

Potential TAMU-Industry Research Collaboration

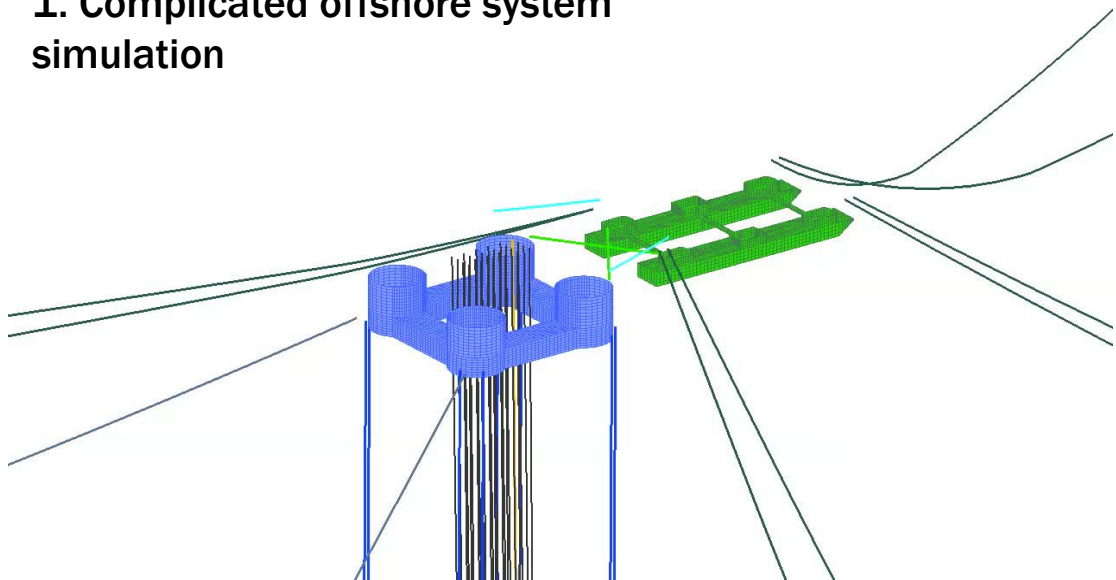
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Director of Ocean System Simulation & Control Laboratory



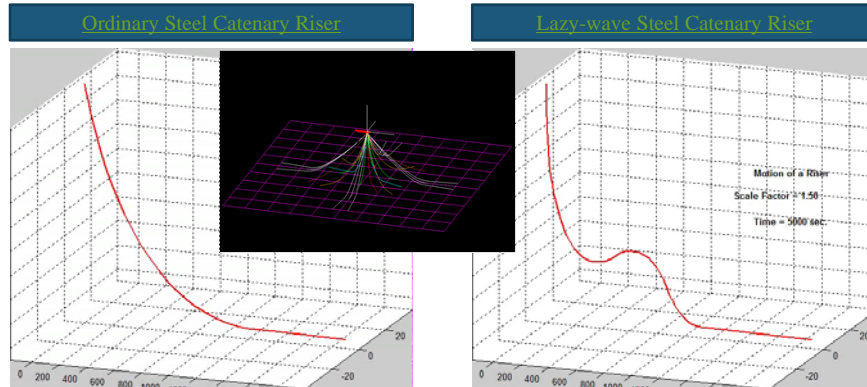
1. Complicated offshore system simulation



