

PRESS RELEASE**SUBSEA 7 PRESENTS PAPERS ON
HP/HT FATIGUE AT OTC 2013**

Subsea 7, a global leader in seabed-to-surface engineering, construction and services to the offshore energy industry, will deliver two papers in the HP/HT Session at this year's OTC on 8 May, in Houston, USA.

In the first paper, Subsea 7's Daniel Karunakaran, Jean-Luc Legras and Richard Jones present on 'Fatigue enhancement of SCRs: Design applying weight distribution and optimised fabrication'.

They state that key issues for the design of SCRs in harsh environment is the fatigue near the hang-off and at the touch down point. The design of SCRs by distributing weight along the riser enhances their fatigue performance thereby extending their feasibility for deep water harsh environments whilst fulfilling both strength and fatigue requirements.

Subsea 7's Dr T.Sriskandarajah, Venu Rao and Graeme Roberts look at 'Fatigue aspects of CRA Lined Pipe for HP/HT flowlines' in the second paper.

The paper discusses the effects of 'low cycle' fatigue of HP/HT flowlines at the seal weld. It also looks at the importance of the radial gap between the CRA layer and the backing steel in general and at the seal weld in particular as a key parameter for consideration at the manufacturing stage.

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PRESS RELEASE**OTC 23945****Fatigue Enhancement of SCRs: Design Applying Weight Distribution and Optimised Fabrication**

Daniel Karunakaran, Jean-Luc Legras and Richard Jones, Subsea 7

Abstract

Steel catenary risers (SCR) have been an attractive choice for recent deep-water field developments. However, design of SCRs for harsh environment or from large motion host platforms has been a great challenge. The key issues for the design of SCRs in harsh environment are the fatigue near the hang-off and at the touch down point.

Design of SCRs by distributing weight along the riser enhances the fatigue performance of SCRs thereby extending the feasibility of SCRs for deep water harsh environment whilst fulfilling both strength and fatigue requirements. The weight distribution along the SCR is obtained by fully qualified ballast modules and also fully qualified light weight add-ons at TDP which are designed for mud-line application. Further, by high quality welding and optimized weld geometry, the fatigue performance of the SCR welds are improved and optimized. This paper also describes the mechanism that drives the weight distributed SCR design and also fatigue test data from optimized weld geometry.

The results clearly indicate that it is possible to have a robust design of SCRs from large motion host platforms in harsh environments using presently qualified materials and technology. These qualified products extend the applicability of the weight distributed SCR concept to most dimensions and applications. This concept is also applicable in less demanding environments. Based on the work, the applicability of this concept is mapped out for various floater motions. Fatigue test results are presented from both carbon steel and clad/lined riser qualification programs which will demonstrate that high fatigue performance can be sustained with established girth welding procedures with appropriate control of pipe fit up tolerances and weld soundness.

The weight distributed SCR concept, combined with high performance welds, will make the applicability of SCRs a credible alternative option for use in increasingly harsh environments or from host platforms with large motions. Since the ballast and light weight add-ons are fully qualified material they are cost effective and ready for project application.

OTC 23932**Fatigue Aspects of CRA Lined Pipe for HP/HT Flowlines**

Dr T.Sriskandarajah, Venu Rao and Graeme Roberts, Subsea 7

Abstract

Hydrocarbon exploration and production is moving into deep and ultra-deepwater to meet global energy demands. The industry is having, as a result, to face up to field developments with great challenges, including designing for a HP/HT product

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whilst also meeting sour service requirements. It has been a common practice in the past two decades to use pipelines with metallurgically bonded corrosion resistant alloys for such field developments.

CRA lined (mechanically bonded) pipes are, however, a viable alternative. The viability of using CRA lined pipes depends largely upon the behaviour of the welds associated with the CRA liner under fatigue loading. Pressure and temperature loading that varies cyclically can be expected to result in plasticity induced fatigue in the CRA liner as a function of the local radial gap at the liner/weld overlay interface (the seal weld). This fatigue behaviour is important in the context of the different manufacturing processes adopted by linepipe manufacturers and the need for consistency in the local geometry of the seal weld overlay when pipe joints produced in large quantities.

Conventional S-N methods are not adequate to estimate the fatigue damage at seal weld. This paper describes an FE based analytical approach to estimate strain range and thus the fatigue damage at the seal weld for Low Cycle Fatigue (LCF). The study shows the fatigue damage variation as a function of the magnitude of the local radial gap between the liner and the backing steel, when the fatigue damage is caused by axial plastic strain ratcheting and elastic-plastic stress-strain hysteresis.

The paper discusses the effects of 'low cycle' fatigue of HP/HT flowlines at the seal weld using an analytical approach. The paper also discusses the importance of the radial gap between the CRA layer and the backing steel in general and at the seal weld in particular as a key parameter to be considered at the manufacturing stage.

For further information contact:

Achilleas Georgiou

+44 20 8210 5544 or +44 (0) 776655 3894

achilleas.georgiou@subsea7.com

Notes to editors:

1. Subsea 7 will have a major presence at this year's event. As well as presenting conference papers, it will be exhibiting at stand 1641. On display will be examples of the Company's deepwater and ultra-deepwater technical expertise and its investment in its fleet.
2. Subsea 7 is a seabed-to-surface engineering, construction and services contractor to the offshore energy industry worldwide. We provide integrated services, and we plan, design and deliver complex projects in harsh and challenging environments.
3. For further information visit www.subsea7.com