



How To Visually Rate Pavements

Presented to the

Northwest Pavement Management
Association

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Rating Asphalt Pavements - Washington Methodology

Pavement Surface Condition Field Rating Manual for Asphalt Pavements

Inspection
Procedure
and Guidelines

Rating
Considerations

Flexible Pavement

Acknowledgments

**Northwest Pavement
Management Association**

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Acknowledgments

- Rating manual developed by the Northwest Pavement Management Association, their respective agencies, County Road Administration Board, WSDOT, and private industry.
- Developed by local agencies for local agency use rating asphalt surfaced pavements.



Participating Agencies

- Cities: Renton, Tacoma, Vancouver, Bellingham, Forks, Sunnyside, Moses Lake, plus many others.
- Counties: Grays Harbor, Island, Thurston, Pend Oreille, Marion (OR), Klamath (OR), Ada (ID), plus many others.
- Others: CRAB, WSDOT, Measurement Research Corp, Pavedex Inc, Pavement Engineers Inc.



Inspection Procedures

- Method of determining pavement condition through observing and recording the following;
 - Type of defect, cracking, patching, etc.
 - Severity of defect, low, medium, high
 - Extent of the defect (how much)



Rating Considerations

- **Recording Severity**: Predominant or Each Severity for each distress type.
- **Predominant**: Record only one severity level for each distress. If equal severity proportions exist record the highest.
- **Each**: Record the extent of each severity level for each distress.



Rating Considerations – cont.

- **Rating Survey Method:** By walking or by vehicle.
- **Walking:** Often used in urban areas, higher level of detail, time intensive.
- **Vehicle:** Best suited to rural areas, typical 2 – 5 mph, generally single lane but can rate more if time allows.



Rating Considerations – cont.

- **Sun**: Relative sun angle and direction of viewing the road surface. Angle of sun can have a great affect on visual observations.
- **Moisture**: Pavement surface must be dry. Moisture in cracks can be helpful.
- **Cracking**: When rating cracks use the average width and not the extremes.



Rating Considerations – cont.

- **Traveled Surface**: Condition ratings apply to traveled surface only. Do not include shoulders or adjacent areas.
- **Intersections**: Can be included with direction of survey or rated separately. Curb returns are considered part of the intersection.

Rutting and Wear



- Rutting is surface depression within the wheel paths.
- Rutting is a load related distress.
- Wear is surface depression caused by tire abrasion.



Rutting and Wear - Severity

- Severity: Average rut depth in the wheel paths.
 - Low – $\frac{1}{4}$ inch to $\frac{1}{2}$ inch
 - Medium – $\frac{1}{2}$ inch to $\frac{3}{4}$ inch
 - High – over $\frac{3}{4}$ inch
- Extent: Assumed to be the full length of the segment in the wheel path.



Alligator Cracking

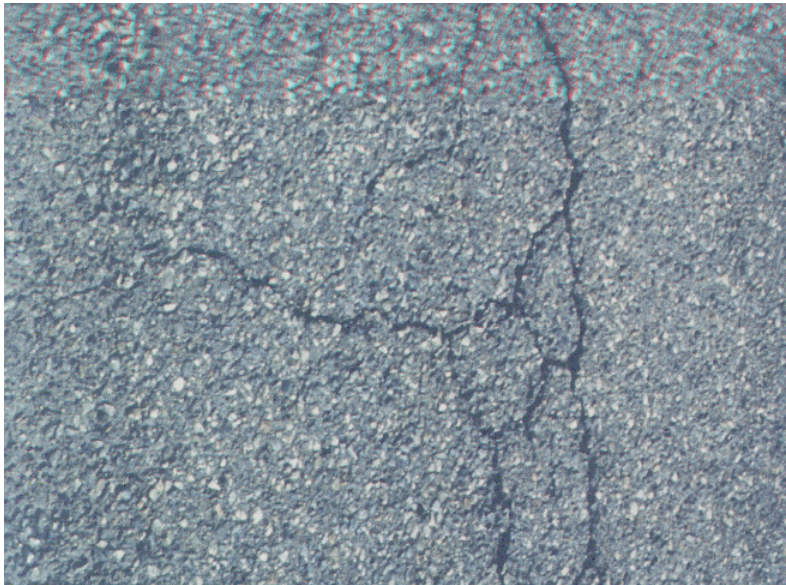
- Alligator cracking is associated with loads and is usually limited to areas of repeated traffic loading (wheel paths).
- On narrow, two-lane roads, alligator cracking may form along the center line.
- Pot holes and occurrences of destroyed or missing pavement are accumulated as high severity alligator cracking.

