

Subsea Design

Applying Cutting Edge Geoscience (Slippery Foundations and other Innovations)

Wednesday, 26 February 2014

Parmelia Hilton Hotel (Swan Room), Mill Street, Perth

Registration 5.30 pm: Presentations 6.00 pm – 7.30 pm Networking over drinks and finger food 7.30 pm – 9.00 pm

Chaired by: **Ian Finnie, Geosciences Manager, Advanced Geomechanics**

Subsea Design Challenges - a View from the Front Line

Paul Brunning, Geotechnical Discipline Manager, Subsea 7

A major Subsea Installation Contractor such as Subsea 7 faces different types of challenge depending on whether we are carrying the design responsibility of a structure and its foundation (usually under an EPCI type contract) or we are simply installing free issued items. Examples are given from both these scenarios to illustrate some typical design and installation issues that we face on a regular basis. The talk concludes with a brief look at how we collaborate with third parties such as Universities to help us research - and hopefully solve - some of the more complex problems associated with subsea foundations and pipelines.

State of the art subsea foundation design – supporting industry needs

Prof Susan Gourvenec, Centre for Offshore Foundation Systems, University of Western Australia

This presentation will summarise some key work from the Centre for Offshore Foundation Systems at the University of Western Australia on methods to optimise subsea foundation design. An improved design methodology for subsea foundations under loading in six degrees of freedom will be presented along with an overview of work to define optimal spacing of internal skirts, effect of the provision of pinned corner piles and allowance of tolerable foundation mobility. These technologies for optimization of subsea foundation design contribute to safer and more efficient subsea engineering.

Slippery foundations – Designing for direct on-seabed sliding

Andrew Deeks, Principal Engineer, Advanced Geomechanics

Significant size and weight (and therefore cost) reductions of pipeline-related foundations may be achieved by allowing them to slip directly over the seabed. A key design requirement is to ensure that they skid ostensibly in a horizontal plane without diving into the seabed. Recent advances in design approaches for allowing this direct on-seabed sliding will be presented, and aspects of the integrated pipeline, structural and geotechnical analysis which are necessary to reliably quantify system performance will be highlighted.

Geohazard Assessment for To-Shore Pipelines from Deepwater Developments

Steve Thomas, Associate Director & Lead Technical Authority for Engineering Geology Geophysics & Geohazards, Fugro GeoConsulting Ltd.

During the operational life of proposed to-shore pipelines from deepwater developments, it is crucial to have quantified any potential “dynamic” processes such as landslides or flows that could compromise the pipeline. This is in addition to the traditional “static” seabed analysis that is usually performed. This presentation will discuss the need to construct an evolutionary three- or “four”-dimensional ground model, preferably hosted in ArcGIS, where all past features such as mass transports can be identified, classified, mapped and age-dated to understand these potential “dynamic” processes. This ground model includes a catalogue of the type, location, frequency and size of past geohazard events which provides the basis for a credible, probability-based, semi-quantitative risk assessment approach to identify the best pipeline routes.

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