

GFP Pavement Condition Rating Manual

Updated July 2010



Pavement Management Unit

Pavement Services
800 Airport Road SE
Salem, OR 97301



All GFP pavement condition surveys will be conducted by two-person teams trained in pavement surface distress identification and rating procedures. The survey teams will be comprised of Pavement Services Unit personnel trained by Pavement Management staff. Training will include proper distress identification and the associated Good-Fair-Poor (GFP) condition rating using actual sections of the State Highway System. These sections will include representative samples of the distress types that affect the GFP condition ratings.

The Pavements Unit will provide each rating team with a list of sections to be rated, bundled by geographic area and sorted by *State Highway Number*. Condition ratings will be accomplished via a “windshield” survey from a moving vehicle. Raters may slow or stop the vehicle as often as necessary to correctly identify and quantify distress and properly rate each section of pavement. **The operator of the motor vehicle should always ensure that he or she operates the vehicle in a manner that does not endanger the rating team or the public. Safety shall always take precedence over the requirement to collect accurate data.**

Standard practice is to drive the section, at or under highway speeds, and note the general condition of the entire section. A GFP rating is then assigned based on the overall average condition of the section and recorded on the appropriate rating forms provided by the Pavement Management Unit. If conditions vary significantly between lanes, the rating shall be based upon the condition of the worst lane. The condition survey teams will only rate pavements that are dry. Ratings shall not be done while it is raining or while the pavement is still wet following a rain event.

The two people in a rating team have different roles. Both people conduct visual surveys of the section being rated. The Driver does so while operating the vehicle in a safe and responsible manner. In addition to the visual survey, the Navigator also provides the Driver with relevant section information (BMP, EMP, age, surface type, etc.), records both people’s section ratings, documents any comments the raters have on the section, and determines the location of the next section to be rated.

Sections are identified from ODOT’s Pavement Management System by the Pavement Management Unit and are based on Region and District boundaries, highway classifications, historical construction, and planned construction. In most cases, the pavement conditions should be relatively uniform along the entire segment. In some cases, conditions may vary within the sections. When appropriate, the rater should suggest new section boundaries by splitting, combining, or adjusting limits. Record the milepoints which define the suggested new boundaries and rate each subsections individually in addition to providing a rating for the original section. The Pavement Management Engineer will review each suggestion on a case-by-case basis to determine if the section boundaries should be adjusted.

Changes for 2008

The 1.0 through 5.0 scoring system is no longer to be used. Scores will be assigned on the 0 to 100 point scale estimating to the nearest 5 points except from 96-100 will be estimated by 1 point increments. The first step in scoring is to determine the most appropriate condition category for the section (very good through very poor), then the next step is to assign the 0 to 100 point score which best represents the overall condition of the section in accordance with the GFP Rating Reference Sheet.

Changes for 2010

FHWA (Federal Highway Administration) has required that additional distress data be collected in sample sections to use in the HPMS (Highway Performance Monitoring System). The FHWA is responsible for assuring that adequate highway transportation data and systems performance information is available to support its functions and responsibilities and uses the HPMS to obtain this goal. Due to the sporadic location and nature of the samples it has been decided to collect the same data for non-sample sections.

The additional data needed for AC pavements includes: cracking by percent area (fatigue), cracking by length (transverse) and rut measurements to the nearest 0.1". Note: to simplify rating of transverse cracking, counting the number of transverse cracks will be used rather than measuring length.

The additional data needed for PCC pavements includes: percent of cracked slabs and faulting to the nearest 0.1.

Furthermore, to provide assistance to internal design staff, changes were made to the current data collection process and additional data will also be collected. This includes: patching severity, patching percent by area, frequency of potholes, block cracking, ride severity, and bleeding.

Additional information (where available) has been provided on the rating form to help assist raters. This information includes: IRI values from previous years, rut measurements from previous years, most recent percent cracking by length (fatigue) value, most recent count per tenth of a mile of transverse cracking.

For definitions of distress type and severity refer to the attached GFP Reference Sheet for a description of severity levels.

Also there is a new field that will appear on some of the pavement section. The rater will see "Mandatory HPMS" written vertically on the right side of the section. This means that the section is an HPMS sample sections. The rater should take special care rating these sections since the data will be sent to HPMS.

