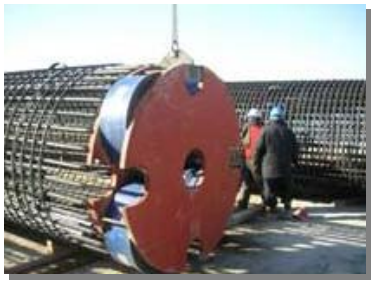
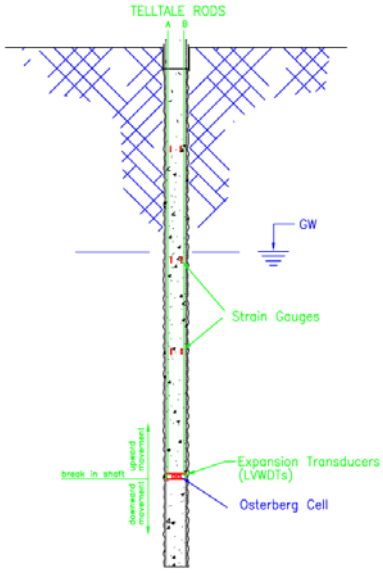
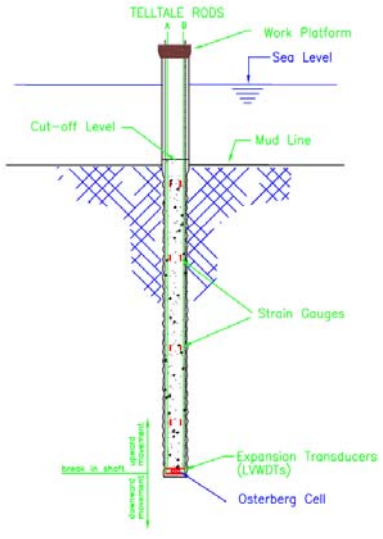
LOADTEST
O-Cell® Testing – How it works



Multiple O-cell Assembly ready for installation



Bi-directional O-cell test on land with O-cell placed within the shaft



Bi-directional O-cell test off-shore with O-Cell near the toe

The Osterberg cell (O-cell) is a sacrificial jack like device installed within the foundation unit; pile, diaphragm wall or barrette. However, unlike a conventional jack, the O-cell is specifically engineered to offer negligible internal friction, even with eccentric movement. The depth of the O-cell within the pile is set according to the test program requirements. A typical level for the O-cell can be determined where there will be equal capacity above and below to maximise the load that can be mobilised in the pile during the test.

The O-cell is attached to the reinforcing steel cage or other support structure to ensure that its location and depth are located precisely.

The test may be started once the concrete or grout reaches a minimum strength. The foundation unit is then separated into two elements by application of hydraulic pressure to the O-cell. As the load is applied to the O-cell, it begins working in two directions; upward against upper skin friction and downward against end bearing and lower skin friction (if applicable). An O-cell test requires no kentledge, reaction beam or anchor piles.

The test is considered complete after reaching the specified test load, ultimate capacity above or below the O-cell or upon reaching the maximum capacity of the O-cell.

Instrumentation is included in each test pile/barrette for direct measurement of O-cell expansion, pile compression and top-of-pile/barrette movements. Strain gauges are often embedded along the length of the shaft to assess load distribution.

Applications

Bi-Directional O-cell Static Load Testing has been performed on:

- Drilled Shafts
- Bored Piles
- Caissons
- Driven Piles
- Slurry Walls
- Barrettes
- CFA or Auger Cast Piles
- Fundex piles.

The O-cell can be used in production and non-production foundations. Multiple O-cells can be placed on the same plane and used to increase the available test capacity to virtually any load. Additionally, several loading arrangements can be located at different levels.

Specially constructed O-cells can be attached to driven piles or cast within concrete precast piles. Bi-directional O-cell load testing can be performed on:

- pre-stressed concrete piles
- steel pipe piles
- concrete shell piles

Advantages

The O-cell test does not require anchor piles, reaction beams or kentledge, all of which are expensive to install or to erect. All loading takes place below ground, making the O-cell test completely safe.

High loads can be applied to magnitudes not possible with any other static test method. Loads in excess of 100 MN are not uncommon, with tests in excess of 220 MN possible.

For offshore tests, piles constructed with restricted access or where concrete cut-off levels are very low, the O-cell method may be the only load test option possible.

The O-cell test is a full scale static loading test, effectively two tests running simultaneously, mobilising the skin friction above the O-cell and the end bearing below the O-cell. (A third component - lower skin friction - is also mobilised when the O-cell is not placed directly on the excavation bottom.)