

HPMS Rule on Collecting Pavement Condition Data

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Final Rule Issued January

- Affects
 - Local agencies that have non-state NHS roads/
street
 - For which you report HPMS data to Caltrans



Final Rule issued Jan 2017

DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

23 CFR Part 490

[Docket No. FHWA–2013–0053]

RIN 2125–AF53

**National Performance Management
Measures; Assessing Pavement
Condition for the National Highway
Performance Program and Bridge
Condition for the National Highway
Performance Program**

AGENCY: Federal Highway
Administration (FHWA), Department of
Transportation (DOT).

ACTION: Final rule.

Highway Performance Monitoring System

Field Manual

Real Information from HPMS Field Manual



Office of Highway Policy Information

December 2016

Office of Management & Budget (OMB) Control No. 2125-0028



Two Sub-Groups for Local Agencies

- Non-Interstate System NHS with speed limits of 40 mph and higher

- Non-Interstate System NHS with speed limits less than 40 mph

Non-Interstate System NHS ≥ 40 mph

- Condition measures to be reported
- AC
 - IRI
 - Rutting
 - Cracking
- PCC
 - IRI
 - Faulting
 - Cracking

Non-Interstate System NHS ≥ 40 mph

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IRI – International Roughness Index

- A statistic used to estimate the amount of roughness in a measured longitudinal profile
 - Inches per mile
- Automated collection
 - Equipment – AASHTO M328-14
 - Methodology – AASHTO R57-14
 - Computation – AASHTO R43-13

IRI

- Profile measured
 - IRI calculated using a quarter-car vehicle math model
 - Estimate impact on rider
- Calculated as in/mi or m/km
- Most accurate at constant speed



