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實海域測試平台建置與旺級黑潮發電先導機組掛載測試

Evaluation of test platform in the open sea and mounting test of KW Kuroshio power-generating pilot facilities

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摘要

臺灣高度能源進口依賴，發展可再生能源是增進國家永續發展重要策略，臺灣海洋立國，並擁有得天獨厚的洋流能發展潛力，國立成功大學水工試驗所與萬機鋼鐵公司合作於2015年初進行洋流能50kW單元發電機組船拖測試，在1.43m/s相對流速下能產出32.57kW之平均發電功率，本年度計畫由成大水工所主導深海繫泊基座浮台系統建置，環境流速監測和發電系統分析，萬機公司負責50kW單元發電機組掛載測試。本團隊於黑潮0.45m/sec之流速下啟動渦輪機，並連續運轉達60小時，在黑潮1.27m/sec之流速下，其平均發電功率為26.31kW，為成功利用黑潮擷取能源之世界首例。本文介紹深海繫泊基座與多功能浮式載台的設計、製作與海上施工過程以及50kW單元發電機組掛載測試成果。

關鍵詞：再生能源、洋流發電、黑潮、實海域測試、錨碇系統。

Abstract

Taiwan is an ocean country and has high potential of ocean current energy. It is imperative to develop political strategy of renewable energy for Taiwan that lacks energy resources and highly depends on import. In 2015, Tainan hydraulic laboratory (THL) collaborated with Wanchi company to conduct towing test of 50kW Kuroshio ocean current power-energy pilot facilities. During towing test, an average value of 32.57kW had been reached at the current speed of 1.43m/s. This year it was led by Tainan hydraulic laboratory to build deep water mooring system and test platform, scan environmental current speed and evaluate generating power. Wanchi company was in charge of mounting test in open water. The turbine of the 50 kW Kuroshio Power-energy Pilot Facilities was triggered at the minimum current speed 0.45m/s and ran 60 hours continually afterwards. An average value of 26.31kW had been reached at the current speed of 1.27m/s. This is the first test to convert the Kuroshio current to electrical power by using the 50 kW Kuroshio Power-energy Pilot Facilities, which was made by the Wan-Chi steel company. This study introduces procedure of building mooring system and test platform, then shows the performance of test result.

Keywords: renewable energy; ocean current energy; Kuroshio; field test; mooring system.