

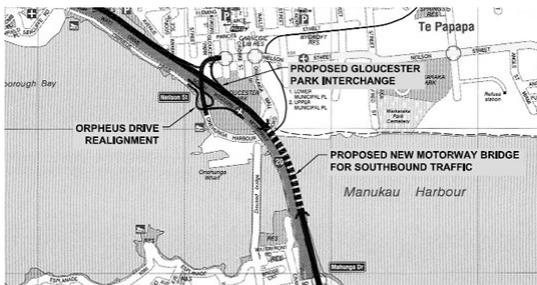
Axial Load Test - O-cell Technology in New Zealand Solutions for Infrastructure Projects



Project: Manukau Harbour Crossing
Location: Auckland, North Island, New Zealand
Contractor: MHX Alliance
Customer: Fletcher Construction Company Ltd
Consulting Engineer: Beca Infrastructure

The Manukau Harbour Crossing project is a key section of the Auckland Western motorway to relieve city congestion and part of a key route between Auckland International Airport and the Business District. The new bridge was built to duplicate the existing Mangere Bridge which connects the suburb of Mangere Bridge to the south and Onehunga to the north of the Manukau Harbour. The new bridge, officially opened in 2010, ahead of schedule brings the number of car and bus lanes across the harbour to ten.

The initial fieldwork involved attaching a single 870 mm O-cell assembly to the steel reinforcing cage. Steel bearing plates welded to the top and bottom of the O-cell locate it in plan position and at the required elevation and distribute the load from the O-cell evenly to the concrete pile above and below.



Welding O-cell Assembly to Reinforcing Cage

In addition to the typical instrumentation for the O-cell test to monitor the pile displacements, nine levels of strain gauges were used to assess skin friction distribution above and below the O-cell and the load transferred to end bearing at the toe of the pile.



Existing Mangere Bridge Completed 1983

As a key member of the MHX Alliance, Fletcher Construction contacted the Loadtest Division of Fugro to carry out a full scale maintained load test on an 1800 mm diameter preliminary pile of depth exceeding 40m. The sub-surface stratigraphy at the location of the test pile comprised over 20 m of soft estuarine material overlying Sandstone bedrock characterized as extremely weak to weak with increasing depth.



Small test footprint and load safely below ground

Pile load testing was carried out in a program in advance of the production piles to determine the soil strength parameters used in the pile design. The MHX Alliance also comprised the NZ Transport Agency and Higgins Contractors.

