IMISS2013 – PROCEEDINGS OF THE INTERNATIONAL SCIENTIFIC MEETING FOR CORPORATE SOCIAL RESPONSIBILITY (CSR) IN SHIPPING

2nd International Maritime Incident and Near Miss Reporting Conference 11-12 June 2013, Kotka, Finland

Vappu Kunnaala

Jenna Viertola

(eds.)

European Union
European Regional Development Fund

Leverage from the EU
2007–2013

CAFE } COMPETITIVE ADVANTAGE BY SAFETY

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Turku 2013

FOREWORD

Kotka Maritime Research Centre (KMRC) organized the 2nd International Maritime Incident and Near Miss Reporting Conference 11-12 June 2013, in Maritime Center Vellamo, Kotka, Finland. The conference was opened and the participants were welcomed by Henry Lindelöf, Mayor of Kotka City. Over hundred participants came from countries like Australia, USA, Great Britain, Sweden, Estonia and Finland.

Maritime safety in general has become an important topic in the whole Baltic Sea Region for many reasons such as increased oil and chemical transportations and difficult navigation conditions especially in wintertime. Baltic Sea does not tolerate any large oil accident, especially not during the harsh icy period.

The main topics of the CSR special session were Corporate Social Responsibility in maritime industry, Sustainability in shipping, Economic interests against social and environmental concerns in shipping and Self-regulative activities in shipping. This two day seminar was filled with very interesting presentations with critical but constructive views regarding the existing shipping culture. The conference also wanted to bring in to discussion the so called human factor in maritime accidents. In the afternoon of the second day, the attendees were divided to three workshops, which covered the topics of the seminar. For the best paper, after lively discussion, the jury nominated "CORPORATE SOCIAL RESPONSIBILITY AND THE QUALITY OF SEAFARERS ACCOMMODATION AND RECREATIONAL FACILITIES" by Neil Ellis and Professor Helen Sampson, Cardiff University.

EU considers maritime issues in Baltic Sea Region very important by funding research projects like Competitive Advantage by Safety (CAFE), which was coordinated by KMRC. The funding was received from the European Regional Development Fund. This conference was one part of the dissemination of the CAFE project. Partners of the project consortium were Kotka Maritime Research Centre, Centre for Maritime Studies at the University of Turku, Aalto University School of Engineering, Turku University of Applied Sciences and Kymenlaakso University of Applied Sciences.

On behalf of the organisers of the IMISS 2013 conference I want to thank all the partners of the CAFÉ project, the authors, who submitted interesting papers to the conference and all participants attending the conference. Special thanks I want to address to MSc Vappu Kunnaala and MSc Jenna Viertola who professionally edited this book.

Kotka 25th November 2013

Esa Hämäläinen, Professor
University of Turku, Centre for Maritime Studies
Kotka

CAFE PROJECT FINANCIERS

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KOTKA
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Jenni Storgård, Project Manager, University of Turku
Nora Berg, Trainee in the Centre for Maritime Studies, University of Turku
Olli-Pekka Brunila, Researcher, University of Turku

SEMINAR PROGRAMME

IMISS2013
2nd International Maritime Incident and Near Miss Reporting Conference
11-12 June 2013, Maritime Center Vellamo, Kotka, Finland

PROGRAMME DAY 1:

10:00	Registration and coffee Moderator, Mikael Panelius, Cruise Manager, TallinkSilja Oy
11:00	Opening words Henry Lindelöf, Mayor of Kotka City
11:15	Maritime Safety in European level Tuomas Routa, Director General, Finnish Transport Safety Agency
11:40	Maritime Safety is a Competitive Advantage! Pekka Räisänen, Principal Lecturer, Naval Architecture, Turku University of Applied Sciences
12:30	Lunch
13:45	Understanding human error and Safety implications of the Costa Concordia accident Dr. Jens-Uwe Schröder-Hinrichs, Associate Professor, World Maritime University
14:30	EU Strategy for the Baltic Sea Region Jouni Lappalainen, Researcher, University of Turku Centre for Maritime Studies
15:00	Accident of Wasa – a modern analysis of causes Cecilia Österman, Kalmar Maritime Academy, Linnaeus University
15:45	End of official programme for the day

PROGRAMME DAY 2:

9:00	Registration and coffee
9:30	The role of Member States in the European Union decision making process in the Maritime Sector Päivi Wood, Counsellor, Permanent Representation of Finland to the EU

10:00	The Management of Seafarer Fatigue Professor Mike Barnett and Associate Professor Claire Pekcan, Warsash Maritime Academy, Southampton Solent University
10:30	Key Note Speech: "Corporate social responsibility and shipping; the role of governance failure" Professor Michael Roe, School of Management, Plymouth University
11:30	Lunch
12:30	Parallel sessions

Parallel session 1: Work safety in shipping

Räisänen: Workshop on Occupational Accidents

Halme: MLC2006 Improves Occupational Health and Safety

Parallel session 2: Corporate Social Responsibility in shipping

Lappalainen, Kunnaala & Storgård: The Social Benefits of Maritime Pilotage

Kunnaala, Lappalainen & Storgård: CSR in the Baltic Sea Maritime Sector

McSweeney, Craig & Tomlinson: Using Safety Metrics to Support CSR Goals & Objectives

Ellis & Sampson: CSR and the Quality of Seafarer Accommodation and Recreational Facilities

Anantharaman: Port State Control Inspection in the Shipping World

Storgård, Berg & Brunila: Insight in Ship Crews

Parallel session 3: Safety management in maritime sector

Mazaheri, Hyttinen, Sormunen: Evidence-based modeling by utilizing accident/incident reports

Jalonen: A Systematic View on Maritime Safety

Hänninen: From Data to Information, Knowledge and Understanding

Pasanen: Analysis and Safety Indicators in Shipping

Valdez Banda: Extracting indicators from maritime safety normative

Valdez Banda: The Bayesian Network Model of Maritime Safety Management

15:30   Concluding words

16:00   End of conference

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Österman, Cecilia	Kalmar Maritime Academy, Linnaeus University

CALL FOR PAPERS

International Scientific Meeting for Corporate Social Responsibility (CSR) in Shipping
Special Session in IMISS 2013 Conference
11-12 June 2013, Maritime Centre Vellamo, Kotka, Finland

Call for Papers

International Scientific Meeting for Corporate Social Responsibility in Shipping will be held in Kotka, Finland on 11th to 12th of June 2013.

The special session will be held during the 2nd International Maritime Incident and Near Miss Reporting Conference 2013 (IMISS 2013). The session will focus on the following topics:

- Corporate Social Responsibility in maritime industry
- Sustainability in shipping
- Economic interests against social and environmental concerns in shipping
- Self-regulative activities in shipping

Key note speaker Professor Michael Roe, Plymouth University: "Corporate social responsibility and shipping; the role of governance failure".

We invite researchers and other interested stakeholders in transport and logistics and especially in maritime sector to submit and present papers in the conference.

Key dates: Submission of abstracts   11.01.2013
             Acceptance of abstracts   01.02.2013
             Submission of full papers   08.03.2013
             Review comments   05.04.2013
             Revised papers   03.05.2013
             Acceptance of full papers   24.05.2013

Accepted papers will be published in Conference Proceedings. More information about the conference and about the submission of abstracts and papers can be found in: http://www.merikotka.fi/cafe/index.php/en/events/imiss2013

Scientific
Committee: Juha Heijari, Adjunct Professor, PhD, Kotka Maritime Research Centre
            Michael Roe, Professor, PhD, Plymouth University
            Johanna Yliskylä-Peuralahti, Project Manager, PhD, University of Turku

Organisers: Kotka Maritime Research Centre
             University of Turku, Centre for Maritime Studies

Venue: Maritime Centre Vellamo, Kotka, Finland
           Maritime Centre Vellamo is a unique meeting place, where the building
           with a wave-like roof houses the Maritime Museum of Finland, Museum
           of Kymenlaakso and Information Centre Vellamo.

Participation to the IMISS2013 Seminar is free of charge for all participants. The
Seminar is arranged as a part of the CAFE project. The CAFE project is funded by the
European Union and the financing comes from the European Regional Development
Fund (www.merikotka.fi/cafe).

More information about the special session:
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THE MANAGEMENT OF SEAFARER FATIGUE: LINKING RESEARCH IN MARITIME OPERATIONS TO SHIPPING REGULATION

ABSTRACT

This paper describes a path from original empirical research in seafarer fatigue through to a consideration of regulatory options for fatigue risk management systems, and finally, to future research needs for the successful implementation of such systems. An overview of Project HORIZON is presented, which investigated the effects of fatigue on the cognitive performance of bridge and engine room watch keepers during a 7 day simulated voyage, using a range of linked simulators and under different watch patterns and workload. During the experimental period, measurements were taken of watch keeping performance and levels of alertness, including the use of EEG recording. The paper then provides a link between academic research and the implementation of practical systems for mitigating the risk of fatigue in the shipping industry through the consideration of two regulatory directions. Recent studies in several safety-critical industries reveal a conceptual move away from prescriptive regulations, which seek to mitigate the risk of fatigue through limiting the hours of work, to a more goal-based system, which involves the employment of Fatigue Risk Management Systems (FRMS). The paper outlines the differences between these regulatory options. Evaluation of the effectiveness of FRMS has highlighted a number of issues to be resolved in successful implementation and the paper will describe a proposal to explore the requirements for successful fatigue risk management on board vessels, through studies of the longer-term psycho-social issues affecting fatigue at sea, and evaluation of fatigue management systems in practice.

Keywords: seafarer fatigue; simulator research; human factors; fatigue management

1   INTRODUCTION

According to the seminal report by the United Kingdom's Marine Accident Investigation Branch (MAIB 2004), fatigue is a major causal factor in collisions and groundings. The MAIB report suggested that the factors which probably contribute to collisions and groundings include, *inter-alia*, watch-keeping patterns, working hours and sleep problems. The report concluded that the majority of the groundings occurred between 0000 and 0600 and that they involved solo watch-keeping officers following a 6 hours on and 6 hours off working pattern for significant periods. More recent high-profile casualties, such as the *Shen Neng 1* grounding on the Australian Barrier Reef have had major adverse impacts, both in financial terms and also on the destruction of the environment. Such accidents continue to cause concern, and fatigue remains a significant risk factor in maritime safety (ATSB 2013).

Although studies, for example, the UK's fatigue research programme at Cardiff (2006), have been made of the operational life of the seafarer before, mainly through the use of questionnaires and sleep diaries, few of these studies produced experimentally based data under controlled conditions, and the shipping industry has been slow to take up any self-regulatory measures. The EU funded Project HORIZON (2012) has successfully achieved the first-ever sets of experimentally based and wide-ranging data on fatigue and cognitive performance in the maritime field, and provided novel methodologies and data to inform future research efforts. One major achievement of HORIZON is the production of a prototype fatigue prediction model (called MARTHA) for use in operations on all types of ship, ideally within a risk management programme. MARTHA is based on a theoretical model of fatigue, and incorporates data from other industries to produce algorithms, which predict the levels of sleepiness of shift workers (Akerstedt et al 2008a).

Since the introduction of the Manila Amendments to IMO's STCW Convention and the forthcoming Maritime Labour Convention (MLC2006), the working hours, the hours of rest of seafarers, and the conditions they work under for long periods of time, are issues which remain continuously under the microscope. In addition, with the advent of maritime governance issues and concepts such as Corporate Social Responsibility (CSR) in shipping, new approaches are emerging to change the safety culture of the industry through self-regulation, to provide both competitive advantage for companies and, at the same time, the improved health and wellbeing of their employees.

A recent report on road safety (Research Report No. 110 2010) revealed a conceptual move by several safety-critical industries away from prescriptive regulations, which seek to mitigate the risk of fatigue through limiting the hours of work, to a more goal-based system, which involves the employment of Fatigue Risk Management Systems (FRMS). Evaluation of the effectiveness of such systems has highlighted a number of issues to be resolved in successful implementation, the major challenges being the effective implementation by management and the acceptance of these systems by the work force. The shipping industry has choices for successful fatigue management: to continue on the path of compliance culture bound by reactive regulation, or a more self-regulated approach aspiring to excellence and best practice. The questions are: in which direction will the industry go, and how might empirical research influence the choices made by organisations and the industry.

This paper is in three parts and links the results from recent research to the regulatory choices for shipping regulation, and finally, the future research needed to influence these choices. The paper begins with a description of the HORIZON experiments on seafarer fatigue, the participants in the study, the measurements used, and an indication of the evidence which has emerged from the project. In addition, the outcome of the project in the context of fatigue prediction models is outlined. These models are part of a fatigue management initiative to move away from prescriptive regulations to mitigate risk, but towards strategies which will empower managers to plan operations more effectively, and individual seafarers to self-regulate their levels of fatigue. Such initiatives are seen by the authors as part of the growing interest in Corporate Social

Responsibility (CSR) as an antidote to the reactive, regulation driven and compliant culture in shipping.

2 PROJECT HORIZON

2.1 The project

The HORIZON project was a European Framework7 funded research study to investigate the effects of fatigue on the cognitive performance of ships' watch keeping officers, using a range of simulators and under different watch patterns and conditions of workload. The main partners in the project came from Southampton Solent University in the UK, Bureau Veritas in France, and Chalmers Technical University and the Stress Research Institute, University of Stockholm in Sweden. In addition, an international panel of stakeholders comprising shipping industry associations was also involved, to provide advice to the research team. The project began in June 2009 and was completed in January 2012, when the final results were delivered.

The experiments were focused on two different watch patterns – the conventional 4 hours on, and 8 hours off regime, and the more arduous 6 on and 6 off watch pattern. These two patterns were chosen because the former is the most common shift pattern used at sea and requires three watch keepers, whilst the latter is the regime which has caused concern as a factor in accidents. A total of 90 officers undertook the experiments on simulator sites at both Chalmers University in Sweden and at the Warsash Maritime Academy in the UK, completing sufficient experiments to ensure the statistical validity of the results. Chalmers University conducted experiments on the 4 on and 8 off watch with 30 participants, and a further 20 subjects undertook a "disturbed" 6 on 6 off watch regime, in which the volunteers missed one sleep period while undertaking extra duties. Meanwhile, the experiments at Warsash studied an undisturbed 6 on and 6 off regime, in which participants undertook their watch keeping duties without any deliberate disturbance of their off watch rest periods.

At Warsash, 10 identical simulator-based "voyages" took place during 2010-2011, involving 40 watch keepers (20 deck officers and 20 engineers) in linked bridge, engine room and cargo simulators. The participants undertook normal watch keeping duties for 7 days, and during that period, measurements were taken of their watch keeping performance and their levels of alertness. Measurement included the use of EEG recordings, for two 24-hour continuous periods, at the beginning and end of the week.

2.2 The Voyage

The detail of the voyage route was designed by the research team and the relevant simulator instructors, and was conducted in exactly the same way during all ten experiments. The voyage was constructed to mimic a real voyage in the English Channel (see Figure 1) including port visits and cargo operations, standard engineering

watch keeping tasks, navigation and collision avoidance situations, mandatory radio reporting points, and some potential emergency scenarios.

Figure 1 The simulated voyage between Fawley and Rotterdam

The voyage between Fawley and Rotterdam was repeated twice in seven days, and many of the events they experienced were also repeated, sometimes because they were normal routine activities, and sometimes in a disguised form. This meant that a comparison could be made directly between the measurements made in the first half of the week, with those taken during the second half.

The watch system was the traditional 6 hours on and 6 hours off system, without deliberate disturbances off watch, but with a change from reality: the volunteer watch keepers never met for a watch hand over. The watch keepers handed their watch over to one of the staff, and received their watch in a similar way. Consequently, they did not meet each other at all at this time, in order to avoid an exchange of information on the geographical position of the vessel. A bridge participant in one watch team did not continue from where the participant before had finished; the bridge simulator was re-set at the same point at the start of the previous watch, and the second watch keeper did the same part of the voyage again. This meant that all participants encountered precisely the same conditions. However, this did not affect the engineers, as the nature of their duties has no geographical context, but is a continuous process. This method had a number of advantages, most importantly, the ability to directly compare the fatigue levels for identical watch keeping conditions shifted by 6 hours.

A number of considerations influenced the choice of experimental scenario, and these included:

- The application of EEG electrodes took up to 40 minutes of the watch time. Cognitive tests took approximately 5 minutes for each test, and therefore, the ability to hand over the watch to the staff saved valuable time.

- The watch handover to and from the staff, and not to and from each other, also had the benefit of allowing observation of the participants at close quarters, so that assessments of their sleepiness levels, body language and performance at these critical times could be made. In the light of the *"Shen Neng1"* case (ATSB 2010) where the omissions at the watch handover were contributory factors, this provided valuable information
- t the ship's normal full speed, the ports of Fawley and Rotterdam are about 24 hours apart. Two port visits in Fawley (Days 1 and 5) and two more in Europort (Day 3 and 6) were scheduled. Cargo operations took place during each port visit, with loading in Fawley and discharging in Rotterdam.

The voyage scenario was constructed carefully to ensure a high level of realism (Barnett, et al 2012). Performance evaluation took place on every watch. Events during the voyage scenario were classified into normal, special and unplanned events. Normal events (or situations) were those which a seafarer on a similar sized vessel would typically encounter during a voyage in the English Channel, but without highly safety-critical or abnormal emergency situations. Special events were carefully constructed incidents which could be replicated exactly each time they occurred so that comparisons in performance could be made. Unplanned events were those incidents, worthy of measurement, when the participants created an incident through their own actions.

All simulator instructors and most researchers were ex-seafarers, and this may have added to the sensation of being "at work". In the simulators, the instructors acted as Master, bosun, lookout, pilot, able seamen, etc., as required and kept in role, even when participants were encountered off watch.

2.3 The Participants

A total of forty participants took part in the experiments. The volunteers were all active seafarers, or recently moved ashore into marine related activities. They were from different nationalities, including UK, Polish, Indian and Nigerian officers. A low prevalence of female participants in the experiment was considered to reflect reality: 39 of 40 participants were males (97%). A number of criteria had to be fulfilled in order for a potential participant to be signed up, and these generally related to health issues. All participants needed to possess an ENG1 (medical) certificate and not suffer from any well-known sleep disorders, such as sleep apnoea. Sleeping quarters were located in nearby student accommodation, just a few minutes walking distance from the simulators and the mess room. Both the sleeping quarters and mess room were similar to such accommodation on board ship.

2.4 Fatigue Measurement

A variety of methods was used to gauge the sleepiness levels of the participants throughout the week. All the measures had been validated through previous research, and they ranged from diary keeping to the use of electrodes to record brain activity.

Each participant had to fill in a set of diaries and a number of questionnaires before, during and after the experiments. Diaries were kept to record the levels of sleepiness, as measured on the Karolinska Sleepiness Scale (KSS), and stress (Kaida et al, 2006; Kjellberg and Wadman 2002). This was recorded every hour on watch, and on the hour off watch, if the participant was still awake. At the end of the watch, participants were also asked to record their food intake on watch, how well they thought they had performed, and their perceptions of the workload.

Two computer-based measurements were taken, called the PVT test, and the Stroop test. The psychomotor vigilance task (PVT) is a vigilance test which is sensitive to fatigue (Thorne at al 2005). The PVT was performed on portable devices, always before starting a simulator watch, and once on completion of a watch. Once initialised, the PVT test presents a target to the participant on a small screen at random intervals, and the participant has to press a button to record when the target is seen. Each test lasted approximately five minutes, and the reaction time, the number of lapses, the mean reaction time, etc. were all recorded and stored on the device.

At the end of each watch, and after completing the PVT test, the participants carried out a Stroop test on a laptop located in the same area as the PVT. As with the PVT test, this task was undertaken whilst the participant was alone in the room to enable total concentration. The names of 2 different colours (green and red) appeared on the screen and the participants had to click the colour-name as quickly as possible, ignoring the meaning of the word displayed.

EEG recordings measure the electrical activity of the brain, through several electrodes that are attached on the head (Akerstedt and Gillberg, 1990). The participants were fitted with these on two occasions during the week by specialists. This occurred on the second and sixth days, and the participants wore them for a complete 24 hour period, thus wearing them for two watches and for two rest periods. The data recorded for the off watch periods is particularly valuable, as it provides an objective picture of exactly when the participant was falling asleep and the quality of that sleep. The data also allowed the analysis for micro-sleeps during periods of watch keeping and this aspect formed an important part of the final results and findings from the project.

2.5   The Results of the Experiment

The full set of results may be found in the final report of the project (Project HORIZON 2012). In summary, the following general points can be made:

- The data supports previous research findings for other shift workers and circadian theory (Akerstedt 2003; Akerstedt et al, 2005; Eriksen and Åkerstedt 2006) Watch keepers are most tired during the night watches and also show signs of tiredness in the afternoon. In addition, there is a gradual increase of fatigue during the work periods as the week progresses.

- Sleepiness and neurobehavioral performance, as measured by the EEG electrodes, are particularly affected towards the end of the 00-06 watch. Sleepiness and fatigue are enhanced and brain performance reduced.
- Incidents of periods of sleep have also been witnessed, both on the bridge and in the engine room. In the Warsash experiment, 20% of watch keepers fell asleep during the midnight to 0600 watch.
- The 6 hours on /6 hours off watch regime is more tiring than the 4on/8off, and there are more incidents of falling asleep;
- The onset of tiredness on the 6on/6off was apparent over a shorter timeframe than might have been predicted by previous research;
- The total amount of sleep afforded watch keepers on 6on/6off is less than normally required for full rest. Watch keepers averaged 6-6.5 hours in total, split into two sessions: the main one during the "night" time, followed by a "nap" during the other period of rest.
- "Disturbed" rest periods produce significantly higher levels of tiredness: the quality of sleep is more significant than the workload.
- The data appears to be robust enough to provide input to future marine-validated fatigue prediction models.

3   FATIGUE RISK MANAGEMENT AND PREDICTION

Project HORIZON has addressed watch keeper sleepiness in a maritime simulator setting. As the results emerged, the particular contribution of HORIZON has been not only to confirm empirically earlier research findings, but to reveal new insights. In the context of this study of seafarer fatigue, the impact of sleep disturbances during rest periods has been found to be profound, and the actual amount of sleep obtained by watch keepers when off watch under different watch regimes has been a significant novel contribution to sleep modelling.

In addition, HORIZON also points the way for fatigue risk mitigation in a new direction. The robustness of the data obtained has allowed a prototype software model of fatigue prediction to be developed for marine use. This prototype, called MARTHA, is based on a theoretical model of fatigue, and uses the results of many years of research effort from other industries, to produce algorithms, which predict the levels of sleepiness of shift workers (Akerstedt et al 2008b). The HORIZON results have allowed the enhancement of this original model to create a marine validated version. The "MARTHA" acronym is derived from "a maritime alertness" regulation tool based on hours of work, and has been developed by the team at the Stress Research Institute at the University of Stockholm.

The development of MARTHA uses modelling concepts which are derived from three basic curves: the first curve represents sleepiness due to circadian influences and has a sinusoidal form with a peak in the afternoon. The second curve is an exponential function of the time since awakening: it is high on awakening, falls rapidly initially and gradually approaches a lower asymptote as time passes. At the onset of sleep, another curve represents a third process and is the reverse of the second process, i.e., recovery

from fatigue occurs in an exponential fashion that initially increases very rapidly but subsequently levels off towards an upper asymptote. Total recovery is usually accomplished in 8 hours.

The functions are combined and provided with a maritime interface with selectable watch schedules, a do-it-yourself watch system facility, a six-week time window for prediction, estimates of time at risk and time with fatigue for each watch and for the whole watch schedule, as well as for time outside watch duty. The major display contains estimates for each 24 hour period, but there is also a second display to describe each 24 hour period, with sleep periods and a continuous estimate of sleepiness. This model is freely available for evaluating by downloading from the project website: www.project-horizon.eu.

The use of such tools as MARTHA, as part of a Fatigue Risk Management System (FRMS), will allow the shipping industry to adopt new goal-based practices in line with other transport industries. Despite this substantial contribution to mitigating fatigue in work at sea, the authors acknowledge that there is much more to be done and that far less work exists in relation to discussing how fatigue is influenced by organisational practices and individual factors; and that more work is needed in evaluating effective methods for preventing and managing seafarers' fatigue and the effect of applying different strategies (Seahealth, 2010).

The issue of effectiveness, based on sound and validated methodologies, is a vital key to success. As part of one of the US National Transportation Safety Board's initiatives in 2011, the following recommendation is made:

"The Safety Board continues to call for the development of fatigue management systems, which take a comprehensive approach to reducing fatigue-related risk. These systems should be based on empirical and scientific evidence and should include a methodology to continually assess their effectiveness." (NTSB 2011)

It is also well known from sleep science that fatigue-related risks can be mitigated with scientifically validated alertness management strategies, of which proper work-rest scheduling and adequate sleep hygiene are of primary importance (Caldwell et al 2008).

Given the current awareness of the value of such strategies, the questions remain: what will the shipping industry do about effective fatigue management in the future, what regulatory options will be most effective and how can research provide solutions to successful implementation? The following sections explore these issues.

4   FATIGUE MANAGEMENT AND REGULATION

Shipping is a highly regulated, (some may argue an over-regulated), industry. It is a truly global industry and employs seafarers from many nationalities. Regulations are often reactive following a disaster, or a series of similar maritime casualties. The shipping industry is different from almost all other industries (with the possible

exception of the off-shore sector and the military), because people working on board ships are expected to perform to the highest possible standards every day for many weeks, or even months on end, without a break. This working condition clearly raises concerns regarding the safety of ships, and also, the wellbeing of seafarers. The United Nations, through their respective bodies, the International Maritime Organisation (IMO) and the International Labour Organisation (ILO), have always been aware of these risks, and on several occasions, have updated the relevant legislation, so that the regulation of hours of rest and work correspond to the new realities in a constantly evolving shipping industry.

However, inevitably, when two different organisations prepare legislation on the same subject, there are some differences in their opinions, and hence the resulting regulations. As a result, the latest regulations concerning hours of rest finalised during the Manila Diplomatic Conference for the Standards of Training, Certification and Watch Keeping of Seafarers (STCW) of IMO in 2010 are slightly different than the rules stated in the proposed Maritime Labour Convention of ILO (MLC, 2006). The latest development of the STCW legislation concerning hours of rest was a set of revisions to the STCW Convention, known generally as the "Manila Amendments" by the Diplomatic Conference in Manila in June 2010. The provisions are laid out in Chapter 8.

In summary, the general rule for watch keepers is that there should be ten hours of rest daily and 77 hours of rest in a week. Rest hours should at most be split into two periods of which one period must be at least six hours. This general rule can be flexible but only subject to the minimum standards set in the STCW Convention. This means that rest time can be reduced to a minimum of six hours in any 24-hour period twice in a week at most, on condition that total rest time in a week is at least 70 hours. On the other days, rest time must be at least ten hours within a 24 hour period, taken from the time when first going on duty in the calendar day. Such regulations are highly prescriptive and are based not on any scientific evidence, but the results of a socio-economic negotiation between different stakeholders in the industry.

In contrast, the introduction of the International Safety Management Code (ISM Code) by IMO represents one of its first pieces of legislation which was goal-based rather than prescriptive. The difference between these two philosophies is best expressed by the Secretary-General of the time:

"In simple terms, a goal-based standard may be something like: 'People shall be prevented from falling over the edge of a cliff'. By contrast, in prescriptive regulation, the specific means of achieving compliance is mandated, for example: 'A one-metre high rail shall be installed at the edge of the cliff' (Mitropoulis 2006)

Table 1 illustrates other characteristics of these two regulatory options for managing fatigue and highlights the differences between them. The advantages of the prescriptive regulation route are that it provides a degree of certainty, and a minimum standard that can hopefully be enforced, thereby ruling out sub-standard operators. However, it also implies a lowest common denominator effect too, so that companies simply settle for compliance with a minimum. An additional problem is implementing the rules in a

uniform and consistent way, when they are open to interpretation by different inspection regimes throughout the world. The goal-based approach is more flexible, and appeals to those who want to raise standards and exert a degree of self-regulation. However, it also relies on an organisational culture which nurtures individual responsibility and engagement, and its flexibility means it is even more difficult for external inspectors to monitor and verify standards.

Table 1: Two regulatory options for fatigue management

"Hours of rest" – STCW and MLC	FRMS within the ISM Framework
• **Prescriptive rules** • **Socio-economic contract** • **Compliance culture: minimum standards** • **Reactive** • **Control** • **Verification through inspection and audit**	• **Goal-based approach** • **Scientific basis for systems** • **"Best practice": aspiring to excellence** • **Pro-active** • **Empowerment of individuals** • **Self-regulating** • **Self-monitoring of standard keeping through maturity models**

The spirit of the flexible goal-based approach is found in the Preamble to the ISM Code:

"Recognizing that no two shipping companies or ship owners are the same and that ships operate under a wide range of different conditions, the Code is based on general principles and objectives. The cornerstone of good safety management is commitment from the top. In matters of safety and pollution prevention it is the commitment, competence, attitudes and motivation of individuals at all levels that determines the end result." (ISM Code – Preamble).

This focus on commitment and motivation of individuals is reinforced again in the guidelines:

*"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".* (ISM Code, Guidelines 1.1.4).

In summary, the industry has traditionally been reactive, introducing new regulations, or amending old ones, using a prescriptive form of regulation. This has gradually given way to a more goal-based notion of regulation and, in the case of the ISM Code, introduced more generic requirements aimed at improving the organisational culture in the industry, of which the introduction of FRMS would form a part. Now, new ideas are emerging as a reaction to the old kinds of regulatory framework, which seems to leave the "good" companies unrewarded (as they comply anyway), and the "bad" companies unpunished, as they slip through the holes in the vagueness of the goal-based approach to regulation.

A new approach to managing fatigue through FRMS seeks to move away from a minimalist compliance culture (do the least possible) to one of excellence as an aspiration for its own sake (do the best possible), i.e., to do the right things because they are good for business, and because they are fair to the work force. These new ideas stem from a number of sources, including modern ideas about leadership, notions of the "just" culture in the learning organisation, concepts of employee engagement and empowerment, fair trade, and environmental responsibility. They also appear to be enshrined in the concepts of corporate social responsibility (CSR).

Corporate Social Responsibility (CSR) is, it turns out, a difficult concept to define, as it has a variety of different perspectives, depending on whether one views it as a business concept, a social one or a political or governance construct.

One definition describes CSR as:

"…typically used to consider and or evaluate the effects of business on society, beyond the traditional role of seeking to maximize profits. These may include such effects as support of charitable and educational organisations, hiring and training of hard-core unemployed, non-discrimination in employment, improved workplace safety, development of green technologies, use of non-animal testing processes, increased consumer protection, and transparency in reporting." (Crane, McWilliams, Matten, Moon and Siegel, 2009)

For the purposes of this paper, the simpler *"firms can do well by doing good"* (Crane et al 2009) expresses the same basic idea.

In the context of this paper, FRMS are seen as being essentially a contribution to CSR as a business case. Four general types of business case for CSR can be distinguished (Kurucz, E.C., Colbert, B.A., and Wheeler D. (2009) with four general purposes in mind: i.e., cost and risk reduction; competitive advantage; reputation and legitimacy; and synergistic value creation. The concepts behind FRMS appear to fit best into the second and third categories of this taxonomy: a strategic approach to CSR to build relative competitive advantage by providing cost efficiencies in vessel operation and exploiting CSR activities to build value through gains in reputation and legitimacy. This latter, more social aim, provides better welfare conditions for employees, hence improving employee engagement and long term retention.

- In fact, the contribution of FRMS to CSR is seen as having the following specific characteristics:
- They contribute to "*improved workplace activity*" as defined above;
- They seek to improve the efficiency of business operations;
- They seek to improve the health and wellbeing of seafarers;
- They seek to provide employee empowerment through an example of a self-regulatory intervention;
- They seek to change professional and organizational cultures;
- They attempt to use empirical measurement to demonstrate its value.

5   FUTURE RESEARCH

The authors believe that future research is needed to evaluate FRMS in the practical operations context. The role of fatigue prediction models as key tools for the effective implementation of FRMS also needs to be tested. A research proposal is now being generated by the HORIZON partners, which will evaluate MARTHA at sea, or more accurately, in the shipping company office, as MARTHA is seen primarily as a planning tool for ship managers to plan future voyages and to predict the fatigue levels of watch keepers and others during peak workloads, for example, during a high number of brief port turn-rounds.

This project will explore the requirements for fatigue risk mitigation on board vessels, through studies of the longer-term psycho-social issues affecting the fatigue of whole teams at sea, and the cultural differences of managers in the interpretation of the legislative framework affecting hours of work. These preliminary investigations will define a series of shipboard experiments, using proven scientific methods for the measurement of sleepiness. The project will assess the impact of fatigue on the decision-making performance of teams in high workload conditions, and will determine the effectiveness of fatigue predicting software as part of a FRMS, in order to mitigate these risks to the ship and the seafarer.

The first part of the project will cover the assessment of different elements of a FRMS strategy using interviews with shore-based staff and on board studies and includes: interviews with managers on the implementation of the ISM Code in the context of seafarer fatigue; an exploration of the longer-term issues of seafarer fatigue through a diary study by selected subjects; and the preparation of these subjects for the shipboard study through a cultural change program, focusing on fatigue awareness education and sleep hygiene training.

The shipboard study is likely to take the form of a comparative experiment between two groups: a "no-change" control group and a "FRMS" group. The purpose will be to measure the fatigue levels, team performance and vessel efficiency of matched groups on high workload sections of voyages. It is envisaged that the Master, chief officer and watch-keeping officers will be involved in the shipboard study. In the "FRMS" group, these will be the same personnel who have completed the sleep diaries and received sleep hygiene training.

The volunteer shipping companies selected for the experiment will also provide company managers for the semi-structured interviews and they will also receive FRMS and training in the use of the MARTHA software. During the high workload sectors of the voyage, for example, port turn-rounds in Europe, fatigue measurement will be conducted during these "intensive periods", using a variety of validated fatigue instruments. Team and vessel performance measures will also be made, using selected criteria.

