

Western Breakwater - Port Expansion in Hanstholm



country

Denmark

owner

Port of Hanstholm

contractor/designer

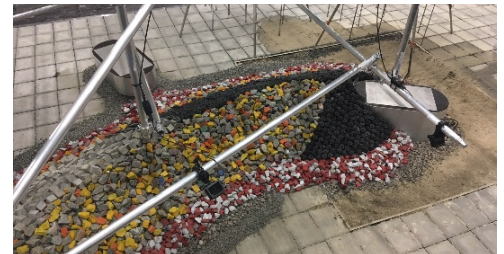
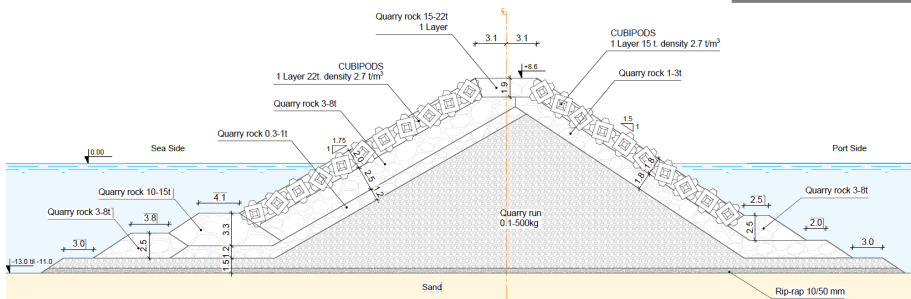
AARSLEFF/COWI

client advisor

RAMBOLL

construction period

April 2018 – December 2020



Model tests Aalborg University

Background

The port of Hanstholm was built in 1961-68 and expanded in 1984-87. The outer breakwaters currently consist of circular concrete caissons. The water depth at the entrance and the outer basin increases from 9.0m to approx. 11m and the entrance width increases from 140m to 170m.

The Port of Hanstholm is planning a major expansion of the port in order to achieve: a larger water depth in the navigation channel; new quays with larger water depth; more hinterland; better navigation conditions; more calm wave climate in the existing port

Port Expansion project includes the design and construction of a Western and Eastern breakwater. The Western breakwater is designed by COWI as solution with a Cubipod single-layer armour, and its roundhead includes a vertical caisson.

Design conditions for western breakwater

- ⊗ Breakwater length: 396 m
- ⊗ Max. water depth: 13.0 m
- ⊗ Design wave height: (H_{m0}): 8.2 m
 $H_{1/3}$ at breakwater toe: 9.0 m
- ⊗ Peak wave period: 16.5 s
- ⊗ Slope H/V: 1.75/1 (1.5/1 Rear-side)
- ⊗ CUBIPOD high density (2.7 t/m³ & 3.0 t/m³) single-layer in trunk (15t & 22t) and round head (30t & 33t)
- ⊗ Breakwater crest: +8.2 to +8.6 m
- ⊗ 2D & 3D stability and overtopping tests by Aalborg University
- ⊗ 2D stability tests by Braunschweig Technical University

Construction aspects

- ⊗ 1,843 CUBIPOD 15 t (5.55 m³)
- ⊗ 694 CUBIPOD 22 t (8.15 m³)
- ⊗ 175 CUBIPOD 30t & 33t (11.11 m³)
- ⊗ Total CUBIPOD concrete volume: 17,807.00 m³
- ⊗ 12 molds for CUBIPOD 15 t
- ⊗ 5 molds for CUBIPOD 22 t
- ⊗ 2 molds for CUBIPOD 30t & 33t



Production in Poland



Storage in Poland



Placement