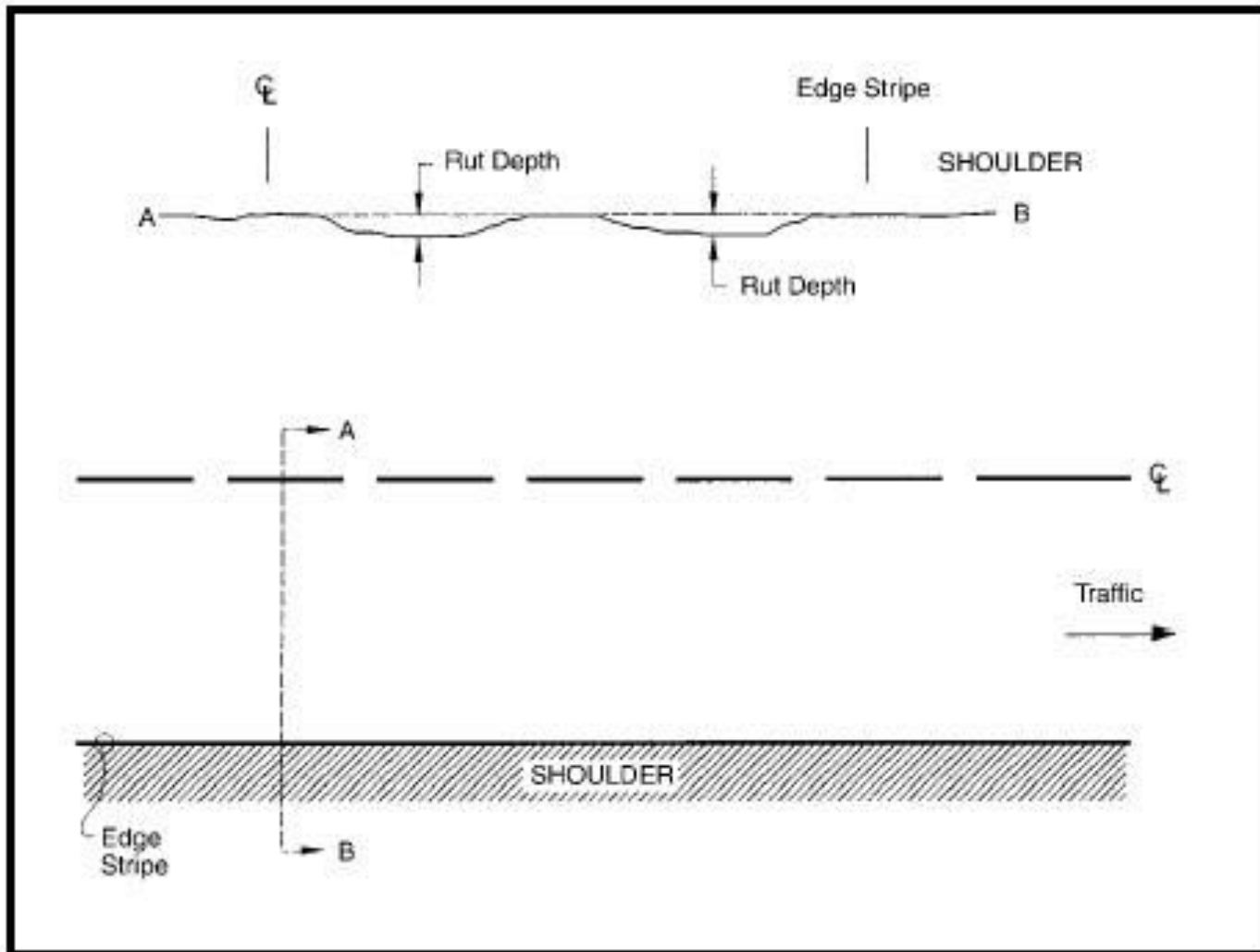
Collected full length

- Rightmost through lane – generally
- Continuously collected – report for uniform section lengths of 0.1 mile
- Biennial frequency
- Cannot be estimated from PSR
- Estimating conditions from data samples of the full extent of the mainline will not be permitted

