

CASE STUDY

CAROUSEL TRANSPORT

Version November 2021



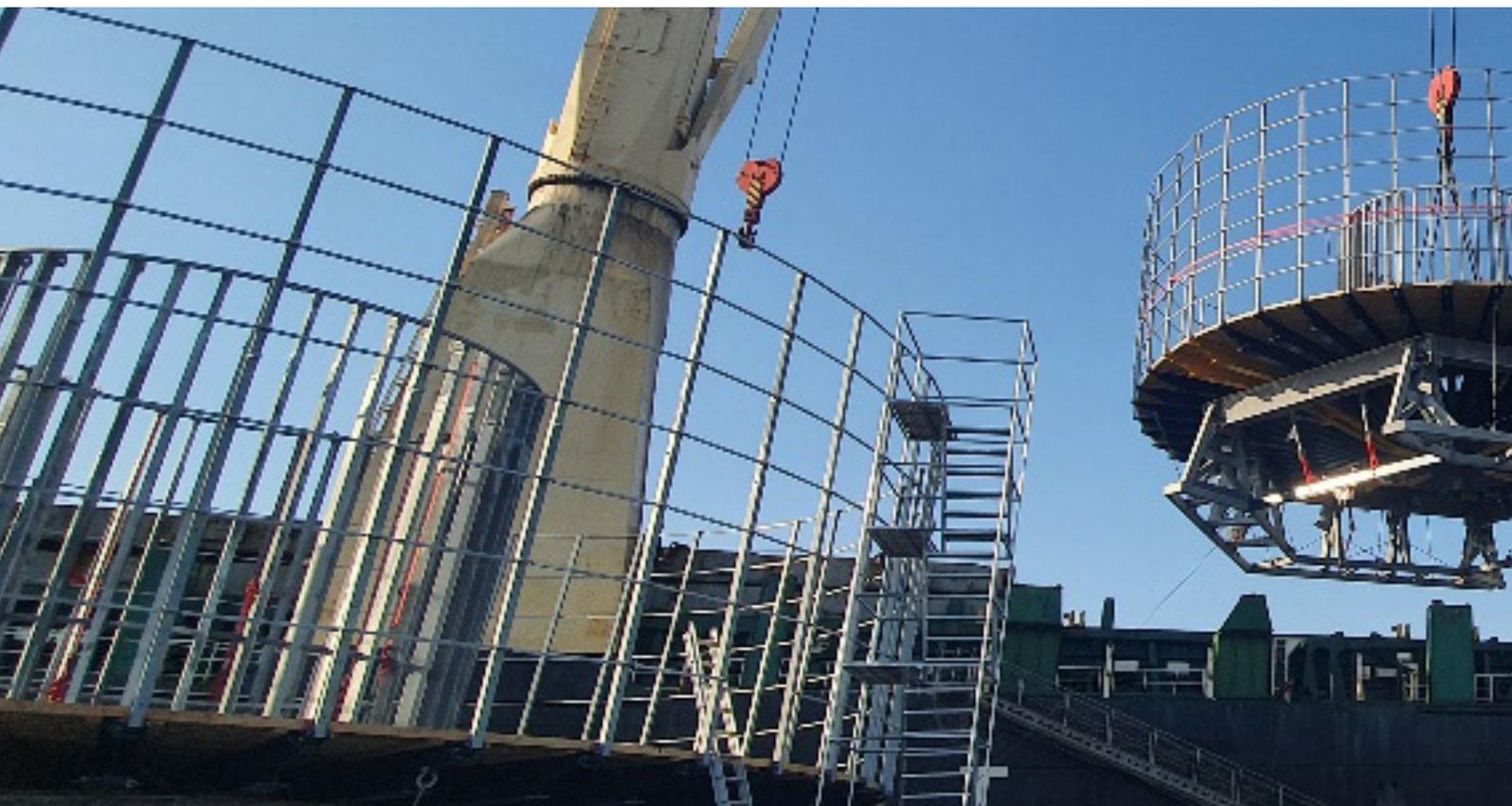
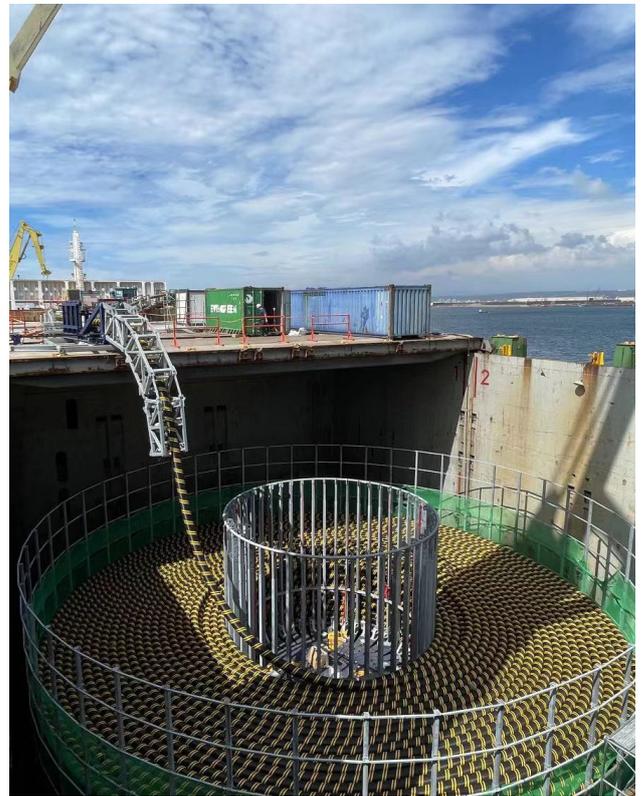
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Carousel Transport

