

ALDOT-358-88

JACK CALIBRATION PROCEDURE

1. Scope

- 1.1. The Alabama Department of Transportation hereby establishes procedures for the calibration of piling jacks; jacks and/or jack systems used with the three-edge bearing apparatus; jacks and gauges, load cells, dynamometers, etc., used in prestress operations.

2. Piling Jacks

- 2.1. The testing machine used for calibration shall be calibrated in accordance with ASTM E-74.
- 2.2. The capacity of the jack shall be divided into 10 equal increments for the calibration.
- 2.3. When calibrating the jack, the Ram shall be extended.
- 2.4. The first cycle readings shall be taken with the ram extended 25% of its stroke. The second and third cycle readings shall be taken with the ram extended 50% and 75% of its stroke respectively. The average of the calibrations of the three (3) Ram extensions shall be used to generate the dial versus indicated load.
- 2.5. The jack shall be capable of holding the load and the jack dial shall be clean and easily readable.
- 2.6. The calibration shall be valid for six (6) months from date calibrated for all DOT projects.
- 2.7. Calibration shall be conducted by applying pressure with the jack to the testing machine, and it shall be the Contractor's responsibility to furnish personnel to operate the jack during test procedure.
- 2.8. All calibrations shall be accurate within $\pm 5\%$ of the applied load, i.e., the indicated load shall be within $\pm 5\%$ of the actual load applied.
- 2.9. When a jack, gauge and hydraulic pump are calibrated they shall remain as a unit. Changing any one of the three components shall require a recalibration.

3. Jacks, Three-Edge Bearing Apparatus

- 3.1. Double ram pipe testing racks with a dual hydraulic ram loading system.
- 3.2. Calibration force measuring instruments for verifying the load indications of above rack shall be calibrated in accordance with ASTM E74.
- 3.3. Procedure for calibration:
 - 3.3.1. For the first calibration each Ram must be extended approximately 25% of the ram stroke with a minimum of six calibration points divided equally over the scale range.

Readings on the proving rings or load cells shall be averaged at each calibration point and the average reading of each calibration point must be with-in $\pm 2\%$ of the pipe testing rack dial reading.

- 3.3.2. For the second calibration each ram must be extended approximately 50% of the ram stroke with a minimum of six calibration points divided equally over the scale range. Readings on the proving rings or load cells shall be averaged at each calibration point and the average reading of each calibration point must be with-in $\pm 2\%$ of the pipe testing rack dial reading.
 - 3.3.3. Calibration No. 1 and Calibration No. 2 are independent of each other and both calibrations must be within $\pm 2\%$.
 - 3.3.4. The calibrations shall be valid for one year from date of calibration unless the Engineer or quality control has reason to suspect that another calibration is warranted.
 - 3.3.5. The intent of the two (2) calibrations (one (1) at 25% and one (1) at 50% of ram extension) is to assure that jack(s) is/are calibrated within operating range of ram when used to test pipe.
- 3.4. Single ram pipe testing racks with a single hydraulic ram loading system.
 - 3.5. Calibration force measuring instruments for verifying the load indications of above rack shall be calibrated in accordance with ASTM E74.
 - 3.6. Procedure for Calibration:
 - 3.6.1. For the first calibration, the ram must be extended approximately 25% of the ram stroke with a minimum of six calibration points divided equally over the scale range. Readings on the proving ring or load cell must be within $\pm 2\%$ of the pipe testing rack dial reading.
 - 3.6.2. For the second calibration the ram must be extended approximately 50% of the ram stroke with a minimum of six calibration divided equally over the scale range. Readings on the proving ring or load cell must be within $\pm 2\%$ of the pipe testing rack dial reading.
 - 3.6.3. Calibration No. 1 and Calibration No. 2 are independent of each other and both calibrations must be within $\pm 2\%$.
 - 3.6.4. The calibrations shall be valid for one year from date of calibration unless the Engineer or quality control has reason to suspect that another calibration is warranted.
 - 3.6.5. The intent of the two (2) calibrations (one (1) at 25% and one (1) at 50% of ram extension) is to assure that jack(s) is/are calibrated within operating range of ram when used to test pipe.

4. Tensioning Systems, Prestress Concrete - Post-Tensioned Concrete

- 4.1. Tensioning systems for prestress and post tensioned concrete items. Jacks and Gauges, Load Cells, Dynamometers.
- 4.2. Calibration force measuring instruments for verifying the load indications shall be calibrated in accordance with ASTM E-74.
- 4.3. Calibration for low pressure gauges shall be conducted at no greater than 5 kN increments.
- 4.4. Calibration for high pressure gauges shall be conducted at no greater than 25 kN increments.
- 4.5. The tensioning system must be capable of holding the load and the dial shall be clean and easily readable.
- 4.6. The calibration shall be accurate within $\pm 2\%$, i.e., the indicated load shall be within $\pm 2\%$ of actual applied load.
- 4.7. The calibration shall be valid for one year from date of calibration.
- 4.8. When a tensioning unit is calibrated, i.e., jack, gauge and hydraulic pump, it shall remain as a unit. Changing any of the components shall require a recalibration.
- 4.9. Stressing jack calibrations shall be conducted by applying pressure with the jack to the calibration measuring instrument.
- 4.10. When calibrating the jack, the Ram shall be extended. The first cycle readings shall be taken with the Ram extended 25% of its stroke. The second and third cycle readings shall be taken with the Ram extended 50% and 75% of its stroke respectively. The average of the three (3) Ram extensions shall be used to generate the dial versus indicated load.

**Jack Calibration Procedure
Piling Jack**

Contractor: _____

Contractor's Address: _____

Make of Jack: _____

Serial No. of Jack: _____

Serial No. of Pump: _____

Make of Dial: _____

Dial Graduation: _____

Smallest Increment of Dial: _____

Marks on Dial: _____

Travel of Ram (mm): _____

Ram Extended _____ mm During Calibration

Calibrated by: _____ Date: _____

Increment No.	Applied Load kN	Jack Dial Reading Mpa			
		Average	Cycle 1	Cycle 2	Cycle 3
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					