Designation: E 1489 – 98 (Reapproved 2003)

Standard Practice for Computing Ride Number of Roads from Longitudinal Profile Measurements Made by an Inertial Profile Measuring Device[1]

This standard is issued under the fixed designation E 1489; 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 practice covers the mathematical processing of longitudinal profile measurements to produce an estimate of subjective ride quality, termed Ride Number (RN).

1.2 The intent of this practice is to provide the highway community a standard practice for the computing and reporting of an estimate of subjective ride quality for highway pavements.

1.3 This practice is based on an algorithm developed in National Cooperative Highway Research Project (NCHRP) 1–23 (**1** and **2**),[2] two Ohio Department of Transportation ride quality research projects (**3** and **4**), and work presented in Refs (**5** and **6**).

1.4 The computed estimate of subjective ride quality produced by this practice was named Ride Number (RN) in NCHRP Research Project 1–23 (**1** and **2**) to differentiate it from other measures of ride quality computed from longitudinal profile. Eq 1 of Section 8.2 represents the mathematical definition of Ride Number.

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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:* [3]

E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E 867 Terminology Related to Vehicle-Pavement Systems

E 950 Test Method for Measuring the Longitudinal Profile of Traveled Surfaces With an Accelerometer Established Inertial Profiling Reference

E 1170 Standard Practice for Simulating Vehicular Response to Longitudinal Profiles of Traveled Surfaces.

E 1364 Standard Test Method for Measuring Road Roughness by Static Level Method.

E 1500 Practice for Computing Mean Square Numerics from Road Surface Elevation Profile Records[4]

E 1656 Guide for Classification of Automated Pavement Condition Survey Equipment

E 1927 Standard Guide for Conducting Subjective Pavement Ride Quality Ratings.

3. Terminology

3.1 *Terminology* used in this standard conforms to the definitions included in Terminology E 867.

3.2 *Definitions of Terms:*

3.2.1 *Rideability Index (RI)*—an index derived from controlled measurements of longitudinal profile in the wheel tracks and correlated with panel ratings of rideability.

3.2.2 *Ride Number (RN)*—rideability index of a pavement using a scale of 0 to 5, with 5 being perfect and 0 being impassable.

4. Summary of Practice

4.1 The practice presented here was developed specifically for estimating subjective ride quality from longitudinal profile measurements.

4.2 This practice uses longitudinal profile measurements for two wheel tracks as an input to a mathematical computation of estimated subjective ride quality (RN). The profile must be represented as a series of elevation values taken at constant intervals along the wheel tracks.

4.3 The range of the computed subjective ride quality estimate is 0 to 5.0 Ride Number (RN) units where an RN of 5.0 is considered to be a perfect ride quality road. The 0 to 5.0 Ride Number scale is defined in Refs **(1, 2, 3, 4**, and **5)**.

4.3.1 In the 0 to 5.0 Ride Number rating scale, the end points and some of the intermediate points have the following descriptions:

[1] This practice is under the jurisdiction of ASTM Committee E17 on Vehicle-Pavement Systems and is the direct responsibility of Subcommittee E17.33 on Methodology for Analyzing Pavement Roughness.

Current edition approved Dec. 1, 2003. Published January, 2004. Originally approved in 1996. Last previous edition approved in 1998 as E 1489 – 98.

[2] The boldface numbers in parentheses refer to the list of references at the end of this standard.

[3] 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.

[4] Withdrawn.

This document is now PUBLIC

Copyright © ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States.