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Osterberg Load Cell

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OSTERBERG LOAD CELL

THE NEED

Establishing the bearing capacity of piles, piers, and shafts is difficult and expensive for engineers to determine. The Osterberg Load Cell allows geotechnical engineers to determine the capacity of drilled shafts, piers, and driven piles. It is used to test for the bearing and skin friction forces that can be developed in the soil through which the shaft, pier, or pile is placed.

FIGURE 1 OSTERBERG LOAD CELL - LOADING MECHANISM

THE TECHNOLOGY

The Osterberg Load Cell is a specialized pressure cell that is placed at the bottom of the excavation for a drilled test pier or pile. It has a hydraulic line extending from the cell to the top of the excavation. After placement, the pier excavation is filled with concrete.

The cell is designed to expand both upward and downward when it is pressurized by way of the hydraulic line. The downward force from the bottom of the cell is resisted by the bearing stratum while the upward force from the top of the cell is resisted by the weight of the pier and by the skin friction along the sides of the pier. The test pier is instrumented with telltales to measure the upward and downward displacement of the cell.

Very large loads can be applied with the Osterberg Load Cell. Test piers can be constructed vertically, slanted, in a building, in water, or in otherwise inaccessible locations.

THE BENEFITS

A load test made with the Osterberg Load Cell is different from a conventional load test, since there is a separation of the end bearing and skin friction components for resisting applied loads. Consequently, this test method allows geotechnical engineers to more accurately estimate pier capacity and to design and construct more cost-effective foundations. The expense of unnecessary conservative designs can be reduced and the risk of underdesigned foundations can be minimized.

STATUS

The Osterberg Load Cell won the 1994 NOVA award. Its implementation for geotechnical assessment in actual job sites has just started to emerge. On February 1997, the firm LOADTEST Inc. set a world load testing record when applied 15,000 tons to a drilled shaft at the S.R. 20 bridge in Blountstown, Florida. Other uses include a load test in a drilled shaft for the Miller Park Stadium Complex in Milwaukee and a load test on a barrette foundation for the Alfaro's Peak project in Manila, Philippines.

POINTS OF CONTACT

Larry P. Jedele, Soil Materials Engineers, Inc.

Clyde Baker, STS Engineers

Scot Litke, Association of Drilled Shaft Contractors

LOADTEST, Inc.

REFERENCES

1. Loadtest, Inc, home page: <http://www.loadtest.com/>
2. 'Nominations for 1994 NOVA Awards', Construction Innovation Forum, 1994.

REVIEWERS

Peer reviewed as an emerging construction technology

DISCLAIMER

Purdue University does not endorse this technology or represents that the information presented can be relied upon without further investigation.

PUBLISHER

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