



DEMONSTRATION OF REAL-TIME HYBRID SIMULATION (RTHS) FOR OFFSHORE WIND TURBINES (OWTs)



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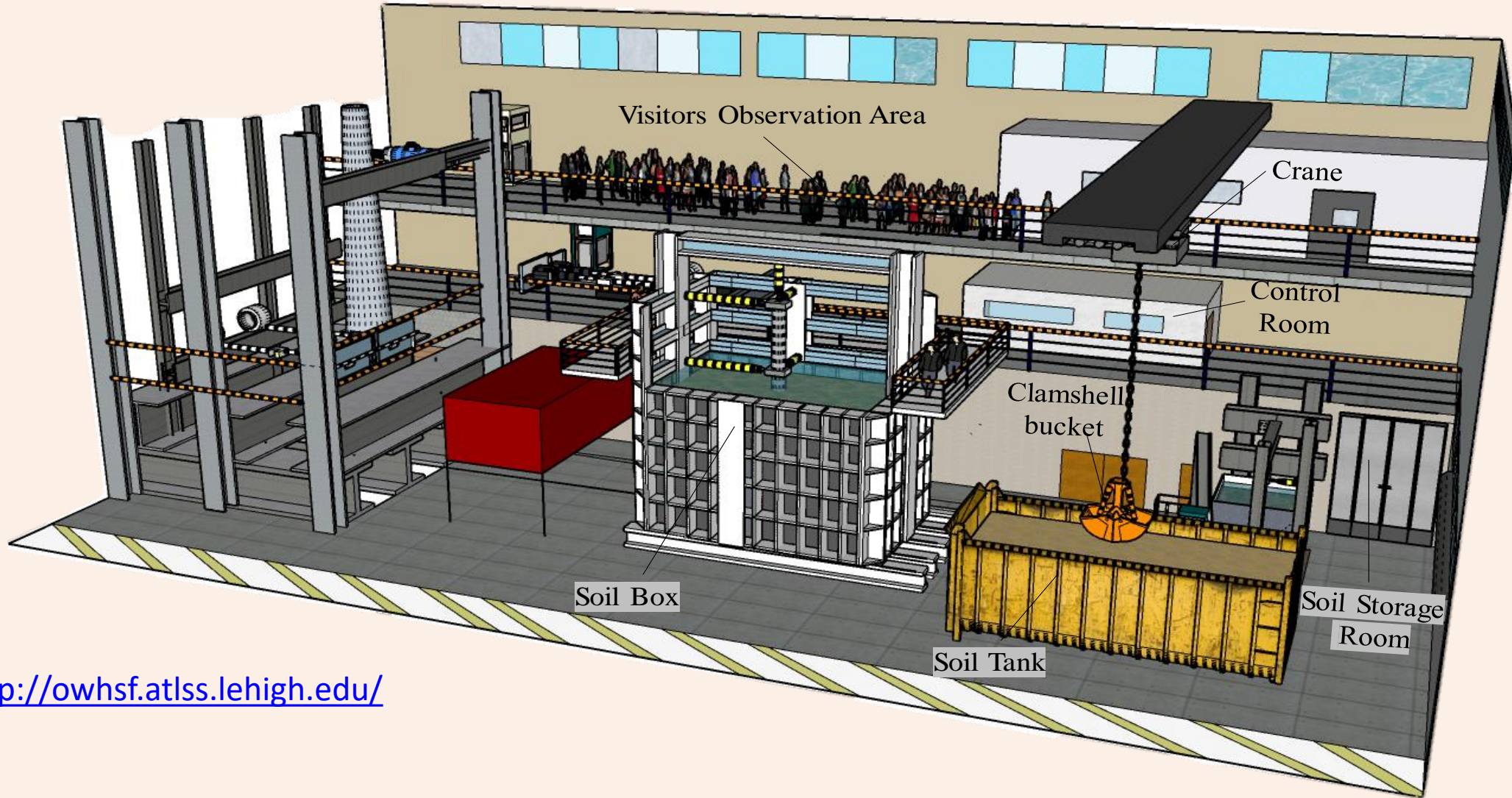
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RTHS Testing Facility for OWTs



