MARITIME PERSONNEL'S SAFETY ATTITUDES

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ABSTRACT

Human errors are considered the most important reason for maritime accidents. The international safety management code (the ISM Code) has been established to clarify the responsibilities of safety on vessels and to cut down the occurrence of human errors by creating a safety-oriented organizational culture for the maritime industry. The ISM Code came into operation in worldwide shipping in 1998.

The purpose of this study is to recognize whether the safety culture has improved due to the ISM Code and evaluate the impacts of the ISM Code on maritime safety in Finland. The ISM Code provides the indicators for recognizing whether the safety culture exists in the maritime industry. These indicators are:

- an established and actively working process of continuous improvement
- commitment from the top management of the company
- motivated and encouraged personnel onboard to actively initiate safety improvements (personnel empowerment)

The research project consists of literature study and in-depth interviews which were carried out in 2008. In this study, we have discovered that a safety culture has emerged and it is developing in the maritime industry. The ISM Code has significantly contributed to the progress of maritime safety in recent years. Shipping companies and ships' crews are more environmentally friendly and more safety-oriented than 12 years ago.

The maritime personnel's safety attitudes have improved. The maritime personnel enthusiastically participate in the safety training. The organization on board is more open and relationships between officers and the crew are communicative. Working onboard is nowadays teamwork instead of being autocratic.

Even though the roots of a safety culture have been established, there are still serious barriers to the breakthrough of the safety management. This study shows that near-misses are not perfectly reported. Some mariners are still reluctant to report their mistakes. One of the most common deficiencies in the safety management systems concerns the reporting of the nonconformities and occurrences of accidents.

Keywords: **Maritime Safety, Safety Management, Safety Culture, ISM Code**

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1 INTRODUCTION

1.1 Background

Human errors are considered the most important reason for maritime accidents. The international safety management code (the ISM Code) has been established to clarify the responsibilities of safety on vessels and to cut down the occurrence of human errors by creating a safety-oriented organizational culture for the maritime industry.

The foundation of the ISM Code was laid in the late 1980s, when numerous fatal accidents had occurred. Particularly the capsizing of the Herald of the Free Enterprise in 1987 awoke broad concern in the maritime community about maritime safety. Through a thorough analysis of the accidents, the shipping community came to a resolution that the main reason for these accidents was human error. The roles and responsibilities of the crew were poorly described and this led to a situation where the bow door was left open without anyone noticing the imminent danger. Consequently, the roots of the numerous human errors were seen to stem from a lack of a comprehensive management system in relation to safety management in shipping (Anderson, 2003).

Also the accident of the ro-ro ship Estonia was caused by poor maritime safety culture. Hänninen (2007) showed that the characteristics of the maritime culture had prevented the precautions a long time before the accident happened. Hänninen saw that there is a lack of risk handling measures and that the risk management systems are underdeveloped in the maritime industry. Due to these deficiencies in the risk management systems, the maritime industry has poor procedures for handling incidents and safety warnings. The fact is that other bow visor failures had occurred even before the Estonia accident. Hänninen supposed that there might have been opportunities to avoid the bow visor failure of the Estonia if an industrial-level system for handling incidents such as bow visor failures had existed. There was no cumulative information about the other bow visor incidents in the industrial level so shipping companies could not learn from the other companies' mistakes. Even national maritime administrations were reported inadequately by the shipping companies.

Hänninen (2007) showed that there are major defects in the safety culture of the maritime industry:

- there is a higher tolerance to accept incidents and near misses in the maritime community
- shipping companies are more profit-oriented and neglect safety issues
- there is no systematic procedure for incident management
- mariners are not proactive about safety issues
- information about nonconformities does not cumulate in the maritime industry, and nonconformities are not accurately reported to the maritime authorities

In order to avoid fatal accidents in the future and in order to get improvements in the maritime safety operations there has to be a revolutionary change in the safety culture of the maritime industry.

1.2 Purpose and methodology of the study

Most of the previous studies regarding the impacts of the ISM Code have been based on quantitative methods, such as structured questionnaires of which the results have been analysed statistically. (Anderson, 2003; IMO, 2005; Paris MoU, 2008; Pun et al. 2003; Othman, 2003) The number of the respondents has been high. Thus, we could consider that the results of the previous studies were more or less representative when providing the general picture of the effects of the ISM Code.

The main merits of the previous quantitative studies are:

- The scopes of the previous studies have been global considering that the maritime industry is extremely global (Anderson, 2003; IMO, 2005; Paris MoU, 2008)
- the results of the previous studies reinforce the public impression that the ISM Code has achieved its objects and the majority of the world maritime industry supports the ISM Code
- the difficulties and deficiencies regarding the implementation of the ISM Code were uncovered

Moreover, the subjects of the further research were proposed. The IMO (2005) recommended that one should launch a study:

> "*employing researchers in the field to ensure that the views of non-supporters could be specifically captured*".