The Greater Changhua Offshore Wind Farm (OWF), located approximately 35km - 60km offshore Changhua, near the coast of Taiwan, has a total power generation capacity of 2.4GW.

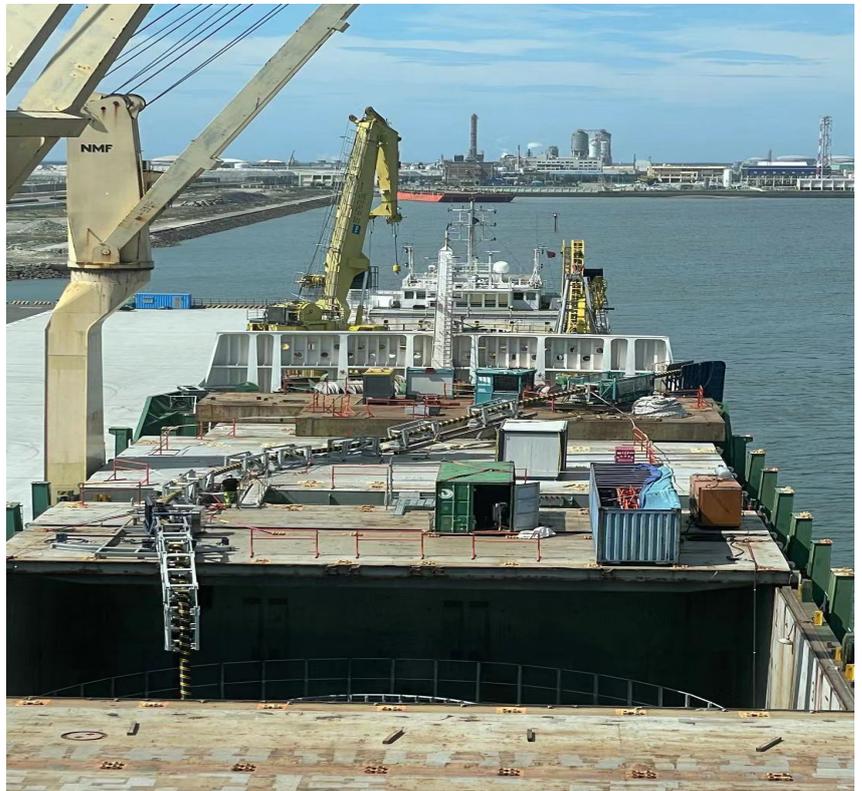
The project is split into Greater Changhua 1 and 2a wind farms with 900MW capacity. Greater Changhua 2b and 4 wind farms with 920MW capacity, with a future 600MW Greater Changhua 3 project planned for a later date. In 2019, the final investment decision (FID) on the Greater Changhua 1 and 2a was granted, with the FID for parts 2b and 4 anticipated in 2023.

