



*****THIS IS A NEW IM. – PLEASE READ CAREFULLY.*****

LOAD CELL TEST FOR DRILL SHAFTS

SCOPE

The intent of the placement of the load cell and instrumentation is to measure and document the skin friction capacity of layers/zones and the end bearing capacity of the shaft. Additionally, the load cell shall provide plots of skin friction mobilized versus vertical movement for each of the layers/zones as identified in the confirmation boring report where strain gauges were installed.

PROCEDURE

A. Materials required include, but are not limited to the following:

1. Potable water to mix with water-soluble oil provided by the approved firm, to form the hydraulic fluid used to pressurize the load cell.
2. Materials sufficient to construct a stable reference beam system for monitoring deflection of the shaft during testing, supported at a minimum distance of three diameters from the center of the shaft to prevent disturbance of the reference system.
3. Materials sufficient to construct a protected work area (including provisions such as a tent or a shed for protection from sun, wind, cold temperatures, and inclement weather for the load test equipment and personnel). The temperature shall not fall below the test equipment manufacturer recommendation.
4. Grout mix shall consist of Type I or II cement and adequate potable water to produce a pumpable grout as suitable for the testing firm's equipment. Grout shall be preapproved with a 28-day compressive strength of 5000 psi (35 MPa).

The Contractor shall prepare a quantity of grout sufficient to fill the load cell and Crosshole Sonic Log (CSL) tubes without interruption.

B. Construction

1. Equipment required includes but is not limited to:
 - a. Welding equipment shall be suitable for the welding process being used. All welding shall be done by welders certified by the Contracting Authority.
 - b. A suitable pressurized gas source consisting either of an approved air compressor or of compressed nitrogen, as per the approved firm's requirements.

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- c. Equipment and operators for handling the load cell and piping, bearing plates, and demonstration shaft reinforcing cage during the installation of the load cell and during the test, including but not limited to a crane or other lifting device for load cell and piping, manual labor, and hand tools as required.
 - d. Equipment and labor sufficient to erect the protected work area and monitoring reference beam system, to be constructed to the requirements of the Engineer and approved firm. Suitable operating and reference level platforms as needed for testing in potentially unstable foundation conditions.
 - e. Equipment provided shall be adequate to load and monitor the load cell to 150% of the nominal capacity of the load cell specified. The load cell shall be sized to a capacity equal to a minimum of three times the design bearing capacity of the drilled shafts as shown in the plans.

C. Approved Firm's Responsibility

- 1. Review of the confirmation boring test report
- 2. Prepare and submit load cell test procedures and program summarizing the selection of the type and location of the load test instrumentation.
- 3. Prepare shop drawing for load cell test and test apparatus.
- 4. A set of two strain gauges that are mounted on a sister bar shall be placed at the locations identified on the plans or as determined in C2, above.
- 5. Place the load cells in the drilled shaft at the location indicated in the plans or as determined in C2, above.
- 6. Install the load cell, piping, and other attachments in an area adjacent to the test shaft.
- 7. Provide on-site engineering/technical staff to supervise the load cell installation.
- 8. Conduct load test.
- 9. Record and analyze data.
- 10. Prepare reports.

D. Approval

Only load cell test firms that are approved prior to letting to furnish load cell testing services shall be allowed. For review and approval the load cell test firm shall submit the following:

- 1. A written application by the company to become an approved load cell-testing firm shall be submitted to the Central Materials Office in Ames, Iowa.

2. Conduct a load cell test in the State of Iowa on a minimum 3-foot (1-m) diameter drilled shaft in accordance with this IM. The successful completion of a load cell test as described in this IM within a two-year period from the date of the application may be considered as a substitution to the requirements of this IM.

Upon satisfactory review and approval of the above, the firm will be placed on the approved list E. Changes in approved procedures, materials, or equipment shall require reapplication and re-evaluation. All labor, equipment, and materials for drilling and installing the application drilled shaft shall be at no cost to the Contracting Authority. Continued approval will be based on satisfactory test results on future projects.

E. Approved Firms

LoadTest, Inc.
2631 Northwest 41st Street, Suite D
Gainesville, Florida 32606
Phone: 352-378-3717 or 800-368-1138
Fax: 352-378-3934

F. Approved Test

Osterberg Load Cell
2631 Northwest 41st Street, Suite D
Gainesville, Florida 32606
Phone: 352-378-3717 or 800-368-1138
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