Anderson (2003) suggested that those shipping companies that have implemented their safety management systems successfully and gained benefit should be thoroughly investigated. Furthermore, a study investigating cultural and national differences in the perception of the ISM should be performed (Anderson, 2003). One should go beyond the questionnaires (ReportISM, August 2006)

The purpose of this paper is to study whether the safety culture has improved due to the ISM Code, and evaluate the impacts of the ISM Code on maritime safety in Finland. The research questions are based on the ISM code and they are:

1. Are there established and actively working processes for continuous improvement in the maritime industry?
2. Is the top management of the shipping companies committed to the safety?
3. Are the mariners motivated and encouraged to actively initiate safety improvements (personnel empowerment)?

We conducted a field survey the main target of which was to investigate the opinions and attitudes of active seafarers employed by Finnish shipping companies. Five Finnish shipping companies were involved in our research project. We visited ten ships and interviewed 47 people. The interviewees were designated persons (DP; the safety managers of the shipping company required by the ISM Code) and managing directors of the shipping companies, masters, other officers and members of the crew of the visited vessel. The interviews were carried out by in-depth interviews. The management were interviewed in their offices. The masters, the officers and the other crew members were interviewed on board at their actual work places, for example at the bridge and in the

engine room. The average duration of the interview was an hour. Six vessels were visited during their port calls. 28 interviewees were interviewed during the sea voyage.

2 MARITIME SAFETY CULTURE

2.1 Establishing a maritime safety culture

Due to the accumulation of disastrous maritime accidents in the 1980s and in the early 1990s, the maritime community made a serious attempt to create an accomplished safety culture for the maritime industry. The IMO adopted the concept of safety culture profoundly at that time (Anderson, 2003; Mitroussi, 2003 and 2004; Karvonen et al. 2006). The IMO's statement about the safety culture is composed as follows (IMO, 2008)

> *An organization with a "safety culture" is one that gives appropriate priority to safety and realises that safety has to be managed like other areas of the business.*

The IMO provides the ways in which the safety-oriented culture can be achieved in the shipping business. The IMO's means for achieving the safety culture are listed below:

- *recognising that accidents are preventable through following correct procedures and established best practices;*
- *constantly thinking about safety;*
- *and seeking continuous improvement.*

In practice, these prerequisites were established in the clauses of the ISM Code.

When establishing the ISM Code in the IMO in the early 1990's there was a prevailing assurance that poor maritime safety culture could be improved (Anderson, 2003; Mitroussi, 2003 and 2004; Karvonen et al. 2006). According to Anderson, the IMO's primary aim with the ISM Code was that there was a chance to create new safety-oriented culture in the maritime community in the course of time. There was great confidence that a safety-oriented culture could reduce accidents, damages, personal injuries and lost-time incidents in shipping operations. The safety culture provided by the ISM Code could contribute to safer ships and cleaner seas. In addition, Anderson saw that with the help of proper safety management, the business of the shipping company could be more competent (Anderson, 2003). The IMO expressed its firm confidence in the success of the ISM Code as follows:

> *"The application of the ISM Code should support and encourage the development of a safety culture in shipping. Success factors for the development of a safety culture are, inter alia, commitment, values and beliefs (IMO, 1995)."*

Hänninen showed that the prevailing culture, including the adopted values and preconceived beliefs, was the major barrier towards safety behaviour of the maritime personnel (Hänninen, 2007). Therefore, the major challenge when implementing the ISM Code is to create change in the values and beliefs of the maritime personnel.

2.2 Organizational culture

The concept of culture is adhered to the organizational context in this study. According to Schein (2001), a unique organizational culture could be established whenever and wherever a group of people join together for a reasonable period of time. Even a small group could form a culture of their own.

The concept of organizational culture is described in various ways in different literary works. According to Wiegmann et al. (2002), two main perspectives of the organizational culture are available.

- the socio-anthropological perspective
- the organizational psychology perspective

The organizational culture could be seen as an aggregation of symbols, heroes, rituals and values which are materialized as visible objects or practices. According to the socio-anthropological theory of the organizational culture, there is a deeper structure of culture inside the structure of symbols, heroes, ritual and values. This structure could be invisible for outside observers and it can be difficult even for the member of the organization to literally phrase the characteristics of the prevailing culture. Due to these unconscious and deep-rooted characteristics, Schein (2001) is convinced that the manipulation of the organizational culture is not an easy task.

As well as the socio-anthropological theory, the organizational psychology perspective of the organizational culture focuses on shared values and beliefs manifested through symbols etc. On the other hand, according to Wiegmann et al. (2002) organizational psychology perspective postulates that organizational culture consists of functional factors which could be manipulated. The organizational psychology theory believes that in the long run attitudes, beliefs and values can be changed through the methods of endurance management.

