

PREVENTING UPLIFT OF SHELL STORAGE TANK

Client: **Shell Oils**
Installer: **Heijmans**
Engineers: **ABB Lumus**

Requirements

At its near Rotterdam, Holland, Shell had a large oil storage tank, some 46m in diameter and over 20m high. Despite its size and weight the tank needed to be fully secured to the ground to prevent any possibility of uplift when it was empty of liquid and full of gas as this would fracture connecting pipework.



Installation

As no heavy equipment could gain access to the site it was necessary to design and build a special machine to undertake the anchor installation.

The purpose-built rig drove 74 Duckbill MR1 anchors with 20mm grip bars 7m into the ground at 1.5m centres around the base of the tank. The anchors were driven in 250mm from the annular ring around the base of the tank and secured to the ring by means of welded angled brackets. The rig was used to recover the drive steels.

Once the anchors had been installed they were proof loaded to 66kN and then set to a 20kN working load and secured to a bracket/plate fixed to the tank with a nylon membrane to isolate dissimilar metals.



The Duckbill range of mechanical ground anchors with the MR1 pictured top right