



Fatigue at Sea: Effects of the Two-Watch System

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Abstract

Background

Fatigue at sea and related issues such as stress and overload are highly important at present. Ships' crews are under pressure from schedules and economy, and have to handle their tasks with fewer crewmembers. Several incidents and accidents are attributable to fatigue, and the real number may be even larger, as a study performed by the Swedish Maritime Administration in 2006 indicates. A recent report describes that many factors in combination must be considered to understand fatigue at sea, such as poor quality sleep, environmental factors, high job demands and high stress (Smith, Allen, & Wadsworth, 2006). The purpose of the present study was to collect quantitative data about the fatigue level of bridge watch keepers on board ships.

Methods

The data collection consisted of interviews with shipping companies and a field study performed during visits (3–5 days) onboard 13 cargo vessels of different types, such as bulk carriers, car carriers and tankers. The table shows the methods used onboard ships.

<i>Instrument</i>	<i>Measure</i>	<i>Variable</i>
Questionnaire	Health questions	Subjective health
Sleep diary	Sleep duration & quality	Subjective sleep length and quality
Actiwatch	Acceleration	Objective sleep length, quality
Awake diary	Watch times, KSS	Subjective sleepiness
EOG	Eye blinks	Objective sleepiness
Reaction time	Reaction time	Reaction time differences

Results

Officers in the 6x6 watch system are more tired than the ones in the 4x8 system. 5.6% of all KSS scorings are 7 and over. This means that during 83 hours participants were tired. During 39 hours they were very tired, staying awake with effort or fighting sleep. 82% of the very high KSS values (over 7) are from 6x6 ships. The sleep on the two-watch ships is divided into two sleeps, very few of which are longer than approximately 4.5 hours.

Conclusions

Working more than 2x6 hours per 24 hours should be avoided since this leads to very high levels of sleepiness. There should always be two persons on the bridge during watch keeping. This conclusion indicates difficulties with a continued use of the two-watch system on ships with only two nautical officers. A survey of existing recommendations shows that most of them are directed to the ship and to individuals onboard. A mutual effort with commitment on all levels is a prerequisite in order to accomplish a change and an improvement.