

PERFORMANCE BASED PLANNING & PROGRAMMING

Pavement and Bridge Performance Measures

Eric Randall, TPB Engineer

Matthew Gaskin, TPB Transportation Planner

TPB Technical Committee

June 1, 2018



Contents of Presentation

- Overview of Pavement and Bridge Performance Measures
- Pavement
 - Overview of the Measures
 - Data / Methodology
 - State and TPB targets
- Bridges
 - Overview of the Measure
 - Data / Methodology
 - State and TPB targets
- Next Steps



Highway Condition Performance Measures

Performance Measure	Data
(1) Percentage of pavements on the Interstate System in Good condition	<i>four metrics:</i> <ul style="list-style-type: none"> • IRI (International Roughness Index) • Cracking_Percent • Rutting (<i>asphalt only</i>) • Faulting (<i>jointed concrete only</i>)
(2) Percentage of pavements on the Interstate System in Poor condition	
(3) Percentage of pavements on the NHS (excl. Interstate System) in Good condition	
(4) Percentage of pavements on the NHS (excl. Interstate System) in Poor condition	
(5) Percentage of NHS Bridges Classified as in Good Condition	<i>three types of pavements:</i> <ul style="list-style-type: none"> • Asphalt pavements • Continuously Reinforced Concrete Pavement (CRCP) • Jointed Concrete Pavements
(6) Percentage of NHS Bridges Classified as in Poor Condition	
	<i>four condition ratings:</i> <ul style="list-style-type: none"> • Deck • Superstructure • Substructure • Culverts



Details of Performance Condition

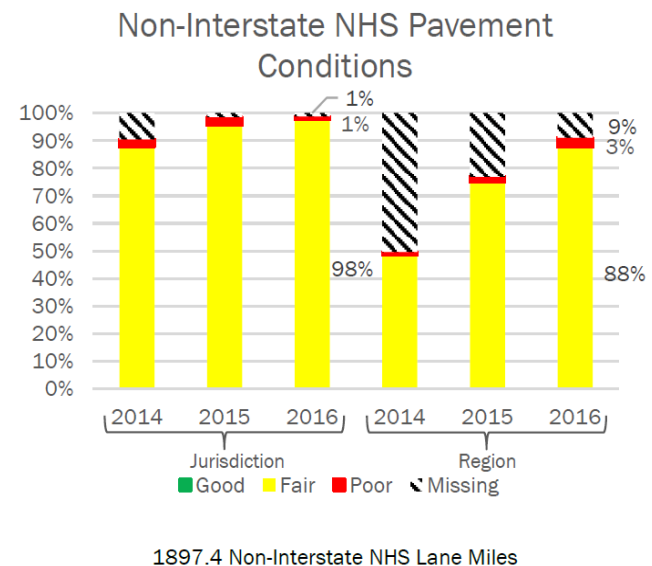
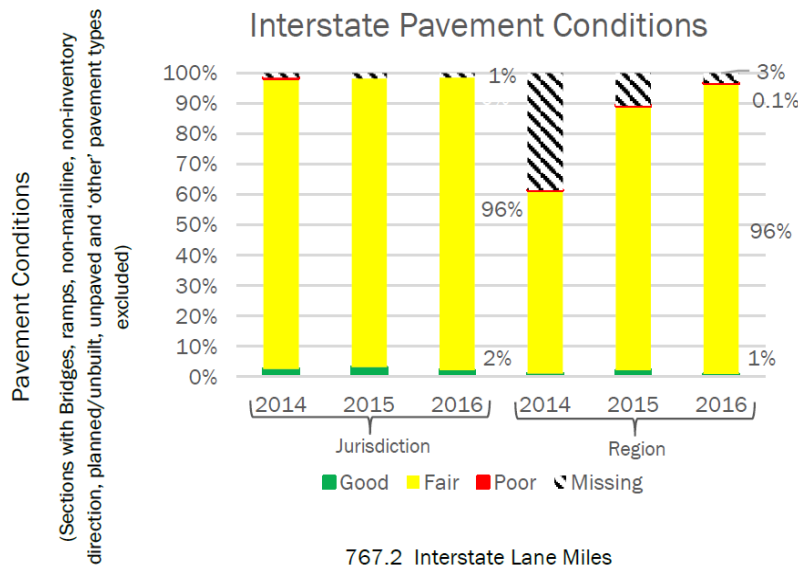
https://gis.mwcog.org/webmaps/tpb/pbpp/pavement_bridge/

- Summary pages with graphs of pavement and bridge condition will be provided – *completed for states; in progress for jurisdictions*

Performance Based Planning & Programming

Virginia

The Federal Highway Administration has established measures for state departments of transportation to use to assess the condition of pavements on the National Highway System (NHS), bridges carrying the NHS which includes on-and off-ramps connected to the NHS, and pavements on the Interstate System.