GFP CONDITION RATING DEFINITIONS

Asphalt Concrete Pavement (AC)

<u>Condition</u>	<u>Definition</u>
Very Good	Stable, no cracking, no patching, and no deformation. Excellent riding qualities. Nothing would improve the roadway at this time.
Good	Stable, minor cracking, generally hairline and hard to detect. Minor patching and possibly some minor deformation evident. May have dry or light colored appearance. Very good riding qualities. Rutting may be present but is less than $\frac{1}{2}$ ".
Fair	Generally stable, minor areas of structural weakness evident. Cracking is easier to detect, patched but not excessively. Deformation more pronounced and easily noticed. Ride qualities are good to acceptable. Rutting may be present but is less than $\frac{3}{4}$ ".
Poor	Areas of instability, marked evidence of structural deficiency, large crack patterns (alligatoring), heavy and numerous patches, deformation very noticeable. Riding qualities range from acceptable to poor. When rutting is present, rut depth is greater than $\frac{3}{4}$ ".
Very Poor	Pavement in extremely deteriorated condition. Numerous areas of instability. Majority of section showing structural deficiency. Ride quality is unacceptable (probably should slow down).

Special Circumstances:

<u>Score</u>	<u>Used When:</u>
"ST"	Section is on a structure (bridge, tunnel)
"UC"	Section is under construction
"NR"	Pavement was not rated

GFP CONDITION RATING DEFINITIONS

Portland Cement Concrete Pavement (JCP and CRCP)

<u>Condition</u>	<u>Definition</u>
Very Good	Ride qualities are good. Original surface texture evident. Jointed reinforced--have no mid-slab cracks. Continuously reinforced--may have tight transverse cracks with no evidence of spalling. No faulting is evident.
Good	Ride qualities are good. Original surface texture is worn in wheel tracks exposing coarse aggregate. Jointed reinforced--may have tight mid-slab transverse crack. Continuously reinforced--transverse cracks may show evidence of minor spalling. Pavement may have an occasional short longitudinal crack. No faulting is evident. Rutting may be present but is less than ½”.
Fair	Ride qualities are good. Jointed reinforced--may have some spalling at cracks and joint edges with longitudinal cracks appearing at less than 20% of the joints. A few areas may require minor level of repair by maintenance forces. Continuously reinforced--may show evidence of spalling with longitudinal cracks occurring in the wheel paths on less than 20% of the section. Shoulder joints may show evidence of deterioration and loss of slab support; faulting may be evident. Rutting may be present but is less than ¾”.
Poor	Ride may continue to be acceptable. On both jointed and continuously reinforced, cracking patterns are evident with longitudinal cracks connecting joints and transverse cracks occurring more frequently. Occasional punchout repair evident. Some joints and cracks show loss of base support. When rutting is present, rut depth is greater than ¾”.
Very Poor	Rate of deterioration rapidly accelerating.

Special Circumstances:

<u>Score</u>	<u>Used When:</u>
“ST”	Section is on a structure (bridge, tunnel)
“UC”	Section is under construction
“NR”	Pavement was not rated

GFP RATING REFERENCE SHEET (AC PAVEMENT)

GFP Rating	Stability	Structural Weakness	Fatigue	Transverse/Block	Patching	Ride Qualities	Deformation and Rutting	Comment	
Very Good	100	Stable	None	None	None	None	Excellent	Rut depth less than 1/4"	Nothing would improve this road
	99								
	98								
	97								
	96								
Good	95	Stable	None evident	Generally hairline and hard to detect	Minor amounts may be present	Minor amounts may be present	Very good	Deformation minor, rut less than 1/2"	May have dry or light colored appearance
	90								
	85								
	80								
Fair	75	Generally stable	Minor areas evident	Easier to detect but low severity	May have widespread low and/or intermittent moderate severity	May be patched, but not excessively (i.e. less than 100%)	Good to acceptable	Deformation more easily noticed, rut less than 3/4"	Typ. treatment need: Low vol.: chip seal High vol.: 2" resurface
	70								
	65								
	60								
	55								
	50								
Poor	45	Areas of instability	Marked evidence of structural deficiency	Large crack patterns (alligatoring) present	May have widespread moderate and/or intermittent high severity	Heavy and numerous	Acceptable to poor	Deformation very noticeable, rut 3/4" or greater if present	Typ. treatment need: Low vol.: 2" resurface High vol.: >2" resurface
	40								
	35								
	30								
	25								
Very Poor	20	Numerous areas of instability	Majority showing structural deficiency	Intermittent to extensive high severity	Extensive high severity	Intermittent to extensive high severity	Unacceptable, should slow down		Typ. treatment need: Low vol.: >2" resurface High vol.: heavy rehab or reconstruction
	15								
	10								
	5								