Alligator Cracking - Low



- Branched discontinuous thin cracks beginning to interconnect and form the typical alligator pattern. No Spalling.

Alligator Cracking - Medium



- Interconnected and fully developed alligator pattern. Spalling may appear at the edges. Cracks may be greater than $\frac{1}{4}$ inch.

Alligator Cracking - High



- Well developed alligator pattern. Spalling is very apparent. Individual pieces may be loose or missing. Pumping of fines may be present.



Alligator Cracking

- Measurement:
 - Option A: Record length of cracking as it occurs in both wheel paths for each severity level.
 - Option B: Record square feet of cracking as it occurs in both wheel paths for each severity level.



Longitudinal Cracking

- Longitudinal cracking runs roughly parallel to center line and is associated with loading or mix durability.
- Longitudinal cracking within the wheel paths are the beginning of alligator cracking.
- Longitudinal cracking within 6 inches of the lane edge is assumed to be related to pavement construction and should be rated as nonwheel path longitudinal cracking.

Longitudinal Cracking - Low



- Little to no spalling and less than $\frac{1}{4}$ inch in width. If cracks are sealed they should be classified as low severity.

Longitudinal Crack - Medium



- Little to no spalling but greater than $\frac{1}{4}$ inch in width. May be a few low severity connecting cracks near the main crack.

Longitudinal Crack - High



- Cracks are spalled. There may be several cracks near the main crack. Pieces are visibly missing along the crack. At some point, will become alligator cracking.



Longitudinal Cracking

- Measurement:
 - Option A: Record length of cracking as it occurs for each severity level.
 - Option B: Record length of cracking as it occurs for each severity level.



Nonwheel Path Longitudinal Cracking

- Nonwheel path longitudinal cracking runs roughly parallel to center line and is associated with mix durability or construction and can be caused by reflective cracking.
- Not associated with loading.



Nonwheel Path Longitudinal Cracking - Low



- Little to no spalling and less than $\frac{1}{4}$ inch in width. If cracks are sealed they should be classified as low severity.



Nonwheel Path Longitudinal Cracking - Medium



- Little to no spalling but greater than $\frac{1}{4}$ inch in width. May be a few low severity connecting cracks near the main crack.



Nonwheel Path Longitudinal Cracking - High



- Cracks are spalled. There may be several cracks near the main crack. Pieces are visibly missing along the crack.



Nonwheel Path Longitudinal Cracking

- Measurement:
 - Option A: Record length of nonwheel path cracking as it occurs for each severity level.
 - Option B: Record length of nonwheel path cracking as it occurs for each severity level.



Transverse Cracking

- Transverse cracking runs roughly perpendicular to the center line and is associated with mix durability or climate.
- Transverse cracking may also be associated with underlying pavement layers such as PCC.
- Consider only transverse cracks that are a minimum of two feet in length.

Transverse Cracking - Low



- Little to no spalling and less than $\frac{1}{4}$ inch in width. If cracks are sealed they should be classified as low severity.

Transverse Cracking - Medium



- Little to no spalling but greater than $\frac{1}{4}$ inch in width. May be a few low severity connecting cracks near the main crack.

Transverse Cracking - High



- Cracks are spalled. There may be several cracks near the main crack. Pieces are visibly missing along the crack.