It is believed that such research will take knowledge a step further by enhancing risk mitigation of fatigue, through studies of long-term fatigue and cultural differences in

interpretation and implementation of hours of rest requirements. These factors need to be evaluated in a shipboard setting, which will allow the measurement of both individual and vessel performance under real and variable conditions.

6   CONCLUSIONS

The HORIZON consortium achieved success by moving beyond the position where fatigue is merely perceived or believed to be an issue, to one where actual measurements have been taken of fatigue in action; relationships have been made between the causes of fatigue and its impact on performance; and where theoretically modelled and validated software can be produced to facilitate fatigue management.

Fatigue is now generally recognised as a major issue not only for the health and welfare of individual seafarers, but also for the efficiency of ship operations and therefore, ultimately, the competitive success of shipping companies. Research over many years has demonstrated the effects of fatigue and although some shipping companies have denied that it is a problem for them, a succession of shipping casualties has now convinced most in the industry that fatigue at sea is a risk factor which needs to be recognised and mitigated.

The introduction of the Manila Amendments and the forthcoming Maritime Labour Convention (MLC2006), the working hours, and hours of rest, of seafarers, and the conditions they work under for long periods of time, are issues which remain continuously under the microscope. In addition, with the advent of maritime governance issues, such as CSR in shipping, new approaches are emerging to change the safety culture of the industry through self-regulation, to provide both competitive advantage for companies and, at the same time, the empowerment and improved health and wellbeing of their employees.

The regulatory options for fatigue management provide the industry with choices, and different parts of the industry will favour different measures. One suggestion for fatigue mitigation presented in this paper is to adopt policies and procedures in an explicit system (FRMS) within the Safety Management System (SMS) under the ISM Code. There is a continuing debate in the transport industries as to the actual benefits of FRMS as a risk-mitigating factor and the proposed MARTHA research project intends to investigate the practical issues in implementing FRMS in the shipping industry through a series of trials.

Whatever direction the industry takes on effective fatigue management, most will agree that there is a need for further understanding of the effects of fatigue, and especially the effects of fatigue over the typical tour durations for officers, i.e. 4-6 months. There is also a need to demonstrate scientifically that mitigation measures are indeed effective, and that systems put in place to monitor and control fatigue are effective and do make a difference.

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MARITIME GOVERNANCE AND CORPORATE SOCIAL RESPONSIBILITY IN SHIPPING – PROCESS RATHER THAN FORM

ABSTRACT

That there is systemic failure in the governance of the maritime sector is evidenced by the widespread inadequacies of shipping policies to address the problems of environmental, security, safety and economic concerns central to corporate social responsibility. The causes of this governance failure stem largely from the inexorable spread of globalisation which although far from new, has accelerated in recent decades in turn exacerbating the inadequacies exhibited by maritime governance. In particular the changed role of the nation-state as a maritime authority and policy-maker has created friction between shipping as a truly globalised industry and its nationally defined legislative and governance authority.

Globalisation is all about flows – of information, materials, money etc – and yet maritime policies remain static – designed at one point in time, for a defined situation with an inability to be flexible to accommodate change. Globalisation is also about process – the movement over time of money, information, materials – and policy-making structures need to accommodate these processes which take little account of national borders and act as the antithesis of static policies.

This paper will look at the role of process in policy-making in the maritime sector with reference to corporate social responsibility and how issues of flexibility, movement, change, and the increasing speed of these events can be accommodated in a new governance framework that takes account of the changed situation for nation-states.

Keywords: policies, governance, form, process flows, dynamism

1   INTRODUCTION

The failure in governance of the public or corporate maritime sector is evidenced by the inadequacies of shipping policy to address the problems of environmental, security, safety and economic concerns (see for example Roe, 2012) which are in turn central to the issue of corporate social responsibility. This governance failure stems largely from the intensification of globalisation which has accelerated in recent decades and exacerbated the inadequacies of traditional forms of maritime policy-making. The changed role of the nation-state as a public maritime authority and policy-maker has generated friction between shipping as a globalised corporate sector and its nationally defined legislative and policy authorities. National flags, nationally defined global authorities and national maritime administrators can no longer effectively develop or implement policies.

This paper examines the problems faced by policy-makers in the public maritime sector, the alternatives in the framework for governance that might be made available, the changes in structure of those involved in policy-making and concludes with ideas for the future as to how the whole concept of maritime policy-making might need to be reconfigured if adequate and effective governance is to be achieved.

Territorial hypocrisy is a characteristic of maritime governance manifesting itself in the way that the shipping industry attempts (and largely succeeds) to take advantage of both its national and global framework. This is evidenced by the widespread abuse of maritime policies through flags of convenience, the application of national tonnage tax regimes and the inadequacies of Port State Control, just some of the ways shipping corporations trade off policies at national and global level to achieve the best of both worlds (and the worst for the environment, safety, security and competition).

The result is characterised by territorial porosity whereby the impact of national borders can be imposed at will (and taken away) by shipping corporations to maximise profit – either in practice or at least by threat. National territory no longer has the meaning it once had and globalisation has created a nightmare for policy-makers condemned to continue working within a nationally defined jurisdictional framework of governance.

Globalisation centres upon flows – of information, materials, money etc – and yet public maritime policies are essentially static – designed to provide governance for the corporate maritime industry at one point in time, for a defined situation with an inability to be flexible to accommodate change. Processes – the movement of money, information, materials – dominate the sector and effective governance structures need to accommodate this dynamism which takes little account of national borders and which act as the antithesis of the static policies that characterise the maritime sector.

2   GOVERNANCE FAILURE IN THE MARITIME SECTOR

To suggest that there is any need for a consideration of changes in maritime governance there needs to be a case made that something at present could be improved. This is not difficult. The range of failure that maritime policy initiatives displays is substantial and includes almost all aspects of the industry – all sectors (liner, bulk, ferry); all activities (safety, the environment, security and efficiency); all locations (from the European Union to the USA, and from the Far East and China to the developing countries of Africa); and in particular every part of the jurisdiction and functioning of policy-making and its underlying governance from the international and global to the local and regional passing on the way through the supra-national and national. Perhaps the most indicative and in some ways the most shocking, are the continued problems exhibited by the inadequate functioning of the United Nations International Maritime Organisation (IMO) and its strained relationships with both its supranational (in particular the EU) partners and even with its own national members. This covers issues from climate change, environmental policy and safety to those that stem from the organisational relationship between the IMO and its constituent members.

There has been considerable commentary on these problems of governance over many years. See for example Roe (2007a, 2007b, 2007c, 2007d, 2007e, 2008a, 2008b, 2009a, 2009b, 2009c, 2009d, 2010a, 2010b, 2012); Roe and Selkou (2006); Selkou and Roe (2004, 2005); Sletmo (2001, 2002a, 2002b) and whilst this cannot provide conclusive evidence of the severity of these governance problems it is indicative that things are not perhaps as satisfactory as might be thought. This in turn raises the issue as to why there has been so little debate about the inadequacies of maritime policy-making and the fundamental governance problems that lie behind them. If policy-making is problematic then perhaps something needs to be done. In fact the structure of maritime governance has remained the same since the 1940s, essentially based upon a framework that was developed from the 1920s. Is it not time that change is at least considered?

Maritime governance has a number of fundamental characteristics that define its operation and structure and which in turn have a major effect upon what can be achieved and by whom and its effectiveness upon shipping corporations. These characteristics can be summarised as follows:

Nation-based: the significance of the nation-state to the development and in the operationalisation of maritime policies has been unfettered by the spread of globalisation. Shipping is an intensely globalised sector with characteristics of ownership, operation, finance, legality, supply, demand, labour and commodities that emerge from almost anywhere in the world as well as changing origin and location with intensity and unpredictability. It retains its predominant role at the UN (IMO), the EU and through the development of domestic shipping policies. This role is as important as it has ever been even though more generally the influence that nation-based decision-making can have over a globalised sector can be erratic and minimal. The shipping industry uses this conflict between globalisation and domesticity to its advantage, trading off one jurisdiction against another and involving itself at the different levels as and when it sees beneficial.

Institutionally defined: maritime governance and the development and implementation of maritime policies are institutionally based – and derived from institutions that reflect industrial and policy needs of the early twentieth century when globalisation was less significant. These institutions – for example the IMO, UNCTAD, World Trade Organisation (WTO), the EU Commission, ASEAN etc – are now in many ways no longer fit for task as they reflect a national domination of jurisdictional integrity that is inappropriate for an increasingly global shipping industry. However there is no debate about how these institutions might adapt or be replaced. As artificial constructs of a world seeking good governance they are anachronistic. Many maritime policy failures can be traced back to a combination of outdated institutions dominated by ineffectual nation-state members.

Stakeholder definition: whilst institutions such as the EU have recently recognised the need to expand their portfolio of stakeholders in policy-making to make maritime governance more effective, the consequences have been very limited. Much is made of the processes of public consultation and inclusion (for example through social networking and email) but in practice it tends to be the same interested parties, for a

long time part of the policy-making process. The need to widen and deepen stakeholder involvement in maritime governance requires accommodating the opinions and significance of the media, politicians, interest groups of all types and many more if policy-making is to be meaningful.

Shipowners: shipowners are highly significant stakeholders in maritime policy-making and should form a central plank of maritime governance. However their present influence is so significant as to overwhelm much else. The multitude of tonnage taxation regimes is an example where relatively profitable shipping companies can gain state subsidies through preferential taxation awarded by nation-states desperate to retain a pseudo-domestic shipping industry. To remain competitive one country after another has introduced a concessionary scheme of this sort, the like of which is unavailable for any other specific industrial sector. Globalisation has enabled shipowners to trade off nations against each other to obtain these type of concessions. The role of national flag registers is similar in providing opportunities for shipowners to bargain their fleet registration between countries.

Form and process: maritime policies have traditionally been designed as static rather than dynamic focussing upon form rather than process. The shipping industry and its operating environment is highly dynamic and the problems addressed by policies need dynamic governance if they are to be effective. Policies are traditionally "snapshot", relevant to one moment in time and increasingly anachronistic even before implementation. Whilst the development of dynamic governance may well present challenges it is something that has attracted much attention in many fields already – it is time that the maritime sector entered into this debate.

Each of these issues needs to be addressed if maritime governance is to be appropriate for the shipping marketplace. Currently none are considered effectively. The role of extended stakeholder involvement is at least understood (see for example recent commentary by the EU on maritime stakeholders [Commission of the European Communities, 2008]). Meanwhile the ambitions of over-influential shipowners are likely to remain whatever governance changes are made. These undesirable effects need to be understood and measures taken to produce policies that balance these desires The importance of the nation-based bias within current maritime governance is hard to over-state and the anachronistic characteristics of the institutions that dominate policy-making remain fundamentally important but it is not these two highly significant characteristics which will be considered in this paper. Instead it is the nature of policies and the continued focus on static rather than dynamic measures that will be addressed; upon form rather than process. And upon the need to develop maritime governance and policy-making so that it can accommodate change rather than fixation in its consideration of the wider corporate social responsibilities that exist.

3 FORM VERSUS PROCESS

The maritime industry is nothing if not dynamic. Shipping is dominated by movement of its main physical assets but in addition to this the very nature of the sector is

persistently one of change including its impact on the environment, the continuous threat of safety failings, the activity of issues emanating from security threats, the sale and purchase of commodities and vessels, the transfer of labour assets, the re-registration of ships, the ever-increasing scenario of flag-hopping and much else. All aspects of the industry are affected to a greater extent than many others reflecting the intensity to which it is influenced by globalisation and the contribution of the maritime sector to the process of globalisation itself.

At the same time maritime policy-making remains static. Characterised by a governance process that is locked within an anachronistic institutional framework and an unchanging nation-state domination, the policies that emerge are almost without exception statically obsessed until the next policy review comes round. This is exemplified by the continually renewed EU maritime policies which are ever-frequently being reviewed to generate a new body of policy in an attempt to catch up with the changes that take place in the maritime market-place and which always keep one-step ahead of policy-makers. This does not adequately provide for an industry where process always takes precedence over form; the dynamic over the static; change over stagnation (Rhoads, 2009: 146; Harrison, 2009: 86). Policies that reflect continuous change and process rather than provide for a snapshot in time are necessary to make progress against the failure endemic in maritime policy-making today. To achieve this, new forms of maritime governance are needed that reflect the movement that characterises the industry (Neo and Chen, 2007).

Whilst the maritime sector is not alone in possessing a governance framework which is directed towards a single-state rather than accommodating processes of change, it is more severely affected because of its inherent characteristics. Not least of these is the opportunity afforded to shipping industry stakeholders (owner, brokers, agents and the like) to take advantage of the chasm that exists between static policies and the real life nature of dynamic industrial activity. Examples abound – flag-hopping, the abuse of the port state control system, the role that tonnage taxation plays in national trade-offs between jurisdictions, the movement of shipping companies between financial and legal administrations to avoid penalties that otherwise might be incurred are just some. Whilst the aims of maritime policymaking are commonly laudable, its static nature makes its effective application difficult.

4   PROCESS

 "Others who seemed to live in a most curious condition of consciousness, as if the state they had arrived at today were final, with no possibility of change, or as if the world and the psyche were static and would remain so forever." Carl Jung, "Man and His Symbols" (1968: 39).

And:

"In the world of immediate data nothing is permanent: even things that we regard as fairly permanent, such as mountains, only become data when we see them, and

are not immediately given as existing at other moments". Bertrand Russell (1926: 109).

The Greeks suggested that experience presents everyone (including policy-makers) with what they termed *flux*. The difficulty was to understand the 'enduring, unchanging entities' behind this flux which had to contain elements of both stability and change. There have also been problems with accommodating dynamism in the analysis of what seemingly were fixed structures (Vogt, 1960: 19) and maritime policies are not exempt from this. The analysis of current developments in policymaking as 'snapshots' and the inadequacies this represents, have been highlighted in general form by a large number of commentators (for example Bulmer, 1994; Pierson, 1993, 2004) but the absence of specific reference to these inadequacies in the maritime policy and governance literature is notable. Maritime governance needs to address the concerns of social science's process laws. Shotter (1953: 248) concurs – policies are not "static, geometric structures subject only to changes of configuration and rearrangement" but need to be viewed as "dynamic stabilities produced within a continuous flow of conduct".

The definition of process is inconsistent but invariably involves at least one of change, time and dynamism. Blaut (1961) believed that "everything is process" (although sometimes very slow), something with which Von Bertalanffy (1952: 134) agreed seeing "all structures as slow processes of long duration". Schaefer (1953: 248) considered that all mature social science depended on "process laws". Meanwhile Castells (1996: 417), quoted in Ballve (2011: 1) suggested|:

> "The global city is not a place, but a process. A process by which centres of production and consumption of advanced services, and their ancillary local societies are connected in a global network… on the basis of information flows."

Pred (1986: 49) considered life as a "composite of simultaneous diversity and successive variation, of unfolding processes…". Harvey (1969) emphasised that a temporal framework was always needed to understand the spatial context and that the "reality" of any element within any system is always time dependent. Berry (1973: 8) commented that "to seek any fixed things is to deal in false imaginations". Maritime policy is not exempt – Castell's information flows are central, Harvey's temporal reality fundamental and Berry's aversion to fixity realistic. Bullimer (1976: 277) stressed that all mankind's activities sought location in time and this extends to policy-making and the maritime sector. Gren (2003: 210) put it eloquently: "I see almost literally, the opulence of the world as a *moiré* of processes in conversation", whilst Hagerstrand (2004: 315) cited Aristotle to whom motion was the key to understanding nature, pertaining to both mobility and change – two concepts central to shipping.

Hartshorne (1939: 176) commentated on the significance of the traditional neglect of time in comparison with space and although written in a geographical context his analysis of the work of Spethmann (1928) was particularly pertinent in its emphasis of the need for a dynamic over a static approach. This was the only way to gain a "proper understanding" of the present and the processes that underlie the "elusive transformations" that continuously take place.

Vogt (1960: 19) noted the difficulties in conceptualising process with the same clarity as form because inevitably the latter emphasises equilibrium rather than change even though change is always with us whatever phenomenon we observe. Although no society is ever static it remains easier to focus upon equilibrium with policymaking avoiding the problems that process governance would generate.

Berry (1973: 3) suggests that it is important to take a dynamic approach in considering a paradigm for geography which with its spatial and commercial characteristics is clearly relevant for the shipping sector. A static approach is inadequate to interpret the causal processes that underlie the spatial patterns that (amongst others) any transport activity (including shipping) displays. Meanwhile Kennedy (1979: 552), along with Shotter (1983: 20) looked at the role of change and process in scientific explanation and identified two models – the immanent, characterised by unchanging properties; and the configurational – where process was significant and related to unique conditions of space and time.

Pred (1984: 279-290) saw spatial forms as frozen scenes within which human activity took place. An analytical approach to policy-making needed to incorporate ceaseless change and which develops within its spatial context. Static policy-making was akin to ignoring the flow of local events that characterise any situation. This contextual approach to analysis and design was first outlined by Hagerstrand in 1974 (see also Pred, 1977: 210-211; Thrift, 1983: 27-8) with its emphasis on process as a central feature.

Gertler (1988: 152) suggested that failure to incorporate dynamism into governance was an "infatuation with form over process, with pattern instead of change and even description over explanation", comments he attributed to Pred (1977) and an earlier paper by himself (Gertler, 1987). There had been a reluctant recognition of the need to incorporate the centrality of process, but in most contexts even the "most popular conceptions of change are primitive and inadequate". In the maritime sector they are non-existent. Whilst there may be any number of studies that look sequentially at the past, present or future state of the shipping industry, policies that link these stages together into a process of change and dynamism taking place through time rather than within it, are absent.

Gertier (1988: 157) summarised:

> "the… dialectic of fixity and fluidity… operates in a temporal sense as well. Hence, firms must commit a good deal of capital to some fixed form, in order to have a means of production. Yet at the same time, they must retain the resources and powers to adjust to change as they can never possess full certainty about future conditions of supply and demand."

Meentmeyer (1989: 164-5) considered that any relevant space (including shipping policy) is defined by its processes – for example pollution dispersal; labour immigration; flow of commodities or money etc. Processes and the rates of process, define the scale of the policy issue. The value which can be attached to a policy

phenomenon is defined by causal processes. For example the relationship between global labour supply and illegal immigration is complex and determined at least in part by the rate of process and the spatial scale of the phenomena which in turn are determined by their speed and direction of flow.

Castells (1996: 408) is prominent in emphasising the importance of societal movement and consequently in the design of effective policies. Ballve (2011: 1) comments on his conception of Castell's notion of the spaces of flows as:

> "the main conduits for power, whether expressed in symbolic, and/or cultural manifestations."

Castells continues (1996: 417):

> "...while the actual location of high-level centres in each period is critical for the distribution of wealth and power in the world... what matters is the versatility of its networks. The global city is not a place, but a process. A process by which centres of production and consumption of advanced services ...are connected in a global network."

This is particularly pertinent for shipping governance. Castells and Portes (1989: 11) considered what they termed the 'informal economy' – fundamentally important linkages that actually make the 'formal economy' work and which are substantive in shipping as much as anywhere. This informal economy needs to be understood as "a process rather than an object".

Der Derian (1990: 297) took a Postmodern view of international relations and policy-making applicable to the global shipping industry. He suggested that "chronology should be elevated over geography, pace over space". In the same year, Dyck (1990: 461) felt that "rules and resources are not static, but are the media of production and reproduction of practices" – something clearly applicable to shipping where effective governance requires rules to be reflective of the changing medium of industrial and commercial practice.

Neo and Chen (2007: 1, 3, 16) were committed to the idea of dynamic governance suggesting that even if the selection of policies was made with good intentions, static governance would inevitably lead to stagnation and decay especially in the unpredictable and volatile globalised world typical of the maritime sector. Policies need to be centred around processes that are agile, susceptible to redesign and creativity.

Cram (2011: 637-8) emphasised the centrality of temporality in public policy-making as the present can only be understood in the context of past narratives which in turn "cast a long shadow into the future".

5   POLICY-MAKING AND PROCESS

Quite clearly the notion of process needs to be intrinsic to maritime governance. Policies for the maritime sector should reflect the dynamism inherent within shipping and the issues that these policies are designed to address. They currently are static in form and a consequence of this is the failure in maritime policy that has been identified.

The interest in process and policy-making can be seen in many sectors. Walt and Gilson (1994: 354) regretted the over-emphasis of the UK health service upon actors and content rather than processes in policy formulation and application; Castells (1996) carried out extensive work on the space of flows and their relationship between process and policy applied to urban and regional development; Schlager and Blomquist (1996), Sabatier (1998: 98) and Sutton (1999) are other examples. This increase in interest is also the case in the maritime sector where Baird (2000: 182-4) provides an example in maritime policy-making as applied to the privatisation of UK ports, and Brooks and Pallis (2008) who focussed upon ports policy-making and governance.

MacLeod and Goodwin (1999: 505) cited Swyngedouw (1997: 141) who suggested that the only way to conceptualise policy-making was to incorporate the concept of process. To do this governance needed to emphasise state strategy and projects within policies as context-specific (maritime for example), actively constructed processes.

Borzel and Risse (2010: 114) are convinced that governance in any sector consists of both structure (and form) and process, the former referring in particular to institutions and events whilst the latter to the "modes of social coordination" which manifest themselves through actions and a succession of activities and deliverables. Process in (maritime amongst others) governance focuses upon the dynamism inherent in making events occur and the actions that are undertaken by policy actors in relation to this dynamism.

Braganza and Korac-Kakabadse (2000: 46-49) identified that policy-makers in recent years have had to change the way that they developed policies in moves away from static strategies, core competencies and narrowly defined and time-fixated business cultures. Whilst emphasising the need to extend the range of stakeholders, they stressed the need to consider processes rather than business functions in the development of policy. Stakeholders in the shipping sector develop expectations that stem from the processes in shipping that are going on – and policies need to reflect these processes with their inherent dynamism rather than provide static snapshots of the sector and its problems which are addressed on a one-off basis. Braganza and Korac-Kakabadse emphasised the need to incorporate processes into policy-making as organisational units on the same basis as business functions, labour teams and administrative and operational departments. Policies need to stretch across both space and time (across actions and places; and across processes on-going across days, months, years) unlike current maritime governance which focusses upon the spatial rather than the temporal considerations.

Braganza and Lambert (2000: 180-181) went further suggesting a business process model that could readily be applied to shipping (Table 1). The Process-Governance framework provides a structure for maritime policy-making which whilst needing refining recognises the need to incorporate a dynamic perspective.

Neo and Chen (2007: 12-13) suggested that dynamism in governance can only be achieved with the execution of 'adaptive policies'. Their model for achieving dynamic governance focuses on three broad concepts of 'thinking ahead', 'thinking again' and 'thinking across' requiring 'able people' and 'agile processes'. Future uncertainties and external practices both constrain and enable opportunities to be realised. Dynamic governance can be made effective only by the creation and adoption of policies that are adaptive and for this to be achieved necessitates the right culture. The interdependencies between each of these elements are vital. Between culture and capabilities, capabilities, people and processes, and between the external environment and all the other elements that make up governance. Policies then have the possibility of being dynamic, to reflect change and to be continually adaptive to the circumstances in which they need to operate (Figure 1).

Table 1: The Process-Governance Framework (Source: After Braganza and Lambert, 2000).

PROCESS PERSPECTIVE	Business Strategy	Stakeholders	Expectations	Processes	Activities
GOVERNANCE PERSPECTIVE	Monitor, evaluate, agree, prioritise, quantify, communicate.	Identify, prioritise, encourage to participate	Identify – past, present and future; understand changes, conflicts.	Define and align with expectations and objectives. Set performance goals. Balance processes with functions.	Define actions to be taken. Align roles and responsibilities Set targets now and for the future and assess processes which need to be institutionalised. Assess resources.

RESPONSIBILITY	Shipowners, port operators, brokers, agents, maritime financiers, insurers etc	Private sector shipping companies, government ministries, QUANGOs (eg marine safety agencies), interest groups (eg Greenpeace, media representatives) etc	Private sector, government, general public, media, politicians.	To achieve balance between business strategy, stakeholder expectations and policy objectives. Designed to be flexible, responsive to change and temporally defined.	Legal, advice, incentives, penalties, encouragement.

Shipping presents some serious challenges in attempting to accommodate corporate social responsibilities. Maritime policy-making is essentially static and it will be a task in itself to introduce increased agility regardless of policy aims in themselves. External practices are traditional and rooted in historical principles and structures. There is little evidence of thinking ahead, again or across – of widening vision; of extending stakeholder involvement, of recognising broader perspectives and trends. Current policies are far from adaptive but remain prescriptive and narrow, focusing on limited stakeholders with constrained ambitions. However, this does not mean that the first steps cannot be taken to incorporate dynamism and to focus policy-making upon the processes that operate within the sector; in essence to achieve dynamic governance.
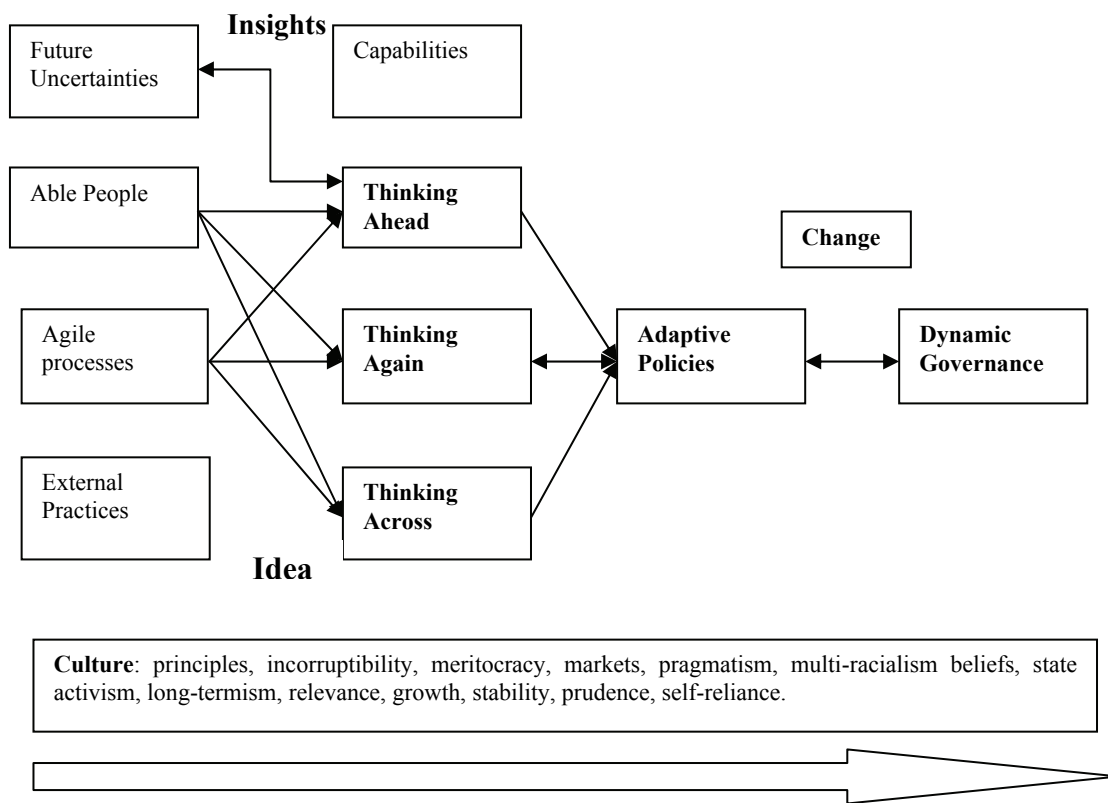
Figure 1: Framework for a Dynamic Governance System (Source: After Neo and Chen, 2007)

6   CONCLUSIONS

Accommodating dynamic governance and process in policy-making is not the only move that needs to be made if maritime governance is to become more effective and issues of corporate social responsibility in the shipping sector to be addressed effectively. The range of stakeholders needs to be extended to include those with genuine interests but whose activities may seem to lie far from the maritime industry – the media, politicians, a variety of interest groups, consumers and so on; in addition their effective inclusion also needs to be assured.

The domination of the nation-state in the formulation and operationalisation of maritime policies remains overwhelming and anachronistic. It is difficult to see how this is going to change to any great extent as nation-states jealously guard their right to self-determination regardless of the impact on others or upon the efficiency of a globalised maritime industry.

Institutions also need to change – it is inconceivable that the framework for governance established from early in the twentieth century can still be relevant and yet it is this framework which dictates the effectiveness of maritime policy-making. The current institutional arrangement is reminiscent of an old car, patched together with repeated applications of sticking plaster, lurching from one inadequacy to the next. Lives, the

environment and the world's economy depend on this dubious structure and it is within this that shipping's corporate social responsibilities are defined; yet discussion of its reform remains taboo.

And the shipping community itself needs to confront its own attitude to governance, policy and regulation. Excused under the broad brush of 'commerce' justifying any practice that ultimately generates wealth, the shipping community's ability to live with the consequences of flag-hopping, inadequate port-state control, tax avoidance and corporate governance denial is alarming.

Whilst we await a comprehensive revision of maritime governance and policy-making, the social inadequacies will continue and the very deficiencies that maritime policies are designed to address will continue to characterise the industry.

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THE SOCIAL BENEFITS OF MARITIME PILOTAGE

ABSTRACT

The purpose of this paper is to present the social benefits of maritime pilotage and how corporate social responsibility (CSR) is perceived in pilotage. The paper describes in the form of a literature review the theory of CSR and the basis of state ownership policy. In order to study the application of CSR in pilotage, the management of the Finnish pilotage company was interviewed. The literature review and the interviews indicate that the social impacts of pilotage are manifold but somewhat difficult to study and establish. That is why the Finnish pilotage company has developed a measurement system to measure the effectiveness of pilotage. In the future, the measurement system will be used to analyse the effects of pilotage on maritime safety and traffic fluency. During the study only the management of the pilotage company was interviewed, thus the views presented on the social benefits of pilotage are somewhat one-sided and compendious. In the future, however, the measurement system should provide information on the effectiveness of pilotage based on data derived from the actual acts of pilotage. Pilotage in general has been studied very little, both in Finland and internationally. Only very few studies of the accidents in which pilots have been involved exist. The social impacts of pilotage have not been studied in any way. Corporate social responsibility provides a framework for pilotage organisations to evaluate the impacts of their operations to overall maritime and environmental safety.

Keywords: maritime pilotage, corporate social responsibility, social impact, measurement, effectiveness

1   INTRODUCTION

Navigational circumstances in the Finnish waters are considered very difficult due to the fact that the seafloor varies between deep and shallow and a number of underwater rocks exist in the Finnish sea area. In addition, the sea freezes annually (Kujala et al. 2009; Lützhöft & Nyce, 2006). The biggest threat to the Finnish marine environment is an oil spill that can be caused by the grounding of an oil tanker or a conventional vessel (Brunila & Storgård, 2012). The possible costs of an oil spill can rise up to billions in the worst case scenario. Nevertheless, shipping accidents in Finland are statistically very rare compared to other countries (Kujala et al. 2009). The general understanding is that the major reason for the low number of accidents is the efficient pilotage of vessels.

Pilotage means activities related to the navigation of vessels in which the pilot acts as an advisor to the master of the vessel and as an expert on the local waters and their navigation; Darbra et al. (2007) have studied the basic tasks of pilotage in their research

by interviewing pilots in Australia and New Zealand. According to them, the most important task for pilots is to ensure safe navigation and environmental protection (Darbra et al. 2007). In maritime traffic, ensuring safety, guaranteeing fluency and promoting environmental protection can be considered to be the three basic tasks of pilotage (EMPA 1997; IALA 2007; Finnish Pilotage Act (940/2003); Darbra et al. 2007). Lappalainen et al. (2011) interviewed maritime pilots in Finland. According to the interviewed pilots, their most important task is to ensure safety and prevent accidents. The pilots also consider their work important in ensuring fluent traffic flow. Both safety and traffic flow are, in the opinion of the pilots, even more relevant in difficult weather and in winter conditions (Lappalainen et al. 2011).

Pilotage in general and its social impacts have been studied very little. The studies comcerning pilotage have mainly focused on maritime accidents in which the pilots have been involved (Lappalainen et al. 2011). So far only a few scientific articles about the relevance of pilots to maritime safety have been released (i.a. Wild 2011; Uluscu et al. 2009). For example Wild (2011) argues that pilotage is essential in ensuring the safety of seafaring on challenging fairways. Uluscu et al. (2009) have found that having a pilot on board reduces the risk of an accident (Uluscu et al. 2009). According to Wild (2011), the successful and safe navigation of a ship in confined waters (like the Finnish waters) *"rests largely with a single individual – the pilot."*

Currently, CSR is mostly supported and dominated by land-based industries. Nevertheless it is apparent that the interest of many stakeholders in the social, environmental and ethical performance of the maritime industry has increased and stakeholders pay more attention to sustainability issues and place greater pressure on the maritime industry (Poulovassilis & Meidanis 2013). In pilotage, there is also a pressure to act responsibly. In Finland, where the pilotage company is state-owned, the state requires that the companies obey the principles of corporate social responsibility and open reporting.

The purpose of this paper is to present the social benefits of maritime pilotage and how CSR is perceived in pilotage. The paper describes the theory of CSR and the basis of state ownership policy. Based on the interviews carried out during this study, the application of CSR in pilotage and the measuring of pilotage operations are described.

The study includes a literature review and an interview study. In order to study the application of CSR in pilotage the management of the Finnish pilotage company were interviewed. The interviews were carried out as focused interviews in a group that included the pilotage director and the head of communications, who is also responsible of CSR related communications. The results of the interviews are based on the oral responses and written documents presented during the interviews. After the interviews some answers were further refined through e-mail discussions and written documents.

The structure of this paper is as follows: chapter 2 describes the theory of corporate social responsibility and the state ownership policy. Chapter 3 describes the results of the interviews of the management of the pilotage company. Chapter 4 includes the discussion and conclusions of this study and presents topics for further research.

