



RPUG 2024
Road Profile Users' Group

April 29 - May 2



ST. AUGUSTINE
FLORIDA

New Technology For An Old World

HPMS PAVEMENT DATA REPORTING AND RECENT STATUS

MAX GROGG

APPLIED PAVEMENT TECHNOLOGY, INC.



RPUG
Road Profile Users' Group



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AGENDA

HPMS PAVEMENT DATA REPORTING

DATA USAGE STATUS

NOTICE OF PROPOSED RULEMAKING



Summary of PM2 Rule

<u>Data Item</u>	<u>Roadway System</u>	<u>Collection Cycle</u>
IRI	Interstate	Annual
	Non-Interstate NHS	Biennial
Surface Type	Interstate	Annual
	Non-Interstate NHS	Biennial
Rutting	Interstate	Annual
	Non-Interstate NHS	Biennial
Faulting	Interstate	Annual
	Non-Interstate NHS	Biennial
Cracking Percent	Interstate	Annual
	Non-Interstate NHS	Biennial

Note: States can opt to report distress data independently for divided Interstate highway sections

IRI

(International Roughness Index)

- **Definition:** A statistic used to estimate the amount of roughness in a measured longitudinal profile
- **Extent Requirement:** All paved NHS and principal arterial system (PAS), and rural minor arterial Sample sections. Optional for other Sample sections.
- **Guidance:**
 - Value Numeric: IRI to the nearest inch per mile
 - Value Text: NHS only; populate only for NHS sections that do not have a newly measured value. The codes explain why a value was not reported.

Code	Description
A	Construction - Roadway was under construction (i.e., not open to traffic due to capital improvement activities)
B	Closure - Roadway was closed to traffic (i.e., not open to traffic, and not under construction, impassable due to earthquake damage, etc.)
C	Disaster - Roadway was located in an area declared as a disaster zone (e.g., not open to traffic due to being flooded)
D	Deterioration - Roadway was too deteriorated to measure
E	New NHS Designation – Roadway added to NHS post-data collection

IRI

Guidance:

- For **Interstate** sections, measured IRI shall be collected:
 - On an annual frequency
 - On a full extent basis for the mainline highway
 - In the rightmost through lane or one consistent lane
 - In a manner that allows for reporting in uniform section lengths of 0.1 mi. (528 ft.); *sections shall not exceed 0.11 mi.*

IRI

Guidance:

- For **ALL** IRI reporting
 - ‘Mean Roughness Index’: calculate IRI for each wheelpath in a section, then average the two values to calculate the MRI to be reported for this data item.
 - Include structures and railroad crossings in measurement
 - Report existing IRI values until they can be replaced by newly measured values

PSR

- **Definition:** Present Serviceability Rating (PSR) for pavement condition
- **Extent Requirement:** *Optional.* Can be used for NHS sections (where speed limit is below 40 mph) and as an alternative on noted Sample sections where IRI is not reported.
- **Guidance:**
 - Value Numeric: PSR to the nearest tenth
 - Value Text: NHS only. Use code A if the posted speed limit is less than 40 mph
 - Value Date: date of data collection in MM/YYYY format
 - Table 7 of the Field Manual for PSR definitions

Surface Type

Code	Description	Pavement Group
1	Unpaved	N/A
2	Bituminous.	Asphalt Pavement
3	JPCP - Jointed Plain Concrete Pavement (includes whitetopping).	Jointed Concrete Pavement
4	JRCP - Jointed Reinforced Concrete Pavement (includes whitetopping).	Jointed Concrete Pavement
5	CRCP - Continuously Reinforced Concrete Pavement.	CRCP
6	Asphalt-Concrete (AC) Overlay over Existing AC pavement.	Asphalt Pavement
7	AC Overlay over Existing Jointed Concrete Pavement	Asphalt Pavement
8	AC (Bituminous Overlay over Existing CRCP)	Asphalt Pavement
9	Unbonded Jointed Concrete Overlay on Portland Cement Concrete (PCC) Pavement	Jointed Concrete Pavement
10	Bonded PCC Overlay on PCC Pavement	Jointed Concrete Pavement
11	Other (e.g. plank, brick, cobblestone, etc.)	N/A

Surface Type

Guidance:

- This data item shall be collected:
 - Annually for **Interstate** sections
 - Biennially for all other sections
- This data item shall be reported on a:
 - Full extent basis for **NHS** sections
 - Sample section basis for **non-NHS** sections

Surface Type

Guidance:

- For **NHS** sections, should be determined from visual inspection and construction records to the extent possible
- Preservation treatments (e.g., thin overlays, micro-surfacing, etc.) of < 0.5 in. compacted material shall be excluded surface type determination

Table 8: Pavement Data Requirements by Surface Type

Code	IRI	PSR	Rutting	Faulting	Cracking Percent	Thickness Rigid	Thickness Flexible
1 - Unpaved							
2 - Bituminous	in/mi	0.1-5.0	0.01''		Fatigue % area		0.5''
3 - JPCP (includes whitetopping)	in/mi	0.1-5.0		0.01''	% cracked slabs	0.5''	0.5'' include for white-topping only
4 - JRCP (includes whitetopping)	in/mi	0.1-5.0		0.01''	% cracked slabs	0.5''	0.5'' include for white-topping only
5 - CRCP	in/mi	0.1-5.0			Punchout/long./patch % area	0.5''	
6 - Composite (AC / AC)	in/mi	0.1-5.0	0.01''		Fatigue % area		0.5''
7 - Composite (AC / JCP)	in/mi	0.1-5.0	0.01''		Fatigue % area	0.5''	0.5''
8 - Composite (Bituminous / CRCP)	in/mi	0.1-5.0	0.01''		Fatigue % area	0.5''	0.5''
9 - Composite (Unbonded JC / PCC)	in/mi	0.1-5.0		0.01''	% cracked slabs	0.5''	
10 - Composite (Bonded JC / PCC)	in/mi	0.1-5.0		0.01''	% cracked slabs	0.5''	
11 - Other (e.g., brick, cobblestone, etc.)	in/mi	0.1-5.0					

Rutting

- **Definition:** Average depth of longitudinal surface depressions in asphalt pavement
- **Extent Requirement:** All asphalt NHS and Sample Panel roadway sections

All NHS	<u>Full Extent</u>		Ramps	<u>Sample Panel</u>	
	Functional Classes			Functional Classes	
	Urban	Rural		Urban	Rural
Yes	1	1	-	2-6	2-5



- **Data Item:** RUTTING

Rutting

Guidance:

- Value Numeric: Code the average rutting for the roadway to the nearest 0.01 inch.
- Value Text: Use appropriate code for NHS sections only if the Value Numeric has not been populated with a newly measured value.

Code	Description
A	Construction - Roadway was under construction (i.e., not open to traffic due to capital improvement activities)
B	Closure - Roadway was closed to traffic (i.e., not open to traffic, and not under construction, impassable due to earthquake damage, etc.)
C	Disaster - Roadway was located in an area declared as a disaster zone (e.g., not open to traffic due to being flooded)
D	Deterioration - Roadway was too deteriorated to measure
E	New NHS Designation - Roadway added to NHS post-data collection

Rutting

Guidance:

- Reporting must be consistent with IRI inventory direction, lane, and section.
- Zero (0) values shall only be reported for roadways where ruts are not present.
- Report the average of rutting values collected in **both** wheelpaths
- Report for Surface Type codes '2', '6', '7', and '8'
- An estimated **date** can be provided when exact collection date is unavailable
- Estimating conditions from Samples of the NHS is not permitted.

