

LOADTEST O-Cell® Technology in Zaragoza, Spain



Project: **The Bridge Pavilion**

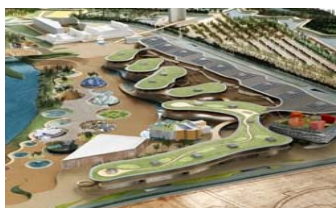
Location: International Exposition 2008, Zaragoza, Spain

Contractor: Dragados S.A.

Foundation Contractor: Terrabauer S.A.

Geotechnical Co.: Ove Arup & Partners

Project Description: Zaragoza is Spain's fifth largest city with a population exceeding 650,000 inhabitants. As host of Expo 2008, this project became a centerpiece of the International Exposition.



Expo 2008, aerial view



Installation of O-cell arrangement within pile cage



Test pile head and reference beam



Bi-directional test in progress

Situated on an artificial peninsular into the River Ebro, the test site was part of a very prestigious and technically challenging pedestrian bridge project. Architect Zaha Hadid and Arup partnered to design and oversee construction of this unique bridge.

This 270 m long bridge held one of five pavilions for the exhibition. It has 6400 m² of exhibition space on 2 floors. The bridge pavilion was designed with the central water theme of the exposition in mind. The scale-like windows, resembling those of a shark, shimmer in the sunshine.

In order to make the design work, the piled foundations support a substantial load in relatively poor soils, requiring some of largest piles ever constructed in Spain. One test exceeded 40 MN on a working pile of 2000 mm diameter. Two 670 mm diameter O-cells were used to provide the required loading of 20 MN in each direction. The O-cells were located approximately 9.5 m above the toe of the 63 m long pile bored under bentonite slurry

Utilizing the O-cell method negated anchor piles (which would have proved both uneconomical and difficult to install within the confines of the site) or kentledge loading (which would have proved impossible to erect on the artificial peninsula).

Linear Vibrating Wire Displacement Transducers (LVWDT's) are used at the O-cell level to measure expansion. Close monitoring of the expansion was needed to ensure that the working pile was not loaded to excessive movements.

Geokon Vibrating wire strain gauges were used along the pile shaft to monitor strain which assists in deducing unit skin friction.

A combined bi-directional loading of over 40MN was applied, with displacements of 20 mm in the downward direction and 8mm upwards.

The test succeeded in providing the Client with confidence that the pile design was more than sufficient for the loads required enabling the construction of this unique bridge structure to proceed.



Source: bdonline.co.uk