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MARITIME SAFETY IN THE GULF OF FINLAND

Evaluation of the regulatory system

Jenna Viertola



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FOREWORD

Growing traffic is believed to increase the risk of accident in the Gulf of Finland. As the consequences of a large oil accident would be devastating in the vulnerable sea area, accident prevention is performed at the international, regional and national levels. This report aims to discover how maritime governance systems or maritime safety policy instruments could be made more efficient in the future in order to improve the maritime safety level. Results of the research are based on a literature review and nine expert interviews, with participants from shipping companies, interest groups and authorities.

Based on literature and the interviews, a suggestion can be made that in the future, instead of implementing new policy instruments, maritime safety risks should be eliminated by making the existing system more efficient and by influencing shipping companies' safety culture and seafarers' safety-related attitudes. Based on this research, it can be stated that the development of maritime safety policy instruments should concentrate on harmonisation, automation and increasing national and cross-border cooperation. These three tasks could be accomplished primarily by developing the existing technology.

Human error plays a role in a significant number of maritime accidents. Because of this, improving companies' safety culture and voluntary activities that go beyond legal requirements are acknowledged as potential ways of improving maritime safety. In the future, the maritime regulatory system should be developed into a direction where the private sector would have better possibilities to take part in decision-making.

This study has been made as a part of the "Minimizing risks of maritime oil transport by holistic safety strategies" (MIMIC) project. The main financing of the project comes from the European Regional Development Fund, the Central Baltic INTERREG IV A Programme 2007-2013. Consortium members of MIMIC project are Kotka Maritime Research Centre, Centre for Maritime Studies of the University of Turku, Kymenlaakso University of Applied Sciences, Aalto University, University of Helsinki, Tallinn University of Technology, University of Tartu, Swedish Meteorological and Hydrological Institute and Finnish Environment Institute.

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Kotka, 15.8.2013

Jenni Storgård
Project manager
University of Turku Centre for Maritime Studies

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ABSTRACT

Growing traffic is believed to increase the risk of an accident in the Gulf of Finland. As the consequences of a large oil accident would be devastating in the vulnerable sea area, accident prevention is performed at the international, regional and national levels. Activities of shipping companies are governed with maritime safety policy instruments, which can be categorised into regulatory, economic and information instruments. The maritime regulatory system has been criticised for being inefficient because it has not been able to eliminate the violations that enable accidents.

This report aims to discover how maritime governance systems or maritime safety policy instruments could be made more efficient in the future, in order to improve the maritime safety level. The results of the research are based on a literature review and nine expert interviews, with participants from shipping companies, interest groups and authorities.

Based on the literature and the interviews, a suggestion can be made that in the future, instead of implementing new policy instruments, maritime safety risks should be eliminated by making the existing system more efficient and by influencing shipping companies' safety culture and seafarers' safety related attitudes. Based on this research, it can be stated that the development of maritime safety policy instruments should concentrate on harmonisation, automation and increasing national and cross-border cooperation. These three tasks could be primarily accomplished by developing the existing technology.

Human error plays a role in a significant number of maritime accidents. Because of this, improving companies' safety culture and voluntary activities that go beyond laws are acknowledged as potential ways of improving maritime safety. In the future, maritime regulatory system should be developed into a direction where the private sector has better possibilities to take part in decision-making.

TIIVISTELMÄ

Meriliikenteen kasvun uskotaan lisäävän onnettomuuksien riskiä Suomenlahdella. Öljyonnettomuuden seuraukset haavoittuvalla merialueella olisivat tuhoisat, joten onnettomuuksien synty pyritään estämään kansainvälisellä, alueellisella ja kansallisella sääntelyllä. Varustamoiden toimintaa ohjataan meriturvallisuuden yhteiskunnallisilla ohjauskeinoilla, jotka voidaan jakaa hallinnollisiin, taloudellisiin ja tieto-ohjaukseen perustuviin ohjauskeinoihin. Merenkulun sääntelyjärjestelmää on kritisoitu tehottomaksi, sillä se ei ole onnistunut estämään rikkomuksia, jotka mahdollistavat onnettomuuksien tapahtumisen.

Tämän työn tarkoituksena on selvittää, millä tavoin merenkulun hallintojärjestelmää sekä merenturvallisuuden yhteiskunnallisia ohjauskeinoja voitaisiin tulevaisuudessa tehostaa, jotta meriturvallisuuden taso Suomenlahdella nousisi. Tutkimustulokset perustuvat yhdeksään asiantuntijahaastatteluun, joihin osallistui varustamoiden ja intressiryhmien edustajia sekä viranomaisia.

Kirjallisuuskatsauksen ja haastatteluiden perusteella voidaan esittää, että tulevaisuudessa meriturvallisuusriskejä tulisi pyrkiä minimoimaan uusien ohjauskeinojen implementoimisen sijaan tehostamalla olemassa olevaa järjestelmää sekä pyrkimällä vaikuttamaan merenkulkualan yritysten turvallisuuskulttuuriin ja merenkulkijoiden turvallisuuteen liittyviin asenteisiin. Tutkimuksen perusteella voidaan esittää, että meriturvallisuuden yhteiskunnallisten ohjauskeinojen kehittämisessä tulisi keskittyä järjestelmien harmonisointiin, automatisointiin sekä kansallisen ja rajat ylittävän yhteistyön lisäämiseen. Pääosin nämä kolme tehtävää voidaan toteuttaa kehittämällä olemassa olevaa teknologiaa.

Inhimillinen virhe on osasy syy merkittävälle osalle meriliikenneonnettomuuksia. Sen vuoksi yritysten turvallisuuskulttuurin parantaminen ja yritysten lainsäädännön ylittävät vapaaehtoiset toimet nousivat tutkielmassa potentiaaliseksi keinoksi parantaa meriturvallisuutta. Tulevaisuudessa merenkulun hallintojärjestelmää tulee kehittää siten, että yksityisen sektorin osallistuminen päätöksentekoon on aikaisempaa laajempaa.

