

LOADTEST O-Cell® Technology in Continuous Flight Auger Piles



Osterberg cell (O-cell) bi-directional load tests have been performed in numerous CFA piles around the world. Osterberg cells have been mounted in the reinforcing cage together with the instrumentation for load testing of a wide range of sizes and depths, some of which are believed to be among the largest and deepest CFA piles constructed.



CFA test pile O-cell assembly ready for placement

Fugro Loadtest was engaged by HJ Foundation, Inc., a leading CFA contractor, to test some world class foundations on separate projects in Miami, Florida. These projects required CFA piles to depths exceeding 30 m and for working loads of around 8 MN.

The ground conditions on these projects are typical for Florida, comprised primarily of a thin deposit of fill, sand or shore deposits, followed by a soft oolitic limestone of the Miami Formation.



Assembly of a multi-level O-cell arrangement

Beneath the limestone are layers of sand of varying density intermixed and interbedded with the soft sedimentary rock formations including limestones, sandstones, cemented sands and shells.



+20 MN CFA test in progress

The O-cells and instrumentation were assembled into the reinforcing cages in preparation for insertion into the wet piles. Crane-mounted hydraulic CFA drill rigs advanced the 30m+ and the piles were backfilled with a cementitious grout mix during auger extraction as usual. The grout mix used had typical strengths of 55N/mm², slumps of around 200 mm, and small sized aggregate.

The full length reinforcing steel cages with the O-cells affixed were lowered into the grouted holes. The O-cell and cage assembly slipped smoothly through the grout with minimal resistance. Some of these are the deepest O-cells installed and used in CFA piles.

In 2006, Fugro Loadtest performed their first multilevel O-cell installation and test on a CFA pile. Cages were able to reach tip elevations without incident or difficulty and the O-cells were placed precisely at their predetermined elevation. Testing started after the grout reached the required 28-day strength. All of the piles have been proven to be robust and test loads exceeded the ultimate design capacities on each of the projects. If the load tests had been performed by application of load at the pile head, stresses in excess of 40N/mm² would have been required.

Maximum size/loads tested to date				
Pile Diameter [mm]	600	750	900	900
Pile Length [m]	38	40	35	36
O-cell Diameter [mm]	405	540	660	2x540
Mobilised Load [MN]	17.5	32	32	46

