

## Project

The general reference for the project is: BAB A 38, Göttingen – Halle Süd (A143) BW 4616/06A located over the Weidatalbrücke, Esperstedt, Germany.

The project consists of a 435 m long box girder bridge of seven spans, the longest of which is 158 m.

The project is due for completion in April 2007 at a cost of 16.8 million Euros. The bridge is located within a nature reserve and is therefore in an environmentally sensitive area.

## Summary

The design for the foundations of this new motorway bridge required verification and the Bi-directional testing methods were selected as it provided the most environmentally friendly solution.



Bridge construction progress March 2006

## Bi-directional load tests

Tests were performed on two 1200 mm diameter piles approximately 27 m deep fitted with a multilevel O-cell arrangement mounted in a purpose built carrying frame.

Two 540 mm diameter O-cell® were installed in each carrying frame and a pile-tip pressure cell also mounted at the bottom of each of the two test piles.

The lower O-cell was 2.4m above the pile tip and at the start of the limestone strata and the second O-cell level set at 9.4 m above the pile toe.



Installation of O-cells and pressure cell on the bottom of the carrying frame

Using to advantage a feature unique to multi-level bi-directional tests, the load was applied in stages, mobilising different portions of the test pile, without the need for reaction beams at the surface nor anchor piles.



Lifting of the steel frame showing two O-cells at two levels

The multi-level test was successfully performed and provided information on side shear for specific zones along the pile shaft. The load tests were carried out mobilising 32MN and 35.2MN combined skin friction and end bearing for the two test piles.

The pile-tip pressure cells allowed the end bearing to be separated from the side shear, with values of 4.62 MN and 1.15 MN for each pile and calculated unit end bearing at the base of 4840 kPa and 1017 kPa respectively.



Installation of the O-cells on the steel carrying frame into the pile bore

## Conclusions

Bi-directional load testing using the Osterberg Cell proved to be the most environmentally friendly solution for testing in this highly sensitive location. The alternative top-down solution would have meant hauling kentledge or installing extra anchor piles and mobilising a reaction system. Instead, only the test piles had to be constructed and truck movements, for pile spoil removal and concrete deliveries were all reduced to a minimum.

Client: DEGES

Geotechnical engineers: ARCADIS Consult GmbH

Foundation Contractors: Züblin Spezialtiefbau GmbH

Local LOADTEST office in Germany: Scanrock GmbH: Carlos Fischer

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