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# Test Method for Determining Pavement Roughness With the Mays Ride Meter

## SC T 122

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### 1. Scope

This test method outlines a procedure for determining the relative roughness (expressed in Inches of Roughness Per Mile) of a roadway surface with the Mays Ride Meter (MRM).

### 2. Referenced Documents

#### 2.1 ASTM Standards

- E 1082 Standard Test Method for Measurement of Vehicular Response to Traveled Surface Roughness
- E 1136 Standard Specification for a Radial Standard Reference Test Tire
- E 1170 Standard Practices for Simulating Vehicular Response to Longitudinal Profiles of a Vehicular Traveled Surface
- E 1215 Standard Specifications for Trailers Used for Measuring Vehicular Response to Road Roughness

#### 2.2 Rainhart's manuals

- "Mays Ride Meter Booklet"
- "Mays Ride Meter Trailer"

### 3. Apparatus

#### 3.1 Mays Ride Meter

- 3.1.1 Roughness trailer
- 3.1.2 Transmitter
- 3.1.3 Chart recorder
- 3.1.4 Tow vehicle
- 3.1.5 Distance Measuring Instrument/Distance Event Marker (DMI)

### 4. Test Specimens

- 4.1 Asphalt and concrete pavements with posted speed limits of 50 miles per hour or greater and as specified in contracts.
  - 4.2 Areas of interest
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## 5. Procedure

- 5.1 Asphalt and concrete pavements
    - 5.1.1 Pretest Check
      - 5.1.1.1 Check all tow vehicle to trailer connections (electrical and mechanical).
      - 5.1.1.2 Check all lights.
      - 5.1.1.3 Check tire pressure on tow vehicle (35 psi).
      - 5.1.1.4 Check tire pressure on trailer (32 psi).
    - 5.1.2 Connect the chart recorder to the transmitter.
    - 5.1.3 Load and properly align the chart recorder paper in the chart recorder.
    - 5.1.4 Load and properly align the three (3) fine line plastic point pens in the chart recorder.
    - 5.1.5 Turn the Numetrics DMI on at least one (1) mile before reaching the test section to:
      - 5.1.5.1 Verify calibration number is correct.
      - 5.1.5.2 Verify unit of measure is correct (miles, etc.).
      - 5.1.5.3 Set auto-event marker to one-tenth (0.1) mile.
    - 5.1.6 Activate all safety lights.
    - 5.1.7 Establish limits of the test section prior to testing in a manner that is easily observed by the tow vehicle driver and MRM operator.
    - 5.1.8 Make project notes on chart recorder paper.
      - 5.1.8.1 Trailer number
      - 5.1.8.2 Calibration factor
      - 5.1.8.3 Road number
      - 5.1.8.4 Direction
      - 5.1.8.5 Date
      - 5.1.8.6 File number
      - 5.1.8.7 Operator and driver
    - 5.1.9 Activate the chart recorder at least one-tenth (0.1) mile before reaching the test section.
    - 5.1.10 Key in beginning milepost on DMI (usually zero (0) unless interstate).
    - 5.1.11 Adjust speed to 50 mph before beginning of test section and maintain 50 mph during the test.
    - 5.1.12 Drive in the normal wheelpaths.
    - 5.1.13 Simultaneously press the start button on the DMI and the manual event marker button on the chart recorder.
    - 5.1.14 Use the manual event marker button on the chart recorder to note bridges, mileposts, etc. and note landmarks on graph.
    - 5.1.15 Press the event marker button on the chart recorder at the nearest one-tenth (0.1) mile before the end of the test section.
    - 5.1.16 Repeat steps 5.1.8 through 5.1.15 twice (all test sections must be measured at least three (3) times.)
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## 5.2 Areas of interest

5.2.1 Conduct all tests on areas of interest as outlined by the requester.

## 6. Calculations

Inches of Roughness Per Mile - The average length of graph per mile advanced by the MRM chart recorder divided by the length of road multiplied by the calibration factor.

$$\text{Average length of graph per mile} = \frac{\text{Average length of graph advanced per mile (inches)}}{\text{length of test section (mile)}}$$

Inches of Roughness Per Mile = average length of graph per mile X calibration factor

- 6.1 From the starting point, measure the length of graph for each mile section or portion thereof with an engineer's scale and record the length on the chart paper. Exclude bridges from the nearest one-tenth (0.1) mile before and after.
- 6.2 Record data on an "MRM Quality Acceptance" worksheet.
  - 6.2.1 Project notes (Section 5.1.8)
  - 6.2.2 Resident Construction Engineer
  - 6.2.3 Contractor
  - 6.2.4 Section termini (Section 5.1.7)
  - 6.2.5 Length of graph
  - 6.2.6 Notes (Section 5.1.14)
- 6.3 Average the three (3) lengths of graph advanced for each section.
- 6.4 Divide the average length of graph (inches) for each section by section length (mile) to obtain the average length of graph per mile.
- 6.5 Multiply the average length of graph per mile by the calibration factor to determine the roughness in inches per mile and record on the "MRM Quality Acceptance" worksheet.

## 7. Report

- 7.1 Test results are reported on Lab Form PE 122 and 122 A with a cover memorandum. Data and calculations are recorded on worksheet PE 122 W.
  - 7.2 Areas of interest are reported as requested.
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