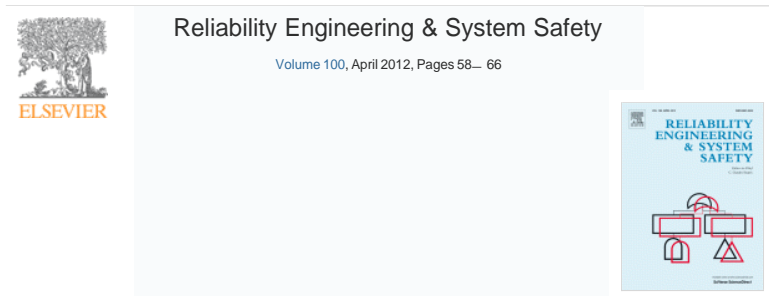


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Quantitative risk analysis of oil and gas drilling, using Deepwater Horizon as case study

Jon Espen Skogdalen , Jan Erik Vinnem
 University of Stavanger, Department of Industrial Economics, Risk Management and Planning, Stavanger, 4036 Stavanger, Norway
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Abstract

According to the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, the Macondo blowout requires a reassessment of the risks associated with offshore drilling. The Commission recommends a proactive, risk-based performance approach specific to individual facilities, operations and environments, similar to the safety case/Quantitative Risk Analysis (QRA) approach in the North Sea. A review of a 15 QRAs from the North Sea reveals that the analyses to a large extent only to calculate the frequency of blowout based on the number of drilling operations. None of the reviewed analyses were initiated based on Risk Influence Factors (RIFs) uncovered in the conceptual phase of well planning. The QRAs do not include Human and Organisational Factors (HOFs). As seen in the Macondo blowout, most of the findings were related to HOFs, e.g. working practice, competence, communication, procedures and management. The narrow drilling window related to deepwater drilling has to be controlled by safety barriers that are dependent on HOFs. There is some research relating to the incorporation of HOFs in QRAs. Further improvements in methodology and datasets are necessary to ensure that the QRAs are valid for the individual facilities, operations and environments.

Abbreviations

BOP, blowout preventer; GoM, Gulf of Mexico; HPHT, high pressure high temperature; HSE, Health and Safety Executive; LWC, loss of well control; MOC, management of change; NCS, Norwegian Continental Shelf; OCS, Outer Continental Shelf; QRA, quantitative risk analysis; RIF, risk influencing factor

Keywords

Quantitative risk analysis; Blowout; Deepwater Horizon

Figures and tables from this article:

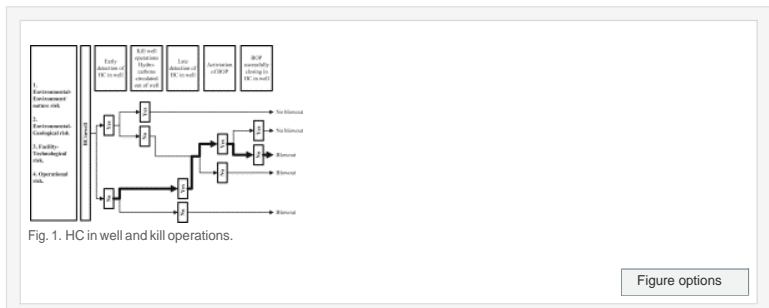


Table 1. HOFs that influence major hazard risks [49].


HOF	Influence
Human error	High
Organisational factors	Medium
Technical factors	Low
Environmental factors	Low

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Table 2. Categories of risk influencing factors.



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 Corresponding author. Tel./fax: +4799024171.
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