Logistic Efficiencies And Naval architecture for Wind Installations with Novel Developments

Project acronym: LEANWIND
Grant agreement no 614020
Collaborative project
Start date: 01st December 2013
Duration: 4 years

Novel maintenance vessel, access systems and installation vessels design report. D.3.4

Lead Beneficiary:
Due date:
Delivery date:
Dissemination level:

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No. 614020.

Executive Summary

This WP focuses on the primary vessel types used for both windfarm installation and O&M operations with the ultimate goal of bringing cost and time savings to the sector through incorporation of technologinal innovations and tailoring the designs specifically to previously identified challenges of this industry.

The basis on which the initial ship design activities start is the mission profile described in D3.3 and also requirements and paramenters outlined in D3.2 report respectively.

This report is structured to reflect the logical sequence of steps and flow of information adopted in the ship design process which basically follows the design spiral methodology for developing ship designs.

This process begins with a set of initial project requirements (desires and needs in the vessel) with certain vessel parameters being quantified or least have target boundaries set. As ships are complex systems with highly inter-dependent variables, it becomes virtually impossible to calculate ship's parameters simultaneously. Therefore an iterative refinement is followed in order to converge towards an efficient design.

D3.4 describes what is called Preliminary Design. The three chosen concepts from D3.3 are taken through more rigorous analysis. Main particulars, initial lines plan, general arrangement, deck layouts, capacities, structural scantlings, propulsion systems and cargo handling tools amongst others are conceptualised.

Therefore the natural evolution along the design spiral starts from the mission profile (described previously in D3.3), following with a parametric analysis for the main dimensions and coefficients of form to derive a starting point for the hullform but also suitable deck cargo layouts which are the main driver for overall dimensions and deadweight requirements for this vessel type. On further spins of the design spiral, the hullform will be refined to minimise wasted volume and ensure adequate displacement. Any deficiencies of stability, resistance or arrangement will be corrected. Weights and centres estimations, hydrostatics and stability, and resistance and propulsion are all inter-linked design aspects which influence each other and must be balanced in order to arrive at an optimised design solution.

As the vessel designs start to take shape and more parameters are fixed, basic economic estimations are employed to justify the validity of main driving parameters such as cargo transported or transit speed amongst others. This is aslo useful to validate the feasibility of design aspects, and in turn may even create slight changes in the vessel design requirements.

As the initial design activities progress for the three chosen concepts, their mission profile starts to evolve into more concise preliminary vessel specification sheets.