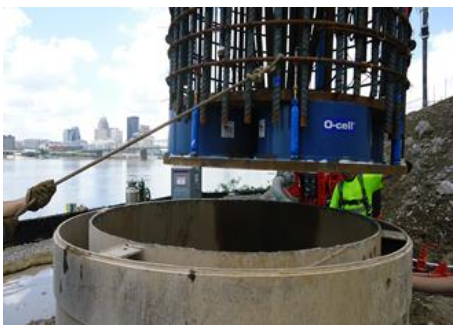
WORLD RECORD STATIC LOAD TEST
Ohio River Bridges Downtown Crossing USA

Project:	Ohio River Bridges Downtown Crossing
Location:	Louisville-Southern Indiana - USA
Foundation design :	Jacobs Engineering
Main Contractor:	Walsh Construction Company
Owner:	INDOT and KYTC joint project

Reinforcement cage installation with O-cells



O-cell at the end of reinforcement cage

Project Overview

The Louisville-Southern Indiana Ohio River Bridges Project is a major design-build infrastructure project intended to improve road safety and alleviate traffic congestion by connecting highways across the river to provide major economic stimulus to the entire region. The project includes both the Downtown and East End Crossings over the Ohio River along with the associated highways that connect them. With a project budget at approximately $2.5 billion, this will be the largest transportation project ever constructed connecting the two states.

Project Summary

The foundations for both the Downtown and the East End Crossings were tested using O-cell® bi-directional static testing technique to confirm the geotechnical parameters and allow for both economising of the design and risk management.

Geotechnical conditions throughout the bridge location indicated the presence of a significant layer of high strength limestone into which the bridge bearing piles could be founded. Accommodating the lateral design loading of the bridges required a minimum rock socket length. With a standard geotechnical design approach, the axial design loads required socket lengths deeper than those required for the lateral loading conditions. As the conventional design was thought to be over conservative, the design and build team sought to overcome some of this conservatism by carrying out a full scale load test. The O-cell® bi-directional load testing technique was the ideal technology to be able to achieve their goal.

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Installation of the O-cell cage

New World Record Test Set-up

Bi-directional load test arrangement

The test pile required at the Downtown Crossing was to not only test the pile capacity but also the piling technique. The dedicated test pile was drilled though overburden soils and socketed into the underlying limestone. The loading arrangement configuration in the test pile used four 860 mm diameter O-cells arranged in a single level located 1.1 metres above the pile toe to provide the maximum test load required of 213 MN at rated capacities.

Test results

Fugro Loadtest performed the bi-directional static load test using the O-Cell® method and exceeded the rated load capacity and achieved a maximum test load of **322 MN** by overpressurising the O-cells, creating a new **World Record** for a static load test of a single foundation element.

Conclusions

Although a new World Record load was achieved, the rock was far from failure and additional pile capacity was available, and illustrates the magnitude of conservatism often used in pile design in rock.

Using the O-cell technique it is possible to achieve very high average unit skin friction and end bearing resistances in hard rock formations. This allows the design to be optimised, resulting in shorter rock sockets, more economical foundation construction and reductions in program time.

Rendering of Downtown Crossing courtesy of http://kyinbridges.com/