LOADTEST
O-Cell® Tests on Two Preliminary Test Piles at Belgrade Waterfront (Plot 19.1 Kula Belgrade) Project, Belgrade / Serbia

Artist's impression of Kula Belgrade (Courtesy of SOM)

Cage placement with O-Cell assembly for TP01

Cage placement with O-Cell assembly for TP02

O-Cell test setup

Belgrade Waterfront is a £2.5bn construction project headed by the Government of Serbia aimed at improving the Belgrade's cityscape and economy by revitalising the Sava amphitheatre, a neglected stretch of land on the right bank of the Sava river, between the Belgrade Fair and Belgrade Main Railway Station. It is also believed that when the entire project is completed -which might take up to 30 years- there should be a much improved access to the riverfront, currently a glaringly underused resource.

The project was initiated in 2014 between the Serbian government and Emirati investors. It includes office and luxury apartment buildings, eight hotels, a shopping mall and Belgrade Tower (Kula Belgrade), which will be a glass skyscraper that will stand at 168 metres and be called the tallest between Vienna and Istanbul.

The project's participants are Eagle Hills as the developer based in in Abu Dhabi, MACE as the project manager, ME Energoprojekt as the general contractor, Novkol A.D. as the piling contractor, Woods Bagot as the concept designer, and Skidmore, Owings & Merrill LLP (SOM) as the architect.

Testing Arrangement:

Two nominal Ø1200 mm, test piles up to a depth of 38.29 m were constructed by NOVKOL A.D. under polymer slurry. A single level, O-cell bi-directional loading arrangement with two 530 mm O-cells with a total rated capacity of 40.4 MN was utilised for each preliminary load test.

Both tests were designed to validate the geotechnical parameters and determine the foundation's behaviour under load. The test piles were also instrumented with six to seven levels of strain gauges to determine the stress distribution throughout the length of the piles.

The sub-surface stratigraphy at the general location of the test piles is reported to consist of clay and clayey sand deposits overlying the limestone bedrock.

Conclusions:

O-cell technology proved an excellent solution for static load testing of the test pile without the need for anchor reaction piles. So only the piling rig was required to be mobilised. No reaction beam was required and the applied load is spread across the whole pile section safely within the shaft and contained at depth.

The preliminary tests revealed an excellent assessment of the skin friction and end bearing.

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