

ANALYSIS AND VERIFICATION OF MANUFACTURING AND ASSEMBLY SETUP FOR MODULAR JACKET OPTIONS

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ABSTRACT

Environmental issues, such as global warming and climate change lead to consideration by governments of the reduction of non-renewable energy as the conventional energy source. To achieve this goal, it is necessary to reduce the Levelized Cost of generating Electricity (LCOE) [1] of wind energy so it becomes competitive and attracts new investors. According to the industry's change in focus, offshore wind farms gradually take the place of onshore wind turbines, as they are capable to resolve the restriction of high population densities and capitalize the advantage of higher wind speeds, however, this option requires a larger investment.

The research and development project of i4Offshore aims for a solution that could capitalize on the advantages of reduced costs by large-scale manufacturing of offshore turbines by involving the whole value chain operate as an integrated consortium. Objectives contain topics like optimized modules for lean industrialized manufacturing, innovative manufacturing, and assembly solutions. Furthermore, the demonstration of cost competitive jacket assembly process. These and other similar challenges are forming the statement/aim of the present project.

In this project, the value chain of the current jacket and bucket production is analysed and reorganized. This indicates where improvement of, for instance logistics, manufacturing and/or assembly is possible. It is also considered that a change in the structural connection points can lead to more efficient assembly time. In terms of logistics, the current manufacturing and assembly at a rented harbour with rented cranes is expensive, having modularized pieces shipped by trucks just in time could be a great cost reduction. How expensive the project is, depends, for a great part, on the duration of the project. Since time is the main factor the manufacturing of single parts of the jackets needs to take place outside the harbour. The assembly time at high cost places needs to be reduced significantly. To achieve the goal of saving time, discrete event simulation tools are used to determine the time and price of each process.

Different manufacturing and assembly processes will be analysed in case studies to obtain the best solution for each process step. While analysing the process, there are no structural properties considered because of the limitation of changes in the process caused by the current structural solution.

A combination of the different concepts leads to a more cost-effective production. The solution includes several ways of production with differing efficiency, working for short and long term.

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REFERENCES

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