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離岸風場海事施工作業安全之評估

— 以「台電彰化海氣象觀測塔新建工程」為例

Assessment of the Operation Safety of Marine Construction—A Case Study of the Met Mast Installation of Taipower's Changhua Offshore Windfarm

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摘要

為達能源永續，各國均積極投入綠色能源之開發，台灣得天獨厚之地理環境，具有可觀的風力資源，惟陸域風能之開發受限於嚴峻地形，反觀海域風能仍蘊含豐富且尚未開發；然台灣卻鮮少有離岸海事工程之施工經驗，加上施工風險較高，以致減緩離岸海事工程本土化之落實及海域風能之發展。

本研究以海事工程作業安全為研究主軸，針對離岸風場海事施工作業安全進行分析探討。藉由離岸風電海事工程先進國家之相關作業準則綱要之研析，並針對海上施工可借鏡之內容，納入研擬離岸風場海事工程施工安全作業準則之參考。同時，調查國內營建及海事工程初步危害分析、施工災害初步分析成果，歸納適用於離岸風電海事工程之主要作業項目與施工方法。同時，以105年年初完工之「台電彰化離岸風力發電計畫-南區海氣象觀測塔新建工程」為例，針對海上運輸、吊裝、打樁、防沖刷、灌漿及水下防蝕等實務經驗，綜整離岸風電海事工程施工安全作業準則之內容，期供未來國內離岸風場海事工程之參考。

關鍵詞：綠色能源、離岸風場、海事工程、施工安全、海氣象觀測塔。

Abstract

Countries have been devoted to the development of green energy to reach the goal of energy sustainability. Taiwan has high potential of wind resources due to its special geographical environment. The development of onshore wind energy source is restricted by adverse topographic circumstance, but the offshore wind energy source has been rich and undeveloped. However, construction companies in Taiwan have extremely less experience in offshore marine works and are concerned about higher working risks. The localization of offshore marine construction and development of wind energy source have slowed consequently.

This study aims to research principally on the operation safety of offshore marine construction and to systematically analyze the operation safety of marine construction for offshore windfarm. By the analysis of offshore windfarm operating guidelines in developed countries, the relevant experience in marine construction for reference to the guideline of marine construction for offshore windfarm was evaluated. Meanwhile, by investigating former achievements about “Preliminary Hazard Analysis” and “Preliminary Analysis of the Construction of Disaster” of marine construction in Taiwan, we found adaptable information for main working items and methodologies of offshore marine construction. Meanwhile, with referring to the project “The Met Mast Installation of Taipower's Changhua Offshore Windfarm”, practical experience especially in marine transportation, lift installation, pile installation, anti-scour devices installation, concrete pouring, and anti-corrosion underwater could moderately feedback to this research. From this study results, it can make some contribution to the future offshore windfarm marine engineering and construction in Taiwan.

Keywords: green energy, offshore windfarm, marine engineering, operation safety, met mast.