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Standard Terminology Relating to Pavement Distress[1]

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1. Scope

1.1 This terminology provides definitions for pavement distress for airfields, highways, roads, streets, and parking lots of all functional classifications.

1.2 This terminology covers surfaces paved with either bituminous or portland cement concrete. It does not include other paved or unpaved surfaces.

1.3 This terminology includes most of the significant types of pavement surface distresses, but it is not all inclusive.

1.4 Not all distresses noted are applicable to all pavement categories listed in 1.1.

1.5 Severity levels are not addressed in this terminology but are addressed in other ASTM test methods and practices (for example, Test Method D 5340). However, a knowledge of severity levels is required for evaluating many of the distresses defined in this terminology.

2. Referenced Documents

2.1 *ASTM Standards:*

D 5340 Test Method for Airport Pavement Condition Index Surveys[2]

3. Terminology

GENERAL

bituminous pavement, *n*—a pavement comprising an upper layer or layers of aggregate mixed with a bituminous binder, such as asphalt, coal tars, and natural tars for purposes of this terminology; surface treatments such as chip seals, slurry seals, sand seals, and cape seals are also included.

continuously reinforced concrete pavement (CRCP), *n*—Portland cement concrete pavement with sufficient longitudinal steel reinforcement to control transverse crack spacings and openings in lieu of transverse contraction joints for accommodating concrete volume changes and load transfer.

crack, *n*—fissure or discontinuity of the pavement surface not necessarily extending through the entire thickness of the pavement.

depression, *n*—localized pavement surface areas at a lower elevation than the adjacent paved areas.

free edge, *n*—an unrestrained pavement boundary.

joint, *n*—a discontinuity made necessary by design or by interruption of a paving operation.

joint seal deterioration, *n*—any condition which enables incompressible materials or water to infiltrate into a previously sealed joint from the surface.

DISCUSSION—Ability to prevent water infiltration is an attribute that cannot always be readily determined visually.

jointed concrete pavement (JCP), *n*— Portland cement concrete pavement that has transverse joints placed at planned intervals.

lane-to-shoulder dropoff, *n*—(*highways, roads and streets only*) difference in elevation between the traveled surface and the shoulder surface.

longitudinal cracking, *n*—cracks in the pavement predominantly parallel to the direction of traffic.

pavement distress, *n*—external indications of pavement defects or deterioration.

portland cement concrete pavement, *n*— a pavement having a surface of aggregate mixed with portland cement paste binder or a mixture of portland cement and other pozzolans.

pumping, *n*— ejection of liquid or solid material or both from beneath the pavement through a crack or joint.

shoving, *n*— the horizontal displacement of a localized area of the pavement surface which may also include some vertical displacement.

DISCUSSION—Generally associated with turning, braking or accelerating vehicles. Can also be due to concrete expansion against adjacent bituminous pavement.

slippage cracking, *n*— cracking associated with the horizontal displacement of a localized area of the pavement surface.

swell, *n*—a hump in the pavement surface that may occur over a small area or as a longer, gradual wave; either type of swell can be accompanied by surface cracking.

transverse cracking, *n*—cracks in the pavement that are predominantly perpendicular to the direction of traffic.

BITUMINOUS PAVEMENT DISTRESSES

alligator (crocodile) cracking, *n*— interconnected or interlaced cracks forming a pattern which resembles an alligator's hide.

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[2] *Annual Book of ASTM Standards*, Vol 04.03.

bituminous bleeding, *n*— excess bitumen on the surface of the pavement, usually found in the wheel paths.

block cracking, *n*—a pattern of cracks that divide the pavement into approximately rectangular pieces, ranging in size from approximately 0.1 m^2 to 1.0 m^2(1 ft^2 to 100 ft^2).

corrugation, *n*—transverse undulations at regular intervals in the surface of the pavement consisting of alternate valleys and crests not more than 1 m (3 ft) apart.

edge cracking, *n*—crescent-shaped cracks or fairly continuous cracks that are located within 0.6 m (2 ft) of the pavement edge.

jet-blast erosion, *n*—(*airfields only*) darkened areas on the pavement surface where bituminous binder has been burned or carbonized; localized burned areas may vary in depth up to approximately 15 mm (½in.).

oil spillage, *n*—a localized deterioration or softening of the pavement surface caused by the spilling of oil, fuel, or other solvents.

polished aggregate, *n*—exposed aggregate worn sufficiently smooth to affect frictional characteristics.

potholes, *n*—bowl-shaped holes in the pavement surface, greater than 0.1 m (4 in.) in diameter, and more than 25 mm (1 in.) in depth.

raveling, *n*—loss of pavement surface material involving the dislodging of aggregate particles and degradation of the bituminous binder.

reflection cracking at joints, *n*— cracks in bituminous overlay surfaces that occur over concrete pavements at joints.

rut, *n*—a contiguous longitudinal depression deviating from a surface plane defined by transverse cross slope and longitudinal profile.

