Method of Test for Determining Surface Deviations of PCC Pavement and Bridge Decks

1. Scope:

This test is for determining longitudinal and transverse surface deviations of PCC Pavement and bridge decks.

2. Apparatus:

2.1 10’ straightedge

2.2 Steel shims of 1/16”, 1/8”, 3/16”, and 1/4” with an allowable tolerance of ±0.010” in thickness. The shims will be a minimum size of approximately 1 1/4” wide and 3” long.

2.3 10’ High-Low Detector

3. Procedure:

Determine if the High-Low Detector will be used or if only the straightedge will be used. If only the straightedge will be used, follow section 3.3.

NOTE: The High-Low Detector is used to determine the general location of possible deficient areas (Bumps/dips) to be checked with a 10’ straightedge. If the area to be checked is small the location of deficient areas may be determined with the straightedge without first identifying areas using the High-Low Detector.

3.1 Verification of the High-Low Detector.

A Prior to use.

(1) Place the High-Low Detector on a flat, straight surface. The surface should be checked with the 10’ straightedge prior to verification.

(2) Verify the High-Low Detector using shims of 1/16”, 1/8”, 3/16”, and 1/4” or a combination of 1/16” and 1/8” shims. Place these shims longitudinally under the wheels.

The High-Low Detector should be verified through the entire range of 1/16”, 1/8”, 3/16”, and 1/4” for both the high and low positions.

(3) Mark the new height and depths accurately on the indicator plate of the detector. Narrow strips of colored adhesive tape are suggested for use in making the marks, as they can readily be removed and replaced when further verification requires slight changes on the indicator plate.

3.2 Operation of the High-Low Detector.

A. The High-Low Detector should be pushed in a longitudinal direction over the approximate center of the wheel paths in each travel lane. The detector should be kept in an upright position, approximately perpendicular to the pavement surface.

B. A deviation of 1/8” exists when the needle of the High-Low Detector swings just past the 1/8” mark of the indicator plate on either the high or low side. Also, when the indicator needle is riding on the high side and swings to the low side (or vice versa) with a total movement indicating a change of 1/8” or more, within a longitudinal distance of less than 10’, the questionable areas should be marked for checking with the 10’ straightedge.

3.3 Straightedging.

The areas in question will be checked with a 10’ straightedge positioned either parallel or perpendicular to the centerline of the roadway. Lay shim flat on the pavement surface approximately perpendicular to the straightedge.

During the checking operation, the straightedge will be at rest and supported by only its own weight on the narrow side.

A surface deviation is considered to exist when the shim resting on the surface of the concrete can be freely passed under the straightedge.

Determine if the 1/8” or 1/4” shim will be used to determine the permissible deviation. This is based on location and standard specifications.

A. Test locations.

(1) Longitudinal surface tests will be completed on each wheel path on travel lanes and acceleration lanes. Tests will be completed at ramp entrances, shoulders, and other similar areas that visually indicate a deviation may exist.

(2) Transverse surface tests will be completed at locations that visually indicate a transverse deviation may exist. Edge slump at the pavement edge is one example.

B. Determine the Maximum Depth of the deficient area.

(1) The maximum depth of the deviation is determined by the largest shim or combination of shims that can pass freely under the straightedge, using examples in Figures 1a, 1b and 2.

Example: If the permissible deviation is 1/8” (2/16”) and the 1/8" shim will freely slide under the straightedge, but 3/16" shim will not, then report as 1/8" (2/16") under “Depth of Deviation – Total”. 22

C. Determining the Length of deviation in the deficient areas.

(1) Longitudinal surface test

The length of the deviation is determined using examples in Figures 1a, 1b and 2.

(2) Transverse surface test.

The length of the deviation is measured in the longitudinal direction.

D. Determine the Width of the deficient area.

(1) Longitudinal surface test

The width will be the total width of the travel lane (12 feet or less) or shoulder.

(2) Transverse surface test.

The width will be the total width of the travel lane or shoulder. This is regardless of the actual measured width of the deviation.

4. Report:

Document the Maximum Depth of Deviation at locations that exceed the permissible deviation. The Maximum Depth of Deviation reported will be to the

nearest 1/16". The wheel path with the larger maximum depth of deviation will be used for determination.

4.1 Calculate the "Deficient Area" of longitudinal surface deviation.

The length used for computation of the area will be the length measured at the wheel path with the larger maximum depth of deviation.

Deficient Area = (L * W) / 9
L = Length of deviation (nearest 0.1')
W = Width (nearest 1')

Report only the deficient area of the wheel path with the larger deviation to the nearest 0.1 yd² on the DOT-29. 22

4.2 Calculate the "Deficient Area" of transverse surface deviation.

Deficient Area = (L * W) / 9

L = Length of deviation (nearest 0.1 ft.)
W = Width (nearest 1')

Report the deficient area to the nearest 0.1 yd² on the DOT-29.