<http://owhsf.atlss.lehigh.edu/>



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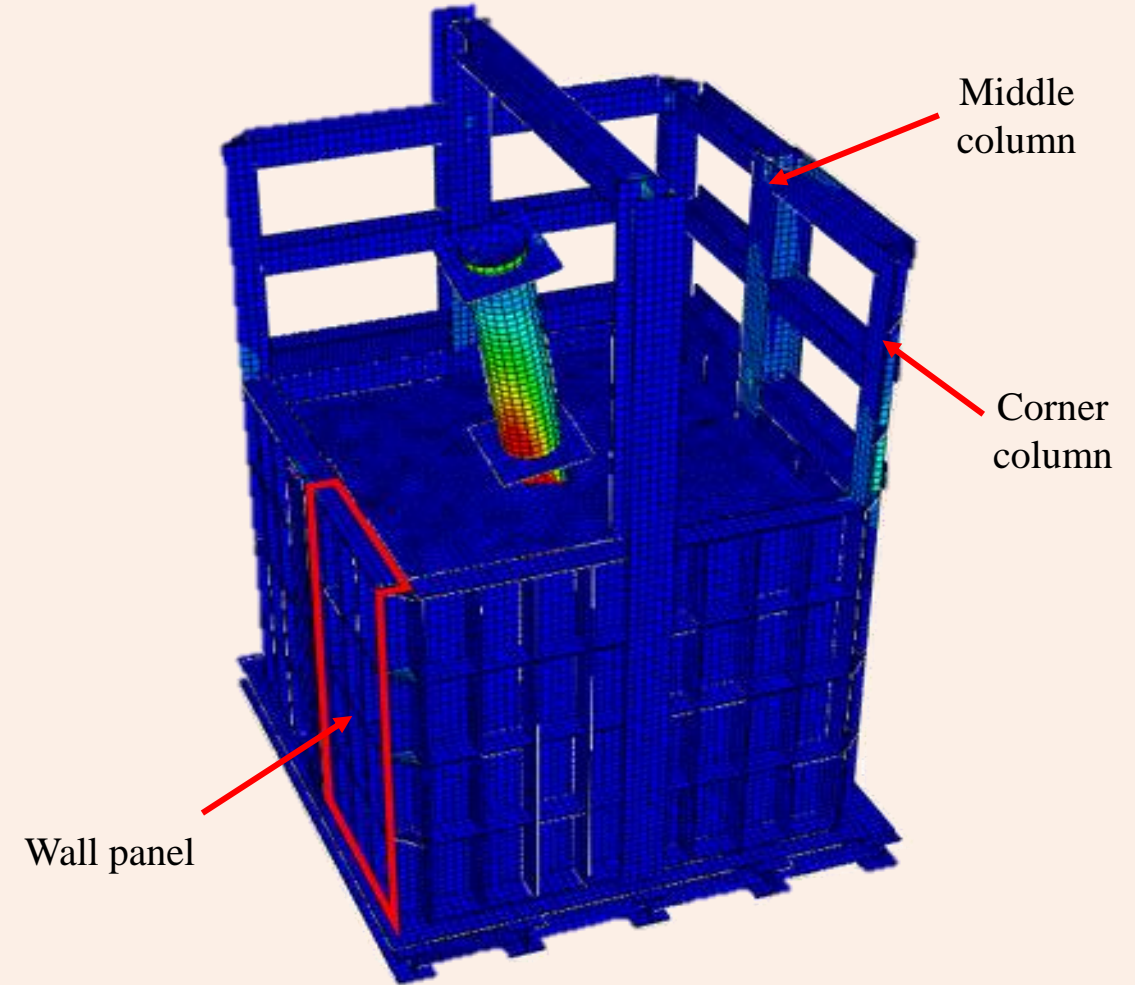
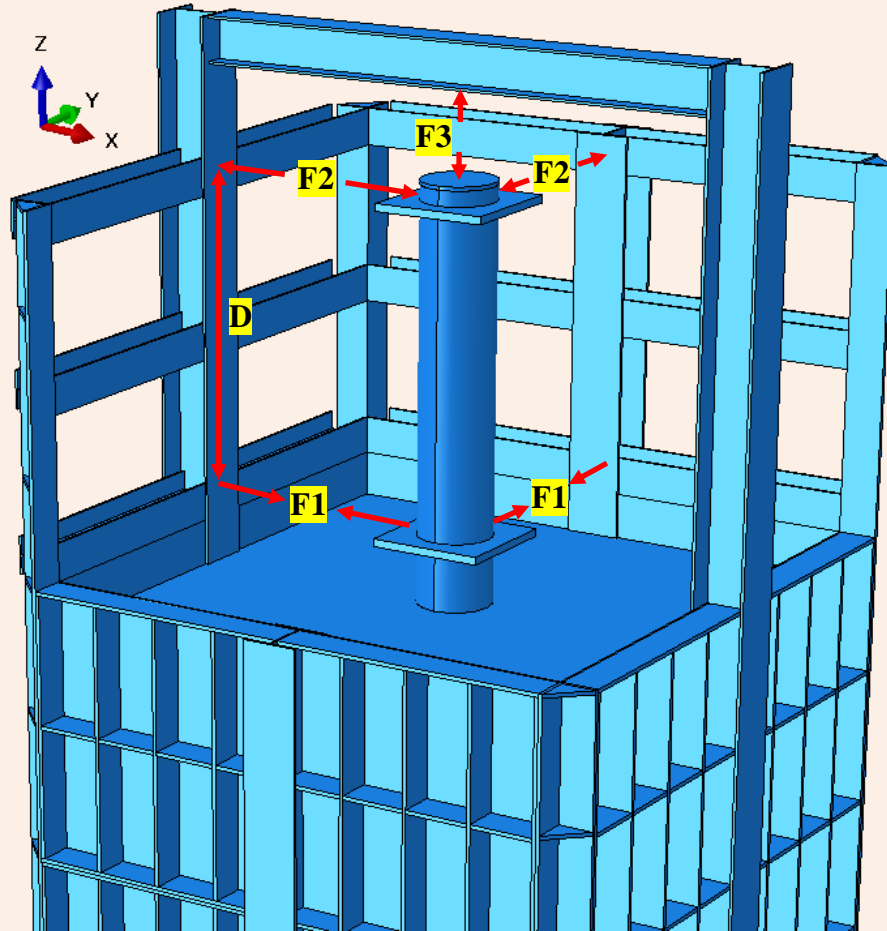
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Design and Fabrication of Soil-Foundation Interaction Facility



