

# Evening Technical Meeting: Researching into the Subsea Future

Wednesday, 11<sup>th</sup> April 2018 ✦ Parmelia Hilton Hotel (Swan Room), Mill St. Perth

Onsite Registration 5.30 pm; Presentations 6.00 pm – 7.30 pm; Networking over drinks and finger food 7.30 pm – 8.30 pm

To register for the event visit [www.SUTETM11Apr2018.eventbrite.com.au](http://www.SUTETM11Apr2018.eventbrite.com.au)

Chaired by: Jatin Lodhia, Senior Engineer, 2H Offshore

The Evening Technical Meeting sub-committee have carefully put this programme together as an opportunity for universities to show case their capabilities and for you, as industry, to get an insight into the future via their presentations. This is a night for industry not to be mistaken as a night for students, though students are of course welcome.

## Stored Electrical Power and Potential to Change Subsea System Power Distribution

**Abdul Fahad Mueed, Curtin University**

The presentation will evaluate current capabilities of battery technology and analyses its applications in subsea power distribution. The method of analysis includes feasibility studies, cost approximations and extrapolations based on observed data. Results indicate that Lithium ion battery technology is the most favourable for adoption in subsea applications owing to its high energy density, cycle performance and low maintenance requirements. While batteries are not capable of replacing the power transmitting cables within an umbilical completely, they can be used to reduce the number of cables within the umbilical and to power subsea equipment which is cyclic in operation.

## Quantitative Discharge Water Analysis using Mobile 1H NMR

**Lisabeth Wagner, The University of Western Australia**

As the oil and gas industry moves towards subsea separation of the aqueous from the oil phase to facilitate direct discharge of the aqueous phase, the development of reliable methods to monitor the water quality prior to discharge is becoming increasingly important. A suitable sensor should be compact, self-contained and account for both dispersed and dissolved oil components [1]. We present the feasibility of mobile, low-field 1H nuclear magnetic resonance (NMR) spectroscopy in combination with solid-phase extraction (SPE) to meet this metrology need. Proof-of-concept on water contaminated with hexane and a light crude oil over the range of 1 – 30 ppm [2] as well as the simultaneous quantification of both aliphatic and aromatic hydrocarbons in the same sample [3] will be demonstrated. Furthermore, we have developed the method into a semi-automated prototype and the results of a successful field trial at an onshore gas plant will be shown.

## Steel Lazy Wave Riser for Turret vs. Spread-moored FPSO in Extreme and Wave-induced Fatigue Conditions

**David Szczepanski, Edith Cowan University**

In this project, the performance of a steel lazy-wave riser (SLWR) was numerically investigated and compared to a conventional steel catenary riser (SCR) for an internal turret and spread-moored FPSO in extreme 100-yr return and ambient metocean conditions. As expected, the SLWR demonstrated favourable characteristics by the elimination of local dynamic buckling in the touch down zone via a wave configuration that decouples surface-motion, hence significantly reducing the maximum stress and fatigue damage. Non-collinear waves and current in the oblique direction relative to the vessel heading showed amplified stress concentrations in the sag and hog sections as a response to the increased compressive (heave and pitch) vessel motions. Correspondingly, in the ultimate limit state, a SLWR showed similar stresses for both turret and spread-moored FPSOs. However, the turret-mounted SLWR demonstrated an unsatisfactory fatigue life compared to its mid-ship-mounted, spread-moored counterpart, owing to riser hang-off location differences and correspondingly varied motions experienced by the riser.

## New Paradigms in Understanding the Behaviour of Cables and Pipelines on Rocky Seabeds

**Terry Griffiths, The University of Western Australia**

On occasion it is impossible to avoid routing subsea cables and pipelines across rocky seabeds. These areas can be very challenging for assuring the pipe's integrity, especially in locations where extreme metocean conditions occur. Terry's PhD has involved developing new models of behaviour for cables on rocky seabeds, which recently enabled back-analysis of existing subsea cables where conventional analysis shows that even solid lead bars would be unstable. The new methods of analysis confirm that these cables are in fact stable, consistent with the field observation of their behaviour. The aim is for these findings and new design methods to be incorporated into publicly available published design recommended practices.

In addition to the above presentations, there will be poster displays on the night. Further details overleaf.

### REGISTRATION FEES:

Student/Individual/Corp Members \$30\*: Non-Members \$50: (additional \$5 if paying on night)

5 Ticket Member Pass: \$125, 5 Ticket Non-Member Pass: \$225

CPD = 1.5 hrs

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# Evening Technical Meeting: Researching into the Future – Up and coming subsea studies

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## Poster displays:

### Developing Active Suction Anchors for Floating Renewable Energies

Nicole Fiumana  
The University of Western Australia

### Impact of Local Misalignment on Stress Concentration Factor (SCF) of Pipeline/Riser Girth Weld

Aswin David Kunnathu  
Curtin University

### Non-linear Flow Above a Shallowly Submerged Wave Energy Converter

Guy McCauley  
The University of Western Australia

### Quantitative Ranking of Hydrate Anti-Agglomerants

Shane A Morrissy  
The University of Western Australia

### Robust Mission Planning for Autonomous Underwater Vehicles Cooperatively Inspecting Subsea Structures

Fletcher Thompson  
The University of Tasmania

### ECU's Circulating Water Channel for Subsea-technologies Testing

Luke Young  
Edith Cowan University

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Xodus  
(correct at time of creating flyer)

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