NEPII_14
應用無線傳輸於風機葉片損壞監測系統之研究
Health Monitoring of a Wind Turbine Blade Using FBG Sensors with Wireless Communication

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摘要

本研究主要為發展無線傳輸技術應用於風機葉片損壞監測，使用布拉格光纖光柵(Fiber Bragg Grating, FBG)感測器，作為即時監測風機葉片承受風力負載之應力應變狀態及相關傳輸預警機制建立，實驗過程於風機葉片上鋪設光纖光柵感測器，並透過光纖與光纖掃描儀(Interrogator)作連接，光纖光柵所監測到之風機葉片應力應變相關數據資料，將透過 Wi-Fi 傳輸技術作資料連結接收，以即時監測風力發電機葉片之安全性。研究結果顯示整合光纖光柵感測器與 Wi-Fi 無線傳輸技術，應用於風機葉片損壞監測是可行的，未來擬實際應用於全尺寸風機葉片之無線傳輸安全性監測。

關鍵詞：光纖光柵、葉片監測、無線傳輸。

Abstract

The aim of this study is to develop health monitoring system for a large offshore wind turbine by using Fiber Bragg Grating (FBG) sensors with wireless communication. Structural health monitoring is critical to improve the reliability of offshore wind turbine. A health monitoring technology was developed that utilizes FBG sensors and Wi-Fi wireless communication as timely emergency surveillance system. Compared with conventional sensor monitoring system, such FBG sensors are considered as a proper sensing system for the health monitoring of a large wind turbine. This study reliable health monitoring technique can be applied to the offshore wind blade, submarine, building and bridge deformation monitoring for further advanced usage.

Keywords: Wind Turbine Blade, FBG Sensor, Wiressless Communication.