

# PERFORMANCE OF FLOATING TWO BODY WAVE ENERGY CONVERTER WITH LINEAR AND HYDRAULIC PTO SYSTEMS

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The axisymmetric floating two-body wave energy converter (WEC) consists of a floating buoy torus and a deep float which is submerged and anchored to the sea-floor using a mooring system[1-2]. Figure 1 shows the schematic of the floating two body WEC. The torus and the float are connected to a power take-off (PTO) unit that converts the relative motion between the two bodies into electrical energy. Thus, the PTO unit affects the performance of the WEC and needs to be optimized for different sea state conditions.

The objective of the current study is to understand the dynamic coupling between the wave energy converter and two PTO systems namely, linear and hydraulic. The linear PTO system is modeled using a spring-mass-damper system, whereas the hydraulic PTO system is modeled as a constant pressure system. The hydrodynamic properties, added mass and damping coefficient, for the floating two body wave energy converter are calculated using boundary element method code WAMIT. The time domain multi-body dynamics of the wave energy converter is studied using WEC-Sim. The performance of wave energy converter is evaluated for linear PTO system with damping coefficient and spring stiffness as 8 MN/(m/s) and 0 N/m respectively. For the hydraulic system, the accumulator pressure difference is maintained at 15 MPa. The performance parameters heave response amplitude operator (RAO), and power matrix is evaluated for varies sea state conditions. Figure 2 shows the heave RAO for WEC with linear PTO system. The study will also be extended to understand the performance of floating two-body wave energy converter with a constant pressure hydraulic PTO system.

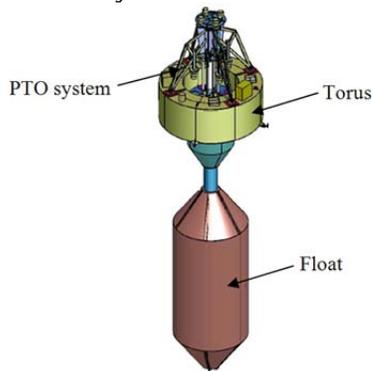


FIGURE 1. SCHEMATIC OF FLOATING TWO BODY WAVE ENERGY CONVERTER[1]

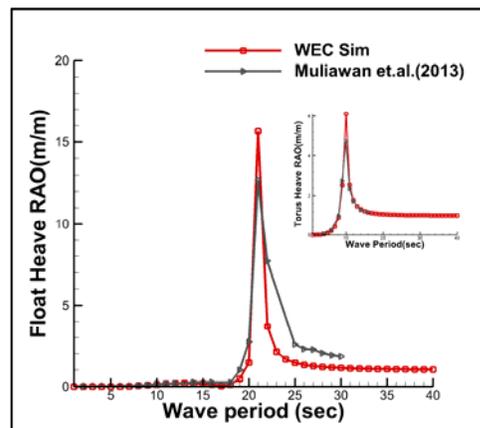


FIGURE 2. HEAVE RESPONSE OF FLOATING TWO BODY WAVE ENERGY CONVERTER

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**REFERENCES**

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