# LOADTEST
# O-Cell® Technology in Helsinki, Finland

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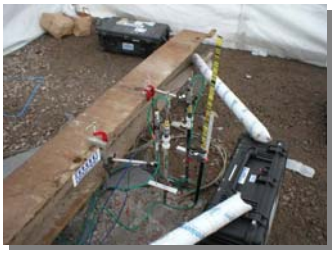
| Project | **Helsinki City Reclamation Project** |
| Location | Helsinki, Finland |
| Client | Skanska Tekra OY |
| Period | December 2006 |
| Project Description | Due to reclamation of the coastal area shortly after WWII using a variety of fill material over unstable glacial deposits, this area suffers from continuous settlement. Mix-in-place ground treatment has been used in some areas and a variety of driven pile types and sizes installed. Since pile design relies solely on end bearing, with significant consolidation, ensuring long term suitability of base capacity was the goal of this static load testing program. Loadtest & Skanska Tekra OY came up with a solution using bi-directional testing. The pile could be tested after installation and then re-tested at intervals of 6 months and 1 year to determine the change in ground conditions over time, without interrupting progress on site. |

*The Arabia Shore after the year 2000*
*© Photograph: Helsinki City*

*O-cell Assembly and Instrumentation*



*TP-1 Test in progress*

*O-cell test in progress in the foreground while presentations were made.*

**Project:**
Pile testing on two of the driven steel tube piles was a requirement and utilizing dynamic load testing (DLT), a common test method used on driven piles in Scandinavia, would not give the required solution to the problem of loading over time, nor the full load-settlement behaviour of the pile base.
The expected base capacity was greater than 4 MN, but with less than 2 MN of skin friction available, anchor piles for a top-down static load test were ruled out. Kentledge was impractical to use over an extended time period, and facing large predicted ground settlements also unstable in the short term. Conveniently, by integrating the pile into the structure additional reaction was obtained to mobilize the end-bearing required.

**Bi-directional load test arrangement:**
Two 530mm driven steel piles were driven to set with a loose driving shoe allowing the 330mm O-cell to load the soil directly below the base. The O-cell arrangement was lowered onto the tube base using a steel cage as a hanging framework. The tube was then concreted to provide O-cell assembly connection to the tube.
Instrumentation cables, steelwork and telltale tubing were then protected while the foundation slab was constructed with the piles incorporated into the structure. The test piles were incorporated into a piled slab as part of a road foundation allowing easy access for the re-testing of the piles after the final road construction.

**Pile Test:**
The testing was to coincide with a seminar on ground improvement techniques. The seminar marquis was to cover the whole test area and provide seating and facilities for the seminar. As the seminar progressed, one of the piles was tested 'live' and the delegates were kept informed of the test results with real time updates.
Since all reactions for bi-directional testing are applied at cell level and are safely locked within the pile there is no safety issue.

**Conclusions**:
Bi-directional testing provided a solution to a testing problem even where the reaction was insufficient. Due to the small testing footprint, testing could take place after the structure was completed without disruption to the construction program.