Fatigue Crack Severity

Low	An area of cracks with no or only a few connecting cracks. Cracks are not spalled or sealed. No pumping is evident.
Moderate	An area of interconnected cracks forming a complete pattern. Cracks may be slightly spalled. Cracks may be sealed. No pumping is evident.
High	An area of moderately or severely spalled interconnected cracks forming a complete pattern. Pieces may move when subjected to traffic. Cracks may be sealed. Pumping may be evident.
0 1 (5) ..	Estimate percent of fatigue cracking by selecting the best option of 0, 1, 5, 10, 25, 50, 75 or 100%

Patching Severity

Low	A good quality patch with a smooth ride. The patch has, at most, low severity distress of any type including rutting or deformation < 0.25"; pumping is not evident.
Moderate	The patch has moderate severity distress of any type or rutting or deformation from 0.25" to 0.5"; pumping may be evident. Ride quality is good to fair.
High	The patch has high severity distress of any type or rutting or deformation > 0.5"; pumping may be evident. All hand patches or patched potholes are rated as high severity patches.
0 1 (5) ..	Estimate percent of patching by selecting the best option of 0, 1, 5, 10, 25, 50, 75 or 100%

Pothole Severity

Low	< 1" deep (Delamination of patch or seal coat)
Moderate	≥ 1" & < 2" deep (Remains within top lift of wearing course.)
High	≥ 2" deep (Extends beyond top lift of wearing course.)
S U E	Circle the best option Sporadic, Intermittent or Extensive.

Transverse and Block Crack

Low	An unsealed crack with a mean width of ≤ 0.25; or a sealed crack with sealant material in good condition and the width cannot be determined.
Moderate	Any crack with a mean width > 0.25" and ≤ 0.75"; or any crack with a mean width < 0.75 in and adjacent low severity random cracking.
High	Any crack with a mean width > 0.75"; or any crack with a mean width ≤ 0.75" and adjacent moderate to high severity random cracking.
___ # / 0.1 mi	Estimate average number of transverse cracks (≥ 6' in Length) per tenth of a mile.

Raveling Severity

Low	The aggregate has worn away resulting in ≥ 25% to < 50% aggregate loss in a 1' wide longitudinal strip of pavement surface. Loss of chip seal rock should be rated as raveling, but this is the maximum severity for chip sealed surfaces.
Moderate	Surface texture is noticeably rough and/or pitted with ≥ 50% to < 75 % aggregate loss in a 1' wide longitudinal strip of pavement surface. A nearly continuous strip of aggregate loss 3" - 6" wide may be present. Loose particles may be present outside the traffic area.
High	Surface texture is very rough and/or pitted with ≥ 75% aggregate loss in a 1' wide longitudinal strip of pavement surface. Flat bottom potholes may be present where complete loss of aggregate has occurred.

Bleeding

Y or N	Bleeding is present if multiple (2 or more) areas of 25 ft ² or larger patches are noted.
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Rutting

___ in.	Estimate average rut of both wheel paths to the nearest 0.1"
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GFP RATING REFERENCE SHEET (JCP PAVEMENT)

	GFP Rating	Cracking	Patching	Joints	Ride Qualities	Deformation and Rutting	Comment
Very Good	100	No mid-slab cracks	None	No faulting is evident	Good	Rut depth less than 1/4"	
	99						
	98						
	97						
	96						
Good	95	May have tight mid-slab or short longit. cracks	Minor amounts may be present	No faulting is evident	Good	Rut less than 1/2"	
	90						
	85						
	80						
Fair	75	May have low to moderate cracks	May be patched, but patches are in good condition	May have some spalling at cracks and joint edges, faulting may be evident	Good	Rut less then 3/4"	A few areas may require minor level of repair by maintenance forces
	70						
	65						
	60						
	55						
	50						
Poor	45	Cracking patterns are evident with cracks occurring frequently	May have numerous patches which exhibit distress	Some joints and cracks show loss of base support	May continue to be acceptable	Rut 3/4" or greater if present	
	40						
	35						
	30						
	25						
Very Poor	20						Rate of deterioration rapidly accelerating
	15						
	10						
	5						

Corner Crack / Longit. And Transv. Cracks

Low	Crack widths < 1/8", no spalling, and no measurable faulting; or well sealed and with a width that cannot be determined
Moderate	Crack widths > 1/8" and < 1/2"; or with spalling < 3"; or faulting up to 1/2"
High	Crack widths > 1/2"; or with spalling ≥ 3"; or faulting > 1/2"

