FUGRO LOADTEST
DANUBE BRIDGE - HUNGARY

Overcoming challenging conditions, Fugro Loadtest successfully tested two piles for a new bridge over the Danube River in Hungary using its proprietary Osterberg Cell (O-Cell®) bi-directional testing.

The new bridge over the river Danube will connect the town of Komárom in Hungary with the town of Komarno in Slovakia. In 1892 Komárom and the then town of Újszőny were connected by an iron bridge and in 1896 the two towns were united under the name Komárom within the Austro-Hungarian empire.

After the empire was split, the towns developed separately in Hungary and Czechoslovakia. The two sides of the town were then connected by an iron bridge, replaced more recently by a 'lifting' bridge. This new bridge will allow a more efficient and continuous fast flow of traffic between the two towns and each country's respective highway systems.

PROJECT SUMMARY

In order to verify and improve the design of the bridge foundations, two preliminary test piles were required by consultants Geoterra. The preliminary test piles were to be installed close to the centre of the river. Providing a traditional reaction system with anchors or using dead weight with kentledge to perform these pile tests was impractical. The O-Cell® method of loading was chosen as the ideal static loading test method, using the pile itself to provide the reaction for the test.

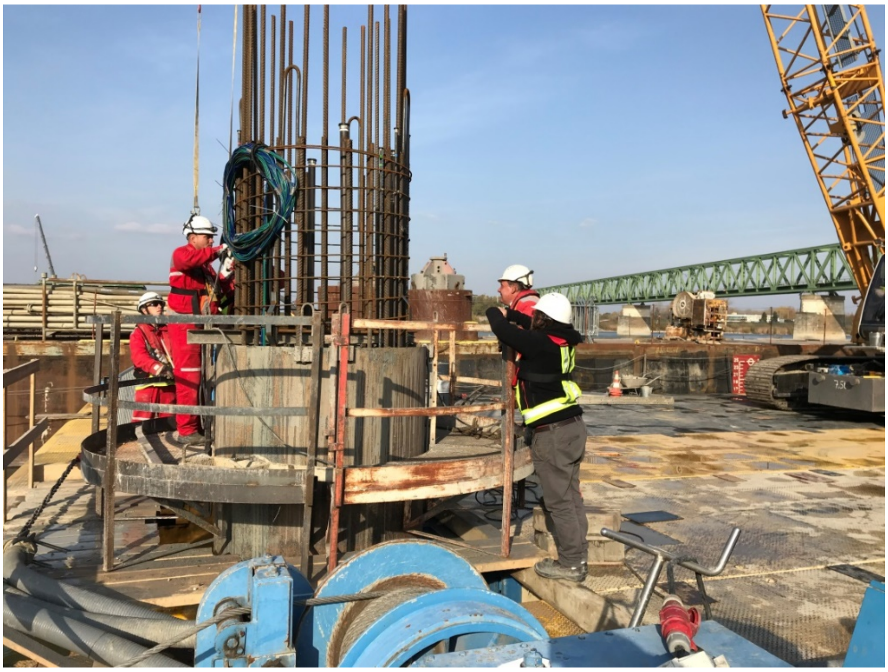
Two 1500 mm diameter bored test piles were constructed, each containing a single level assembly comprising of a 540 mm O-Cell, of 20 MN nominal capacity.

Client: HBM kft (Soletanche Bachy)
Period: 2017
Location: Hungary
Consultant: Geoterra

From Komarom in Hungary to Komarno in Slovakia (photo: Pont-Terv engineering consultants)

CASE STUDY

The piles were installed from a jack-up barge with a permanent casing placed into the strata below the riverbed to above high water level. Each pile was concreted up to the mudline so they could easily be removed after the tests. Strain gauges were placed along the 2 m long concreted sections of the piles to assess load distribution in the sandy clay soils.



Installation of test pile

TEST RESULTS

The soils at each location were substantially different. The loads applied to each pile were below the capacity of the O-Cell with the end bearing dominating the behaviour.

The results from each pile were analysed using the Cemsolve® pile settlement analysis program to determine the ultimate skin friction capacities and end bearing characteristics, with the pile head load / movement prediction achieved by combining the results in Cemset®.

Pile after installation in the Danube River

Pile under test in the Danube River

CONCLUSIONS

What was at first considered an extremely difficult task of performing a full-scale static load test over water with loading capacity up to 20 MN was made a simple by using the Osterberg bi-directional load testing method. The results provided the designers with full-scale insitu results so they could optimize their design.

Concrete arriving by barge