ABAQUS FE Model

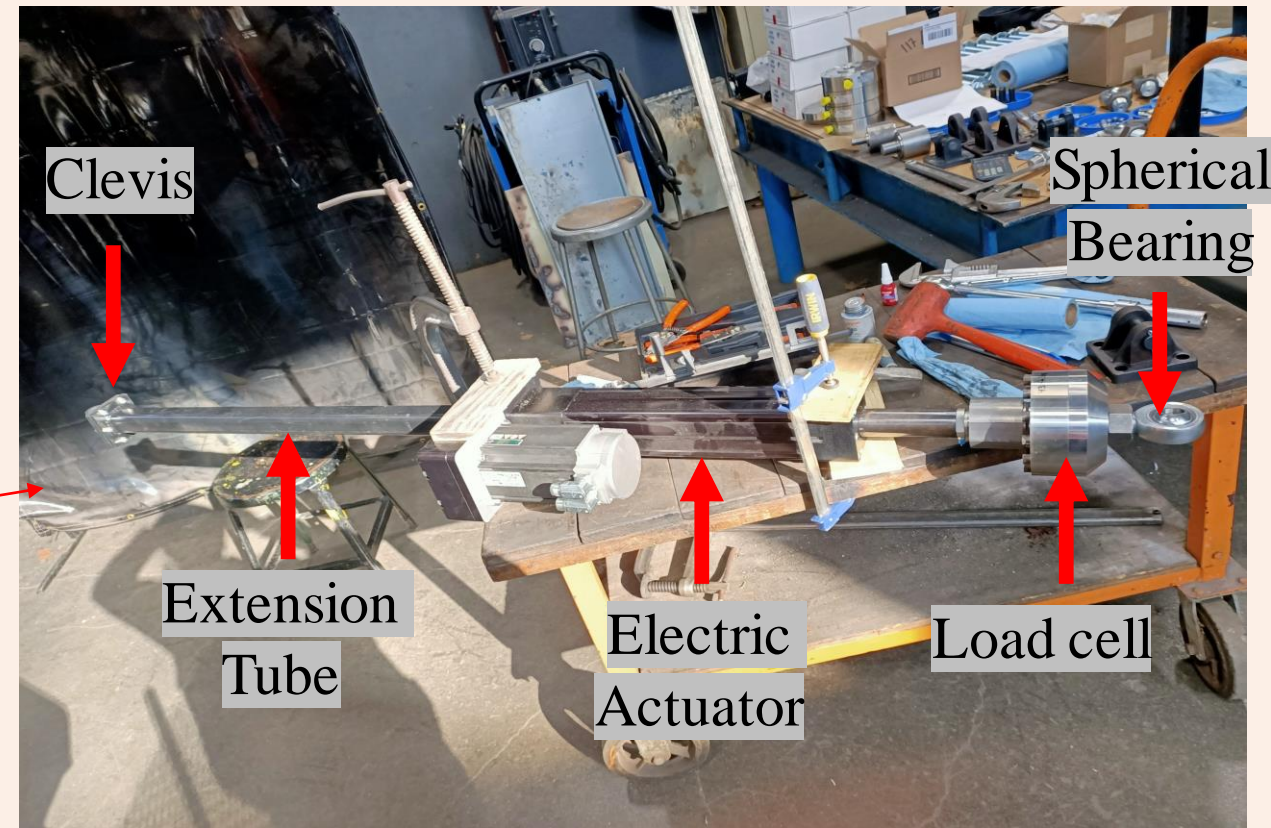
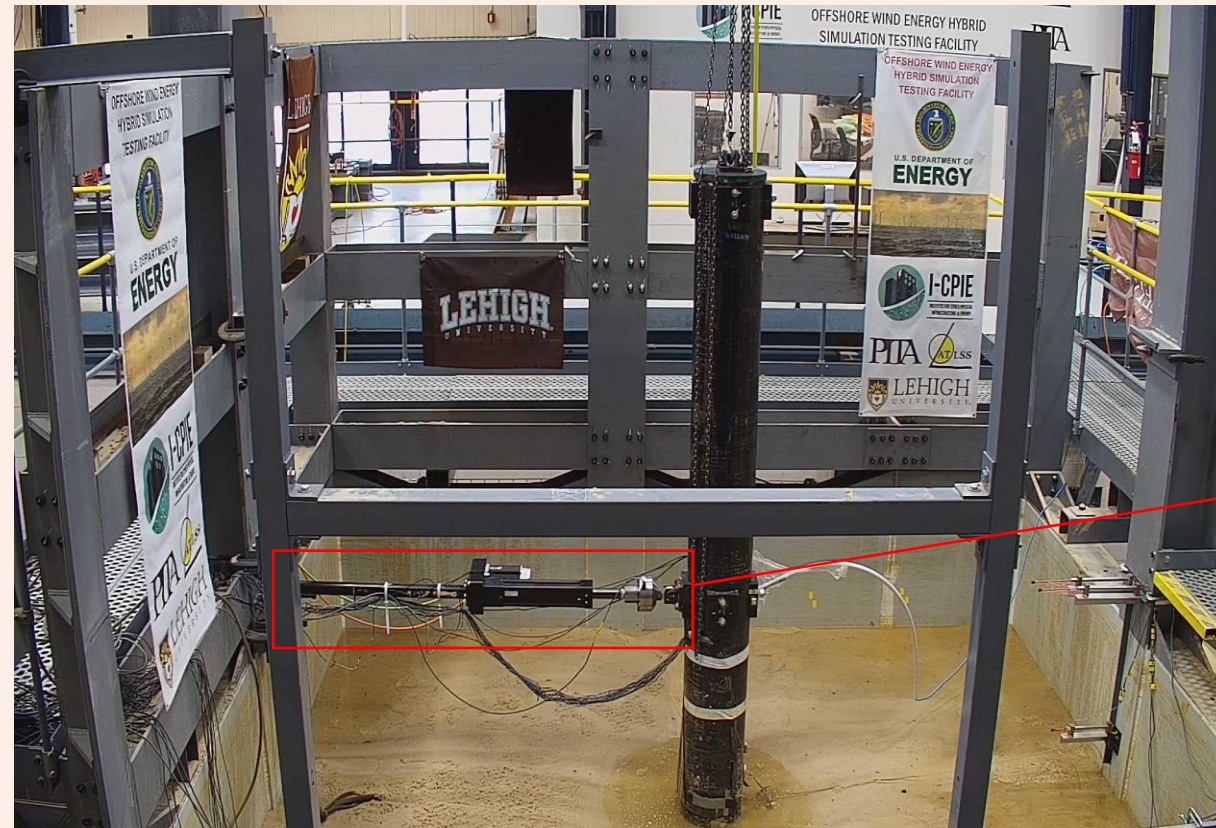




