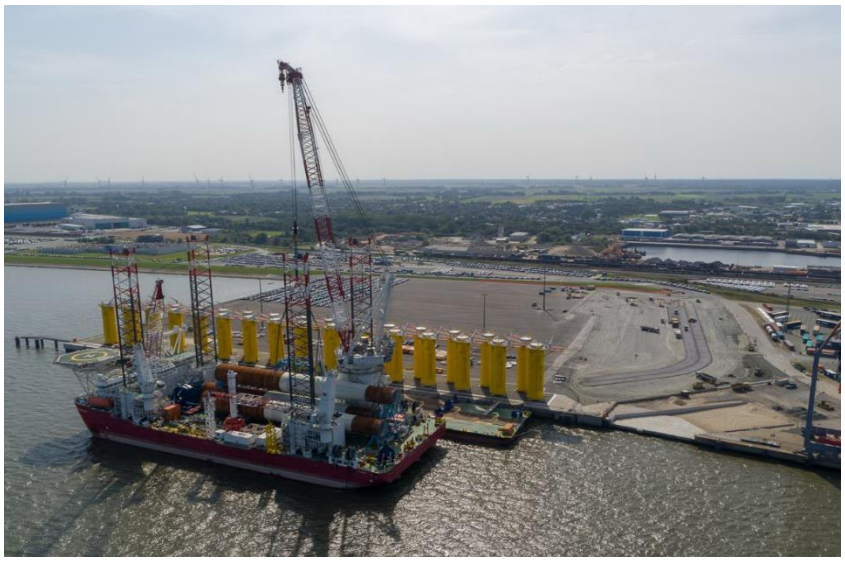
REFERENZ HARBOUR CONSTRUCTION AND MARINE ENGINEERING

Expansion „Europakai“ berth 4, Cuxhaven including a ramp



In spring 2016 the Joint Venture Bilfinger Marine & Offshore Systems **(today F+Z Baugesellschaft)** / TAGU and Nordsee received an order from NPorts GmbH & Co.KG for the expansion of Berth 4 „Europa Kai“ inclusive a ramp.. The decision was taken because of a competitive variant solution with an optimized quay wall and a shortened edge dam.
The quay wall with a length of about 250m is divided into 8 blocks and consists of a combined sheet pile wall (system width a=3,08 m), which is back-anchored by inclined HTM-piles. A deep laying concrete slab was designed to protect the sheet wall from high loads. It has a constant thickness of 90 cm and is founded on in-situ piles with a diameter of Ø 61 cm.

The following profiles were used for the quay wall:
- tube piles Ø1620x22 mm steel grade S460MH or NH
  - length up to 43 m
- Intermediate piles AZ 26-700 steel grade S355GP
- batter piles HTM 600/151 steel grade S355GP
  - length up to 67 m

Contract Value:
~27 € Mio

Executed by:
Bilfinger Marine & Offshore Systems GmbH
today: F+Z Baugesellschaft

Employer:
Niedersachsen Ports GmbH & Co. KG

Construction Period:
May 2016 - Aug. 2018
(main works finished Oct. 2017)

Site:
Cuxhaven

Specifications / Main Quantities:

Max elevation	23,25 m
Harbour bottom	NN -17,0 m
Calc. future harbour bottom	NN -19,0/-20,0 m
Bearing tube piles	ca. 3.700 t
Intermediate piles	ca. 630 t
Batter Piles	ca. 1.100 t
In-situ concrete Piles	ca. 300 St
Reinforced concrete	ca. 6.500 m³
Reinforcement steel	ca. 920 t
Sandfilling	ca.1.000.000 m³

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By extending the eastern transverse wall the consolidation phase was shortened and thus the construction time could be optimized.

The wharfage is designed for a live load of 100 kN/m² for the regular areas and a load of 200 kN/m² for the heavy load areas.

The mighty layers of soft soils surrounding the operational area were a particular challenge to this project as well as for the implementation of a working consolidation concept with pre-loading and vertical drains, which had to be integrated in the construction process and the short construction time.