Faulting

- **Definition:** A vertical misalignment of pavement joints in Portland Cement Concrete pavements (Jointed Concrete Pavement)
- **Extent Requirement:** All jointed-concrete NHS and Sample Panel roadway sections

All NHS	<u>Full Extent</u>			<u>Sample Panel</u>	
	Functional Classes		Ramps	Functional Classes	
	Urban	Rural		Urban	Rural
Yes	1	1	-	2-6	2-5



- **Data Item:** FAULTING

Faulting

Guidance:

- Value Numeric: Code the average/mean absolute faulting for all joints to the nearest 0.01 inch.
- Value Text: Use appropriate code for NHS sections only if the Value Numeric has not been populated with a newly measured value.

Code	Description
A	Construction - Roadway was under construction (i.e., not open to traffic due to capital improvement activities)
B	Closure - Roadway was closed to traffic (i.e., not open to traffic, and not under construction, impassable due to earthquake damage, etc.)
C	Disaster - Roadway was located in an area declared as a disaster zone (e.g., not open to traffic due to being flooded)
D	Deterioration - Roadway was too deteriorated to measure
E	New NHS Designation - Roadway added to NHS post-data collection

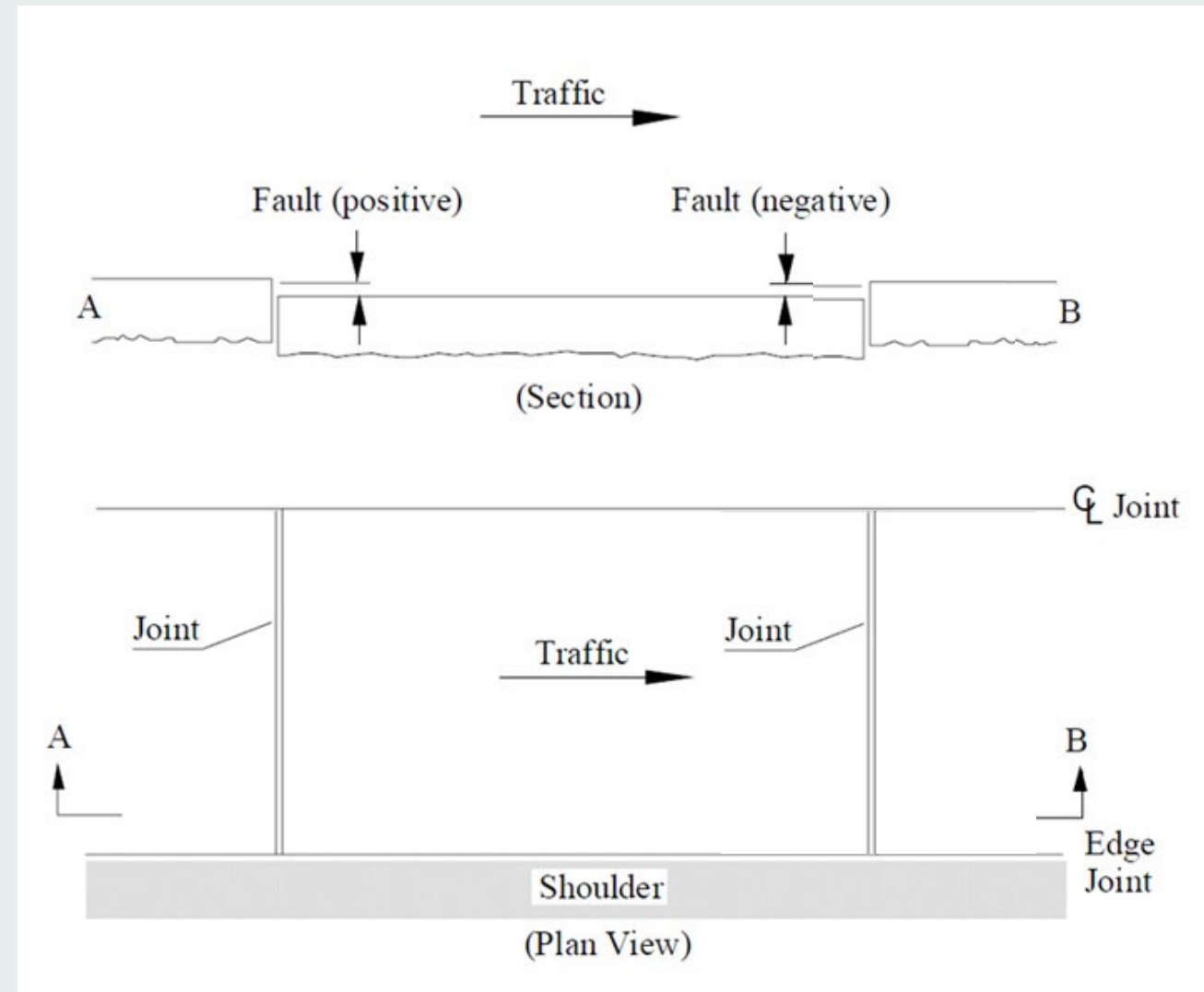
Faulting

Guidance:

- Reporting must be consistent with IRI inventory direction, lane, and section.
- Zero (0) values shall only be reported for roadways where faults are not present.
- Report the average/mean **absolute** faulting in the right wheelpath of **all** joints in a section
- Report for Surface Type codes '3', '4', '9', and '10'
- An estimated **date** can be provided when exact collection date is unavailable
- Faulting at cracks shall not be included, only at joints

Faulting

Faulting Example (Plan View)



Cracking Percent

- **Definition:** The percentage of pavement surface exhibiting cracking
- **Extent Requirement:** All NHS and Sample Panel roadway sections
- **Guidance:**
 - Value Numeric: the percentage of pavement surface exhibiting cracking, to the nearest 1%
