

The Paper Tower, Silkeborg

Construction pit, O-cell test pile and drilled piles



AARSLEFF

In one of Silkeborg's most attractive areas, Per Aarsleff A/S carries out a project comprising establishment of a construction pit as well as re-location of pipes, installation of test pile, execution of load test and subsequent installation of 75 drilled piles in lengths up to 38 metres. The work is carried out in connection with the construction of the 70-metre-high Paper Tower (Danish: Papirtårnet) which will become the tallest building in Silkeborg. The project for KPC A/S is carried out in One Company cooperation between Construction and Ground Engineering.

Establishment of construction pit

When we started on the project, the site was used as a parking ground and was to form the basis for a new high basement for underground parking with an automatic parking system and a technical room. Before installing the retaining walls for the construction pit, we had to move all crossing pipes to new alignments and connect them to new structures and wells. In addition, we had to demolish and remove existing pipes and structures within the construction plot.

During the pipe relocation, we had to use more well point systems than planned, as the groundwater

inflow was higher than expected. This was due to highly water-bearing sand deposits under a peat layer which was difficult to dewater.

Test pile and drilled piles

Concurrently with the pipe work, we installed the test pile, and the results from the test pile formed the basis for the design of the 75 drilled piles. The test pile was established as a DN880-millimetre drilling with a length of 45 metres. The pile was established using the traditional Kelly method with casing down to full depth and water load. The reinforcement cage consisted of three parts in the entire length of the pile, and in the cage, two O-cells, strain gauges and measuring pipe were mounted for the subsequent load test of the pile. After 28 days of regeneration of the clay and curing of the concrete, the pile was tested by means of the O-cell.

When the retaining walls were installed, we excavated the top soil inside the construction pit, and subsequently we started installing the 75 drilled piles. Concurrently with the drilling work, we installed anchor brackets and anchors, and we established relief wells to allow excavation after completion of the piles.

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Data

- Relocation of pipes before start-up of the work
- 1 test pile DN880 mm, 45 m long with an O-cell
- 75 Kelly drilled piles DN1180, 34-38 m long
- 3,000 m² of sheet piles, 12.4 m long incl. Roxan interlock sealing and welded corner locks
- 135 soil anchors, DN152 mm, permanent as well as temporary. All with permanent water proofing
- 14 relief wells, 8" with DN125 mm filter

- 15,000 m³ of soil handled, from uncontaminated to highly contaminated soil
- Sewer and drainage work inside the construction pit, including 2 pumping wells
- 1.2-metre base slab, foundations and stabilising core made of in situ concrete
- Concrete topping on TTD deck at ground level

Client
KPC A/S

Contractor
Per Aarsleff A/S

Type of contract
Design & build contract

Consultant
Aarstiderne Arkitekter
MidtConsult, Herning

Construction period
January 2018-March 2019

Contract value
DKK 42.5 million

Aarsleff Ground Engineering is one of Europe's leading piling contractors, and we undertake a wide variety of piling, drilling and foundation projects in Denmark and abroad. We have offices in Poland, Sweden, Germany and the UK.

Our fleet covers fully hydraulic piling and drilling rigs as well as cranes and vibrators.

Contact
Per Aarsleff A/S
Ground Engineering
info@arsleff.com
Tel. +45 8744 2222

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