2   LITERATURE REVIEW ON CSR IN PILOTAGE

2.1   Principles of CSR

In the corporate social responsibility concept, the companies voluntarily take part in actions, that contribute to a cleaner environment and better society through interaction with their stakeholders and by integrating these concerns to their business operations, which can potentially also result in economic benefits (COM(2001)366).

CSR in practice means cooperation and interaction between different stakeholders in order to identify and control unwanted externalities and maximise the positive externalities. CSR obedient companies operate in a financially and ecologically sustainable manner, while considering the demands of their stakeholders. There are two different views on responsibility. Firstly, responsibility can be seen as an internal tool of the company's management. Here, responsibility is seen as a tool to improve the company's operations and therefore improve the company's financial performance. On the other hand, a demand for responsibility can stem from outside the company, for example from stakeholders and legislation (Sorsa 2010).

According to Lovio (2000) there are three ways to execute responsible operations in a company. These ways are the charitable work approach, the procedure approach and the core business approach. The charity approach entails that a company voluntarily takes part in charitable work by sponsoring and donating funds to solve important problems in the society. The charitable work approach can be problematic if a company is part of any unethical procedures in their business operations or while obtaining profit.

The second way is the procedure approach, which means that it is not important how the profits are used, but how they are acquired. The profits need to be acquired in a responsible way and in a manner that is approved and valued by the society. All the operations in the company need to be executed by following good business- and society norms. This means that the suppliers are tendered and treated responsibly and that the company follows the labour code and contracts, develops good working conditions and promotes staff wellbeing. The company only burdens the environment within the limits set by laws and tries to save resources and energy by its own initiatives. The company also pays its taxes, does not violate the competition decrees or partake in bribery (Lovio 2000).

The third responsibility approach concentrates on the core business of the company, i.e. the product. In this approach as well, good business procedures are followed. The company is considered responsible when its product or service is seen as beneficial to the customer and to the society (Lovio 2000).

The CSR process can be summarised into a handful of major steps: planning, in the form of identifying stakeholders and their key values; stakeholder engagement and dialogue; performance measurement, which allows the company to demonstrate its progress to its stakeholders; reporting, as a means of communicating with the

stakeholders; auditing and quality assurance; commitment to improve performance and incorporating CSR into operations and policy making (Grewal & Darlow 2007).

The increasing demand for businesses to be transparent about the environmental and other corporate responsibility challenges they face, has led to the development of a number of reporting guidelines and frameworks. (Government Resolution, 2011)

2.2   State ownership policy

Pilotage services in Finland are provided by a state-owned company. The pilotage organisation is a special assignment company which has a mission assigned to them by the Pilotage Act (Government Resolution, 2011; Pilotage Act 940/2003). The Pilotage Act entitles a monopoly for the pilotage organisation in providing pilotage services (Pilotage Act 940/2003). The state is committed to a long-term increase in the shareholder value of state-owned companies. The state ownership policy aims at a socially and financially sustainable result.

The goals for the state ownership of the special assignment companies are based on maximum overall social benefits and financial results. These are primarily evaluated in terms of how and at what cost the company is able to carry out the given assignments and achieve the goals established by the ministry responsible for the administrative sector involved; i.e., how the company fulfils its function in the service of the society. (Government Resolution, 2011)

In companies responsible for special assignments, the state is involved as an active owner that determines the content of the assignment and its significance with regard to the goals set for the company. The business strategy for commercial operations is determined by the company's executive management and administrative bodies. The coordination of the company-specific business strategy and the special assignment calls for cooperation between the state officials responsible for ownership steering and the special assignment and, if appropriate, between the ministries involved. (Government Resolution, 2011)

The state ownership policy requires that state-owned companies follow the principles of corporate social responsibility and respect their social responsibilities in the field of employee rights and act in an environmentally responsible manner. The state requires that the companies perform CSR reporting according to instructions derived from international Global Reporting Initiative (GRI) reporting guidelines. (Government Resolution, 2011)

3   CSR AND PILOTAGE IN FINLAND

3.1   Background

In the pilotage company, the different aspects of corporate social responsibility are based on the state ownership policy, the Pilotage Act and the government resolution. The other special requirements imposed on pilotage by customers, personnel and other stakeholders are also taken into account when developing the CSR work of the pilotage company. The main aspects of corporate social responsibility in the pilotage company are providing pilotage services, personnel, stakeholder engagement, society and environment.

The pilotage company complies with the government resolution on corporate social responsibility. The government has also provided instructions on CSR reporting. In reporting, the guidelines of GRI and special instructions given to state-owned companies are followed.

The operational target of the pilotage company is reasonable operating profit which is required by the Pilotage Act. Primarily the profit is invested into the development of operations. The target for the operating profit of state-owned companies is set to 7%. There is no set target for the revenue growth. The revenue is heavily dependent on the development of import and export in Finland. The annual number of pilotage assignments has been approximately 30 000.

The demand for pilotage services has slightly decreased during the recent years due to the fact that the overall maritime traffic has decreased because of the recession period. Additionally, the demand for pilotage services has decreased since a pilotage exemption certificate could also be granted to English speaking masters after an amendment to the Pilotage Act. The pilotage company has estimated that the annual number of pilotage assignments will decrease to 25 000 in the future, because the number of pilotage exemption certificates is expected to increase.

3.2   The aspects of CSR in pilotage

3.2.1   Maritime safety and environmental protection

The primary purpose of pilotage is to ensure maritime safety and prevent environmental damage that can be caused by vessel traffic.

According to the management of the pilotage company, safety is the basic value of the organisation. Safety is embedded into all components of corporate social responsibility. Basically, the pilotage services are provided in order to ensure the safety of the maritime traffic. Using a pilot reduces the risk of groundings and collisions and thus protects the vessels against damages and the maritime personnel against injuries or deaths. Reducing the risk of groundings and other maritime accidents reduces the risk of

environmental damage. Using a pilot helps protect the marine nature and property values such as waterfront estates, bridges and port equipment.

The safety benefits created by pilotage can also lead to monetary benefits. The costs caused by maritime accidents are extensive. Vessel damages are expensive and especially the costs of a possible oil spill can be immense. In the case of an accident, a pilot can also help to reduce the damages and thus also the costs.

The pilotage company offers its customers responsible pilotage services and since compulsory pilotage is regulated by law, even the non-responsible shipping companies must use the pilotage services offered, thus enabling the improvement of overall maritime safety. In these cases, the pilotage company creates a safety benefit to the society. When the shipping company is socially responsible as well, both the society and the shipping company benefit from the responsibility of the pilotage services. A responsible shipping company might say that they aim to be responsible and therefore want to use a pilot in order to guarantee the safety of maritime traffic.

The management of the pilotage organization likes to compare maritime safety to aviation safety. In aviation, safety is a competitive advantage. In the maritime industry, social responsibility is not necessarily seen as a competitive advantage. In some shipping companies, pilotage is seen only as an extra expense. Therefore, in the views of the management of the pilotage company, compulsory pilotage is a good thing.

3.2.2 Providing pilotage services

As a special assignment company, the pilotage company is responsible for providing pilotage services in the public fairways located in the Finnish waters and the part of the Saimaa Canal leased by Finland. Pilotage services are provided 24 hours a day on every day of the year. The pilotage company shall be prepared to provide services also in emergency conditions, as specifically ordered by the Ministry of Transport and Communications.

The use of pilotage is compulsory in Finland. Vessels shall use a pilot in the public fairways. Some vessels are exempt from compulsory pilotage based on the size of the vessel or because the master of the vessel holds a pilotage exemption certificate. The pilotage company provides pilot services for all vessels requiring pilotage. Pilotage resources are proportioned to correspond with regular traffic.

Pilotage is exceptionally challenging in Finland due to shallow and winding fairways and the ports freezing over every winter. The core aim of pilotage is the safety of maritime traffic and the environment, which is why all vessels carrying oil products or chemicals in bulk are always obliged to use pilotage services.

The pilotage company also has economic objectives and in that sense the operations should be rational. This can be seen in, for example, human resource management. Nevertheless, safety is the basic task and no risks to safety are to be taken with e.g.

resourcing. For example, rest times are not to be breached. Safety and environmental protection are objectives that are regulated by law and therefore form the basis of the operations of the pilotage company. Nevertheless, being cost-effective is not in controversy with being responsible. Responsibility is incorporated in the all areas of the company's operations and businesses.

3.2.3 Personnel relations

Special attention should be paid to the occupational safety of the pilots. The major risk faced by pilots in their work is falling into the sea during embarking or disembarking the ship. The management of the pilotage company is responsible for supervising that safe working methods are applied at sea. Because the pilotage services are based on competent personnel (the pilots and the boat men), the working conditions and well-being of the employees are some of the most important components of CSR in the pilotage company. The pilotage company has adopted the state policy that respects the position and rights of the employees.

Most of the time, the pilot is the person onboard who makes the final decisions concerning safety. Often the pilot has to insist on e.g. using a tugboat in windy weather. In some cases, the pilot might even have to refuse or abort the pilotage of the ship if the situation so demands.

3.2.4 Customer and stakeholder relations

In addition to maritime safety, traffic fluency is an important objective for pilotage. This helps support the operation of Finland's export and import sectors, since in practice all foreign trade is dependent on maritime traffic. Traffic fluency is also an important factor to the customers of the pilotage company. Even if a shipping company doesn't appreciate the safety benefits that responsible pilotage produces, they appreciate the fluency and efficiency of the pilotage services. According to customer satisfaction surveys, it is important to be able to get the pilotage services on time. Nevertheless, the majority of the respondents of the customer satisfaction surveys also considered the safety benefits provided by the pilots to be very valuable.

The pilotage organisation is responsible for providing pilotage services to its customers in the public fairways everywhere in the Finnish waters, at all hours, year round. The pilotage company is committed to the service level, which is measured by the waiting time for the pilot service. The official time period in pilot order is 2 hours. That is to say that a pilot order must be done 2 hours prior to the arrival. Waiting situations mean that a pilot arrives later than the said time limit. Most of the time, the pilot should arrive as soon as the pilot order is done and in approximately 80 % of the cases the pilot is onboard the ship within an hour from the pilot order.

To the pilotage company, some of the most important stakeholders are the Finnish Transport Safety Agency (Trafi) and the Finnish Transport Agency, who are the main

authorities co-operating with the pilotage organisation, and the state as the owner of the company. Trafi is the pilotage authority in Finland. Trafi monitors the observance of the Pilotage Act and any provisions issued under it. Trafi grants pilot licences and pilotage exemption certificates. The Finnish Transport Agency operates the vessel traffic services in Finland. A pilot is obliged to report to the Vessel Traffic Service any observations that can be of significance for the safety of navigation, for the protection of people, property and the environment, and for maritime and customs surveillance. The pilot shall also report any damage caused to or by the vessel and, upon request, provide the authorities with further information. Other important partners in co-operation, as well as stakeholders, are the port authorities and the icebreaking service. It is the pilots' job to communicate with the icebreakers and the port during the act of pilotage.

3.3   Measuring the pilotage operations

In order to measure the safety and traffic fluency of its operations the pilotage company has developed a measurement system. The purpose of the measurement system is to provide information for the internal development of the pilotage organisation, for the authorities about the vessels' operation, for the customers, the society and the owner (state). The measurement system creates a platform for reporting corporate social responsibility issues to the stakeholders.

Most of the piloted vessels visit Finnish ports regularly. The measurement system also provides information about the piloted vessels and singles out the vessels that have caused the most incident observations. Based on the information gathered, a list of singled out vessels can be created and such listings of weak vessels are useful for authorities as well.

The measurement system was introduced in the beginning of November 2012. By now, information regarding over 5000 pilotage assignments has been recorded into the system. All the basic information about the pilotage assignments is reported to the measurement system. The measurement system has been integrated as a functional application into the enterprise resource planning system (ERP) of the pilotage organisation. The ERP includes the basic information of each act of pilotage. This includes information about the vessel, the start and end time of pilotage and the pilotage passage. From the ERP system, it is possible to gather information and report on, for example, how often the pilotages start on time or how often the act of pilotage has started late. The pilots give an estimate to the system on how much the use of a pilot hastened the voyage of the vessel. Based on this estimate the effect that using a pilot has on traffic fluency is measured.

In connection with every pilotage assignment, the pilot must report safety related observations or lack of observations. The observed incidents are classified as follows:

- **unsafe acts prevented**
- **near miss situations prevented**
- **accidents prevented**

- **unsafe acts**
- **near misses**
- **accidents**

So far, 90 % of the pilots have reported some incident during an act of pilotage. Correspondingly 10 % of the pilots have reported that they have observed no incidents during pilotage. The eagerness amongst the pilots to report incidents varies greatly. The most active pilot has reported on average 2.5 observations per pilotage and the least active pilot has reported only one incident during 70 acts of pilotage.

The reports entered into the measurement system vary a lot, and the reporting is still somewhat unreliable. Pilots do not report their observations similarly - they interpret similar situations differently and classify their observations unsystematically. In addition, every pilotage area has 2-3 pilots that have only made reports in which there are no observations of incidents during pilotage. In some cases, this may result from vacations or sick leaves that have occurred during the introduction of the reporting system. In some cases, the pilots may neglect the reporting on purpose. There is a need to train the pilots to report consistently and define more accurately what types of incidents should be reported and how. The personnel must be further instructed and motivated so that the reports would not be merely "no incidents observed" reports.

Nevertheless, it is remarkable that already 90 % of the pilots perform the reporting with care. This was accomplished with a single command to adopt the system. Now the aim is to get the rest of the personnel active by visiting the different pilotage areas. There are a few pilots that have not yet reported any incidents who are to be approached and motivated in person. The measurement system has already been discussed amongst the personnel of the different pilotage areas. The discussion so far has been good and fruitful and the implementation of the system has started well. The personnel of the pilotage company are satisfied with the quality and usability of the new measurement system, but they stress that the system should be calibrated and harmonized.

The system was developed so that it would be easy to use and so that the person filling the report cannot complete the pilotage assignment without at least reporting "no incidents observed". This could explain why the launch of the new measurement system has been so successful. At this point, it can be concluded that the usability and reliability of the system can be enhanced by motivating the pilots to report their observations more thoroughly and in a uniform manner. More discussion inside the organization is needed.

Further analysis of the information gathered through the measurement system has not yet been performed, since the application of the measurement system and gathering of information has only just begun. Nevertheless in the near future the gathered data is to be used to establish for example how many unsafe acts, near misses and accidents have been prevented with pilotage or how much pilotage has quickened the vessels' visits to ports. By analysing the data it is possible to obtain tangible numeric valuations on the effects of pilotage on maritime safety and traffic fluency and thus also measure the social benefits of pilotage.

3.4   Reporting the pilotage operations

The pilotage organization is preparing its first GRI report during this spring. The purpose of the first report is to retrospectively include the last 3 years of operation in the report. The report will include sections on customer satisfaction, employee satisfaction and punctuality i.e. waiting situations and delays. The quantitative safety objectives can be established through the measurement system.

One of the main goals of the reporting system is to develop the operations of the pilotage company. Internal development is also a part of responsibility and responsibility reporting. No quantitative goals e.g. how much the amount of near miss situations should decrease, have yet been set for the development of the operations. At this point, merely the utilization potential of the system and the calibration of the reporting practices are to be resolved - e.g. how does the pilotage company analyse and disseminate the information to authorities without using extra resources. Yet it is also in the interest of the company itself to find out how to organize the analysing and handling of the information so that it can be used to develop the company's operations. Should the work be done by an internal work group? What is the position of the management in this?

3.5   Future challenges and opportunities in pilotage

The operative challenges of the pilotage company in the future are in resourcing e.g. the aging of the personnel, and to some extent safety issues. With the aging of personnel, the risk is that the individual's ability to work could deteriorate and an employee might be less available to work. In that case, to ensure maritime safety more employees must be allocated to perform the acts of pilotage than it is actually needed according to the theoretical calculation of human resources.

The continuity of customer demand is also a risk factor. The pilotage company has a legal obligation to offer pilotage services nationwide and in an equal manner to 60 different ports and over 1000 fairways. Simultaneously, it is possible that the customer demand decreases, the income decreases and the personnel age.

In practice, the maritime traffic towards the ports of HaminaKotka and Helsinki are funding all the pilotage services in Finland. The situation is similar in Finnish aviation. The income from the air traffic to the Helsinki-Vantaa airport funds the maintenance of all the other airports in Finland. The question is political: how do we want to organize the functioning of the Finnish transportation system in the future?

4   SUMMARY AND CONCLUSIONS

The most important task of pilotage is to ensure maritime safety. A pilot secures the safe voyage of the vessels through the most difficult phases of the ship's voyage in and out of the port. Using a pilot decreases the risk of collision and grounding, thus

decreasing the risks of vessel damage, cargo damage and damage to passengers and on-board personnel. By decreasing the risk of maritime accidents, the risk of damage to the vulnerable marine environment is also diminished.

Pilotage benefits both the national economy and the business of the shipping companies. Pilotage ensures the fluency of maritime traffic. To the customers of the pilotage organisation, that is shipping companies, traffic fluency means swifter visits to the port resulting in reduced operating costs. The fluency effect is even more profound in difficult weather conditions and during winter when the sea is frozen. From the point of view of the customers, it is important to be able to get the pilotage services swiftly. In 80 % of the acts of pilotage, the pilotage can be started ahead of time, which speeds the visit to the port even more. The fluency of maritime traffic is also important to the national economy, since approximately 80 % of Finland's import and export is dependent on maritime traffic and a pilot is used in approximately one third of the vessels that visit Finnish ports.

According to Lovio (2000) business could be executed by applying either the procedure approach and/or the core business approach. Both approaches are applied in the pilotage company. The core business of the pilotage company is to provide safety to its customers and thus produce social benefits for the society. The management of the pilotage company is committed to maintaining safe procedures in pilotage operations that could be risky for the employees especially in the winter time and in bad weather. The pilotage organisation is a special assignment company where the owner's (state) requirements concerning social responsibility are complied with.

Based on literature and the interviews carried out during this study, it can be stated that the social benefits of pilotage are manifold and are in connection with maritime safety, fluency of maritime traffic and securing the marine environment. So far, the benefits pilotage provides to maritime safety and traffic fluency have not been possible to establish as tangible numeric facts. Quantitative research is needed to establish how strongly pilotage affects the safety of maritime traffic or how much the use of a pilot quickens the visit to the port i.e. how pilotage affects traffic fluency.

The pilotage company has recently established a measurement system to measure the effectiveness of pilotage. Information about all the acts of pilotage is gathered into the system. In the future, this information is to be analysed numerically in order to gather quantitative information about the effects of pilotage on the maritime safety and traffic fluency. By using this information, the pilotage company can further develop it operations, become more safe and efficient and inform and communicate its operations with the stakeholders and the public.

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CORPORATE SOCIAL RESPONSIBILITY IN THE BALTIC SEA MARITIME SECTOR

ABSTRACT

Corporate social responsibility or CSR can enhance maritime safety and improve shipping companies' competitiveness. The aim of this study is to increase the knowledge of CSR in the maritime sector and study its applicability and benefits to shipping companies. The research methods include a literature review and a questionnaire study. The literature review examines CSR in shipping and the competitive advantages it produces. The questionnaire was carried out as a Webropol survey to shipping companies that operate in the Baltic Sea area. The aim was to discover whether and how CSR is implemented in shipping companies and how CSR is perceived. CSR is recognised as having real business benefits in terms of attracting customers and high-quality employees. In shipping, CSR usually focuses on environmental issues. Shipping companies engage in CSR to gain competitive advantage and to increase maritime safety. The questionnaire results show that shipping companies are motivated to engage in CSR mostly by environmental concerns and safety gains. The main economic benefit was seen to be the increase of customer numbers as a result of a better reputation. Resulting from the small number of answers it must be noted that the generalization of the questionnaire study is limited. The results are to be utilized in disseminating information concerning CSR in shipping. The safety of shipping in the Baltic Sea is extensively studied. However the possibility of tackling maritime safety issues by the means of self-regulatory and voluntary measures, such as CSR, has not been widely studied.

Keywords: corporate social responsibility, shipping companies, competitiveness, Baltic Sea, questionnaire survey.

1 INTRODUCTION

1.1 Background of the study

The majority of globally transported goods are moved through ocean transport. It is a cheap and efficient means of international transportation. Nevertheless, when maritime shipping and the full life cycle of the shipping companies' operation is viewed as a whole, questions of sustainability begin to emerge. For example, the shipping industry is shown to release a great amount of greenhouse gases, costs of which are not included in the direct pricing of maritime shipping. The possibility of registering ships in other jurisdictions with lax environmental standards is discouraging the sustainable development of the shipping industry (McGuire & Perivier 2011).

In the corporate social responsibility (CSR) concept, the companies voluntarily take part in actions, that contribute to a cleaner environment and better society through interaction with their stakeholders and by integrating these concerns into their business operations, which potentially also results in economic benefits (COM(2001)366; Kujala 2009). This means that corporate social responsibility takes into account environmental, social as well as economic aspects in the operations of a company.

CSR themes such as safety, health and the environment should already be high on quality shipping companies' list of priorities. Currently, however, CSR is mostly supported and dominated by land-based industries (Poulovassilis & Meidanis 2013). Nevertheless, it is apparent that the interest of many stakeholders in the social, environmental and ethical performance of the shipping industry has increased and the pressure from the stakeholders has changed the business environment of the shipping sector during the past decade. The stakeholders are demanding higher quality services, which entail operation improvements and a better image as well as increased awareness of the social, environmental and economic factors of shipping. Corporate social responsibility has the tendency to improve all three of these factors and, through them, enhance the quality of shipping. The quality of the service improves the image and reputation of a shipping company, whereas earlier the emphasis was on low cost services rather than image improvement (Fafaliou et al. 2006).

1.2   Objectives of the study

Corporate social responsibility can enhance maritime safety and improve shipping companies' competitiveness. The aim of this study is to increase the knowledge of CSR in the maritime sector. This paper examines the significance of CSR in shipping companies' competitiveness and maritime safety and studies its applicability in and benefits to shipping companies.

1.3   Research methodology

The research includes a literature review and a questionnaire study. The literature review is carried out by combining existing theories of CSR and shipping with an emphasis on competitiveness and maritime safety. The questionnaire is carried out as an e-mail survey to shipping companies that operate in the Baltic Sea area. The aim is to discover whether and how CSR is implemented in shipping companies and how CSR is perceived.

1.4   Study structure

The following chapter 2 includes the literature review on CSR in maritime sector. Chapter 3 discusses the shipping companies' answers to the e-mail questionnaire. Chapter 4 includes the conclusions of this paper.

2   LITERATURE REVIEW ON CSR IN THE MARITIME SECTOR

2.1   CSR in shipping

CSR activities are usually not taken into serious consideration by companies whose corporate activities take place at a business-to-business level, such as shipping companies. For shipping companies the main function is to produce services for transportation needs and thus the basic goal for companies in this sector has always been the ability to produce low-cost services (Progoulaki & Roe 2011). Nevertheless, the companies that are the major beneficiaries of maritime shipping have themselves become pioneers in the field of CSR. To those major companies, it is important to demonstrate to their stakeholders that they are concerned about social and environmental risks. They are bound to realize that a major component of their supply chain, that is maritime shipping, is potentially a source of vulnerability for their corporate reputation (Neef 2005).

There are two different views on responsibility. Firstly responsibility can be seen as an internal tool for the company's management. Here responsibility is seen as a tool to improve the company's operations and therefore improve the company's financial performance. On the other hand a demand for responsibility can stem from outside the company, for example from stakeholders and legislation (Sorsa 2010).

Corporate social responsibility is a voluntary undertaking. A socially responsible shipping company is a company working actively to integrate economic, social and environmental concerns in their business operations. Engaging in CSR forms a good basis for managing the company's social and environmental performance. It also gives guidance on how to communicate with stakeholders. Engaging in CSR can become a part of the company's brand, which can later help the company to sustain its reputation in times of crisis or accidents (Poulovassilis & Meidanis 2013). In shipping, CSR has tended to focus on environmental issues, such as avoiding pollution and reducing greenhouse gas emissions (Lloyd's list 2010).

Corporate social responsibility is increasing in the shipping sector because the shipping companies strive to be transparent and accountable and they try to comply with the rules and regulations and even go beyond them, as well as to avoid the fines and detention, that could result from non-compliances. The shipping companies are starting to realise that they might be favoured as shippers if they engage in sustainable operations and sourcing. This would result, in their favour, in higher margins and could generate competitive advantage. They are also starting to realise that CSR operations do not always inflict higher operating or production costs, but more likely will reduce the costs and even limit them (Etsy & Winston 2006).

Corporate social responsibility can be perceived as long-run profit maximization (Carroll 1999). The shipping companies should focus on obtaining long term profits rather than quick short term profits, which are often easy to get by violating standards and regulations. These long term profits should not only be monetary profits, but also

social benefits and environmental benefits, which are often challenging to measure and can only be seen after a while (Grewal & Darlow 2007).

The link between corporate social responsibility and financial performance is complicated. Roughly put, it can be stated that responsible actions can produce financial and time costs, but due to those actions, cost savings in the form of learning and increased efficiency can be achieved. Responsible actions can also produce concrete improvements and a responsible reputation, both of which are valued by the stakeholders and can lead to both cost savings and an increase in the company's income (Sorsa 2010). Companies engaging in CSR and socially responsible investing have demonstrated that ethical codes, humane social policies, corporate citizenship and proactive environmental procedures reduce the corporate risks, enhance the creativity and loyalty of the employees and improve the company's financial performance. Companies that promote sustainability and are concerned and aware of the social, environmental and economic impacts of their operations, also provide more predictable corporate results for their stakeholders (Fafaliou et al. 2006).

Environmental social responsibility in shipping is motivated mainly by the need to comply with existing and forthcoming regulation, the desire to identify efficiency gains by incorporating environmental aspects in the company strategy and by the desire to gain competitive advantage through establishing a "green" profile (Acciaro 2012). A socially responsible company tries to operate in a manner that causes minimal harm to the environment and tries to reduce its environmental impacts as far as possible. The environmental aspect of CSR for a company can mean that they try to manage the consumption of energy and non-renewable resources as well as reduce the amount of waste they produce and dispose of the waste in a safe and legal manner, which in return reduces their ecological footprint. CSR companies often conduct life cycle assessments to their products or services to determine their environmental costs in these phases (Elkington 1994).

The social aspects of CSR take into account the well-being of the employees, the corporation and the other stakeholders of the company. Social responsibility also connects the stakeholder groups together. A CSR compliant company aims at gaining benefits for its interest groups without exploiting or endangering them (Elkington 1994; Carroll 1999). The main aspects of social responsibility are the wellbeing and skills of workers, human rights, product liability and consumerism (Sorsa 2010). Voluntary initiatives in the field of workplace conditions help defend against potential consumer boycotts as well as formal accusations of unacceptable or illegal business practices. Such initiatives can also prevent the need for government regulation by demonstrating that the industry practice satisfies the public interest (Urminsky 2001). Companies which place an emphasis on CSR also tend to have more loyal and committed employees. Given the shortage of seafarers, it is wise for shipping companies to emphasise labour or employee issues as a part of their CSR, because this could have a positive impact on how seafarers view the company (Lloyd's list 2010). Apart from the ethical aspects, mistreatment of crew also affects the safe operation of ships. It can also be concluded that a competent, rested and well-motivated crew can reduce the company's operational costs and costs related to the ship's maintenance through

increasing efficiency, through their knowledge and performance and through their commitment to the goals of the firm (Progoulaki & Roe 2011; Progoulaki & Theotokas 2009).

2.2   Linking CSR with competitiveness and maritime safety

The shipping companies engage in CSR actions in their operations in order to gain a better position in competition and to increase overall maritime safety, which secures their operating capability and improves their reputation amongst all stakeholders. Companies that ignore social priorities and responsibilities are at risk of losing competitive advantage in terms of gaining market share. Neglecting environmental issues, on the other hand, can have a harmful effect on the company's long-term growth rates and business (Maritime CSR 2012).

Sometimes the values that the companies endorse, such as CSR, are the only thing that separates them from their competitors. Therefore "green marketing" in the form of e.g. formulating and publishing codes of conduct, making statements in media and advertising material and making presentations to customers is somewhat common within the shipping business (Holmgren 2010). The "green" or CSR profile of a company is also a factor in procurement decisions and often the more desired alternative, since a "green" company is associated with good quality service and innovativeness (Acciaro 2012).

Competitive advantage can also arise from anticipating societal changes. Companies can benefit from being early movers in the field of technology and strategy. They can also participate in shaping the overall direction of legislation and public debate (Blowfield & Murray 2008). A committed workforce is also regarded as a prerequisite for a company's commercial success. Responsible human resource management policies can lead to competitive advantages in recruiting and retention of talented and motivated employees in an industry facing difficulties relating to labour shortage (Pawlik et al. 2012).

The competitive advantages generated by CSR largely depend on the measures taken, the costs affiliated to them and the time period considered. Competitive advantage can be gained in different fields, such as environment, human resources, customer relations, innovation, risk and reputation management and financial performance. In the environmental field, measures to reduce energy consumption as a CSR measure can lead to cost savings. Rising energy costs and the pricing of emissions increase the cost-saving potential of environmental CSR. In the field of human resources, CSR can lower the employee turnover and improve employee motivation. From the innovation perspective, CSR can lead to competitive advantage in three major ways: innovation resulting from stakeholder communications, identifying business opportunities based on societal challenges and creating an innovative work environment. In the field of risk management CSR enables the companies to prepare for new regulations and enhance their reputation (COM(2008)774).

There are some factors of social responsibility that are specific for the shipping industry and affect maritime safety. The workplace hazards typically encountered in the shipping sector are fatigue, stress and work pressure, which can contribute to the error of judgement and inadequate lookout or watchkeeping. This is often followed by failure to comply with the rules and regulations set for the operations. Other demands include communication, environmental factors and long periods away from home. These characteristics are potential contributors in a causal chain of shipping accidents (Collins et al. 2000).

A shipping company can provide safe and efficient services as well as protect the marine environment, when it has a skilled, satisfied and loyal staff onboard. The duty of the shipping company engaging in CSR is to create a social responsibility culture among its personnel (Progoulaki & Roe 2011). Operating a ship is not just about having the necessary knowledge of the ship's equipment and systems - that knowledge must also be utilised properly and with a connection to safety and environmental protection. Only then can long-term benefits be achieved (Poulovassilis & Meidanis 2013).

3 THE QUESTIONNAIRE STUDY AND DISCUSSION ON THE MAIN FINDINGS

The questionnaire study was conducted during February and March 2013. The questionnaire was sent to over 500 recipients in shipping companies that, according to their web pages, operate or are located in the Baltic Sea area. Shipping companies from all countries that border the Baltic Sea were invited to answer the survey. The shipping companies were chosen based on an extensive web page investigation. No restrictions to survey participation were made based on, for example, the size or type of the company or the type of the company's operation.

In the questionnaire, the participants were divided into three answer groups: companies that are engaged in CSR, companies that are not, but are interested in the concept nevertheless and companies that are not engaged in CSR nor are interested in implementing CSR in their operations in the future. The questions asked varied slightly depending on the answer group. The participants were asked questions concerning for example the concept of CSR, the CSR measures the companies are or would be involved in, reasons and obstacles for engaging in CSR and CSR and its links to competitiveness and maritime safety. The questions were mostly multiple choice questions, but the questionnaire also included a few open questions.

Only 19 answers were received during the time period of the study. Because of the small number of respondents, the generalisation potential of the study is limited. Most of the responding shipping companies were privately owned and the size of the companies mainly varied from medium (6-20 vessels) to large (more than 20 vessels) companies. Mostly the companies operated in the Baltic Sea area, but some operated in larger areas, even globally. The questionnaire received answers from Denmark, Estonia, Finland, Germany, Lithuania and Sweden. The respondents were mainly management personnel. Approximately 68 % of the participating companies had implemented CSR

measures in their operations. From the remaining companies that had not yet implemented CSR, 33 % were not interested in implementing CSR to its operations even in the future. Those participants were asked no further questions.
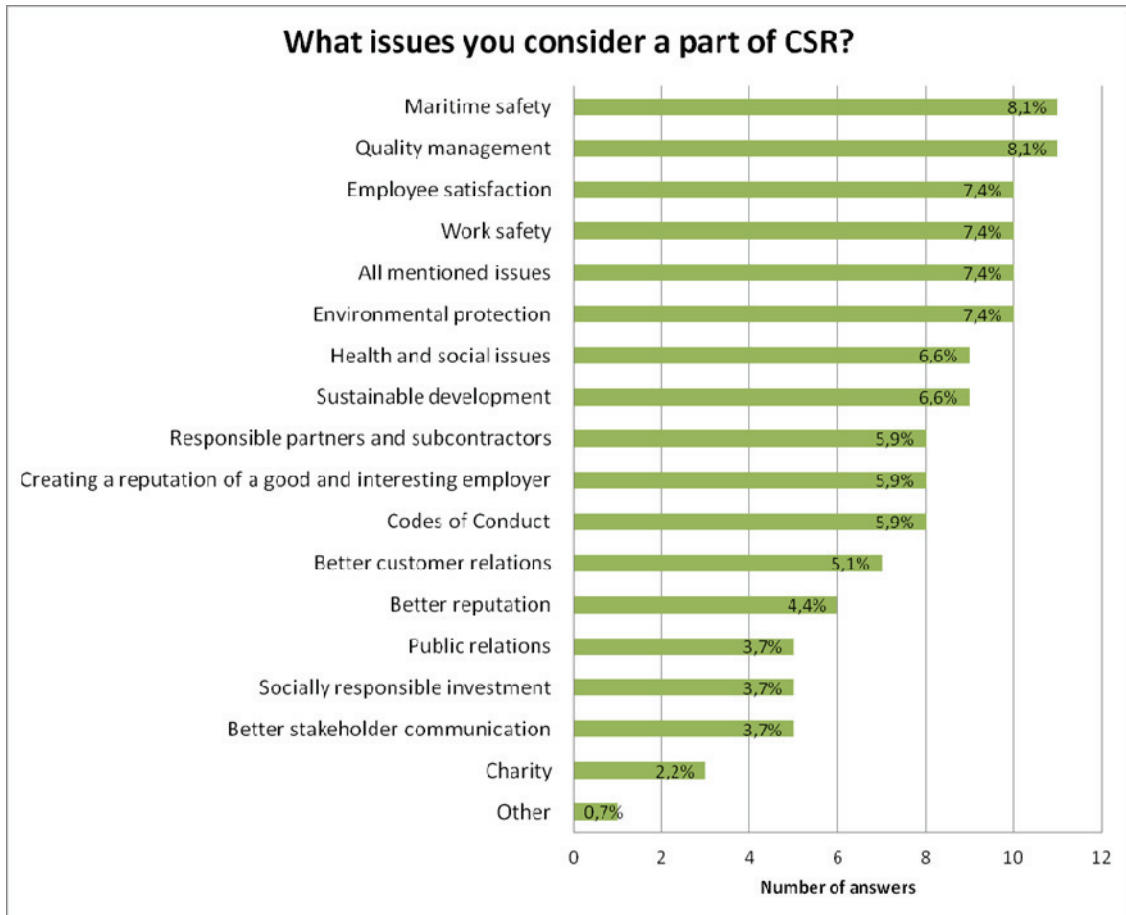

Figure 3.1 The concept of CSR in the views of the respondents. More than one answer was allowed.