5. References:

DOT-29

Sample ID 2287419 **Longitudinal Surface Deviation** DOT-29
File No. 7-19

PROJECT PH 0066(00)15 COUNTY Aurora, Ziebach PCN B015
Field Nbr 05 Date 04/25/2019 Tested By Tester, One Location 60+00 to 80+00 WBL

Station	Direction Tested	Lane Width	Length of Deviation	Depth of Deviation		Deficient Area (Sq. YD.)	Remarks
				Total	Permissable		
66+35	L	12.0	5.4	3/16	2/16	7.2	Driving Lane Header - Grind
	L	14.0	5.8	4/16	2/16	9.0	Passing Lane Header - Grind
72+20	L	12.0	4.0	2/16	2/16	5.3	Driving Lane
	L	14.0	5.7	3/16	2/16	8.9	Passing Lane
72+88	T	8.0	7.3	6/16	4/16	6.5	PCCP Outside Shoulder
73+16	L	10.0	2.8	4/16	4/16	3.1	Acceleration Lane
76+25	T	12.0	2.2	3/16	2/16	2.9	Driving Lane Outside Edge

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Direction Tested = longitudinal (L) or transverse (T)
Lane or Shoulder Width = affected width to nearest 0.5'
Length Deviation = nearest 0.1'
Depth of Deviation Total = max measured under straightedge to nearest 1/16"
Depth of Deviated Permissible = specification

Sq Yd= (Length x Width)/9

Comments

Figure 1

LONGITUDINAL SURFACE DEVIATION

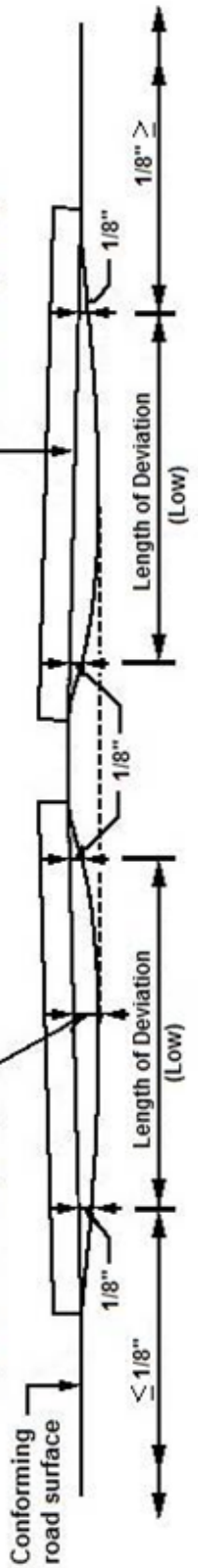

Figure 1A

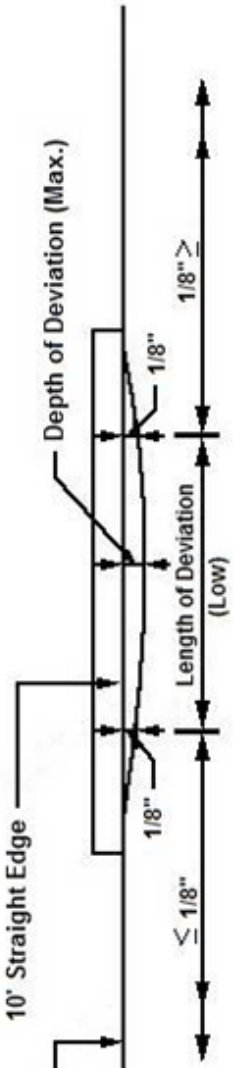

Figure 1B

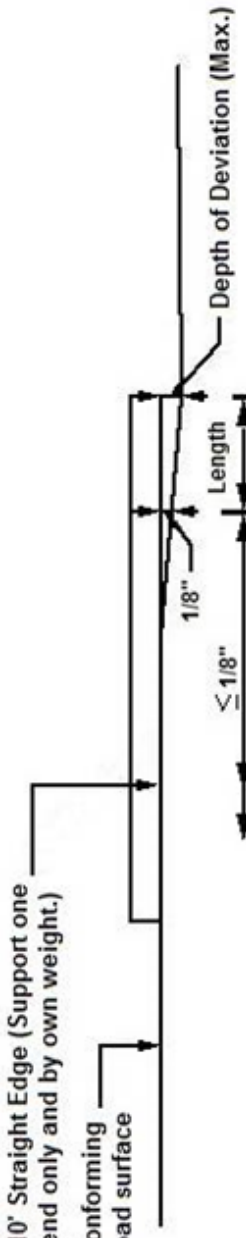

Figure 2