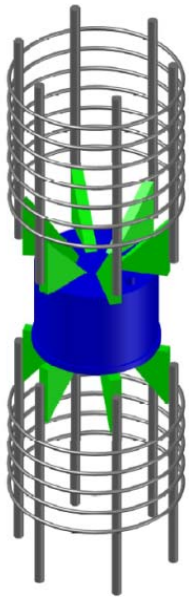
LOADTEST First UK use of O-cell Technology in a CFA pile Brighton Marina

Project:	**Brighton Marina Development**
Location:	Brighton, East Sussex, UK
Developer :	Brunswick Developments
Main contractor:	J Reddington
Piling Contractor:	Miller Piling Limited

Project Description:



3D rendering of reinforcing cage with attached O-cell assembly

The current Brighton Marina development will create a major economic boost for the Brighton area. When completed, the development will boast 11 tall towers creating 853 new homes with 1,600 berths spread over 126 acres. The complex is also scheduled to be host to 25 restaurants and bars, 26 shops and a boutique hotel. With an estimated cost of £250m, this is a major investment in the area.

At the time of testing, Phase 1 of the complex was already well underway. The testing program was developed to pave the way for the future Phase 2 and Phase 3 works.

The main issue for piling contractor Miller Piling was how to verify that the underlying chalk strata would perform as per expectations once Phase 2 piling works started. The complication was that Phase 2 piling would take place beyond the breakwater once land had been reclaimed at a much later date. Only a small plot of land was available on land for trial drilling and pile testing.

Lifting of full length reinforcing cage .

It was considered that the O-cell bi-directional static load test would be the ideal solution, as there would be no requirement for anchor piles and large beams or kentledge which would suit the site conditions perfectly. Further the reference beam was also not required and two instead two electronic Leica levels were used to monitor the top of pile movement.

The piles to be installed would be of CFA construction, 600 mm nominal diameter and lengths of approximately 20 metres. Soft alluvial clays overlay chalk which was of unknown quality and strength.

Many O-cells tests have been undertaken in the USA on continuous flight auger piles (auger-cast) and several on continental Europe, this was to be the first to be performed in the UK. A single O-cell is preferred for CFA pile testing since the reinforcing cage is required to be plunged into the wet concrete or grout. To assist in this, the cross section is minimized by using triangular section castellations welded to the O-cell (see illustration) and the assembly is then welded within the cage.

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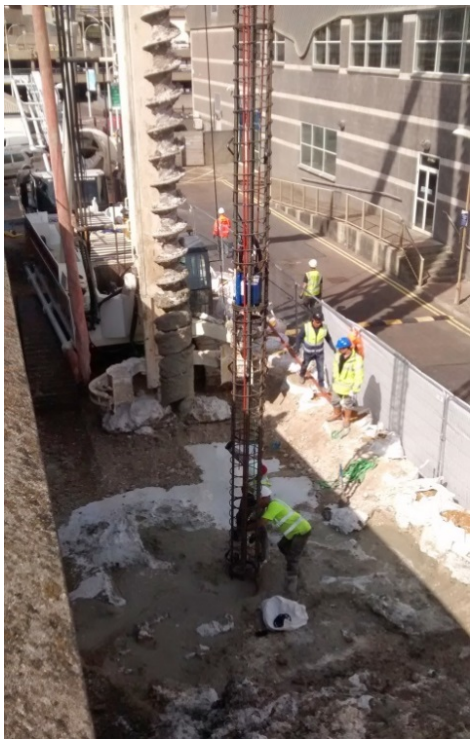
Photographs showing the congestion in the site



Instrumentation such as expansion transducers, strain gauges and telltale compression extensometers are then attached to the reinforcing cage.

Miller Piling undertook trials using grout instead of concrete on a project in London to understand the requirements and calibrate their on-board instrumentation system for when pumping grout before using the system at Brighton Marina.

The site footprint was completely filled during piling works with the piling rig, concrete pump, delivery trucks and the crane for the cage which was located on the road to the fishing pier at a higher level due to restricted access. The 20.1 metre long CFA bore was constructed without incident and the cage gently lowered into the bore until the bottom of the cage rested on the toe of the pile.

Testing:

After a 21 day curing period, the single 320 mm O-cell, located 4.10 metres above the pile toe, was pressured in 19 nominally equal increments to achieve a maximum net load of 7.88 MN applied to the pile. This proved to be far in excess of the anticipated 5 MN maximum capacity expected. The pile capacity both above and below the O-cell was significantly higher than expectations indicating skin friction values above those anticipated by design.

Conclusion:

The O-cell bi-directional method of static load testing is equally suited to all types of bored piles, including CFA piles. Where a restricted site profile or unstable ground is present, the O-cell technology can remove design uncertainty.

Courtesy of opportunities.greassets.co.uk at Brighton Marina