



Florida Method of Test for MEASUREMENT OF PAVEMENT SMOOTHNESS WITH THE 15-FOOT ROLLING AND MANUAL STRAIGHTEDGES

Designation: FM 5-509

1. SCOPE

- 1.1 This method covers the measurement of pavement smoothness using the 15-foot rolling and manual straightedges.

2. APPARATUS

- 2.1 Rolling straightedge – The rolling straightedge should be 15 feet \pm 2 inches in length measured from center-to-center of the wheel axles and in good working order. The rolling straightedge should have a read-out gauge with low and high reading marks to the nearest 1/16 inch.
- 2.2 Manual straightedge – The manual straightedge should be 15 feet \pm 2 inches in length and in good working order.
- 2.3 3/16 inch shims – Each shim should be 3/16 inches thick, clean and in good working order. A total of four 3/16 inches shims are needed.
- 2.4 3/8 inch shims – Each shim should be 3/8 inches thick, clean and in good working order. A total of four 3/8 inches shims are needed.

3. CALIBRATION

- 3.1 Check the manual straightedge with a string line for accuracy on a weekly basis or more frequently if it is suspected that the straightedge may be damaged. The edge of the manual straightedge that contacts the pavement must not have any vertical deviation in excess of 1/16".
- 3.2 Verify the calibration of the rolling straightedge each day before the rolling straightedge is used. The following steps should be used to verify the calibration:
 - a) Before the beginning of the verification, make sure the center wheel moves up and down freely. Make sure all wheels are free of deposits and contamination and rotate freely.



- b) Locate a flat area with the manual straightedge. The entire straightedge should touch the pavement on this flat location. Place the rolling straightedge next to the manual straight edge on the flat area and read the gauge. The gauge should read zero on both sides of the gauge.
- c) Place the 3/16 inch shim under the center wheel. The gauge should read 3/16 inches high on both sides of the gauge.
- d) Remove the 3/16 inch shim and place the 3/8 inch shim under the center wheel. The gauge should read 3/8 inches high on both sides of the gauge.
- e) Remove the 3/8 inch shim and place a 3/16 inch shim under each outside wheel. The gauge should read 3/16 inches low on both sides of the gauge.
- f) Remove each 3/16 inch shim and place a 3/8 inch shim under each outside wheel. The gauge should read 3/8 inches low on both sides of the gauge.
- g) If any of the readings are incorrect, the rolling straightedge should be adjusted according to the manufacturer's specifications and the calibration rechecked before testing begins.

4. PROCEDURE

- 4.1 **Maintain proper traffic management and safety precautions at all times as defined in the specifications.** The pavement shall be clean prior to performing straightedging operations. The rolling straightedge shall be pulled at a speed of 3 to 5 mph or less.
- 4.2 During rolling straightedging operations, mark the pavement at the center wheel where the needle initially shows a deficiency and where the deficiency ends. A deficiency is defined according to the specifications. All rolling and manual straightedging shall be conducted in the wheel path or as defined in the specifications.
- 4.3 At the first transverse joint of the project, place a 15-foot manual straightedge on the new pavement while overlapping the transverse joint at the beginning of the project by one inch. Mark the pavement at any location that shows a deficiency, as defined in the specifications.
- 4.4 Locate the back wheel of the rolling straightedge at the transverse joint

at the beginning of the project. If continuing straightedging operations from a previous stopping point (such as the end of a day's production), then place the rolling straightedge at the same location where straightedging was previously stopped. Pull the rolling straightedge along the wheel path toward the new pavement to be tested.

- 4.5 Stop the front wheel of the rolling straightedge at the transverse joint at the end of the project. At the transverse joint at the end of the project place a 15-foot manual straightedge on the new pavement while overlapping the transverse joint at the end of the project by one inch. Mark the pavement at any location that shows a deficiency, as defined in the specifications.
- 4.6 For bridge approaches, place the rolling straightedge on the new pavement and start the rolling straightedge at the same location from the previous straightedging operation. Pull the rolling straightedge toward the joint until the front wheel reaches the end of the asphalt layer (see Figure 1). Mark any deficiencies up to that point, as described in 4.2. Place a 15-foot manual straightedge in the same location while overlapping the approach slab by one inch (see Figure 2). Mark the pavement at any location that shows a deficiency.
- 4.7 For bridge departures, place a 15-foot manual straightedge at the joint of the bridge departure slab and asphalt layer, while overlapping the departure slab by one inch. Mark the pavement at any location that shows a deficiency. Place the rolling straightedge on the new pavement with the back wheel at the joint of the bridge departure slab and asphalt layer. Pull the rolling straightedge away from the joint toward the new pavement to be tested. Mark any deficiencies, as described in 4.2.

