Extension of Port of Hanstholm

Improvement and development of the port's core business

The Port of Hanstholm had, for a long time, wanted to expand the harbour to improve the service of its core business, the fishing industry, and to provide goods facilities, sustainable energy and aquaculture. So, Per Aarsleff A/S turned the first sod for the long-awaited port extension in Hanstholm in November 2017. The project was carried out as a design & build contract together with our sister company VG Entreprenør A/S.

Wider, deeper, bigger

The project comprised moving the habour entrance from the wave-exposed north-western location to a north-eastern location. In addition, the water depth at the harbour entrance was increased to 11 metres, and the water depths in the new harbour basins were increased to 10.5 metres. In this process, we handled more than 500,000 cubic metres of dredged spoils. And we established 130,000 cubic metres of a new hinterland area designated for the industrial development of the harbour. Moreover, we constructed a total of 1,400 metres of outer breakwaters and 350 metres of new quay facility in front of the hinterland area.

Extensive in-house production

We used so-called Cubipods as part of the western breakwater structure to protect both the inner and outer walls of the breakwater against the major wave impacts. In total, more than 2,500 of these concrete amour units were used in four different weight sizes: 15, 22, 30 and 33 tons. The concrete amour units were produced at Aarsleff's production plant in Poland and placed at the harbour site in Hanstholm using Denmark's largest excavator of 220 tons.

The pier head for the western breakwater was also cast at the production plant in Poland as a type of caisson weighing approx. 7,000 tons. The pier head was subsequently transported on a barge from Poland to Aalbæk Bay outside of Frede- rikshavn. Here, the structure was released of the barge allowing the pier head to float. Subsequently, it was towed to Hanstholm and installed at the end of the new big western breakwater. Aarsleff's own Design & Engineering specialists performed the design and planning tasks involved for the transport and installation of the pier head, just as they designed a major part of the project in general, including the 490-metre quay structure.

Challenging conditions

The weather and wind conditions are important factors in Hanstholm and have an impact on the waves, which can be particularly long and high in Hanstholm. That made the stonework for the breakwater structure, at deep water depths, even more complex and challenging. Especially the new outer western breakwater was established under challenging wave conditions, so a 3D model of the breakwater was tested in a special wave laboratory at Aalborg University before we started the actual breakwater work. The 3D model was made with the same material as the original breakwater and with scale dimensions of 1:45.

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Data

- 900,000 tons of granite rocks for breakwater construction
- 20,000 m³ of concrete armour layers for breakwater (Cubipods)
- 1,400 m of stone/concrete breakwaters
- 350 m of quay prepared for a water depth of 11 metres
- 140 m of quay prepared for a water depth of 9 metres
- 165,000 m² of hinterland
- 580,000 m³ of backfilling
- 750,000 m³ of dredging
- 7,000 tons of pier head at a water depth of 14 metres
- 550 running metres of sheet piles, length varying from
- 14.5 to 18 m
- 230 anchors.

Client

Port of Hanstholm

Contractors

Per Aarsleff A/S
VG Entreprenør A/S

Collaborating partner

Rohde Nielsen A/S

Type of contract

Design & Build contract

Consulting engineers

COWI A/S (design of pier heads)
Aarsleff Design & Engineering

Contract period

November 2017-December 2020

Contract value

DKK 569.9 million

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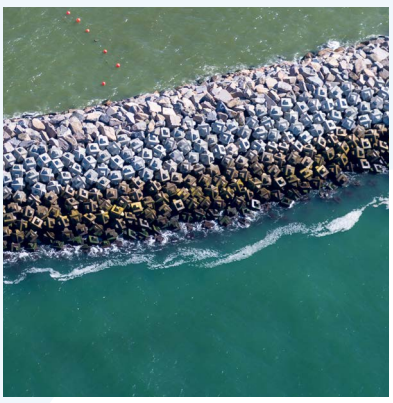

Contact

Per Aarsleff A/S
Construction
Tender & Estimation
info@aarsleff.com
Tel +45 8744 2222

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