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### 電路系統腐蝕監控儀於離岸風機塗層之應用

# The Development of Corrosion Monitoring Technique on the Coating of Offshore Wind Turbines

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## 摘要

台灣為一個位於亞熱帶，四面環海的海島型國家。其高溫高濕的環境使離岸風機面臨到使用過程中材料腐蝕劣化的問題。材料腐蝕的發生將大幅度降低離岸風機之壽命與及安全性。因此離岸風力發電機組的腐蝕保護設施的可靠性要求必須更高，同時，保護設施破壞的塗層腐蝕監控技術建立也顯得十分重要。本研究將自行開發電路系統腐蝕量測儀(Coating Circuit System, CCS)，藉由量測材料的電化學阻抗性質，評估防蝕塗層之抗蝕性並觀察塗層浸置於腐蝕環境中之劣化行為。實驗過程中量測之數據將與恆電位儀(Potentiostat)以及商業化之腐蝕監測儀(Coating Health Monitor, CHM)進行三方比較，評估三種系統應用於離岸風機防蝕塗層之腐蝕監控系統上之優勢與劣勢。研究結果顯示針對商用塗層進行交流阻抗(108 歐姆~1010 歐姆)進行量測時，電路系統腐蝕量測儀的準確性可與恆電位儀之量測數據相比擬，相較之下商用腐蝕監測儀並無法量測到高交流阻抗數值。此外，電路系統腐蝕量測儀也在實驗中顯現出能即時監控塗層阻抗值下降的能力。

關鍵詞：腐蝕監控、電化學、交流阻抗、離岸風機

## Abstract

In this research, a new measuring system, Coating Circuit System (CCS), has been developed to measure the impedance value of various coatings. The accuracy of this new system has been tested and verified, and all the results are compared with those measured by Gamry ref 600 potentiostat and commercial Coating Health Monitor (CHM). The preliminary results show that CCS can obtain almost the same impedance value of coating evaluated by Gamry ref 600 potentiostat when a high impedance value coating systems (about 108 ohms to 1010 ohms) were measured. In contrast, CHM could not have the same results. Furthermore, CCS can also monitor the decrease of impedance value when the coating started degrading.

**Keywords:** Corrosion monitor ,Electrochemistry ,EIS, Offshore wind turbine