
Standard Practice for

Determining Maximum Rut Depth in Asphalt Pavements



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1. SCOPE

- 1.1. This practice describes a five-point method for estimating maximum rut depth in asphalt pavement surfaces. Five points are the minimum number of points, measurement of more points on the transverse profile enhances the likelihood of identifying the maximum rut depth.
- Note 1**—A rut is a longitudinal surface depression in the wheelpath(s) of a pavement surface.
- 1.2. Procedures are defined for measuring rut depth, but detailed specifications are not included for equipment or instruments used to make the measurements. Any equipment, which can measure as specified, with the accuracy stipulated herein and which can be adequately calibrated, is acceptable for this method.
- 1.3. *This practice does not purport to address all of the safety issues, if any, associated with its use. It is the responsibility of the user of this protocol to establish appropriate safety and health practices and determine the applicability of regulatory limitations related to and prior to its use.*

2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standard:*
- *Guide for Design of Pavement Structures*. American Association of State Highway and Transportation Officials, Washington, DC, 1993.
- 2.2. *SHRP Standard:*
- *Distress Identification Manual for the Long-Term Pavement Performance Project*. Strategic Highway Research Program, SHRP-P-338, Washington, DC, 1993.

3. SIGNIFICANCE AND USE

- 3.1. This practice outlines standard procedures for estimating and summarizing rut depth on asphalt pavement surfaces. Its purpose is to produce consistent estimations of rut depth for network-level pavement management. The intention is to measure rut depth in a vehicle traveling in the designated lane at highway speeds.

4. RUT MEASUREMENT

- 4.1. Each agency designates the lane(s) and direction(s) of travel to be surveyed based on sound engineering principles and management needs within the agency.

- 4.2. Rut depths are estimated in both wheelpaths of the survey lane. Measurements to estimate rut depth are made longitudinally at maximum sample intervals of 10 m (33 ft). The goal of this practice is to get a transverse profile of both ruts in a traffic lane. An available summary statistic is the deepest rut found in each wheelpath. The locations of the minimum five measurement points are shown in Figure 1.

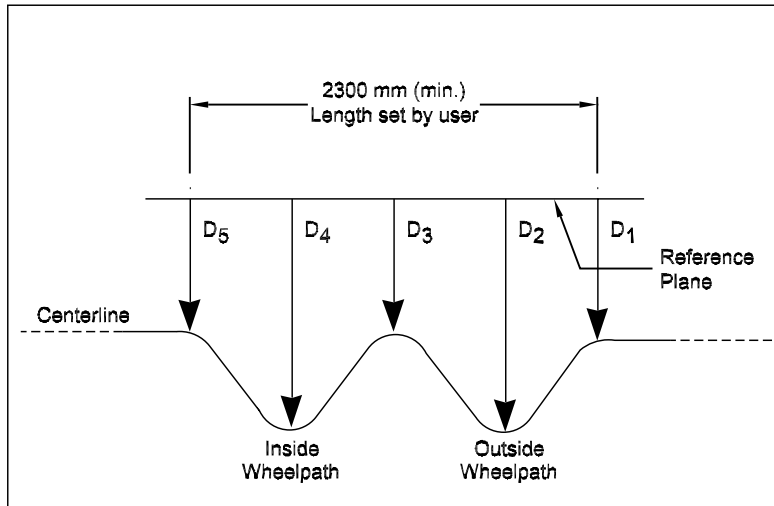


Figure 1—Rut Depth Measurements

- 4.2.1. *Five-Point Rut Depth Calculation:*

$$R_o = D_2 - \frac{D_1 + D_3}{2} \quad (1)$$

$$R_i = D_4 - \frac{D_3 + D_5}{2} \quad (2)$$

where:

- R_o = rut depth outside wheelpath estimate, mm;
- R_i = rut depth inside wheelpath estimate, mm;
- R_o = is not less than 0;
- R_i = is not less than 0; and
- $D_1, D_2 \dots D_5$ = height measured as shown in Figure 1 (mm).

- 4.2.2. The transverse profile is determined on the basis of the vertical distance between an imaginary string line run across the traffic lane from the shoulder to the lane line. The string line may bend at the hump between the wheelpaths where the hump is higher than the outside and centerline of the lane. For manual measurements, the use of a string line will require D_1 , D_3 , and D_5 to be zero.

5. OBTAINING OF DATA

- 5.1. Obtain and store the maximum rut depth determined from each wheelpath within a 0.1-km data summary interval. Keep the length of the data summary interval to 0.1 km (0.062 mi).
- 5.2. Summarize rut depth measurements into the agency defined levels as illustrated in example Tables 1, 2, and 3.