In order to rapidly improve the performance and effectiveness of the organization, one has to be deeply conscious of the factors of the prevailing organizational culture (Schein, 2001). The chosen measures for the improvement should coincide with the current organizational culture.

2.3 Safety culture

Safety culture has been examined as a part of the organizational culture. Wiegmann et al. (2002) have performed a comprehensive literature analysis concerning the safety culture. They have explored numerous definitions of safety culture in different industries for example within the energy industry, aviation and manufacturing. One of the most uncomplicated definitions of the safety culture is:

> *"Safety culture reflects the attitudes, beliefs, perception and values that employees share in relation to safety"*.

Wiegmann et al. establish their analysis of the safety culture on the organizational psychology theory. For the purpose of measuring organization's safety culture they represent indicators for an accomplished safety culture. These indicators are:

- organizational commitment,
- management involvement,
- employee empowerment,
- reporting system and
- rewarding system.

Krause et al. stated that the safety management system reflects the safety culture of the organization (Kristiansen 2005). The success of the safety management system is very depended on the prevailing safety culture.

2.4 How to change the safety culture

According to Schein (2001), the organizational culture is difficult to change. Schein described that changing the organizational culture might begin when something is threatening the survival of the organization. The purpose of the culture for an organization is to maintain the stability and predictability of the future. In order to change the current organizational culture there has to be something disturbing the ongoing stability. According to Schein, the organization culture affects the actualized operations through a cognitive framework of the people which are involved in the organization. The transformation of the organizational culture presumes an adaptation of a new cognitive framework of the personnel of the organization (Schein, 2001). Schein itemized two different ways to establish a new cognitive framework:

- imitation of and identifying with the role model provided by a management system (learning)
- trial and error until the behaviour remains successful (experiences)

According to the organizational psychology theory, the organizational culture could be developed by the systematic tools of management. Krause et al. represent the causation from the safety culture to the appearance of the incidents (near misses, hazardous situations, accidents etc.) (Kristiansen, 2005). The prevailing culture determines the phenomenon of the safety management system and its mediation into actualized operations. These causal relationships could be seen as bidirectional. In the long run, the actualized operations affect the safety culture through learning and the experiences of the personnel in the organization (Lanne, 2007).

The interactions between safety culture, safety management and active operations are shown in Figure 2.1.

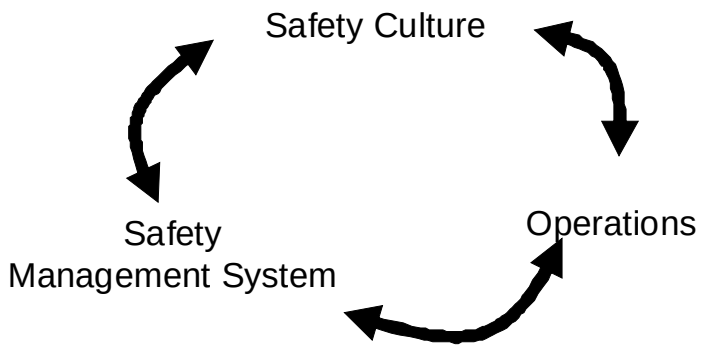

Figure 2.1: Interactions between safety culture and safety management and operations

2.5 Evaluating the maritime safety culture

According to Schein (2001), changing of the organizational culture presumes the adaptation of a new cognitive framework. Undoubtedly, the shipping companies which have successfully implemented their safety management systems have adopted the new cognitive framework provided by the ISM Code. The role of the top management is essential when adapting the new cognitive framework. The top management is required to act as a role model in terms of admirable safety attitudes. In this way, the top management is able to manifest its commitment to safety. The top management encourages and supports the personnel to actively report incidents and near-misses, and the top management gives positive feedback on safety initiatives made by the personnel. The personnel on all levels of the organization are willing to learn from incidents, near-misses and accidents (Schein, 2003; Anderson, 2003; IMO, 2005).

Schein (2001) proposed that one solution for the assessment of the organizational culture is to analyze the contradictions or inconsistencies between the manifested values and policies and actual operations.

Mejia (2001) proposed that the evaluation of the effectiveness of the ISM Code should be based on whether the desired objectives of the ISM Code have been achieved. According to Anderson (2003), the main objective of the ISM Code is to establish a safety culture for the maritime industry. In order to recognize that the safety culture exists we are required to specify the indicators used in the evaluation. Various lists of indicators have been presented in literary works dealing with quality and safety management (Deming, 1986; Juran and Godfrey, 1998; Mejia, 2001; Wiegmann et al. 2002; Anderson 2003).