As a preliminary question, all the participants were asked what issues they consider to be a part of CSR (figure 1). The question was multiple choice and the participants were allowed to choose more than one answer. The most frequent answers were maritime safety and quality management. Employee and work safety related issues, such as employee satisfaction, work safety and health and social issues, were also often considered a part of CSR.

It should be noted that reputational issues such as better customer relations, better reputation and public and stakeholder relations were not very often seen as a part of CSR and a reputation as a good employer was a more frequent answer than reputation altogether. This could imply that in some way, CSR issues are considered to be a company's internal matter. The fact that quality management was a popular answer would also indicate the same. Of all the different reputational aspects, customer relations seems to be considered the most important. Stakeholder communication which, according to literature, is an integral part of CSR work, received fewer answers. The question included an open answer option. One participant replied that they consider human rights, anti-corruption measures and equality a part of CSR also.

In the questionnaire, the companies that were already engaged in CSR were asked about the CSR measures they are involved in (figure 2). More than one answer was allowed. The most common CSR measures implemented were environmental measures and safety measures. One answer outside the provided list was given. That particular company engaged in CSR by providing education in a local school.
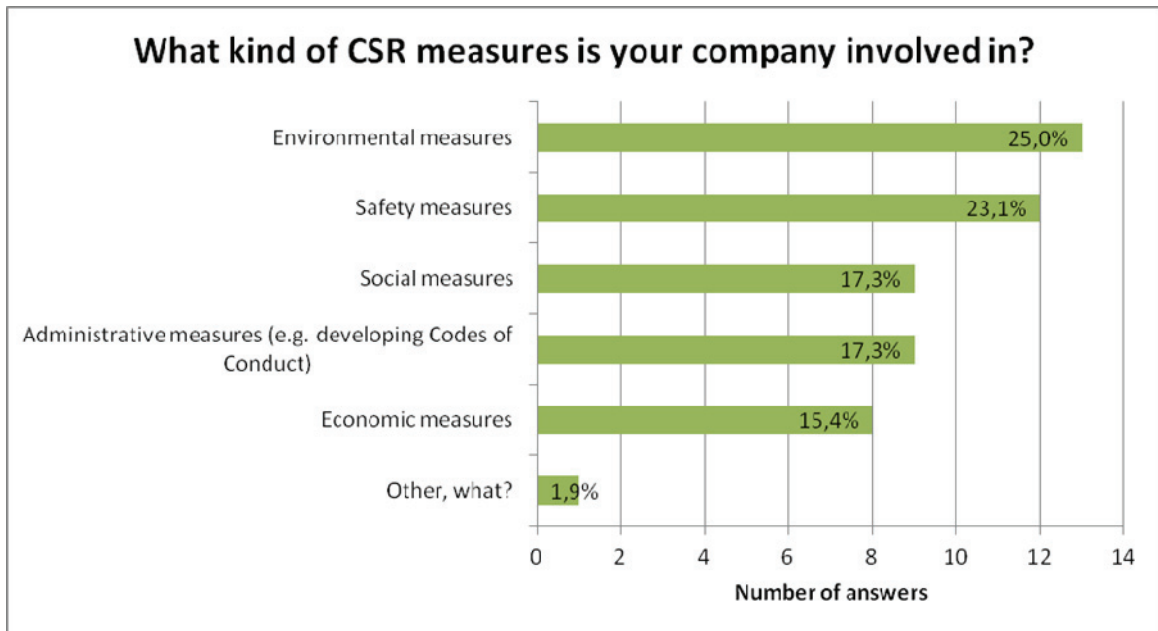
What kind of CSR measures is your company involved in?

Measure	%
Environmental measures	25,0%
Safety measures	23,1%
Social measures	17,3%
Administrative measures (e.g. developing Codes of Conduct)	17,3%
Economic measures	15,4%
Other, what?	1,9%

Number of answers

Figure 3.2 CSR measures implemented in the responding shipping companies. More than one answer was allowed.

When the participants were asked to voluntarily elaborate the answer and reveal the reasons for choosing the particular CSR measures the answers varied, but considered mostly economic and moral priorities. The CSR initiatives have to suit the business strategies of the company. Safety and environmental protection were considered an important issue and seen as benefits to be pursued, but the companies also deemed important the benefits of sustainable development and constant improvement of operations. One participant also mentioned stakeholder pressure as a driver in choosing CSR measures. Apart from this answer, stakeholders were rarely mentioned in the answers of the respondents.

The companies that had not yet implemented CSR measures in their operations were also asked what kind of CSR measures they would possibly be involved in. The most frequent answers were environmental measures and safety measures, which both gathered 25 % of the answers. The third most common answer was administrative measures. One company replied that the measures were still undecided. The views of these companies were rather similar to the views of those that are already engaged in CSR. This could indicate that the information gathered about CSR and attitudes towards it are rather uniform throughout the shipping industry.

In the questionnaire, the companies that were already engaged in CSR were also asked what kind of obstacles there are for engaging in CSR (figure 3). The same question was asked from the companies that had not yet implemented CSR. The main obstacle for

engaging in CSR was considered to be the lack of resources. As an open answer, one respondent mentioned the lack of systems. In the views of the respondents of the companies that are not yet involved in CSR practically all of the obstacles were considered relevant.
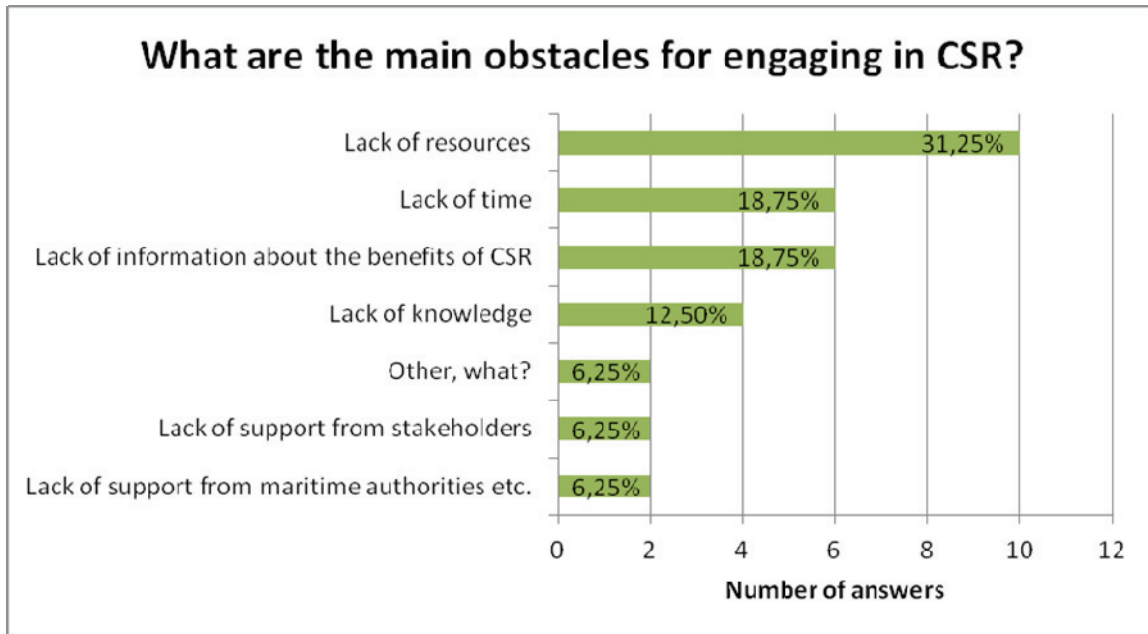
Figure 2.3 The main obstacles for engaging in CSR faced by the companies. 1-3 most important alternatives could be chosen.

Approximately 85% of the respondents felt that the implementation of CSR measures had brought benefits to their company. Those benefits were mostly customer satisfaction and image related, such as a good reputation as a responsible company. One participant also mentioned employee satisfaction and reduced costs as a benefit gained from engaging in CSR.
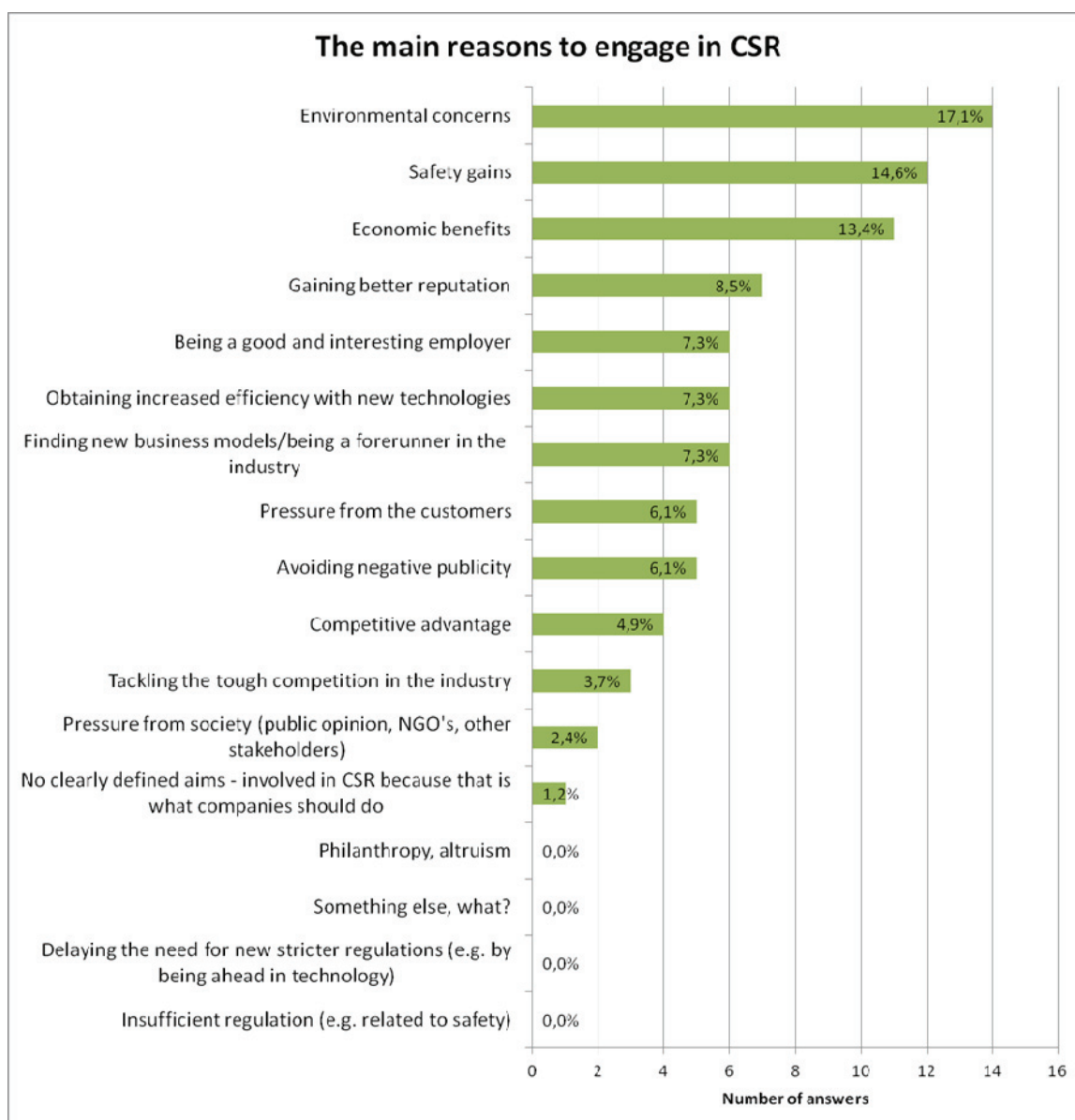
The main reasons to engage in CSR

Reason	
Environmental concerns	17,1%
Safety gains	14,6%
Economic benefits	13,4%
Gaining better reputation	8,5%
Being a good and interesting employer	7,3%
Obtaining increased efficiency with new technologies	7,3%
Finding new business models/being a forerunner in the industry	7,3%
Pressure from the customers	6,1%
Avoiding negative publicity	6,1%
Competitive advantage	4,9%
Tackling the tough competition in the industry	3,7%
Pressure from society (public opinion, NGO's, other stakeholders)	2,4%
No clearly defined aims - involved in CSR because that is what companies should do	1,2%
Philanthropy, altruism	0,0%
Something else, what?	0,0%
Delaying the need for new stricter regulations (e.g. by being ahead in technology)	0,0%
Insufficient regulation (e.g. related to safety)	0,0%

Number of answers

Figure 3.3 The main reasons to engage in CSR. The respondents were allowed to choose a maximum of 5 most important alternatives.

All the participating companies were asked the following question: What are or would be the main reasons why your company engages or would engage in corporate social responsibility? The respondents were allowed to choose up to 5 most important alternatives (figure 4). The most predominant reasons for engaging in CSR were environmental concerns, safety gains and economic benefits.

Most of the motives chosen by the respondents were internal or reputational. Pressure from outside the company was seldom mentioned as a motive for engaging in CSR. Pressure from customers was mentioned a few times, but pressure from other stakeholders or society or pressure caused by new legislation were not considered as the most important motives to engage in CSR. This could indicate that, in the shipping industry, stakeholders are not very often included in the development of the companies' CSR work.

It should be noted that from the preliminary question about the concept of CSR (figure 3.1) it can be seen that safety issues are most commonly considered to be a part of CSR. Yet the most common CSR measures seem to be environmental measures (figure 3.2) and environmental concerns are considered to be the most important reason to engage in CSR (figure 3.4). This shows that CSR in shipping focuses mostly on environmental issues like the literature review indicated. From the questionnaire it can be concluded that gaining a better reputation is also one of the most important reasons to engage in CSR in the first place. It might be that in the views of the companies a reputation as a safe shipping company does not provide as good a competitive advantage as a reputation as a "green" shipping company. Therefore environmental issues might be somewhat emphasized in the shipping industry.

Concerning the economic side of engaging in CSR, the respondents were asked what they consider to be the most important economic benefits that motivate them to participate in CSR activities (figure 5). The most common answer was the increase in the number of customers and orders that results from a positive company reputation.

The economic benefits of CSR were not only seen to be reputational benefits. Engaging in CSR is seen to have other economic benefits as well. Pure economic savings and saved resources were also common answers. Economic benefits can be obtained due to increased efficiency and productivity as well. This includes the efficiency of the employees. There was also one open answer from a respondent, who pointed out that reducing emissions also reduces fuel costs.
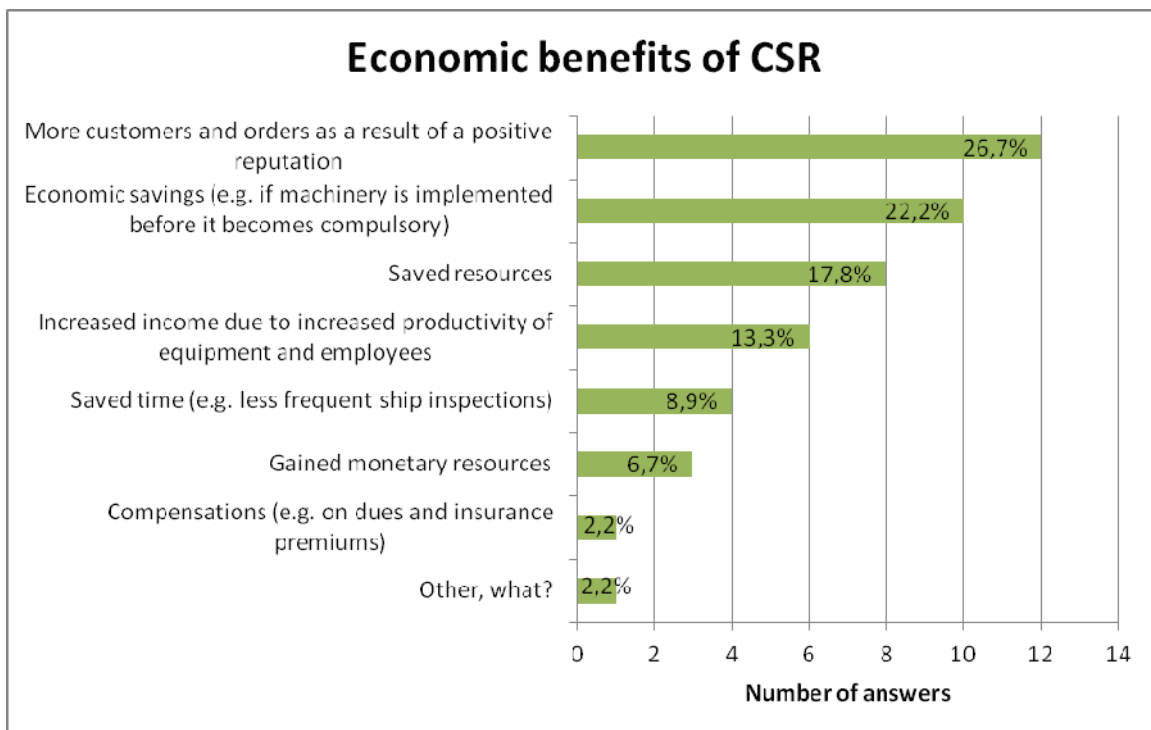

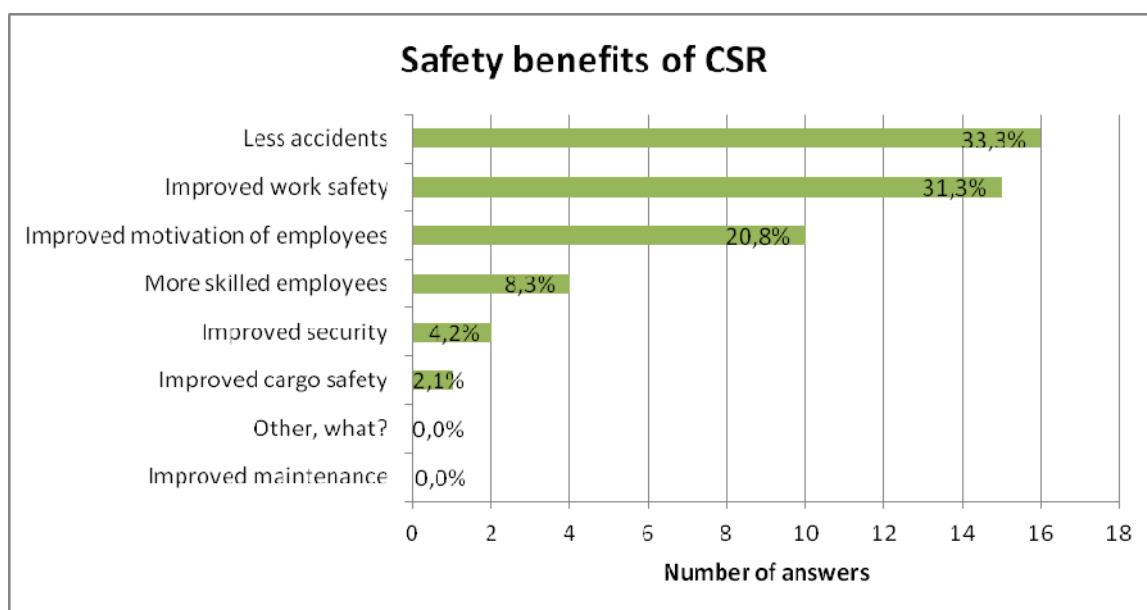*Figure 3.4 Economic benefits that motivate to CSR. 1-3 most important answers could be chosen.*

Figure 3.5 Safety benefits that motivate to CSR. 1-3 most important answers could be chosen.

According to the questionnaire the most important safety benefits that motivate companies to engage in CSR were accident prevention and improved work safety (figure 6). It should be noted that the improvement of employee motivation and skills were also considered to be safety benefits, thus the nexus between safe operations, social responsibility and the conditions of the employees is well known in the shipping industry.
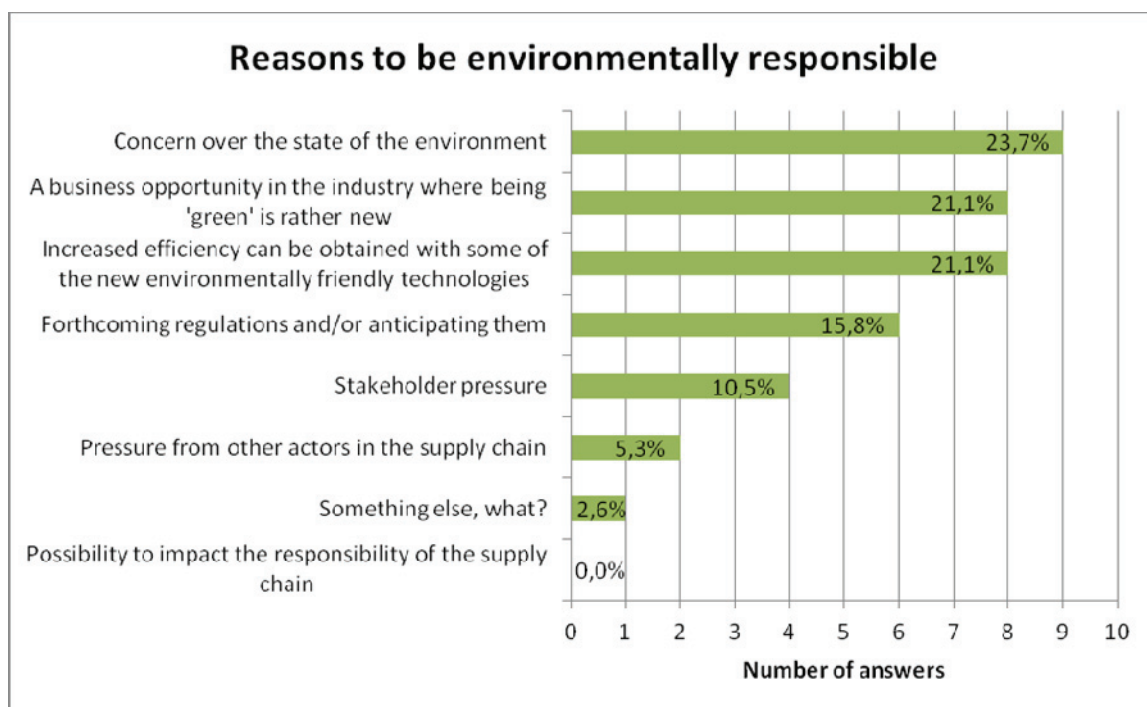

Figure 3.6 Main reasons to be environmentally responsible. 1-3 most important answers could be chosen.

The respondents were also asked what the main reasons for their company to be environmentally responsible are (figure 7). The most common reason was concern over

the state of the environment. This can be seen not to include any potential for economic or reputational benefits and therefore as being a purely moral motive. The second most common answers were creating business opportunities by being "green" and the increased efficiency obtained by employing new environmentally friendly technologies. These motives are more business driven, since they combine environmental concerns with reputational issues and economic benefits.
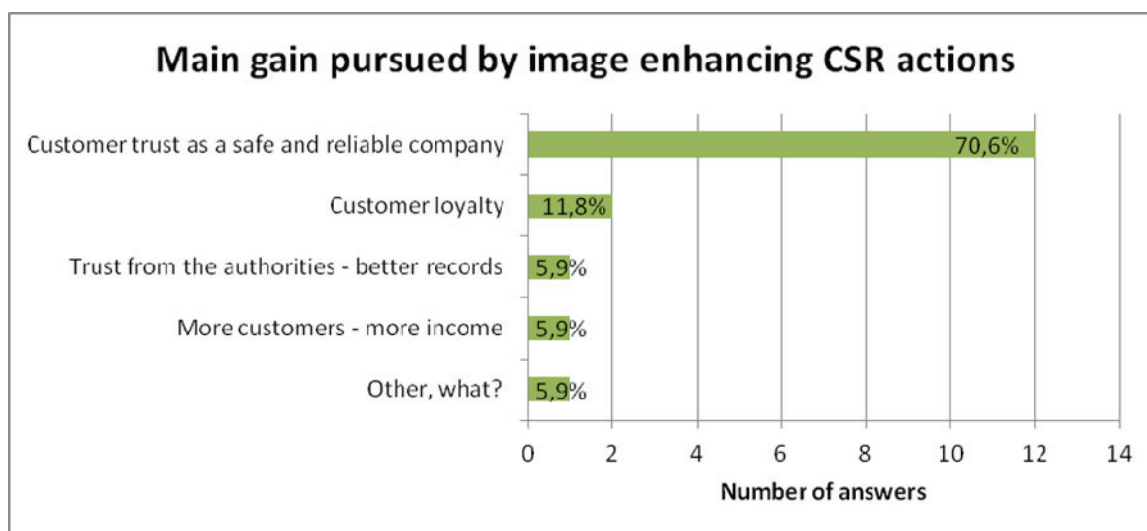
Figure 3.7 Main gain to be pursued by engaging in image improving CSR actions.

According to the questionnaire, if the companies would take CSR actions in order to improve the image of the company, the main gains pursued would be the customers trust and loyalty (figure 8). Gaining new customers due to a better company image was not a common answer and most of the given answers concerned maintaining the trust and loyalty of the customers that already exist. Customer trust as a safe and reliable company was clearly the most important motive to the companies even though in the preliminary question the relational issues were not often considered as an aspect of CSR. There was also one open answer, and according to it the main motive would be to be perceived as a sustainable company. In the open answer, no target group was determined so it would seem to cover all stakeholders including old and new customers and the society as a whole.

The maritime sector differs from other industry sectors in many ways. The respondents were also asked what special characteristics of the maritime sector should be taken into consideration when implementing CSR in shipping and whether some characteristics make the implementing of CSR in shipping more challenging. In the views of the respondents, CSR is possible in all industry sectors including the maritime sector. Nevertheless, the global nature of shipping imposes difficulties on the implementation of CSR. Cultural differences both within the industry and inside the shipping companies can impede the implementation of CSR. The lack of communication between the different stakeholders can also cause problems.

The companies stressed that compulsory regulation should apply to all companies worldwide and simultaneously and national regulations should not hinder the local companies' competitiveness. From the answers it would seem that the unfairness of

regulation impedes the introduction of CSR into the maritime sector. Shipping companies are inclined not to participate in self-regulation and voluntary actions since local legislation might already impose higher standards on them. Unfair legislation can invalidate the purpose and benefits of engaging in CSR.

4   CONCLUSIONS

The safety of shipping in the Baltic Sea has been studied extensively. However, the possibility of tackling maritime safety issues by means of self-regulatory and voluntary measures, such as CSR, has not been widely studied. Nevertheless, based on this study it would seem that safety issues are considered to be an integral part of the corporate social responsibility concept. When shipping companies were asked about the concept and different aspects of CSR, the most common answers were maritime safety and quality management. The most important safety benefits of CSR were considered to be accident prevention and better work safety.

During the study CSR in shipping was examined through a literature review and a questionnaire study was carried out to examine CSR in shipping companies operating in the Baltic Sea area. The questionnaire study yielded 19 answers from 6 countries. Due to the small number of answers it must be noted that the generalization potential of the study is limited. Nonetheless, the results provide an indication of the attitudes towards CSR in shipping companies.

According to the literature review, responsible actions can produce financial and time costs, but due to those actions cost savings in the form of learning and increased efficiency can be achieved. Responsible actions can also produce concrete improvements and a responsible reputation that can lead to both cost savings and an increase in the company's income. Environmental social responsibility in shipping is motivated by the need to comply with existing and forthcoming regulation. The social aspects of CSR take into account the well-being and skills of the employees, corporation and other stakeholders of the company.

In shipping, CSR has tended to focus on environmental issues. That can also be seen from the results of the questionnaire study. The questionnaire shows the most common CSR measures are environmental measures and environmental concerns are considered to be the most important reason to engage in CSR. Based on the questionnaire study, it would also seem that the shipping companies are starting to realise that they might be favoured as shippers and thus gain competitive advantage if they engage in sustainable operations and present themselves as "green". They are also starting to realise that CSR operations do not always lead to higher operating costs.

Further research on CSR in shipping and its effects on maritime safety is needed. In the future an interesting research topic would also be how self-regulation and voluntary measures affect the other instruments of maritime governance.

ACKNOWLEDGEMENTS

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USING SAFETY PERFORMANCE METRICS TO SUPPORT CSR GOALS AND OBJECTIVES

ABSTRACT

Corporate Social Responsibility (CSR) is multifaceted, encompassing economics, ethical business behavior, preservation of the environment, and social performance. An additional element that spans CSR and can impact CSR goals and objectives in the marine industry is the provision of an appropriate working environment that helps improve worker performance and promotes health and safety for workers, the vessel, and the environment. An appropriate working environment is critical because human error frequently is reported as a causal factor in more than 80% of maritime incidents and as a precipitating cause of more than 45% of these incidents. These statistics were an impetus for ABS research and development activities focusing on the Human Element with the aim of improving worker safety and performance.

The research activities/projects involve:
INCIDENT INVESTIGATION: ABS developed the ABS *Guidance Notes on the Investigation of Marine Incidents* to provide a structured approach to the investigation of incidents and close call events.
MARINER PERSONAL SAFETY PROJECT: the MPS project is a searchable database of maritime incident, injury, and a close call report that identifies trends and possible causes, potential corrective actions, potential lessons learned.
PROVISION OF ERGONOMIC DESIGN GUIDANCE: Guidance dealing with the ergonomics in design and construction of ships and offshore structures has been developed by ABS
ASSESSMENT OF SAFETY CULTURE AND LEADING INDICATORS OF SAFETY: ABS developed this Guidance Note with the objective of improving safety performance in the management and operation of cargo-carrying commercial vessels.

These ABS activities are providing the industry with relevant tools and information important for reducing and eliminating adverse events and close calls in a proactive manner and to investigate these events to prevent reoccurrence. This paper presents existing and ongoing ABS research activities and discusses different methodologies to utilize, analyze, and report safety performance metrics to help set goals, and measure performance. There are significant benefits to applying the developed tools, including increased understanding of risks and opportunities for improving safety levels,benchmarking, improving reputation, indentification of weak areas in advance of adverse events, and proactive hazards identification. The tools also can aid in risk assessment and management, all in support of Corporate Social Responsibility (CSR) goals and objectives.

1   INTRODUCTION

Corporate Social Responsibility (CSR) is a form of company self-regulation invoked as part of a business' overall corporate model. This self-regulation governs its compliance with laws and norms related to business conduct, and to standards of ethical business conduct and related responsibilities. The "triple bottom line" (sometimes called the "TBL" meaning people, planet, and profit) (Willard, 2002) encompasses an expanded range of values and metrics for measuring organizational and societal success along these three bottom line objectives: valuing people (safety, health, and well-being), planetary protection (managing resources, reduced environmental footprint) and economic success.

CSR elements can be quite broad in nature and scope considering the TBL; therefore, this paper focuses on the "people" component and how some of the ABS Safety & Human Factors Group's research activities can contribute to the success of CSR "people" component goals and objectives. Success in this case means the ability to properly analyze and utilize appropriate safety performance metrics to help establish and attain goals and manage change within the company. Listed below are possible CSR elements associated with the "people" component with the goal to provide a working environment that helps improve worker performance, health, and safety.

Table 1.1 Possible CSR elements associated with the "people"

- **Provide adequate resources (financial, time, personnel)**
- **Provide appropriate training to improve competence in safe task performance**
- **Perform risk assessments identifying control measures**

- **Promote a structured and effective follow-up to incidents and accidents to promote proactive preventive measures**
- **Assess the application and effectiveness of close call reporting onboard vessels**
- **Promote active participation in safety efforts by all (shipboard, shore-side, and management)**
- **Establish and maintain a corporate structure that defines**

- **Improve safety awareness**

- **Provide appropriate training to improve competence recognizing potential hazards**
- **Develop processes and procedures for timely control of the hazards and risks**
- **Improve the knowledge and skills of workers in the root cause analysis for incidents and close calls (near misses)**
- **Analyze and then improve the quality of life onboard vessels**

- **Define roles and responsibilities of all members of management toward health and safety**
- **Improve corporate-level visibility on safety and health**

	responsibility for promoting safety and health activities	**performance to reduce injuries and illnesses**

The following sections discuss several different ABS research and development activities related to mariner (worker) safety which support the analysis, development and implementation of the above-mentioned CSR elements.