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ABBREVIATIONS

AIS	Automatic Identification System
APM	Additional Protective Measure
CR	Corporate responsibility
CSR	Corporate social responsibility
DW Route	Deep Water Route
DWT	Dead Weight Tonnage
EU	European Union
FSA	Formal Safety Assessment
FSC	Flag State Control
GOFREP	Gulf of Finland Reporting
GT	Gross tonnage
HELCOM	Helsinki Commission
ILO	International Labour Organization
IMO	International Maritime Organization
ISM Code	International Safety Management Code
MARPOL	International Convention for the Prevention of Pollution from Ships
MIMIC	Minimizing risks of maritime oil transport by holistic safety strategies -project
MLC	Maritime Labour Convention
NGO	Non-Governmental Organisation
P&I Clubs	Protection & Indemnity Clubs
PSC	Port State Control
PSSA	Particularly Sensitive Sea Area

SAR	Search and Rescue
SOLAS	International Convention for the Safety of Life at Sea
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
Trafi	Finnish Transport Safety Agency
TSS	Traffic Separation Scheme
UNCLOS	United Nations Convention on the Law of the Sea
VARELY	The Centre for Economic Development, Transport and the Environment of Southwest Finland
VTS	Vessel Traffic Services

1 INTRODUCTION

The Baltic Sea is one of the busiest sea areas in the world and its traffic is growing constantly. As crews of all nationalities and competence levels sail on the Gulf of Finland, the threat exists that not all crews have the competence for sailing in the demanding conditions of the sea area. Therefore, authorities must provide high quality assistance and services to vessels that require it, and the authorities must be prepared for emergency situations. Maritime safety is constructed of the actions of authorities who provide the basis for safe shipping, as well as from the activities of ship owners and other companies, who utilise the infrastructure provided by the authorities. Both actors have responsibilities regarding maintaining and improving shipping safety.

Maritime transportation is known for fatal accidents and misbehaviour towards, for instance, the environment and workers' rights. During the last few decades, maritime safety has improved greatly as technology has replaced human labour in many tasks on board. In contrast, the industry has witnessed that while technology cannot replace humans in all tasks, the human error is a very significant reason for accidents. Some 80 per cent of the maritime accidents are due to human error.

Maritime safety legislation has traditionally been revised after large accidents and near miss situations that have indicated deficiencies or lacks in the legislation. The international maritime safety regulation and the hierarchic regulatory system have been accused for being insufficient, and many actors wish for more proactiveness from the system.

It is important that the policy instruments that are used for guiding maritime safety are efficient and approved by the industry, as otherwise malpractice occurs easily. In the light of the current maritime safety regulation, monitoring vessels is complicated especially when they are in international waters. Thus, acting responsibly and complying with maritime safety regulations is very important. Laws should encourage actors to responsibility and to going beyond the measures defined by the legislation.

Although misbehaviour frequently occurs on board, the safety culture on the corporate level of shipping companies is significant for safety, as decisions concerning many issues, such as vessel condition or the implementation level of policy instruments, are primarily made at the company level.

The framework for maritime safety legislation is made on the international level. For the fluency of traffic and the fairness of competition, maritime laws should be similar everywhere. This is why protecting the vulnerabilities of the Baltic Sea is challenging.

1.1 Research questions

1. Is the existing maritime safety governance system sufficient for protecting maritime safety in the Gulf of Finland?
2. How could the maritime safety level in the Gulf of Finland be improved?

This study aims to discover the opinion of maritime experts regarding how the maritime safety regulatory system serves the needs of the Gulf of Finland and what the ways of improving maritime safety in the area in the future are. The empirical material collected in interviews is compared to the research literature, which suggests that the hierarchical regulatory system is no longer sufficient to protect the public good or fair competition. Thus, literature suggests that governance should move towards co- and self-regulation.

The main focus of this report is on the maritime safety of the whole Gulf of Finland area. However, because the interviews were conducted with Finnish experts, the examples given are mostly related to the Finnish maritime safety system and laws. It should be noted that some laws, for instance those concerning the Vessel Traffic Service (VTS), vary from country to country and therefore some statements are only valid in Finland. Moreover, it needs to be mentioned that as the Gulf of Finland is a part of the Baltic Sea, in some cases issues are explained from the perspective of the Baltic Sea area instead of merely the Gulf of Finland. This report focuses on oil transportation because it poses a large threat to the environment. However, also other operation types are mentioned throughout the research.

1.2 Contents of chapters

Chapter 2 introduces the main concepts that provide the background for this report. The chapter provides an introduction to the special characteristics of the Gulf of Finland, the main features of maritime transportation in the region and the reasons to why it is important to keep the risks of maritime transportation as low as possible. In addition, the current regulatory system, aiming to decrease the accident risk, is introduced.

Chapter 3 describes the methods and materials that have been used. The chapter describes the use of interviews and thematic analysis and goes through the whole process that resulted in this report.

Chapter 4 presents the main results of the thematic analysis that was made from the interview material. Chapter 5 compares the interview results with the research literature that was presented in the theory part.

Chapter 6 makes conclusions on the research and provides ideas for further research. The conclusions include suggestions on how to improve safety in the future. Regarding the results, it must be noted that the empirical material used in this research is very limited, so the results present only cautious suggestions instead of making valid statements about the state and future of maritime safety and the maritime safety regulatory system.

1.3 Cooperation

This report is made as a part of the “Minimizing risks of maritime oil transport by holistic safety strategies” (MIMIC) project in the University of Turku, Centre for Maritime Studies. MIMIC takes a comprehensive, holistic approach to the risks related to maritime oil transportation in the Baltic Sea. The project integrates knowledge acquired in earlier projects with new information on less studied aspects related to oil hazards. Another aim is to study and compare the effects of different management actions taken to avoid accidents, providing insight into the cost-effectiveness of such actions. In the project, a probabilistic model integrating models related to traffic, accident probabilities, ecosystem impacts and the oil spill response capacities of society to decrease the likelihood and consequences of oil hazards is developed. MIMIC project lasts from May 2011 till the end of December 2013.

The project includes five work packages. This study is a part of task one of work package five, which is operated by the University of Turku, Centre for Maritime Studies. Task one is called ‘Analysis and improvement of policy instruments’.

Consortium members of MIMIC project include Kotka Maritime Research Centre, Centre for Maritime Studies of the University of Turku, Kymenlaakso University of Applied Sciences, Aalto University, University of Helsinki, Tallinn University of Technology, University of Tartu, Swedish Meteorological and Hydrological Institute and the Finnish Environment Institute.

The project is funded by the European Union and it has been approved as an EU flagship project. The financing comes from the European Regional Development Fund, the Central Baltic INTERREG IV A Programme 2007-2013; the Centre for Economic Development, Transport and the Environment of Southwest Finland (VARELY); the City of Kotka; Kotka-Hamina Regional Development Company (Cursor Oy); Kymenlaakso University of Applied Sciences; the Finnish Environment Institute; the University of Tartu; Tallinn University of Technology and the Swedish Meteorological and Hydrological Institute.

This report has been written by research expert Jenna Viertola. Project manager Jenni Storgård has edited the report to its final layout. The Managing Authority of the Central Baltic INTERREG IV A Programme 2007-2013 cannot be held liable for the information published in this report.

