

O-cell[®] Technology in Russia

Summary

Several large high-rise projects in Moscow have required foundations through the Voskrensky clay layer and into the Suvorov Limestone. Since the behaviour of the Limestone is relatively unknown pile tests have been recommended to verify the foundation designs. Bi-directional testing using O-cells was employed as these tests are particularly appropriate for verifying rock socket behaviour. Tests were performed on 900 mm and 1200 mm diameter piles, located on three separate plots, mobilising total capacities in excess of 60 MN.

Projects

The Moskva-City Project is a \$12 billion development close to the heart of Moscow and is comparable in size and scale of London's Dockland development. This new international business centre will consist of offices, hotels, retail and residential development. It will be the first of its kind in Eastern Europe and will offer the most up to date transport and telecommunications network.

The first phase, covering 100 Ha, is divided into 20 plots and will surround a new train terminal with a direct link to the Airport. A mini-metro line will connect the complex to the main metro network.

LOADTEST have been contracted to perform tests on three of these plots



Capitol City

The first of these projects, known as Plot 9, was for the twin 53 and 63 floor Capital Group towers.



Federation Tower

The second project was for the 340m high, 87 floor, Plot 13, Federation Tower.



Naberezhnaya Tower C

The project on Plot 10 was for the construction of the Naberezhnaya Tower C, a 250m high, 56 storey tower block.

Load testing program

Testing was performed with two bi-directional tests using O-cells technology on each site.



Reinforcing cage with O-cell installed

Using to advantage features unique to bi-directional tests, the applied load could immediately be directed onto the end bearing portion of the pile. By using the skin friction as a reaction, there is no need for a reaction beam at the surface with expensive anchor piles. If the tests were carried out by top down testing it would have been necessary to devise complex sleeving arrangements to reduce the friction above the rock socket.

Pile Tests

Despite snow and freezing weather conditions, all three testing programs were completely successful.



Testing in progress protected from the elements

The effective mobilised capacity in each of the test piles was carried out to the desired maximum loading, and upon request taken to higher loads; in the case of plot 13, the piles were tested to twice the required capacity.



Testing monitored and controlled from inside a heated cabin

Total mobilised capacities were in excess of 40MN on Plots 9 and 10, and capacities of over 60MN were achieved on Plot 13.

Foundation Contractor: Kasktas Piling & Drilling Contracting Co. Inc.

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