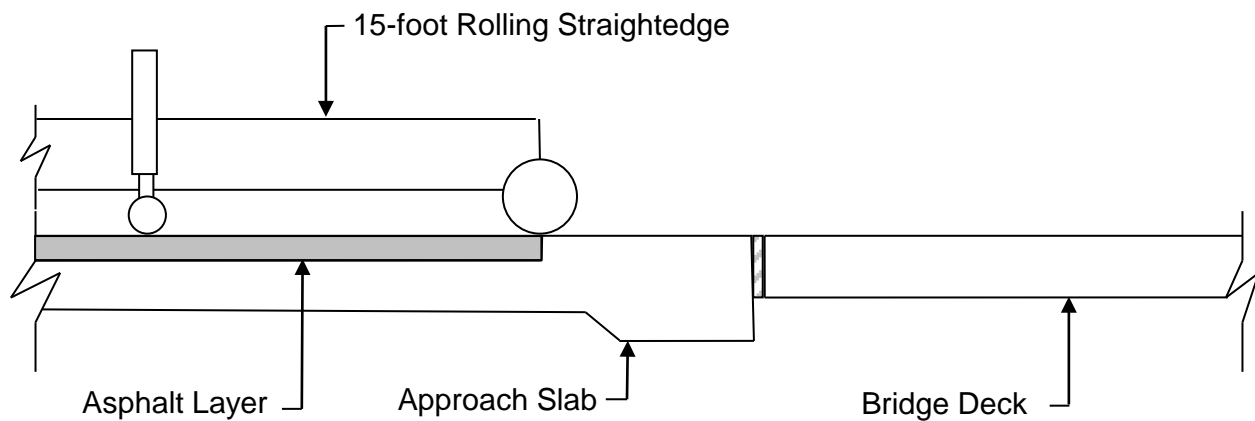


Figure 1 - 15-foot Rolling Straightedge at Approach Slab

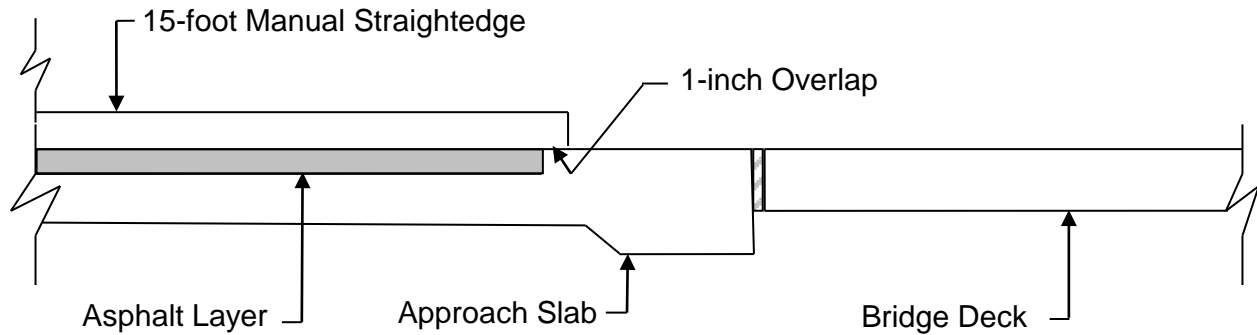


Figure 2 - 15-foot Manual Straightedge at Approach Slab

5. REPORTING

- 5.1 Record the location, measurement and whether “high” or “low” of any area where a smoothness deficiency occurs. Use FDOT form “Asphalt Pavement Straightedge Test Report” (Form No. 675-060-10).