RTHS of OWTs - Demonstration



Experimental Substructure: Monopile Specimen Fixturing

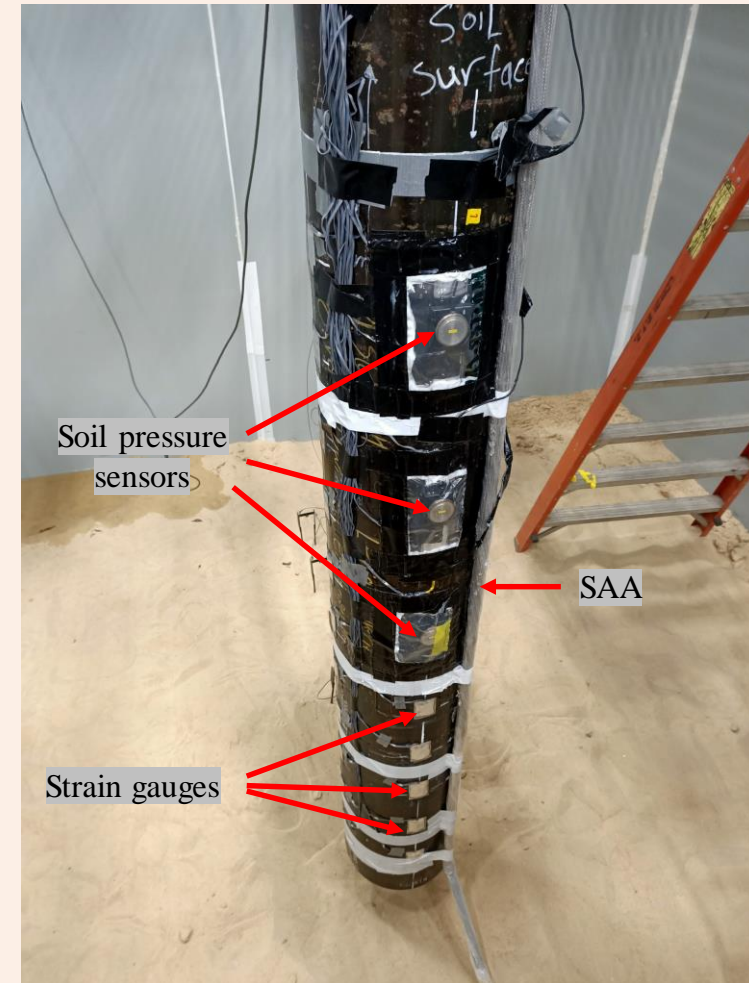
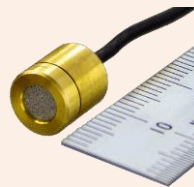
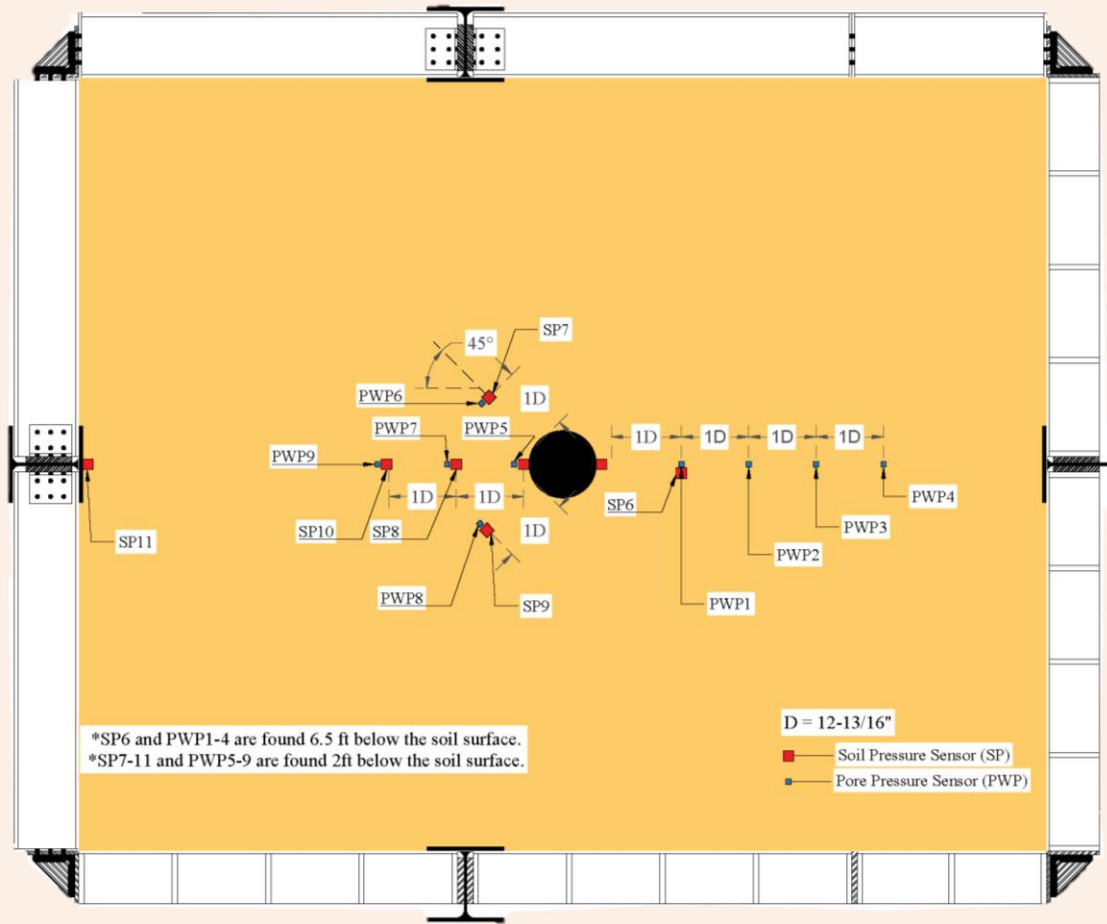




RTHS of OWTs - Demonstration



Experimental Substructure: Monopile and Soil Instrumentation





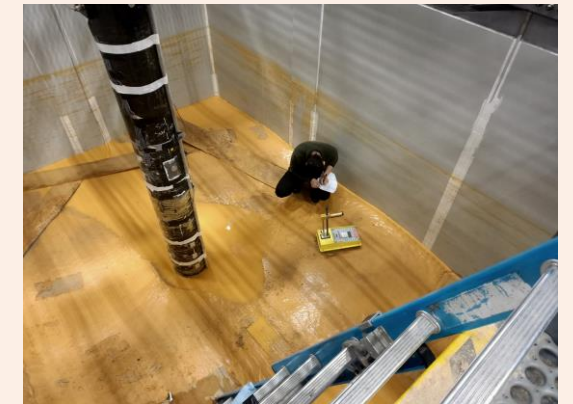
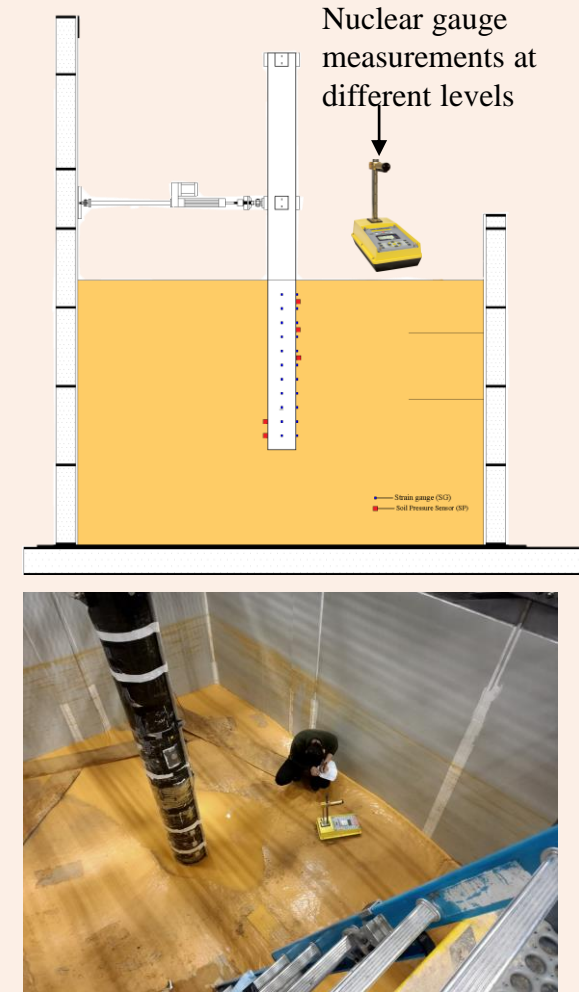
RTHS of OWTs - Demonstration