Count number of cracks for corner cracks and transverse cracks.
Estimate length of longitudinal cracks

Shattered Slab

Low	Slab is broken into 3 pieces. The cracks describing the broken sections are not spalled or are spalled for <10 % of the length of the crack; no measurable faulting
Moderate	Slab is broken into 4 pieces; or the cracks describing the broken sections are spalled at low severity (< 3") for >10% of its total length; or faulting is < 1/2"
High	Slab is broken into 5 or more pieces; or the cracks describing the broken sections are spalled ≥ 3" for > 10 % of its total length; or faulting is ≥ 1/2"

Corner Break - rate spalling and faulting not width

Low	Crack is not spalled or is spalled for <10 % of the length of the crack; no measurable faulting; and corner piece is not broken into two or more pieces
Moderate	Crack is spalled at low severity (< 3") for >10% of its total length; or faulting of crack or joint is <1/2"; and the corner piece is not broken
High	Crack is spalled at moderate (≥ 3" and < 6") to high severity ≥ 6" for >10 % of its total length; or faulting is ≥ 1/2"; or corner is broken in two or more pieces

Count number of corner breaks

Percent Cracked Slabs

0 1 5...	Estimate percent of cracked slabs by selecting the best option of 0, 1, 5, 10, 25, 50, 75 or 100%
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Faulting

___ in.	Report the average joint faulting in the right wheel track for the section to the nearest tenth on an inch (0.1").
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2010 GFP PAVEMENT CONDITION FORMS - GROUP 2-N

D I R M O
 ROUTE R HWY W T V BEG MP END MP SECTION LENGTH AGE PAVEMENT TYPE BOUNDARY ADJUSTED

US 101 S 009 1 0.00 3.67 ASTORIA MEGLER BRIDGE 3.67 STRUCTURE STRUCTURE

DISTRESS										RATING					
FATIGUE										08	T-CRK				08
L M H	0 1 5 10 25 50 75 100	% length								L M H	#/0.1 mi				
PATCH											RAVEL	BLOCK CRK	BLEEDING	POTHOLES	
L M H	0 1 5 10 25 50 75 100	% area	L M H	L M H	> 50sqft	<1"/1" - 2"/>2"	Y or N	S I E							
										04	06	08	09	2010	
										OVERALL					ST
										IRI					GD FR PR
										RUT					in.

US 101 S 009 1 3.67 3.80 ASTORIA BR APPROACH 0.13 27 C-MIX DGAC THIN OVLY A

DISTRESS										RATING					
FATIGUE										08	T-CRK				08
L M H	0 1 5 10 25 50 75 100	% length	15%							L M H	3 #/0.1 mi			1	
PATCH											RAVEL	BLOCK CRK	BLEEDING	POTHOLES	
L M H	0 1 5 10 25 50 75 100	% area	L M H	L M H	> 50sqft	<1"/1" - 2"/>2"	Y or N	S I E							
										04	06	08	09	2010	
										OVERALL					50 50 70 65
										IRI					288 275 276
										RUT					0.2 0.2 0.3
															GD FR PR
															0.2 in.

US 101 S 009 1 3.80 4.51 ASTORIA BR - NEW YOUNGS BAY BR 0.71 7 C-MIX DGAC THIN OVLY A

DISTRESS										RATING					
FATIGUE										08	T-CRK				08
L M H	0 1 5 10 25 50 75 100	% length	0%							L M H	0 #/0.1 mi			0	
PATCH											RAVEL	BLOCK CRK	BLEEDING	POTHOLES	
L M H	0 1 5 10 25 50 75 100	% area	L M H	L M H	> 50sqft	<1"/1" - 2"/>2"	Y or N	S I E							
										04	06	08	09	2010	
										OVERALL					100 100 89 90
										IRI					131 132 155 133
										RUT					0.1 0.2 0.2 0.3
															GD FR PR
															0.3 in.

US 101 S 009 1 4.51 5.31 NEW YOUNGS BAY BRIDGE 0.80 STRUCTURE STRUCTURE

DISTRESS										RATING					
FATIGUE										08	T-CRK				08
L M H	0 1 5 10 25 50 75 100	% length								L M H	#/0.1 mi				
PATCH											RAVEL	BLOCK CRK	BLEEDING	POTHOLES	
L M H	0 1 5 10 25 50 75 100	% area	L M H	L M H	> 50sqft	<1"/1" - 2"/>2"	Y or N	S I E							
										04	06	08	09	2010	
										OVERALL					ST
										IRI					GD FR PR
										RUT					in.

