

論文要旨

Summary of Dissertation

氏名 Name	Hasan Muhammad Sohail
論文題目 Title	Conceptual design of a concrete multi-column floating platform supporting a 10 MW offshore wind turbine
和訳	10 MW 級洋上発電用風車を支持するコンクリート製多柱式セミサブ型浮体の概念設計
<p>This thesis aims to design a concrete semi-submersible floating structure for a 10 MW wind turbine using precast panel-based concrete, i.e., a concrete floating offshore wind turbine (FOWT), using a parametric hull design methodology and optimization. The design was applied by considering different parameters, such as main floater dimensions, the thickness of the concrete panels, heave plate dimensions, the draft of the platform, and the thick concrete portion at the connecting part between the concrete floater and steel tower. Preliminary structural design has been done based on static load conditions. Environmental conditions of waves and wind were selected from the Japanese coast to analyze the dynamic behavior of the proposed concrete semi-submersible floater in waves and wind. A parametric hull design methodology was conducted based on some restrictions to generate feasible cases and to select the potential best solutions through a Pareto curve. The Pareto curve was created by minimizing the nacelle's acceleration and the platform's structural mass. WAMIT and OpenFAST were used to calculate the hydrodynamic behavior and the coupled analysis. A detailed comparison was presented for three cases; moreover, a best potential case was proposed as a final option. This thesis successfully illustrated the hydrostatic, hydrodynamic and aerodynamic behavior to confirm the feasibility of this new concept of a concrete floater for 10 MW FOWT.</p>	