2   INCIDENT INVESTIGATION

ABS developed the ABS *Guidance Notes on the Investigation of Marine Incidents* to provide the maritime industry with a structured approach to the investigation of incidents and close call (near miss) events. These Guidance Notes contain information to assist with identifying and documenting event root causes as required by the International Safety Management (ISM) Code. Also described in these Guidance Notes is an incident investigation methodology that was expressly developed for the maritime industry, reflecting those elements of maritime operations and incident causation particular to the industry. It is important to note that incident investigation is a process that is intended to help organizations learn from past performance and develop strategies to improve safety.

The ABS approach to incident investigation caters to the unique needs of the marine industry, including human element, machinery and engineering, structural and security concerns. The objectives of the ABS approach are as follows:

- **Provide a technique that will guide incident investigators when conducting root cause analyses in identifying, documenting and trending the causes of accidents and close calls**
- **Assist with the investigation of a variety of incident types (e.g., groundings, collisions, fires, etc.) and sizes of incidents (minor to major, including close calls) related to their vessels and facilities (ashore and at sea)**
- **Allow analysis of losses whether they are related to safety, the environment, human element concerns, security, reliability, quality or business losses**
- **Support activities such as Tanker Management and Self-Assessment (TMSA), as well as the ISM Code, and the International Ship and Port Facility Security (ISPS) Code**
- **Provide a technique that is sufficiently flexible to allow customization to a user's own management system, Health, Safety and Environment (HSE) programs or related initiatives.**

The focus of these Guidance Notes is on the application of structured analysis techniques, including the use of the ABS *Marine Root Cause Analysis Map*, to the incident investigation process. There are two levels of analyses that can be used as part of the incident investigation process, apparent cause analyses (ACAs) and root cause analyses (RCAs). Root cause analyses involve a deeper level of analysis than apparent cause analyses. These Guidance Notes provide instructions for the performance of incident investigation activities, including:

- **Incident Investigation Initiation - How to determine if an incident has occurred, then how to classify and categorize the incident, and how to decide whether to conduct an in-depth investigation**
- **Data Gathering - How to collect data related to people, processes, procedures, documents, position of the vessel and physical evidence associated with an incident.**
- **Data Analysis - How to analyze incidents to determine causal factors using tools such as causal factor charts, fault-trees and the 5-Whys technique. Guidance is also provided regarding the identification of root causes, using the ABS Marine Root Cause Analysis Map**
- **Generating Recommendations - How to document causal factors and root causes identified during an analysis, including how to identify what changes may be needed to enhance management systems and reduce risks**
- **Reporting and Trending - How to archive findings and recommendations to allow review and trending of incident patterns.**

The ABS Incident Investigation Model, Figure 1, ABS Incident Investigation Model encapsulates a process for conducting investigations following losses whether they are related to people, structures, machinery, equipment, outfitting or other factors.

Figure 2.8 ABS Incident Investigation Model

3   MARINER PERSONAL SAFETY PROJECT

The Mariner Personal Safety (MPS) project is a collaborative effort among ABS, Lamar University, and numerous Industry Partners (McSweeney, et al 2011). The objective of this research effort is to offer insight into the human element and to develop and share

this information with the maritime industry in order to assist in the mitigation of potential human error or incidents involving the crew, the vessel or the environment. To help accomplish this, the MPS project created a searchable database of maritime incident, injury and close call reports. The goal is to identify trends and possible causes, potential corrective actions, potential lessons learned, create close call benchmarking indicators, and provide relevant training materials. These are all being shared with the maritime community.

To date, the project has collected approximately 40,000 close call and injury records from fifteen (15) Industry Partners. The database has been created and is undergoing continual update based on the needs of accommodating the addition of new Industry Partners.

3.1   Close Call (Near Miss) Data

To date, fifteen (15) different Industry Partners are providing close call data, providing approximately 25,000 reports. Though the data varies, commonly reoccurring data fields include close call type, potential root or cause for the incident, equipment involved, location on the vessel, tasks being performed at the time of a reported event, and demographic characteristics of the crewmembers involved. This data and the corrective actions and lessons learned have been shared with the Industry Partners.   It was apparent from reviewing these close call reports that the MPS Industry Partners have different approaches to close call reporting. Key differences include:

1) **The type(s) of information being captured**
2) **The information's comprehensiveness**
3) **The process or system to manage the close call.**

These differences could be due to several factors such as crew member training (or lack thereof) with respect to close calls and their reporting, corporate maturity related to close call reports, or a more (or less) effective (evolved) close call management system. These differences commonly appear as continuous improvement opportunities or CSR elements.

As part of the MPS project, guidance was developed and made available to Industry Partners to assist with close call management and training related to close call reporting. Contained in the following list are high-level close call management program components:

- **Awareness - Begins with management support, training of employees in the identification of hazards, close calls, and recognition of improvement opportunities**
- **Reporting - Implemented and management-supported system for reporting hazards and close calls, preferably electronically**
- **Investigation - Determination of the priority level, high, medium, or low depending on the potential outcome if the close call becomes an accident.**

> Based on the identified need and associated risk, investigation is carried out to the extent deemed necessary
> - **Root Cause Identification - The incident is analyzed and causes are evaluated until a detailed cause is determined**
> - **ID corrective actions and recommendations - Using previous experience, research, knowledge of the situation, and brain storming, acceptable corrective action(s) and recommendations can be made.**
> - **Dissemination - All close calls are shared with the immediate crew, and within the organization. If deemed valuable, the close calls investigation and outcomes should be shared with industry to raise awareness about the hazard.**

Contained in the following list are the different training elements for a close call reporting system:

- **What a close call is and how can they be identified?**
- **The role of close calls in crew and vessel safety**
- **Corporate and individual responsibilities related to close call reporting and management**
- **The close call management team members?**
- **How the company's close call process works**
- **Root cause identification.**

3.2   Injury Data

To date, eleven (11) different Industry Partners are providing injury data, summing to over 13,000 reports. Though the data provided varies with regard to specific content, commonly reoccurring data fields include injury type, potential, root or cause for the incident, equipment involved, location on the vessel (engineering, deck, accommodations, etc.), vessel type/trade, tasks being performed at the time of a reported event, and demographic characteristics of the crewmembers involved. From this data, injury causes, types, locations, and their corrective actions and lessons learned have been communicated back to the Industry Partners. Some of the different ways this data is being used is listed below:

- **Directing safety auditing efforts by identifying hazards for specific spaces on board**
- **The identification of hazards related to crew activities**
- **The identification of the more hazardous tasks and task performance locations**
- **The identification of new training areas**
- **Help direct safety intervention, efforts, prioritization and resource allocation**
- **Input to safety measurements (metrics)**

- **Support the development or guidance related to JHAs, JSAs, HAZIDs, operating and working procedure development.**

ABS is using the injury and close call analyses to identify the need for ergonomic guidance related to worker interfaces with structures such as ladders, stairs and work platforms, and the need for ergonomic guidance related to the design of engineering spaces to support human access and maintenance activities.


4   PROVISION OF ERGONOMIC DESIGN GUIDANCE

A large body of guidance has been developed by ABS dealing with the ergonomics in design and construction of ships and offshore structures, including the following (Pray et. al., 2013):

- *Guidance Notes for the Application of Ergonomics to Marine Systems (2003).* **Updated during 2012, to be republished in the second quarter of 2013**
- *Guide for Ergonomic Notations*, **to be published in the second quarter 2013**
- *Guidance Notes on Ergonomic Design of Navigation Bridges (2003)*
- *Guide for Means of Access to Tanks and Holds for Inspection (2007)*
- *Guidance Notes on Vibration and Noise Control* **(in preparation)**
- *Guidance Notes on the Application of Ergonomics to Marine Engineering Spaces* **(in preparation)**

Based largely on findings stemming from analyses of the MPS database, the new ABS *Guide for Ergonomic Notations* is being created to offer ergonomic (**ERGO**) notations for selected working areas on vessels and offshore structures, including topsides design, enclosed space design (e.g., on or below the main deck on the interior of the vessel), design for operability and maintainability, and design for valve access and operability. The figures below represent a comprehensive review of the injury and close call records for ergonomic improvement opportunities related to vessel operations, maintenance and repair activities. When performing these searches, answers for the following questions were being sought:

1) **Is adequate space provided to perform the required activity (e.g., work envelope) which includes space for special tools, anthropometrics, and any requisite PPE?**
2) **Are adequate means of access provided (e.g., work platforms)?**
3) **Are appropriate tools provided (e.g., equipment hoists or dollies)?**
4) **Are appropriate labels/instructions provided (e.g., comprehensive and comprehendible)?**
5) **Is the equipment/workplace designed such that adequate safety protection is afforded the maintainer (e.g., guardrails, toe boards on elevated walkways/platforms above maintenance areas)?**
6) **Are there adequate procedures in place such as lock-out/tag-out, confined space entry, safe work permits, etc.?**
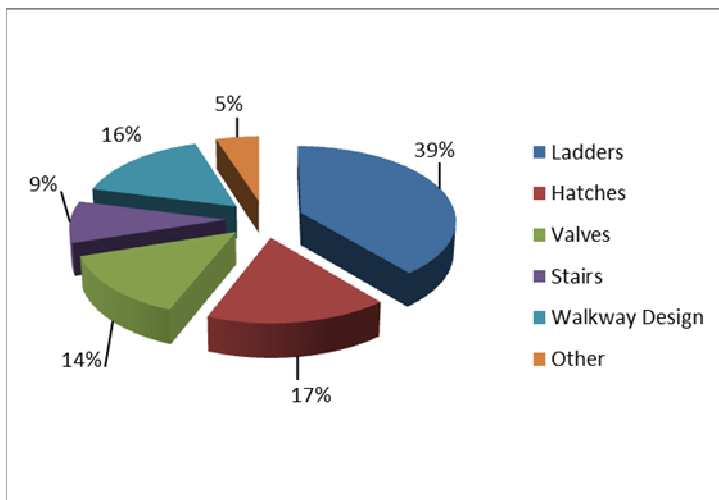
Figure 4.1 Injuries Related to Permanent Means of Access

Slips, trips and falls are causes of some of the more common types of injuries found on board ships and offshore structures and many of these are related to means of access. This figure represents injuries in the ABS MPS Database. Means of access aids in this case are what we commonly refer to as permanent means of access (PMA).   These include stairs, ladders, walkways, guardrails, platforms, etc. Twenty-four (24) percent of the injuries, representing over 3,000 records in our injury database, are related to permanent means of access.
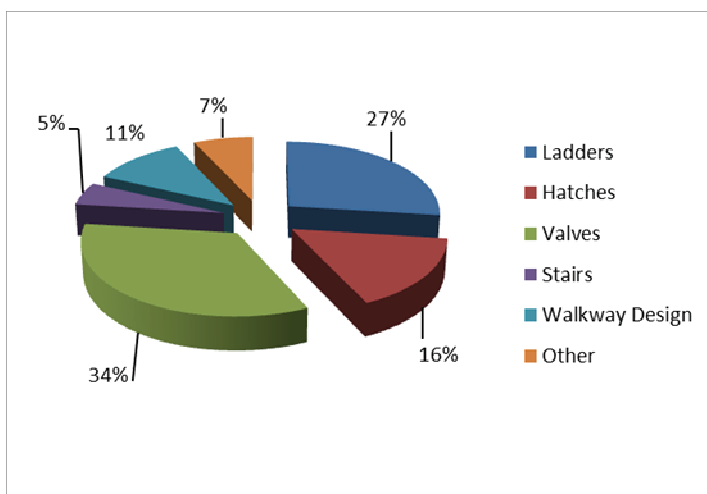
Figure 4.2 Close Calls Related to Permanent Means of Access

This figure, similar to the previous one, represents only close calls related to PMA. This slide addresses only close calls. Approximately twenty-two (22) percent of the close calls, representing over 5,200 records in our close call database, are related to permanent means of access.

The ABS *Guide for Ergonomic Notations* has been developed with the objective of promoting an ergonomically-focused design. This guide offers the following ergonomic notations:

- **Ergonomic Topsides (**ERGO TOP**), which establishes a level of ergonomic design promoting human performance and safety when working with topside structures exposed to the weather**
- **Ergonomic Enclosed Space (**ERGO ES**), which establishes ergonomic design when working within enclosed spaces (not exposed to the weather)**
- **Ergonomic Valve (**ERGO VALVE**), which establishes ergonomic design when accessing and operating valves**
- **Ergonomic Maintenance (**ERGO MAINT**), which establishes ergonomic design for accessing maintenance items.**

The guide and its notations are directed at enhancing occupational safety at sea. The requirements imposed in using this guide address the structural design of the following human interfaces:

Table 4.1 Human Interfaces

• **Stairs**	• **Walkways and ramps**
• **Vertical and inclined ladders**	• **Guard rails and climber safety devices**
• **Work platforms**	• **Hatches, doors, scuttles and handles**
• **Manual valve operation, access, location and orientation**	• **Maintenance access**

It is anticipated that achieving compliance with the requirements of the guide, leading to these notations, will help reduce the number and severity of accidents, injuries and close calls to people working at sea. In addition to this guide, the *Guidance Notes on the Application of Ergonomics to Marine Systems* (ABS 2012) has been revised to update the guidance provided and to better target that guidance to the safety and performance concerns revealed from the database.

5   ASSESSMENT OF SAFETY CULTURE AND LEADING INDICATORS OF SAFETY

ABS developed this Guidance Note (ABS 2012) with the objective of improving safety performance in the management and operation of cargo-carrying commercial vessels. ABS provides this guidance in recognition of the beneficial effect that a positive safety culture can have on safety performance, and the part played by leading indicators in guiding action to improve safety performance. This Guidance Note provides:

- **Guidance to maritime organizations on the survey and assessment of their organizational safety culture, both onshore and at sea.**
- **A process for identifying an organization's leading indicators of safety performance.**

Leading indicators are safety metrics associated with safety performance. Tracking and improving these metrics may help to maintain and improve safety performance. The results from the survey, and/or any leading indicators, can be incorporated into the organization's ongoing CSR and continual improvement program.

Leading indicators are safety culture metrics that are associated with, and precede, an undesirable / unexpected consequence such as an operational incident, close call or personal injury. They can:

- **Reveal areas of weakness in advance of adverse events**
- **Be associated with proactive activities that identify hazards**
- **Aid risk assessment and management**

Example leading indicators of safety include size of safety budget, safety audit scores, number of safety inspections, number of safety meetings involving management, etc. Leading Indicators are the most important safety culture metrics for the organization as they correlate with the organization's safety performance.

The ABS approach for safety culture and leading indicator efforts is shown in Figure 4, the "The ABS Safety Culture and Leading Indicators Model". The central premise of the ABS Model is that improvements in corporate safety culture can lead to enhanced safety performance by revealing corporate strengths which can be built upon, and any weaknesses that need rectifying which can be used in the CSR effort.
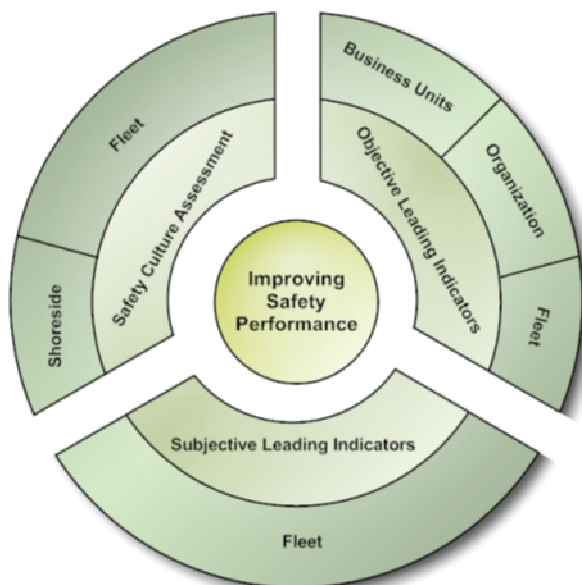
Figure 5.1 The ABS Safety Culture and Leading Indicators Model

5.1 SAFETY CULTURE

Safety factors are important dimensions of a safety culture and include effective communications or safety awareness. The set of eight safety factors used in the ABS Safety Culture Survey and the Leading Indicators Program was derived during ABS-funded research conducted with leading clients in the maritime industry. The ABS Safety Culture Survey contains forty statements, five statements about each safety factor which participants are asked to rate.

The different safety factors assessed with the ABS survey include:

1. **Communication**
2. **Empowerment**
3. **Feedback**
4. **Mutual Trust**
5. **Problem Identification**
6. **Promotion of Safety**
7. **Responsiveness**
8. **Safety Awareness**

The ABS Guidance Notes describe each of these safety factors in detail, identifying desired corporate activities, attitudes, and behaviors along with different means to help improve performance and support CSR goals and objectives. As an example, the safety factor of Safety Awareness is discussed below.

Safety Awareness - Desired Activities, Attitudes and Behaviors

- **All members of the workforce exhibit a high standard of safety performance**
- **The workforce will not tolerate willful violation of safety standards, rules or procedures**
- **Watch-handovers are careful and unhurried.**

Safety Awareness - Possible Activities for Improvement

- **Establish effective and efficient procedures for ship and watch hand-overs**
- **Establish a training program for safety awareness**
- **Establish a training program and targets for safety investigation**
- **Provide training matrices to persons involved in new-hires or in transfers of personnel between ships to show adequate competency**
- **Provide training in analysis of job tasks and associated hazards, including hazards affecting quality (e.g., using cranes with wires that are beyond their useful life for cargo movements wherein a load could be dropped and cargo subsequently damaged or destroyed)**

- **Provide awareness training on workplace hazards/risks and accident statistics**
- **Set targets for number of near misses reported per employee.**

5.2   Leading Safety Indicators

There are two (2) different types of leading indicators, objective and subjective. Objective leading indicators are identified by correlating safety metrics with safety performance data. This is the preferred approach because of its objectivity; because it utilizes metrics that the organization has collected; and it does not require a survey of the workforce. Subjective leading indicators are identified from a safety culture survey. These indicators are based on the values, attitudes and observations of employees. This method may identify potentially beneficial safety metrics not yet tracked by the organization. This approach is used when the organization lacks sufficient metrics to enable use of the *objective* leading indicators process.

ABS research has identified three types of metrics that have different levels of usefulness for inclusion in a leading indicators program. These are shown Figure 5., "The Metrics Hierarchy".
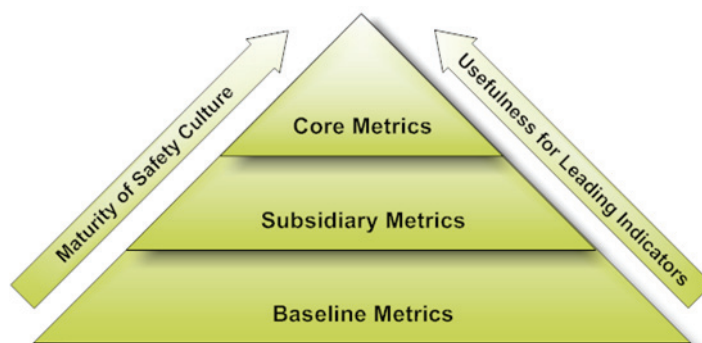

Figure 5.2 The Metrics Hierarchy

Baseline metrics form the foundation of a safety culture and should be collected. However, because they are expressed as the presence or absence of an activity, procedure or policy (and not as interval data, ratios, frequencies, etc. that can vary), they are unsuitable for inclusion in a leading indicators program. Examples of baseline metrics are:

- **Provision of a communications training program**
- **Presence of a crew feedback system concerning near misses and hazard identifications**
- **Establishment of a fair system for incident investigation**
- **Presence of a maintenance budget**

Subsidiary metrics are useful in a leading indicators program until they peak or become invariant, which they may do as the safety culture takes root. For example, once

"Percentage of crew who have PPE" consistently attains 100%, it is no longer useful as a metric for correlating with safety performance. Examples of subsidiary metrics are:

- **Percentage of employees receiving ALL safety training**
- **Number of safety inspections per annum**
- **Frequency of safety meetings attended by senior management**
- **Number of safety performance indicators utilized**

The core set of metrics are eminently suitable for inclusion in a leading indicators program by all organizations, even those with a mature safety culture. Examples of core metrics are:

- **Percentage of accidents reported per employee**
- **Number of job hazard analyses conducted per employee**
- **Number of safety audits completed per year**
- **Percentage of total operational budget allocated to safety items.**

The identification of leading indicators has often begun with a search for safety factors, elements or conditions that can be linked to high levels of organizational safety performance (ABS, 2012).

6   CONCLUSIONS

The four initiatives discussed in this paper are a sampling of research activities being performed by ABS to take direct aim at the "people" component of Corporate Social Responsibility.   These activities are providing the industry relevant tools and information essential for reducing and eliminating adverse events and close calls in a proactive manner and to investigate these events to prevent reoccurrence.

In order for these activities to be successful, active industry-ABS partnerships are crucial. It is through these partnerships that the industry can be confident the tools and information provided have been vetted by the industry and therefore are particularly useful to the industry.

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CORPORATE SOCIAL RESPONSIBILITY AND THE QUALITY OF SEAFARERS ACCOMMODATION AND RECREATIONAL FACILITIES

ABSTRACT

Corporate Social Responsibility (CSR) cannot be properly exercised using a 'pick and mix' approach. Companies seeking to establish their credentials in relation to social responsibility have to take account of practices ranging from the impact their activities have on the environment/local communities to their responsibilities towards employees. Such social responsibility may demand that companies adhere to higher standards than those established as minimum requirements via statutory regulation. As such, the standards of accommodation/ welfare provided to seafarers provides a key test of the extent to which CSR is exercised across the industry, especially as research onshore shows that the built environment may have important effects on health and well-being and may impact upon performance. This paper reports the result of a survey of 1533 seafarers asking about satisfaction with accommodation and recreational facilities. The survey indicates that there is considerable variation in standards of seafarer accommodation and the provision of recreational facilities, and we offer an account of where such variation is of statistical significance. The paper indicates where improvements to accommodation/recreational facilities could be made.

Keywords: Corporate Social Responsibility, accommodation, recreational facilities, seafarers, well-being.

INTRODUCTION

Within the last 30 years companies have begun to take on the concept of Corporate Social Responsibility (CSR) in relation to strategy and conduct (Quartey and Puplampu, 2012). Although there are clear ethical reasons for adopting such principles, there may also be a number of business related benefits associated with doing so. For example studies have found there are financial and performance related returns for companies that adopt CSR strategies (Quartey and Puplampu, 2012; Kotler and Lee 2005; Bhattacharya and Sen, 2004). It has also been shown that there is a link between how companies treat their employees and their performance at work, particularly their productivity (Dahalan, *et al.*, 2012) and customer relations (Quartey and Puplampu, 2012). Not only do good CSR practices carry the potential to improve quality and productivity, but studies also suggest that good CSR policies may allow companies to attract and retain good quality staff, which in turn allows them to build better reputations and thereby increase the value of the company for shareholders (Tencati, *et al.*, 2004; Cowe and Porritt, 2002; Swift and Zadek, 2002). In fact in today's troubled markets some even go as far as to suggest that it is imperative for companies to employ good CSR practices in order to try and gain competitive advantages over their rivals

(David, 2010; Fernandez-Muniz, *et al.*, 2009; Porter and Kramer, 2006). This may be particularly the case nowadays as customers can be influenced in their choice of products/services by the reputation and ethical stance of providers (McWIlliams and Siegel, 2000). Good examples of this can be found in considering the success of 'Fairtrade' products such as coffee (Blowfield and Murray, 2011).

Although Corporate Social Responsibility (CSR) has become a commonly used term, the precise definition is difficult to pin down. Definition may vary from country to country (Snider, *et al.*, 2003; Maignan and Ralston, 2002; Zyglidopoulos, 2002), from industry to industry (Progoulaki and Roe, 2011), and even across companies within the same industry. For those trading internationally defining CSR is even more complex as moral responsibilities in one country of operation may be more strict than in another, leading to a company having to adopt more stringent values (Zyglidopoulos, 2002; Windsor 2001).

A good definition of CSR is given by the World Business Council for Sustainable Development (2005) which suggests that it is a, 'continuing commitment by businesses to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and the society at large' (in World Business Council for Sustainable Development, 2005, pg 3). Others have gone into even more detail about what CSR should entail, for example Quartey and Puplampu (2012) suggest that companies should consider employees' health and safety, work related stress, working hours, work-life balance, and general well-being. However, not all see companies' responsibilities as so encompassing. For example, the famous economist Milton Freidman suggested that a company's only CSR should be to make a profit as the employment of the workforce is enough of a contribution in itself, a view that continues to be fairly prevalent in some circles (Blowfield and Murray, 2011).

So where does the shipping industry stand on Corporate Social Responsibility? Some within the industry suggest that many shipping companies simply do not take CSR activities seriously as they see their main concern as day to day business. For example, Willingale (1998) suggests this is especially the case for those in the bulk shipping sector where the main goal is to produce a low cost service due to the highly competitive nature of this sector. However, this is not the case for all as there are a number of prominent shipping companies that have adopted CSR as an integral part of operations, for example the Japanese shipping company NYK Lines has been reported to have developed a wide range of CSR policies, and to employ dedicated CSR co-coordinators (see Dahalan, *et al.*, 2012).

Fafaliou, *et al.*, (2006) suggest that shipping companies' behaviour in relation to CSR can be seen to fall into three categories. The first approach is an 'adverse' approach where companies ignore any social responsibilities, simply trying to be competitive and make a profit by any means, legal or not. The second approach (the one practiced by most shipping companies) is a 'typical' one, where companies aim to keep within international guidelines and regulations, but go no further than this, with an aim to create profit. The final approach is a 'supportive' one where companies go beyond

legally required standards, in setting their own higher standards whilst still seeking profit. It is these companies that can be regarded as having taken on the ethos of social responsibility. In relation to the financial benefits that can accrue from the adoption of CSR it has been suggested that these should be seen as long term returns (Thai, *et al.*, 2013).

This has been the case in some instances however most present CSR commitments in shipping relate to environmental protection, and corporate image. Such strategies ignore the industry's key 'asset' which is the human resource (Progoulaki and Roe, 2011, Quartey and Puplampu, 2012). Not only is this an ethical and moral issue but neglect of the crew may negatively affect the safe operation of the ship. Horck (2004) argues that it is the human element that the industry should focus on, rather than factors such as increased levels of automation or bridge layout. However, Montero, *et al.,* (2009) suggest that rather than this being a conscious decision, many employers do not realise that protecting those they employ is part of their corporate social responsibility.

In this context it is unsurprising perhaps that the provision of good quality accommodation and recreational facilities on board are often not considered by companies in developing their CSR policies. The modern seafarer has to work long hours, with tours lasting many months and with little chance of getting ashore. Therefore when seafarers do get time to rest the standards of the accommodation and recreational facilities available to them may be of paramount importance in cushioning the demands of such hours, aiding recovery from mental and cognitive fatigue, and stress (Maas, *et al.,* 2009; Van de Glind, *et al.*, 2007; Caspari, *et al.*, 2006; Kaplan, 1995). Evidence from studies onshore into the effect of the built environment also indicate that poor accommodation may have a negative effect on seafarers' health and well being (see Küller, *et al.,* 2006; Riediker and Koren, 2004; Evans, 2003). Factors such as quality of housing (Evans, 2003), noise levels (Salyga and Juozulynas, 2006; Riediker and Koren, 2004), light levels (Küller, *et al.,* 2006), and colour schemes (Caspari, *et al.*, 2006; Baglioni and Capolongo, 2002) have all been shown to have negative effects on health and well-being, where as good quality interior furnishings and decor have been positively linked to well-being, mood and behaviour (Küller, *et al.,* 2006; Caspari, *et al.*, 2006; Baglioni and Capalongo, 2002). Furthermore, aesthetically pleasing surroundings have been shown to increase recovery rates from mental fatigue (Evans, 2003).

Looking at the benefits of providing good accommodation and recreational facilities from the perspective of the company, Progoulaki and Roe (2011) suggest that, 'a competent, rested and well-motivated crew is an essential factor in reducing operational costs by increasing efficiency, safe operations and protecting the owner's investment in expensive vessels and equipment' (Progoulaki and Roe, 2011, pg 20). Good CSR has also been recognised as exerting a positive effect on recruitment in the shipping industry (Thai, *et al.*, 2013). Bottiglieri Shipping Company suggests for example that, 'some companies still think CSR is time-consuming and money–consuming, but they must realise it is vital tool for recruitment' (in Dahalan, *et al.*, 2012, pg 198). Thus good CSR policies may be seen as especially important in the current climate where some

owners/managers are struggling to find good quality well trained crews for their ships (Tingyao Lin, 2013; Lowery 2012; Matthews, 2010).

In order to examine how companies are living up to CSR responsibilities in relation to accommodation and facilities on board, this paper looks at the standards of current provision from the perspective of contemporary seafarers. Findings from a survey of vessel accommodation undertaken by the Lloyd's Register Foundation research unit[1], part of the Seafarers International Research Centre (SIRC), are presented. The results focus on aspects of accommodation design and the provision of recreational facilities that were seen as lacking, or of concern (see Ellis, *et al.,* 2012 for full details of this study).

METHODS

A questionnaire survey was used to examine active seafarer's experiences of accommodation and recreational facilities onboard their current or most recent vessel. The questionnaire was adapted from one used in a study of accommodation and recreational facilities onboard commercial yachts (see Bailey, *et al*., 2010). This was modified for use with the merchant fleet flowing pre-pilot interviews conducted at shipyards in China, and after discussion with industry experts. It was then piloted with a small group of seafarers, after which minor changes were made relating to their comments and feedback. The questionnaire asks about a number of aspect of seafarers experience of living at working at sea including: seafarers demographics, information about the last/ current vessel worked on, terms on conditions of employment, working patterns, shared accommodation, experience of cabins, messrooms/ crew lounges, washing/ drying facilities, shore leave, recreation facilities onboard, food, concerns about working at sea, and benefits of working at sea. The final version of the questionnaire was produced in three languages to facilitate accuracy and accessibility: English, Chinese (Mandarin), and Tagalog.

For the actual survey questionnaires were distributed and collected by researcher at maritime colleges, training centres, and Seafarers Missions in three counties: China, Philippines, and the UK. Seafarers were not contacted through companies as there was concern that seafarers might not feel able to give honest answer due to concerns about company staff seeing their responses, and also so that the sample did not over represent certain companies. The questionnaire was distributed during classes at the colleges/ training institutes with the agreement of the lecturers, or when seafarers were in seafarers' missions with the researcher being on hand to answer any queries the respondents may have. However, in answering questions care was taken not to lead respondents to arrive at particular responses. Anonymity and confidentiality was assured at all times.

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[1] Previously The Lloyd's Register Educational Trust Research Unit. On 1 March 2013 The Lloyd's Register Educational Trust was assimilated into the Lloyd's Register Foundation. For further information please visit their website www.lrfoundation.org.uk.

1,533 questionnaires were completed and returned in total, and these were then entered into the computer based statistical analysis package SPSS18. Chi squared analysis was used to test for statistical differences in reported experiences of accommodation and recreation facilities onboard, using a significant level of 0.05. Logistic regression was also used to look at associations between variables and their influence on experiences. Within this paper only significant findings are discussed.

THE SAMPLE

Only two percent (n=30) of the sample were women, with the average age of respondents being 33 years old (ranging from 17 to 73 years old)[2]. The sample consisted of four main nationalities, mostly reflecting the countries in which the questionnaires were distributed. The largest nationality groups were Filipinos (39%) and Chinese seafarers (32%). Indian seafarers made up the next most frequent nationality group (15%) followed by British seafarers who represented 12% of the sample. All other nationalities grouped together represented only 3% of the sample overall[3]. In terms of rank, senior officers accounted for 24% of the sample, junior officers 42%, and ratings 34%. The majority of seafarers had worked at sea for less than 11 years (67%), with only 6% having been at sea for over 20 years.

In terms of the vessel types represented the most frequent ship types seafarers were working on were bulk carriers (31%) and tankers (27%), followed by a lower percentage (23%) of specialist cargo/general cargo/container vessels. Passenger carrying vessels and 'other' vessel types[4] represented a smaller percentage of the overall sample (8% and 11% respectively). The mean gross tonnage of vessels was just under 40,000gt (39,264.62gt)[5], and the average age of vessels in the study was 10 years old[6]. The majority of ships were built in the Japan (33%), China (23%) and South Korea (17%)[7].

RESULTS

Contracts

Three quarters of seafarers reported being employed on temporary (fixed term) contracts, with officers being more likely to be working on permanent contracts. In terms of length of contract just over half were working tours of over 6 months, with

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[2] For all following analysis age is split up into five age groups: 25 years old or less, 25-29 years old, 30-34 years old, 35-39 years old, and 40 years old and over.

[3] These other nationalities are grouped together and are referred to as 'other' in all subsequent analysis.

[4] 'Other' vessel types are those that did not fall into the four main ship type categories.

[5] Gross tonnage is used as an indication of size within this study, with vessels being split into equally sized small, medium and large ship groupings, irrelevant of ship type.

[6] For all subsequent analysis ships are split into four age groups: less than 5 years old, 5-9 years old, 10-19 years old and over 20 years old.

[7] Ships not built in the 3 main countries (Japan, China, South Korea) are grouped together and referred to as 'others' in following analysis.

19% of seafarers working tours of over 9 months. In terms of nationality, Chinese and UK seafarers were more likely to have permanent contracts, with Indian and Filipino seafarers more frequently having voyage by voyage contracts. UK seafarers were also less likely to be working tours of over six months, compared to other nationalities.

Sharing a cabin

Although the majority (86%) of seafarers indicated that they did not share a cabin, of the 14% that did, 86% said they did not have a choice about sharing, with the majority indicating that they minded sharing a cabin. Twenty one percent of those that shared reported they minded sharing 'a great deal', with only 7% indicating that they 'did not mind sharing'. Not surprisingly it was younger seafarers (those under 30) who were more likely to be sharing a cabin, with ratings also more likely to be sharing than officers.

