

# 離岸風機及支撐結構設計驗證及工程技術建立

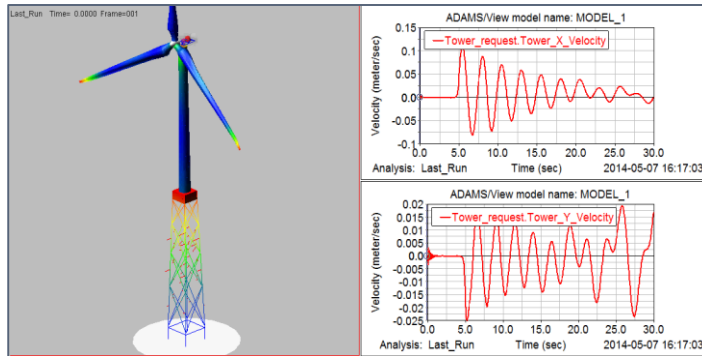
執行單位

行政院原子能委員會核能研究所

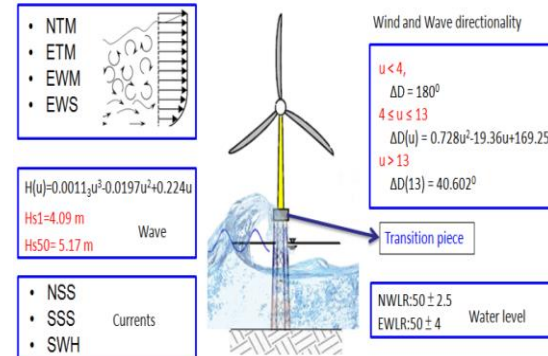
計畫主持人

黃金城

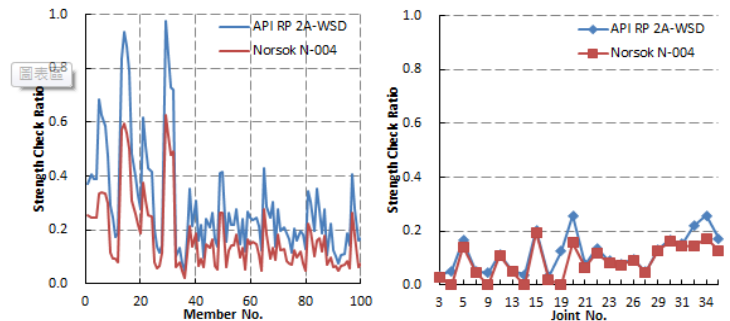
- 本計畫考量國內特殊極端環境，建置離岸風機及支撐結構整合之動態載重設計分析技術，涵蓋颱風、海波流及地震效應之影響，建立自主化的離岸風機及支撐結構設計驗證與工程技術能力，以確保國內未來離岸風機設計及運轉的安全、性能與可靠性。



離岸風機整合動態負載模擬



離岸風機及支撐結構極限負載分析



不同法規的檢核比較

- **計畫總目標：** 建立國內自主化離岸風機及支撐結構設計驗證與工程技術，以提供未來國內離岸風機及支撐結構設計、驗證、測試及施工之參考。

- **技術介紹：**

引進國際能源署(IEA)所完成之國際合作計畫 OC3與OC4 的研究成果。建立國內特殊極端環境適用之5MW參考離岸風機及支撐結構整合動態設計分析技術為目標，可應用於主管機關之技術標準研訂、審核及產業界之離岸風機設計與驗證。

- **計畫成果：**

- a) 完成建立本土化5MW參考離岸風機及支撐結構整合動態設計分析及驗證技術，並據以涵蓋本土極端環境之影響。
- b) 考量彰化外海離岸示範風場場址相關本土環境條件及極端條件如颱風及地震之影響，進行5MW參考離岸風機及桁架式支撐結構動態負載分析及強度檢核。

