Media Release

Chiefs of Staff, News Directors

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PhD partnership welds research with industry experience

PhD candidate Curtis Armstrong has partnered with deepwater engineering specialists INTECSEA on a research project to help protect and get better performance from their riser flow line systems.

Riser flow lines act as the arteries to the oil and gas sector, transporting oil, gas and other chemicals through a hose-like system on subsea installations. Their effective and safe design is paramount to the success of a venture.

Mr Armstrong will simulate the floating facility, its riser system and the environmental conditions in which it operates using response-based analysis (RBA) modelling. The three-year project is jointly funded by the Australian Maritime College at the University of Tasmania and INTECSEA, part of Advisian consulting business Worley Parsons.

RBA modelling has already been proven on ship-shaped floating vessels, but this project will be the first to apply it to riser systems.

“Risers are difficult to analyse because they are mostly flexible, hose-like structures of complex construction with spans reaching from sea-surface to seabed. A lot can happen when this system is exposed to such a complex force of nature as the ocean. Another factor is that the riser system is joined with a floating vessel and its mooring anchors with their own dynamic responses,” Mr Armstrong said.

“My research aims to develop RBA for riser flow lines when they are coupled with the other systems and help protect the arteries of the offshore oil and gas industry by preventing loss of assets through failure, reducing costs through efficient design methodology, and conserving the environment in which they operate.”

Until recently, companies have relied on data collected from ocean buoys measuring wave height and wind speed to determine the extreme conditions that will act on their multi-million dollar equipment. This modelling approach is flawed as it predicts only ‘perfect storm’ scenarios, or the biggest possible wave that could hit the system.

It’s not necessarily one big hit that will break a structure, rather the many smaller ones that will resonate with its natural frequency and cause it to fail. RBA modelling will provide a much

clearer picture of what happens when the system is exposed to every single data packet of the buoy that has been floating in the ocean for decades, not just the big hits.

Perth-based offshore engineering consultancy INTECSEA will provide in-house supervision and part-time employment for four months each year during Mr Armstrong's PhD tenure.

"This partnership is unique to my project and will provide a great experience meshing research and industry experience with a common objective," he said.

The project was proposed by INTECSEA and the research and tools developed will be used by the company for its front-end engineering services. The results will be applied to riser design and also integration of the risers with mooring systems and floating structures. They will also be incorporated into the teaching of AMC's undergraduate offshore engineering program.

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