In terms of vessel characteristics, type of vessel was found to have a significant impact on whether seafarers shared a cabin or not. On passenger/general cargo ships a high proportion of seafarers (51%) were found to be sharing cabins, with only a small proportion of seafarers sharing a cabin on the other main vessel types (6% tankers, 8% bulkers, 10 % cargo vessels, see Figure 1). The percentage of seafarers sharing a cabin in the 'other' ship type was higher at 35%, although it is difficult to draw any conclusions about this group as it consists of a varied range of vessels. Those working on older and smaller ships, as well as those vessels built in China and 'other' countries were also more likely to be sharing a cabin.
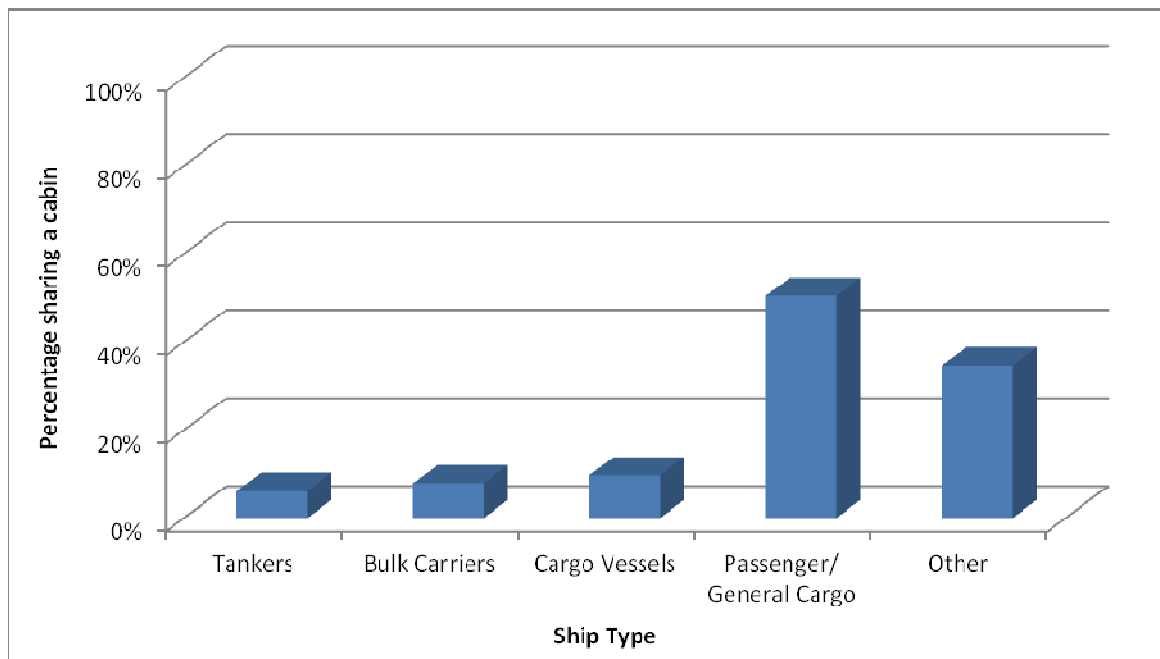

Figure 1: The Percentage of Seafarers Sharing a Cabin by Ship Type

Cabin size

When seafarers were asked about the size of their cabins, almost a third (30%) indicated that they were 'unsatisfied' or 'very unsatisfied' with the size of their accommodation, with just over half (54%) suggesting they were 'satisfied' or 'very satisfied' with the size. Surprisingly, although higher ranking seafarers (i.e. officers) would generally be expected to have larger cabins, they were more dissatisfied with the size of their cabins than ratings, and junior officers indicated the most dissatisfaction. However, it is possible that this might reflect nationality distribution in certain ranks, as further analysis showed that ratings were predominantly Filipino, and Filipino seafarers were generally significantly more satisfied with the size of their cabin than other nationalities.

In terms of differences relating to ships, seafarers on tankers and passenger/general cargo vessels were more frequently satisfied with the size of their cabins than those on bulk carriers. Country of build was also an important factor. Seafarers on larger vessels were also significantly more satisfied with the size of their cabins (see Figure 2). Seafarers on vessels built in South Korea or 'other' countries were generally more satisfied with the size of cabins. Following logistic regression analysis we were able to confirm that there was a independent associations between country of build and cabin size, and that this was not a manifestation of the nationality composition of crews on board Korean and 'other' country built vessels.
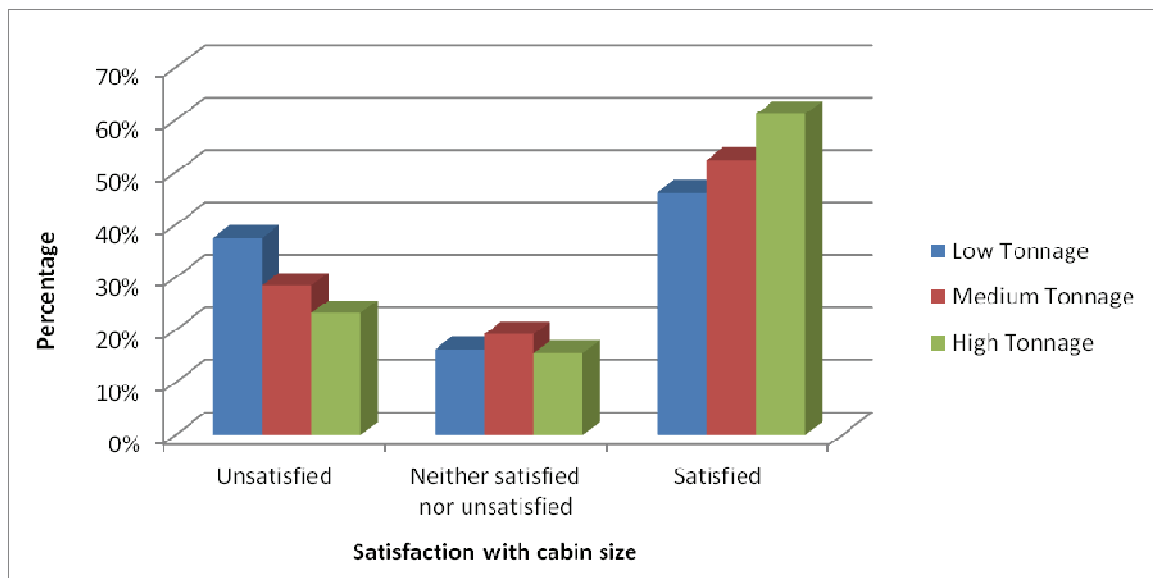

*Figure 2: Satisfaction with Cabin Size by Ship Size*

Storage space

In terms of storage space within cabins a similar picture emerged. Thirty-four percent of seafarers indicated that they did not have sufficient storage space. Again it was junior officers who were least satisfied. Thirty-nine percent suggested that they did not have sufficient storage space compared to 36% of senior officers, and 27% of ratings.

Vessel size was again important. Those on larger vessels were more satisfied with storage space than those on smaller vessels. Seafarers on ships built in South Korea were also more satisfied with storage space than those on ships built in China or Japan.

Cabin temperature

Forty-one percent of seafarers indicated that they were unable to control the temperature in their cabins. Interestingly it was senior officers and ratings that were significantly more likely to suggest that they <u>could</u> control the temperature within their cabins. Although this finding may be contrary to expectations, it may relate to senior officers having more general control over the ship systems (i.e. the setting of air-conditioning/heating systems) whereas ratings may have a habit of using external electrical appliances to regulate temperature, such as heaters or fans. However there is insufficient information in the current study to assess the accuracy of such a suggestion.

Ship type also influenced whether seafarers could control the temperature in their cabins. Those on passenger/general cargo ships were more likely to be able to control the temperature in their cabin. Those on newer vessels were also more likely to be able to control the temperature (see Figure 3).
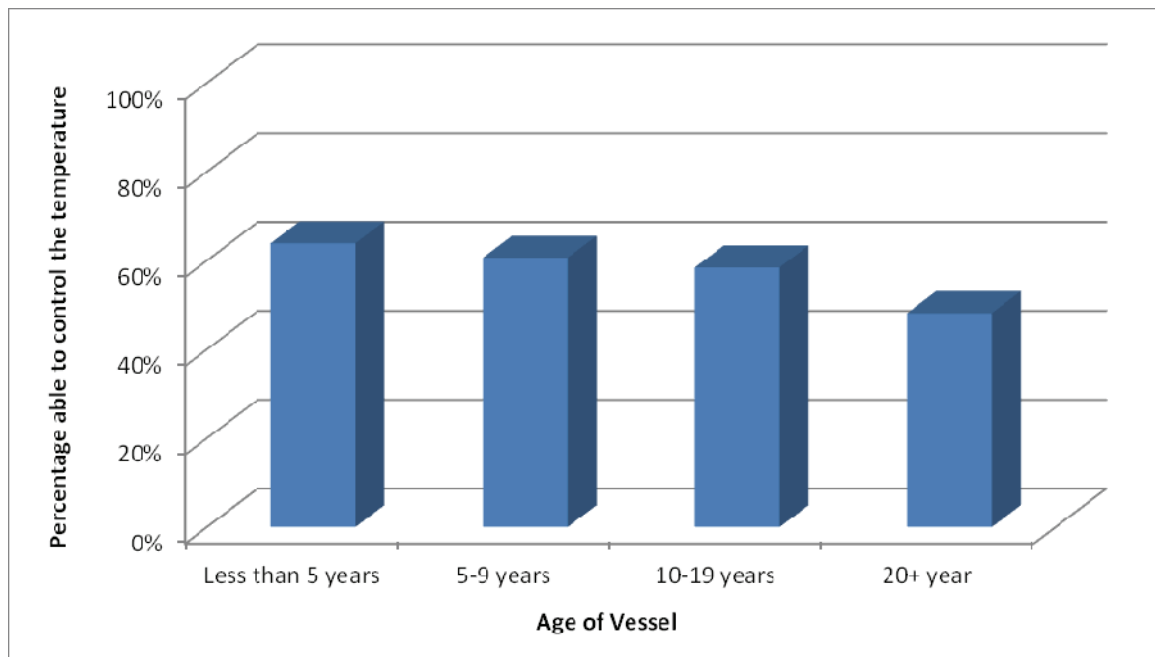
Figure 3: The Percentage of Seafarers Who Were Able to Control the Temperature in their Cabin by Age of Ship

Light in cabins

Just over half (52%) of the seafarers in the survey were unable to control light levels in their cabins. Thirteen percent of these described light levels as too bright, and 14% as

too dim. Filipino seafarers were the most likely to say that they were <u>able</u> to adjust lighting levels, with Chinese, UK and Indian nationals being <u>least likely</u> to say that they could do so. There was also an influence of rank, with senior officers and ratings more frequently suggesting they could adjust lighting levels than junior officers. The ability to adjust lighting levels in cabins was not influenced by any of the vessel factors (i.e. vessel type, age, country of build or size).

In terms of natural light 10% of seafarers indicated that they did not have a window/porthole in their cabin allowing natural light in. Nationality and rank differences were found, with Filipino seafarers and ratings less likely to have natural light in their cabins.

Noise in cabins

Nearly two thirds of seafarers reported that they were disturbed by noise in their cabin at least some of the time, with 20% of these suggesting they were disturbed by noise 'all of the time'. Of those disturbed by noise in their cabin, 29% were disturbed both at sea and in port, 30% at sea only, and 33% in port only. In terms of rank, it was officers that were most likely to be disturbed by noise. Chinese seafarers were most likely to suggest they were disturbed by noise in their cabins, with Filipino seafarers the least likely to say they were disturbed by noise.

The type of ship seafarers were on also had an impact on whether they were disturbed by noise: those on general cargo vessels were most frequently disturbed by noise (68%), compared to bulk carriers (62%), passenger/general cargo ships (53%), and tankers (51%). Seafarers on ships 20 years old or older were also slightly more likely to report being disturbed by noise, as were those on ships built in China.

Vibration

As with noise a high percentage (63%) of seafarers indicated that they were disturbed by vibration in their cabins. This disturbance occurred mostly at sea (66%), with only 11% of seafarers stating that they were disturbed in port. Seventeen percent of seafarers were disturbed by vibration in both port and at sea. Chinese seafarers and officers (both senior and junior) were more likely to report being disturbed by vibration. Ratings and Filipino seafarers were the least likely respondents to report being disturbed.
As with noise, ship type again influenced whether seafarers were affected by vibration. Seafarers working on cargo vessels (68%) and bulk carriers (67%) were the most likely to report being disturbed by vibration as were seafarers working on ships built in China (70%). Seafarers working on ships built in Korea were less likely to report being disturbed (52%).

Quality of rest

Just under a quarter (23%) of respondents suggested they could get adequate rest on board. A large proportion (59%) indicated that they could only get adequate rest 'some of the time' and a further 19% suggested that they did not get adequate rest very often, or that they did not get adequate rest at all. Of those who did not get adequate rest very often or at all, 21% said this was a problem at sea, 44% said it was a problem in port, and 35% stated that it was a problem both at sea and in port. The only vessel related factor that had an effect on rest was age of vessel. Respondents on the youngest vessels (5 years or less) reported getting adequate rest more frequently than those on older vessels.

Standards of furnishing

When seafarers were asked about the standards of furnishing in their cabins, just under a half described them as 'good' (42%) or 'very good' (5%). A significant number (36%) described them as 'neither good nor poor', and nearly a fifth (18%) described them as 'poor' or 'very poor'. Officers were more likely to suggest the standard of furnishings was poor/very poor than ratings (see Figure 4). Chinese seafarers also more frequently described the furnishings as 'poor' or 'very poor' compared to other nationalities.

Figure 4: Standards of Furnishing by Rank

In terms of ship related factors, ratings of furnishing improved as ship size increased, but decreased as vessels got older. Standards of furnishing were rated more favourably on vessels built in South Korea and in 'other' countries, than built in China or Japan. Furnishings were also seen as better on tankers or passenger/general cargo ships than bulk carriers where satisfaction levels were low (only 37% rated furnishings as 'good' or 'very good' aboard bulk carriers).

In terms of the condition of the furnishings, the vast majority of seafarers indicated that the furnishings and facilities in their cabins were clean and in a reasonable condition (85%). Officers and Chinese seafarers did however more frequently suggest that the furnishings were poor/dirty compared to other nationalities/ranks. Age, country of build, and ship type all influenced ratings of cleanliness. Seafarers working on tankers frequently suggested their cabins were clean and well maintained (93%). Smaller proportions of respondents working on cargo vessels and bulk carriers considered the furnishings and facilities in their cabins were clean and well-maintained (81% for both). Those on older vessels more frequently suggested furnishings were poor/dirty, as did those on Chinese and Japanese built vessels.

Cabin furnishings

Seafarers were asked about a broad range of fittings and furnishings that were provided in their cabin, and on the whole most seafarers reported being provided with basic facilities, such as bedding, drawers, wash basins, reading lights, toilet paper, and soap (see Table 1). Electrical appliances were less frequently provided: only 30% of seafarers reported having a TV in their cabin, 17% reported the provision of a radio and 19% reported the provision of a music system. Only 15% of seafarers had internet access in their cabins.

Table 1: The Facilities Provided Within Cabins

Facility	Percentage of seafarers who had facility
Bedding	98%
Drawers	96%
Table/desk	95%
Toilet paper	94%
Soap	94%
Towels	93%
Wash basin	90%
Reading light	85%
Wardrobe	80%
Comfortable chair	76%
TV	30%
Music system	19%
Radio	17%
Internet access	15%

The provision of cabin furnishings and facilities was influenced by a number of ship related factors. Those on larger vessels were more likely to be provided with reading lights, tables/desks, wash basins, towels, and comfortable chairs. Those working on older ships were more likely to have radios in their cabins, whereas those on newer ships were more likely to be provided with comfortable chairs, reading lights, internet access, wash basins, toilet paper, and drawers in their cabins. The type of vessel

seafarers worked on also influenced the facilities provided. Those on passenger/cargo vessels and 'other' vessel types were more likely to have internet access and electronic appliances provided, such as TVs, radios, music systems, whereas those on bulk carriers were the least likely to have internet access in their cabins. Vessels built in countries other than the three main countries of build (i.e. South Korea, China, or Japan) were much more likely to provide internet access, TVs, radios and music systems.

Messrooms/lounges

The vast majority of seafarers reported that they were sailing on ships with messrooms /lounges (97%). Eighty percent stated their vessels had separate officer and rating messrooms/lounges. Where common messrooms were provided, these were significantly more likely to be on smaller ships. In terms of what was provided within messrooms/lounges most seafarers indicated that the following were provided: tables and chairs (98%), television (94%), films/DVDs (87%), and fridges (88%). Drinking water (83%), hot drinks facilities (76%), and radio/CD players (70%) were less frequently provided. However, by quite a considerable margin the least frequently provided amenity was comfortable chairs, with only 66% of seafarers indicating that these were available.

In relation to vessel characteristics, comfortable chairs and radio/CD facilities were most likely to be provided on larger vessels. General cargo ships were the least likely to have comfortable chairs for relaxing, hot drinks facilities and drinking water in messrooms/lounges. In contrast tankers were the most likely to have films, DVDs, and radio/CD facilities provided. 'Other' ship types and passenger/general cargo vessels were the most likely to have comfortable chairs for relaxing, hot drinks facilities, and drinking water. Refrigerators were least likely to be found in the messrooms/lounges of passenger/general cargo vessels. Vessels aged between 5-9 years old seemed to have the best provision of messroom/lounge facilities, and were the most likely age-group to have comfortable chairs, radios/CD players, refrigerators, and drinking water in messrooms.

Recreational facilities

The most commonly provided recreational facilities onboard were DVD libraries which were provided in 78% of cases (see Figure 5), followed by books (71% of cases), and less frequently music systems (65%), computer terminals (53%) karaoke machines (52%), and games (50%). The most infrequently provided recreational facility was internet access/Wi-Fi, which was provided in only 26% of cases (access to the internet is discussed in more detail later).
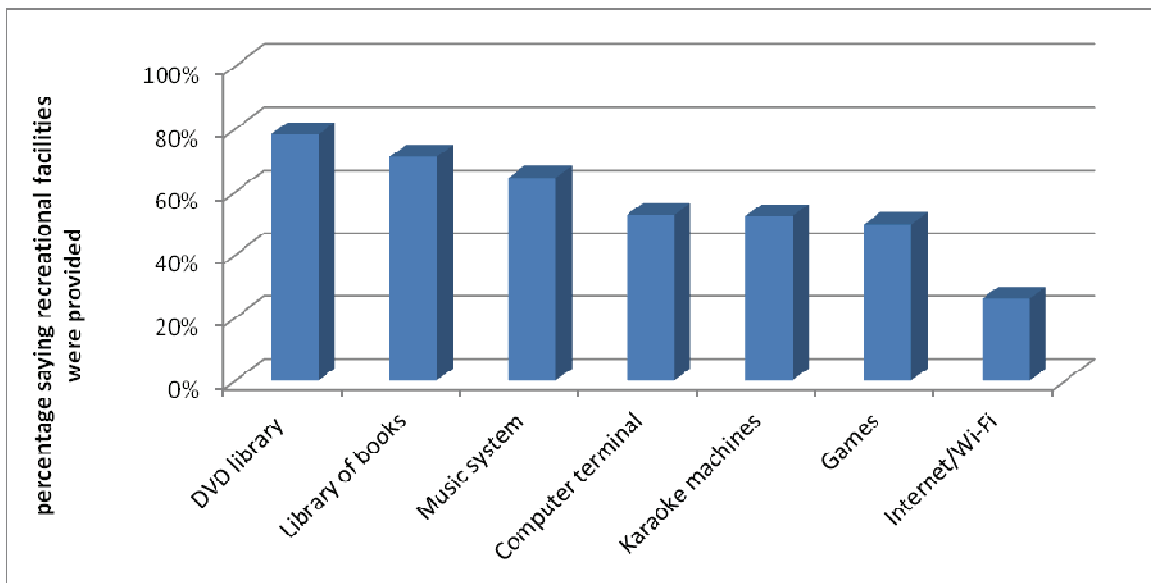
Figure 5: Recreational Facilities Provided Onboard

Music systems, DVD libraries, and karaoke machines were more frequently found onboard tankers, and were found least often on passenger/general cargo vessels. On these ships the most frequently provided recreational facilities were internet/Wi-Fi and games. Larger vessels were more likely to have music systems, karaoke machines, games, DVD libraries and book libraries than smaller vessels. Ships built in South Korea were the best equipped in terms of recreational facilities with music systems, karaoke machines, games, DVD libraries and book libraries more frequently found onboard.

Seafarers were also asked if there were any facilities they would like onboard that were not currently available. By far the most frequent answer, suggested by 66% of seafarers, was that they would like access to the internet/Wi-Fi onboard. The next most frequent answer, suggested by 17% of seafarers, was a gym, with the third most popular choice being telephone access (7%), or access to games, either electronic or physical (7%). Also listed were: satellite TV (5%), computer terminals (3%), and a swimming pool (2%).

Internet access

When seafarers were asked if they had internet access onboard, nearly two thirds (61%) indicated that they had no internet access at all (see Figure 6). Only twelve percent of seafarers had free and unlimited access to the internet. The remaining seafarers who had access faced some form of restriction, such as only having access with the captain's permission, time limitations, or financial charges (see Figure 6). Seafarers with free and unlimited access were more likely to be from the Philippines or the UK.
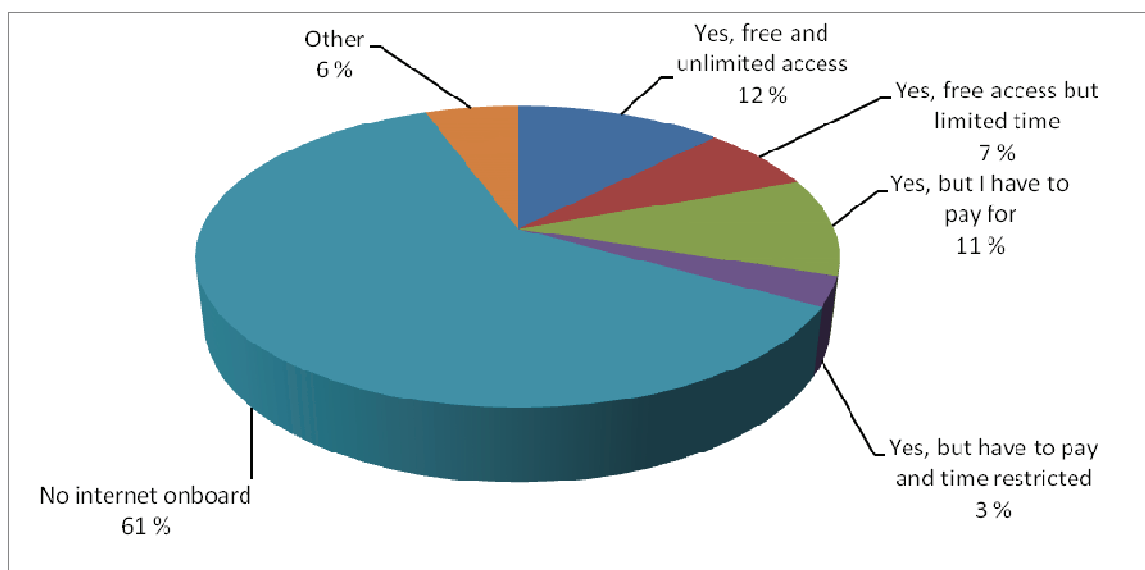
Figure 6: Internet Access

Those on 'other' vessel types most frequently had free and unrestricted internet access (34%), followed by respondents working on tankers (20%). Only 3% of respondents working on bulk carriers had free and unrestricted internet access. The ability to access the internet was more frequently found on modern vessels, with access declining as vessels got older. Access to the internet was also more likely on vessels built in 'other' countries where 22% of seafarers reported free and unlimited access to the internet. In contrast 79% of respondents working on Japanese-built vessels reported no access at all to the internet, and only 5% reported free or unlimited access.

Email access

Access to email facilities was generally better than access to the internet. However, 41% percent of seafarers still indicated that they were not able to send or receive emails onboard ship. Chinese seafarers were less likely than other nationalities to have access to email. Just over a quarter (27%) of the respondents who had email access could send/receive emails on a free and unlimited basis. These respondents were more likely to be from the Philippines and the UK than from other countries. Twenty eight percent of seafarers reported access to email facilities with some restrictions, such as requiring the captain's permission, time limitations, or at a cost. For seafarers that had to pay for email access the average cost was 11.89 US dollars per hour.

Again it was seafarers on 'other' ship types who most frequently reported unlimited access to email facilities (51%).Those on cargo vessel and passenger/general cargo had much more restricted access with only 24% and 20% respectively having unlimited access. However, the most limited provision was found on bulk carriers where only 12% of respondents reported free and unlimited access to emails. Email access was also more frequent on larger vessels (63%), and on those built in South Korea and 'other' countries. In terms of vessel age, seafarers working on 5-9 year old vessels more frequently had access to emails, compared to other groups.

Telephone access

Although 97% of seafarers reported that they took a mobile phone onboard with them, they were only able to get a signal on average on 15.1 days per month. Seventy four percent of respondents had access to the onboard telephone, but with some limitations. Limitations included: requiring permission from the captain (15%), having to pay (53%), or limited time allowed (6%). Only 3% of seafarers had free and unlimited access to the ship's telephone. Twenty percent of seafarers had no access to a telephone onboard at all and Chinese seafarers were less likely than other groups to have access to the ship telephone. For those seafarers that had to pay for access to the telephone, the average cost was 43.12 US dollars per hour.

The type of ship seafarers were working on influenced access to the telephone. Twenty-six percent of seafarers on cargo vessels reported no access at all, compared to only 9% of respondents working on tankers. Seafarers working on larger vessels were more likely to report some sort of access to a telephone, although those on smaller vessels were more likely to have free or unlimited access to the telephone. Access to the onboard telephone also reduced with the age of the ship. Respondents working on ships built in South Korea more frequently reported access to the telephone (95%), than those working on ships built in Japan (77%) or China (74%)

CONCLUSION

The findings from the research reported here suggest that there are still poor standards of accommodation and recreational facilities in the current merchant fleet. In many cases seafarers reported they were less than satisfied with the facilities they were provided with. For example, although most seafarers had single occupancy cabins, these were seen as too small, lacking in storage space, and offering seafarers little control of their environment (such as cabin temperature, light levels, noise and vibration). The standard of furnishings within cabins were also seen as poor/dirty in a small but significant number of cases. Although some basic fittings and furnishings were provided in cabins, facilities, such as reading lights, wardrobes and comfortable chairs were less frequently supplied and electronic equipment such as TVs, radios, or music systems were provided only in just a small percentage of cases. In this context it is clear that seafarer accommodation should be a priority for all companies seeking to exercise CSR

In this research cabins were seen by many seafarers to be small and in poor condition, contrasting with the standards of accommodation many shore based employees take for granted in our own homes. Such poor standards are especially concerning in relation to seafarers, as research suggests that good living conditions may not only help restoration from stress and fatigue at the end of the day, but also may have positive effects on health and well-being (Maas, *et al.,* 2009; Van de Glind, *et al.*, 2007; Caspari, *et al.,* 2006; Küller, *et al.,* 2006; Riediker and Koren, 2004; Evans, 2003; Kaplan, 1995). Aside from issues with cabins the research found that messrooms/lounges were not always well furnished, or provided with good facilities. The lack of provision of many

taken for granted items may have consequences on board that are unanticipated by companies. For example a lack of comfortable seating in messrooms may serve to discourage socialisation on board, which research suggests may undermine both mental and physical health (see Maas, *et al.*, 2009; Leventhal and Brooks-Gunn, 2003; Hawe and Shiell, 2000; Kawachi, 1999). Whilst it is very difficult to change the size of existing cabins, it could be regarded as relatively straightforward for companies to see that cabin and messrooms are kept well maintained, equipped with good quality furnishings, and in good condition.

Communication facilities such as the internet, email and even telephones that the majority of us use on a daily basis were not frequently provided to all crew. Such facilities are of crucial importance as they allow seafarers to keep in contact with family and friends who they are away from for long periods of time. Not only are there humane grounds for providing such facilities, but communication with family and friends has been found to have positive links to health and well-being and the ability to cope with stress (see Chan and Lee, 2006; Franzini, *et al.*, 2005; Cohen, 2004; Berkman and Syme, 1979).

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PORT STATE CONTROL INSPECTION IN THE SHIPPING WORLD – A SAFETY AND SOCIAL RESPONSIBILITY

ABSTRACT

Merchant shipping has undergone a great transformation in the past four decades. The ship manager or the ship owner has to tackle great challenges ahead of them, to successfully load, move and discharge cargo from Port A to Port B. At every port, the vessels will undergo a Port State Control inspection by competent maritime authorities of the host nation, to ensure that the vessels comply with the International Maritime Organisation (IMO) regulations, concerning safety of life at sea and marine pollution. Deficiencies discovered at such Port State Control inspections, hereafter referred to as "PSC" inspections, may result in detentions of vessels in ports leading to a serious downtime for vessels and huge costs to ship owners and managers. In some cases this has also led to loss of charter. This paper aims to look at developing a "Global Checklist for PSC", which would suffice for any Port State Control regime worldwide. To design such a checklist, we need to look at data provided by various port state control authorities around the globe, and reasons for detention of vessels around the globe. As players of the maritime industry we need to address this issue of PSC inspection, as a part of our social responsibility. This will add immense value to the maritime safety in the modern commercial shipping world.

Key words: Port State Control (PSC), International Maritime Organisation (IMO), vessel, detention, Memorandum of Understanding (MOU).

1   INTRODUCTION

Modern commercial shipping world is highly competitive. The charter hire rates available in the shipping market are the least attractive. This coupled with high costs of fuels, lubes and other consumables, non-availability of competent crew and officers to man sophisticated vessels, have posed a great challenge to the ship owners and managers. Flexibility is the key word here and ship owners need to make important decisions within very short time duration. One such decision could be re-routing of vessels and arrival of vessels at ports never visited previously. At every port, the vessels will undergo a Port State Control inspection by competent maritime authorities of the host nation, to ensure that the vessels comply with the IMO regulation. The importance of this inspection lies in the safety of the port, safe operation of vessels and safe practices employed on board by crew members. Port State Control (PSC) is the control of foreign flagged ships in national ports. In a nutshell Port State Control (PSC) ensures safety of our ports and vessels in our ports, security of our ports and vessels in our ports, clean waters around our ports, and finally no pollution of our atmosphere.

Various studies have done by leading researchers in the maritime field on this vital issue of Port State Control. Reinforcing compliance of IMO legislation (Bang, 2013) by flag states is one aspect of dealing with sub-standard vessels. PSC is a remedy for vessel safety (Bandyopadhyay, 2003) is another view. Effectiveness of Port State Control Inspections (Cariou et all, 2008) has been considered by several authors. In the present paper the author has utilised his vast sailing experience ranging 20 years and his involvement in maritime education over the past 11 years, to look at the issue of Port State control as a collective social responsibility, by all the players in the maritime world.

2   PORT STATE CONTROL INSPECTION LINKED TO IMO

To understand Port State Control Inspection, it is necessary to shed some light on the IMO conventions. IMO is the International Maritime Organisation which lays rules and regulations for vessels sailing in the ocean. The following conventions shall apply to most ocean going vessels:

The International Convention for the Safety of Life at Sea (SOLAS), 1974.
The international Convention on Load Lines, 1996.
The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 and 1997 relation thereto as amended (MARPOL).
The International Convention on the standards of training, certification and Watch keeping for Seafarers, 1978, as amended (STCW).
The International Convention on tonnage measurement of ships, 1969 (Tonnage) and
The International Convention on the control of harmful anti-fouling systems on ships (AFS).

An important convention other than the IMO conventions, to be considered in dealing with Port State Control Inspection is, the International Labour Organisation (ILO) Convention No. 147, "Merchant Shipping (Minimum Standards Convention, 1976"

3   THE IMPACT OF PORT STATE CONTROL (PSC) INSPECTIONS ON SHIP OWNERS AND MANAGERS

Literature on Port State Control (PSC) published worldwide always mentions about port state control, in an ideal world is inessential. But the author's vast sailing experience has seen that this is far from reality. This has a lot to do with the outlook of the Ship owners and Managers, who do not always provide and support a healthy and efficient planning system, both ashore and on board the vessels.

All efforts should be made to minimise and do away with any 'Communication gap' between ship and shore.

3.1   Ship owners and ship managers

First let us consider the Ship Managers. In the modern shipping world, there are a large number of Ship Management Company, who have the expertise in crew and technical management of ships. They would thus manage ships for ship owners for an agreed fee. The ship managers thus work on a budget for the vessel, based on their experience and knowledge. At times this fee factor can be a constraint for good maintenance, procurement of spares and stores. Also the cost of marine stores and spares may vary greatly in the international market. To cite an instance a ship management company located in Singapore may prefer to supply spares, stores and lubes in Singapore, to a fleet of vessel under their management. But it is likely that some of the vessels are chartered and plying between North America and UK may not touch Singapore for the next four (4) months. Hence the ship manager needs to make arrangements for supply of stores or spares at a convenient port of call across the North Atlantic, most likely at a much higher cost. Such factors need to be well accounted for by the Managers in the vessel's budget. Same applies to labour costs, which are much higher in Europe, United States and Japan, compared to labour cost in some Asian countries like China, India and Bangladesh. Also ship managers may consider putting a riding gang of fitters and welders on board the vessel, for a specific voyage/s to carry out maintenance jobs like pipe renewals, overhaul of auxiliary engines, deck cranes, during a long ballast or loaded passage. There will be a substantial savings in cost when such practices are adopted, by ship management companies. The author recollects a case of a handymax bulk carrier where, repairs of ballast pipelines were carried out during sailing by a riding gang of three (3) fitters, which resulted huge savings to the ship owner.