Transverse Cracking

- Measurement:
 - Option A: Accumulate the count for cracks that are a min. of 2 feet in length as it occurs for each severity level .
 - Option B: Record length for cracks that are a min. of 2 feet in length as it occurs for each severity level.



Raveling and Aging

- Raveling and aging are surface deterioration that occurs when aggregate particles are dislodged (raveling) or when oxidation causes the loss of the asphalt binder (aging).
- Raveling and aging are associated with mix durability or climate.
- Measured differently depending on whether the road surface is BST or HMA.

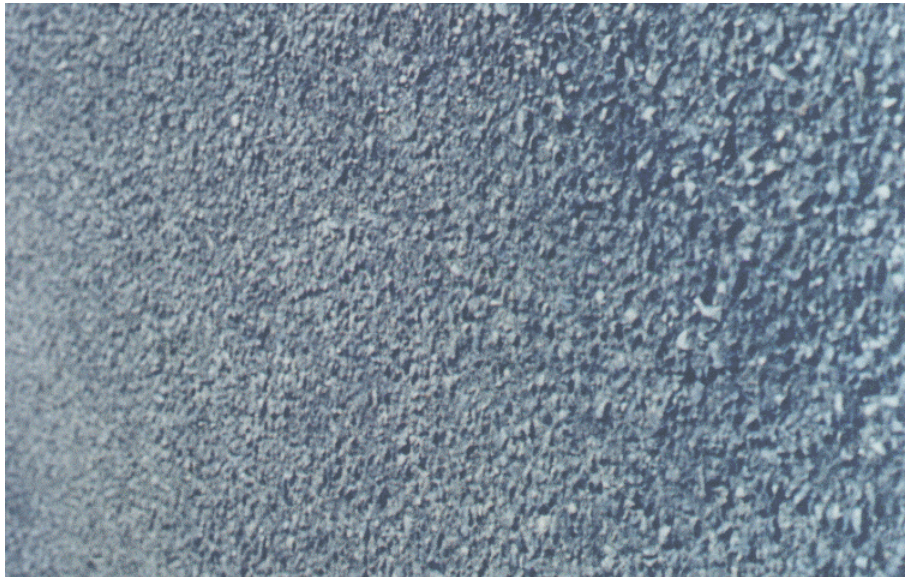
Raveling and Aging - Low



- Aggregate and/or binder has started to wear away but not significantly. Appears only slightly aged and rough.



Raveling and Aging - Medium



- Aggregate and/or binder has worn away and the surface texture is moderately rough and pitted. Fine aggregate is partly missing from the surface.

Raveling and Aging - High



- Aggregate and/or binder has worn away significantly and surface texture is deeply pitted and very rough. Fine aggregate is missing from the surface.



Raveling and Aging

- Measurement:
 - Option A and B: The extent of raveling is expressed relative to the surface area. Record the distressed area.



Flushing / Bleeding

- Flushing and bleeding is indicated by an excess of asphalt material on the pavement surface which looks shiny and may be sticky in hot weather.
- Flushing and bleeding occurs most commonly in the wheel paths.
- Measured differently depending on whether the road surface is BST or HMA.



Flushing / Bleeding - Low



- Minor amounts of aggregate have been covered by excess asphalt but not significantly.

Flushing / Bleeding - Medium



- Significant amounts of the surface aggregate have been covered with excessive asphalt. Much of the course aggregate is still exposed.

Flushing / Bleeding - High



- Most of the aggregate is covered by excessive asphalt. The area appears wet and is sticky in hot weather.