2 BACKGROUND

2.1 The Baltic Sea and maritime safety

2.1.1 Special characteristics of the Gulf of Finland and the Baltic Sea

The Baltic Sea is more vulnerable than many other sea areas. The sea area is a narrow and shallow brackish water area with varying levels of salinity and a long residence time of waters due to limited and slow exchange of water from the North Sea (IMO 2005a). Because of its low salinity (0–7‰), relatively short geological history and northern location, the Baltic Sea has very special flora and fauna; only a small number of species are capable of living in the area (Helle et al. 2011: 182). Maritime traffic poses a major threat to the vulnerable marine ecosystems as disappearance of a single key species could impede the functioning of the whole system. (IMO 2005a).

The Gulf of Finland is usually partially ice-covered during the winter, between December and April, the ice cover being heaviest at the Russian side of the gulf (Nikula and Tynkkynen 2007: 3). During cold winters all harbours in the Gulf of Finland are surrounded with ice. Winter conditions can make navigating very challenging so the safety level must be maintained at a high level.

Being an important habitat for flora and fauna, the Gulf of Finland is also very important for people, for instance, as a habitat, transportation route and in the economic sense: many trade and recreational activities are dependent of the sea. To increase awareness and to protect the vulnerabilities of the Baltic Sea, the sea area was designated as a Particularly Sensitive Sea Area (PSSA) by the IMO in December 2005. The PSSA status provides regional actors a possibility to enhance maritime safety by adding stricter regulations to the sea area.

2.1.2 Shipping in the Gulf of Finland

Maritime transportation in the Baltic Sea has grown remarkably during the 21st century and it is expected to further increase in the future. Between the years 2000 and 2010, the transportation and handling of oil and oil products in the Gulf of Finland has grown from 43 million tonnes to almost 160 million tonnes (Brunila 2012: 61). The rapid growth in maritime transportation is connected with economic growth in the Baltic Sea region and increasing oil transportation by Russia (Kuronen et al. 2008: 11, Helle et al. 2011: 182). Especially the opening of oil terminals in the port of Ust-Luga, Russia is expected to increase traffic volumes in the Gulf of Finland (Brunila and Storgård, 2012: 61).

In 2010, approximately 290 million tons of oil and oil products was handled in the Baltic Sea ports. The same year, the volumes of the four largest oil ports in the Gulf of Finland, were over 135 million tonnes (table 2.1). These ports are Tallinn, Sköldvik, Primorsk and St. Petersburg. (Holma et al. 2011).

Table 2.1. Volumes oil and oil products (tonnes) of four largest oil ports of the Gulf of Finland in 2010.
 *Port of Tallinn includes Ports of Muuga, Paljassaare and Paldiski South. (Holma et al. 2011)

Port	Volumes of oil and oil products in 2010 (t)
Tallinn*	25 560 095
Sköldvik	15 898 000
Primorsk	77 640 000
St Petersburg	16 117 000
Total	135 215 095

Based on vessel information provided by Automatic Identification System (AIS), more than 2000 vessels are continuously en route in the Baltic Sea, making it one of the busiest sea areas in the world (HELCOM 2012). AIS equipment is compulsory to all vessels of 300 gross tonnage (GT) and upwards engaged on international voyages, cargo ships of 500 GT and upwards not engaged on international voyages, as well as all passenger ships irrespective of size. In general this means that if ferries, smaller fishing vessels and leisure crafts were included, the number of vessels would be significantly larger.

At the moment the largest vessels in the Baltic Sea can carry up to 150 000 tonnes of crude oil (Ministry of the Environment 2011: 19). Oil tanker traffic crosses the Gulf of Finland mainly in the east-west direction as crude oil is transported from Russia to oil refineries in the Baltic Sea and all over the world. East-west tanker traffic intersects with passenger traffic between Helsinki and Tallinn, making the spot between the two ports one of the most risky areas in the Gulf of Finland (Ylitalo et al. 2008). Largest oil ports in the Gulf of Finland and areas with large accident risks are presented in figure 2.1.

Winter conditions and a long and fragmented coastline make the consequences of an oil accident more devastating in the Gulf of Finland than they would be in many other sea areas. An oil spill of 10 000 tonnes is generally considered to be a disaster in many sea areas, but in the sea area close to Finland an oil spill of 5000 tonnes or even less is enough to create a catastrophe (Ministry of the Environment 2011: 17).



Figure 2.1. Four largest oil ports* of the Gulf of Finland in 2011 (Holma et al. 2011) and areas with large accident risk (Ylitalo et al 2008, Luoma 2010: 37). *Port of Tallinn includes Ports of Muuga, Paljassaare and Paldiski South. (Holma et al. 2011)

2.1.3 Maritime accidents

Interest towards maritime safety increased internationally after the accident of Titanic in 1912 (Karvonen et al. 2006: 9). Because of the accident, the first International Convention for the Safety of Life at Sea (SOLAS) regarding passenger ships was passed in 1914. Along the increase of oil transportation in the twentieth century, also the awareness of possible environmental impacts of oil has increased. Disastrous accidents have often resulted in tightening international maritime regulations.

Oil spills and other accidents can have a remarkable impact on the environment and the economics of the accident area. For instance, the grounding of Exxon Valdez in the coast of Alaska in 1989 still impacts the environment in the unfortunate area. The company Exxon Mobil had to pay almost two billion US dollars for cleaning and other direct costs. With legal and other expenses, the costs of the accident have been around six billion US dollars (Ministry of the Environment 2011: 18).

The special characteristics of the Baltic Sea can make even a relatively small oil accident more devastating than it would be in some other sea areas. Collecting oil is most expensive in coastal areas, where also the effects of oil are often the most severe. It has been evaluated that an accident with 5000 tonnes of oil drifting to the shore of the Baltic Sea could cost from tens to hundreds of millions of euros, including clean-up costs and material losses. (Ministry of the Environment 2011: 18).

In the long term, the number of marine accidents and oil spills has decreased worldwide (Knudsen and Hassler 2011: 201). Technological advantages have decreased the number of shipping accidents as technology has replaced man in many tasks on board. Due to this change, the frequency and severity of shipping accidents has decreased, but in turn the influence of human error in accident causation has become evident

(Hetherington et al. 2006: 402). The human factor has been acknowledged to be the most significant individual cause for maritime accidents (E.g. Trucco et al. 2008: 823, Kujala et al. 2009: 1351, Karvonen et al. 2006: 5). Economic pressure in the strongly competitive industry is one reason for the human factor being an important cause for accidents (Trucco et al. 2008: 824). Due to technological advances and economic pressures, the amount of manning has decreased during the last few decades so the skill level of the crew increased its importance.

Although the number of accidents has decreased, the accident risk remains high because of the growing traffic in the Gulf of Finland (Kujala et al. 2009: 1349). At the moment, Finland has preparedness for combating a maximum of 30 000 tonnes of oil. Fortunately, the probability of an accident that large is considered to be very small (Ministry of the Environment 2012: 40). Regardless, the concern over growing traffic is reasonable.