For the purpose of evaluating the maritime safety culture we should base the evaluation on the intention set by the maritime community itself. The ISM Code provides the indicators for recognizing whether the safety culture exists in the maritime industry. These indicators are going to be utilized as the criteria for the forthcoming evaluation. The chosen indicators are listed below.

- an established and actively working process of continuous improvement
- commitment from the top management of the company
- motivated and encouraged personnel onboard to actively initiate safety improvements (personnel empowerment)

3 PREVIOUS ANALYSES OF THE ISM CODE

3.1 Implementation of the safety management system

Pun et al. have discovered the problems and difficulties which have appeared in the implementation phase of the ISM Code (Pun et al. 2002). According to Pun et al., the most difficult problems are:

- Resistance to change
- Lack of human resources
- Insufficient knowledge of procedures
- Lack of inter-departmental communication
- Low level of education
- Frequent staff turnover
- Time pressure to obtain registration of the SMS

Pun et al. mentioned that there was a mismatch between the prevailing organizational culture and the requirements of the ISM Code (Pun et al. 2002).

Also Anderson (2003) listed the problems and difficulties with the implementation of the safety management system. Anderson identified certain common factors which describe the unsatisfactorily implemented safety management systems. Anderson found out that there was too much paperwork due to voluminous documentation; a typical situation when a company has bought an off-the-shelf safety management system. Many irrelevant procedures and irrelevant checklists are involved in these systems. In these cases, safety management was usually realized through paperwork exercises and the personnel could not develop any feeling of involvement in the system. The company did not provide support for the personnel. The vessels have suffered from a lack of resources and insufficient training for the new requirements of the ISM Code. So the motivation for safety management of the personnel is low. Also, Anderson paid attention to the turnover of the personnel. Anderson emphasized that establishing a safety culture is not easy when the turnover of the crew is high. Too often, the new employee has been familiarized too poorly (Anderson, 2003).

On the other hand, Anderson identified the success factors of a very well functioning safety management system which entail for example:

- Leadership and commitment from the top management, i.e., from the ship owner
- The personnel have a sense of ownership of the safety management system and are empowered to safety
- Good communication between ships and office

- Paperwork has been reduced to manageable levels

In order to uncover the benefits of the ISM Code to the Malaysian shipping companies, Othman carried out an evaluation of the effectiveness of the safety management system in the Malaysian shipping companies in 2003. Othman compared the compliance of the shipping companies' safety management systems with particular elements of the ISM Code. He detected that almost 80 per cent of the companies had effectively implemented the requirements of the ISM Code into their safety management systems (Othman, 2003). Othman observed that the major gap found between the implemented safety management system and the requirements of the ISM Code was related to system documentation. Over 40% of the cases indicated that the documentation process was non-compliant with the ISM Code.

Hahne et al. analyzed the prevailing safety culture in the late 1990s. In a study by Hahne et al. the safety attitudes of the shipping companies and maritime personnel towards the ISM Code were examined. The purpose of the study was to find out the problematic areas encountered with the implementation of the ISM Code. Researchers came to the conclusion that the main obstacle to the successful implementation of the ISM Code was the widespread resistance by the seafarers to the *obligatory* establishment of the safety culture. According to Hahne et al., the maritime industry was not ready for the ISM Code at that time (Hahne et al. 2000).

3.2 Improvement of maritime safety

Some international studies have been carried out to explore what the significance of the ISM code is to the safety culture in the maritime industry (IMO 2008b).

Anderson investigated the impacts of the ISM Code in a wide international survey in 2002 (Anderson, 2003). Anderson found out that it is quite difficult to get objective evidence of the impacts of the ISM Code on maritime safety. According to Anderson, there is no relevant "hard data" on which the impact analysis could be based.

The second study was organized by the IMO. An Independent Experts Group has been established by the IMO Secretariat to study the impact of the ISM Code (IMO, 2005). The Group of Experts (IMO, 2005) attempted to get objective evidence (hard facts) of the ISM impacts on maritime safety. However, the Group found this difficult and so the Group could not draw comprehensive conclusions when determining the impact of the code. The Group tried to collect data based on Port State Controls and from IACS (International Association of Classification Societies) and P&I Clubs (Protection and indemnity, mutual insurance associations).

Both Anderson and the Independent Experts found it impossible to claim quantitative benefits gained by implementing the safety management system. Appropriate statistics and measures of safety performance of the shipping companies were unfortunately not available (Anderson, 2003; IMO, 2005).

Stuart Withington has considered the means of measuring the progress of the improvement of the safety management system (Withington, 2006). According to Withington, accurate reporting of incidents and defects could provide the fundamental

basis for evaluating the effectiveness of the ISM Code. Unfortunately, he has recognized that regardless of the requirements of the ISM Code, in practice, severe insufficiencies in the reporting of the shipping companies can be found. The level of the reporting varies significantly between companies, flag States and port States. Withington (2006) has noticed that neglected reporting is due to the fear of blame and criticism.

