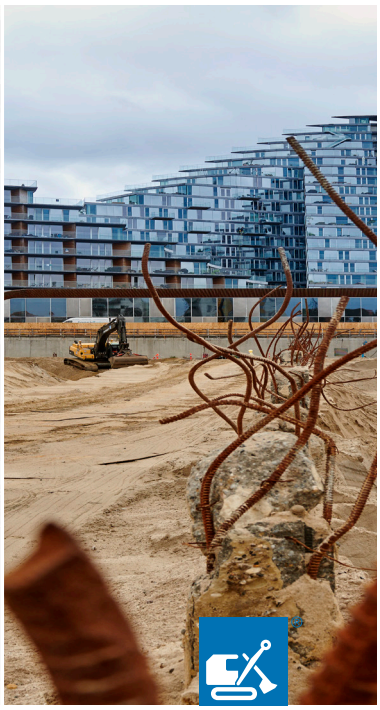
Bassin 7, Aarhus Ø

Establishment of construction pit and foundation for two residential blocks



AARSLEFF

For the construction of an 67 x 194-metre underground parking, Aarsleff has designed and established the construction pit at depths of up to 8.5 metres and with up to four bracing levels as well as carried out the foundation for two residential blocks and a tower inspired by Big Ben.

The project at Aarhus Ø was contractually divided into two contracts, but Aarsleff was responsible for the total execution and design of the entire construction pit which comprises a hotel and conference centre in addition to residential buildings. For the hotel and conference centre, we have installed and tested two drilled piles, DN 1180 millimetres and drilled to 55 metres below ground level. The results of the test piles were to form the basis for the final design of the foundation of the building.

Challenging underground

The foundation of the area at Aarhus Ø is challenging as the strength and the deformation properties of the underground are poor causing an increased need for deep and solid structures. We used some of our largest and strongest equipment for vibro-driving and sheet pile driving onshore, and we installed the 20-metre-long sheet piles without interlocks.

Due to the poor deformation properties, we paid special attention to a newly constructed theatre at the neighbouring site. Instead of installing sheet piles towards the neighbouring site, we installed a solidly anchored secant pile wall. Monitoring of the theatre showed minor deformation far below the specified limits.

In addition to the new theatre, there were several structures from the old container terminal which was previously located in the area. By using the existing structures for the design of the new construction pit, we reused part of the structures for anchoring. Thus, the client saved costs.

VDC og 3D modelling

At the start-up of the project, the big number of piles driven for the construction of the theatre at the neighbouring site was a challenge to the anchoring of the construction pit. The challenge was solved by Aarsleff's VDC specialists who made a complete 3D model of piles and anchors solving the complicated geometry, and all anchors were installed without collision.

During the establishment of anchoring for the existing quay structure, it turned out to be necessary to put part of the water main supply temporarily out of operation. Through detailed planning and extra resources, the anchoring was established, and the main supply re-established in just two weeks.

Data

- 430 drilled strand anchors, average length = 23 m
- 170 anchors with mutual anchoring using horizontal directional drilling
- 70 drilled rod anchors, DN50, with an average length of 20 metres
- 122 secant piles, 70 rm of retaining wall to level -14
- 170,000 tons of soil handling
- 3 filter wells at a depth of 10 m
- 6 vertical uplift anchors designed as 18-metre rod anchors
- 255 rm of sheet piles in lengths of up to 20 m.
- 1,231 driven reinforced concrete piles, L= 16-26 m
- 316 driven HE400B steel piles, L= 15-26 m
- 2 drilled DN1180 test piles at a depth of 55 m
- 14,000 m² of asphalt, milling
- 190 m of removal of crane tracks, crane foundation and asbestos.

Client

Bassin 7 Erhverv ApS

Contractor

Per Aarsleff A/S

Type of contract

Design and build contract, but pile project in main contract

Consulting engineers

Aarsleff D&E
Frands Haahr ApS

Client's consultants

BIG
Sleth A/S
Hamiconsult a/s
GEO
Rambøll A/S

Construction period

April 2019-June 2020
(design from January 2019)

Contract value

DKK 89 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, Norway, Germany and the UK.

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

Contact

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19.01.21-R128UK-rev1