FLORIDA DEPARTMENT OF TRANSPORTATION
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Florida Method of Test for performing ROTATIONAL CAPACITY TEST BOLTS TOO SHORT TO FIT INTO TENSION CALIBRATOR

Designation FM 5-582

(Reference: FHWA Report No. FHWA-SA-91-031, dated May 1991, Appendix A1 Procedure for Performing Rotational Capacity Test, Bolts Too Short to Fit Tension Calibrator)

1. SCOPE

1.2 This method covers the procedure for performing Rotational Capacity Tests on bolts too short to fit into a Tension Calibrator. The test is to ensure that fastener assemblies are capable of developing the specified strength.

2. EQUIPMENT REQUIRED:

2.1 Dial Indicator or digital type calibrated torque wrench. Use a calibrated torque wrench that has been calibrated within the last 12 months.

2.2 Spud wrench or equivalent.

2.3 Spacers and/or washers with hole size no larger than 1/16 inch [1.6 mm] greater than the bolt to be tested.

2.4 Steel section with normal size hole to install bolt. Any available splice hole can be used with a plate thickness that will provide the number of threads under the nut required in Step 3.1 below. Mark off a vertical hole and lines at 1/3 of a turn, 120 degrees; ½ of a turn, 180 degrees; and 2/3 of a turn, 240 degrees, from vertical in a clockwise direction on the plate.

3. PROCEDURE:

3.1 Install nut on bolt and measure stick-out of bolt threads when 3 to 5 full threads of the bolt are located between the bearing face of the nut and the end of the shank. Measure the bolt length, the distance from the end of the threaded shank to the underside of the bolt head.

3.2 Install the bolt into the hole and install the required number of shim plates and/or washers (one washer must always be used under the nut) to produce the stick out measured in Step 3.1.

3.3 Snug the bolt using a hand wrench. The snug condition should be the normal effort applied with a 12-inch long wrench. The applied torque should not exceed 20% of the torque determined in Step 3.5.

3.4 Match mark the nut to the vertical stripe on the plate.

3.5 Tighten the bolt by turning the nut using the torque wrench to the rotation listed below. A second wrench must be used to prevent rotation of the bolt head during tightening. Record the torque at the required rotation. Torque must be measured with the nut in motion.

Bolt Length (Measured in Step 3.1)	4 x bolt dia. or less	Greater than 4 but no more than 8 x bolt dia.	Greater than 8 x bolt dia.
Required Rotation	1/3	1/2	2/3

3.6 The measured torque should not exceed the values listed below. Assemblies that exceed the listed torque have failed the test.

Bolt Dia. (in.)	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
ASTM A 325 Bolt Torque (ft-lbs)	150	290	500	820	1,230	1,500	2,140	2,810	3,690

3.7 Tighten the bolt to the rotation listed below. The rotation is measured from the initial marking in Step 3.4. Assemblies that fail prior to this rotation either by stripping or fracture fail the test.

Bolt Length (Measured in Step 3.1)	4 x bolt dia. or less	Greater than 4 but no more than 8 x bolt dia.	Greater than 8 x bolt dia.
Required Rotation	2/3	1	1 1/6

3.8 Loosen and remove the nut, and examine the threads on the bolt and nut. No signs of shear failure, stripping, or torsional failure of the bolt should be evident. Assemblies that show evidence of shear, stripping, or torsional failure have failed the test.

3.9 If Direct Tension Indicators are used or as an alternate to the above, perform the test method in accordance with FM 5-583.