PROJECT REPORT

Fifth sluice chamber construction, Brunsbüttel

Data and facts

Company	PORR Spezialtiefbau GmbH
Type	Foundations
Runtime	12.2016 - 05.2022
Principal	5.SKB Brunsbüttel consortium

Project report online

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Further complications included the groundwater on the site, which is damaging to concrete, and the expectation of loads of up to 4,000kN. The team chose to apply jet grouting methods, which could be implemented without vibration. The jet-grouted elements improve the durability of the grout body.

The grouted anchoring of the sheet-pile wall consisted of jet-grouted piles in the form of raking piles at a 45° angle, anchored up to 40 metres into the ground. The uplift piles were transported 25m through the water from the pontoon as empty bores, and then drilled 27m into the ground on location.

Uncharted territory in manufacturing the jet-grouted piles

In the jet grouting method, the soil is cut by a cutting jet and then replaced, with a hardened cement slurry serving as the construction material for the jet-grouted elements. Our innovation in Brunsbüttel: steel supporting elements up to 125mm in diameter were inserted in the jet-grouted columns, which measured a diameter of 1.1m and lengths up to 7.5m. Stump-Franki constructed a special machine to combine the drilling and jetting procedures and implement this plan. Building approvals for this procedure were not available, so exceptional permission was obtained from the Federal Waterways Engineering and Research Institute.

Once the holes (borehole diameter approx. 245mm) were drilled to depths up to 64m, the area of the fixed anchor length was expanded with jet grouting in two operations. Next, the core of each jet-grouted column was replaced with cement slurry (water/cement ratio approx. 0.45) and the supporting element incorporated into the fresh body. Spraying ensured the jet-grouted columns interlocked successfully with the soil. The resultant piles will be highly durable: able to withstand the expected loads of up to 4000kN, even with high concentrations of sulphates and ammonia in the groundwater.

Impressions

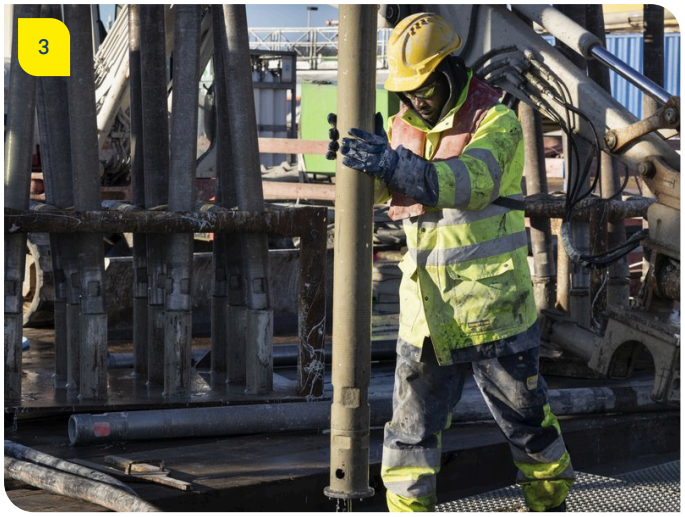

Image notes

1

New construction of 5th lock chamber, Brunsbüttel

The buoyancy piles were drilled 25 metres from the pontoon through water and then 27 metres into the subsoil.

2

New construction of 5th lock chamber, Brunsbüttel

From the construction teams and machinery to steel components, aggregate and cement: everything has to be transported by water.

3

New construction of 5th lock chamber, Brunsbüttel

The drill pipe is aligned above the drilling starting point.

4

New construction of 5th lock chamber, Brunsbüttel

Customised work instructions ensure high-quality execution on the construction site.

Do you have questions about the project or would you like to learn more? Feel free to contact us for further information.

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