2.1.4 Maritime safety and risks

Risks in maritime transportation can be divided into safety and security risks. Security, which is left outside of the scope of this study, includes such danger causing issues as piracy, armed robbery and other unlawful acts against or on board ships (IMO 1986).

Maritime safety means safety of life and property at sea from the environmental and operational threats, as well as the safety of maritime environment from pollution by the ships (Urbański et al. 2009: 11). International maritime regulations divide factors impacting maritime safety into internal and external factors. Internal factors are related to the condition of a ship and equipment and the competence of the personnel on board. External factors include, for example, the condition of waterways and maritime safety devices, nautical charts, quality of vessel traffic services, piloting, ice-breaker assistance, and available information on weather conditions, ice and water level.

Maritime safety aims to minimise the occurrence of accidents or near miss situations. An accident refers to a situation which results in some kind of damage or injury. Near miss is a hazardous event or situation where the sequence of events could have caused an accident if it had not been interrupted somehow (Storgård et al. 2012: 12). In addition to prevention, maritime safety also includes, for instance, Search and Rescue (SAR) and oil combatting operations and accident investigation after hazardous situations (Kuronen and Tapaninen 2009).

McSween (2003: 1–7) states that hazardous events are usually a result of a chain of events, including a combination of unsafe behaviour and unsafe conditions, which allow the hazardous event to happen. McSween continues that unsafe work behaviour is a result of physical and social environment and workers' experience in these areas. This means that the safety culture of shipping companies is crucial for the safety. Lappalainen and Salmi (2009: 52–54) state that high safety performance requires a process of continuous improvement, motivated personnel on board and the commitment of the top management. The values and engagement of the top management can inspire

employees to take initiatives that improve the manners of operation (Hemingway and Maclagan 2004: 41). Safety culture should be common for the whole company and all operation levels should be encouraged to make improvements and initiatives.

McSween (2003: 1–7) notes that by adapting safety measures properly and by going beyond the level defined by regulations, accidents can be reduced. The proper adaptation of safety measures impacts safety related behaviour and decreases unsafe operations.

2.2 Governance of maritime safety

2.2.1 Regulatory bodies in shipping

The shipping industry carries four fifths of the world trade (UNCTAD 2011: 10). Shipping is global by nature, so common rules are required in order to be able to handle the enormity of the industry. These common laws and regulations provide the basis for the competition between shipping companies (Skovgaard 2011: 6). The most important decision-making regarding shipping safety is made on the international level, but complementing measures are set also on the supranational and the national level (e.g. Roe 2008: 265, Kuronen and Tapaninen 2011). In addition, classification societies and customers, such as oil majors, present their own safety requirements which have to be met in order to remain competitive.

The most fundamental rules governing all uses of the oceans and their resources, including the movements of ships, are written in the United Nations' Convention on the Law of the Sea (UNCLOS). The highest regulatory bodies in shipping are two United Nations agencies: the International Maritime Organization (IMO) and the International Labour Organization (ILO). These organs have established the four pillars of the international maritime regulatory regime which are presented in table 2.2.

At regional level in the Baltic Sea Region, the Helsinki Commission (HELCOM) has great importance. HELCOM gives recommendations to its member states, which comprise the coastal states of the Baltic Sea. Though the member states are not legally obliged to implement HELCOM's recommendations, they usually do so, as the recommendations reflect the common values related to environmental protection in the sea area (Karvonen et al. 2006). Another central regional decision-maker in the Gulf of Finland is the European Union, whose shipping policies regarding safety, security and the environment are implemented through national legislation of the member states and applied through regional and local regulations (Roe 2008: 265).

Table 2.2. The four pillars of the international maritime regulatory regime (Skovgaard 2011:3)

	Convention	Authority	Key issues
SOLAS	International Convention for the Safety of Life at Sea, 1914	United Nations, International Maritime Organization	Sets minimum safety standards regarding construction, equipment and operation of ships.
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1987	United Nations, International Maritime Organization, International Labour Organization	Sets qualification standards by prescribing the minimum requirements for training, certification and watchkeeping for seafarers.
MARPOL	International Convention for the Prevention of Pollution from Ships, 1973/1978	United Nations, International Maritime Organization	Prevention and minimising of pollution in routine operations and accident situations.
MLC	Maritime Labour Convention	United Nations, International Labour Organization	Addresses requirements for fair terms of employment and safe, secure and decent living and working conditions for seafarers.

The role of HELCOM can be described as important, as the Helsinki Commission has been working on the questions specific to the Baltic Sea since 1974. That is years before environmental and maritime safety related instructions were applied by the EU. HELCOM recommendations are of a great importance also because the major regional player, Russia, takes part in the agreements. Since Russia is not a member of the EU but all other Baltic Sea states are, the HELCOM recommendations must be updated to meet the changing EU regulations in order to have a complementary system for all Baltic Sea actors (Nikula and Tynkkynen 2007: 18).

National authorities in coastal states are responsible for maritime safety related issues in their own national waters and their exclusive economic zone. Responsibilities include implementing policies agreed in the higher levels of decision-making. For example in Finland, there are two agencies responsible for maritime-related issues. These agencies, The Finnish Transport Agency (Liikennevirasto) and the Finnish Transport safety Agency (Trafi), operate under the Ministry of Transport and Communications. In Finland, the maintenance of fairway and safety devices, Vessel Traffic Services (VTS), piloting, nautical charting, as well as weather, water level and ice services are governed nationally (Ministry of Transport and Communications 2009: 17).

2.2.2 Maritime safety policy instruments

Policy instruments are techniques used by governmental authorities for wielding their power in the attempt to ensure support and to effect or prevent social change (Vedung 1998). Authorities have two reasons for controlling the shipping industry. Firstly,

providing subsidies promotes the creation of employment and prevents the development of monopolies (Roe 2009: 40). Secondly, protecting public goods such as clean air and water, nature or the climate must be done by the authorities as these cannot be regulated through the market and the market does not have incentives to protect or reduce the use of public goods (Skovgaard 2012: 6).

There are many ways to categorise policy instruments. Several scholars have divided instruments into regulatory, economic and information instruments (e.g. Vedung 1998, Klemmensen et al. 2007, Vieira et al. 2007, Kuronen and Tapaninen 2009). Vedung (1998: 29–30) characterises these three types as carrots, sticks and sermons. This is because being based on actors' behaviour, actors can be addressed to rewards (carrots) such as subsidies, sticks such as charges and sermons, which can impact the behaviour of some groups of actors but cannot force actors to do anything. In addition to guiding the operations of the private sector, maritime safety policy instruments provide a framework for the work of the public sector, which is responsible for providing infrastructure for safe shipping.