The Paris and the Tokyo MoU have conducted three Concentrated Inspections Campaigns (CIC) concerning the compliance of the implemented safety management systems with the ISM Code after the year 1998 (Paris MoU, 2008). The previous campaigns in 1998 and 2002 focused on verifying that the safety management systems were created on board in compliance with the ISM Code. The last campaign in the autumn of 2007 focused on verifying that the safety management system is working effectively in practise. Moreover, the duty of the Port State Officers was to confirm that the safety management system was not mainly a paper exercise. The inspection officers paid special attention to the fact that the master was fully conversant with the SMS and that the crew was able to communicate effectively when executing their duties related to the SMS.

The Paris MoU reported that 20 per cent of the inspections indicated non-conformities onboard of the inspected vessels. The study entailed inspections of 5 427 vessels (Paris MoU 2008). ISM deficiencies were found on 1 031 ships. 176 ships were detained due to major non-conformities with the ISM Code. The Paris MoU detected that the safety management systems were poorly implemented in the detained ships. The safety management systems were treated as dead letters although the documentation consisted of a mountain of paper. The Paris MoU reported that the most common non-conformities dealt with the following issues:

- effective maintenance of the ship and equipment
- emergency preparedness
- reports of nonconformities and accident occurrences

All three issues are considered as key areas in regard to the safety of the ship and its crew. Notwithstanding that the Paris MoU came to the conclusion that the safety management systems are gradually starting to work on ships. The Paris MoU realized that most of the shipping companies and the crews of their vessels understand the safety requirements and implement them. (Paris MoU, 2008a; Paris MoU, press release January 2008)

Also the Tokyo MoU published the results of the CIC in the beginning of 2008 (Tokyo MoU press release February 2008). The Tokyo MoU sets two major targets to the inspection campaign: first, it is studied whether the safety management system is implemented effectively and second, whether the safety management system is actively maintained. The results of the Tokyo MoU were a little more optimistic than the results of the Paris MoU. The results indicated that for most ships and ISM operators, the safety management system was functioning and properly understood onboard.

The MCA's (British Maritime and Coastguard Agency) study was one of the latest evaluations of the impact and effectiveness of the ISM Code (ReportISM, May 2008). The primary goal was to study the influence of the ISM Code on the development of a safety culture in the commercial shipping industry. The results of the research project were published during the meeting of the IMO Maritime Safety Committee in May 2008. The objectives of the study were as follows:

- To evaluate how effectively the ISM Code has improved safety and safety culture while it has prevailed.
- To compare the effects of the ISM implementation between the UK Fleet and the other "white-listed" member states of the Paris MoU.
- To find out what other safety or quality approaches, such as the ISO 9001 or TMSA (Tanker Management and Self Assessment), are utilised in the maritime industry in order to identify what improvements should be integrated into the ISM Code in future revisions.
- The British Maritime and Coastguard Agency attempted to understand how the implementation of the ISM Code has enhanced maritime safety and the protection of the marine environment.

The basic result of the MCA study was that the shipping industry is a safer and a more environmentally friendly industry than it was 12 years ago when the ISM Code became mandatory. The study indicated that there is a common consensus about the positive contribution of the ISM Code to the maritime safety although the direct effects and influences of the ISM Code could not be isolated very well from the other factors such as those established by STCW and MARPOL etc. Also these factors have made a contribution and brought improvements to maritime safety at the same time as the ISM Code has been prevailing (ReportISM, May 2008). The MCA attempted to provide an analysis based on the Port Sate Control statistics concerning ISM-related non-conformities and statistics of Port State Control detentions due to incompliance with the requirements of the ISM Code. The MCA found out that no meaningful results could be provided due to a lack of data from pre-ISM phase before 1998. Furthermore, the MCA discovered that only few detentions of the UK flag ships have occurred during the examined time period.

The MCA found out that there are *great* barriers to the development of the safety culture in maritime industry. One of the most significant factors is the transient nature of the work force hired onboard. Especially the turnover of the crew hired from a labour hiring company is high, which might cause difficulties when establishing the safety culture. The second factor recognised by the MCA was the distance of the asset owner from their ships. The MCA found out that where there was strong leadership, the germ of a safety culture was growing. (ReportISM, May 2008.)

4 RESULTS OF THE INTERVIEW STUDY

The purpose of this interview study was to discover if the safety culture exists in a shipping company and onboard a vessel. The indicators of the safety culture are: management commitment, personnel empowerment and continuous improvement. These indicators formed the main themes of our interview study. The key results of the interviews are structured under these themes.

The interviewees were divided into four groups. The management group included safety managers (DPs) and the managing directors of the shipping companies involved in our study. The management group consisted of 9 interviewees. The group of the masters consisted of 12 persons, and the group of other officers consisted of 15 persons. Other crew members formed a group of 11. The total amount of the interviewees was 47.