- **國際合作：**

透過本所與德國斯圖加特大學SWE共同合作，建立及精進國內離岸風機及支撐結構設計驗證技術。

# Technology development for design certification and engineering for offshore wind turbine and its support structure

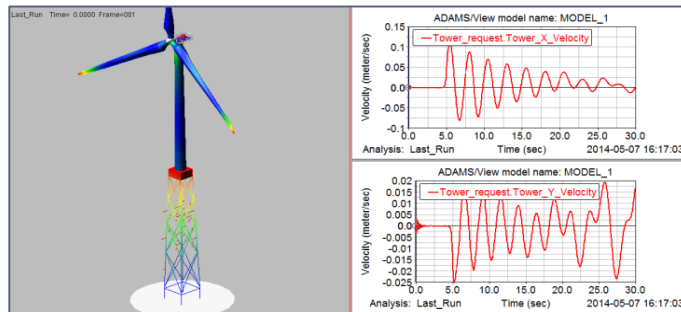
Execution Unit

Institute of Nuclear Energy Research  
Atomic Energy Council, Executive Yuan

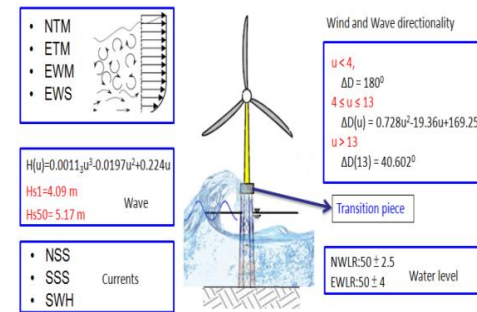
Project Director

Huang, Chin-Cheng

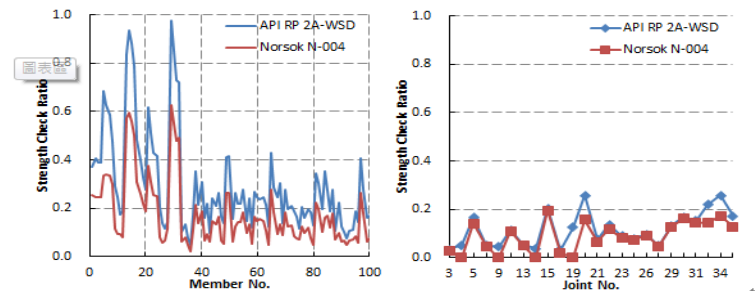
- This project aims to account for extreme external conditions on calculations of dynamic loads for offshore wind turbines. With the technology development for design certification and engineering of offshore wind turbines and its support structure, the safety, performance and reliability of our offshore wind program can be ensured.



Integrated Dynamic Load Simulation of Offshore Wind Turbines



Extreme Load Analysis of Offshore Wind Turbines and Support Structures



Comparison of API and Norsok code

- **Overall objectives** : Outcomes of this project have developed the technology of domestic design certification and engineering for offshore wind turbine with support structure, and will be helpful for design, certification, testing and construction of support structures and foundations of offshore wind turbines.
- **Technical Introduction** :

This project primarily introduces technical information of the international collaborative programs OC3/OC4 of International Energy Agency(IEA) into Taiwan. The goal is to build the integrated dynamic analysis technology of 5MW reference wind turbine and support structure for adopting the domestic specific environment. The result can be applied to the technical standard development of competent authority and also applied to the offshore wind turbine design verification of industry.
- **Project Results** :
  - a) Achieving to set up the integrated dynamic load analysis and verification including the effect of domestic extreme environment.
  - b) Based on the relevant environmental data and geological conditions of offshore wind power demonstration site in Changhua, including the effects of typhoon and earthquake, this project has carried out the dynamic loading analysis and strength check of 5 MW offshore wind turbine and local jacket-type support structure.
- **International Corporation** :

Develop and strengthen the design verification of domestic offshore wind turbine and support structure by cooperating with Stuttgart Wind Energy (SWE), Germany.