Regulatory instruments aim to modify actors' behaviour by defining or changing the sets of rules (Vieira et al. 2007: 423). Regulatory instruments are mostly command and control instruments which establish legally binding rules that define goals and the manner of achieving these goals (Bähr 2010). Regulatory instruments include jurisdiction, restrictions, licenses, controls, permissions and standards (Kuronen and Tapaninen 2009). Regulatory instruments are written in laws, so sanctions, such as fines, imprisonment, business prohibition, expropriation or claims for damages result from non-compliance. In shipping, the construction and equipment of ships, the inspection of ship conditions (e.g. Port State Control, PSC), seafarers (e.g. workers' rights), navigational aids (e.g. VTS or nautical charts), and ice breaking are regulatory instruments. Also planning systems used for controlling the use of the area or equipment, such as infrastructure, can be included in the regulatory instruments (Vieira et al. 2007: 422–423). In shipping, for instance, Traffic Separation Schemes (TSS) and routeing are such planning systems, as they are mandatory to merchant shipping and the systems are controlled by governmental authorities (figure 2.2) (Kuronen and Tapaninen 2009).

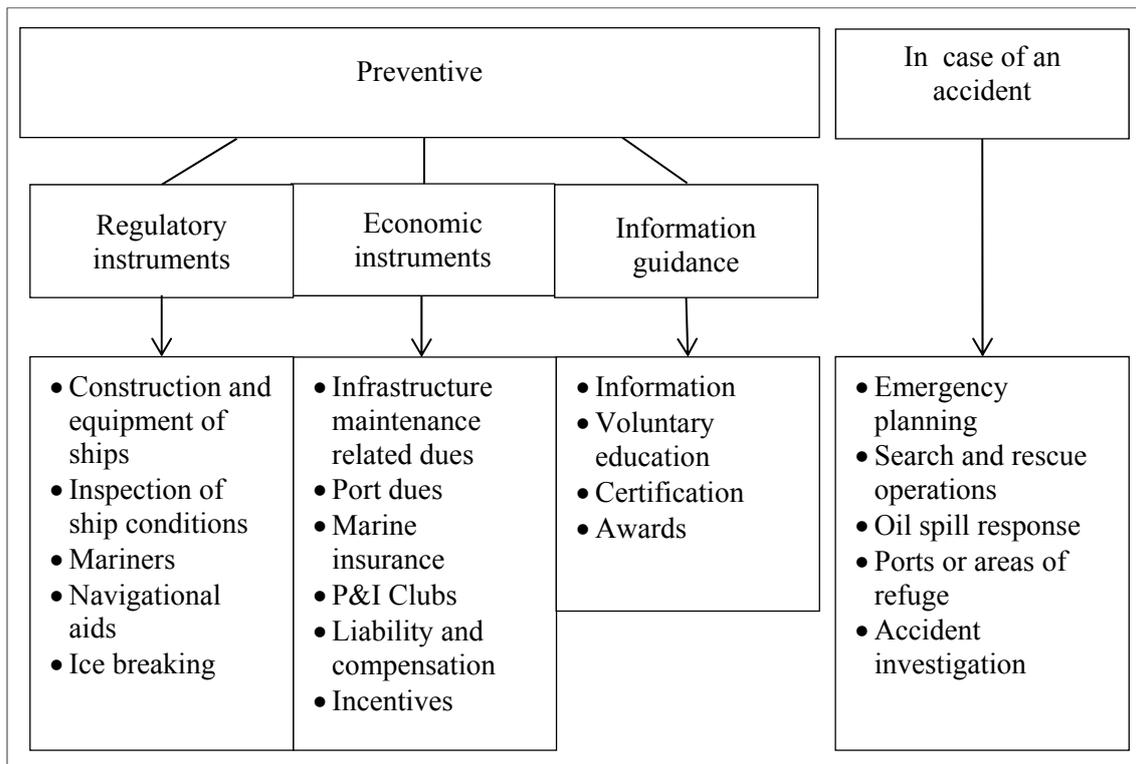


Figure 2.2. Maritime safety policy instruments (Modified from Kuronen and Tapaninen 2009: 50).

Economic instruments make certain actions cheaper or more expensive in terms of money, time, effort or other valuables (Vedung 2007: 32). Economic instruments, which are also called market-based instruments, involve handing out or taking away material, monetary or other resources so that companies would have an economic incentive to change their activities towards the desired behaviour (Bähr 2010, Kuronen and Tapaninen 2010). Economic instruments may, for instance, be charges for services or for usage, taxes, tax reliefs and subsidies. In addition to impacting on actors' behaviour, economic instruments aim to prevent the exploitation of common resources and act as a source for covering the costs of infrastructure provided by the society. In shipping, economic instruments include infrastructure maintenance related dues, port dues, marine insurance, Protection & Indemnity insurance club (P&I clubs), liability and compensation systems and incentive systems (Kuronen and Tapaninen 2009).

Information instruments are based on the idea that shared information makes individuals, communities and companies voluntarily change their behaviour patterns towards the favourable (Kuronen and Tapaninen 2009: 21). Information instruments use plain knowledge, emotional persuasion, normative appeals and recommendations for action instead of incentives and penalties (Vedung 2007). Information instruments include, for instance, training, audit schemes, standardisation, certification, awards and research (Kuronen and Tapaninen 2009: 18). Also corporate social responsibility (CSR) can be regarded as belonging to information instruments, as companies may indicate

their responsibility by fulfilling requirements of a standard or other initiatives that have been introduced by authorities. More about CSR in chapter 2.4.

2.2.3 Measuring the effectiveness of maritime safety policy instruments

Many methods for researching the effectiveness of maritime safety policy instruments exist. The IMO (2006) has presented a tool called Formal Safety Assessment (FSA), which can be used for calculating the effectiveness of maritime safety policy instruments. FSA was used also in the study by Nyman et al. (2010), in which the effectiveness of policy instruments in the Åland Sea was studied. The results of the research revealed that adopting a Traffic Separation Scheme and a DW route in the Åland Sea reduced the collision risk from 2.5 accidents per ten years to 1.5 accidents, which signifies a reduction of 40 per cent from the situation in 2009. When monitoring was implemented, the number was reduced to 1.2 collisions. When adding a reporting system to this, the number of collisions would drop to one collision in ten years.

Literature (E.g. Vieira et al. 2007, Greiner et al. 2000) presents criteria for evaluating policy instruments. Kuronen and Tapaninen (2009) have summarised that the main points of these criteria, in relation to maritime safety, are effectiveness, economic efficiency, acceptability, enforcement, lateral effects and incentive and innovation effects of the instruments. Introduced below are these factors which impact on the viability and effectiveness of an instrument.