PORTLAND CEMENT CONCRETE PAVEMENT SURFACE DISTRESSES

blowups, *n*—localized upward movement of the pavement surface at transverse joints or cracks, often accompanied with shattering of the concrete in that area.

corner breaks, *n*—(*JCP only*) a portion of the slab separated by a crack that intersects the adjacent transverse and longitudinal joints, describing approximately a 45 degree angle with the direction of traffic where the length of the sides is from 0.3 m (1 ft) to one half the width of the slab.

durability "D" cracking, *n*—closely spaced crescent-shaped hairline cracking pattern that initiates adjacent to joints, cracks, or free edges, first manifesting itself at the intersection of joints, cracks or free edges; dark coloring of the cracking pattern and surrounding area often exists with "D" cracking.

faulting of joints and cracks, *n*— difference in elevation across a joint or crack.

joint spalling, *n*—cracking, breaking, or chipping of concrete pavement edges within 0.6 m (2 ft) of a joint.

lane-to-shoulder separation, *n*—(*highways, roads and streets only*) widening of the joint between the edge of the slab and the shoulder.

map cracking, *n*—a series of interconnected cracks that extend only into the upper portion of the slab.

patch, *n*—a portion of pavement surface which has been replaced or where additional material has been applied to the pavement after original construction.

popouts, *n*—small holes in the pavement surface, normally ranging in diameter from 25 mm (1 in.) to 100 mm (4 in.) and depth from 13 mm (0.5 in.) to 50 mm (2 in.).

pumping, *n*—ejection of water, material, or both from beneath the pavement through a crack or joint.

DISCUSSION—The mechanism for ejection is not necessarily limited to traffic loading.

punchouts, *n*—a broken area of a concrete slab bounded by closely spaced cracks (usually less than 1 m (3 ft)).

scaling, *n*—the deterioration of the upper concrete slab surface, normally 3 mm (0.125 in.) to 13 mm (0.5 in.) in depth, resulting in the loss of surface mortar.

transverse construction joint deterioration, *n*—(*CRCP only*) series of closely spaced transverse cracks or a large number of interconnecting cracks occurring near a construction joint.

4. Significance and Use

4.1 This terminology provides a reference for defining pavement distress types regardless of the ultimate intended use for the data or the amount, or both, of pavement to be surveyed.

4.2 This terminology may be used with both manual and automated distress surveys. The terminology will allow equipment manufacturers to develop automated methodologies that will help address the needs of agencies at all levels of government, based on a common set of definitions, while at the same time being readily adaptable for use with manual surveying.

4.3 This terminology will allow agencies to identify and define pavement distresses in the same terms. Similarly, it allows agencies at the same level to discuss and compare pavement surface distresses using common terms.

4.4 There are many different uses for distress surveys; however, from an engineering point of view, the purpose for conducting these surveys may include one or more of the following:

4.4.1 Describe present pavement condition,

4.4.2 Predict future pavement condition (deterioration curves),

4.4.3 Identify current and future pavement maintenance and construction needs,

4.4.4 Facilitate pavement maintenance and construction programming,

4.4.5 Determine effectiveness of alternative treatments,

4.4.6 Select maintenance treatment,

4.4.7 Identify needed spot improvements, and

4.4.8 Develop maintenance and construction quantity estimates.

5. Hazards

5.1 The collection of pavement distress information is a hazardous activity generally conducted in the presence of operational traffic. If the facility is closed for inspection, all regulatory and professional practice standards must be applied to provide traffic protection and traffic control for those personnel in the work zone.

5.2 If the data are collected using an automated device that

travels at highway speeds, this activity should also be conducted in accordance with appropriate local and national regulatory methods and safety procedures. Appropriate adherence to traffic laws, common driving practices and safety measures is essential.

5.3 Traffic is a hazard to inspectors who must walk on the pavement to perform manual condition surveys. Inspection must be approved by and coordinated with the local authority.

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