Experimental Substructure: Soil Raining



Video

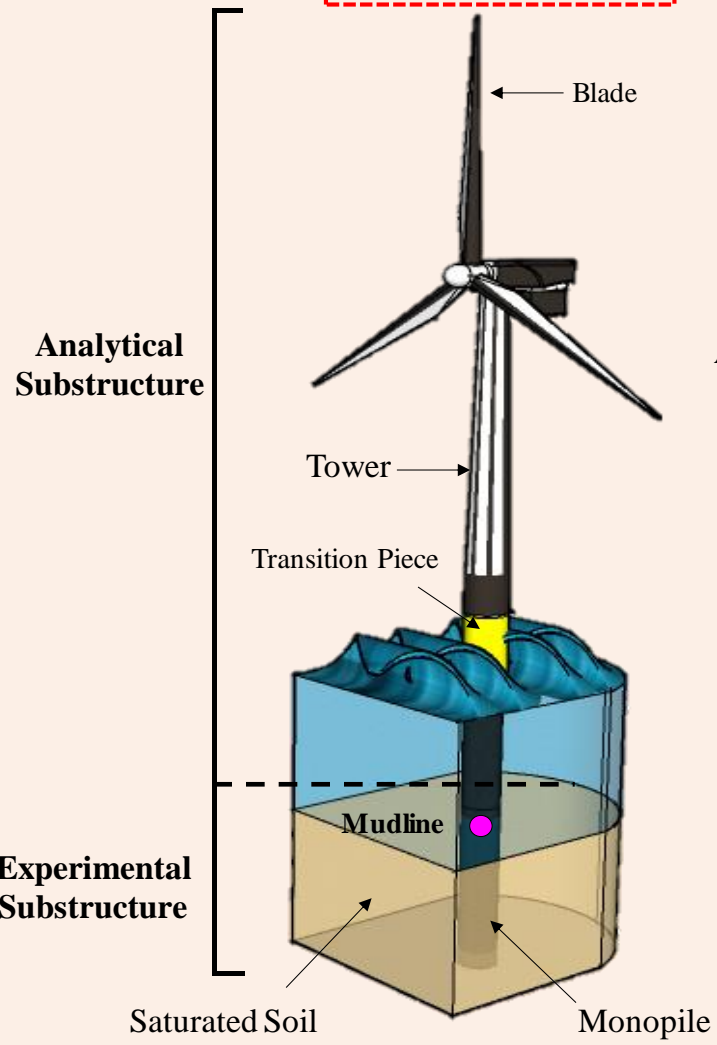




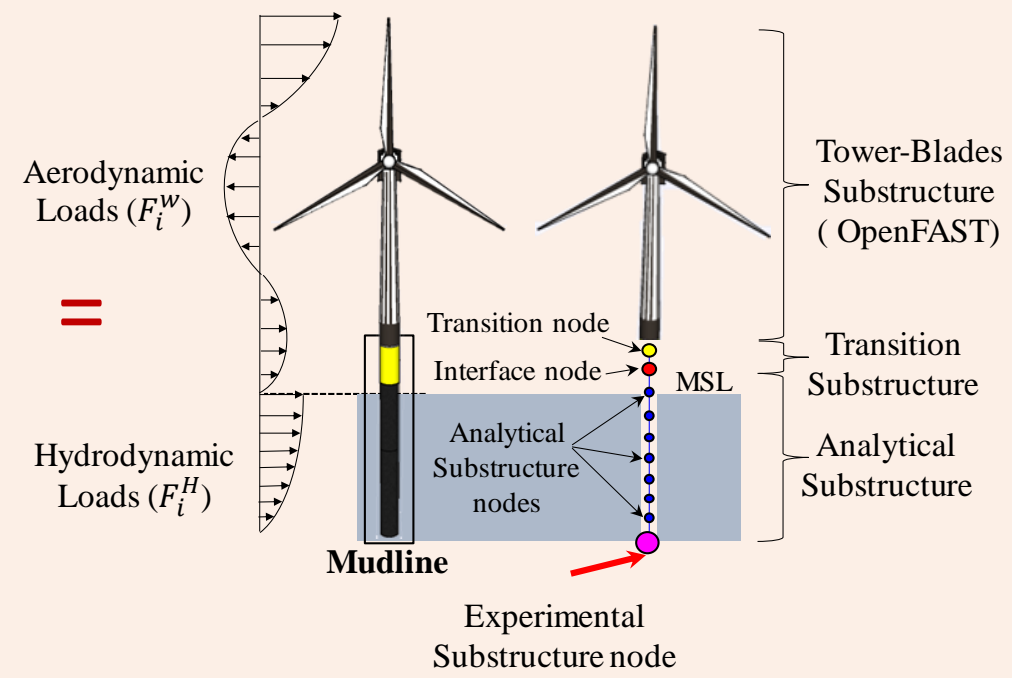
RTHS of OWTs - Framework



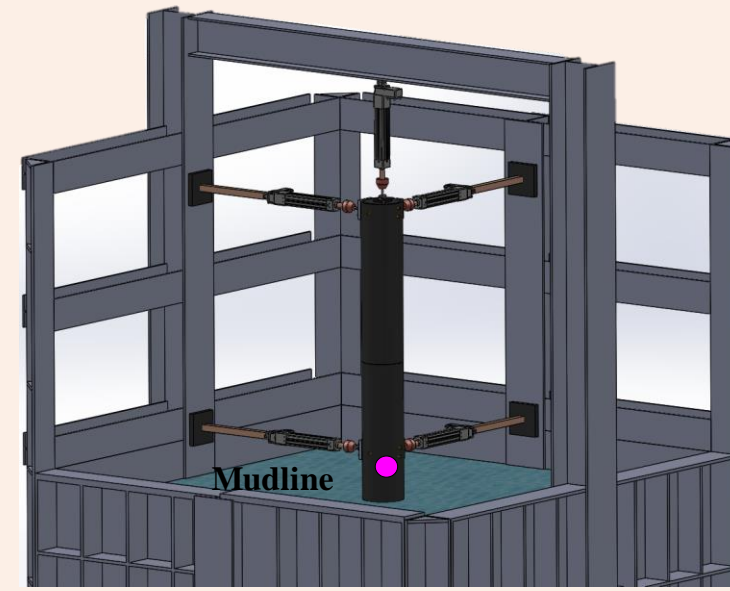
a) OWT System



b) Analytical Substructure



