



OTC 18776

Risk-Based Classification of Offshore Production Systems

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This paper was prepared for presentation at the 2007 Offshore Technology Conference held in Houston, Texas, U.S.A., 30 April–3 May 2007.

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Abstract

Risk based verification methods are being utilized more frequently in the offshore industry as a means of managing and confirming that an acceptable level of safety has been attained in the design and fabrication of production systems. In an effort to integrate this risk based approach with Classification and certification activities, a new process has been developed to obtain risk based Classification of production systems in lieu of the application of prescriptive Classification Rules. The information presented in this paper is based upon practical experience as well as ABS Guides and Guidance Notes on the application of risk assessment for Classification.

The fundamental concept of a risk based Classification approach is the development of a risk assessment to understand the risk contributions of each component within the scope, and then use this information to develop an installation specific Classification plan. The application of this plan will shift efforts in Classification activities (design reviews and surveys) towards the identified critical equipment.

This paper addresses the advantages of Classification through risk based verification as well as general methodologies employed from FEED through construction and commissioning. This procedure constitutes an innovative approach to the Classification of offshore installations, which is tailored to the specific design features of each installation, as opposed to the typical prescriptive rules which apply to all installations of a certain type.

The methodology described in this paper has been successfully implemented. Application of this methodology results in a reduction of the number of components to be reviewed by Class, shifting efforts towards the safety critical equipment.

Introduction

Class Societies have always implicitly considered risk and incorporated risk mitigation principles in their Rules. This has been accomplished in many ways throughout the history of maritime Classification. Most improvements and updates to the Rules throughout the years have been based upon reactions to accidents and failures. By learning from the experiences of the maritime industry, Rules are added and updated with the intention of mitigating Risk in the future. In the more recent history of Classification Societies (30-40 years) a more organized collection of information and analysis of failure trends had led to further refinement of the Rules. This analysis is commonly performed by utilizing techniques common to many standard risk analysis methodologies. The next logical step is to begin utilizing these methodologies as the basis of Class alone as opposed to using them to create and improve upon prescriptive Rules.

In 2004, ABS began providing Classification of production facilities through Risk Based Verification (RBV) in lieu of utilizing prescriptive Rules and Guides. Beginning with the FEED phase of engineering design and continuing through construction, ABS has been involved in development and Approval of risk tolerance criteria and performance standards for equipment and systems. This involvement allows for a large degree of flexibility toward methods of verifying the safe design and construction production facilities.

A significant effort was made to coordinate the RBV scheme for Classification with the QC activities of the FPSO owner and builder. This synchronization provides all parties (owner, builder, Class Society) with the advantage of each others cooperation and experience.

Experience has shown that Classification of production facilities through RBV can be performed successfully. While prescriptive Classification methods are still the norm, the potential of Class through RBV has been made evident. Risk based verification provides a “project specific” approach to Classification of production facilities that ensures that the significant risks to the facility have been sufficiently mitigated or eliminated.

Definitions

Major Accident Event

An accident that has the potential to cause substantial consequences. Substantial consequences are defined as any one of the following: