Naval Architecture & Marine Engineering Department

Combined Offshore Wind Mill and Wave Turbine Converters for C lean Renewable Power Energy Source

Supervised
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Graduation Project

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Project's Abstract

In recent years, with more and more offshore wind farms being constructed, the possibility of integrating other marine renewables with offshore wind has arisen. This integration presents a number of advantages, including a better utilization of the marine space and lower installation costs relative to separate installations.
The main objective of this work is to analyses the integration of different WEC technologies into offshore windmills. More specifically, three technologies were considered: oscillating water column, oscillating body, and overtopping devices; of which three prototypes were designed to a preliminary level. Particular attention was paid to the windmill foundations and how they are affected by the installation of the WEC.

Design of a Plat Form Supply Vessel with Hydrofoil Bow Wings For Auxiliary Propulsion

Graduation Project
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Project's Abstract

Increasing fuel prices and environmental issues have been a driving force in the direction of exploiting clean and sustainable energy re-sources, one of which is, wave energy.

In this project, research has been conducted to investigate the potential benefits of employment of hydrofoil sections as an integral part of the ship hull. These will work as an auxiliary propulsion mechanism. The hydrofoils work as a wave energy converter to produce thrusting force in the longitudinal direction. Energy is extracted by exploiting vertical motions of the ship in waves, in particular heave and pitch motions.

In a case study, a 93m long, platform supply vessel is chosen to demonstrate results. Firstly, the hydrofoil section was selected and properly placed along the hull. Results were limited for regular head waves. Secondly, theoretical estimates were obtained for the vertical motions and the unsteady thrust generated by the hydrofoil. Conclusions were drawn for the percentage of fuel savings and the working domain for best performance i.e. wave frequency and amplitude. Recommendations into further research are also presented

Calculations were verified against published data in the literature and remarkable agreement was obtained.