

Common Distresses on Flexible Pavements

From... Maintenance Technical
Advisory Guide (MTAG)

Fundamentals of Pavements

- Function of pavements
- Factors affecting pavement performance
 - Subgrade soil
 - Pavement materials characteristics
 - Asphalt cement
 - Aggregate
 - Modifiers for asphalt cement (e.g., rubber and polymers)
 - Additives or stabilizing agents for aggregates (e.g., lime and cement)
 - Traffic loading
 - Environment
 - Moisture; and
 - Temperature

Common Flexible Pavement Distresses

- Cracking
- Deformation
- Deterioration
- Mat problems
- Problems associated with seal coats

Common Flexible Pavement Distresses

Category	Distress Type
Cracking	Longitudinal, fatigue, transverse, reflective, block, edge
Deformation	Rutting, corrugation, shoving, depression, overlay bumps
Deterioration	Delamination, potholes, patching, raveling, stripping, polished aggregate, pumping
Mat problem	Segregation, checking, bleeding
Seal Coats	Rock loss, segregation, bleeding/fat spots, Delamination

Initial Site Assessment Distress Identification

- Types of Distresses and Definitions
- Definitions from:
 - “Guide to the Investigation and Remediation of Distress in Flexible Pavements,” Caltrans, July 2003
 - “Distress Identification Manual for the Long-Term Pavement Performance Program,” FHWA, June 2003

LONGITUDINAL CRACKING

Cracks that are approximately parallel to pavement centerline and are not in the wheel path. Longitudinal cracks are non-load associated cracks. Location within the lane (wheel path versus non-wheel path) is significant. Longitudinal cracks in the wheel path are normally rated as Alligator 'A' cracking.



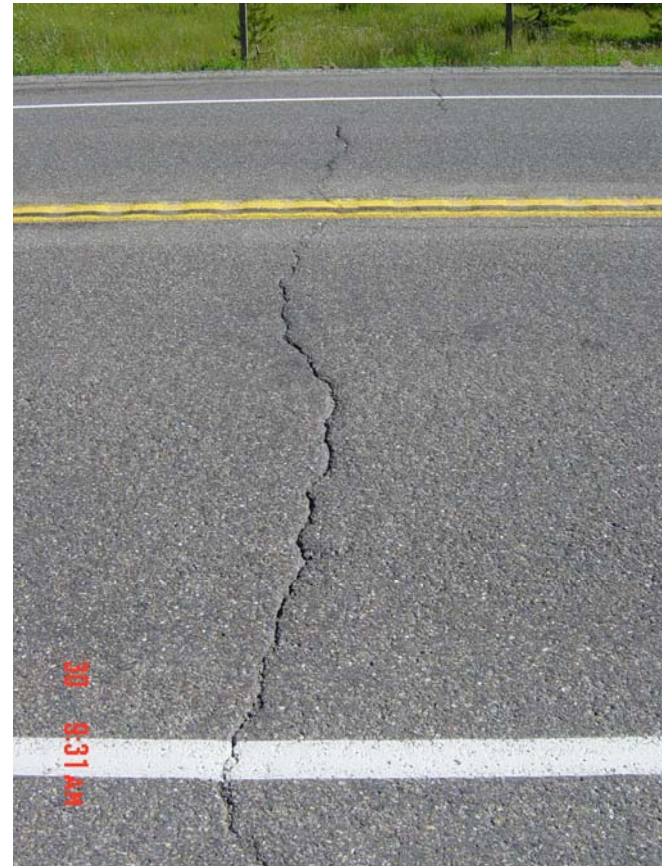
FATIGUE CRACKING

Cracks in asphalt layers that are caused by repeated traffic loadings. The cracks indicate fatigue failure of the asphalt layer. When cracking is characterized by interconnected cracks, the cracking pattern resembles that of an alligator's skin or chicken wire. Therefore, it is also referred to as alligator cracking



TRANSVERSE CRACKING

Cracks that are predominately perpendicular to pavement centerline and are not located over portland cement concrete joints. Thermal cracking is typically in this category.



