Standard Method of Test for

Pavement Deflection Measurements

AASHTO Designation: T 256-01 (2020)

Technical Subcommittee: 5a, Pavement Measurement

Release: Group 1 (April)

AASHTO

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1. SCOPE

1.1. This test method provides standards for measuring pavement surface deflections, directly under, or at locations radially outward (offset) from a known static, steady-state, or impulse load. Deflections are measured with sensors that monitor the vertical movement of a pavement surface due to the load. This test method describes procedures for the deflection measurement using various deflection testing devices and provides the general information that should be obtained regardless of the type of testing device used.

1.2. This test method is applicable for deflection measurements performed on flexible asphalt concrete (AC), rigid portland cement concrete (PCC), or composite (AC/PCC) pavements. Rigid pavements may be plain, jointed, jointed reinforced, or continuously reinforced or fractured concrete.

1.3. The values stated in SI units are to be regarded as standard. The U.S. Customary system of units given in parentheses is for information purposes only.

1.4. *This standard does not purport to address the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. REFERENCED DOCUMENTS

2.1. *AASHTO Standards*:

- R 32, Calibrating the Load Cell and Deflection Sensors for a Falling Weight Deflectometer
- R 33, Calibrating the Reference Load Cell Used for Reference Calibrations for a Falling Weight Deflectometer

2.2. *ASTM Standard*:

- STP1026, *Nondestructive Testing of Pavements and Backcalculation of Moduli*

2.3. *Other Documents*:

- FHWA-HRT-07-040, FWD Calibration Center and Operational Improvements: Redevelopment of the Calibration Protocol and Equipment
- FHWA-RD-98-085, *Temperature Predictions and Adjustment Factors for Asphalt Pavements*
- SHRP-P-661, *Manual for FWD Testing in the Long-Term Pavement Performance Program*

3. TERMINOLOGY

3.1. *Definitions of Terms Specific to This Standard*:

3.1.1. *deflection sensor*—electronic device(s) capable of measuring the relative vertical movements of a pavement surface and mounted in such a manner as to minimize angular rotation with respect to its measuring plane at the expected movement. Such devices may include seismometers, velocity transducers, or accelerometers.

3.1.2. *load cell*—capable of accurately measuring the load that is applied perpendicular to the loading plate and is placed in a position to minimize the mass between the load cell and the pavement. The load cell shall be positioned in such a way that it does not restrict the ability to obtain deflection measurements under the center of the load plate. The load cell shall be water resistant, and shall be resistant to mechanical shocks from road impacts during testing or traveling.

3.1.3. *loading plate*—capable of an even distribution of the load over the pavement surface. Loading plates may be circular in shape (or rectangular in some cases), one piece or segmented, for measurements on conventional roads and airfields or similar stiff pavements. The plate shall be suitably constructed to allow pavement surface deflection measurements at the center of the plate.

3.1.4. *deflection basin*—the idealized bowl shape of the deformed pavement surface due to a specified load as depicted from the peak measurements of a series of deflection sensors placed at radial offsets from the center of the loading plate.

3.1.5. *deflection basin test*—a test with deflection sensors placed at various radial offsets from the center of the loading plate. The test is used to record the shape of the deflection basin resulting from an applied load. Information from this test can be used to estimate material properties for a given pavement structure.

3.1.6. *load transfer test*—a test, usually on PCC pavement, with deflection sensors on both sides of a transverse or longitudinal break in the pavement. The test is used to determine the ability of the pavement to transfer load from one side of the break to the other. Also, the load-deflection data can be used to predict the existence of voids under the pavement.

3.1.7. *test location*—the point at which the center of the applied load(s) is located.

4. SUMMARY OF TEST METHOD AND LIMITATIONS

4.1. This test method consists of standards for measuring pavement surface deflections directly under and/or at appropriate offset locations from the load center. Each nondestructive testing (NDT) device is operated according to the standard operating procedure applicable to the device.

4.2. This test method includes general descriptions of the various types of static and semicontinuous deflection testing devices, and procedures for deflection measurement corresponding to each testing device.

4.3. Standards for collection of general information, such as test setup, ambient temperature, pavement temperature, equipment calibration, number of tests, and test locations, pertain to all devices.