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Addressing the Integration and Installation HSE Risks for Deepwater Projects

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Abstract

Modern day large deepwater projects tend to be truly international; it is not unusual for the hull to be constructed in Asia, the topsides facilities in the USA, the pipelines in South America and subsea equipment in Europe. A key issue arising from this complexity and geographical diversity is the requirement to identify, evaluate and mitigate the HSE risks associated with integrating and installing the many components either at an integration site and/or offshore. The industry has typically focused on identifying and assessing the operational risks through techniques such as HAZOPs, PHAs, fire & explosion analysis, etc. These techniques are well understood by the industry and offer a robust means of assessing operational hazards. This paper reviews how similar approaches can be used during the integration and installation phases.

The increasing complexity of projects has led to the focus on integration and installation risks increasing in recent years but the techniques utilized to identify and assess these risks are less well established and understood by the industry. This introduces the potential that key risks could go unidentified or inappropriate levels of assessment and mitigation are undertaken and embodied. Adopting the approach proposed here will provide assurance that risks during the integration and installation phases of a project are reduced to an acceptable level.

This paper presents a case study to demonstrate the techniques that can be employed to identify and evaluate the integration and installation HSE risks associated with complex deepwater projects. Through discussing the types of techniques available the paper goes on to present a holistic approach that can be utilized to identify and assess the risks to delivery of a successful project.

Introduction

The industry finds itself in a position where the greatest opportunities for the discovery and development of significant

oil & gas reserves are in deepwater or frontier regions. The costs associated with delivering the reserves to market are high and the levels of investment can run to billions of dollars. The recent experience is that to exploit the reserves in these areas requires full use of the global supply and services market available to the oil & gas industry. The high development costs and technological challenges make it essential that the industry brings world class capabilities to bear, whether it is the construction capabilities of the SE Asia shipyards, the pipe mills of Europe and South America or the topsides fabrication expertise along the US Gulf Coast. This approach introduces a complexity with respect to the integration and installation phase of a project¹. This increasing complexity has led to the focus on integration and installation risks increasing in recent years but the techniques utilized to identify and assess these risks are less well established and understood by the industry.



Figure 1 - Asian Shipyard

Risk Assessment Techniques

The industry has typically focused on identifying and assessing the operational risks through techniques such as HAZOPs, PHAs, fire & explosion analysis, etc. These techniques are well understood by the industry and offer a robust means of assessing operational hazards. The identification and assessment of the hazards associated with the integration and installation workscope of a project require the application of similar techniques but the approach and expertise required will tend to be different.

Typically the industry has relied on hazard identification techniques to both identify and assess the risks associated with integration and installation work. Although these types of techniques have proved adequate for the identification process, the level of understanding of the risk cannot be adequately guaranteed through this process. The hazard