LOADTEST
O-Cell® Technology in Guinea Bissau

Project	**São Vicente Bridge**
Location	Guinea-Bissau
Client	Grupo Soares da Costa, S.G.P.S., S.A.
Period	July 2007
Project Description	

Ferry is the only existing method of crossing

Installation of O-cell arrangement within pile cage

Installation of one of the removable extensometers

Bi-directional test in progress with steel reference beam for monitoring

Summary:
Guinea-Bissau in West Africa has several rivers making road traffic to and from Senegal a challenge. Outside of the capital city São Vicente, the last remaining river without a bridge is the Cacheu river. The existing ferry service was replaced with a European funded road bridge, the Ponte Euro-Africana.

Project:
To confirm the foundation pile design in the soft sandy clays, verification of the bearing capacity was necessary via the performance of a static load test. Performing a top-down test (load applied to the head of the pile) to the specified load for each foundation element would have required a very costly reaction system utilizing at least 4 anchor piles. A more economic option; an O-cell bi-directional static load test with the O-cells embedded in the test pile.

In order to test one of the deeper 1600 mm diameter piles and apply the maximum load required, one 670 mm diameter O-cell was cast into the pile at approximately 10m above the toe of the 56 metre long bored pile on the south side of the river.

Linear Vibrating Wire Displacement Transducers (LVWDTs) were used at the O-cell level to measure expansion and conventional telltales used to measure the compression of the pile above the O-cell assembly. Geokon Vibrating wire strain gauges were used along the pile shaft to monitor strain at various elevations.

In addition, LCPC (Laboratoire Central des Ponts et Chaussées) employed a series of strings of removable extensometers arranged in nine segments for the pile above the O-cell and three levels below to determine the change in compression along the pile and deduce skin friction.

Conclusions:
A combined bi-directional loading mobilised over 22 MN resulting in displacements of approximately 80 mm downward and 7 mm upwards. Further understanding of the end bearing performance, the Cemsolve® Method of analysis was performed, demonstrating a high end bearing stiffness for the material under the pile toe. In addition, the interpretation of the LCPC extensometer arrangements allowed detailed evaluation of the frictional behaviour above and below the O-cell assembly.

Ponte Euro-Africana, inaugurated June 19, 2009 *Source: minturgb-gov.com*