

Hydrodynamic Characterization of a 2D Pitching WEC

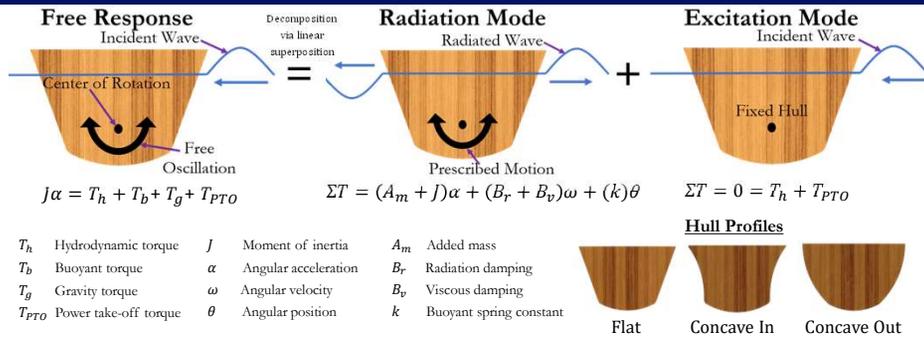
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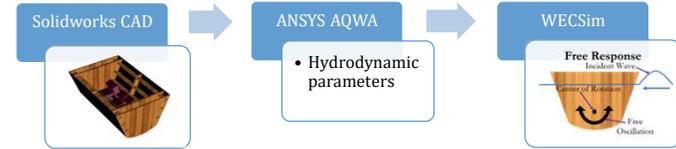
Scope

Investigate how WEC hull geometry affects interactions with incident waves by characterizing hydrodynamic coefficients and pitch response through simulation and physical experiments.

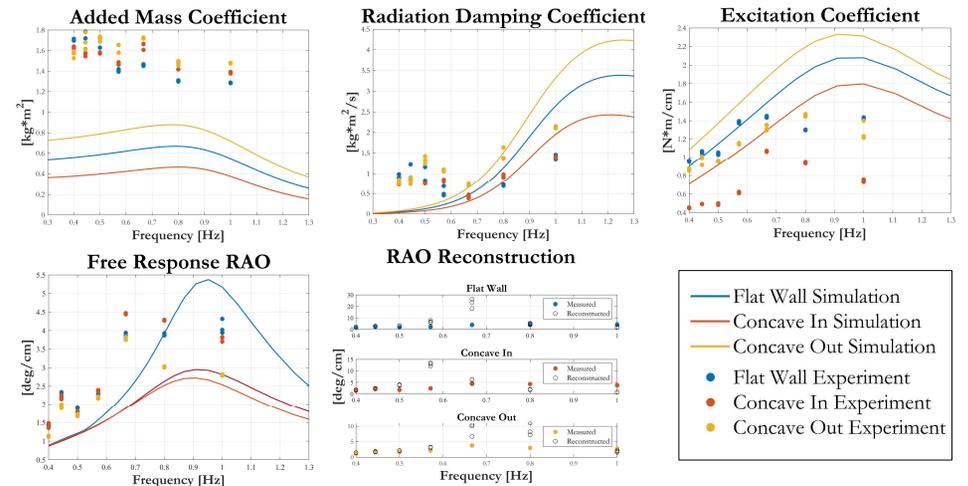
2D WEC System Overview



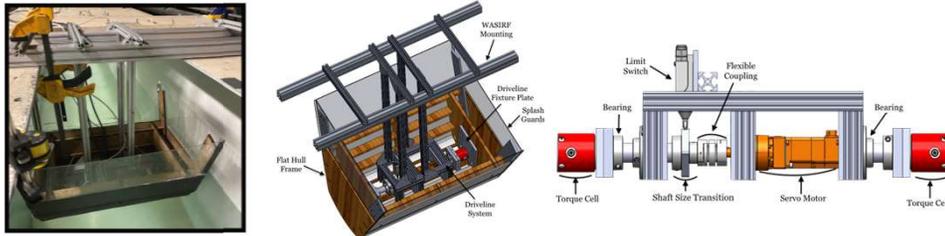
Simulation Setup



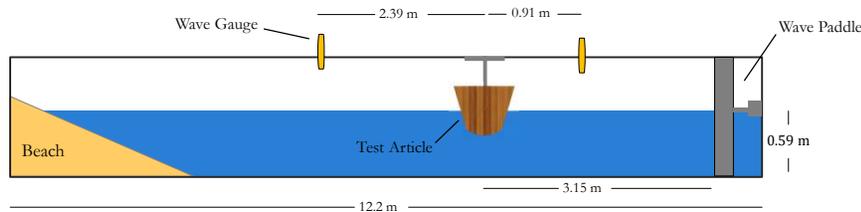
Results



Experimental Setup



Experiments were conducted in the Washington Air-Sea Interface Research Facility (WASIRF), shown schematically below. The incident wave amplitude was 5 cm with frequencies between 0.4 and 1 Hz. The angular position and torques were measured using the instrumentation shown above right.



Conclusions and Lessons Learned

- Hull shape affects the WEC pitch response, though simulation predicts more differentiation than experimentation.
- Separating incident, reflected, and radiated waves proved difficult, and requires refinement of the instrumentation setup.
- In a number of tests, we did not observe steady state behavior.
- Linear superposition agreed well with experiments for some frequencies. Disagreement may be a consequence of experimental approach.
- Immediate next steps: streamlining data collection, upgrading to a higher torque servomotor, and testing in a larger tank.

Funding Sources

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