



Standard Test Method for Using a Rolling Inclinator to Measure Longitudinal and Transverse Profiles of a Traveled Surface¹

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1. Scope

1.1 This test method describes the measurement of transverse and longitudinal surface profiles on paved road, bridge, and airport surfaces using a rolling inclinometer traveling at walking speed.

1.2 It is designed to (1) quantify the roughness of new pavements and bridge decks; (2) Investigate the effect of various construction methods on surface roughness; (3) determine the location for corrective grinding; and (4) evaluate the effect of corrective grinding.

1.3 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 must be used independently of the other. Combining values from the two systems may result in non-conformance 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- E 867 Terminology Relating to Vehicle-Pavement Systems²
- E 1274 Test Method for Measuring Pavement Roughness Using a Profilograph³
- E 1364 Test Method for Measuring Road Roughness by Static Level Method²
- E 1489 Practice for Computing Ride Number of Roads from Longitudinal Profile Measurements Made by an Inertial Profile Measuring Device²
- E 1703/E 1703M Test Method for Measuring Rut Depth of Pavement Surface Using a Straightedge²
- E 1926 Practice for Computing International Roughness

Index of Roads from Longitudinal Profile Measurements²

2.2 NCHRP Report:

NCHRP Report 434 Guidelines for Longitudinal Pavement Profile Measurement⁴

3. Terminology

3.1 Definitions:

3.1.1 *elevation, n*—vertical distance of a point on a traveled surface relative to the horizontal datum.

3.1.2 *longitudinal profile, n*—the perpendicular deviations of the pavement surface from an established reference parallel to the lane direction, usually measured in the wheel tracks.

3.1.3 *slope, n*—angular deviation of the traveled surface from the horizontal datum.

3.1.4 *transverse profile, n*—the vertical deviations of the pavement surface from a horizontal reference perpendicular to the lane direction.

3.1.5 *traveled surface, n*—any man-made, solid surface for vehicular travel, for example, highways, runways, rails, bridge decks, guide ways, race ways.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *contact spacing, n*—the fixed distance between the forward and rear measurement supports of the rolling inclinometer device, otherwise known as the wheelbase.

3.2.2 *data reading, n*—the average of a series of slope measurements taken over the data reading interval starting at the beginning of every data spacing.

3.2.3 *data reading interval, n*—the distance in which a series of slope measurements are taken at regular intervals and the average slope is computed and saved as the data reading.

3.2.4 *data spacing, n*—distance between successive slope measurements, equal to contact spacing.

3.2.5 *feet or wheels, n*—the appendages that physically contact the traveled surface for the purpose of measuring the slope and/or for providing support to the measurement device.

3.2.6 *inclinometer, n*—a precision instrument that measures angular deviations of a pavement surface from a horizontal datum.

¹ This test method is under the jurisdiction of ASTM Committee E17 on Vehicle-Pavement Systems and is the direct responsibility of Subcommittee E17.31 on Methods for Measuring Profile and Roughness.

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² *Annual Book of ASTM Standards*, Vol 04.03.

³ Discontinued; see 2002 *Annual Book of ASTM Standards*, Vol 04.03.

⁴ Available from the Transportation Research Board, 500 Fifth Street, NW Washington, DC 20001.