PAVEMENT



Pavement Measures

- Measurement of the condition (good or poor) of pavement on both the Interstate and Non-Interstate roadways on the National Highway System
 - State DOTs must establish **two and four-year targets** (2019 and 2021 respectively) for the NHS (Non-Interstate) roadways, but only a **four-year target** for the Interstate NHS, by May 20, 2018
- All conditions will be reported in the State's baseline performance period report due by October 1, 2018
- MPOs must either support the State targets or establish their own quantifiable **four-year targets** within 180 days of the State target establishment



Current (2016) Summary of Pavement Data

Interstate	Lane Miles	Good	Fair	Poor	Missing
DC	55.2	1%	20%	0%	79%
MD*	853.6	0%	1%	0%	0%
VA*	767.2	2%	96%	0%	1%
Region	1676.0	1%	96%	0.1%	3%

NHS (Non-Interstate)	Lane Miles	Good	Fair	Poor	Missing
DC	464.4	0%	18%	0%	82%
MD*	2272.4	0%	94%	6%	0%
VA*	1897.4	0%	98%	1%	1%
Region	4634.2	0%	88%	3%	9%

*Sub-region information

Data Collection/Methodology - Pavement

- Data was collected via HPMS (Highway Performance Monitoring System). The HPMS field manual inventory contains metrics for rutting, faulting, cracking, and International Roughness Index (IRI)
- All DOTs set statewide targets by May 20, 2018
- To calculate targets for the TPB planning area:
 - District DOT statewide targets are applied for District lane-miles
 - Maryland DOT provided county level targets which were applied to the lane mileage to produce a target for Suburban Maryland
 - Virginia DOT provided statewide targets, which were applied to the Northern Virginia lane mileage to calculate a sub-region target
 - The percentage of both “good” and “poor” lane miles for the region was then calculated



District of Columbia Pavement Targets

- District of Columbia targets were established on May 20
- Statewide target percentage was applied to the total lane miles of both the Interstate and Non-Interstate roadways on the NHS

Interstate	CY 2018 – 2020 Two Year Target	CY 2018 – 2022 Four Year Target
Percent Good	10%	5%
Percent Poor	5%	5%

NHS (Non-Interstate)	CY 2018 – 2020 Two Year Target	CY 2018 – 2022 Four Year Target
Percent Good	67%	54%
Percent Poor	7.1%	14.1%



Maryland Sub-Region Pavement Targets

- Maryland targets were established on May 20.
- Sub-region targets at the county level were provided to TPB staff
- The Sub-region target percentage was applied to the total lane miles of both the Interstate and Non-Interstate roadways on the NHS

Interstate	CY 2016 – 2018 Two Year Target	CY 2016 – 2020 Four Year Target
Percent Good	Not Required	62.8%
Percent Poor	Not Required	0.3%
NHS (Non-Interstate)	CY 2016 – 2018 Two Year Target	CY 2016 – 2020 Four Year Target
Percent Good	32.4%	31.6%
Percent Poor	6.5%	7.2%



Virginia State Pavement Targets

- Virginia statewide targets were established on May 20
- Statewide target percentage was applied to the total lane miles of both the Interstate and Non-Interstate roadways on the NHS

Interstate	CY 2018 – 2019 Two Year Target	CY 2018 – 2021 Four Year Target
Percent Good	45%	45%
Percent Poor	<3%	<3%
NHS (Non-Interstate)	CY 2018 – 2019 Two Year Target	CY 2018 – 2021 Four Year Target
Percent Good	25%	25%
Percent Poor	<5%	<5%



TPB Pavement Targets - Draft

- Targets for the TPB planning area have been calculated by totaling the forecast “good” and “poor” lane miles for the region

Interstate	CY 2018 – 2019 Two Year Target	CY 2018 – 2021 Four Year Target
(1) Percentage of pavements on the Interstate System in Good condition	Not Required	52.7%
(2) Percentage of pavements on the Interstate System in Poor condition	Not Required	1.7%
NHS (Non-Interstate)	CY 2018 – 2019 Two Year Target	CY 2018 – 2021 Four Year Target
(3) Percentage of pavements on the NHS (excl. Interstate) in Good condition	32.8%	31.1%
(4) Percentage of pavements on the NHS (excl. Interstate) in Poor condition	5.9%	7.0%