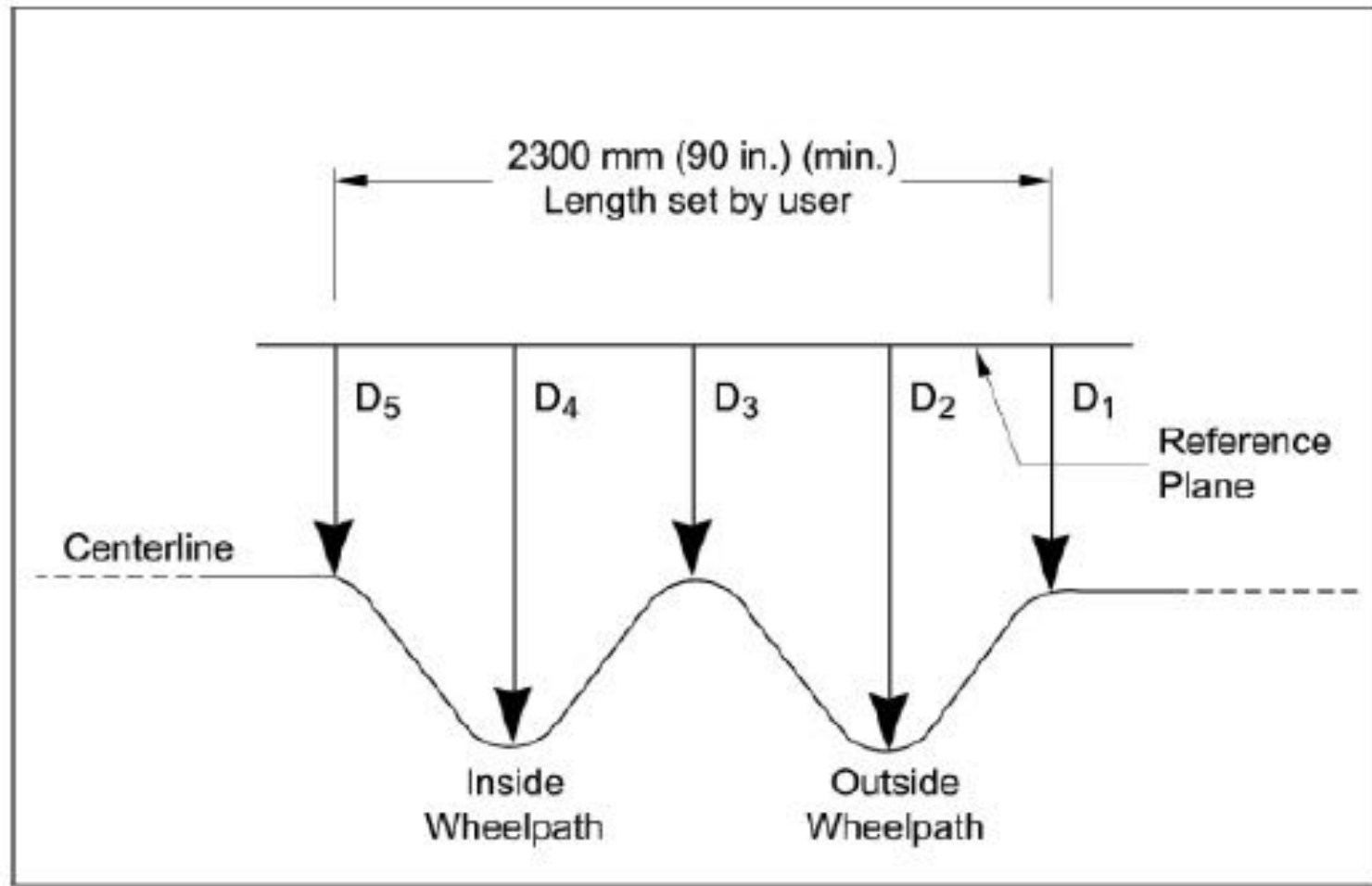
Rutting – average depth

- Collection – AASHTO R48-10
- Transverse profiles measured with no less than 5 profile points
- Maximum longitudinal spacing between transverse profiles not more than 12 in
- Calculation – AASHTO R48-10