OCEAN SYSTEM SIMULATION &
CONTROL LABORATORY



More details: local dynamic buckling of SCR



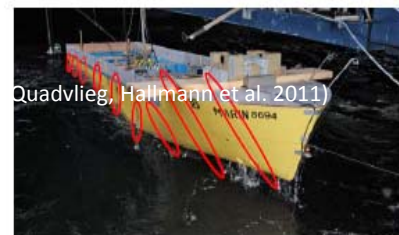
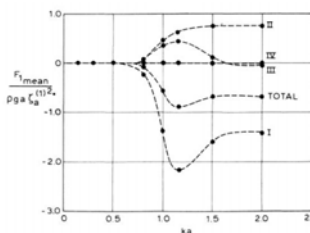
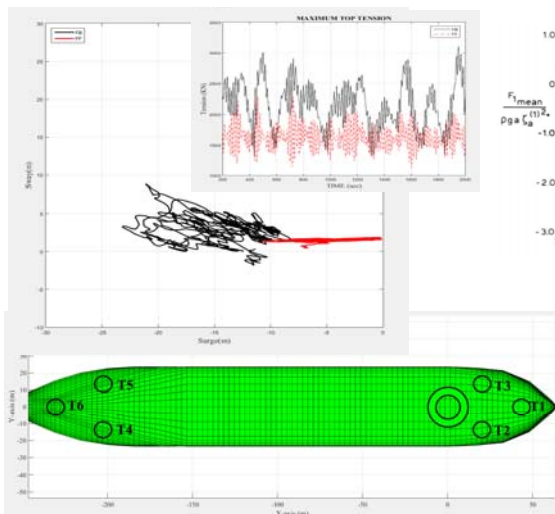
* Floater: turret moored FPSO
 Environmental condition: 100y hurricane (WWC-Western GOM)
 Water depth: 6,000 ft
 Used simulation program: HARP/CHARM3D



Offshore System Simulation Lab.

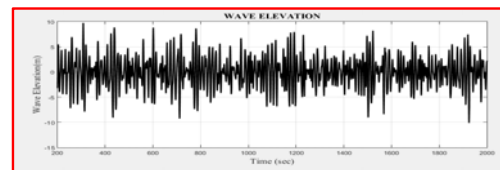
Advanced Control: real-time DP FF Application

:Measurable Wave Information - Wave Elevation Time History



20 Wave Probes

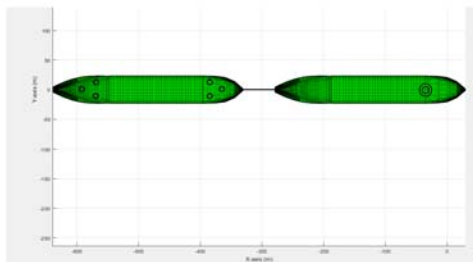
$$F_{wave} = \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} h(\tau_1, \tau_2) \eta(t - \tau_1) \eta(t - \tau_2) d\tau_1 d\tau_2$$



Advanced control: Motivation

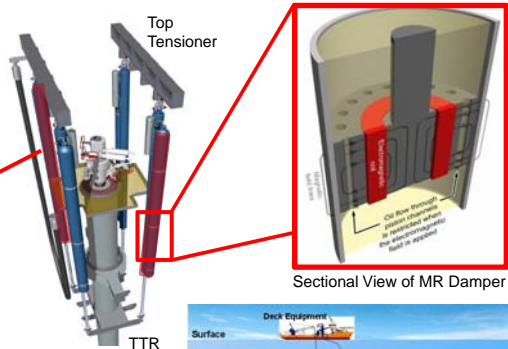
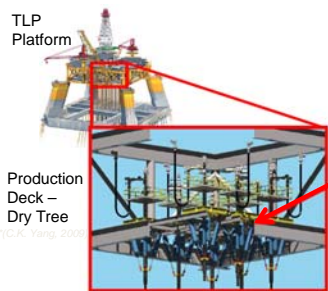


12 Incidents/year
4 Collision Incidents

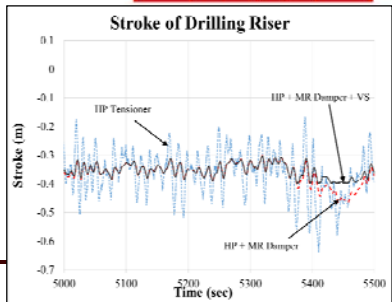


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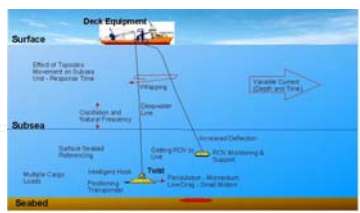
SMART PLATFORM – Advanced control by MR DAMPER



