

The Osterberg Cell[®] (O-Cell[®]) – How it works

How it Works

The O-cell is a sacrificial jack like device installed within the foundation unit. 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 its location and depth is located precisely.

After the concrete reaches a minimum strength, the test may be started. Separation of the pile into two elements is induced by hydraulic pressure applied at the cell.

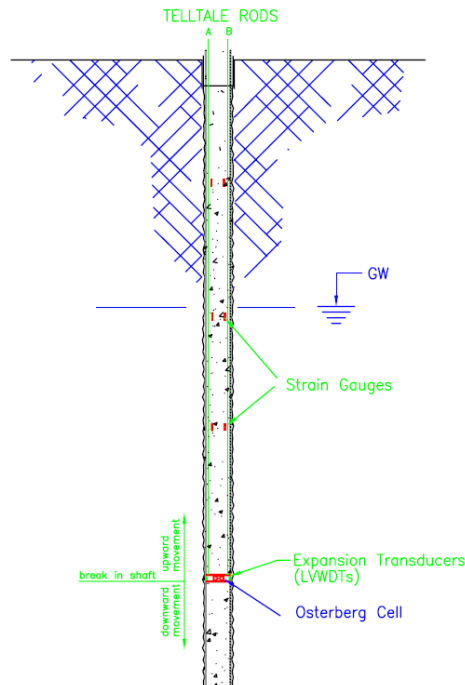
As the load is applied to the O-cell, it begins working in two directions; upward against upper skin friction and downward against base resistance and lower frictional capacity (if applicable), the O-cell test requires no reaction beam or anchor piles.



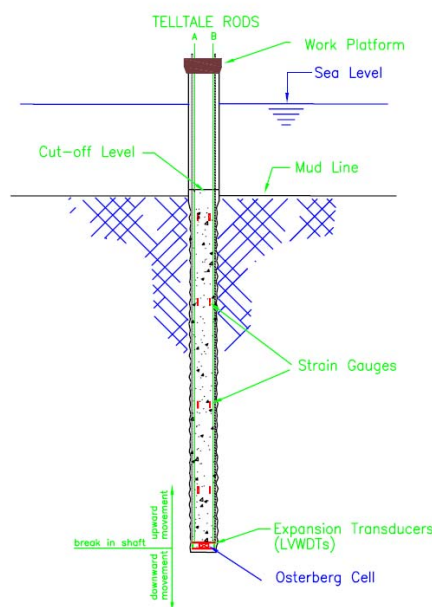
Multiple O-cell Assembly ready for installation

The test is considered complete after reaching 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 for direct measurement of O-cell expansion, shaft compression and top-of-shaft movements. The test pile often includes monitoring strain gauges embedded in the shaft.



O-cell Test on Land with Cell off Tip



Bi-directional test Off-Shore with O-Cell near Tip

Applications

Bi-Directional Static Load Testing has been performed on:

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

The O-cell can be used in production and non-production foundations. Multiple O-cells can be used and placed on the same plane to increase the available test capacity to virtually any load.

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

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

Advantages

The O-cell test does not require reaction beams or anchor piles, which can be very costly to install.

High loads can be applied to magnitudes not possible with any other static test method. Loads in excess of 100MN are not uncommon, with tests in excess of 220MN 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 measures directly the upward upper skin friction and downward end bearing and lower frictional resistance.