Rutting diagram



Minimum of 5 Transverse Points





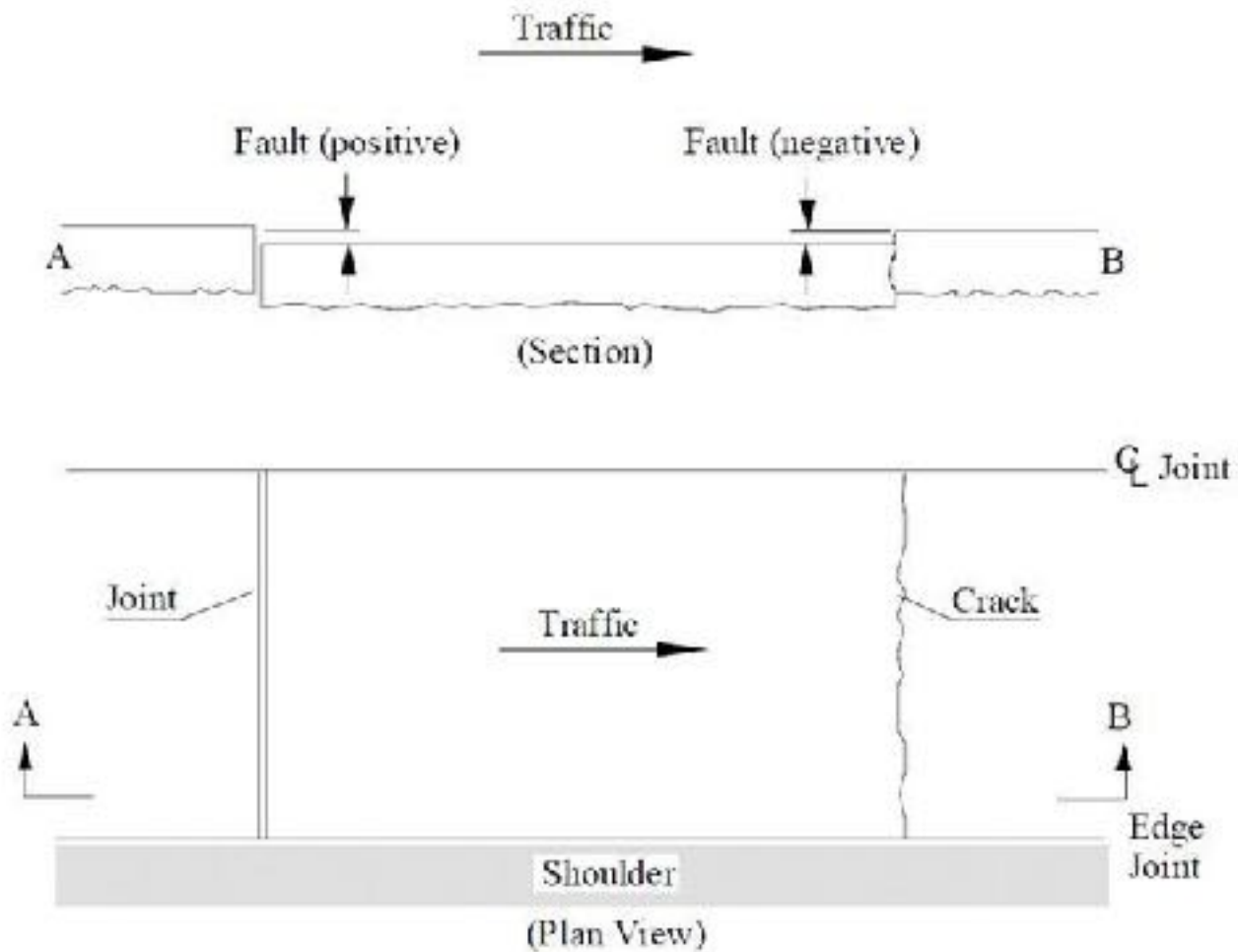
Collected full length

- Rightmost through lane – generally
- Continuously collected – report for uniform section lengths of 0.1 mile
- Biennial frequency
- Estimating conditions from data samples of the full extent of the mainline will not be permitted
- Default values or values obtained by other means or conversions that are not directly obtained from measured road profiles not allowed