BRIDGES



Bridge Measures

- Measurement of the bridge deck area condition (good or poor) for all bridges carrying NHS, including on and off-ramps connecting to the NHS
 - State DOTs must establish **two and four-year targets** (2019 and 2021 respectively) for the bridge deck condition by May 20, 2018
- All bridge conditions will be reported in the State's baseline performance period report due by October 1, 2018
- MPOs must either support the State targets or establish their own quantifiable **four-year targets** within 180 days of the State target establishment



Current (2017) Summary of Pavement Data

Bridge	Deck Area*	Good	Fair	Poor	Missing
DC	5,998,224	11%	84%	5%	0%
MD	966,300	55%	43%	1%	0.9%
VA	10,234,893	61%	37%	2%	0.2%

*Square footage



Data Collection/Methodology - Bridge

- The National Bridge Inventory (NBI) contains condition information for this measure, including structure length, deck width, and approach roadway
- The state DOTs of Virginia, Maryland and the District of Columbia provided statewide targets, established May 20, 2018
- Established statewide targets were then applied to the sub-region deck areas
- The percentage of both “good” and “poor” deck area was then calculated

*Square footage

District of Columbia Bridge Targets

- District of Columbia targets were established on May 20

Bridges	CY 2018 – 2020 Two Year Target	CY 2018 – 2022 Four Year Target
Deck Area Good	15.8%	24.9%
Deck Area Poor	8.6%	4.1%

- Statewide target percentage was applied to the bridge deck area condition (good or poor) for all bridges carrying NHS



Maryland State Bridge Targets

- Maryland targets were established on May 20.

Bridges	CY 2018 – 2019 Two Year Target	CY 2018 – 2021 Four Year Target
Deck Area Good	29.5%	27%
Deck Area Poor	2%	5%

- Statewide target percentage was applied to the bridge deck area condition (good or poor) for all bridges carrying NHS in the region



Virginia State Bridge Targets

- Virginia targets were established on May 20

Bridges	CY 2018 – 2019 Two Year Target	CY 2018 – 2021 Four Year Target
Deck Area Good	33.5%	33%
Deck Area Poor	3.5%	3%

- Statewide target percentage was applied to the bridge deck area condition (good or poor) for all bridges carrying NHS in the region



TPB Bridge Targets - Draft

- Targets for the TPB planning area have been calculated by totaling the forecast “good” and “poor” deck area for NHS bridges in the region

Bridges	CY 2018 – 2019 Two Year Target	CY 2018 – 2021 Four Year Target
(5) Percentage of NHS Bridges Classified as in Good Condition	27.1%	29.8%
(6) Percentage of NHS Bridges Classified as in Poor Condition	5.2%	3.5%



Next Steps

- Continue coordination with DDOT, VDOT, and MDOT with the development of targets and methodologies
- Brief TPB on draft targets on June 20
- Receive and respond to draft targets
- TPB adopts targets at July 18 meeting
- MPO pavement and bridge targets provided to state DOTs for inclusion in Baseline Period Performance reports to be submitted to FHWA by October 1, 2018
- Include pavement and bridge targets in the System Performance report to be included in Visualize 2045



Eric Randall

TPB Engineer

(202) 962-3254

erandall@mwkog.org

Matthew Gaskin

TPB Transportation Planner

(202) 962-3761

mgaskin@mwkog.org

mwkog.org/tpb

Metropolitan Washington Council of Governments

777 North Capitol Street NE, Suite 300

Washington, DC 20002



National Capital Region
Transportation Planning Board

Pavement Conditions

- Data from Highway Performance Monitoring System (HPMS)
- Data submitted in June for prior year; available for analysis in October

Extent – Entire NHS reported in 0.1 mile sections

Interstate – 2 Directions

Non Interstate National Highway System – 1 Direction

Three inventory data elements:

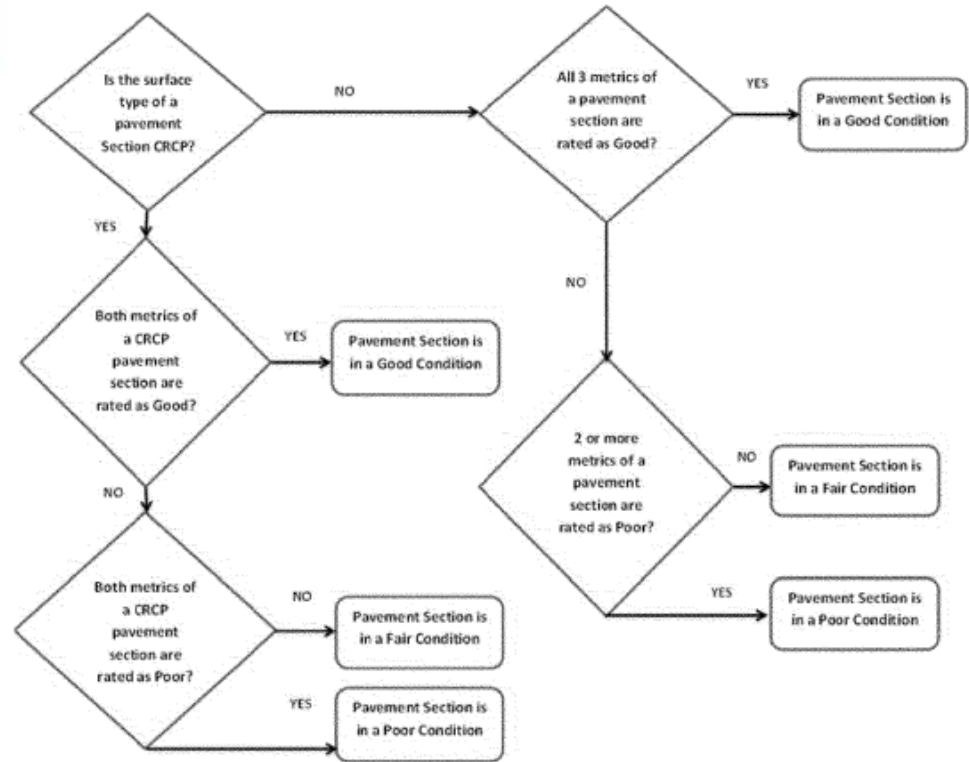
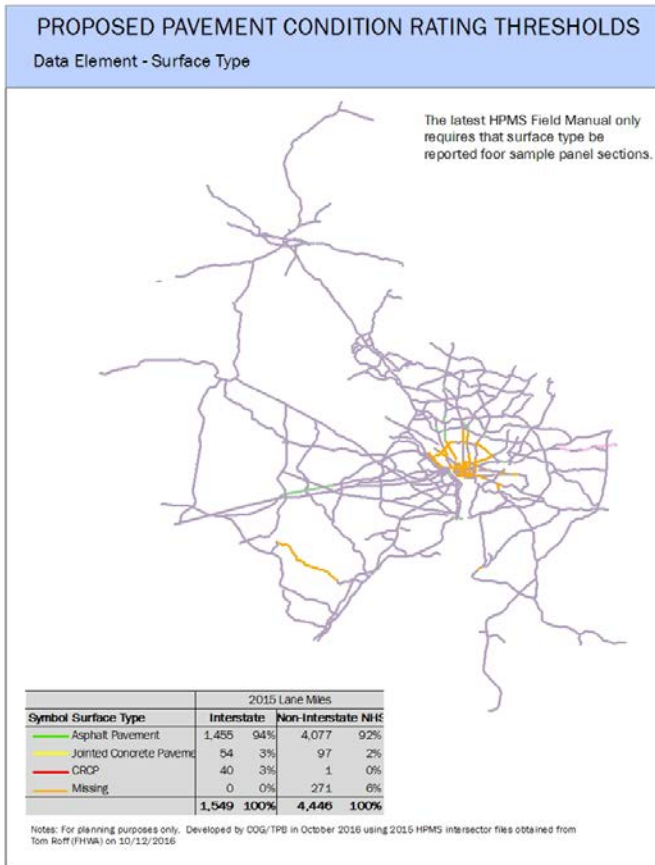
1. Structure Type
2. Through Lanes
3. Surface Type

Four metrics:

1. IRI (International Roughness Index)
2. Cracking Percent
3. Rutting (*asphalt only*)
4. Faulting (*jointed concrete only*)