The transportation of 92km of various weights and dimensions of cable was awarded to BBC Chartering, with a critical component of the transportation being the export cable installation. The total weight transported from the fabricator to the construction site weighed approximately 9.200 mt and was planned months in advance and executed over



consecutive voyages with the cable carousels stowed and secured under deck.

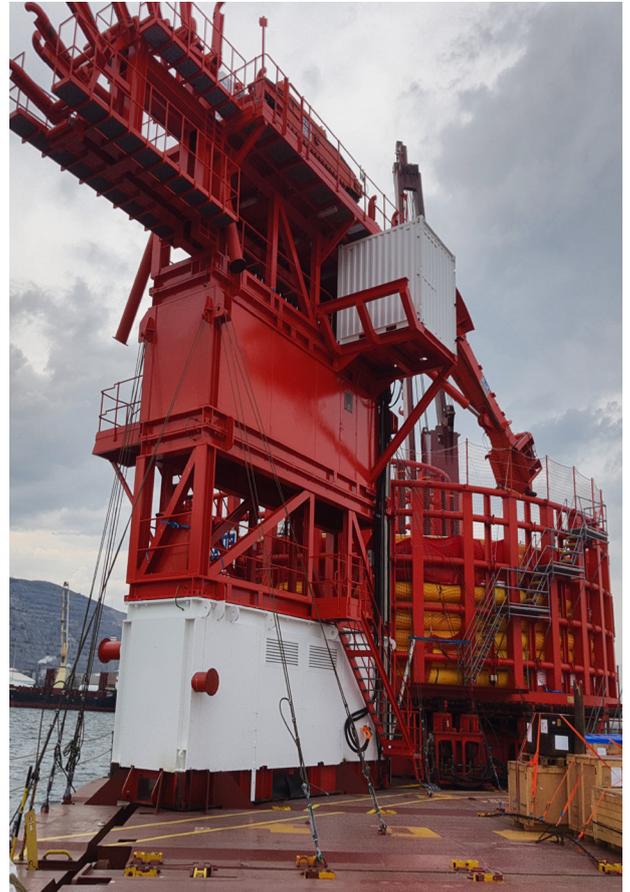
The project required intense engineering to allow the cable carousel with an outer diameter of 21m to be fully loaded with 2.500mt of product. Months of engineering and detailed planning were involved in stowing the carousels under deck to optimize and reduce the load spreading and simultaneously manage the on-deck spool track operation, to monitor the bending moments of the cable, along with the position of the vessel.



Carousel Transport

The Berri Field was discovered in 1964 and is located on and offshore the eastern coast of Saudi Arabia. The field has been delivering crude oil since 1970, and the Berri Gas Plant, the first in the Saudi Arabian 'Master Gas System,' has been in operation since 1977. As part of the Berri Increment Program (BIP), the Berri Field is being expanded by several new gas plants and facilities and 11 oil and offshore water platforms to double its crude production capacity to 500,000 barrels per day (bpd).

One crucial stage in the Berri Increment Program was the replacement of eleven pipelines in the Berri Field, in which the team at BBC Chartering played an integral part. Through intensive and thorough planning, the project team at BBC Chartering safely planned the mobilization and demobilization of one carousel with a diameter of 24m from Northern Europe to the Persian Gulf. The carousel accommodated 4.8km of a flexible pipeline safely transferred to the Installation Vessel in Port Khalid, United Arab Emirates.