 - Value Text: Use appropriate code for NHS sections only if the Value Numeric has not been populated with a newly measured value.



Cracking Percent

Guidance:

- Reporting must be consistent with IRI inventory direction, lane, and section.
- Zero (0) values shall only be reported for roadways where cracking is not present.
- Report for all Surface Type codes
- An estimated **date** can be provided when exact collection date is unavailable
- Default values should not be reported

Cracking Percent

Guidance:

- For asphalt pavements:
 - Report the percentage of the total area exhibiting visible fatigue type cracking for all severity levels in the wheelpath; non-wheelpath-based cracking is not to be reported

Cracking Percent

Calculating for AC Surface Types:

Scenario:

- Section: 1 lane, length = 0.1 mi. (528 ft.), width = 12 ft.
- Fatigue cracking: 125 ft. (inside wheelpath), 200 ft. (outside wheelpath) **wheelpath* = 3.25 ft.

1. Fatigue Cracking Area Calculation:

- $(125 \text{ ft.} + 200 \text{ ft.}) * 3.25 \text{ ft.} = 1,056.25 \text{ sq. ft.}$

2. Cracking Percent Calculation:

- $1,056.25 \text{ sq. ft.} / (528 \text{ ft.} * 12) \text{ sq. ft.} = .1667$
- $.1667 * 100\% = 16.67\%$ (rounded to the nearest 1% = 17%)

Cracking Percent

Guidance:

- For jointed concrete pavements:
 - Report the percentage of slabs within the section that exhibit transverse cracking

Cracking Percent

Calculating for jointed concrete Surface Types :

Scenario:

- Section length = 0.1 mi.
- 4 slabs contain one or more transverse cracks extending for at least one-half the lane width
- 10 total slabs

Cracking Percent Calculation:

- $4 \text{ cracked slabs} / 10 \text{ total slabs} = 0.4$
- $0.4 * 100\% = 40\%$

Cracking Percent

Guidance:

- For continuously reinforced concrete pavements:
 - Report the percentage of the area of the section exhibiting longitudinal cracking, punchouts, and/or patching; exclude transverse cracking

Cracking Percent

Calculating for CRCP Surface Types :

Scenario:

