

Assessment of the Effect of Wind Turbulence on the Aero-Hydrodynamic Behavior of Offshore Wind Turbines

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Abstract : The aim of this study is to investigate the amount of wind turbulence on the aero hydrodynamic behavior of offshore wind turbines with a monopile holder platform. Since in the sea, the wind turbine structures are under water and structures interactions, the dynamic analysis has been conducted under combined wind and wave loading. The offshore wind turbines have been investigated undertow models of normal and severe wind turbulence, and the results of this study show that the amplitude of fluctuation of dynamic response of structures including thrust force and base shear force of structures is increased with increasing the amount of wind turbulence, and this increase is not necessarily observed in the mean values of responses. Therefore, conducting the dynamic analysis is inevitable in order to observe the effect of wind turbulence on the structures' response.

Keywords : offshore wind turbine, wind turbulence, structural vibration, aero-hydro dynamic

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