

Project Summary

A new high speed railway line from Genoa to Milan required interconnecting the new infrastructure with the Giovi, Genoa - La Spezia, Genoa-Turin and Alessandria-Piacenza lines, and involving the interports of Rivalta Scrivia and Milan South. This involved the construction of several new high speed railway lines taking trains at speeds of 300km/h.



High speed train reaching speeds of 300km/h

One section of the Milan-Bologna line between Alessandria and Piacenza required the building a 400-metre cable stay suspension bridge over the Po River (the first of such bridges for trains built in Europe). The bridge has an open span of 192 metres.

As part of this project, Piacenza became the site for the first Osterberg Cell tests to be performed in Italy.



Construction of the bridge underway

Minimising disruption and impact on the environment was of the utmost importance for the whole project. Top-down static load testing would require a 50 MN test with either the construction of anchor piles or the haulage of kentledge and test beams to the site.

Due to the nature of the project, these options were considered not only expensive, but would increase the amount of disturbance to the environment.

Loadtest provided an alternative solution in the form of bi-directional testing using O-cell technology.

Load testing program

Two multi-level O-cell® tests were performed on 2000 mm piles installed by Trevi Spa. The piles were constructed using bentonite slurry to depths of 52.3 and 57.7 metres.

Sister bar vibrating wire strain gauges were placed at levels along the pile shaft allowing a profile of net unit side shear to be determined as mobilised along the pile shaft.



Installation of pile cage with O-cell assembly

Pile Tests

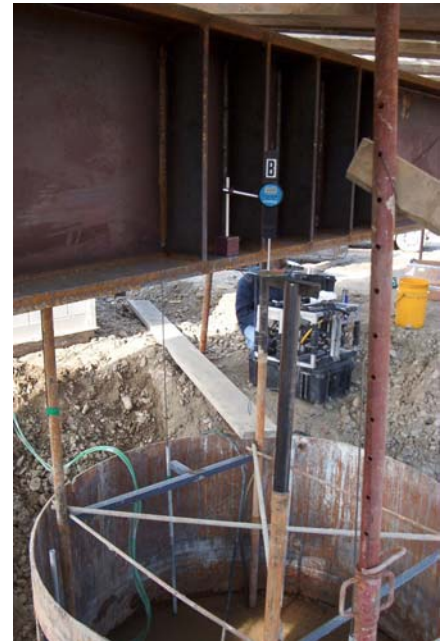
The mobilised capacities for the piles were 66 MN and 69 MN respectively.



Pile test in progress

Summary

By placing the O-cell® at strategic elevations in the shaft, Loadtest was able to assess shear characteristics in specific zones, as well as isolate end bearing and total skin friction loads. These tests provided evidence of the technical merits of O-cell® technology and the benefit the method can have by minimising disruption to the environment.



Pile test in progress

Client: Italferr

Main contractor: Grandi Lavori Fincosit SpA

Foundation Contractors: Trevi SpA

Engineers: Ce.A.S. s.r.l. Milano

April 2006