- Section: 1 lane, length = 0.10 mi. (528 ft.), width = 12 ft.
- 1 Punchout: Area = 20 sq. ft.
- 1 Longitudinal Crack: Length = 10 ft.
- 3 Patches: Area = 6 sq. ft./each

1. Distress Area Calculation:

- $20 \text{ sq. ft.} + (10 \text{ ft.} * 1 \text{ ft.}) + (3 * 6 \text{ sq. ft.}) = 48 \text{ sq. ft.}$

2. Cracking Percent Calculation:

- $(48 \text{ sq. ft.} / (528 \text{ ft.} * 12 \text{ ft.})) = 0.00757$
- $0.00757 * 100\% = 0.758\%$ (rounded to the nearest 1% = 1%)

Status – How is data used

Transportation Performance Management

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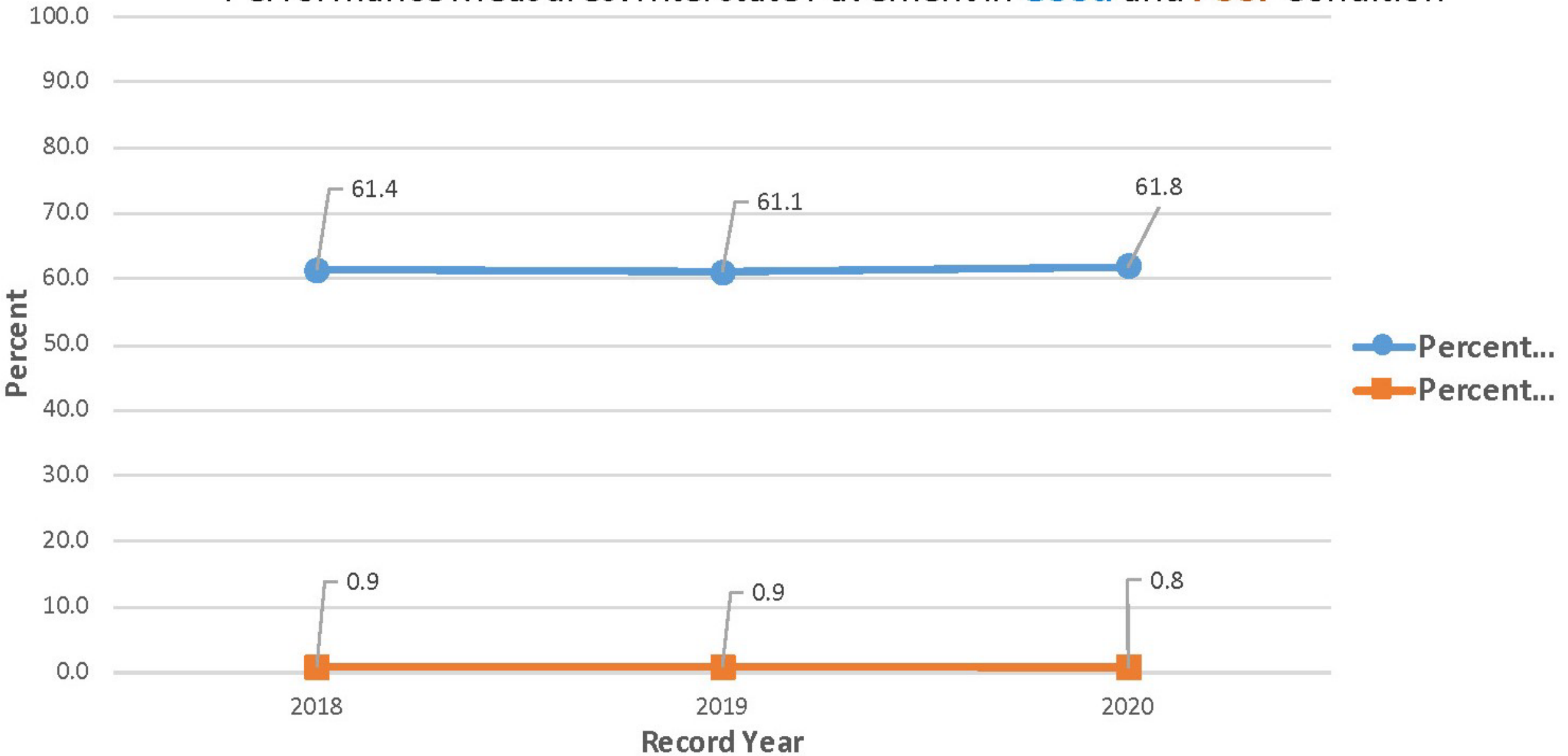
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TPM