US 101 S 009 1 5.31 6.83 YOUNGS BAY BR - NEPTUNE DR 1.52 18 F-MIX OGAC THIN OVLY A

DISTRESS										RATING					
FATIGUE										08	T-CRK				08
L M H	0 1 5 10 25 50 75 100	% length	0%							L M H	1 #/0.1 mi			0	
PATCH											RAVEL	BLOCK CRK	BLEEDING	POTHOLES	
L M H	0 1 5 10 25 50 75 100	% area	L M H	L M H	> 50sqft	<1"/1" - 2"/>2"	Y or N	S I E							
										04	06	08	09	2010	
										OVERALL					98 88 84 80
										IRI					116 122 144 125
										RUT					0.3 0.4 0.4 0.5
															GD FR PR
															0.5 in.

RW (Roadway ID): 1 = Add Roadbed, 2 = Non-Add Roadbed

MT (Mileage Type): T=Temporary Mileage, Y=Spur Mileage, Z=Overlap Mileage

For JCP Enter faulting in the rut data box for Fatigue circle % of cracked slabs rather than % area

S = Sporadic I = Intermittent E = Extensive

Photo Illustrations
of
GFP Pavement Condition Categories
for
Asphalt Concrete

Condition – Very Good

Pavement structure is stable. No cracking, patching, or deformation evident. Riding qualities are excellent. Nothing would improve this pavement at this time. Roadways in this category are usually fairly new.

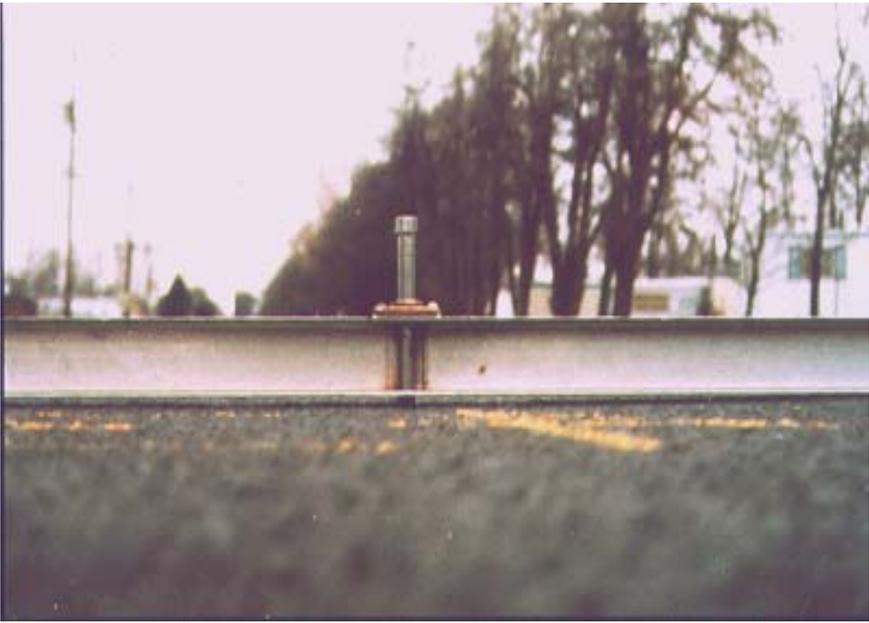




Condition – Good

Pavement is stable. Minor cracking may be present, but cracks are generally hairline and hard to detect. Minor amounts of patching and deformation may be present. May have a dry or light-colored appearance. Very good riding qualities. Rutting is less than 1/2”.





Condition – Fair

Pavement structure is generally stable with minor areas of structural weakness evident. Cracking is easier to detect. May be patched, but not excessively. Deformation more pronounced and easily noticed. Ride qualities are good to acceptable. Rutting is less than $\frac{3}{4}$ ".





Condition – Poor

Pavement has areas of instability, marked evidence of structural deficiency, large crack patterns (alligating), heavy and numerous patches. Deformation is very noticeable. Riding qualities range from acceptable to poor. When rutting is present, rut depth is greater than $\frac{3}{4}$ ".





Condition – Very Poor

Pavement is in extremely deteriorated condition. Numerous areas of instability. Majority of section showing structural deficiency. Ride quality is unacceptable (probably should slow down).



