



Stress on the bridge of offshore vessels: Examples from the North Sea



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ABSTRACT

This paper reports result from a survey on 157 navigators (bridge officers) from eight offshore companies operating in the North Sea. The questionnaire measured stress, work pressure and sleep/rest (fatigue). Sleep/rest and work pressure explained around 35% of the variation in stress. Work pressure increases stress, and sleep and rest reduce stress both directly and through reduced work pressure. A positive work climate/supportive culture reduces stress on the bridge substantially through reducing work pressure and improving sleep and rest quality. The research indicates that age and the length of time that respondents have been seafarers do not have any influence on stress. However, a significant difference at the 10% significance level was found in relation to occupation (between first mate and other navigators). Around 30% of the respondents reported unsatisfactory sleep and rest during a normal day. More than 10% of the respondents reported that senior management was not interested in their health and safety, and more than 15% of the officers reported that they took short cuts to get their work done.

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1. Introduction

This paper is directed towards stress on the bridge of offshore vessels and how pressure and sleep/rest/fatigue might influence stress. Seafarers are often faced with time pressure and hectic activity during the course of their work. The environment aboard a vessel is also potentially stressful because the workforce lives in a 24/7 environment and works in one restricted location for a significant period of time without a break. A wide range of potentially dangerous duties are carried out in an environment which has the potential for incidents and accidents.

Such a potentially dangerous high stress situations might be working close to the oil platforms in tough weather conditions. Collision between fixed or floating oil installations and vessels is dangerous. Causation factors for incidents or accidents might be poor weather conditions and visibility, mechanical failures (loss of power, engine control failure or dynamic positioning failure) and human control failure (dynamic positioning operator failure, misjudgement of weather or manoeuvring misjudgement).

Anchor handling is another potentially high stress situation. Anchor handling is one of the most demanding and dangerous tasks performed in the offshore oil industry. When moving platforms and deploying anchors, bad weather, wet and muddy decks, heavy buoys and wires under strain are some of the risk factors involved in the process.

2. The conceptual model and hypotheses

Fig. 1 presents the conceptual model adopted in this study and the hypothesized relationships. The core model (stress, work pressure and sleep and rest) is based on a literature review and uses stress as the ultimate dependent variable and work pressure and sleep and rest (fatigue) as mediators. Risk behaviour, competence, supportive culture/work climate, reporting culture and safety attitudes are used as antecedents.

2.1. Stress

During the last 30 years there has been more and more focus on the undesirable influences of stress on health and accidents/incidents (e.g. Mitroussi, 2008; Leszczynska et al., 2007; Jezewska et al., 2006; Lützhöft et al., 2007). The Health and Safety Executive's (HSE) definition of stress is: "The adverse reaction people have to excessive pressures or other types of demand placed on them at work" (HSE 2012, Web 1).

Work related stress is, in other words, the process that arises where work demands exceed a person's coping capability. "Job related psychological stress is often attributable to high job demands, shift work, pressure, and limited scope for decision-making" claims Oldenburg et al. (2009) and might in turn lead to lack of control over work, psychological ill health, sickness, absenteeism and poor support from managers (Michie and Williams, 2003).

Agterberg and Passchier (1998) report higher work related stress in seafarers than in the general population. Seafaring is

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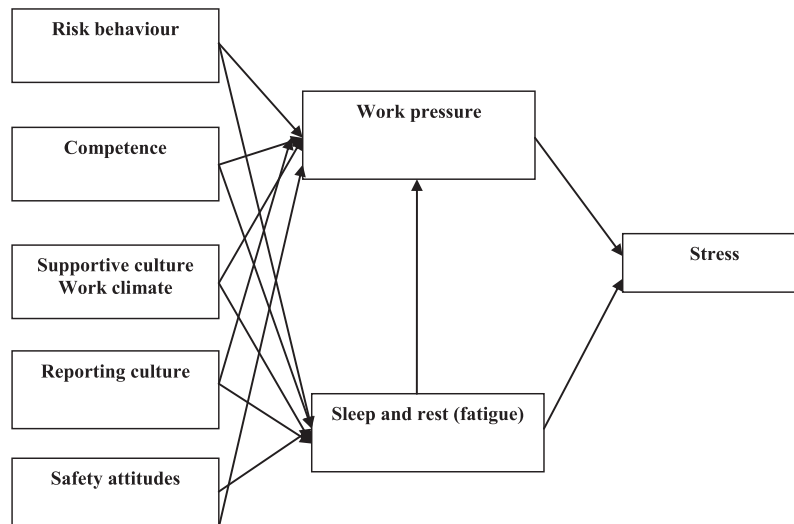


Fig. 1. The conceptual model.

associated with special mental, psychosocial and psychical stressors compared with jobs ashore. In recent decades there has been pressure on the manning aboard vessels and the number of crew has decreased considerably.

