

Offshore Wind Farm Rødsand 2



Project data

Gravity foundation
Height: 11 m-16 m
Diameter/top: 9.6 m
Outer diameter/shaft: 4.2 m
Diameter/bottom: 17.0 m
Weight excl. ballast: 1,200 t
Total volume Norit ballast:
35,820 m³
Total volume Norit sand:
8,184 m³
Total volume concrete:
44,143 m³

Excavation

Total volume excavation:
31,729 m³

Scour protection

Total scour protection:
11,300 m³ (Granite)

Installation time offshore

02/2009 - 04/2010

Contact

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AARSLEFF

Placing of foundations

General information

Rødsand 2 was the second wind farm after Nysted Wind Farm (Rødsand 1) to be constructed in Rødsand off the Danish coast. Rødsand 2 has a total installed capacity of 200 MW, consisting of 90 wind turbines as well as an offshore transformer platform. Therefore, it is one of the largest offshore wind farms in the world.

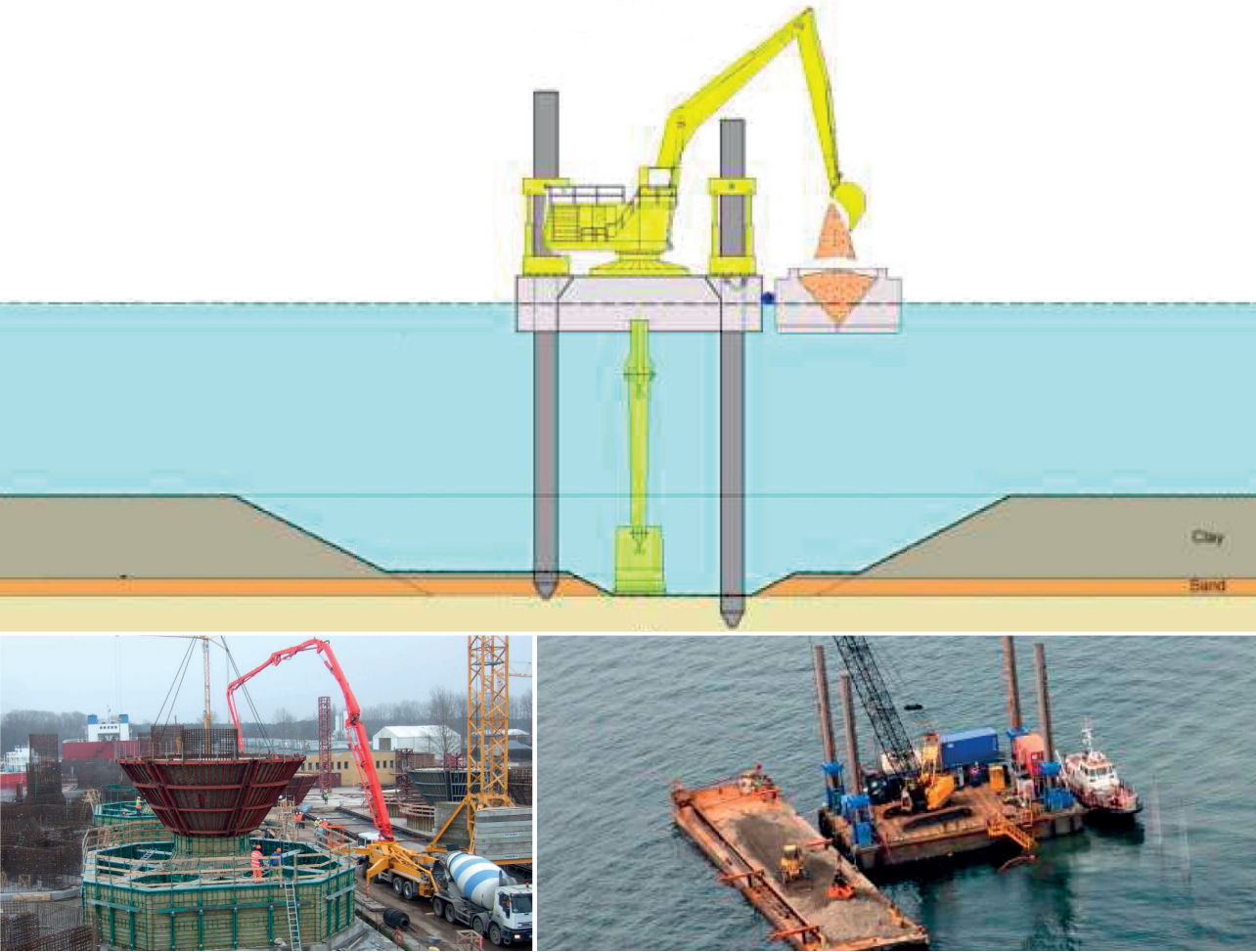
In July 2008, a joint venture consisting of Bilfinger Berger Ingenieurbau GmbH and Per Aarsleff A/S, Aarsleff Bilfinger Berger Joint Venture (ABJV), was awarded the contract for the design, production and installation of the foundations.

In the following, the foundation design and installation are outlined.

