

## **DYNAMIC CHARACTERISTICS OF THREE DIFFERENT TLP'S SUPPORTING 5-MW WIND TURBINES UNDER MULTI-DIRECTIONAL RANDOM AND REGULAR WAVES**

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### **ABSTRACT**

Over recent years the offshore wind turbines are becoming more feasible solution to the energy problem, which is crucial for Egypt. In this article a three floating support structure, tension leg platform types (TLP), for 5-MW wind turbine have been considered. The dynamic behavior of a triangular, square, and pentagon TLP configurations under multi-directional regular and random waves have been investigated. The environmental loads have been considered according to the Egyptian Metrological Authority records in northern Red sea zone. The dynamic analysis were carried out using ANSYS-AQWA a finite element analysis software, FAST a wind turbine dynamic software, and MATLAB software. Investigation results give a better understanding of dynamical behavior and stability of the floating wind turbines. Results include time history, Power Spectrum densities (PSD's), and plan stability for all configurations.

**KEYWORDS:** Dynamic Response, Offshore Wind Turbines, Tension Leg Platform, Wave Forces