The Ship owners managing their own vessels may adopt a different strategy for the running of their vessels. They have a concept of in house management, where the Masters and Chief Engineers, prepare a budget for their vessel, and make important decisions in the purchase of stores and spares, and carry out the repair and maintenance on board, bearing the cost in mind. Masters and Chief Engineers are compensated by the ship owners, for this additional responsibility. This may be in the form of additional wages or a bonus. Irrespective of a vessel operated by the ship owners or hiring ship management companies to do the job, it is imperative that cost savings are very vital, especially in the present day of economic crisis. However good maintenance for the overall safe operation of the vessel, should not be compromised under any circumstances.

3.2   Ineffective planning ashore

Here we are referring to the ship management company located ashore. A number of vessels in the fleet may be assigned to a Technical Superintendent in the office who is responsible for the day to day operations of the vessel. This person performs the remote control operation from his office, for a vessel out at sea. The Superintendent is always in touch with the Master or Chief Engineer of the vessel. Generally the Superintendent is familiar with the movement of the vessel, the present location, the next port of call and the ETA (Expected Time of Arrival) at the next port This Superintendent is also

required to inspect and visit ships in various ports for periodic general inspection. During their absence from the office, their role is substituted by their colleague, who in most cases will be a Technical Superintendent responsible for managing their own fleet of vessels. This additional load on the substitute Technical Superintendent may lead to ineffective coordination and control of the vessel in question. Procurement of spares and stores for a vessel involves the purchase or commercial department of the shipping company, who would place an order for the same. The Technical Superintendent liaises with the purchase department in the procurement of spares and stores. Also the Technical Superintendent needs to coordinate with the freight forwarding company, to ensure that the stores and spares reach the vessel, during her stay at the port. Any amended ETA of the vessel at the port of arrival, to be advised to the freight forwarding company and the vessel's appointed agency for the port. Any communication gap between the Technical Superintendent and personnel from purchase or commercial department, is likely to result in delay or non-supply of the requisite stores/spare parts on board the vessel, as per the original plan.

3.3   Ineffective planning on board

Some of major factors which contribute to ineffective planning on board the vessel, prior to a Port State Control inspection, are tabulated below

Management committee meetings not held on a regular basis.
Communication gap between Master and Chief Engineer, resulting in Chief Engineer not being informed about the vessel's ETA at the port of call. Else Chief Engineer unaware of any amendment in the vessel's ETA.
Communication gap between Master and Deck officers/ deck crew.
Communication gap between Chief Engineer and Engineer officers/engine crew.
Safety meetings not held on a regular basis and not minuted.
Safety drills not occurring on a routine and regular basis.
Safety equipment and lifesaving appliances not tried out on a regular basis.
Defect list registers not updated by a responsible officer.
Officers and crew's living quarters not being regularly inspected by the vessel's Chief Officer.

All the above factors lead to the vessel not in a state of readiness to undertake a Port State Control inspection.

3.4   Communication gap between ship and shore

Communication between ship and shore is very critical when it comes to vessel operation. The Technical Superintendent should be in close contact with the vessel on a daily basis. This could be by means of fax, email or telephone. The Technical Superintendent should advise the Master/Chief Engineer about any Port State Control inspection due in the next port of call, and assist the vessel to plan for a successful inspection. Based on their past experience the Technical Superintendent, should come

out with a list of items to be looked into prior to the vessel's Port State Control inspection. Typically this should be in a form of a check list which the Master/Chief Engineer could use on board. Based on past experience the Technical Superintendent, could collate data from vessels which were detained by Port State Control authorities on vessels in his fleet. They should look into reasons for detention of vessels and how to avoid the same. The Technical Superintendent should also gather information from various websites of the different Port State Control authorities worldwide. Most of these websites contain data about vessel detentions at various ports and the reasons therein. There should be a good exchange and flow of information between ship's personnel and shore personnel. All this will go a long way for a good preparation and successful completion of a Port State Control inspection.

4 GENERAL PROCESS OF PORT STATE CONTROL INSPECTION EMPLOYED WORLDWIDE

As per the International Maritime Organisation (IMO), it is the responsibility of the flag state to ensure compliance to all IMO regulations and ensure safety construction and safe operation of vessels. At the same time International Maritime Organisation (IMO), has also recognised the vital contribution of the Port State Control (PSC), to ensure that global maritime standards are being implemented consistently on ships of varying nationalities (IMO, 2012).PSC basically involves the inspection of foreign vessels in national ports to ensure safety of the vessel, safety of the crew on the vessel and safety and security of the port. There are publications given by the International Maritime Organisation (IMO), which provide guidance on the conduct of Port State Control inspections and afford consistency in the conduct of these inspections, the recognition of deficiencies of a ship, its equipment, or its crew, and the application of control procedures. The Port State Control inspectors, who board the vessels for inspection in ports, are generally qualified ex Masters or Chief Engineers, who have good experience of sailing on board vessels. The Port State Inspectors have the authority, to board the foreign vessels in their national waters and carry out inspection. They go about doing this in a systematic manner, without hindering the vessel or cargo operations in port. The Port State Authority will not cause undue delay or detention of the vessel. They would carry an identity card and present the same to the officer on duty. They may then be escorted to the Master's office, where after introduction to the vessel's Master, the PSC inspector would like to view all the vessel's certificates An opening meeting would take place in the Master's office, where members of the senior management team and the Port State Control Inspector are present. After getting introduced to the senior management team members, the PSC Inspector briefs the team about their purpose of coming on board, the areas of inspection and equipment they would like to witness escorted by a responsible officer, deputed by the vessel's Master.

5   METHODS OF PORT STATE CONTROL INSPECTION FOLLOWED BY LEADING AUTHORITIES WORLDWIDE

The following are some of the leading Port State Control Authority around the globe

AMSA	Australian Maritime Safety Authority
MCA	Marine Coastguard Agency U.K.
USCG	United States Coast Guard
China MSA	Maritime Safety Administration
MPA	Maritime Port Authority Singapore
DG shipping	Director General of Shipping, India.

The plan is generally two fold. To begin with an initial inspection of the vessel's appearance, looking for signs of corrosion, load line markings, condition of paint, condition of plates & pipes on deck, and checking the validity of certificates. This forms a general impression and may form the terminating point of inspection. But on the contrary if the PSC Inspector, based on this initial inspection, has reasons to believe that things are not shipshape, then they may call for a more detailed inspection which will be the next step in the process. Possible grounds for a detailed inspection may include but not limited to;

Ship certificates not available or invalid.
Emergency Fire Pump not in a working condition.
Emergency Generator fails to start
Life boat engine non-operational.
Blower and funnel isolating fire flaps inoperative
Crew not familiar with the operation of ship's safety equipment

During the process of the detailed inspection, if deficiencies found are of a serious nature then the PSC Inspector may decide to detain the vessel in port. The reasons for detention may include but not limited to:

| |
|---|
| Certificates not valid. |
| Crew not as per the Safe Manning Document. |
| Impairment of Navigational Safety |
| Equipment for monitoring cargo condition not available on board. |
| Main propulsion and Steering arrangements defective. |
| Fire fighting equipment not functioning as per requirement of the convention. |
| Pollution prevention equipment damaged. |
| Unsafe and unhealthy conditions prevalent on board. |

The PSC Inspector would follow a procedure for rectification of deficiencies. This may include repair of the defects by ship staff or shore repair workshop at the port of detention. If facilities for repairs are unavailable at the port, then the authority may

allow a short sailing of the vessels to a nearby repair yard to undertake repairs. The Flag state will be informed about the status of the vessel. The PSC authority may require that the Flag state informs them about the confirmation of repairs carried out. If the vessel was permitted to do a short sailing with deficiencies, then the PSC authority should communicate the same to the appropriate authorities at the next port of call.

6 PICTURES SHOWING SOME CAUSES OF VESSEL DETENTION BY PORT STATE CONTROL AUTHORITIES WORLDWIDE

Holed fire line on deck
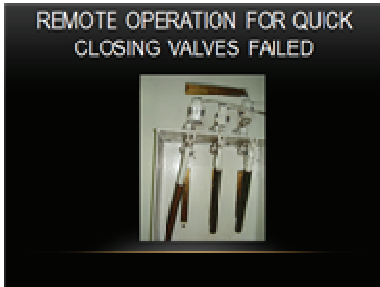
Quick Closing valve remote operation failed

Defective air vent for Fuel Oil Tank on deck.

7 ANALYSIS OF RECENT DETENTION REPORTS BY VARIOUS PORT STATE CONTROL REGIMES WORLDWIDE

Over the years countries around the globe have experienced a large number of foreign flag ships visiting their national ports. Countries in various regions depending upon their location have agreed to group together, to form a harmonised system of Port State Control, the result of which is being signatories to a Memorandum of Understanding MOU. Accordingly today we have the following Memorandum of Understanding MOU (IMO.2012)

Memorandum of Understanding MOU	Number of members
Paris MoU	27
Acuredo de Vina de Mar	13
Tokyo MoU	18
Caribbean MoU	25
Mediterranean MoU	10
Indian Ocean MoU	20
Abhuja MoU	22
Black Sea MoU	6
Riyadh MoU	6

The author has looked into recent annual reports of the above Port State Control regimes worldwide, to see the trend in the percentage of vessels detained in recent years. Key information related to detention of vessels around the globe is collated below, with useful comments. Please refer to figure 1 below, which is Record of vessel detentions between 2009 & 2011 by Port State Control regimes worldwide.

7.1   Paris MOU

As per the Paris MOU annual report of 2011, there has been a drop in the number of inspections from 24,058 in 2010 to 19,058 in 2011, while the number of individual ships inspected had increased from 14,762 in 2010 to 15,268 in 2011. This will also have a consequence for some trends over previous years. Until last year the detention percentage has been decreasing gradually. The trend has not continued and in 2011 the percentage increased to 3.6%. This can be explained since the focus of targeting is on ships with a higher priority. The number of detentions has decreased significantly from 790 in 2010 to 688 in 2011.In 2011 a total of 20 ships were banned. 13 more compared with last year. Multiple detentions were the most common reason for banning in 2011. [I].

7.2   Acuredo de vina del mar

Ships inspected by Port State: Considering the 2009 results, there was an increase of 959 inspections, making a total of 8586 in 2010, in comparison with 7327 of the previous year. The tendency of detentions has decreased, registering 108 detentions, equalling 1.25%of the inspected ships; whereas in 2009 a total of 136 detentions were made equaling1.78%. [II].

7.3   Tokyo MoU

In 2011, the Tokyo MOU took an initiative to consider establishment of an appropriate scheme for exchange of views and carrying out dialogues with the industry. The scheme under consideration would improve the common understanding and mutual co-operation between the Tokyo MOU Authorities and the industry. The concentrated inspection campaign (CIC) on Structural Safety and the Load Lines Convention was conducted from 1 September to 30 November 2011. During the campaign period, a total of 7,534 PSC inspections were conducted by the eighteen member Authorities, of which 5,901 were related to a CIC inspection. A total of 2,929 CIC related deficiencies were recorded. The detention rate for the CIC is 1.41% while the overall detention ate for the period is 4.59%. A major concern which had been raised from the CIC was that a large number of deficiencies relating to cargo hatch openings were found on board ships during the period. The measures taken on under-performing ships proves effective as it has been found that more and more people check the list of under-performing ships published by the Tokyo MOU regularly and that a number of positive feedbacks from the relevant flag State administrations and the ISM companies of the ships have been received. [III]

7.4   Carribean MoU

Data for comparison in previous year not available, but states that in 2012 the deficiency count was 185. [IV].

7.5   Mediteranean MoU

Data available states that currently 9 vessels in detention which includes 7 from Egypt and 1 each from Malta and Turkey. Annual reports for this MOU not yet available. [V]

7.6   Indian Ocean MoU

A total of 5550 inspections were carried out in 2011. Out of these 5550 inspections, 3306 inspections had deficiencies and the total numbers of deficiencies were 19219.Serious deficiencies noted by PSCOs led to the detention of 600 ships. The detentions allow for the rectification of the serious deficiencies prior to the ships departure; the overall detention percentage for the year is 10.81%. Although there is hardly any increase in total number of inspections in 2011,compared with those in 2010; the detention percentage increased from 8.54% recorded in 2010.The average number of deficiencies per inspection in 2011 (3.46) has also increased compared to the previous year (3.04). [VI]

7.7   Abuja MoU

The Memorandum of Understanding on Port State Control for West and Central African Region generally referred to as Abuja MoU is one of the 9 Regional MoUs and 1 national MoU established pursuant to IMO Resolution A.682 (17) of 1991. The Organization operates under a Cooperative Agreement with the IMO.Abuja MoU was established on 22nd October 1999 as an inter-governmental organization comprising of countries on the Atlantic Coast of Africa. Signatories to the Memorandum are the Maritime Administrations of countries abutting the Atlantic coast of Africa. The regime covers 22 countries from Mauritania to South Africa. [VII].

7.8   Black Sea MoU

The Black Sea MOU on Port State control is a system of harmonized inspection procedures designed to target sub-standards ships with the main objective being their eventual elimination. In 2000 the Black Sea Memorandum of Understanding on Port State Control was signed by 6 Black Sea countries with the common understanding of main principles for PSC. The detention percentage for vessels dropped from 5.8% in 2010 to 5.35% in 2011. [VIII]

7.9   Riyadh MoU

The Riyadh Memorandum of Understanding(MoU) is an agreement to achieve safe, secure and efficient shipping in the maritime jurisdictions in the Gulf region. In June 2005 The Riyadh Memorandum of Understanding on Port State Control in the Gulf Region, known as the Riyadh MOU, was signed at a meeting in Riyadh by 6 countries

(Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and UAE). Limited data available on detention of vessels. Overall 13 vessels were detained in 2010 and 2 vessels were detained in 2011. [IX].
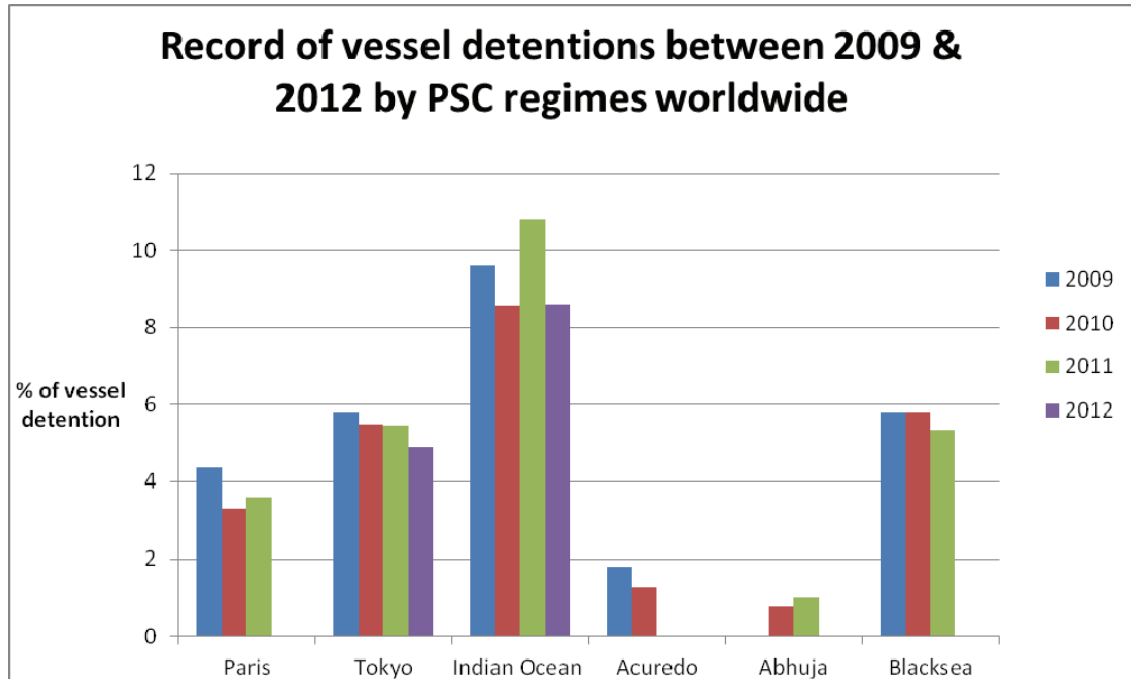
Figure 1: Record of vessel detentions between 2009 & 2011 by Port State Control regimes worldwide

8   IMPLICATIONS OF VESSEL DETENTION

Detention of a vessel in port by PSC authority is not a very pleasant experience, to the vessel and crew members of the vessel. First and foremost detention of vessels causes a delay in the cargo operation of the vessel, leading to heavy penalty and financial consequences. The vessel has to incur the port charges and may be off hire during this delay period. In extreme cases there is a likelihood of losing a charter. Also the reputation of the vessel and the ship owner is at stake. This may also have a negative impact on other vessels in the fleet. Also such detentions also leave a bad taste for the vessel's Master and his crew. Present day commercial shipping is highly competitive and officers and crew members work on a contractual basis. Detentions may lead to abrupt termination of contract for the Master and his crew, leading to a very low morale on board the vessel.

9   PREPARATION OF A VESSEL SPECIFIC GLOBAL CHECKLIST

In the present day commercial shipping world, vessels are managed by many leading, reputed and experienced ship management companies. These companies employ technical superintendents for the operation and manning of vessels. These personnel are well experienced sailing personnel and in most cases sailed as a Master or Chief

Engineer on commercial ships. Based on their past experience, such personnel are very much aware of the issues that are likely to crop up during a vessel's port state control inspection. They are thus in a very sound position to advise the vessel's Master and Chief Engineer on PSC inspection. In fact they have the capability to assist Master's and Chief Engineer's, to plan well ahead, for an uneventful PSC inspection of the vessel.

Shipping world is quite transparent when it comes to exchange of information with regards to safety and pollution control. Most of the Port State Control authorities have their own dedicated websites, where information related to PSC and vessel detentions are easily accessible to the common public. They also clearly explain the grounds for vessel detentions on their respective web pages. The vessel's technical superintendents should be guided by such information on PSC. This along with close interaction with the vessel's Master and Chief Engineer will go a long way in preparation of an exhaustive check list for PSC inspection of the vessel. Such check list could be vessel specific and a well-designed checklist would suffice for any PSC inspection worldwide. The author has more than 20 years of sailing experience in the merchant shipping, which includes more than 10 years, on large number of Panamax and Capsize bulkers. A sample check list for bulk carriers has been prepared. This is only a guide based on experience and may not be very exhaustive.

The sample global check list covers certificates, external appearance of vessel's hull, deck area, cargo holds, condition of machinery spaces, as can be seen in the Appendix section.

10 CONCLUSION – PORT STATE CONTROL - SAFETY AND SOCIAL RESPONSIBILITY

From the above discussion we could positively conclude that Port State Control is a collective responsibility involving many stake holders of the commercial shipping world. The International Maritime Organisation (IMO) frames conventions for the maritime world, for safe construction, safe operation, safe manning and management of vessels, prevention of pollution of the sea and atmosphere. Port state control authorities ensure that foreign vessels do not pose a problem to their nation. They ensure that all vessels landing in their nation comply to the conventions laid down by International Maritime Organisation (IMO).This has led to shipping companies to be more vigilant about their vessel operations. Detention of vessels in port could result into huge financial losses to the ship owner and ship manager. Detentions end up earning a bad reputation for the shipping company and loss of a valuable charter hire. This could in extreme cases lead to bankruptcy and closure of small shipping organisations, the result of which could be loss of employment for the vessel's officers and crew. Such a situation could lead to a global economic downturn.

So it is in the best interest of the world, all stakeholders in the commercial maritime industry, look at this as a social responsibility and act with prudence. Employing and training people to become well qualified sea farers, providing a decent living and

working condition on board and paying decent wages should be one step in the right direction. Ships can thus be better maintained resulting in a healthy competition between ship owners. This will also lead to better communication on board amongst multicultural group of seafarers. Well trained and educated seafarers will be in a much better position to understand the consequences of a vessel being detained by Port State Control authorities worldwide. They will be an asset to the shipping company, and would strive to do their best to have an uneventful Port State Control inspection for their vessel, and thus earn the confidence of their ship managers. This could lead to their long term employment in the shipping company, a steady income for them and their families, the end result of which could be happiness and job satisfaction. Shipowners could also announce nominal awards to deserving crew members, following a successful Port State Control inspection. This would help to boost the morale of the crew on board.

Ships without detentions by Port State Control authorities puts the shipping company in a good position, earns them a good reputation and a good charter hire. This would increase the profitability of the shipping organisation and a win-win situation for all of us in the maritime world.

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[VI] http://www.iomou.org/ (accessed 21 March 2013).

[VII] http://www.abujamou.org/index.php (accessed 21 March 2013).

[VIII] http://www.bsmou.org/ (accessed 21 March 2013).

[IX] http://www.riyadhmou.org/ (accessed 21 March 2013).

APPENDIX

Global sample checklist for a Bulk Carrier

1 VESSEL'S CERTIFICATES TO BE VALID AND AVAILABLE FOR INSPECTION

The following certificates and documents should be kept ready for inspection

1. **Any previous port state control inspection reports**
2. **Certificates of Master and crew members**
3. **International Tonnage certificate**
4. **Cargo Ship Safety Construction certificate**
5. **Cargo Ship Safety Equipment certificate**
6. **Cargo Ship Safety Radio Certificate**
7. **Damage control plans and booklet**
8. **Stability information**
9. **Unattended Machinery space evidence register**
10. **Fire control plan clearly marked and stored well outside the accommodation.**
11. **Document of compliance – dangerous goods**
12. **Ship's log book and engine room log book.**
13. **Safety register showing dates of emergency drills conducted.**
14. **Minimum safe manning document**
15. **Bulk carrier booklet**
16. **Loading / unloading plan for bulk carriers.**
17. **Safety Management certificate as per ISM Code.**
18. **Continuous synopsis record**
19. **IOPP certificate**
20. **Oil record books.**
21. **SOPPEP**
22. **Garbage record book**
23. **International Sewage pollution prevention certificate**
24. **International Air pollution prevention certificate**
25. **Bunker delivery notes**
26. **Technical file – NOx Technical Code**

27. International Ship security certificate
28. International anti=fouling System certificate

2   EXTERNAL APPEARANCE OF THE VESSEL

1. Hull appearance reasonably sound with no obvious signs of corrosion and exposure of bare metal.
2. Plimsoll load line markings clearly visible.
3. Vessel's gangway in a good condition, no loose stanchions.
4. Vessel's gangway always guarded and a visitor's register available.
5. Pilot ladder in good shape and boarding arrangements satisfactory.

3   VESSEL'S DECK, DECK MACHINERY AND CARGO HOLD AREA

1. The vessel's safety plan available on the main deck
2. All watertight doors on the deck fully operational and condition of rubber packing seals good.
3. Deck plates all around the vessel in good condition, without any signs of excessive corrosion and wastage.
4. All oil drip trays on the deck in good condition and drain plugs secured.
5. Caps for all fuel oil and ballast tank sounding pipes secured in place.
6. Air vents for fuel oil tanks and ballast tanks in good condition and functional
7. All fire lines and hydraulic lines for hatch cover openings on deck in good condition, with no clamps to secure any temporary leakages.
8. Gratings protecting the pipelines on deck in good condition with no wastage or excessive corrosion.
9. All openings for cargo hold in good condition and water tight sealing in order.
10. Openings to hydraulic pump rooms on the deck and forecastle stores on the deck in good condition. All watertight doors for these compartments operational.
11. Windlass and mooring winches in good operational condition. No signs of excessive wastage of pipelines and gratings for the pipelines in order. No signs of excessive wear on the windlass and mooring winch brake linings. Also the brake operating mechanism well lubricated and frees to operate.
12. All fair leads on the deck well lubricated and free to turn.
13. Anchor wash hydrants free to operate and greased.
14. Cargo hold hatch covers in good shape. The weather tight seals and compression bars for the seals should be in good condition. The hatch coamings in good order without much wastage. The PSC inspector may call for a hose test to ensure watertightness of the hatch covers.
15. No signs of excessive wastage on the track way for hatch cover wheels.
16. Drains holes and drain channels for the hatch cover are clear to allow easy drainage of water.
17. All hatch cover cleats to be well greased and operational.

4   VESSEL'S ACCOMMODATION AND SUPERSTRUCTURE

1. External appearance good.
2. Starting from top the masts on the monkey island generally sound condition. All access ladder rungs in good shape and not wasted away.
3. The vessels' antenna in good shape.
4. All blower flaps and funnel flaps operational.
5. All watertight doors for the accommodation operational and in good condition.
6. Living quarters in a good hygienic condition.
7. The galley equipment in good shape and fire extinguishers and fire blankets stored well and available for use.
8. The dry provision stores clean and ventilated.
9. The cold rooms for provision operating at the correct temperature and the refrigeration machinery in order.
10. Crew and officer's lounge room in order with adequate facilities available for recreation.

5   BRIDGE AND RADIO ROOM

1. Voyage charts and related publications in order.
2. All navigational bridge equipment functional.
3. Fire detection and navigation light panels in good shape.
4. Portable VHF inspection to be satisfactory
5. Radio batteries in good condition.
6. GMDSS equipment to be tested on batteries.

6   LIFE SAVING APPLIANCES AND FIRE FIGHTING APPLIANCES

1. Life boats and rescue boat well secured.
2. Boat deck lights all working.
3. Embarkation ladder in good condition.
4. Boat release mechanism operational.
5. Life boat engines working well.
6. PSC inspector may call for a boat drill.
7. All crew members to be aware of their duties.
8. Main fire pumps and Emergency fire pumps delivering good pressure on the fire mains.
9. All fire mains in good order.
10. All hydrants on deck, engine room and isolating valve on deck free to operate.
11. The fixed firefighting medium foam or carbon dioxide room inspection to be carried out. Ensure all pipelines are well secured and clamped.
12. All portable fire extinguishers charged and charging dates marked on the same.
13. Fire control station or Emergency headquarters access easily available. Spare fire extinguishers and breathing apparatus in place. Deck fire line

isolating valve operation satisfactory. Emergency stoppage of blowers and quick closing valves satisfactory. Starting of Main Fire pump and Emergency Fire pump from the Fire control station satisfactory.

7 ENGINE ROOM AND STEERING COMPARTMENT

1. **Engine room entrance clearly marked.**
2. **The Engineer's change room in a hygienic condition.**
3. **Staircases to the various engine room platforms clean and not slippery.**
4. **Safety posters placed at prominent places in the engine room.**
5. **All garbage drums covered and do not provide any fire hazard.**
6. **Engine room floor plates and tank top free of oil.**
7. **No oil leaks around the running machinery.**
8. **Engine room fuel oil tank valves, remote closing operation satisfactory.**
9. **All portable fire extinguishers in the engine room charged and dates clearly marked.**
10. **All fire hydrants in engine room operating freely.**
11. **All engine room fire hoses in good condition.**
12. **Main Electrical switch board in the engine control room in good condition. No rubbish at the back of the switch board.**
13. **Engine control room neat and tidy.**
14. **All engine room records available.**
15. **Oily Water Separator 15 ppm alarm operational.**
16. **Incinerator and Sewage plant operational.**
17. **Auxiliary engines safety cut outs operational.**
18. **Engine room alarms and fire alarms operational.**
19. **Main propulsion engine emergency stops operational.**
20. **All Engine room personnel are aware of their duties and are also aware of actions to be taken by them during an emergency situation.**
21. **Communication arrangements between Bridge, Engine control room, Emergency Manoeuvring station in engine room, Steering compartment and Chief Engineer's cabin well established**
22. **Steering room oil tank levels normal.**
23. **No oil leakage around the Steering compartment.**
24. **Rudder stock greasing satisfactory**
25. **Rudder angle indicator satisfactory.**
26. **Emergency steering operational procedure well displayed and operation satisfactory.**

8 EMERGENCY POWER SUPPLY

1. **Emergency generator performance satisfactory.**
2. **On load performance checked.**
3. **Emergency batteries in good condition. Record of maintenance available.**

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INSIGHT INTO SHIP CREWS – MULTICULTURALISM AND MARITIME SAFETY

ABSTRACT

Modern shipping is a highly international, multicultural and technological industry that places strong demands on economic efficiency and profitability. Despite advances in technology, some 80 % of all accidents are, according to studies, caused by human error. This paper focuses on safety issues related to the multicultural crews and gives examples of how nationality and national cultures affect maritime safety. The paper is based on a literature review and on a sample of crew nationalities visiting Finnish ports. The survey was based on crew lists entered in the national database Portnet. Based on the literature review, intercultural cooperation, communication and language skills are the most important issues that contribute to maritime safety in the case of multicultural crews. The results show that more training in understanding other cultures is needed. Improvements in teaching English to seafarers are also suggested. It is believed that the well-being of seafarers also enhances the safety of shipping activities. The survey showed that in the studied area, only 15% of ship crews consist of one nationality. The majority of ships have two or three different nationalities represented in their crew. In addition to Finnish seafarers, Philippine seamen constitute a remarkable share of crews as both officers and other crew. This paper is the authors' first step in the study of crew issues and deeper research into the subject is needed. The extent of the survey is limited, so the results cannot be generalized. The wellbeing of seafarers could be improved, as well as the safety of shipping. The paper includes statistics about the nationalities of seafarers aboard ships visiting Finnish ports.

Keywords: seafarers, multiculturalism, social well-being, maritime safety

1   INTRODUCTION

Shipping is one of the most globalised industries in the world economy, and the leading means of transport (Ljung 2010; Gekara 2008). In total, about 80 % of foreign trade is carried out using marine transport (e.g. European Union 2009). Shipping is a highly international, multicultural and technological industry and it faces strong demands with regard to economic efficiency and profit-ability (Hanzu-Pazara & Arsenie 2010; Ljung 2010).

These reasons have led to a globalized labour market of seafarers and to ship crews that are more and more multinational. About 70-80 % of the world's merchant fleet has multicultural crews (Ma-gramo & Cellada 2009; Pyne & Koester 2005). Multicultural crews and a possible lack of a common language have produced an increasing concern

regarding the competence of ship crews. This is of crucial interest, especially when technological advances have cut down the number of crew members, from what used to be 40-50 to about 20-25 even on large carriers (Ljung 2010).

The research on the operational and human aspects of maritime safety is of growing interest. The concerns about maritime safety have caused a growing demand for research into what kinds of competences the crews operating the seas have. The question is inevitable, especially when it concerns areas with a high risk of accidents. The Baltic Sea is an area with a lot of traffic and shallow waters. The importance of competent crews able to handle their ships in the difficult conditions characteristic to the area is evident.

There are several reasons why the seafarers of today appear to be among the pawns of globalization. One reason is that the demand for logistics is global, due to markets that are unaffected by borders. That crews have become part of a global market is inevitably a question of money. A study published in Marine Policy (Silos et al. 2012) states that it is hard for the owner to regulate fuel, insurance and port dues, among others, whereas crew costs are regarded as "variable costs" and can therefore be reduced by the owner. A new philosophy arising in the sector also states that vessel maintenance has become a lower priority.

According to Silos et al. 2012, the cost of the crew is about 15 % of the total costs of handling a ship. According to Stopford (2009), the crew cost can be up to 42 % of the ship's operating costs. The operating cost of a ship varies according to the ship's age and size and the nationality of the crew. It can vary between about 20 and 40 % of the total operating costs, depending on the age of the ship. Crew costs also vary according to the flag of the ship. Stopford (2009) states that a crew member sailing on a vessel under the European flag can cost twice as much as a vessel registered under an "open" flag such as Liberia, Panama or Singapore.

Another reason for the growing numbers of international crews is the social aspect. The rising standard of living in the industrialized countries, such as Western European countries, the US and Japan causes changes in the global maritime market for seafarers. When a country undergoes economic growth, it will require migrant labour. This is because its citizens have more possibilities for education and therefore a chance for advancement in careers. This results in a shortage of labour doing certain types of jobs, the so called 3-D: dirty, dangerous and difficult (Galam 2011). The recruitment of seafarers has become a major problem for the shipping sector (Ljung 2010). The fact that the time that vessels spend in port is cut to minimum, the decreasing sizes of crews and a growing list of responsibilities has made the profession of a seaman less and less attractive, especially for citizens of highly developed countries (Silos et al. 2012).

The purpose of this paper is to provide a review on studies that concern multicultural crews and maritime safety issues. The purpose of the review is to look at how the relationship between the multiculturalism of crews and maritime safety has been studied so far. In addition, the paper contains the results of a survey on the crew list information of ships visiting certain Finnish ports. The aim of the survey is to provide information

about how multicultural the crews in the Gulf of Finland/the Baltic Sea actually are. The paper has been produced as a part of a project concentrating on the risks of maritime oil transportation in the Gulf of Finland and in the Baltic Sea (the MIMIC project).

The structure of the paper is as follows. Section 2 shortly presents the legislation on the manning of ships and the competence of crews as background information. Section 3 reviews the previous studies on the subject. Section 4 includes the results of a survey on crew information. Finally, the paper discusses what kind of conclusions can be drawn based on the survey as compared to the state-of-the-art research on multiculturalism and maritime safety, and if and how the multiculturalism of crews should be studied in more depth.

2   LEGISLATION ON MANNING OF SHIPS AND ON COMPETENCY OF SEAFARERS

To ensure crews are competent and have the proper education for ships plying international waters, the International Maritime Organization (IMO 2004) has adopted qualification standards for seafarers on merchant ships. These standards set the framework for how ships are manned and what kind of qualifications and education the seafarers are required to have.

The International Convention on Standards of Training, Certification and Watch keeping for Seafarers (STCW) sets basic requirements for training and certification in international seafaring. The STCW had, in the year 2011, altogether 134 parties, which represent a majority of the world shipping tonnage (IMO 2011a). The instructions for the proper manning of ships are stated in the IMO resolution on the principles of safe manning A.890 (21) (IMO 2000). It states that there should be enough crew on board a merchant ship to have the capability to safely maintain the navigation, mooring, environment, fire prevention and fighting, medical care, life-saving equipment and cargo handling of the ship.

