

TEXTURE – BRITISH PENDULUM

General Description

This test method provides a measure of a frictional property and microtexture of surfaces.

COLLECTION FREQUENCY

When needed.

Procedure

1. Site Selection.

For general skid surveys follow Process 1.1 for site selection. When skid resistance is being determined as part of a performance assessment for a performance based specification follow Process 1.2 for site selection.

1.1 Select a test site that is representative of the road surface or exhibits a potential skidding problem. Pavement skid resistance should be measured in the wheel tracks; however, other locations can be tested depending on the purpose of the investigation.

1.2 Identify the measured lane and determine the boundaries of the segment which is to be assessed.

1.2.1 Select a sub-segment of suitable length (Note b) within the segment.

1.2.2 Select 3 test sites (Note c) within the sub-segment.

1.2.3 Repeat Process 1.2.1 and 1.2.2 for as many sub-segments as are required to assess the segment (Note d).

2. Preparation of BPT (Zero Check).

2.1 Sweep the test site to ensure it is free from loose particles. Place the BPT so that the slider swings in the direction of the traffic flow.

2.2 Inspect the slider for wear (see Figure 2) or damage and replace it if necessary.



- 2.3 Set the base of the BPT level (Note e) using the spirit level and leveling screws on the frame.
- 2.4 Raise the head of the BPT by releasing the locking knob at the rear and turning the height control knob until the pendulum arm and foot can swing clear of the pavement surface. Lock the head in place at this position.
- 2.5 Raise the pendulum arm to a horizontal position on the right side of the BPT and secure it in place with the release catch mechanism. Rotate the pointer anti-clockwise to its stop position parallel with the pendulum arm.
- 2.6 Check the zero setting by releasing the pendulum arm with the release catch to allow the arm to swing through an arc and then catching the pendulum arm on its return swing. Observe the pointer reading and return both the arm and pointer to the original release position. The zero setting can be adjusted using the friction adjustment rings (see Figure 1). If the pointer has swung past the zero position screw the rings a little more tightly. If it has not reached the zero position unscrew the rings slightly. If windy conditions affect the zero setting use a wind guard.
- 2.7 Repeat Process 2.6 until the pendulum arm carries the pointer to the zero position.
- 2.8 Allow the pendulum arm to hang freely and then place the centre of the contact path length gauge adjacent to the striking edge of the slider. The gauge should be placed parallel to and offset from the path of travel of the slider.
- 2.9 Move the pendulum arm to the left of vertical and at the same time lower the head of the BPT. The trailing edge of the slider should contact the pavement surface adjacent to the zero mark on the length gauge. Secure the head of the BPT in this position. Lift the slider clear of the surface using the lifting handle and move the pendulum arm to the right of vertical. Release the lifting handle and gently lower the leading edge of the slider on to the surface. The contact path length between the points of contact of each edge of the slider should be between 125mm and 127mm. If this has not been achieved adjust the height of the head and/or the position of the gauge to obtain the correct contact path length. After the final adjustment ensure the head of the BPT is locked.
- 2.10 Prepare any new slider fitted at Process 2.2 by performing four swings on a dry road surface.

3. Operation

- 3.1 Secure the pendulum arm in the horizontal position and rotate the pointer anti-clockwise to its stop position parallel with the pendulum arm. Spray the pavement surface and slider with water, push the release button and allow the pendulum arm to swing freely through its arc. Catch the arm on its return swing before the slider touches the road surface. Record the reading indicated by the pointer. Return the arm and pointer to their original position, keeping the slider clear of the pavement surface by using the lifting handle.
- 3.2 Repeat Process 3.1 until the results of five successive swings do not vary by more than three scale units.
- 3.3 Determine and record the temperature (t) of the wetted pavement surface to the nearest 1°C.



3.4 Repeat Process 2.1 to 3.3 at other selected test sites (Note f).

4. Recording.

4.1 Record, where applicable, the following information about a test site:

- site location
- date of test
- type of surfacing
- aggregate type and surface texture (Note g)
- traffic density and speed limit
- road geometry, eg. grade, crossfall, bend, roundabout, etc.
- other features such as traffic lights or braking areas.

4.2 Record, for a performance assessment, the following additional information:

- the measured lane
- the location of the segment and sub-segment(s).

Notes:

- (a) ARRB can provide a calibration service in accordance with their technical manual ATM No. 6.
- (b) A suitable length is 10m but the location and length of the sub-segment may be varied to correspond with sampling patterns used by automated skid resistance measuring systems.
- (c) Skid resistance is usually measured in the wheeltracks, however, in some circumstances other locations may need to be tested. Avoid testing small areas of obvious contamination such as oil leaks or tyre marks unless this is required for an accident investigation.
- (d) Where a segment has a uniform surface condition, measurement of a single representative sub-segment is permissible.
- (e) On sloping sites level the BPT in its working position using only the levelling screws.
- (f) The intent of repeating nearly the entire procedure is to ensure that at each test site the temperature is measured and the BPT is adjusted for level, length of the contact zone and zero setting.
- (g) The texture depth of the pavement surface is usually measured in conjunction with skid resistance.