c) Experimental Substructure





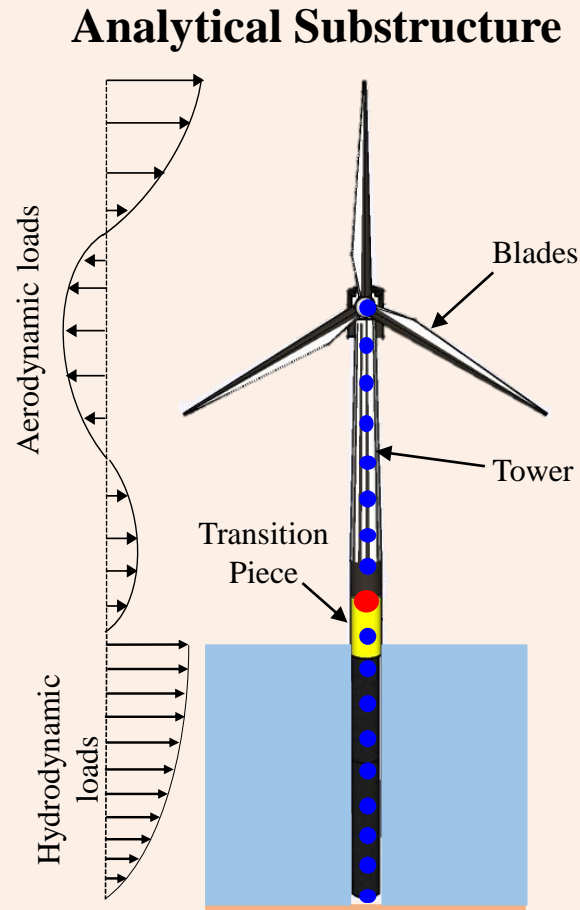
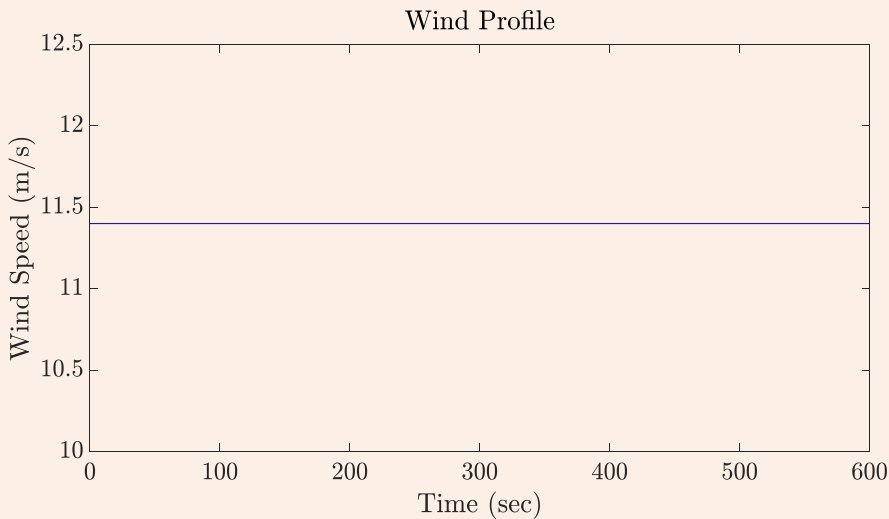
RTHS of OWTs - Demonstration



Large-Scale RTHS Validation Test: Loading Conditions

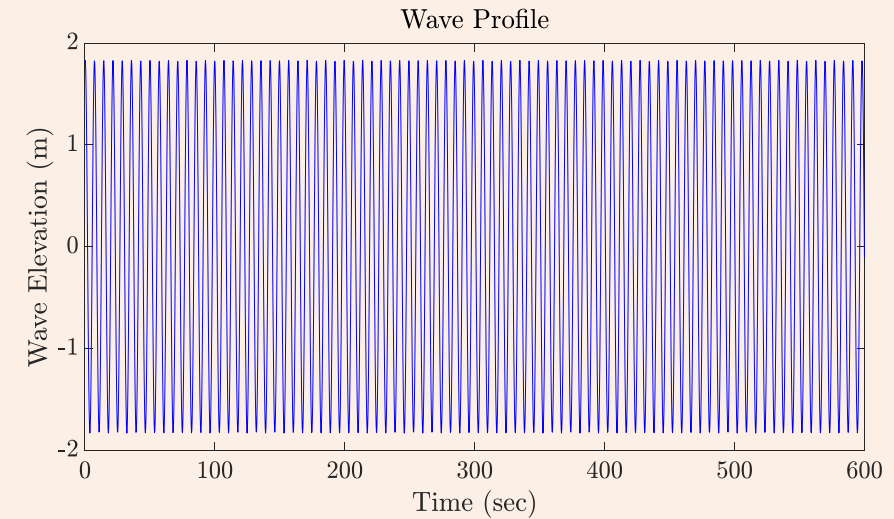
Aerodynamic Loading:

- 1- Steady Wind
- 2- Wind Speed = 11.4 m/s



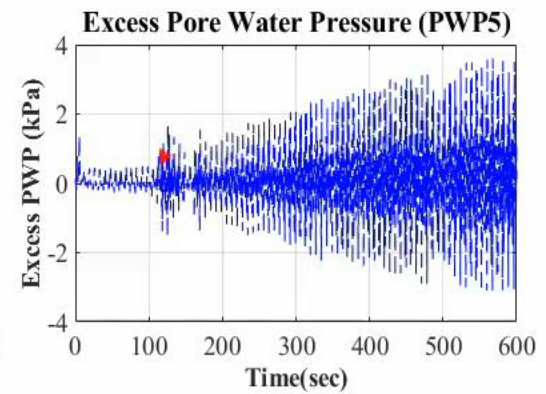
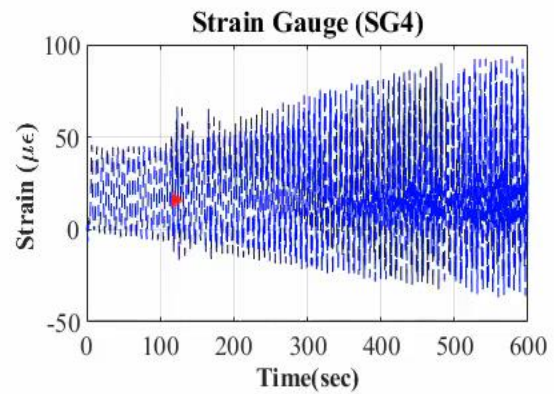
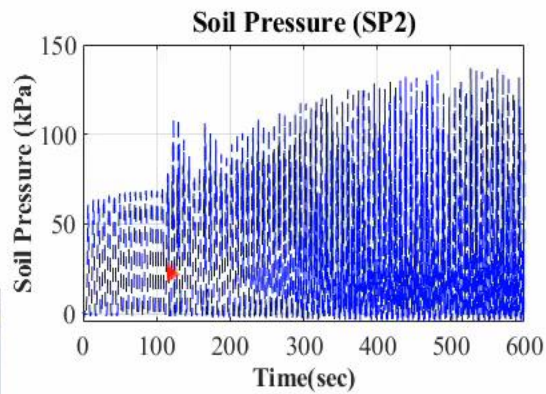
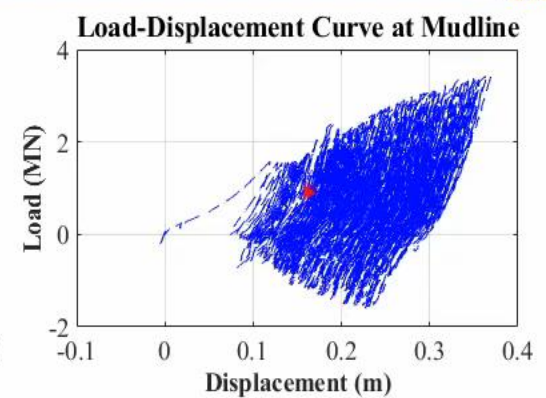
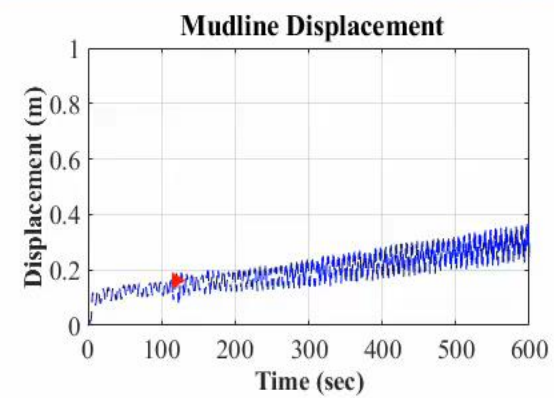
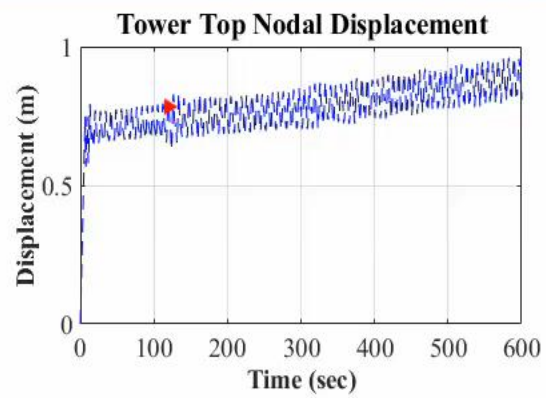
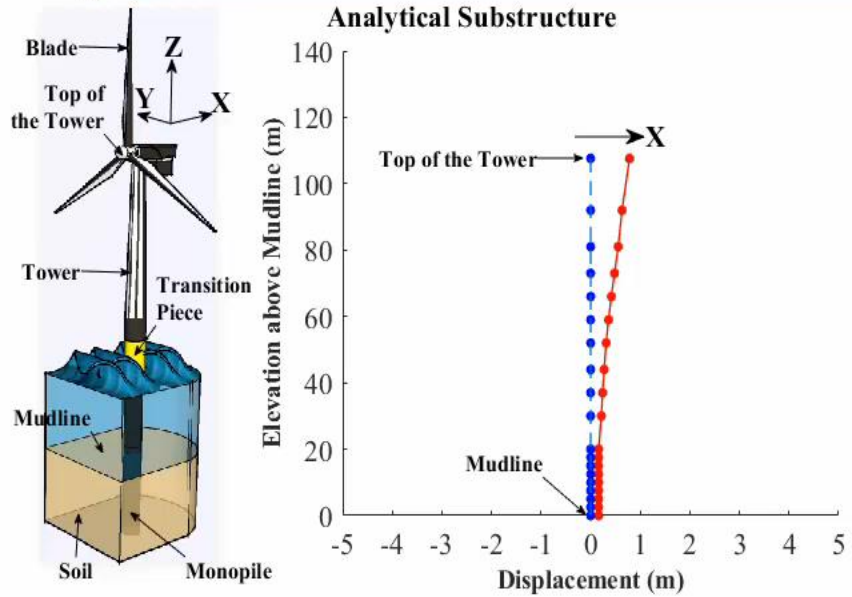
Hydrodynamic Loading:

- 1- Regular Wave
- 2- Significant Wave Height (H_s)= 3.66 m
- 3- Wave Period= 7.12 sec.





Real-time Hybrid Simulation of Monopile Supported-OWT



Experimental Substructure

