



Designation: D6951/D6951M – 18

Standard Test Method for Use of the Dynamic Cone Penetrometer in Shallow Pavement Applications¹

This standard is issued under the fixed designation D6951/D6951M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the measurement of the penetration rate of the dynamic cone penetrometer with an 8-kg [17.6-lb] hammer (8-kg [17.6-lb] DCP) through undisturbed soil or compacted materials, or both. The penetration rate may be related to *in situ* strength such as an estimated *in situ* CBR (California Bearing Ratio). A soil density may be estimated (**Note 1**) if the soil type and moisture content are known. The DCP described in this test method is typically used for pavement applications.

1.2 The test method provides for an optional 4.6-kg [10.1-lb] sliding hammer when the use of the 8-kg [17.6-lb] sliding mass produces excessive penetration in soft ground conditions.

1.3 *Units*—The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

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

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This test method is under the jurisdiction of ASTM Committee E17 on Vehicle - Pavement Systems and is the direct responsibility of Subcommittee E17.41 on Pavement Testing and Evaluation.

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2. Referenced Documents

2.1 *ASTM Standards*:²

D7380 Test Method for Soil Compaction Determination at Shallow Depths Using 5-lb (2.3 kg) Dynamic Cone Penetrometer

3. Terminology

3.1 *Definitions*:

3.1.1 *8-kg [17.6-lb] DCP dynamic cone penetrometer, n*—a device with an 8-kg [17.6-lb] hammer used to assess the *in situ* strength of undisturbed soil or compacted materials, or both, by dropping the hammer from a set height and measuring the depth of penetration and counting hammer drops (blows). (See Fig. 1.)

3.1.2 *sliding attachment, n*—an optional device used in reading the distance the DCP tip has penetrated. It may be fastened to the anvil or lower rod to hold/slide along a separate measuring rod, or it may be fastened to the separate rod and slide along a graduated drive rod. (See Fig. 1.)

4. Summary of Test Method

4.1 The operator drives the DCP tip into soil by lifting the sliding hammer to the handle and then releasing it. The total penetration for a given number of blows is measured and recorded in mm/blow, which is then used to describe stiffness, estimate an *in situ* CBR strength from an appropriate correlation chart, or other material characteristics.

5. Significance and Use

5.1 This test method is used to assess *in situ* strength of undisturbed soil and compacted materials (or both). The penetration rate of the 8-kg [17.6-lb] DCP can be used to estimate *in situ* CBR (California Bearing Ratio), to identify strata thickness, shear strength of strata, and other material characteristics.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.