The interviews were carried out by in-depth interviews. A structured questionnaire was provided in order to comprehensively examine the research area. The purpose of the questionnaire was to assist the interviewer and serve as a reminder.

The interview sessions resembled discussions. The interviewees were encouraged to express themselves freely in order to find out the most important issues from their point of view. The questions were not represented similarly to the interviewees. Therefore, the formulation of the answers varied significantly. In order to summarize the answers we have collected the answers under same headings.

4.1 Management commitment

The IMO manifested that the cornerstone of good safety management is commitment from the top management (IMO, 2008a). The company is responsible for supporting the personnel and providing adequate resources for safety management.

The management were asked about the goals of the safety management. Seven managers of the nine interviewed said that the major safety goal of the company is to achieve at least the average level of safety when compared to the other Finnish companies. The managers (7 answers) assured the researchers that their companies have achieved the target level. Only one representative of the management expressed self-criticism. This interviewee told the researchers that the top management (the executive board) of the company lacked seafaring experience. The interviewee supposed that the lack of seafaring experience could prevent the comprehensive understanding of the safety requirements.

On the contrary, the masters (12), the officers (15) and the other crew members (11) were asked about their opinion about their employer's safety level. Most of the masters (8) considered that their employers had achieved at least the average national level of safety. The other officers (9 answers) and some of the other crew members (6 answers) considered that the safety levels were at least the average. The other members of these groups were not asked about the safety level of their employing company or they did not mention any opinion about the safety level. No one of the interviewees believed that their employing shipping company had been below the average safety level.

The masters, the officers and the crew were asked how the management supports the personnel on safety issues and how the management gives feedback about safety issues. In addition, they were asked whether there are any contradictions between the manifestations of the company's safety policy regarding goals, measures or values and the actual practices of the management.

Some of the masters (5 answers) and some officers (7) mentioned that the basic way to support the vessel on safety issues is to provide financial resources when needed. These interviewees said that the top management provide money or other resources for safety investments particularly if the need is well-founded.

Many of the interviewees (15 answers totally) could not see any contradictions between the company policy and the actual practices (typically investments on safety improvements) of the management. Some of the interviewees (4 answers totally)

expressed a critical opinion. They told the researchers that sometimes for financial reasons, even the well-founded improvements are rejected. One officer criticized that there had not been enough human resources in order to update and make renewals to the safety management system.

Some of the interviewees were asked how the management communicate to the personnel on safety issues. Particularly the employees of the smaller shipping companies (7) told the researchers that the management of the company have visited the vessels regularly and have chatted with the personnel. One shipping company had adopted a good practise to keep a log about the visits of the management on board. Some officers (4 answers) and the other crew members (5 answers) told that they did not have any direct communication with the management. They have had communication with the master of the vessel. Six masters answered that they have been satisfied with the communication between the vessel and the management ashore.

On the other hand, the representatives (7 answers) of the bigger shipping companies hoped that the top management would visit the vessels more regularly. The interviewees (5 answers) told that the safety managers (DP) took care of communication between the office and the vessel. In some cases, (3 answers) the safety managers were commended for the good communication by the interviewees.

Some interviewees told the researchers that the management should give more positive feedback to the personnel about the progress of safety management. The management should award the personnel for actions which benefit the safety of the vessel. In some cases, the management were criticized because they occasionally neglect to give feedback on incident reports and safety proposals.

Many interviewees (11 answers) commended their masters. They told that their masters have good capabilities to collaborate and manage people. Particularly the mates whom we interviewed commended that the working conditions on the bridge had become more communicative and more respectful towards other employees. The maritime personnel feel that nowadays the work onboard is teamwork.

4.2 Personnel involvement and motivation

The IMO (2008a) declares that the safe management and operation of ships depends on the personnel at all levels of the company. The safety culture can only improve if individuals at all levels of the organisation are committed and motivated to the safety and if all individuals have adopted a positive attitude towards the safety management system. The special role is appointed to the master. The master's responsibility is to actively motivate the personnel (IMO, 2008a)

The motivation and involvement of the personnel was discovered by asking: How do the personnel communicate with each other regarding safety issues? And how do the personnel make proposals concerning safety issues?

The interviewed masters (11 answers out of 12) believed that the maritime personnel have courage to express their opinions and make proposals for improvements on safety issues.

The management's answers polarized. Five managers believed that their personnel dare to express themselves freely. Four representatives had an opposite opinion. They believed that the personnel should encourage themselves to express their opinion and make proposals for improvements. These managers (4 answers) expected that the personnel should report incidents more actively.

Some masters and some managers told the researchers that although the Finnish mariners have courage to discuss with their superiors, they believed that the mariners are not willing to make reports or safety proposals on paper. The interviewees told that the reporting of the incidents and near-misses has frequently been neglected.