It seems as many seafarers experience stress that might lead to health and psychological problems in connection with their work.

Jezewska et al. (2006) found that almost 50% of the crew reported that they experienced stress aboard the vessel and Fairbrother and Warn (2003) found that 35 per cent of seagoing personnel and 25 point 9 per cent of officer trainees report too much stress associated with their job.

2.2. Work pressure

Work pressure indicates how people perceive their work. Several authors include the work situation as one of the main factors influencing behaviour. The work situation includes conditions like the psychical work environment, time pressure and high demands from the manager, colleagues and “customers” (e.g. Cox and Cox, 1996; Håvold, 2000, 2007a,b; Håvold and Nettet, 2009). According to WHO (World Health Organization) is pressure, when it is perceived as acceptable by an individual positive, and may keep workers alert, motivated, and able to work and learn, depending on the available resources and personal characteristics (Web 3).

However pressure from the work situation might be competition within or between individuals, departments or organizations, high expectations by managers or customers, imbalance between work and rest (Abel and Sewell, 1999; Houkes et al., 2001) leading to a feeling of resentment and anxiety (Donaldson and Gowler, 1975), depression and increased stress (Robertson and Cooper, 1983), fatigue (Rogers, 2008), trouble concentrating (Abel and Sewell, 1999) and problems with sleeping (Åkerstedt et al., 2002).

2.3. Sleep and rest

Rogers (2008), Lützhöft et al. (2007), Krueger (1994) and Harrison and Horne (2000) do all underscore the importance of sleep in connection to stress and fatigue. According to Rogers (2008) are “fatigue” and “sleepiness” often used interchangeably, they are distinct phenomena. Sleepiness refers to a tendency to fall asleep, whereas fatigue refers to an overwhelming sense of tiredness and lack of energy. Sleepiness and fatigue often coexist as a consequence of sleep deprivation.

Seafaring is shift work and involves rest and sleep in a 24/7 environment that involves noise, motion, heat and cold. Sleep under such conditions is often difficult and sleep loss is often related to fatigue and contributory to accidents/incidents (Åkerstedt et al., 2002; Bjørkum et al., 2004; Phillips, 2000).

Phillips (2000) reports that 39% of “Incident at Sea” reports in Australia describe sleeping or sleepiness as contributory to accidents and working on an offshore vessel means working long hours and night shifts. It is published several papers, discussing the negative effect of changing the biological 24-h rhythm. Fatigue can be accumulated by working long hours with inadequate recovery between the shifts (Rogers, 2008; Lützhöft et al., 2007; Krueger, 1994).

A high degree of fatigue and /or stress might lead to reduced awareness, productivity and increase in accidents and incidents. Dawson and Reid (1997) calculated that 17 h of sustained wakefulness had the same effect on performance as having an alcohol content of 0.05% in the blood.

When people are working in a state of fatigue on deck or on the bridge of a vessel performing critical tasks requiring a high degree of focus, the risk of making serious mistakes seems to become much higher (Trakada et al., 2007).

2.4. The links between pressure, stress and sleep

At times it is difficult to determine which comes first, insomnia or stress. Or they may arise together. Worry and stress are causes of sleeplessness. Stress has an effect on just about everything a person does. At any given time during the night, stress can affect a person’s sleep. Without taking steps to eliminate the cause, one may end up tossing and turning, destroying any potential of sound, peaceful sleep. On the other hand sleep problems are a major cause of physiologic stress. Trakada et al.(2007) claims that “As many as 17–24% of men and 5–9% of women in the USA, demonstrate an apnoea index of more than five events per hour of sleep, which was the originally proposed criterion for sleep apnoea” (p251).

Hetherington et al. (2006) find that the maritime industry differs from most others industries since pressure sleep and stress is woven into each other: “There is a particular combination of demands characteristic of the maritime industry such as fatigue, stress, work pressure, communication, environmental factors, and long periods of time away from home, which could be potential contributors to stress” (p402). Parker et al. (2002) reported

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