The *effectiveness* criterion relates to the instrument's potential of improving the prevailing system and achieving policy goals with the implementation and use of an instrument (Vieira et al. 2007: 424). In the case of this research, the goal for an instrument would be improving maritime safety. Achieving policy goals may, for instance, depend on the technical suitability of instruments or on prevailing conditions (Greiner et al. 2000: 24). For instance, some maritime safety policy instruments can be more challenging to implement in the Baltic Sea than in some other seas, as at times the conditions in the sea area can be rather harsh. In addition, it may be difficult to estimate the effectiveness of some instruments before their implementation. For instance, technical appliances may turn out to be less effective than expected.

The economic efficiency criterion has two viewpoints. Firstly, regarding the profitability of the industry, and secondly, in a collective sense comparing the total costs with the benefits of the instrument (Vieira et al. 2007 and Greiner et al. 2000). Companies aim for profit, so if an instrument, in addition to pursuing certain policy goals, increases the viability of the industry, acceptance from the industry towards the instrument can be increased. The second viewpoint signifies that an instrument should aim for reaching its goals with costs as low as possible. This includes the costs for companies but also the costs for authorities. With cost-effective policy instruments, resources can be allocated to some other safety improving measures.

Acceptability signifies stakeholders' and the society's level of acceptance regarding a policy instrument. Acceptability is a necessary condition for the durability of a policy

(Greiner et al. 2000: 35). Unless an instrument is approved by the shipping community, its impacts may remain moderate, as it can be difficult to control compliance when vessels are not in ports. The acceptability of different policies can in some cases be related to the type of the instrument. Bähr (2010: 42) states that mandatoriness can make regulatory instruments efficient, but, on the other hand, it can also provoke resistance if actors are forced to comply against their interest. In contrast, voluntary instruments, such as information instruments, can encourage actors to better behaviour, but they can also be ignored by some less interested actors.

Enforcement refers to the effectiveness of the implementability of an instrument in the operational level. Vieira et al (2007: 424) state that some policies can have the potential of being efficient and acceptable but poor enforcement may hinder their implementation on the operational level. Obstacles to implementation may, for instance, be related to legal or regulatory conflicts, resistance by some groups or a lack of financial, physical or technological resources (Vieira 2007). Hemingway and Maclagan (2004) state that related to companies' responsibility, the personal values of the management have an important role. Perhaps this could be applied also to safety matters. If the top management is concerned with safety, the enforcement can be expected to be better than in companies in which the management only cares about making profit. In this regard it could be stated that the enforcement of maritime safety policy instruments is subordinate to safety culture, which comes down from the management to the operational level.

Lateral effects refer to the positive and negative spill-over effects that an instrument may cause (Vieira et al. 2007). Hassler (2011: 171) presents improved safety as a possible effect which may follow stricter regulations regarding a crew's working conditions, although safety is not in the primary scope of the instrument. In contrast, Hassler continues that, for example, establishing environmental protection areas may signify longer routes for vessels. Though the intention is good, longer routes can result in more pollution and increased costs for shipping companies.

Policy instruments should encourage actors to experimenting and improving the prevailing situation beyond the set target. *Incentive and innovation effects* measure whether an instrument provides an on-going incentive for improvements and increasing the effectiveness of the instrument (Greiner et al. 2000: 34–35).

Vieira et al. (2007) recognise that a perfect policy instrument would combine all of the above mentioned qualities, but, unfortunately, none of the existing instruments has been found capable of meeting all the indicators. Kuronen and Tapaninen (2009: 71–73) estimate that the greatest lacks in the maritime safety policy system are related to implementation and cost-effectiveness. The authors criticise the effectiveness of nation state implementation systems and state that regarding some policy instruments, the impacts of the instruments may remain low while the costs of the instrument are relatively high. Maritime safety policy instruments aim to be complementary, so the lacks of an individual instrument can be complemented with other instruments. Because of this, Greiner et al. (2007: 36–37) and Vieira et al. (2007) recommend that research

should focus on revealing the synergy effects of several policy instruments instead of focusing on individual instruments.

Developing maritime safety regulation should aim to increase the effectiveness of the system while minimizing the negative effects. The synergy effects of policy instruments can be utilized for this. For instance, regulatory instruments can increase the acceptability and enforcement of economic instruments if the instruments are implemented as a package. The implementation of more efficient fuels can improve the acceptance of new taxes that are determined by environmental friendliness. Moreover, if new instruments are incorporated to existing ones, the enforcement may be more efficient, as the existing instrument has built a basis for the new one. (Vieira 2007: 430–431).

2.3 Criticism and alternatives for the current regulatory system

The existing regulatory system is designed to act as a so-called nested hierarchy where the international regulation is the highest level and the lower levels should always be consistent with the higher ones (figure 2.3.) (Kuronen and Tapaninen 2009: 22).



Figure 2.3. Nested hierarchy of the main regulatory bodies of maritime safety in the Gulf of Finland (Kuronen and Tapaninen 2009: 22).

The regulation of commercial shipping has a long history, during which the regulations has been revised and modified in accordance with politics or changes in politics, specific events and the general public opinion (Skovgaard 2011: 1). Major disasters have been one pushing factor towards stricter regulation. As a result, the number of accidents and oil spills has been decreasing during the last decades (e.g. Knudsen and Hassler 2011: 201). Though these regulatory changes have resulted in significant safety improvements, the effectiveness of the current maritime governance system has been widely criticised.

The system has been accused of being reactive and acting merely when accidents have

already happened, even though the problems were known and could possibly have been prevented if an intervention was made earlier (e.g. Roe 2008: 264). The static system with several levels of governance has been found inefficient because proper implementation of the policies can become complicated if different decision-making levels disagree on policies or policy objectives. The governance system has been accused of allowing poor performance from shipping companies, as different governance levels do not communicate effectively or complement each other (e.g. Karahalios et al. 2011: 450, Hassler 2011: 170).

Literature states that modern societies are too complex for traditional command-and-control governance (Bähr 2010: 43). Command-and-control policies can provoke resistance or non-compliance may occur if actors must comply with the rules against their interests. Difficulties may arise if policies conflict with companies' objectives, which often are related to profit making. In addition, Bähr (2010: 44) states that the effectiveness of a policy instrument depends on the compatibility of international and national policies. Embedding international policies into national laws can be demanding because, similarly to companies, states have individual objectives and strategies which may conflict with the regulation. In addition, the national laws may require wide modifications when new policies are planned and adapted. Roe (2009: 41) recognises that international principles are needed in order to have uniform rules that enable fair competition. However, Roe notices also that it is significant that those principles are applicable in several lower levels of jurisdictions, so that, for instance, national decision-making, which focuses on meeting the local needs and desires, would not conflict with the supranational and international interests.