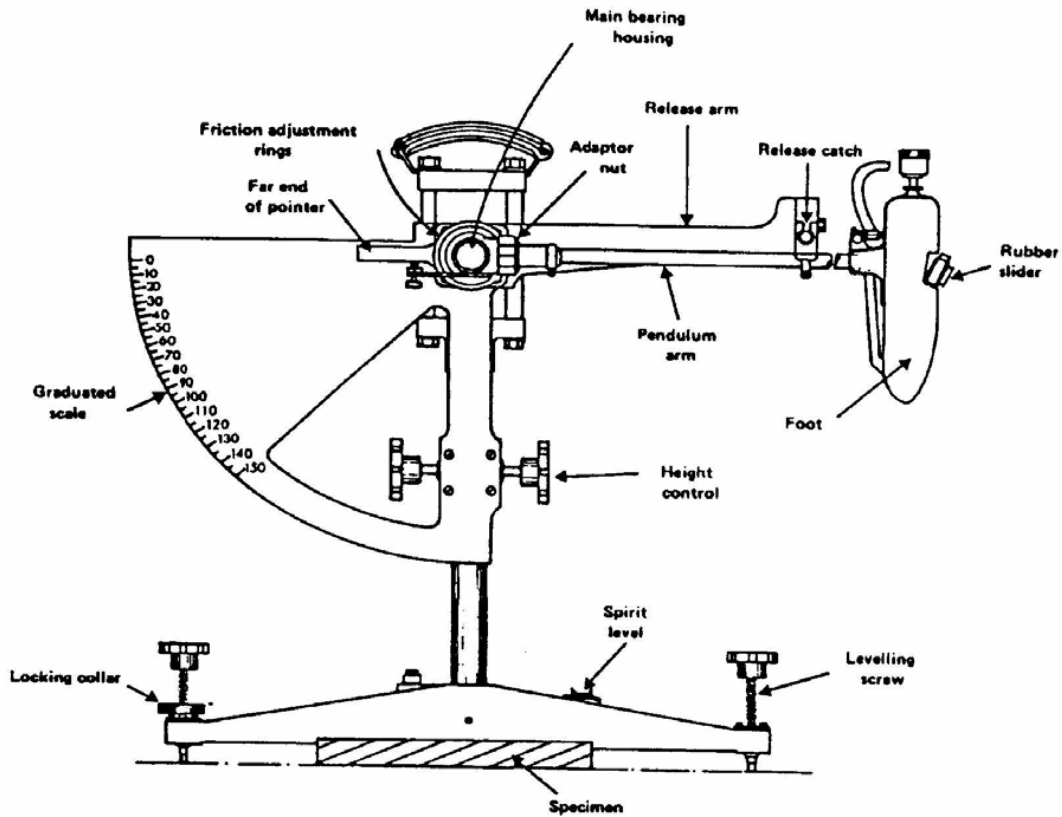


Figure 1. The British Pendulum Tester

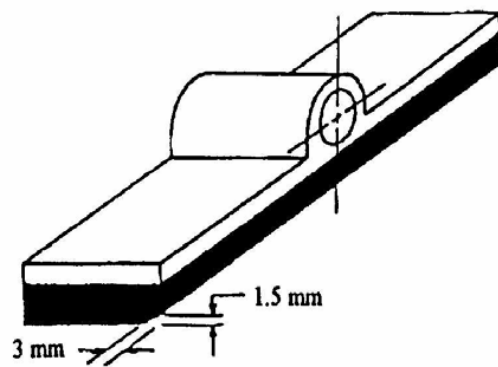


Figure 2: Slider Assembly showing wear limits on striking edge

Specifications

ASTM E 303

Calibrations/Formulas

1. For each test site, calculate the mean skid resistance value (SRV) from the five results obtained in Procedure 3.2.
 2. For each test site calculate the corrected skid resistance value using the formula:
$$SRV_c = SRV / (1 - (0.00525(t - 20)))$$
where SRV_c = mean skid resistance value corrected to 20°C
 SRV = mean skid resistance value
 t = temperature of wetted pavement surface in °C.
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Database Tables

TABLE – BRITISH_PENDULUM

Name	Null?	Type	Units	Ranges	Example Data
CELL	NOT NULL	NUMBER(3)		0-999	205
DATE	NOT NULL	DATE			09-11-08
TIME		TIME	HRS	0-2400	1350
CONSTRUCTION		NUMBER(1)		1-9	2
STATION	NOT NULL	NUMBER(4,2)	FT		1126+55
OFFSET	NOT NULL	NUMBER(2,1)	FT	0-50	-13.5
PANEL_NO		NUMBER(2)		0-99	35
LANE		VARCHAR(15)			ML_DRIVING
WHEEL_PATH		VARCHAR(15)			RIGHT
MEAN_SKID_RESISTANCE_VALUE	NOT NULL	NUMBER(4,2)			
COMMENTS		VARCHAR(255)			dry, spalling



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MnROAD is a state of the art cold weather pavement and transportation testing facility located in Minnesota 