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永傳能源福海風場離岸測風塔風況特性及與 IEC 61400 標準風況模型之比較研究

Wind Characteristics Studies of Fuhai Offshore Wind Mast of Taiwan Generations Corporation and its Comparison with Normal Wind Conditions in IEC 61400

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摘要

風況特性對於風力發電機的建造及運作有相當深遠的影響，而 IEC 61400-1 國際標準所提及之標準風況模型(Normal Wind Conditions)是一般風機設計建造的重要參考依據，其中有三大比較項目:風速廓線(wind profile)、風速分布(wind speed distribution)及標準紊流模型（Normal Turbulence Model, NTM）。本研究利用永傳能源福海風場離岸測風塔 86 公尺高度位置所收集風況資料進行分析，並與 IEC 61400-1 國際標準風況模型所建議之各項參數值相比較。主要分析比較台灣東北季風影響期間，福海風場離岸測風塔 86m 高度風速在 15m/s 上下之風況，研究結果發現台灣福海離岸風場實際風切變指數平均值為 0.0688，與 IEC 61400-1 國際標準風況模型風切變指數參考值 0.14 相比是偏小，且台灣福海離岸風場紊流風況與 IEC 標準紊流模型的建議參數值並不相同，最後希望藉由本研究結果對於台灣西部離岸風況特性之建立與深入瞭解，以提供未來架設離岸風力發電風場運轉及維護的參考依據。

關鍵詞：標準風速模型、風速廓線、風切變指數、標準紊流模型、韋伯分布。

Abstract

Wind conditions have far-reaching impacts on establishing and operating wind turbines. Normal wind conditions mentioned in the international standard IEC 61400-1 are important references for designing wind turbines. There are three major items for comparing including wind profile, wind speed distribution and Normal Turbulence Model (NTM). Current research focuses on analyzing wind data at 86 meter height from Fuhai offshore wind mast of Taiwan Generations Corporation and compares wind data with the international standard IEC 61400-1. First, wind conditions with wind speed around 15 m/s during north-east monsoon period are analyzed. The results show that average of wind shear exponent parameter is 0.0688 which is lower than the suggested value 0.14 by international standard IEC 61400-1, and wind turbulence characteristics from Fuhai offshore wind data is also not the same as NTM suggested by international standard IEC 61400-1. Finally, this research is expected to establish and understand Taiwan offshore wind conditions which can be an important reference for future operation and maintenance of the offshore windfarm in Taiwan.

Keywords: Wind profile, Wind shear exponent, Normal Turbulence Model