

Metro Sydhavnen

25,000 linear metres of secant piles



AARSLEFF

For the new Metro Sydhavnen Per Aarsleff A/S has installed 1,213 secant piles as retaining walls down to a depth of 28.5 metres for three of the future stations: Sluseholmen, Mozarts Plads and Fisketorvet. The project was subject to very stringent quality requirements which resulted in few adjustments during the execution.

The drilling work

The many secant piles – overlapping drilled piles – were installed in the firm Copenhagen limestone which is hardened limestone with a very high degree of hardness, H5.

The purpose of installing the piles in the limestone was that the secant pile wall then had a cut-off effect allowing the construction pit to be kept dry during construction. This also meant that all the casings had to be installed in the same toe level rather than drilling the pile without casing into the limestone which

is often allowed in the Copenhagen limestone. This will improve the quality of the retaining wall and improved water tightness. However, the method also means increased wear and tear of the drilling equipment and that the working time with the individual pile is increased.

Generally, the piles are reinforced with traditional reinforcement cages, but glass fibre reinforcement is used for ducts for tunnel pipes. The glass fibre reinforcement made it easier for the tunnel boring machines to break through the secant pile wall without being destroyed.

There was a high level of activity on the project, and we worked on several sites at the same time. Some of Aarsleff's largest rigs were mobilised for the project, including BG28, BG36, BG39, BG45 and not least BG55 which is the largest drilling rig found in Aarsleff and in Northern Europe.



High water pressure

After the installation of the secant piles, the station shafts were excavated to a depth of 25 metres. Due to the external water pressure of up to 23 metres on the piles, we were working under very strict requirements in terms of the quality of the individual secant piles and the gap between them.

When casting the deepest piles – up to 28.5 metres – there were some initial challenges with the concrete recipe. But after some adjustments, we managed to install the retaining walls, and

although there was a high external water pressure, we only experienced minor leaks.

Coordination in focus

As there was restricted space on two out of the three sites, we focused particularly on coordination, and even though the client's strong focus on safety and environment sometimes caused challenges during the daily production, we were still able to meet all deadlines.

Data

- 1,213 secant piles comprising:
 - 17,415 lm of DN1180 piles (lengths of 22-28.5 metres)
 - 7,866 lm of DN880 piles (lengths of 12.5-26.5 metres)
 - 23,500 m³ of concrete
 - 1,730 tons of reinforcement

- 74 tons of glass fibre reinforcement

Client

Metroselskabet I/S

Type of contract

Subcontract

Construction period

September 2018-November 2019

Contract value

DKK 107.5 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

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