SOLAS (International Convention for the Safety of Life at Sea), from 1974, is applied for the manning and training of seafarers (SOLAS chapter V, regulation 15). STCW is also the prime authority on training. The STCW, too, applies to ship-owners, training establishments and national maritime administrations and it concerns merchant ships in domestic or international operations. The convention applies separate requirements for each position on board a ship. It specifies the amount of seagoing experience a master of a ship has to have, the certificate of education and training and the age of the seafarer. It also states that "all officers must have a good command of spoken and written English. Senior officers with functions at a managerial level must also speak and write English". Crew members in lower positions are required to be able to comply with helm orders issued in English (Obando-Rojas 2002). The STCW standard specifies a required level of fluency in the ship's declared working language that each employee must speak to a certain level (Hetherington et al. 2006). The so called Manila amendments were adopted in 2010 as an addition to the convention (IMO 2011b).

The IMO conventions and regulations are not binding in the member states until they have been ratified. The IMO regulations and conventions serve as the basis when member states write their own national acts for shipping and the ships flying their flags. The Finnish act on Ships' Crews and the Safety Management of Ships (1687/2009) states that "every ship shall be manned in such a manner that the ship, crew, passengers, cargo, other property or the environment are not needlessly put at risk and that the qualifications of the crew shall be such as to enable the proper performance of all watch keeping duties on board" (§ 5). It also states that "certificates of competency are issued by the Finnish Transport Safety Agency", where "provided that the applicant meets the requirements with respect to age, medical fitness, knowledge and skills, training and experience" (§ 17). Regarding the working language on board the act notes that all seafarers shall have a sufficient understanding of the working language and that safety instructions shall be issued in that language (§ 25).

According to the Finnish maritime law, in ships sailing under the Finnish flag, the captain has to be a citizen of a country that is a member of either the European Union or the European Economic area. In comparison, for example, in Russia the captain or first officer has to be Russian (Russian code for Merchant vessels 2011, article 56).

3   MULTICULTURAL CREWS AND MARITIME SAFETY

Studies on accidents (i.e. Baylon & Santos 2011; Kujala et al. 2009; Mårtensson 2006; Rothblum 2000) show that the ship's crew is the main risk factor when it comes to maritime safety, since approximately 80-90 % of maritime accidents are caused by human error. The role of crews on the bridge has changed due to advances in technology and in the way of manning ships due to the employment of multinational crews (The Nautical Institute 2012). This makes the impact humans have on the maritime safety system evident.

For this study, a number of studies concerning crew and safety issues were surveyed. A summary of these can be found in Table 1. In the following sub-chapters, some studies are presented in more detail. Studies are presented under the following categorization, based on their main themes: the effect of national culture on maritime safety and multiculturalism on board, communication issues and education and training.

Table 3.1 Summary of studies on crew and maritime safety

Authors	Type of publication/published in	Subject of study	Central theme of the study
Barsan et al (2012)	Journal article/International Journal on Marine Navigation and Safety of Sea Transportation	Training as a subject of competitiveness	Education

Baylon & Santos (2011)	Journal article/International Journal of Innovative Interdisciplinary Research	How Filipino seafarers affect the global markets	Seafarer markets
Benton (2005)	Conference paper/International Association of Maritime Universities (IAMU) 6th Annual General Assembly and Conference	Problems at sea caused by multicultural crews	Multiculturalism
Grøn & Knudsen (2011)	Research report/the Danish International Ship Register	The differences between Danish and Filipino seafarers	Multiculturalism
Hansen et al. (2008)	Journal article/International Maritime Health	Comparison of the health of the two groups of seafarers	Maritime health
Hetheringt on et al. (2006)	Journal article/Journal of Safety Research	How humans affect maritime safety	Human factor
Horck (2010)	PhD thesis/Malmö University	Cultural matters in maritime training	Multiculturalism
Horck (2006)	Licentiate thesis/Malmö University	Communication among international students	Communication
Håvold (2007)	Journal article/Work & Stress	The association between national culture and the safety orientation of seafarers on Norwegian-owned vessels	Multiculturalism
Lu et al. (2012)	Journal article/Accident Analysis and Prevention	Effects of national culture on human failures in container shipping	Multiculturalism
Mårtensson (2006)	PhD thesis/Luleå tekniska universitet	Understanding the problems tied to safety by utilizing an organizational perspective	Multiculturalism
Popescu et al.(2010)	Conference paper/Advances in maritime and naval science and engineering, Romania, September 2010	Communication in a language that is not the native one for many seafarers	Communication
Pyne & Koester (2005)	Journal article/The Archives of Transport	Communication of crews	Communication

Rothblum (2000)	Congress paper/ The National Safety Council Congress and Expo, Orlando 2000	Human error such as communication and situation awareness	Human factor, communication
Sampson & Wu (2007)	Conference paper/ SIRC's seventh Symposium July 2007	Maritime education and students in China and the Philippines	Education, multiculturalism
Sampson & Zhao (2003)	Journal article/World Englishes	Communication and the operation of ships in a multilingual environment	Communication
Theotokas & Progoulaki (2007)	Journal article/Maritime Policy & Management	Co-operation between Greek seafarers and other nationalities	Multiculturalism
Thomas (2003)	Conference paper/SIRC's third symposium September 2003	Differences in attitudes concerning the perspective of gender	Gender issues

3.1   The effect of national culture on maritime safety

Lu et al. (2012) state that national culture has significant importance in explaining the occurrence of human errors on ships. They emphasize that various dimensions of national culture are related to human failures in ship operations. Lu et al. (2012) used the theory of cultural dimensions presented by Geert Hofstede in the 1970s as a reference. The theory of cultural dimensions suggests that there are five elements that most affect intercultural cooperation and therefore also maritime safety. These are Power Distance, Collectivism, Uncertainty Avoidance, Masculinity and Confucian Dynamism later referred to as Long term orientation.

For example, Lu et al. (2012) assume that the higher the masculinity level in a culture, the higher the probability of human failures. Factors such as saving one's face, shame and respect for social status are seen to have a negative relationship to work safety. Or, if a person's Long term orientation is high, it weakens the relationship between collectivism and human failures in container shipping: high collectivism will lead to fewer human failures experienced by seafarers, but only when the levels of long term orientations among the crew are high. The authors mention the Filipinos as an example. They score high degrees in collectivism, being more group oriented and co-operative, whereas the Chinese culture relies on a high power distance and organizational hierarchy and face-saving. Seafarers from lower power distance cultures participate in contributing to a safer work environment and risk reporting.

Several other authors have also concentrated on Filipinos in their studies. Grøn & Knudsen (2011) present the concept of social cultural structure on board a ship. When comparing Norwegians and Filipinos, the issue of cultural differences comes up. Norwegians see work as a value and highlight individualism, whereas a Filipino, originating from a highly collectivistic culture, sees work as a means to support the

family and community, which leads to fewer risks from them compared to their northern colleagues.

A stronger social network among the Filipinos also leads to better mental health. According to Pyne & Koester (2005), studies indicate that Asians commit less murders and suicides. Another cultural issue are the cultures with a high power distance, where it is not allowed to question the decisions of one's superior. Pyne & Koester (2005) present some interesting examples of cultural factors affecting people's working habits. One example is that the word 'no' is considered rude in Asian cultures. This is a challenge when, for example, the pilot is a westerner used to getting direct feedback from the mariners.

Hansen et al. (2008) studied the on board occurrence of accidents and illnesses of different nationalities by comparing Filipinos with Danes. They discovered that Filipinos encounter less occupational accidents than Danish seafarers. They also found differences in the physical abilities of the two groups. The Danes, for example, are more often overweight, which leads to a significant amount of back problems. They drew a conclusion that a seafarer from the Philippines has a higher risk of losing his job due to an accident and may, for that reason, be willing to avoid potential risk situations to a greater extent than his Danish colleague.

Håvold (2007) studied cultural differences on board Norwegian ships and presents the fact that the more nationalities there are on board the ship, the lesser scores are obtained in safety attitudes. This is also what Mårtensson (2006) found out. National culture also affects the safety culture: people from cultures with higher power distance, high uncertainty avoidance and high individualism score positively in terms of safety and are therefore safer employees. He states that if a seafarer comes from a culture with high uncertainty avoidance, they are more likely to follow orders and standard operating procedures.

Some authors have focused on the interaction between different national cultures. Theotokas & Progoulaki (2007) studied how well Greek seafarers interact with crews from other nationalities. They found out that for the Greeks, it is more difficult to cooperate with people from cultures with a power distance lower than their own, such as Russians, since they feel that they might question their position and behaviour. The Greeks also had problems with communication, language, customs and religion. The study indicated that mixed crews can be a risk if they are not properly supported.

On the other hand, Sampson & Zhao (2003) indicated that working with persons from different kinds of cultures increases safety, as it creates a social distance, tolerance and respect among people from different nationalities and makes it easier to form especially professional relationships on board. Some crew members also stated that a multinational crew increased cultural understanding and racial tolerance (Sampson & Zhao 2003).

The problem with a multicultural crew, according to Horck (2010; 2006), is the diverse background of the seafarers and that the crews often do not know each other in advance and are therefore not able to work as a team very quickly. Introducing more social

activities on board the ships as well as making longer contracts with the crews would, according to Horck (2010), increase maritime safety. In these kinds of situations, the leader has to act differently than with a crew where everybody comes from similar cultural backgrounds. When discussing, cultural stereotyping is a way of defining cultural differences and "it makes it easier to predict another person's character and to reduce our own uncertainty". To accomplish a working multicultural environment on board ships, the maritime industry needs to adopt stronger leadership and a more developed culture of teamwork (Horck 2010).

Sampson & Wu (2007) point out that a seafarer's experiences within national frameworks have a great impact on what a person considers to be a risk. These are, for example, safety practices, safety regulations and labour market conditions that vary internationally.

3.2   Communication

Language is one of the strongest elements in culture (Horck 2010). He states that "people from the same culture have to be able to communicate" and that language is undoubtedly the greatest facilitator of communication. The proper knowledge of a language clearly leads to fewer accidents. Lack of communication has been reported to be common and language problems are mentioned since a declining number of ships have single nationality crews (Hetherington et al. 2006).

Pyne & Koester (2005) bring up several cases of communication failure in their report. These are listed as problems related to different cultures and languages between the crew and the pilot, the crew and the passengers on passenger vessels, and with respect to external communication and VHF communication on other vessels. They justify that it is possible to minimize the amount of accidents directly related to poor communication since most of the accidents occur when the level of understanding English is poor. Other factors to be improved are procedures for communication, better selection of personnel and improved design of maritime equipment and technology, including means for communication. Pyne & Koester (2005) further state that especially crew communication is a significant factor in maritime accidents. Even when crew members speak the same language, there is a risk of misunderstanding. When adding people using English as a second language, as well as the possible cultural differences, the risk of miscommunication increases a great deal.

The lack of communication is a problem not only on an organizational, but also on an individual level. In his licentiate thesis from 2006, Horck states that the lack of a common language in a multinational crew can lead to the isolation of a crew member and a limited social life on board. The effect of culture on the means of communication gives the individual an understanding of the social interaction. Sampson & Zhao (2003) also emphasize the importance of English in social situations, leading to a more uniform crew and therefore an improved safety culture.

Horck (2006) presents several accidents where the lack of communication has been clearly shown to have caused the accident. These include, for example, the collision of Silja Opera in the Baltic in 2003, the collision between Xu Chang Hai and Aberdeen in 2000, and a fire aboard the Scandinavian Star in 1999.

It is often stated that a great deal of communication is what we call non-verbal (Horck 2010). This can be understood as the things people do not say that are expected to be understood from manners and facial expressions. In understanding non-verbal communication, culture plays a crucial role.

3.3 Maritime English

Because of the international nature of shipping activities, maritime English has proven to be a very important part of future officer training. If an officer is not used to speaking English, in the beginning it may be difficult to express oneself. A paper written by Popescu et al. (2010) suggests that the improvement of standard maritime English would help young apprentices to communicate and so to avoid accidents that happen due to human errors caused by bad communication. Despite the positive impacts of multinational crews, communication was seen as the major problem. Sampson & Zhao (2003) present an example of a captain who had poor knowledge of English. This caused problems with the lower ranks in terms of a reduced authority.

Recommendations for standard maritime English have been adopted by the IMO. It is a simplified version of English including standard vocabulary for maritime communication (Sampson & Zhao 2003). Despite good efforts towards adopting Maritime English into the field, it was not detected in the study on board ships. The drive for cheaper crews from less developed countries can, according to Sampson & Zhao (2003), also be seen as a risk, since the assumption is that their English skills may be poorer.

The additional training in English is well acknowledged by maritime training facilities (Horck 2010). In any case, the English skills of seafarers are often very basic, and the situation in ports is similar, too (Horck 2010). According to Horck (2010), it is evident that the level of English taught in maritime education has to be more advanced and also implemented for on-shore operators such as port operators.

3.4 Training

As shipping grows to be a more and more international business, its managers also need to be more aware of cultural differences. The STCW convention has acknowledged the cultural effects on people's ways of communicating and it has been added to the regulations as an issue of training and education. The question is how much resources the training programs allocate for this. Horck has, in several studies, suggested

introducing more education in cultural awareness into maritime education (Horck 2010; 2006; 2005). Benton (2005) states the same.

Horck (2006) states that greater focus should be placed on the human element, instead of automation and technology in decreasing the impact of the human factor. One improvement would be better cooperation on board. Hence, education and knowledge of different cultures and how people act together as a group are needed, as misunderstandings are a great threat to safety in the shipping industry. The outcome of the study is "to realize that we all need education in cultural awareness to be efficient in an industry getting more and more globalized" (Horck 2006). Furthermore, it is necessary, according to Horck (2010), for maritime students to attend courses in pedagogy. Horck (2010) states that gender perspective, cultural awareness and pedagogy are the three subjects that should be introduced at maritime education training facilities very soon. Maritime education institutions do not, in Horck's (2010) opinion, "give enough time in their curriculums to teach communication and management skills whereas the technical issues are highly emphasized at all parts of the education of mariners".

At sea, errors are caused by bad design, poor training and bad management systems. Competitive seafarers are well trained and low risk takers. This is achieved through good quality training. Training ensures a ship maintains a high standard of operation and it enhances the safety culture aboard a vessel (Barsan et al. 2012). The increase of technology aboard ships has increased the need for training and especially training on modern ships.

4   SURVEY ON SHIP CREWS VISITING FINNISH PORTS

4.1   Methodology

The crew data was collected from the Portnet database which includes information about the ship calls in Finnish ports. The ship calls were collected from 13 ports in the area of the Gulf of Finland and the Archipelago Sea (HaminaKotka, Loviisa, Valko, Sköldvik, Helsinki, Inkoo, Kantvik, Hanko, Turku, Parainen, Uusikaupunki, Naantali and Rauma). These ports were selected for the analysis because the focus in the MIMIC project is especially the Gulf of Finland and to make the survey more comprehensive the ports in the Archipelago Sea were included as well. Due to some practical reasons (explained in more detail later) it was not possible to survey all Finnish ports.

Portnet is a national information system for vessel traffic and port call information. All vessels visiting Finnish ports report to the Portnet e.g. the following information: the vessel calls, cargo reports, hazardous cargo declaration and ship waste notification. The main users are Customs and maritime authorities. In other words, obligatory information concerning a ship call is transmitted through the Portnet System to the authorities. (Portnet 2012)

Originally, 539 ship calls were selected for the analysis based on ship call information from Portnet, but crew lists were available in Portnet for only 453 of these. Each individual ship was included in the analysis once per port. In other words, if a ship visited the port three times during the survey period, information from the crew list was recorded only from one ship call, which was selected randomly. Thus, the crew information shouldn't be regarded as being in relation to the amount of ship traffic in the same period.

Crew data was collected from the crew lists (IMO FAL form 5) which are entered in the Portnet system. Ships have to deliver crew lists to authorities on the basis of The Convention on Facilitation of International Maritime Traffic (FAL Convention) set by the International Maritime Organization (IMO). The crew list form includes the following information: ship information (name, call sign, IMO number, flag state), information about the departure/arrival and the latest port call, and crew information (name, rank or rating, nationality, date and place of birth, nature and the number of their identity document). (IMO 2013) Permission to use crew list data for the research was provided by Finnish Customs.

The survey was performed on the 5-7 November 2012 in the Finnish Customs office in Kotka. The crew lists were surveyed from the period of 5th October 2012 to 4th November 2012. Crew lists are maintained in the Portnet system for only 30 days due to the Personal Data Act (529/1999) so it was possible to collect data only from the previous 30 days. Data from each crew list had to be saved manually to an excel sheet, which limited the size of the sample. Crew lists are saved mainly in PDF format in the Portnet system.

The following information from crew list was recorded: number and ratings (officers and other crew members) of ship crew, nationalities of crew members and ship information (name, flag state). The survey was complemented with information on the Net Tonnage (NT) of ships, which was obtained from Portnet as well.

Officers and other crew were analysed separately. Officers include the following ratings: chief officer, second officer, third officer, chief engineer, second engineer, third engineer and fourth engineer. Other crew includes the following ratings: cadets, boatswains, able seamen, oilers, greasers, fifth engineers, cooks and ordinary seamen.

The analysed ship types included Ro-Ro, container ships, dry cargo (incl. also dry bulk), tankers and other ships like tug boats and barges. Crew lists of the passenger ships are not entered in Portnet, so passenger ships were excluded from the analysis. Information is presented for all the ports in total in order to ensure that a single seafarer, a ship or a shipping company cannot be extracted from the results.

4.2   Number and flag states of ships

Dry cargo ships (160 ships) and tankers (125 tankers) formed a majority of the ships in the survey (63 %). In addition, the survey included 80 Ro-Ro ships, 70 container ships and 18 other ships (see Table 4.1).

Approximately 22 % of ships were Finnish. The second largest group was ships operated under Netherlands flag (15 %), and 10 % operated under Antigua & Barbuda flag (see Table 2).

Table 4.1 Number and flag states of ships

Flag states	Ro-Ro	Container	Dry cargo	Tanker	Other	Total	%
			Number of ships				
Antigua & Barbuda	4	22	18	-	-	44	9,7
Cyprus	2	10	12	2	1	27	6,0
Denmark	-	-	1	13	-	14	3,1
Finland	42	3	36	11	6	98	21,6
Germany	4	5	6	5	1	21	4,6
Gibraltar		5	5	3		13	2,9
Liberia	-	6	4	5	-	15	3,3
Malta	1		7	27		35	7,7
Netherlands	10	6	46	7	-	69	15,2
Norway				15		15	3,3
Sweden	7	-	1	8	-	16	3,5
Others*	10	13	24	29	10	86	19,0
Total	80	70	160	125	18	453	

* Bahamas, Cambodia, Croatia, Estonia, Faroe Islands, Great Britain, Hong Kong, Isle of Man, Italy, Japan, Lithuania, Luxemburg, Netherlands Antilles, Panama, Poland, Portugal, Russia, Singapore, Switzerland

4.3   Nationalities of officers and other crew

The survey included 2530 officers and 3507 other crew members in 453 ships. Seafarers represented 48 different nationalities in total. The complete list of nationalities can be found in Appendix 1.

By nationality, the largest group of officers was Finnish (17 %,), second largest group Philippines (15 %) and third largest Russians (14 %). These three largest nationalities comprised almost half of all officers. The following nationalities were: Ukrainian (9 %), Dutch (6 %), Estonian (7 %), Polish (6 %), Swedish (4 %) and German (4 %). Other nationalities each comprised less than 4 % (see Fig. 1).
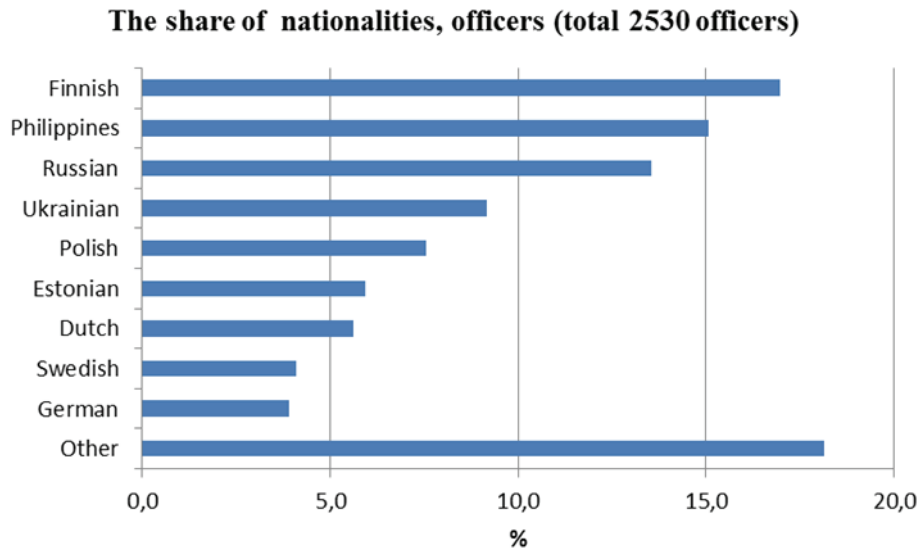
The share of nationalities, officers (total 2530 officers)

Figure 4.1 The share of different nationalities, officers

The largest group of other crew by nationality was Philippines (48 %) and second largest group Finnish (14 %). According to Galam (2011), in Japanese and Greek ships about 40 % of the crew were Filipinos, which is in agreement with the results of this survey.

The third largest group, Russians, compose only 5 % of other crew members. In other words, Filipinos and Finns dominate other nationalities as most common crew members. Diversity in nationalities of other crew members is not as wide as it is in officers (see Fig. 2).
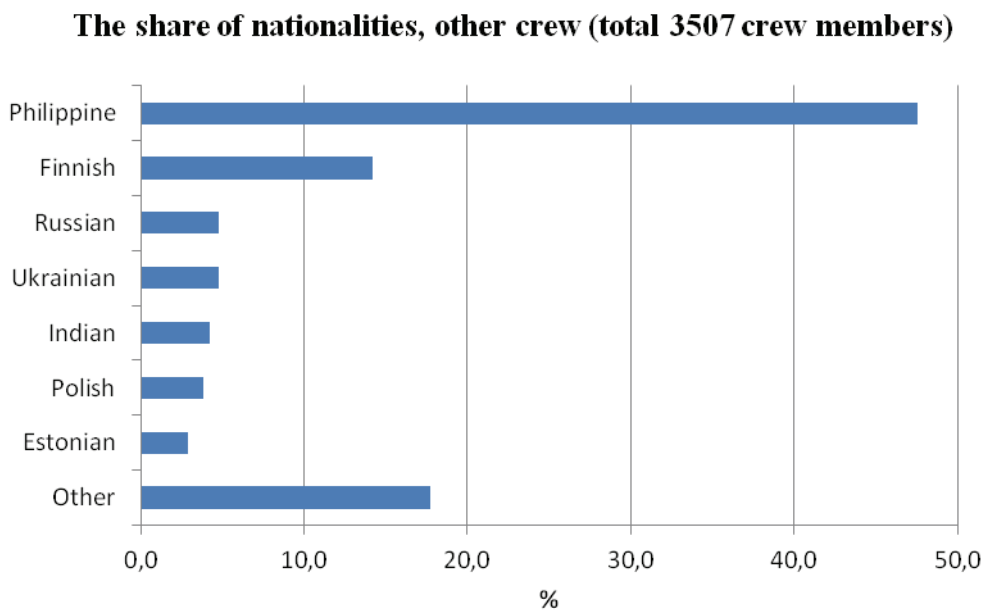
The share of nationalities, other crew (total 3507 crew members)

Figure 4.2 The share of different nationalities, other crew

When ship types are compared, certain differences can be found. Finnish officers were the largest group in Ro-Ro vessels. Ukrainians were the largest group among ship officers in container ships, Russians in dry cargo ships. Filipinos formed the largest group of officers in tankers. Poles and Swedes were especially notable in tankers and Dutchmen in dry cargo ships. (see Table 3). This partially correlates to the flag states of ships, as the largest number of dry cargo ships were under Netherlands flag, and 8 tankers were under Swedish flag.

Table 4.2 Nationalities by ship types, officers

Nationality	Ro-Ro	Container	Dry cargo	Tankers	Other	Total	
	Number of officers						%
Finnish	211	12	116	81	9	**429**	17 %
Philippine	109	43	59	169	1	**381**	15 %
Russian	26	75	156	65	21	**343**	14 %
Ukrainian	3	130	61	37	1	**232**	9 %
Polish	45	22	37	82	5	**191**	8 %
Estonian	65	11	50	3	21	**150**	6 %
Dutch	25	17	88	12	0	**142**	6 %
Swedish	35	0	4	63	2	**104**	4 %
German	12	18	23	44	2	**99**	4 %
Other	41	89	87	242	0	**459**	18 %
Total	572	417	681	798	62	**2530**	

In other crew, the Philippines dominated in all ship types except in other ships (see Table 4).

Table 4.3 Nationalities by ship types, other crew

Nationality	Ro-Ro	Container	Dry cargo	Tankers	Other	Total	
	Number of officers						%
Philippine	376	356	322	605	8	**1667**	66 %
Finnish	255	21	90	119	13	**498**	20 %
Russian	7	17	77	41	27	**169**	7 %
Ukrainian	0	58	75	35	0	**168**	7 %
Indian	0	70	0	79	0	**149**	6 %
Polish	58	0	22	43	11	**134**	5 %
Estonian	17	5	54	2	23	**101**	4 %
Other	78	83	246	208	6	**621**	25 %
Total	791	610	886	1132	88	**3507**	

4.4   Number of different nationalities per ship

The number of different nationalities per one ship varied from one to seven. The largest share of ships had representatives of three different nationalities on board (28 % of ships), followed by ships with 2 nationalities on board (26 %). In 15% of vessels, crew consisted only of one nationality (see Fig. 3).
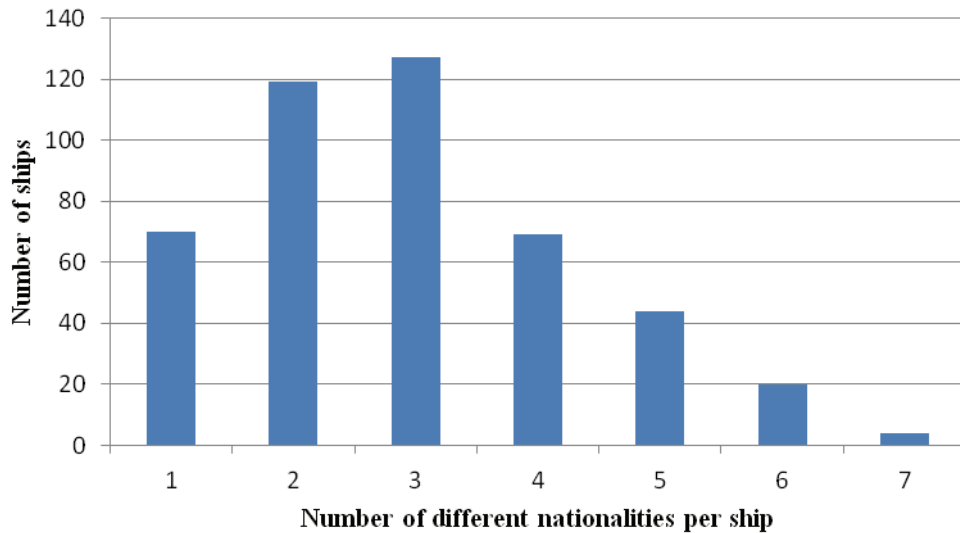

Figure 4.3 Number of different nationalities per ship

In a comparison of ship types, some tankers, container vessels and dry cargo vessels had over 5 different nationalities on board. Other vessels were most commonly manned by one nationality. Otherwise, the differences between ship types were not very clear (see Fig. 4).
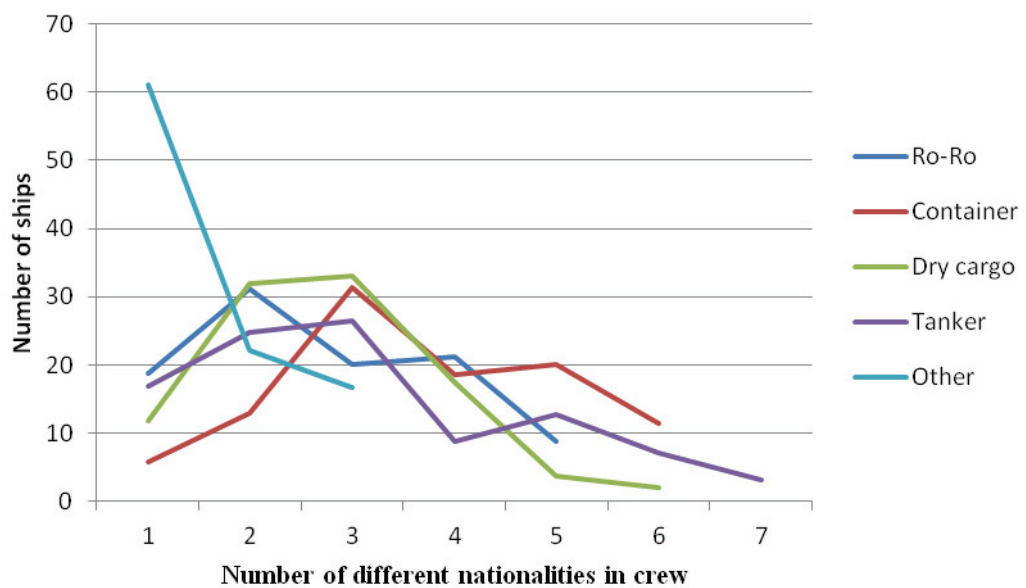
Figure 4.4 Number of different nationalities by ship types

5   DISCUSSION AND CONCLUSIONS

The focus of this paper has been on ship crews and how the multiculturalism of crews affects maritime safety. The paper has consisted of a review on previous studies and of a survey on crew information in ships visiting Finnish ports. The purpose of the survey is to provide data about how multicultural crews actually are.

The multiculturalism of crews is an important subject to study, because shipping is a highly international branch of industry where economic competition is harsh. There are several reasons that have led to a globalized labour market of seafarers. Money plays a role when shipping companies are trying to cut operational costs, of which crew costs form a remarkable share. Especially the flag state of a ship and the nationality of seafarers affect crew costs. The rising living standards in the industrialized countries have decreased the supply of seafarers in these countries. The working conditions of seafarers have become more demanding and consuming, which decreases the attractiveness of the seafarer profession, especially for citizens of developed countries.

Previous studies on the multiculturalism of crews and maritime safety have mostly focused on the following themes: differences between national cultures and how it affects e.g. working habits or safety perceptions; communication issues and language skills; and training needs relating to multicultural issues. There are also some studies which have looked at, for example, gender or health issues between different nationalities.

Studies which focus on differences between national cultures have found out, for example, that the masculinity level of a culture affects the probability of human failures. Collectivism versus individualism has been one key element: high collectivism will lead to fewer human failures, because collectivistic cultures (such as Filipino culture) see work as a means to support the family and community, which leads them to take fewer risks. Another aspect is power distance: seafarers from lower power distance cultures participate in contributing to a safer work environment and risk reporting, while seafarers from high power distance cultures do not question decisions made by their superiors, even if they would pose a risk to safety.

In intercultural communication, the central question is how to overcome language barriers which can have severe consequences for both the organizational risk level and the individual level as a member of work team. There are examples of accidents in which communication and poor language skills have contributed to the causes of an accident. To solve the problem, attempts have been made to create standard maritime English. Studies, which have looked at training issues, mostly state that there should be more training on multicultural issues and intercultural communication which would support working in multicultural settings.

According to the studies of Magramo & Cellada (2009) and Pyne & Koester (2005), about 70-80 % of the world's merchant fleet has multicultural crews. According to the results of this survey, 85 % of ships had multinational crews. It is important to make a difference between the concepts of multicultural and multinational, because nationality

doesn't necessarily mean there is one uniform national culture, but one nationality can include several ethnic groups as is the case, for example, in many Asian countries.

Majority of ships in the Gulf of Finland and in the Archipelago Sea have two or three different nationalities on board, but some ships have even more. The study of Galam (2011) states that Filipinos usually work in lower ratings, but this survey showed that they are also the second largest nationality in ship officers after Finns, and the largest nationality in other crew. Although the size of the survey was very limited, it still gives some insight into the structure and nationalities of crews. The accurate nationality and other crew information are not simple to obtain because of the sensitiveness of personal information.

The results of the survey raise some further questions when compared to the results from previous multiculturalism studies. The effects of two strong national groups in a crew, in comparison with crews which have wider range of different nationalities, remain untouched as a research subject. In previous studies, there are divergent views on whether multicultural crews pose a risk to maritime safety or actually improve safety. In the author's opinion, it would be discriminatory to say it poses more safety risks if a ship has multicultural crew or there are certain nationalities on board. Rather, the focus should be on how multiculturalism should be taken into consideration in ship operations, how good intercultural communication can be supported and how common safety culture can be implemented on board despite the presence of different national cultures. It would also be interesting to look at the number of crew members: do ships operate with the minimum amount of crew or how many ships exceed the minimum manning requirements.

In future, an interesting topic to study would be to look at the responsibility issues of manning. Manning issues are connected to Corporate Social Responsibility (CSR), both in an economic and a social sense. Shipping companies strive to do profitable business, but does it lead to neglecting societal responsibilities and the wellbeing of seafarers? These issues also have a crucial impact on maritime safety, because many accidents are caused by human factors. The manning and competency of crews is of crucial importance for the safe operation of ships.

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APPENDIX 1

List of nationalities

Austrian	Czech	Indian	Myanmar	Slovak
Belgian	Danish	Indonesian	Norwegian	Spanish
Belorussian	Dutch	Italian	Pakistani	Swedish
British	Estonian	Jamaican	Peruvian	Swiss
Bulgarian	Finnish	Japanese	Philippines	Turkish
Canadian	French	Kiribatian	Polish	Ukrainian
Cape Verde	Georgian	Latvian	Portuguese	Uruguayan
Chilean	German	Lithuanian	Romanian	Vietnamese
Chinese	Ghanaian	Malaysian	Russian	
Croatian	Icelandic	Montenegrin	Singaporean	

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