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離岸風機單樁基礎支撐結構簡化分析模式

Simplified analysis model of monopile sub-structures for offshore WTG

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摘要

風力發電為國際再生能源發展的主流，離岸風電於過去十年間成長相當迅速。以目前固定式基礎之風機型式，國際案例七成以上採單樁基礎，累積之設計與施工經驗亦最為豐富，故其成本估算亦較為精確。本文由風機單樁基礎與支撐結構分析設計，藉簡化力學分析模式，考量環境載重、支撐結構動力分析、材料疲勞特性與規範應力檢覈等條件，建立以材料重量為基礎之成本估算模式，除可提供風場開發基礎概念設計參考外，並可提供風場開發設計初期估算投資成本之依據。

關鍵詞：離岸風機、單樁基礎、簡化分析模式。

Abstract

Wind power has been the mainstream of the development of renewable energy. The development of offshore wind was increased significantly in the last decay. Monopile foundation has been adopted over 70% in the bottom-fixed foundations worldwide for offshore TWG that leads to accumulate considerable experience not only on engineering design and construction but also on the accuracy of cost estimation. In this paper, the simplified analysis model of monopile foundation is proposed considering environmental loading, structure dynamics, fatigue loading and allowable stress check. According to the simplified analysis model, the cost estimation model can be further developed to provide the useful reference on the estimation of the capital expenditure for offshore wind farm development.

Keywords: offshore wind turbine generator, monopile, simplified analysis model.