

Feeder Barge Offshore Wind Insight

This report summarises the expected campaign durations and vessel costs for the installation of wind turbine generator (WTG) components at a hypothetical offshore wind farm off the east coast of the United States. The analysis assessed four jack-up

barge and feeder barge vessel strategies. The work was carried out using JBA's ForeCoast[®] Marine Design Desk software. The results presented demonstrate how project costs can be significantly reduced through the optimisation of vessel strategies.



Turbines

81



Capacity

1,053

MW total



Hub Height

150 m

Four vessel strategies were compared:

The first two strategies were based on the use of one or two standard jack-up barges. During installation, each feeder barge was positioned next to a jack-up barge. The components were transferred and installed with the feeder barge floating, therefore using a 'floating-to-fixed' approach. The average installation significant wave height threshold was 1.6 m. The day rate each of jack-up barge was United States Dollars (USD) 200,000/day.

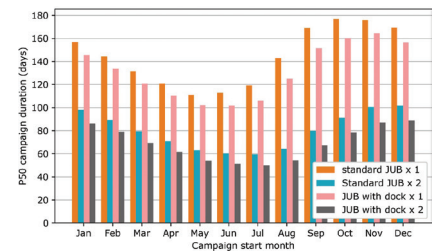
The second two strategies used one or two jack-up barges with a dock for a feeder barge. During installation, each feeder barge docked in a jack-up barge and was lifted out of the water, therefore using a 'fixed-to-fixed' approach. This resulted in fewer operations, at least 2.5 hours less time per installation and an increased average installation significant wave height threshold of 1.7 m. Due to the greater amount of technology required, the day rate of each jack-up barge was set as 10% higher than the standard one, i.e. USD 220,000/day.

N.B. Simulations were started at the beginning of each month. Each bar in the plots represents the expected cost/duration if the installation campaign starts in that month.

The findings shown are for illustrative purposes only and are based on a hypothetical case study.

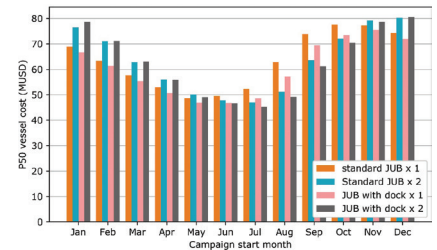
Campaign Durations

- Clear seasonal trend, with campaign durations typically two or more times in the winter than those in the summer.
- The use of two jack-up barges reduces the durations by up to two to three times.
- The use of the jack-up barges with a dock had typically 10 days lower campaign duration than for the standard jack-up barges, due to the former's improved operability.



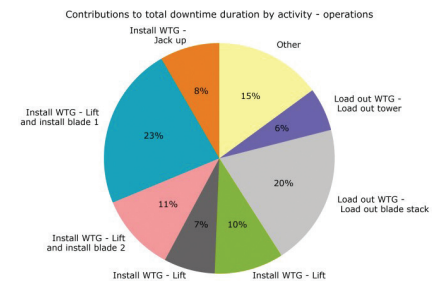
Vessel Costs

- Vessel costs across the year were million USD (MUSD) 45-81.
- The reduced campaign durations by using two jack-up barges resulted in lower vessel costs in the summer months compared to using one jack-up barge.
- Comparing the minimum values for each strategy, the lowest cost strategy was using two jack-up barges with docks, saving at least MUSD 3.5 compared to using the highest cost strategy of one standard jack-up barge.



Downtime Contributions

- This plot shows which operations contributed the most downtime for the lowest cost vessel strategy.
- This type of analysis can be used to further optimise the vessel strategies.



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