Flushing / Bleeding

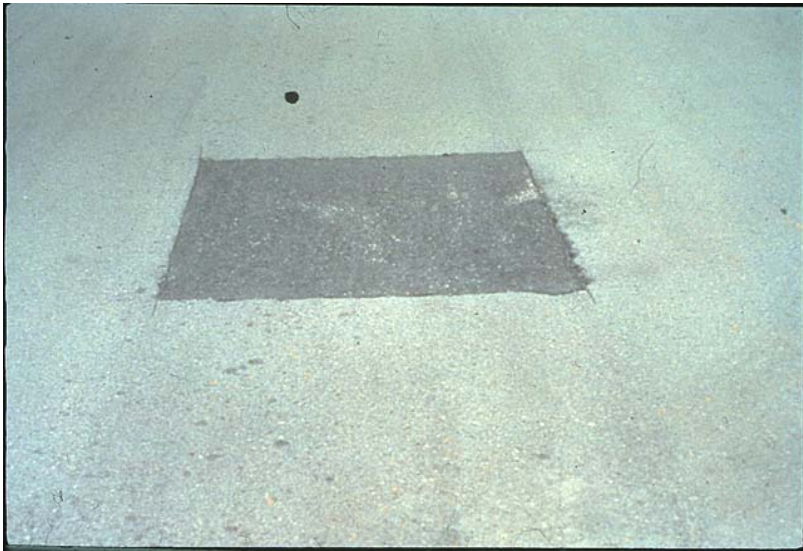
- Measurement:
 - Option A and B: The extent of raveling is expressed relative to the surface area. Record the distressed area.



Patching

- A patch is an area of pavement which has been replaced with new material to repair the existing pavement or access a utility.
- A patch is considered a defect no matter how well it is performing.
- Temporary or permanent repairs are included in this distress.
- No other distresses are rated within a patched area.

Patching - Low



- Patch has at most low severity distress of any type.

Patching - Medium



- Patch has medium severity distress of any type.

Patching - High



- Patch has high severity distress of any type.



Patching

- Measurement:
 - Option A: Record the length of each severity of patching. Extent of patching is related to wheel paths. Each half lane is a wheel path.
 - Option B: Record the area of patching for each severity. No other distresses are recorded within the patch.



Corrugations and Waves

- Corrugations and waves are regularly occurring transverse undulations in the pavement surface.
- Corrugations occur as closely spaced ripples, while waves are undulations whose distance from peak to valley is more than 3 feet.

Corrugations and Waves - Low



- 1/8 inch to 2 inches per ten feet. Corrugation is defined as the maximum vertical deviation from a 10 foot straightedge along centerline.

Corrugations and Waves - Med



- 2 inches to 4 inches per ten feet. Corrugation is defined as the maximum vertical deviation from a 10 foot straightedge along centerline.

Corrugations and Waves - High



- Over 4 inches per ten feet. Corrugation is defined as the maximum vertical deviation from a 10 foot straightedge along centerline.



Corrugations and Waves

- Measurement:
 - Option A: Record the length of each severity. Extent is related to segment length.
 - Option B: Record the area for each severity. Extent is related to segment area.



Sags and Humps

- Sags and humps are localized depressions or elevated areas of pavement that result from settlement, pavement shoving, displacement due to subgrade swelling, or displacement due to tree roots.
- Sags and humps usually occur in isolated areas of the roadway surface.

Sags and Humps - Low



- 1/8 inch to 2 inches per ten feet. Sags and humps are defined as the maximum vertical deviation from a 10 foot straightedge along centerline.

Sags and Humps - Medium



- 2 inches to 4 inches per ten feet. Sags and humps are defined as the maximum vertical deviation from a 10 foot straightedge along centerline.

Sags and Humps - High



- Over 4 inches per ten feet. Sags and humps are defined as the maximum vertical deviation from a 10 foot straightedge along centerline.



Sags and Humps

- Measurement:
 - Option A: Record the length of each severity. Extent is related to segment length.
 - Option B: Record the area for each severity. Extent is related to segment area.



Block Cracking

- Block cracks divide the pavement into nearly rectangular pieces with cracks that intersect at about 90 degrees. This distress is related to shrinkage of the asphalt pavement or daily temperature cycling.
- Block cracks are not load related.
- The occurrence of block cracking indicates that the asphalt has hardened significantly through aging.

