Hydrodynamic Analysis of Spar buoyancy Platform for Floating Vertical Axis Wind Turbine in Shallow Water

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Abstract

In this paper, we discuss hydrodynamic analysis on the three different design of spar buoyancy platform utilise for floating vertical axis wind turbine. The design of experiment carried out withg Ansys Aqwa software to determine the minimum ballast weight , length, and diameter of spar platform .The hydrodynamic analysis is performed to determine the lower center of gravity and maximum positive metacentric height to ensure maximum stability of floating spar buoyancy platform .The analytical calculations are performed to determine reserve buoyancy and turning moment of the spar floating platform under wind and wave loading. The graph obtained from Hydrodynamic diffraction amplitude and phase of the structure response are investigated for change in diameter of spar, ballast weight and draft .The behavior of floating spar platform is investigated with the change in wave direction, frequency and both direction and frequency. The angle between wind and wave directions applied to floater is analyses for Pitch, Roll and Yaw motions. The Ansys software's used for stability analysis is discussed along with their major considerations and accuracy of results with analytical results.

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