



Contactless Position Control of Offshore Wind Turbines during the Installation

PhD candidate: Ir. Panagiota Atzampou
Section: Dynamics of Structures
Supervisor: Ir. P.C. Meijers
Promotor: Prof.dr. A.V. Metrikine
Co-Promotor: Dr.ir. A. Tsouvalas

Description:

Offshore wind turbine technology is an ascending method of harvesting wind energy to generate electricity. Despite the various applications and the technical knowledge gained through experience, it appears to be room for improvement and advancement especially in regards to the methods of installation and positioning. More specifically, the techniques and means used for the installation (jack-up vessels) have led to restrictions in the installation depth, the size of the turbine as well as to an increase of the total duration of the procedure and consequently to cost-ineffectiveness. Therefore, in order to tackle the aforementioned issues, an alternative installation/positioning method is proposed, namely by employing floating Heavy Lift Vessels (HLVs). These vessels have larger lifting capacities, can be used in deeper waters while enabling dynamic positioning, thus saving valuable time resulting in a cost reduction of the total installation. Furthermore, a contactless motion control technique is introduced, in order to substantially diminish the subsequent motion, to which the turbine's components are subjected by the dynamic positioning during the installation. This state-of-art technique involves the use of magnetic forces to counteract the displacement and rotation of the component, while these forces will be exerted through robotic arms supported directly by the vessel's deck.

Goal:

The aim of the research project is to develop a numerical model and a lab-scale prototype of a contactless system for the position control of the foundations and towers of XXL offshore wind turbines, while focusing on the coupled vessel and turbine motion obtained by both a numerical and a physical model, including the non-contact positioning system and control thereof.

Sponsors:



Contact Details:

E-mail: P.Atzampou@tudelft.nl
Phone: +31 (0)
Room: 3.36