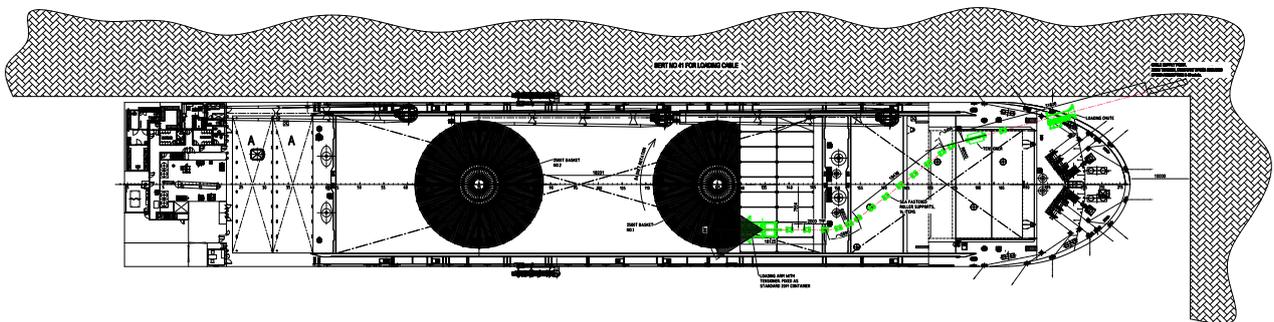
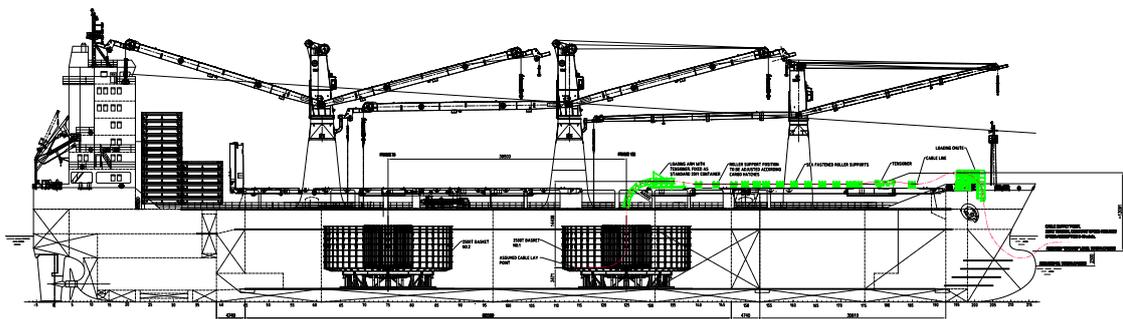
Due to the on-deck stowage requirements of the 24m diameter carousel, advanced front-end planning and engineering were required, along with precision positioning during stowage. Despite the laden weight of the carousel being approximately 1970mts, the project team developed a plan to keep load spreading costs to a minimum by utilizing the vessels two strengthened pontoons that have a capacity of up to 8.0mts/sqm each. Additional stanchions were installed in the vessel's tween deck to support the carousel and weather deck, to further reduce the bending moments of the carousel structure during mobilization and demobilization to the Berri Field.



