LOADTEST
O-Cell® Technology in Jeddah, Saudi Arabia

Project:	**Lamar Towers**
Client :	Kasktas Arabia Ltd
Project Management:	Turner Arabia
Consultant:	Saudi Diyar Consultants (SDC)
Developers:	Cayan Investment and Development
Foundation Contractor:	Kasktas Arabia Ltd.
Project Description:	2008 was the inaugural year O-cell bi-directional load testing was performed in The Kingdom of Saudi Arabia at the site of the new Lamar Towers project in Jeddah near the shores of the Red Sea.

Project:
Lamar Towers will be the first high rise development in Jeddah (artist's impression below) long known throughout the kingdom for its shops, restaurant and cafes. Positioned on the Red Sea coastline, this $2.5 Billion SAR, 7 star luxury project will offer residential, commercial and retail space plus spa all as part of one project.
At 70 storey's, the structures would exert more loading at foundation level than ever experienced previously in the area. The characteristics of the coral founding strata under loading were not well known.

To verify sufficient pile load bearing capacity and side shear characteristics of the coral layer, a static load test was required on two test piles. The required loading would not be cost effective using traditional top-down techniques and the concrete cut-off level was almost 7 m below piling platform level, making the O-cell bi-directional test method ideal for this project.

Lifting of O-cell assembly prior to installation

Bi-directional load test arrangement:
Two 540mm diameter O-cells were installed in each of the 1500mm test piles. Both test piles were base grouted 6 metres before testing commenced. The O-cell assemblies were positioned within the 58 metre long piles at approximately 33 metres and within the coral strata. To provide more detailed information regarding skin friction distribution characteristics, twelve levels of vibrating wire strain gauges (Geokon 4911-4 model) were placed within the pile section, 7 levels below the O-cell assembly and 5 levels above.

Test Results:
A maximum gross loading of 30 MN was required to verify the load bearing capacity of the piles. Settlement criteria were specified for top down static load testing. The equivalent load settlement values proved to be well within the expected criteria. At the maximum applied load, skin friction resistance above the O-cell level resulted in upward top plate movements of 1mm and 3.7mm for TP1 and TP2 respectively. Combined end bearing and lower skin friction below the O-cell level produced downward bottom plate movements as low as 3.1 mm.

Installation of one of the O-cell assemblies

Conclusions:
The two test piles allowed the geotechnical design characteristics to be determined within the coral strata, previously unknown mobilised unit shaft friction values to be measured and successfully proved the piles could attain the factor of safety required.

Testing in progress sheltered from the elements

Artist's rendering *Source: skyscrapernews.com*