Sectional View of MR Damper



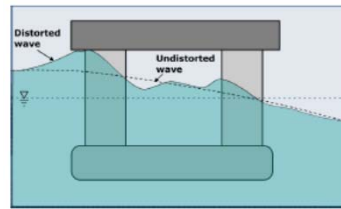
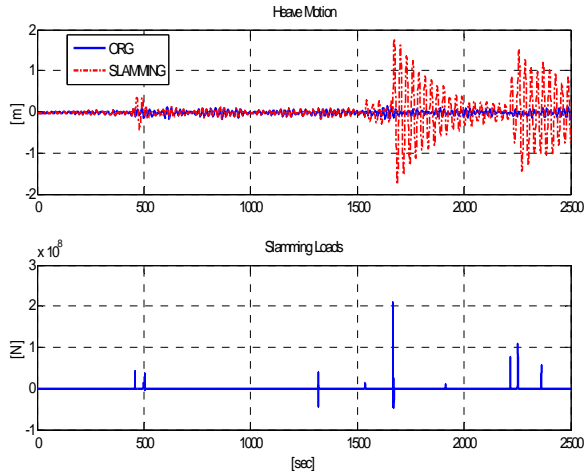
- MR Dampers (red)
- HP Tensioners (blue)



Offshore System Simulation Lab.



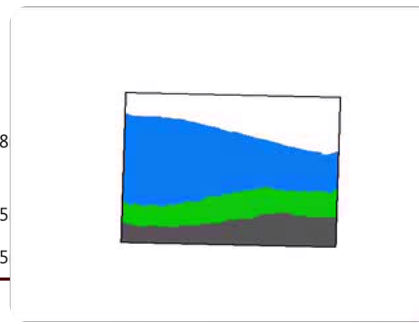
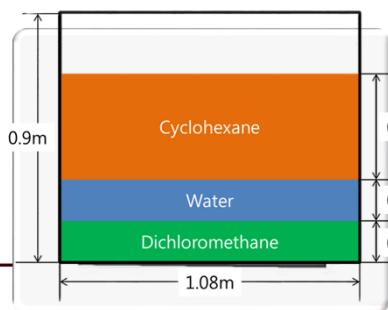
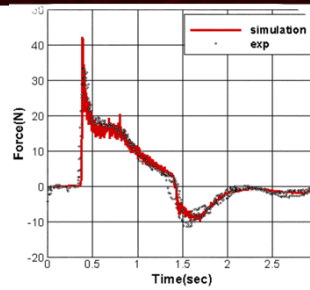
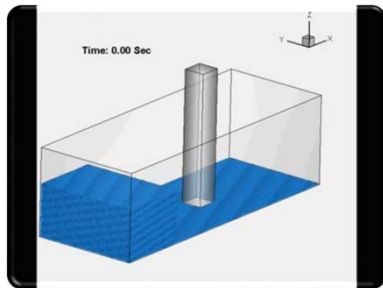
CHARM3D Air-gap & Slamming & Ringing



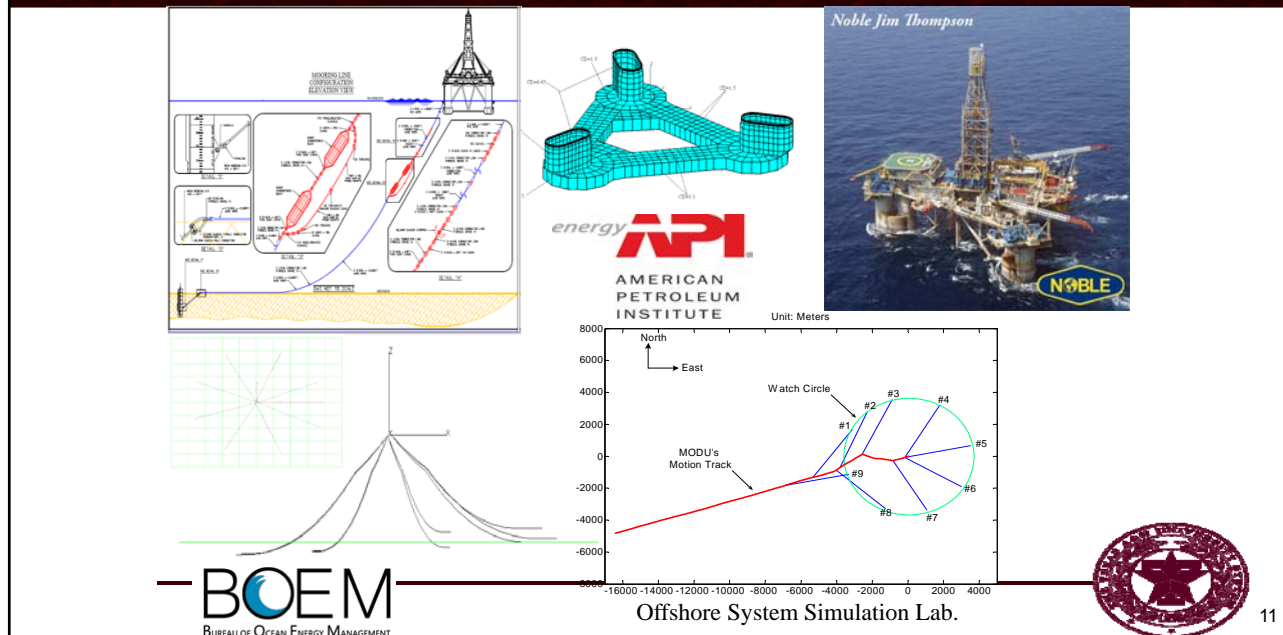
Offshore System Simulation Lab.



