Bi-Directional Static Load Test

It’s Easier, Reliable and Cost Effective

Sensing Safety for the Middle East
Use the easier, reliable, and cost effective SLT
Super-Cell
Bi-Directional Static Load Test

DuSense is a Dubai based company specialized in High-Tech instrumentation systems for the Construction and Structural Monitoring Markets, we have more than 12 years’ experience with pile testing in the Middle East market including numerous applications using the Bi-Directional Static Load Test method.

We can offer you via our Dubai office the complete service from designing the test through to analysis of the test data.
Super-Cells were introduced to the global market in 2005, since then more than 2,000 tests have been conducted around the world.

Hangzhou Bay Bridge
(Longest Cross-Sea Bridge ever built, 70 MN load, year 2006)

Qingzhoufang Residential Building, Macau, China
(1,000 mm dia pile, 11.7 MN load, year 2012)

Catholic High School, Singapore
(800mm dia, 6.12 MN load, 1,000 mm dia, 5.72 MN load, year 2014)
“Super-Cell” is a hermetically sealed expandable steel pressure cell specially designed for load testing of piles, it’s innovative design is the most suitable for casting into concrete piles for Bi-Directional Static Load Testing. Super-Cells are not like earlier design Bi-Directional Load Cells which are a type of modified hydraulic cylinder using a sliding piston, cylinder and seals, the patented Super-Cells have a larger surface area, low height, and light weight, which provide greatly improved loading performance using much lower pressures of <30Mpa. Super-Cell is often the preferred choice for Working Pile tests where due to it’s large cross-sectional area it can be reliably grouted to virtually restore the full bearing capacity of the pile. The Super-Cell design has improved flexibility under high load conditions too where it can tolerate a good degree of non-uniaxial loading. Super-Cells are available in a wide variety of different shapes and sizes depending on the pile diameter and purpose of the BDSL test.

Testing by Super-Cell also uses an innovative technique by flexible tell-tale wires to measure displacement. Fixed at the top and bottom of cell to measure the movement of upper and lower sections of the pile. The tell-tale wires are armoured design and pressure proof they’re installed at the same time as the hoses, in a complete run to the pile top. At the pile top the stranded steel wire is run over a pulley attached to the reference frame with steel weight suspended from it to maintain constant tension—the weight movement = cell movement.

When loaded as the Super-Cell inflates, it mobilises the upper shaft’s side shear and the lower shaft’s side shear and end bearing.
A typical Bi-Directional load test is performed until the ultimate capacity of either side shear or end-bearing is achieved, so the maximum load capacity of the pile can be accurately obtained. Installation of strain gauges embedded at different layers will indicate how the load capacity is distributed through the pile’s length.

Bi-Directional load test has been a well proven technique in many thousands of projects all over the world, it has many advantages over conventional top-down static load testing including:

- **High Test Load capacity**—the Super-Cell has been used to loads of >5,000 tonnes under suitable conditions.
- **Reduced working area**—Testing can be conducted in a very confined area.
- **Time**—Testing is able to commence within 7 to 10 days from pile installation.
- **Economy**—The Super-Cell method becomes more economical as load increases, unlike conventional static load test.