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Standard Test Method for Cyclic Plate Load Tests to Evaluate the Structural Performance of Roadway Test Sections with Geosynthetics¹

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1. Scope

1.1 This standard test method outlines the procedure used to determine the performance of unpaved and paved roadway cross sections, with and without geosynthetics, that are built in a controlled manner and tested using a stationary, cyclic load applied to the surface to simulate traffic.

1.2 Test section performance from these tests is normally calculated as a function of life extension, but can also be determined based on structural improvement. Life extension is related to the number of load cycles that can be accommodated by a particular configuration when compared to a similarly constructed control. Structural improvements are based on elemental or system-wide stiffness increases.

1.3 The cyclic plate load (CPL) test is intended to be a performance test conducted as closely as possible to as-built unpaved and paved roadway cross sections. It has been used as a tool to compare different geosynthetics; soil types, strengths, and thicknesses; and construction procedures for a variety of pavement applications.

1.4 *Units*—The values stated in SI units are to be regarded as standard. Values in parentheses are for information only.

1.5 *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.*

1.6 *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 D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.01 on Mechanical Properties.

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2. Referenced Documents

2.1 *ASTM Standards*:²

D4439 Terminology for Geosynthetics

2.2 *AASHTO Standards*:³

AASHTO R 50-09 Standard Practice for Geosynthetic Reinforcement of the Aggregate Base Course of Flexible Pavement Structures

3. Terminology

3.1 *Definitions*—For definitions of common geosynthetic terms used in this test method, refer to Terminology D4439.

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *equivalent single-axle load (ESAL)*, n —the total number of repetitions of a standard design load of 80 kN (18 kips) applied to a single axle having two sets of dual wheels.

3.2.2 *stationary traffic benefit ratio (S-TBR)*, n —the ratio of the number of load cycles of a pavement structure with geosynthetics to the number of load cycles for the same test section without geosynthetics to reach the same defined failure state, where the cyclic load is applied using a stationary plate.

3.2.3 *traffic benefit ratio (TBR)*, n —the ratio of the number of load cycles of a pavement structure with geosynthetics to the number of load cycles for the same test section without geosynthetics to reach the same defined failure state.

4. Summary of Test Method

4.1 This test method covers the major considerations associated with cyclic plate load tests conducted on laboratory-constructed pavement test sections that are built inside a large, rigid test vessel and cyclically loaded to simulate traffic. Common configurations include paved and unpaved roads and other load support applications that include geosynthetics.

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.

³ Available from American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Suite 249, Washington, DC 20001, <http://www.transportation.org>.