Type 1

BBC-24-200A / BBC-31K-500A Type

5 sister vessel | 4.964mt dwt/ 31.651mt dwt | hold width of 23m
combined lifting capacity of 200/500mt

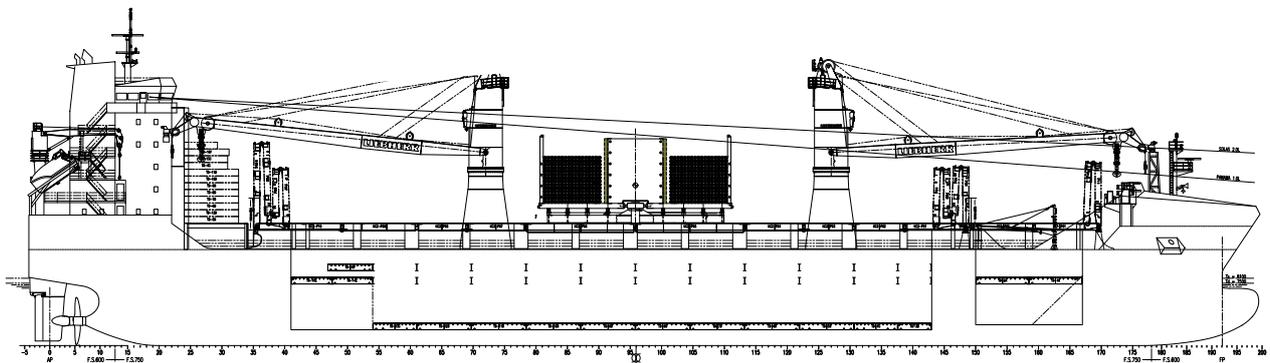


- the cargo hold arrangement and width of 23m allows the accommodation of 2 carousels of 22m diameter and related spooling towers
- the deck length allows the installation of tailor-made spool tracks and spooling operations via the bow section to Charterers tonnage or onshore facilities
- crane positions allow mobilization and spooling operation support

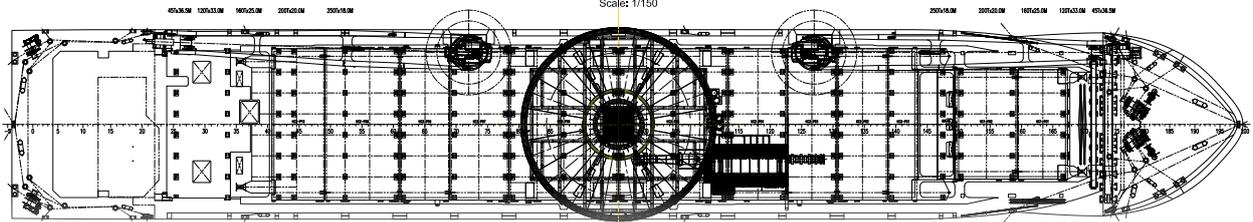
Type 2

BBC-12k-500A / BBC-12k-500B Type

4 sister vessels with additional 4 vessel to be delivered 2021-2022 | 12.400mts dwt
Hold width of 18,2m/vessel breadth 22,8m | combined lifting capacity of 500mt