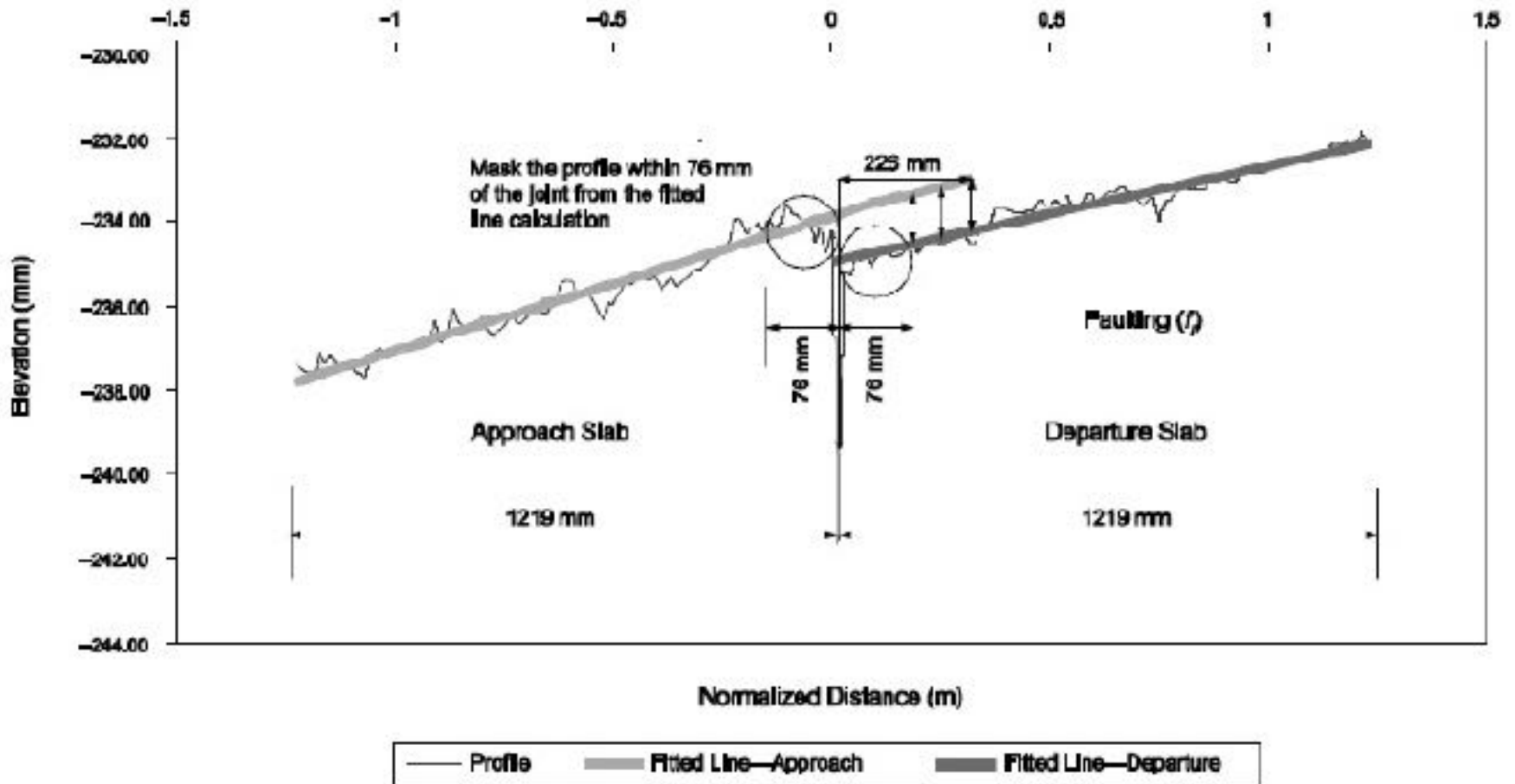
Faulting

- Vertical misalignment of pavement joints
 - Collection – AASHTO R36-13
 - Manual Measurement not recommended
 - Average absolute faulting of right wheelpath
 - Faulted cracks not included

Faulting diagram



Automated Faulting



Collected full length

- Full length
- Rightmost through lane – generally
- Continuously collected – report for uniform section lengths of 0.1 mile
- Biennial frequency
- Every joint measured in right wheel-path
- Estimating conditions from data samples of the full extent of the mainline will not be permitted
- Default values or values obtained by other means or conversions that are not directly obtained from measured road profiles not allowed

Cracking AC

- Percent of total area with fatigue cracking for all severity levels in the wheelpath
 - Manual or automated – automated preferred
 - Measured in both wheelpaths
 - All severity levels included
 - AASHTO R55-10
 - AASHTO PP67-14 for automated
 - Wheelpath – 39in

PCC Cracking

- Percent of slabs with transverse cracking
 - Manual or automated
 - Exclude longitudinal cracks, corner breaks, D-cracking, etc
 - Percent calculated as # of slabs with one or more cracks (at least half width) divided by number of slabs



Collected full length

- Full length – all severities collected
- Rightmost through lane – generally
- Continuously collected – report for uniform section lengths of 0.1 mile
- Biennial frequency
- Estimating conditions from data samples of the full extent of the mainline will not be permitted
- Default values or values obtained by other means or conversions that are not directly obtained from measured road profiles not allowed



Non-Interstate System NHS < 40 mph

- PSR is allowed only for this group
- Present Serviceability Rating - PSR
- Mean values of ratings by a group of highway users

