Pavement Distress Identification

Jointed Concrete Pavements

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Pavement Distress Categories

- Cracking
- Joint Deficiencies
- Surface Defects
- Miscellaneous Distresses
Distress Types

- Cracking
  - Corner Breaks
  - Durability Cracking
  - Longitudinal Cracking
  - Transverse Cracking

- Severity Level Determination
  - Crack Width
  - Spalling
  - Faulting

Distress Types

- Joint Deficiencies
  - Transverse Joint Seal Damage
  - Longitudinal Joint Seal Damage
  - Spalling of Longitudinal Joints
  - Spalling of Transverse Joints

- Severity Level Determination
  - Length of Damaged Sealant
  - Width of Spall
Distress Types

- **Surface Defects**
  - Map Cracking
  - Scaling
  - Polished Aggregate
  - Popouts

- **Severity Level Determination**
  - Severity Levels Are Not Applicable

Distress Types

- **Miscellaneous Distresses**
  - Blowups
  - Faulting of Transverse Joints and Cracks
  - Lane-to-Shoulder Dropoff
  - Lane-to-Shoulder Separation
  - Patch/Patch Deterioration
  - Water Bleeding and Pumping

- **Severity Level Determination**
  - Severity Levels Not Applicable Except for Patching
  - For Patching, Based Upon Distress Within Patch
- Measuring width of spalls and cracks in PCC pavements:

**Cracking**
**Corner Breaks**

- Crack intersecting adjacent transverse and longitudinal joints at a 45° with the direction of traffic
- Length of sides is from 1 ft to 0.5*(width of the slab)
**Durability Cracking (D-Cracking)**

- Closely spaced crescent-shaped hairline cracking pattern
- Occurs adjacent to joints, cracks, or free edges; initiating in slab corners
- Dark coloring of the cracking pattern and surrounding area.

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**Moderate severity D-cracking with well defined patterns**

**High severity D-cracking with loose and missing materials**
Longitudinal Cracking

- Cracks that are predominantly parallel to the pavement centerline.
Transverse Cracking

- Cracks that are predominantly perpendicular to the pavement centerline

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Transverse Cracking

- Example images of transverse cracking in pavement.
Joint Deficiencies

Joint Seal Damage

- Joint seal damage is a condition which enables incompressible materials or a significant amount of water to infiltrate into the joint from the surface.
- Typical types of joint seal damage are:
  - Extrusion, hardening, adhesive failure (bonding), cohesive failure (splitting) or complete loss of sealant.
  - Intrusion of foreign material in the joint.
  - Weed growth in the joint.
Joint Seal Damage

Low Severity Joint Seal Damage

Spalling of Longitudinal Joints

- Cracking, breaking, chipping or fraying of slab edges within 2 ft of the longitudinal joint
Spalling of Transverse Joints

- Cracking, breaking, chipping or fraying of slab edges within 2 ft of the transverse joint

Spalling of Joints
Surface Defects

Map Cracking

- A series of cracks that extend only into the upper surface of the slab
- Frequently, larger cracks are oriented in the longitudinal direction of the pavement and are interconnected by finer transverse or random cracks.
Map Cracking

Scaling

- Scaling is the deterioration of upper concrete slab surface
- Normally 0.1 inch to 0.5 in
- May occur anywhere over the pavement
Scaling

Polished Aggregate
- Surface mortar and texturing worn away to expose coarse aggregate.
**Popouts**

- Small pieces of pavement broken loose from the surface
- Normally ranging in diameter from 1 to 4 inches and depth from 0.5 to 2 inches
**Miscellaneous Distress**

**Blowups**

- Localized upward movement of the pavement surface at transverse joints or cracks, often accompanied with shattering of the concrete in that area.
Blowups

Faulting
- Difference in elevation across a joint or crack.
Faulting

Lane-to-Shoulder Dropoff

- Difference in elevation between the edge of slab and outside shoulder
- Typically occurs when the outside shoulder settles
Lane-to-Shoulder Dropoff

- Widening of the joint between the edge of the slab and the shoulder.
Lane-to-Shoulder Separation

Patch/Patch Deterioration

- A portion, greater than 1 square feet, or all of the original concrete slab that has been removed and replaced, or additional material applied to the pavement after original construction.
**Patch/Patch Deterioration**

- Low severity AC patch
- Low severity AC patch
- Low severity PCC patch
- High severity AC patch

**Water Bleeding and Pumping**

- Seeping or ejection of water from beneath the pavement through cracks.
- In most cases detectable by deposits of fine material left on the pavement surface, which were eroded (pumped) from the support layers and have stained the surface.
Water Bleeding and Pumping

References

- LTPP Pavement Distress Identification Manual
- INDOT Pavement Condition Data Collection Manual
  - INDOT Systems Analysis and Planning Division, Pavement Management Section
Thank you for your attention!