STOWAGE PLAN
-Top View-
Scale: 1/150

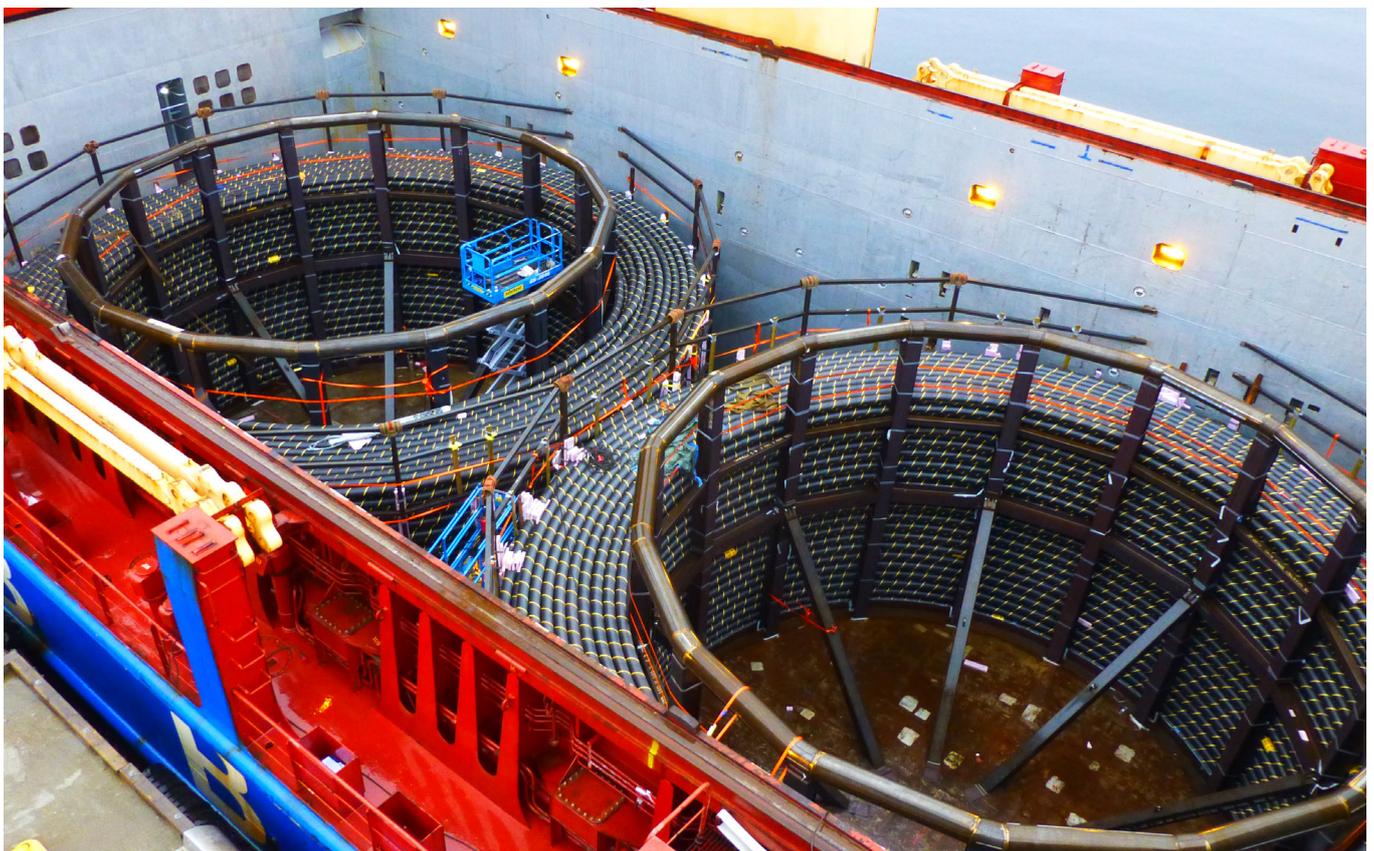
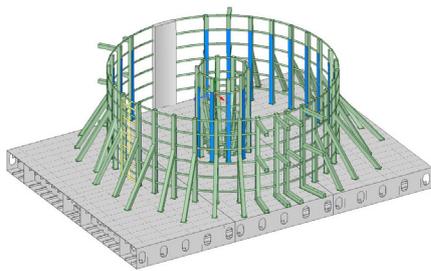


STOWAGE PLAN
-Foundation-
Scale: 1/150

- the two strengthened weather deck pontoons with a capacity of up to 8,0mts/sqm in between the cranes allow stowage of one large diameter carousel up to a certain weight and depending on the carousel's grillage design
- crane positions allow mobilization and spooling operation support

Carousel Transport - Impressions

BBC gained recognition over the last few years for our team's portfolio of experience and engineering expertise with cable tank transportation, offshore construction, and spooling operations, as well as Charterer's installation tonnage. Each project is well planned and organized in advance, executed to our client's satisfaction, and according to their strict health and safety requirements. It is worth noting that many of BBC Chartering's offshore projects are executed with our own proprietary engineering tank designs and technical solutions, which are adjusted to the individual cable sizes and related bending moments for each project.







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