

LOADTEST O-Cell® Technology BA A38 Friedetalbrücke, Germany



Project
Location
Client
Period
Project Description

Friedetal Bridge, Germany

Friedetalbrücke, Germany

DEGES

May 2005-June 2006

The new Göttingen to Halle autobahn BAB A38 will alleviate heavy traffic flow on the B80 in Germany. A viaduct is required where the route crosses Peace Valley (Friedetal) near Sollstedt in the state of Thüringen. This viaduct will have a total span of 485m formed in 6 sections with the largest span of 130m.

Ground conditions required a unique solution for pile testing and subsequent pile design. Washout of the Gypsum layers at around 26m is already evident in the middle of the valley. At the location of the piers, some gypsum still exists and the concern about its long term behaviour, local mining subsidence and consequential settlement of the upper soils necessitated a means for minimizing potential negative skin friction in the working piles. The piled foundation design required founding in the lower stable soil layers and utilizing a skin friction reducing mechanism to assure the 120 year design life required.

A test pile incorporating two levels of O-cells allowed the upper O-cell arrangement to evaluate the effectiveness of the friction reducing mechanism; and the lower level of O-cells, placed just above the toe, determined skin friction and end bearing. Three 405mm diameter O-cells were installed at both levels. The pile cages with O-cells were assembled off-site in a workshop and then transported to site for installation in the 1200mm diameter cable and grab bored shafts.

A 1m diameter viscous bitumen coated sleeve arrangement was arranged to reduce the skin friction in the upper layers. This steel tube was instrumented with an array of Geokon 4810X-1MPa contact pressure cells and a 6300 series vibrating wire inclinometer string used within this section of the pile for monitoring during the lateral load test. The placement of this sleeve above the O-cell arrangements and the complexity of the instrumentation presented some challenges for the installation procedure. Careful alignment of the cage and sleeve combination was required.

Despite the complexity of the pile instrumentation and test configuration, the testing proved to be a great success with all phases of the testing completed satisfactorily.

As is conventional in a multilevel test, the lower assembly was pressurised first and achieved a bi-directional load of 36MN. The pressure in the lower assembly was then released and the upper assembly pressured to a level at which the upper section (with the friction reducing agent) was fully mobilised. On completion of the bi-directional testing, a lateral test with a loading of 600kN was then performed whilst monitoring the pressure cells and inclinometer string.



Installation of the lower assembly arrangement with 3x 405mm diameter O-cells



Installation of test pile cage



Lateral testing in progress

Under construction
April 2009



Source: Structurae

