

Human and Organisational Safety Barriers in the Oil & Gas Industry

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The oil & gas industry is a safety-critical industry where errors or accidents may potentially have severe consequences. Offshore oil & gas installations are complex technical systems constructed to pump hydrocarbons from below the seabed, process them and pipe them to onshore refineries. Hydrocarbon leaks may lead to major accidents or have negative environmental impacts. The industry must therefore have a strong focus on safety.

Safety barriers are devices put into place to prevent or reduce the effects of unwanted incidents. Technical barriers are one type of safety barrier, e.g., blow-out preventers to prevent uncontrolled release of hydrocarbons from a well. Human operators may also have an important function in maintaining safety. These human operators are part of a larger organisation consisting of different roles and responsibilities and with different mechanisms for ensuring safety. This paper will present two research projects from the Norwegian oil & gas industry that look at the role of humans and organisations as safety barriers.

The first project used questionnaire data to investigate the use of mindful safety practices (safety-promoting work practices intended to prevent or interrupt unwanted events) and what contextual factors may affect employees' willingness to use these safety practices. Among the findings was that employees' willingness to use mindful safety practices was affected more by factors on a group level than factors at an individual or organisational level, and that the factors may differ depending on what is the object of a practice — the employee or other persons. It was also suggested that employees' willingness to use mindful safety practices could be an indicator used in the assessment of the safety level on oil & gas installations.

The second project is related to organisational safety barriers against major accidents. This project was based on a review of recent incidents in the Norwegian oil & gas industry, as well as interviews with personnel from the oil & gas industry with competence on major accidents. The purpose was to develop requirements to the properties of organisational barriers to ensure the effectiveness of the barriers, e.g., demands to capacity, functionality or reliability. A method for monitoring the organisational barriers was also developed. This method may be applied as a way to monitor the risk for major accidents in an organisation, and may also be used to communicate major accident risks across organisations or companies.

The projects and their findings are discussed in light of their relevance to the nuclear industry.