
Standard Method of Test for

Detection of Voids Under Rigid Pavement

AASHTO Designation: TP 28-94 (2001)^{1,2}



1. SCOPE

- 1.1. This standard describes a procedure for detecting voids under rigid pavements. The procedure verifies the existence of voids where visual or mechanical evidence of voids has been indicated, and provides for quantification of the vertical dimension of the voids.
- 1.2. *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user 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 9, Acceptance Sampling Plans for Highway Construction
 - T 24, Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- 2.2. *ASTM Standards:*
- D 3665, Random Sampling of Construction Materials
 - E 105, Probability Sampling of Materials
 - E 122, Choice of Sample Size to Estimate a Measure of Quality for a Lot or Process
 - E 141, Acceptance of Evidence Based on the Results of Probability Sampling

3. SUMMARY

- 3.1. This standard determines the existence and vertical thickness of voids under rigid pavement. The procedure requires drilling an access hole with a diameter of approximately 40 to 50 mm (1.5 to 2 in.) through the pavement and pouring a low-viscosity rapid setting liquid in the hole until the hole and any void below is filled. The liquid, which has been previously mixed with red food coloring, is allowed to set and a 100-mm (4-in.) diameter core is taken through the pavement, base, and into the subgrade. The core circumference is positioned to pass through the access hole. The core is removed, examined, and the vertical thickness of the red material below the pavement slab is measured.

4. SIGNIFICANCE AND USE

- 4.1. The premise of this procedure is that if a void lens can be filled with a low-viscosity liquid of contrasting color that would subsequently solidify, then a core of the pavement and the supporting foundation would reveal any void that existed at the base/pavement interface.
- 4.2. The procedure is also used to calibrate mechanical tests such as the Falling Weight Deflectometer (FWD), the Dynaflect, and other such nondestructive methods.
- 4.3. The vertical dimensions of the voids determined by this standard can, in combination with other data defining the horizontal extent of the voids, be used to estimate the volume of the voids.

5. INTERFERENCES

- 5.1. A temperature gradient through the thickness of the pavement slab of sufficient magnitude to induce curling or warping will affect the results obtained. It is, therefore, recommended that the test be performed at the time of the day when the slab corners are in level position.

6. APPARATUS

- 6.1. *Rotohammer*—A rotohammer with a nominal 40- to 50-mm (1.5- to 2.0-in.) diameter dry bit for drilling in concrete.
- 6.2. *Power Source*—A power source suitable for operating the rotohammer and the shop vacuum.
- 6.3. *Coring Equipment*—Coring equipment, meeting the requirements of T 24, that is capable of cutting 100-mm (4-in.) diameter cores through the pavement, base, and into the subgrade.
- 6.4. *Miscellaneous*—A screwdriver, shop vacuum, funnel, a can with a nominal capacity of 500 mL (0.018 ft³) and a disposable 250-mL (0.009 ft³) container suitable for pouring the epoxy.

7. MATERIALS

- 7.1. *Epoxy*—A two-part epoxy with a nominal viscosity of about 0.4 Pa·s (400 cps).
Note 1—The viscosity should be about the same as pancake syrup. An epoxy formulation can be selected that will set in from 10 minutes to two hours. The epoxy supplier can help in selecting the correct formulation. Approximately 30 L (8 gal.) would fill about 32 holes, each hole requiring about 500 mL (0.018 ft.³) to fill the hole and voids.
- 7.2. *Red Food Coloring*—Red food coloring that is mixed with the epoxy to provide good color contrast.