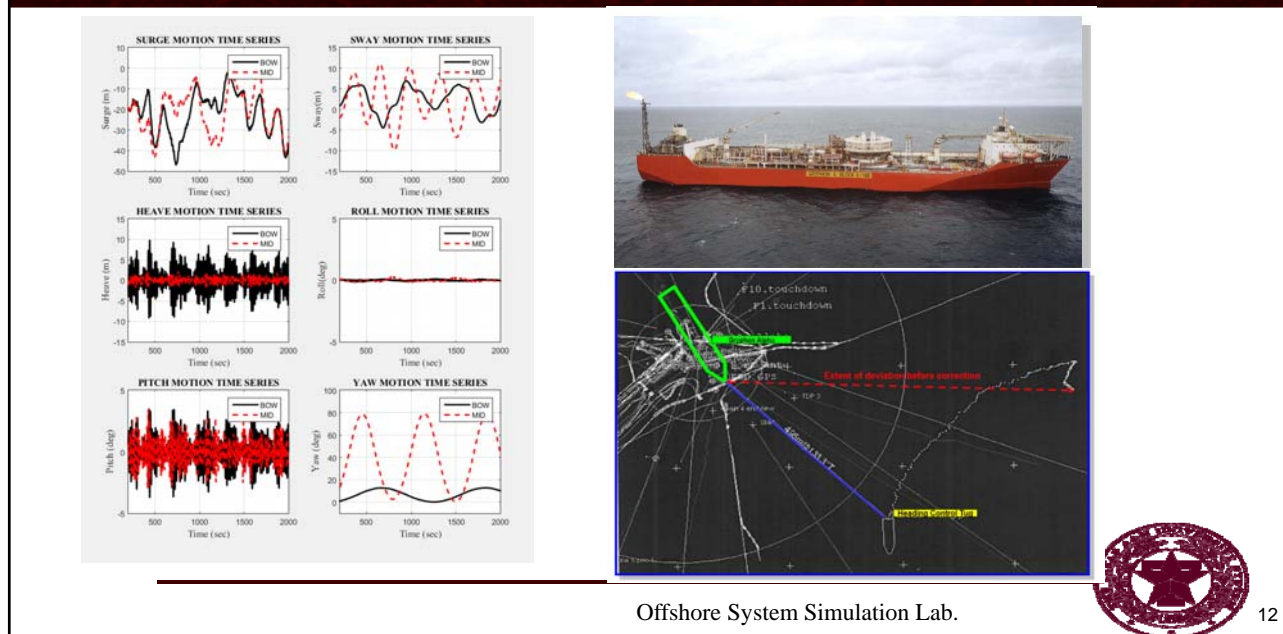
CFD – Assisted Simulation: greenwater impact & sloshing



Forensic Engineering: Sequential Mooring Failure



Forensic engineering: 2011 Gryphon FPSO Accident in North Sea ($H_s=5.5m$ $V_w=33.5m/s$)



MUFOWT(multi-unit floating offshore wind turbine) wind-wave-current condition surge/heave/tension spectra ($H_s=7.7\text{m}$, $T_p=12.4\text{s}$)