Block Cracking - Low



- Average size of blocks and average width of cracks.
- Blocks: 9 x 9 ft. or greater.
- Cracks: Less than $\frac{1}{4}$ inch.

Block Cracking - Medium



- Average size of blocks and average width of cracks.
- Blocks: 5 x 5 to 8 x 8 ft.
- Cracks: Over ¼ inch.

Block Cracking - High



- Average size of blocks and average width of cracks.
- Blocks: 4 x 4 ft. or less.
- Cracks: Over ¼ inch and spalled.



Block Cracking

- Measurement:
 - Option A: Assumed to be the full surveyed segment. If not, rate using longitudinal and transverse cracking.
 - Option B: Assumed to be the full segment area. If not, rate using longitudinal and transverse cracking.



Pavement Edge Condition

- Edge raveling occurs when the pavement edge breaks away from roadways without curbs or paved shoulders. Edge patching is the repair of this distress.
- Edge raveling is usually associated with loading.



Pavement Edge Condition - Low



- Edge raveling is present.

Pavement Edge Condition - Med



- Edge patching is present.

Pavement Edge Condition - High



- Edge lane is less than 10 feet wide.



Pavement Edge Condition

- Measurement:
 - Option A and B: Record the length of each distress level. Extent of pavement edge condition is related to the percentage of the length of the segment.



Crack Seal Condition

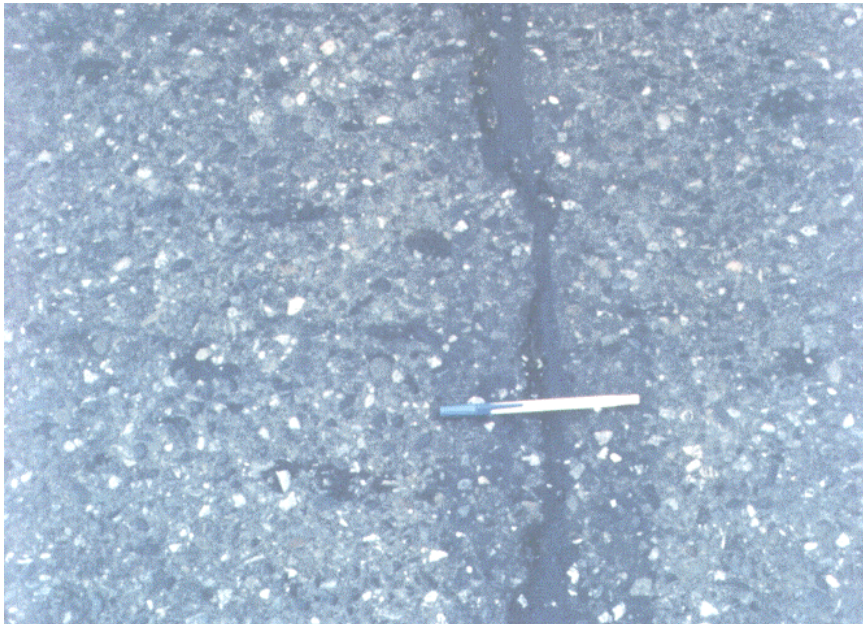
- Crack seal condition is an informational distress and carries no deduct values.
- Can be used to run a crack sealing program.

Crack Seal Condition - Low



- Sealant in good to excellent condition.
- If no sealed cracks present record none.
- Informational distress can be used to run your crack sealing program.

Crack Seal Condition - Medium



- Hairline failure of sealant. Allows minimal amount of water to pass.
- If no sealed cracks present record none.



Crack Seal Condition - High



- Sealant severely cracked and can allow significant amount of water to pass or is wide open.
- If no sealed cracks present record none.



Crack Seal Condition

- Measurement:
 - Option A and B: Record the length of each severity level. Extent of crack seal condition is related to the total length of the segment cracks.