Proposed Overall Pavement Condition Measure for Each Section



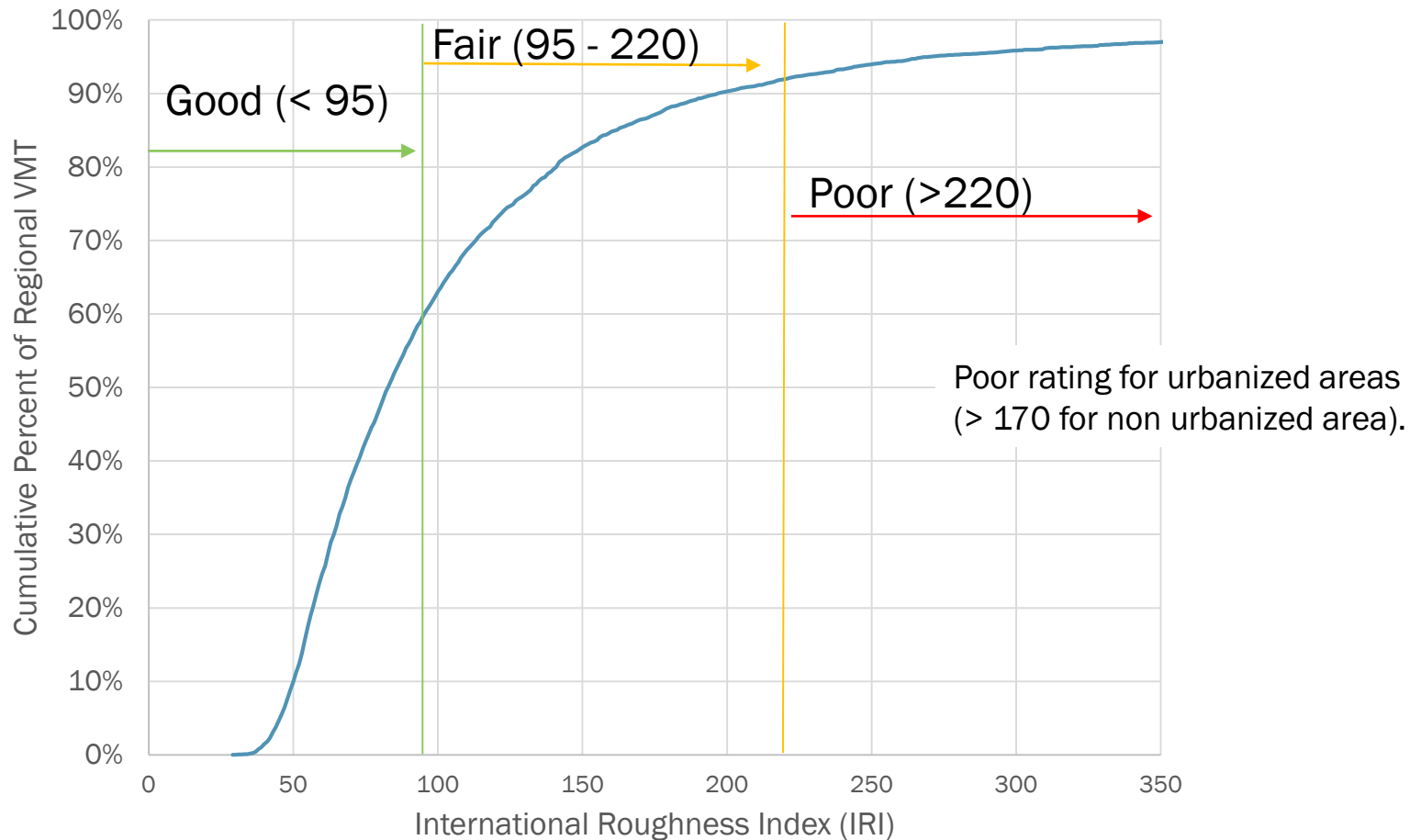
Legend: CRCP=Continuously Reinforced Concrete Pavement

Figure 9 -Flow Chart of Proposed Overall Pavement Condition Measure for Each Section

Note: Proposed overall pavement condition measure for non-interstate NHS based upon IRI rating until data collection cycle ending December 31, 2019

Regional IRI Quality Distribution

What drivers experience on the roads.



Note: IRI reported for sections with 99.6% of VMT on NHS; Summary for sections where (1) Structure Type not equal to bridge and (2) Facility type not equal to Ramp, Non Mainline, Non Inventory Direction, or Planned/Unbuilt



Condition of Bridges

- Data from National Bridge Inventory (NBI)
- Data submitted by April 1 for current year but may be corrected or updated throughout the year; considered final and published at the end of each calendar year
- All NHS bridges including bridges on ramps connecting to the NHS and NHS bridges that cross a State border regardless of ownership or maintenance responsibility.
- Condition -
 - Minimum NBI Condition Ratings: Deck, Superstructure, Substructure, and Culverts
- Minimum level –
 - Structurally Deficient Classification: Same as above, plus Structural Evaluation and Waterway Adequacy