REFLECTION CRACKING

Cracks in HMA overlay surfaces that occur over joints in concrete or over cracks in HMA pavements.



BLOCK CRACKING

Pattern of cracks that divides the pavement into approximately rectangular pieces. Rectangular blocks range in size from approximately 0.1 square yard to 12 square yards



EDGE CRACKING

Crescent-shaped cracks or fairly continuous cracks that intersect the pavement edge and are located within 2 feet of the pavement edge, adjacent to the unpaved shoulder. Includes longitudinal cracks outside of the wheel path and within 2 feet of the pavement edge



Edge Cracking on Lift Prior to Overlay

RUTTING

Longitudinal surface depression that develops in the wheel paths of flexible pavement under traffic. It may have associated transverse displacement



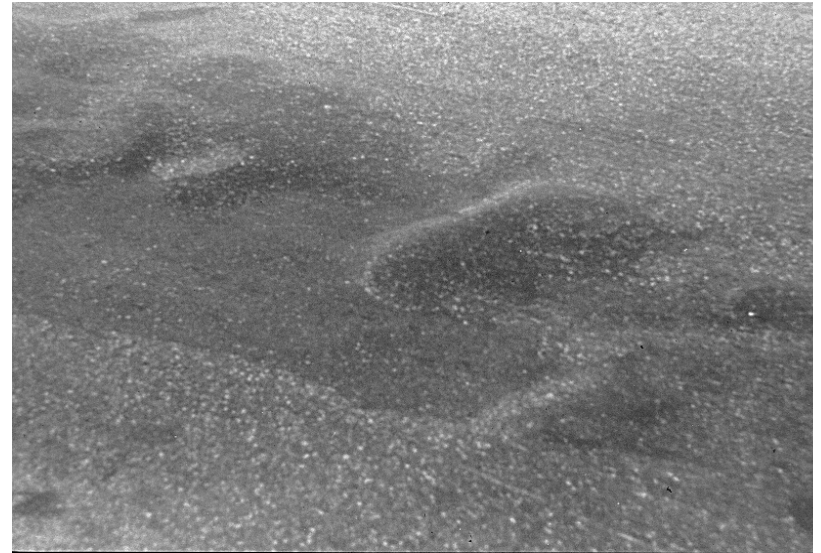
CORRUGTION

Transverse undulations appear at regular intervals due to the unstable surface course caused by stop-and-go traffic



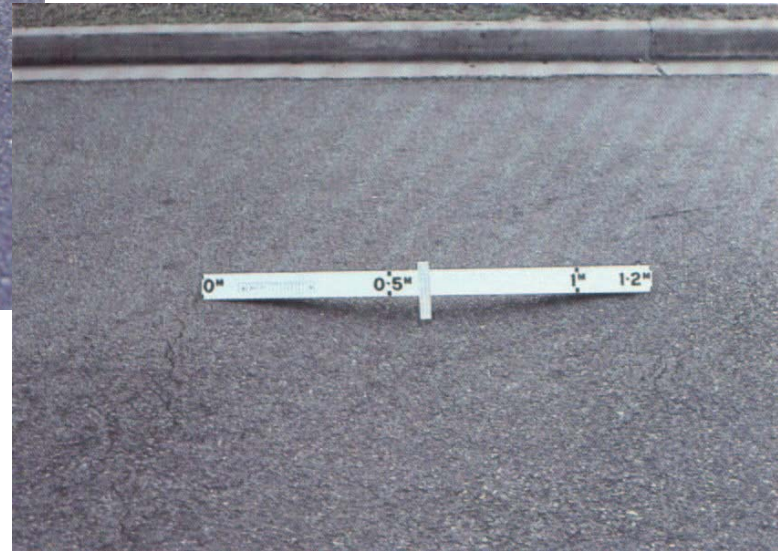
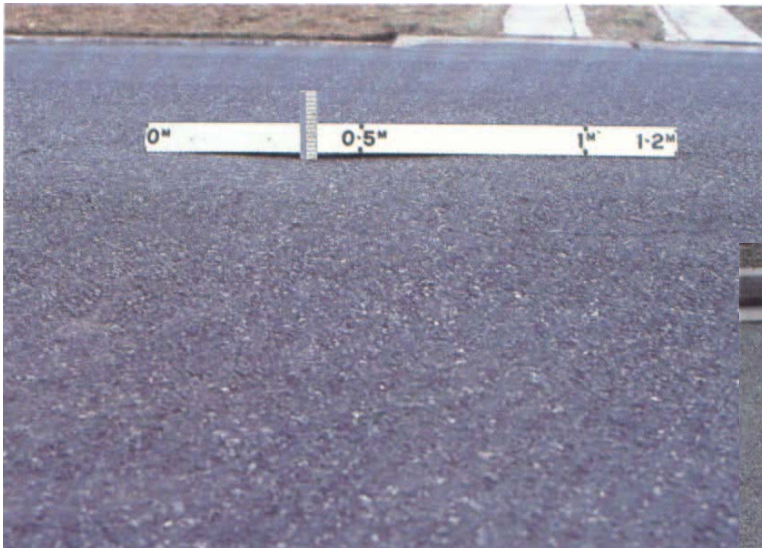
SHOVING