The officers (10 answers) and the other members of the crew (9 answers) assured the researchers that they have no barriers to communicate with their superiors.

Some masters and some managers (6 answers in total out of 21) told the researchers that the personnel were highly motivated to participate in the safety training. The interviewees told the researchers that some members of the crew were even enthusiastic. The interviewees consider that safety training is more systematic and planned by virtue of the ISM Code. The safety training is organized regularly. The safety training is performed weekly on the passenger ships and monthly on the cargo vessels. The interviewees believed that the motivation of the personnel has improved due to well-ordered safety training.

4.3 Continuous improvement

The ISM Code requires that the shipping companies establish procedures which ensure that the non-conformities, accidents and hazardous occurrences are reported to the company (usually called reporting of incident and near-miss situations in the previous literature). Naturally, the companies should ensure that the corrective actions are implemented. (IMO, 2008a)

In order to evaluate the processes of continuous improvement, we have asked: How are the incidents and near-miss situations reported and analysed in your company and how are the corrective actions performed? In addition, the safety managers were asked about the quantities of the reported incidents per year and per vessel. The designated persons were asked about the existence of the quantitative targets, indicators or usage of the statistical methods for evaluating the safety performance of the company.

The safety managers (DP's) and the masters of the vessels were asked about the number of the reported incidents and near-misses per year. The number of the written reports was low; just a few reports per year and per vessel. The average number of the reported incidents and near-misses varied from 1 to 3 per vessel per year. The exact figures were not represented because no statistical method had been utilised. One shipping company had implemented a new database into which they will collect the incident records in the future.

Reasons for unwillingness to report were mentioned. Some (5 answers) interviewees thought that people are ashamed if something happens. One interviewee told the researchers that some masters discourage the reporting because they think that nothing

should happen on their ship. Especially the older seafarers considered that the minor incidents should not be reported. They considered it bureaucratic. Notwithstanding, some interviewees thought that the unreported incidents and near-miss situations are discussed onboard. Improvements are made although the written reports do not exist.

No quantitative measurements or statistical methods were utilised in the studied companies. The safety managers considered that there is a lack of suitable measurements. The safety managers thought that the measurement should be developed. The quantitative measurements could be useful in order to allocate resources for the safety improvements. At the worst, the management do not wake until something has gone wrong.

5 CONCLUSIONS AND FURTHER RESEARCH

The literature review showed us that the ISM Code has significantly contributed to the progress of maritime safety in recent years. Shipping companies and ships' crews are more environmentally friendly and more safety-oriented than 12 years ago. This has been showed by several studies which have been analysed for this research (Othman, 2003; Anderson, 2003; IMO, 2005; Paris MoU, 2008; ReportISM, May 2008).

The results of our interview study support the general view of the previous studies. The safety culture has emerged and it is developing in the Finnish maritime industry. The maritime personnel act more safety-oriented than before the implementation of the ISM Code. The top management of the studied shipping companies consider safety as a value of the shipping business.

The relationships and communication between shore and sea personnel has improved due to the applications of the ISM Code. Communication between the officers and the crew has improved. The working culture on board is no more autocratic.

The safety attitude of maritime personnel has improved. Improved attitudes are expressed especially in safety training. The well-organized training increases the motivation of the personnel.

One of the major shortcomings concerned the reporting of incidents and near-miss situations. The referenced studies showed that incidents and near-misses are not perfectly reported. Some mariners are still reluctant to report their mistakes (Withington, 2002; Anderson, 2003). Also the Paris MoU (2008) reported that one of the most common deficiencies relates to the incident reporting. Furthermore, Anderson (2003) uncovered that in certain cases, further analysis and corrective actions of the reported incidents were not properly carried out.

Our interview study showed that the maritime personnel's attitude towards incident reporting is unsatisfactory. The interviewed mariners admitted that the reporting has often been neglected. The small amount of the reported incidents supports the conclusion.

The poor reporting practises cause further problems. The information about the non-conformities, accidents and hazardous occurrences does not cumulate at any level of the maritime industry. The personnel of the other ships cannot learn from the experiences of the other vessels. There are no possibilities to interchange information about incidents

between the vessels. The company cannot utilize the cumulative information when improving its safety performance. Companies do not have the opportunity to learn from other companies' mistakes. The national maritime administrations are powerless in their attempts to develop the maritime safety.

The fundamental philosophy of the IMS Code is the philosophy of continuous improvement. The procedures for reporting the incidents and performing the corrective actions are the essential features of the continuous improvement. Under these circumstances, the successful cycle of continuous improvement cannot function.

