NUMERICAL AND EXPERIMENTAL STUDY OF MOORING SYSTEMS WITH CLUMP WEIGHTS FOR FLOATING WIND TURBINES

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Abstract

The exploitation of offshore wind energy is very promising economically but has also come with a significant technical challenge due to the increasing trend of placing wind turbines in deep waters. This implies that the length of the mooring lines, and therefore their weight and costs, increase considerably. Thus, optimizing the mooring lines is crucial for the demanded cost reduction of this growing technology, and for this purpose, an exhaustive and comprehensive study of their dynamics is necessary.

A reduction in motions allows the turbine to generate electricity over a broader range of sea states, and smaller motions reduce the tensions on the line and the associated costs. Therefore, the main objective of this research project is to reduce the loads to which the mooring lines are subjected and to minimize the motions of offshore wind turbine platforms.

Objectives

“Contribute to the development of comprehensive, and experimentally validated, computational tools for studying mooring lines that incorporate inertial elements such as clump weights along their length.”

Methodology

Experimental study VS. Numerical study … For every “zoom level”

Model tests at 1:10

Numerical simulations (CFD) with OpenFOAM

Model tests at 1:30

Implementation in the OPASS and MoorDyn codes

Model tests at 1:47

Numerical validation with OpenFAST and FASTfarm

Results

Publication JCR: [1]

Publication JCR: [2]


Planning

Publications and Conferences


References


Jornada de Presentación de Resultados Anuales 2022-2023 - Madrid (España) - 23 de mayo de 2024