A longitudinal displacement of a localized area of the pavement surface. It is generally caused by braking or accelerating vehicles, and is usually located on hills or curves, or at intersections. It also may have vertical displacement



DEPRESSION

Small, localized surface settlement that can cause a rough, even hazardous ride to motorists.



OVERLAY BUMPS

In newly overlaid pavements, bumps occur where cracks in old pavements were recently filled. This problem is most prevalent on thin overlays.



DELAMINATION

Loss of a large area of pavement surface. Usually there is a clear separation of the pavement surface from the layer below. Slippage cracking may often occur as a result of poor bonding or adhesion between layers.



POTHOLES

Bowl-shaped holes of various sizes in the pavement surface.
Minimum plan dimension is 150 mm.



PATCHING

Portion of pavement surface, greater than 0.1 sq. meter, that has been removed and replaced or additional material applied to the pavement after original construction.



RAVELING

Wearing away of the pavement surface in high-quality hot mix asphalt concrete that may be caused by the dislodging of aggregate particles and loss of asphalt binder



STRIPPING

The loss of the adhesive bond between asphalt cement and aggregate, most often caused by the presence of water in asphalt concrete, which may result in raveling, loss of stability, and load carrying capacity of the HMA pavement or treated base



POLISHED AGGREGATE

Surface binder worn away to expose coarse aggregate.



PUMPING

Seeping or ejection of water and fines from beneath the pavement through cracks.



SEGREGATION

Separation of coarse aggregate from fine aggregate as a result of mishandling of the mix at several points during mix production, hauling, and placing operations. Segregation leads to non-uniform surface texture and non-uniform density.



CHECKING

Short transverse cracks, usually 1 to 3 inches in length and 1 to 3 inches apart, which occur in the surface of the HMA mat at some time during the compaction process. The cracks do not extend completely through the depth of the course, but are only about 1/2 inch deep.



BLEEDING/FLUSHING

Excess bituminous binder occurring on the pavement surface. May create a shiny, glass-like, reflective surface that may be tacky to the touch. Usually found in the wheel paths.



