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離岸風機水下椿柱土壤之非破壞性檢測方法
Method for non-destructive inspection of offshore substructure foundation affected by seabed

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摘要

　　為了減少對化石能源進口需求的依賴，我國開始積極發展綠能，離岸風電即為政府發展的項目之一。本研究計畫主要係探討風機椿柱在水面下之週遭土壤狀況的非破壞性檢測。其目的在於能藉由風機轉子所造成的基椿振動訊號，判別出椿柱周圍土壤已產生破壞之位置。本研究重建出實驗室尺度的基椿縮尺模型及其周遭環境，經由量測及雙譜轉換椿柱取得之振動訊號及其特徵來進行類神經網路的訓練，進而藉由此系統判別出土壤可能的破壞的方位。計畫目標在於提供一有效率之判別系統，即時發現椿柱土壤產生的損傷，予以加強補救，降低所需之成本與開銷，並期望能提升風機產業技術實力，帶動產業發展。

關鍵詞：離岸風力發電、非破壞性檢測、雙譜分析、類神經網路

Abstract

　　To reduce the reliance of the import of fossil energy sources, our country began to develop green energy actively. Offshore wind turbine is one of the projects which is developed by the government. In this research paper, we focus on non-destructive testing (NDT) of the wind-turbine pile soil. By using the vibrational signal generated from rotor ,the location of damaged pile soil can be detected .In this experiment, first, we rebuilt the small-scale structure and its surrounding environment, then obtain the characteristics of vibrational signal by bispectrum analysis and use it to train the artificial neural network system, then we can learn the damaged location by above mentioned system .The objective of this experiment is to provide an effective identification methodology to reduce the associated cost and upgrade technology.

Keywords: Offshore Wind Turbine, Non-Destructive Test, Bispectrum Analysis, Neural Network