

# The Carlsberg City's tallest tower

## Diaphragm walls – a gentle installation method



**AARSLEFF**

In connection with the development of the Carlsberg City, Aarsleff carries out the design & build contract for the construction of the 74,300-square metre building. The contract comprises establishment of the construction pit as well as construction of the building.

### Gentle method with diaphragm walls

We used diaphragm walls for the construction pit as it provides a very gentle installation method which was preferred due to the listed buildings located just 3 to 4 metres from the diaphragm walls, and due to the soil hardness which prevented us from driving or vibrating the sheet piles down to the required depth. Also, we carried out monitoring on some of the listed buildings during the execution.

In addition to the diaphragm walls, the work also included excavation and removal of soil. A total of 85,000 cubic metres of soil of different contamination classes was handled and removed.

Concurrently with the excavation work, we installed ground anchors in up to two levels. We established temporary ground anchors with 11 strands, which we installed in several levels on consoles as well as waling beams.

We installed diaphragm walls on each side of the street Olivia Hansens Gade to secure the future building activities at the neighbouring construction plot and avoid future collision between sheet piles and ground anchors. The two parallel walls were mutually anchored to keep the traffic flowing during the excavation work. Across the two parallel walls we established a tunnel for subsequent access between the two plots.

### The method in brief

The diaphragm walls are installed with an 18-ton shovel bucket mounted on a 110-ton wire crane. We excavated through the soil to the required depth. Bentonite suspension was currently poured into the alignment, allowing the excavation work to be carried out in a thin concrete liquid which stabilised the soil before installing the sheet piles. When the sheet piles were installed and the bentonite suspension had obtained the required strength, we carried out the excavation for the ground anchors, which were installed in several levels, and we installed mutual anchoring to keep the diaphragm walls in place.



### From tender design to project

Our Design & Engineering department was involved in the construction pit project, right from the preparation of the tender design to the preparation of the project for authority approvals, including bearing capacity and deformation calculations of all the

walls, inclusive of ground anchors, just as we have carried out risk analysis of the existing structures. In close collaboration with the executing department there was a current follow-up during the project to ensure correct execution.

<b>Data</b> <ul style="list-style-type: none"> <li>• 720 m of diaphragm walls/ 9,500 m<sup>2</sup></li> <li>• 719 tons of sheet pile profiles</li> <li>• 85,000 m<sup>3</sup> of soil</li> <li>• 340 temporary ground anchors</li> </ul>	<b>Client</b> Carlsberg Byen BA60 P/S	<b>Consulting engineer</b> Design & Engineering, Aarsleff
	<b>Contractor</b> Per Aarsleff A/S	<b>Construction period</b> July 2018-June 2019
	<b>Type of contract</b> Design & build contract	<b>Contract value</b> DKK 73 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.

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