As an alternative for the traditional forms of governance, literature suggests increasing the use of regulation forms that increase the role of private sector in decision-making (e.g. Greiner 2000, Roe 2008). These regulation forms can be, for instance, co- or self-regulation. In co-regulation, private sector can, for instance, make voluntary agreements with the public sector. This way the private sector has a possibility to impact on the contents of the agreements that companies engage to comply with. Self-regulation includes, for instance, common rules and instructions, guidelines for operation and voluntary agreements that are made by the private sector in order to target activities (Sorsa 2010: 11). Self-regulation can refer to, for instance, producing quality standards, certification or codes of conduct, which all aim to improve operation quality. In this research, self-regulation is considered to be a part of information instruments. Co-regulation is not considered as a part of any individual regulation type: it is present in all types.

Literature suggests that that the governance system should be made more comprehensive by involving more actors, such as pressure groups, the private sector and individuals, in decision-making. In addition, negotiation, persuasion and cooperation should be used instead of implementing traditional policies in which authorities command and private sector obeys. (e.g. Bähr, 2010: 43, Roe 2008: 277).

2.4 Voluntary activities of companies as means of governance

Kuronen and Tapaninen (2010) state that companies' voluntary activities have the potential to improve maritime safety in the future. These activities can be considered as corporate social responsibility (CSR), which at simplest signifies the companies' voluntary measures that go beyond laws. The European Commission (2011: 6) has defined CSR as "the responsibility of enterprises for their impacts on society". The commission (2011: 6) amplifies that in order to fully meet their corporate social responsibility, enterprises should have in place a process to integrate social, environmental, ethical, human rights and consumer concerns into their business operations and core strategy in close collaboration with their stakeholders. In shipping, CSR can, for instance, include increased vessel maintenance, reducing emissions, improving crew competence through training, as well as taking care of workers' conditions such as the balance between work and rest.

Usually companies expect benefits as a return for responsible performance. For instance, economic and reputational benefits or increased competitive advantage are benefits that motivate companies to engage in CSR. Interest towards CSR can also be related to companies' hopes of retaining their license-to-operate and minimising mandatory intervention by external parties, such as authorities or NGOs (Halme and Laurila 2008: 325).

Lankoski (2008: 536–539) summarises that CSR can produce learning related, reputational and Corporate Responsibility (CR) outcomes. Learning happens basically inside the company while reputational outcomes are related to stakeholder relations and CR outcomes to the social and environmental impacts that company's operations produce. Despite the voluntariness, CSR is rarely motivated by pure altruism. Because of this, also the CR outcomes are usually value-laden. For instance, installing new equipment can reduce the use of energy, which can be regarded as an act for the common good, but it can also decrease the company's costs by increasing energy-efficiency.

Voluntary activities are a win-win situation for both companies and the society. Possible benefits encourage companies to responsible performance, which improves, for instance, the level of safety and the state of the environment. Furthermore, companies' engagement in CSR is favourable for policy-makers because it can help to meet policy objectives on a voluntary basis and thus decrease political costs (Steurer 2010: 50–51). For instance, if shipping companies reduce their emissions in areas where emission laws are not yet in force, policy objectives are easier and cheaper to attain.

Many customers nowadays demand a high safety level. Especially oil companies are very aware of the importance of shipping safety. Safety excellence requires that companies adopt safety management more widely than usual (McSween 2003: 2–6). This is because compliance with safety regulations is expected from every company, so regulations basically set the average safety level. For this reason, companies aiming to be known for safety excellence should voluntarily implement activities that go beyond regulations.

3 METHODS AND MATERIALS

3.1 Contents of the chapter

The empirical material for this research was collected in semi-structured interviews with maritime safety experts. Interviews were recorded and later transcribed. A thematic analysis was then conducted in order to find out what kind of issues maritime experts emphasise. The empirical material provides an overview of issues impacting on the efficiency of the maritime regulatory system and on how the experts think maritime safety could be improved in the future. Finally, the results of the thematic analysis were compared with the research literature introduced earlier in chapter 2.

3.2 Themes for interview questions

Themes and questions for the interviews are based on research by Kuronen and Tapaninen (2009, 2010). The question list can be found in Appendices 2 and 3. Kuronen and Tapaninen (2010) have conducted a questionnaire research in which the effectiveness of maritime safety policy instruments is evaluated by maritime experts. Questions concerning the Vessel Traffic Service, ship reporting systems and fairway and port dues were asked in the interviews. This is because interesting aspects related to them were brought up in the study by Kuronen and Tapaninen (2010). In addition, the question list included broadly issues related to maritime safety policy instruments. Using such an extensive list of questions was expected to provide versatility to the interviews. This did occur, but there were also a lot of similarities in the responses, so some conclusions could be made even though the number of interviews remains relatively low.

Questions concerning Vessel Traffic Service were formed because VTS is one of those instruments that, in the Kuronen and Tapaninen's survey, were considered to have improved safety in the past and to have potential to improve safety also in the future. In addition, the structural changes that VTS is going through at the moment were considered to be of the kind that would provoke conversation about costs, benefits and efficiency in the interviews.

Ship reporting systems were selected as one of the interview themes because, interestingly, the results by Kuronen and Tapaninen (2010) indicated slight scepticism concerning the safety gains or the future potential of ship reporting, even though the benefits of ship reporting have usually been highly valued within the industry. The respondents of the survey claimed that the workload of ship reporting can be burdening for the bridge but not much is received as a return for submitting reports (Kuronen and Tapaninen 2010: 29).

Port and fairway dues were found interesting for this research, as they have characteristics from all regulation types and, while being mandatory, they provide an economic incentive for environmental friendliness and for keeping vessels in a good

condition, as in some cases shipping companies can impact on dues. For example, in Finland the ice class of the vessel determines the amount of fairway dues. In some countries and ports the amount of dues is lower for environmentally friendly vessels. In addition, some of the respondents in the research by Kuronen and Tapaninen (2010) considered that dues could have a high potential to increase safety in the future if they were organised differently, for example, based on those ship characteristics that have an impact on safety. This indicates that a system in which shipping companies have more possibilities to influence the regulations addressed at them could be welcomed by the industry.

Also questions concerning the designation of the Baltic Sea as a Particularly Sensitive Sea Area (PSSA) were asked in the interviews. The status was considered to be of interest for the research because it allows implementing special policies and thus makes it a special and distinct tool for protecting sea areas. One point of interest for this research was to find out the interviewees' opinions considering PSSA as a special means for improving safety in the future. This is because the literature states that the PSSA status does not seem to be very well known among seafarers (Roberts 2007: 258) and it seems to have been used mostly in some formalities to emphasise the vulnerabilities of the Baltic Sea. Some have regarded regional arrangements like PSSA statuses as a sign of the international system's inability to act effectively and comprehensively enough (Goss 2008: 144, Kaps 2004: 92). This is because PSSAs can be seen as an attempt to extend national and regional authority over international decision making (Uggla 2007: 253).