National Totals

Performance Measures: Interstate Pavement in **Good** and **Poor** Condition



Trend through 2025

Desired trend: ↑

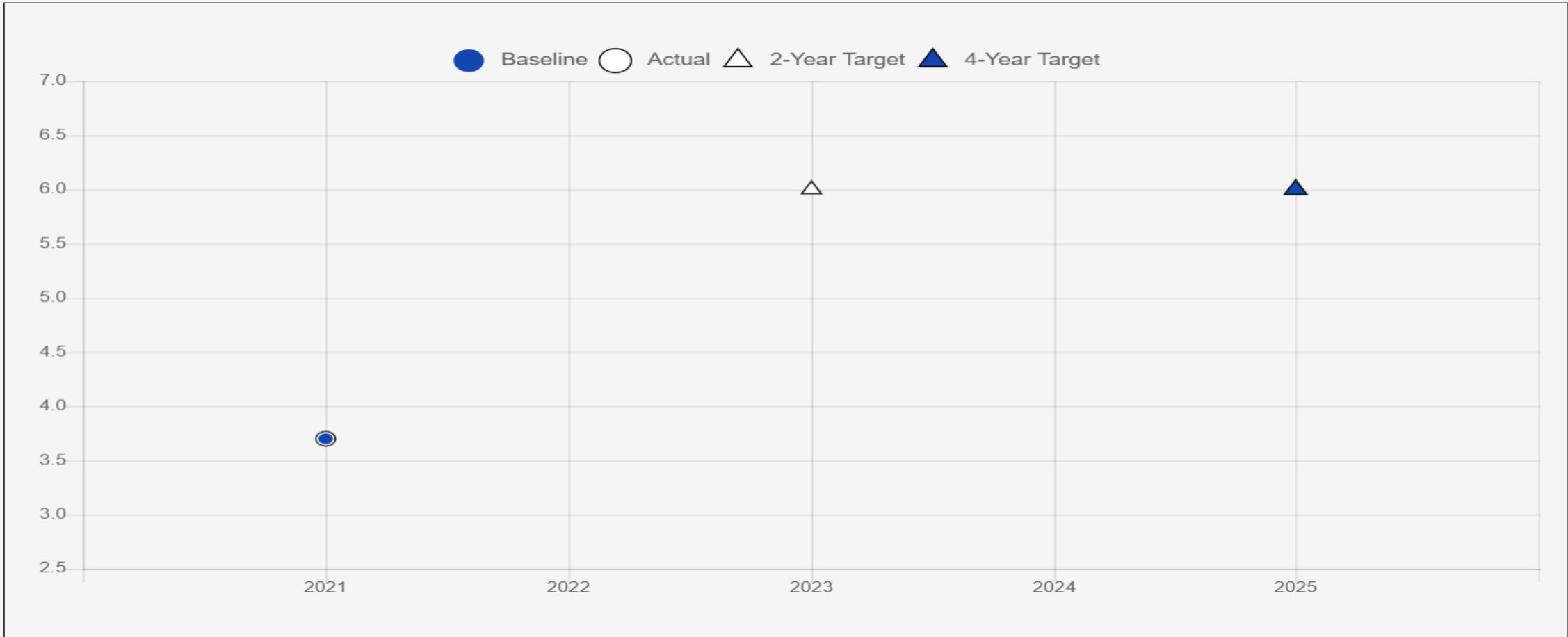


Iowa % Interstate Lane Miles Good Condition

Interstate Pavement in Good Condition	2021	2022	2023	2024	2025
Condition/Performance	58.8	--	--	--	--
Target	--	--	55.0	--	55.0