Our further research concentrates on discovering the obstacles and difficulties in incident reporting. We will arrange several workshops in co-operation with the shipping companies. The purpose of the workshops is to analyze the procedures for incident reporting and the procedures for corrective actions. The objective of the workshops is to generate the best practices possible for improving the safety management procedures of the shipping companies. In addition, we will collect benchmarking data from other industries, for example the aviation and the oil industry.

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REFERENCES

Anderson, P. (2003), *Cracking the Code – The Relevance of the ISM Code and its impacts on shipping practices*, The Nautical Institute, London.

Deming, W. E. (1986), *Out of the Crisis*, MIT Press, Cambridge, MA USA

Hahne, J. Baaske, G. Rothe, R. Schulte-Strathaus, R and Quas, O. (2000) Assessment of deficiencies in the organisation of work in shipping, Wirtschaftsverlag NW Verlag für neue Wissenschaft GmbH , (*Schriftenreihe der Bundesanstalt für Arbeitsschutz und Arbeitsmedizin: Forschungsbericht, Fb 835*),

Hänninen, H. (2007), *Negotiated Risks: the Estonia Accident and the Stream of Bow Visor Failures in the Baltic Ferry Traffic*, Helsinki school of economics, Helsinki

IMO, (1995), *Guidelines on the Implementation of the International Safety Management (ISM) Code*, Annex to IMO Assembly Resolution A.788(19), International Maritime Organization, London

IMO (2005), *Role of the Human Element – Assessment of the impact and effectiveness of implementation of the ISM Code*, International Maritime Organization, MSC 81/17

Juran, J.M. and Godfrey, A.B. (Editors in chief) (1998), *Juran's Quality Handbook*, fifth edition, McGraw-Hill, New York

Karvonen, T. Keltaniemi, A. Sundberg, P. Tikkanen, R. Nyman, T. Porthin, M. & Sonninen, S. (2006), Merenkulun turvallisuuden hallinta - (Maritime safety administration) *Merenkulkulaitoksen julkaisuja 6/2006*, Finnish Maritime Administration (FMA), Helsinki

Kristiansen, S. (2005), *Maritime Transportation – Safety management and Risk Analysis*, Elsevier, Amsterdam

Lanne, M (2007), Yhteistyö yritysturvallisuuden hallinnassa (Co-operation in corporate security management), VTT, *VTT Publications 632*, Espoo

Mejia, M (2001), *Performance Criteria for the International Safety Management (ISM) Code.* Proceedings of the 2nd General Assembly of IAMU International Association of Maritime Universities 2 / 5 October 2001 – Kobe, Japan

Mitroussi, K. (2003), "The evolution of the safety culture of IMO: a case of organisational culture change, *Disaster Prevention and Management*, Vol. 12 No. 1 pp. 16 - 23

Mitroussi, K. (2004), "Quality in shipping: IMO's role and problems of implementation", *Disaster Prevention and Management*, Vol. 13 No. 1 pp. 50 -58.

Paris MoU (2008), *Evaluation CIC on ISM in 2007*, Paris MoU on Port State Control, Port State Control Committee 41st session, 19-23 May 2008 Loutraki, Greece

Paris MoU (2008a), *Annual report 2007*, Secretariat Paris Memorandum of Understanding on Port State Control, Hague

Pun, K. Yam, R. Lewis, W. (2003), Safety management system registration in the shipping industry, *International Journal of Quality & Reliability Management;* Volume 20, Issue 6, 2003

Othman, M. R. (2003), *Effectiveness of Safety Management Systems (SMS) BY Malaysian Shipping Companies in Compliance to the International Safety Management (ISM) Code* http://www.ismcode.net/research_projects/wmd_2003_paper.pdf

Schein, E. (2001) *Yrityskulttuuri, selviytymisopas; tietoa ja luuloja kulttuurinmuutoksesta, (The Corporate Culture, Survival Guide)* Laatukeskus, Helsinki

Wiegmann, D. Zhang, H. von Thaden, T. Sharma, G. and Mitchell, A, (2002), *A Synthesis of safety Culture and Safety Climate Research,* Aviation Research Lab Institute of Aviation, University of Illinois, Savoy

Electronic sources:
IMO (2008a) International Safety Management (ISM) Code 2002, (http://www.imo.org/HumanElement/mainframe.asp?topic_id=287), International Maritime Organization, accessed Sept 8 2008

IMO (2008b), Information resources on the international safety management code, (http://www.imo.org/includes/blastDataOnly.asp/data_id%3D21592/ISMCode_12May2008_.pdf), International Maritime Organization, accessed Sept 8 2008

ReportISM, August 2006,
http://www.consultism.co.uk/ReportISM_August_2006_PDF.pdf

ReportISM, May 2008, http://www.consultism.co.uk/ReportISM_May_2008_PDF.pdf

Withington, S. (2006), ISM – What has been learned from marine accident investigation? Source: http://www.he-alert.com/documents/published/he00475.pdf