Bleeding



Flushing

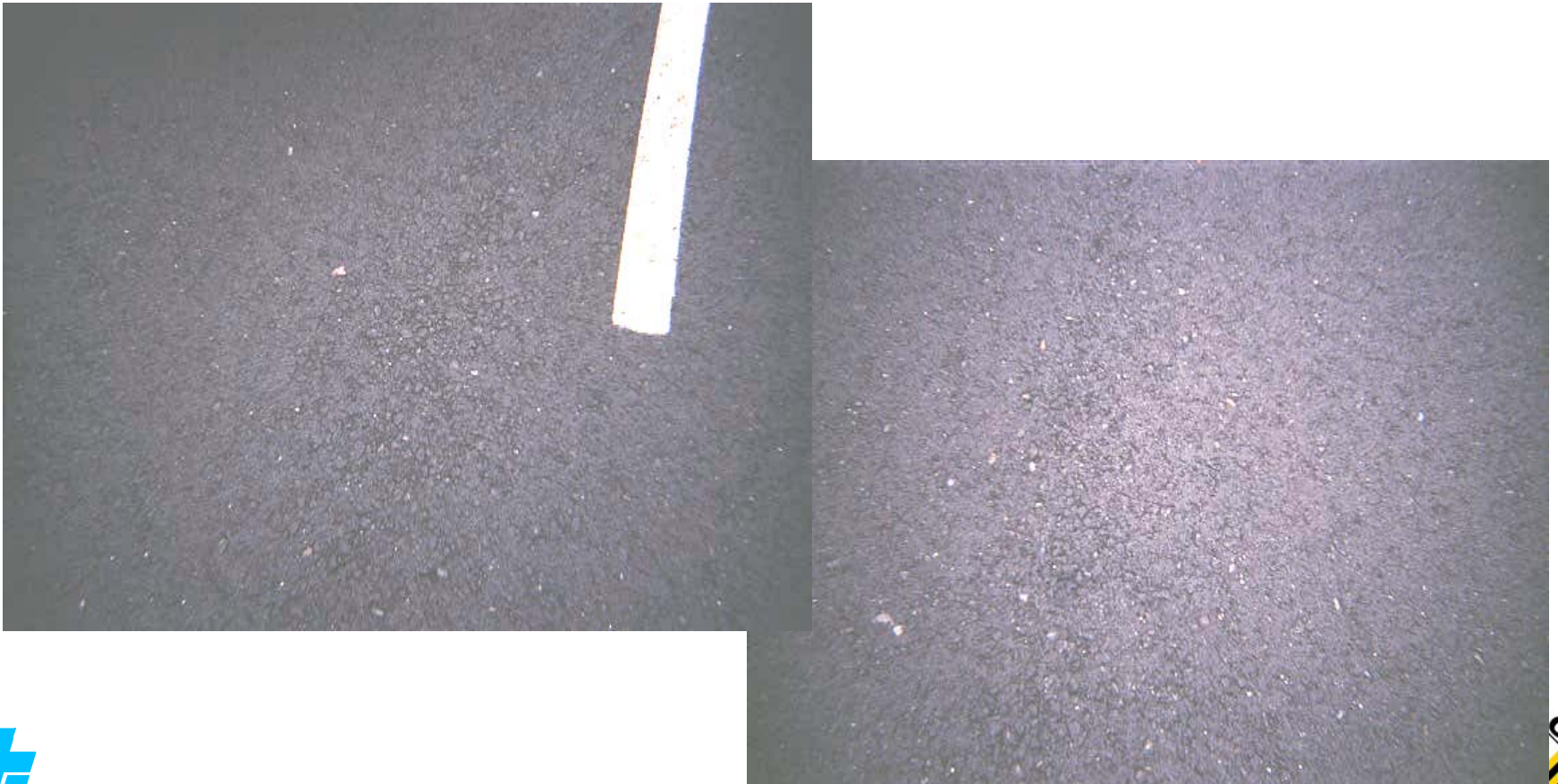
ROCK LOSS

Wearing away of the pavement surface in seal coats.



SEGREGATION

Separation of coarse aggregate from fine aggregate as a result of mishandling of the mix at several points during mix production and placing operations. Segregation leads to non-uniform surface texture.



BLEEDING / FAT SPOTS

Excess binder occurring on the surface treated pavements. May create a shiny, glass-like, reflective appearance. Fat spots are localized bleeding.



Distress Causes and Treatment Guidelines

- Table 1-1 Mechanism for Distresses
- Table 1-2 General Treatment Guidelines

Summary

- Pavement preservation treatments may be applied to most distresses with low severity.
- For distresses that are related to the existing pavement structure, pavement preservation treatments will not be appropriate; separate rehabilitation design(s) will need to be developed on a project basis