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離岸施工運維決策支援系統建置
The Establishment of Offshore Operation Decision Support System

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摘要

工研院綠能所發展離岸施工風險評估技術，利用短期海氣象機率性預報及長期氣候窗統計，結合各項海域施工特性及限制、船隻租賃動員費用等，來計算離岸作業執行機率及成本估算，得到海上施工整體的風險機率，以做為決策判斷之依據。離岸施工運維決策支援系統架構在現有的海氣象模擬技術與中央氣象局的合作管道上，取得與建立關鍵機率性預報資訊，結合web-based 三維地理資訊系統與使用者介面，即時算出離岸施工的起訖時間機率分布，可進而估算出完工日期及作業成本。現階段已完成系統雛形建置包括系集資料讀取功能、三維地理資訊展示功能、浪高風速、日光篩選條件及連續作業時數設定、條件因子開關、蒙地卡羅模擬運算、分析結果展示與繪圖、以及即時海氣象觀測資料展示等。本文最後說明後續工作規劃。

關鍵詞：離岸作業、決策支援系統、海氣象系集預報、風險評估、蒙地卡羅方法

Abstract

Green Energy and Environment Research Laboratories, ITRI is developing an offshore operation risk assessment technology, using short-term metocean forecasting and long-term weather window statistics, combined with the offshore construction restrictions and vessel rental costs, to calculate the offshore construction execution probability and construction cost estimation for decision-making. Offshore Operation Decision Support System (OODSS) was established with the architecture of the existing metocean simulation technology and the cooperation with the Central Weather Bureau to obtain and establish key probability prediction information, further combined with web-based three-dimensional geographic information system (GIS) and user interface, the probability of the execution of offshore operation and the related cost can be calculated. Currently the system prototype was completed includes ensemble simulation data input, three-dimensional GIS display, wave height, wind speed, daylight criteria, continuous operating hours, and Monte Carlo simulation amount setting, and the analysis results display and charting. The real time meteorological observations with statistic data of related stations can also be displayed. This paper concludes with a follow-up work plan.

Keywords: offshore operation, decision support system, ensemble forecasts, risk analysis, Monte Carlo method