Trend through 2025

Desired trend: ↓



Iowa % Non-Interstate Lane Miles Poor Condition

Non-Interstate National Highway System (NHS) Pavement in Poor Condition	2021	2022	2023	2024	2025
Condition/Performance	3.7	--	--	--	--
Target	--	--	6.0	--	6.0

Trend through 2025

Desired trend: ↑



Florida % Interstate Lane Miles Good Condition

Interstate Pavement in Good Condition	2021	2022	2023	2024	2025
Condition/Performance	70.5	--	--	--	--
Target	--	--	60.0	--	60.0

Trend through 2025

Desired trend: ↓



Florida % Non-Interstate Lane Miles Poor Condition

Non-Interstate National Highway System (NHS) Pavement in Poor Condition	2021	2022	2023	2024	2025
Condition/Performance	1.1	--	--	--	--
Target	--	--	5.0	--	5.0

State of Utopia 2022 Full Performance Period Significant Progress Determination Results

Measure Area	Measures	Baseline	Target	Actual	Better than Baseline?	Achieved Target?	Made Significant Progress?
The condition of pavements on the Interstate System	Percentage of pavements of the Interstate System in Good condition	68.0	60.0	70.5	Yes	Yes	Yes
	Percentage of pavements of the Interstate System in Poor condition	0.5	5.0	0.7	No	Yes	Yes

Notice of Proposed Rulemaking

- Docket No. FHWA–2023–0014
- Federal Register / Vol. 89, No. 17 / Thursday, January 25, 2024 / Proposed Rules
- Comments closed February 26, 2024

Purpose

This rulemaking proposes updates to the National Performance Management Measures regulations to consider impacts of national emergencies on performance achievement, address compliance determinations and penalty assessment for the pavement condition measures, clarify data collection standards and requirements, adjust freight reporting to align with the 4-year update cycle for State Freight Plans in the Bipartisan Infrastructure Law (BIL), and provide select clarifying technical corrections. The rulemaking would also incorporate by reference the Highway Performance Monitoring System (HPMS) Field Manual, which includes updated fields related to the collection of Transportation Performance Management (TPM) data. This rulemaking also would provide for greater opportunities for meaningful safety performance targets and outcomes, consider approaches to alternative safety performance measures, and align performance targets for the three common measures that must be identical with the National Highway Traffic Safety Administration (NHTSA).

Why Should RPUG Attendees Care?

- Extenuating circumstance includes a presidentially declared national emergency, which would cover events such as national public health emergencies
- FHWA's HPMS software was updated to version 9, and the associated database fields that impact TPM were modified to address necessary changes identified in the 2018 HPMS Reassessment. The HPMS Field Manual was similarly updated to improve readability and reflect changes made to the HPMS software, processes, and table structures, as well as to data items, estimate types, and metadata.

Field Name Changes

- Route_ID to RouteID
- Begin_Point to BeginPoint
- End_Point to EndPoint
- Year_Record to BeginDate
- Value_Date to ValueDate

AASHTO Standards

- Proposing to remove the AASHTO Standard R48–10 (2013), Standard Practice for Determining Rut Depth in Pavements, 2014, 34th/2014 edition, in § 490.111(c)(3) since it has been withdrawn by AASHTO. The HPMS Field Manual addresses automated rut data collection methods so no additional AASHTO Standards are needed at this time.
- Update the AASHTO Standard from R36–13 to R36–21, Standard Practice for Evaluating Faulting of Concrete Pavements. This update to the Standard retains the two methods for measuring and calculating faulting using automated measurement devices. The most notable change to the new Standard is the incorporation of an acceptable third method for calculation of faulting using 3D techniques. This Standard is less restrictive than the original.



QUESTIONS

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