

# Samenvatting proefschrift

## Towards vision zero: The possibilities and challenges for accident prevention in the Danish oil and gas industry

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Op 2 december 2013 is Hanna B. Rasmussen (Deens-Pools) gepromoveerd aan de Syddansk Universitet in Denemarken. Haar proefschrift heet "towards vision zero: the possibilities and challenges for accident prevention in the Danish oil and gas industry". Hierin beschrijft zij mogelijkheden voor ongevallen preventie in de Deense olie- en gas industrie, die ook voor de Nederlandse industrie interessant kunnen zijn. Hieronder is het proefschrift in het Engels samengevat.

### Summary

This thesis describes accident prevention in the Danish oil and gas industry. It provides new knowledge about accident prevention within the Danish oil and gas industry and describes the possibilities and challenges of this task. The overall research question is:

*What are the possibilities and challenges in accident prevention in the Danish oil and gas industry?*

This topic was examined with a focus on:

- 1 involvement of employees (hereunder safety representatives) in safety work,
- 2 learning from near-misses, and
- 3 the attitude toward safety (safety climate) and risk perception among offshore employees.

These issues were explored in four articles, which are included in second part of the thesis. This thesis uses mixed methods approaches that include quantitative and qualitative methods. The first article examines the role of safety representatives and their participation in safety and the second article examines learning from near misses with qualitative methods; the third and fourth articles explore the association between risk perception and safety climate through the use of quantitative methods.

The thesis is divided into two main parts. Part I consists of seven chapters that constitute the overall framework for the thesis, while Part II includes the four articles. In Part I, chapter one introduces the aims, the main research problem, the research questions, and the conceptual model of the thesis, while the second chapter describes the industrial context. The theoretical framework is presented in chapter three, followed by methods in chapter four. The main results are briefly presented in chapter five and discussed in chapter six. The last chapter in Part I presents the conclusions.

### Culture makes social phenomena comprehensible and meaningful

Safety research constitutes a cross-disciplinary research field, which means that theoretical frameworks in the field are inspired by different sciences, such as sociology, psychology, anthropology, and engineering. This thesis is mainly based on sociological theory but also found inspiration in research on community-based approaches to promote health. The project has a broad approach to accident prevention because it focuses on all levels of the organisations and encompasses both structure and agency. One of the important elements in this thesis is the examination of culture/organisational culture and its influence on safety. In this thesis, the concept of culture is inspired by Alvesson (2002), who defined culture as existing not in people's heads but *between* people, and culture is central to our understanding of behaviour, social norms, institutions, and processes. Culture makes social phenomena comprehensible and meaningful.

### The safety representatives' roles and dilemmas in the Danish oil and gas industry

The first article explores the role of safety representatives, their participation in safety, and their dilemmas connected to their role. The study concludes that the role of safety representatives is unclear and that safety representatives find themselves caught between legislative demands and contradictory expectations from colleagues and management. The training of safety representatives is not very systematic apart from the mandatory environmental course. The study emphasises several dilemmas, such as the time required to perform the tasks required of a safety representative, the lack of support from management, and difficulties with influencing safety planning by safety representatives. The study concludes that the Danish safety representatives in the oil and gas industry meet the same challenges as their colleagues in Norway and the United Kingdom (UK) and that safety representative could increase the effectiveness of accident prevention.

### Using near-miss reports for accident prevention

The second article focuses on learning from incidents. All companies involved in the study have procedures in place and comply with these procedures; however, reports on near-misses as learning tools are still not used effectively. One of the barriers to the effective use of these reports is the underreporting of near-misses,

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particularly those related to personal behaviour. The study indicates several reasons for underreporting, including unclear definitions of near misses, employees' fear of reporting, and an overly demanding reporting system. As currently designed, the report systems are aimed at gaining an overview and log of the reports, which limit the possibilities of learning from these incidents.

### **The impact of human and organisational factors on risk perception**

The third and fourth articles examine the association between risk perception and safety climate/organisational factors. The first article shows that the organisational and human factors have an impact on the offshore employees' risk perception. Individual factors, such as safety behaviour, work experience, or experience of injuries, influence the risk perception of occupational hazards, while the priority of safety versus production influences the risk perception of process incidents. The study also shows that offshore employees' risk perception for both categories appears to be influenced by organisational factors, such as satisfaction with safety measurements (e.g., detection systems) and working conditions.

The fourth article identifies differences in risk perception between Danish and Norwegian offshore employees. Norwegian employees have a more positive perception of safety and management's involvement in safety than Danish offshore employees. However, the risk perception

for both process incidents and injuries are higher among Norwegian offshore employees than Danish offshore employees. Although the study found differences between these two populations, these differences are relatively small.

### **Conclusions**

Based on the findings from the four articles, this thesis identifies possibilities and barriers in accidents prevention within the Danish oil and gas industry. The possibilities could be found in the focus on safety within the industry; the development of procedural systems, which provide safety guidelines for the employees; reporting systems; safety organisations; and safety awareness among employees. If these factors could be strengthened, these changes would likely improve safety on oil and gas installations. However, this thesis also identifies some barriers, including a lack of focus on structural/organisational factors to prevent accidents, a fragmented view on accident prevention, lack of support from management in certain areas, lack of a long-term strategy to prevent accidents, and a lack of follow-up on and evaluation of actions taken. The overall conclusion is that while the Danish oil and gas industry is promoting accident prevention, there is still room for improvement. Accident prevention must be viewed as a complex process in which several factors are involved, and a more complex intervention program that simultaneously focuses on several factors and structural changes are required.