

### 3MW 해상풍력발전기 기초구조물 설계

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#### Design of Substructure for 3MW Offshore Wind Turbine Demonstrator Project

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The 3MW OWEC demonstrator project in Korea will be the first offshore wind project with Korean turbine, Doosan WinDS3000, and constructed on the north-eastern sea of Jeju Island as the water depth of 15m. Integrated loadings of wind and wave are investigated to describe a design loads for both extreme and fatigue conditions using GH-Bladed. A dynamic behaviour of substructure strongly affects a substructure loadings. The jacket structure is designed in accordance with DNV guidelines. The results of this paper show overall design process of offshore substructure as a complex jacket concept and this design process can be implemented on a design of monopile and tripod structures.

**Key words** : OWEC(해상풍력발전기), Jacket(자켓), Offshore substructure(해상기초구조물), Integrated analysis(통합 해석)

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### 풍력발전용 하이브리드 타워 경제성 및 하중영향 분석

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#### Analysis of economy and load effect of hybrid tower for wind turbine

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With the development of wind industry, the rated power of wind turbine also increase gradually. Accordingly, the size of wind turbine tower becomes larger and larger. The tower base diameter of 2MW wind turbine is about 4m. Larger tower is expected for 4MW or 5MW turbine. Due to limitation of transportation, new type of tower with smooth transportation and effective cost is needed. In this work, a hybrid tower consisting of steel and concrete is designed and analyzed. The optimum ratio of steel and concrete of hybrid tower are calculated as well as the thickness of the concrete part. Different FE analysis including modal analysis, buckling analysis and fatigue analysis are performed to check the design of hybrid tower comparing with the steel tower. Redesign is also expected after various analysis.

**Key words** : Hybrid tower(하이브리드 타워), Wind turbine tower(풍력발전기 타워), Steel-concrete(스틸-콘크리트), Design load case(설계하중조건), Extreme load(극한하중)

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