Spud-rigged pontoon with backhoe dredger

Casting of foundation structures on barge

Soil preparation

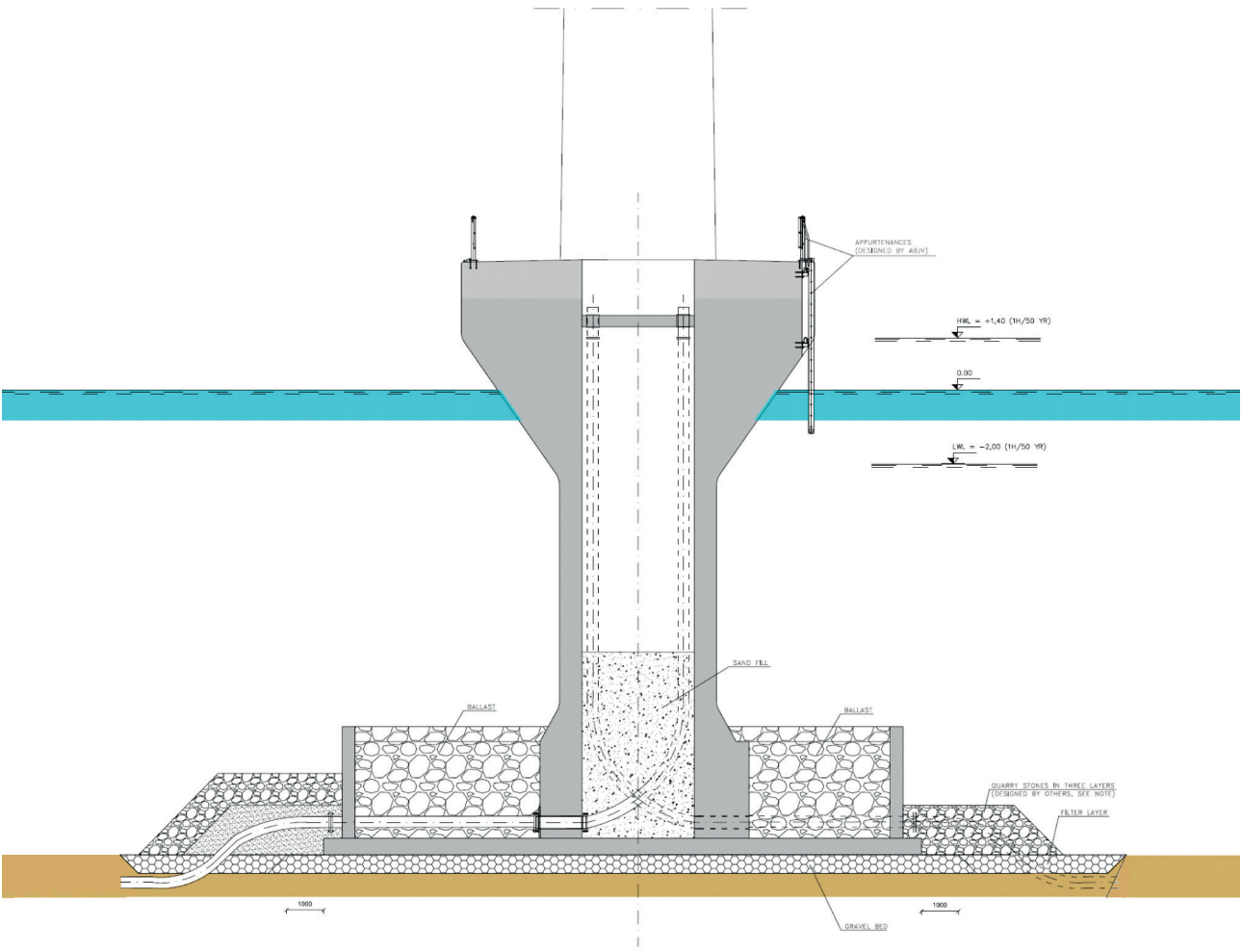


Technical solution

The foundations are concrete gravity caisson foundations, like those used for the Nysted Wind Farm. The structures are equipped with a concrete cone at the upper level of the shaft in order to reduce the ice loads. These foundations were produced on large pontoons with a footprint of 17 metres x 17 metres, a central shaft diameter of 5 metres and an empty weight of 1,200 tons. The foundations were secured in place after final positioning with approx. 1,200 tons of ballast stones in the bottom cells and approx. 300 tons of Norit sand in the central shaft.

Installation

The installation took place from February 2009 to April 2010. At first, the seabed at the installation site of each of the foundations was prepared to ensure that the soil conditions were able to support the loads resulting from the dead weight of the foundation and the attached wind turbine as well as the dynamic loads from waves, currents and wind. This involved excavating the seabed with a backhoe until soil with sufficient bearing capacity such as sand or chalk was reached.



The whole process was monitored by CPT tests. The final foundation levels were expected to vary between -7.5 metres and -12.5 metres.

Next, the concrete foundations on top of the pontoons were towed from their production location to their final location at sea. Upon arrival at the location, the transport pontoon connected to the installation vessel "EIDE Barge 5", which lifted and positioned the foundations onto the seabed with tug assistance.

Afterwards, the foundation elements were filled with ballast stones to hold the foundation in its required final position and to provide it with enough weight to effectively anchor the wind turbine to the seabed. This was done with a large backhoe dredger onboard a spud-rigged pontoon and ballast stones which were sourced off site. Finally, the backhoe was used to place two layers of scour protection around the base of the foundation.