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 saw the first bi-directional load tests performed in The Kingdom of Saudi Arabia. Utilizing O-cell technology, two preliminary tests and six working tests were undertaken at the site of the new Lamar Towers project in Jeddah, situated by the shores of the Red Sea.

Lifting of O-cell assembly prior to installation

Installation of one of the O-cell assemblies

Testing in progress sheltered from the elements

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 the piles would have sufficient load bearing capacity, static load tests were required on two preliminary test piles to verify the design. The magnitude of load required 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.

Bi-directional load test arrangement:
Two 540mm diameter O-cells were installed in each of the 1500mm preliminary test piles. Both test piles were grouted to a depth of 6 metres below the toe 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.

Two 405mm diameter O-cells were installed in each of the proof tests; three tests carried out in each of the two towers.

Test Results:
A maximum gross loading of 30 MN was required to verify the load bearing capacity of the piles. The equivalent load settlement values proved to be well within the design criteria. The proof tests were also most successful and the O-cells were grouted after testing for incorporation into the structure.

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. The proof tests demonstrated reliability of the construction method and settlements were well within the specified requirements.

Artist's rendering *Source: skyscrapernews.com*

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