Original PSR – AASHO Road Test

Acceptable ?		5	Very Good
Yes	<input type="checkbox"/>	4	Good
No	<input type="checkbox"/>	3	Fair
Undecided	<input type="checkbox"/>	2	Poor
		1	Very Poor
		0	

Rating

Section Identification _____

Rater _____ Date _____ Time _____ Vehicle _____

-
- Subjective panel rating
 - Rated using values in the following Table 4.4
 - Correlation
 - If sufficiency ratings of pavement condition are available, they may be used after a correlation between the sufficiency rating scale and the PSR

PSR (Present Serviceability Rating)

Table 4.4: Present Serviceability Rating

PSR	Description
4.0 – 5.0	Only new (or nearly new) superior pavements are likely to be smooth enough and distress free (sufficiently free of cracks and patches) to qualify for this category. Most pavements constructed or resurfaced during the data year would normally be rated in this category.
3.0 – 4.0	Pavements in this category, although not quite as smooth as those described above, give a first class ride and exhibit few, if any, visible signs of surface deterioration. Flexible pavements may be beginning to show evidence of rutting and fine random cracks. Rigid pavements may be beginning to show evidence of slight surface deterioration, such as minor cracks and spalling.
2.0 – 3.0	The riding qualities of pavements in this category are noticeably inferior to those of new pavements, and may be barely tolerable for high-speed traffic. Surface defects of flexible pavements may include rutting, map cracking, and extensive patching. Rigid pavements in this group may have a few joint failures, faulting and/or cracking, and some pumping.
1.0 – 2.0	Pavements in this category have deteriorated to such an extent that they affect the speed of free-flow traffic. Flexible pavement may have large potholes and deep cracks. Distress includes raveling, cracking, rutting and occurs over 50 percent of the surface. Rigid pavement distress includes joint spalling, patching, cracking, scaling, and may include pumping and faulting.
0.1 – 1.0	Pavements in this category are in an extremely deteriorated condition. The facility is passable only at reduced speeds, and with considerable ride discomfort. Large potholes and deep cracks exist. Distress occurs over 75 percent or more of the surface.



Data Collection

- More intensive
- 0.1 mile inspection units
- Full length

Data items

- PSR – nearest 10th (4.2, 3.6, etc.)
- IRI – in/mi (avg over 0.1 mi)
- Rutting – nearest 0.01 in (avg over 0.1 mi)
- Faulting – nearest 0.01 in (avg over 0.1 mi)
- AC Cracking – nearest 1% wheelpath area (in 0.1 mi)
- PCC Cracking – nearest 1% slabs (in 0.1 mi)

State of Good Repair Asphalt Pavements

Measure	Good	Fair	Poor
IRI (in/mi)	< 95	95 - 170	> 170
Cracking (%)	< 5	15-May	< 15
Rutting (in)	< 0.20	0.20 - 0.40	< 0.40
PSR	≥ 4.0	2.0 - 4.0	≤ 2.0

State of Good Repair

Concrete Pavements

Measure	Good	Fair	Poor
IRI (in/mi)	< 95	95 - 170	> 170
Cracking (%)	< 5	5 - 15	< 15
Faulting (in)	< 0.1	0.10 - 0.15	< 0.15
PSR	> 4.0 —	2.0 - 4.0	< 2.0 —

NHS – Interstate & Non-Interstate System ≥ 40 mph

- Overall Condition

Condition	ACP & PCC
Good	All 3 Measures - Good
Fair	Not Good or Poor
Poor	2 \geq Measures Poor

NHS Non-Interstate System < 40 mph

- Overall Condition

Condition	ACP & PCC
Good	PSR > 4.0
Fair	PSR > 2.0 and < 4.0
Poor	PSR < 2.0

Distress Collection

- All Interstate highways beginning in **2018**
- All non-Interstate NHS routes beginning in **2020**



Questions

