcomes. But many state DOTs, like WSDOT, have engaged in voluntary accountability and reporting efforts.

Contractor crews working for WSDOT in the process of rebuilding a new bridge on State Route 162 across the Puyallup River Bridge in Pierce County.

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