It has to be taken into consideration that originally the interview questions were designed for another research. The research is related to the economic cost-efficiency of maritime safety policy instruments and it will be published by the University of Turku, Centre for Maritime Studies in 2013. Having personally conducted the interviews and with thorough knowledge of the material, it was considered that the same empirical material is valid also for this research. This is because the material covers the issue of maritime safety policy instruments very broadly, allowing conclusions concerning the regulatory system and the future changes in the system to be drawn.

3.3 Interview as a method

An interview is a variation of 'normal' interaction between people (Anderson 2010: 169). This is because an interview is less spontaneous, as usually a specific goal for the discussion exists and, furthermore, because there are more or less clear roles for the people involved (Ruusuvuori and Tiittula 2005: 23). Interviews are divided into structured, semi-structured and unstructured interviews depending on how tightly the questions and the interview situation are planned. With tightly structured questions and response alternatives, a structured interview can even resemble quantitative research, whereas an unstructured interview may resemble an informal conversation with a defined subject (Ruusuvuori and Tiittula 2005: 9).

Interviews in this study were made in a semi-structured manner, which includes features

from both structured and unstructured interviews. The structure is looser than in a structured interview, but usually at least some questions exist to lead the interview and to help the researcher to get some answers to the research questions. The aim of a semi-structured interview is to proceed in the most natural and inviting way so that the interviewee can feel comfortable in the situation (Secor 2010: 201). When the question structure is not tight, the interviewees can emphasise issues they find important. Interviews in this research were based on a list of questions; however, the interviewees could quite freely emphasise some questions based on their knowledge and interest.

Semi-structured interviews allow the interviewer to improvise, which means that in order to gain extra information, complementary questions can be made during the interview (Anderson 2010: 169). That was one of the reasons why semi-structured interviews were selected for this research.

3.4 Interviewees

Semi-structural interviews were conducted with maritime safety experts in their offices between late May and early July 2012. The duration of each interview was approximately one hour.

Fifteen persons were asked for an interview via email. The persons who were contacted were considered to have wide knowledge on maritime safety and different aspects of safety regulation. Out of those fifteen, nine persons took part in the research (Appendix 1). Five of them were authorities, two from maritime interest groups and two from Finnish shipping companies. All of the contacted authorities and interest groups that were asked were willing to participate in the research. Shipping companies were the most difficult to get in touch with because it was hard to reach the right person with the knowledge on the issues covered in the research, especially as the research questions were rather broad. Some shipping companies did not answer the query at all and some politely responded that they were not able to take part in the study.

Although the number of interviews is rather low, the sample works quite well for the purpose of the research. For the most part, the interviewees in this research emphasised similar issues. Examples naturally varied, but the grand lines of the opinions were rather convergent. Only a few times something completely distinct was presented and, usually in those cases, the interviewee could tell that perhaps the rest of the industry does not agree with the opinion or suggestion. Regardless of the limited amount of interviews, it can be concluded that the group of interviewees and their expertise cover the aspects of this research quite well.

One group that could have provided new aspects to the research are small shipping companies. For instance, they might have had a distinct opinion on the costs of implementing some policy instruments, as smaller companies often plan their operations more on the short-term due to their cost structure and, because of this, the implementation of some mandatory regulations can feel burdening. Small shipping companies are missing from the sample because the companies willing to give an

interview only included large ones. Small shipping companies are not intentionally left outside of the research.

Because the question list (Appendices 2 and 3) for the interviews was rather broad and long, it was sent to the respondents in advance so they could become familiar with the themes and questions. Interviewees were told that if necessary, they could skip difficult questions and concentrate more on the themes that they are familiar with. Several interviewees used the possibility to emphasise questions of their own special knowledge and many skipped at least one question due to lack of knowledge. A few times questions were not answered as they were found politically inappropriate or otherwise not suitable because of the position of the respondent.

Interviews were made in Finnish because all of the respondents were Finnish. Question lists that are found from Appendices 2 and 3 include some minor differences due to distinctions in the two languages. These differences do not matter as the question list merely gave a framework for the semi-structured interviews and the form, and the order of the questions varied from interview to interview.

When expert knowledge is used as a resource for information, expertise can be divided into epistemic and performative expertise. Roughly, epistemic expertise is based on what an expert knows and performative expertise on what an expert can do (Weinstein 1993: 57). The maritime industry is interesting because often maritime authorities have a background as seafarers. Thus the performative expertise is not only limited to operational level as the authorities have also experienced the life at the sea. Having people with both epistemic and performative expertise makes researching the maritime sector interesting, but at the same time the industry is slightly difficult to approach, as some believe that those without seafaring experience cannot know the industry and thus cannot be considered as competent researchers, either.

3.5 Distractions in interviews

Interviews can be affected by many factors. Busy schedules, restless locations or geographical distance can be troublesome for interviewing. Political, legal or ethical constraints can limit interviews and people may also be suspicious or uncomfortable about being questioned. (Gillham 2005: 4).

Anderson (2010: 170) reminds that an interview is impressionable for a geographical context. As every place is subject to different orders and borders, they can raise different feelings which can affect the interview. On the other hand, the place for an interview can also be chosen so that it will stimulate the interviewees' feelings and responses to questions. In this research, the interviews took place in interviewees' working places in order to make taking part easy to the busy interviewees. Offices are also familiar to the people who work there, so the environment was thought to be comfortable for an interview.

Several interviewees stated they were busy but still the interviews were arranged quite

easily. Dates and times for a meeting were suggested and if those were not suitable, some other time was selected. Disturbance or finding a quiet and comfortable place for an interview was not a problem. Interview locations were all fairly quiet office and meeting rooms.

Perhaps more than the locations, interviews were influenced with the personal mood or physical condition, such as fatigue or illness, of either party. Many times interviews took place in the morning or during the late afternoon, when the vitality of a person may not be at its highest.

3.6 Phases of the analysis

Interviews were recorded and afterwards transcribed. Recording enables the interviewer to fully concentrate on the interaction without feeling pressure to write down everything said by the interviewee (Valentine 2005: 123). When interviews were finished, the audio material was transcribed. It is advantageous to make a transcription soon after making an interview because regardless of being able to write down everything that has been said, facial or bodily gestures may easily be forgotten. This means that everything cannot be caught from the words or the tone of the speaker.

The transcript is rather accurate and nothing that could impact the results has been left out. It includes nearly everything that was said, except for repetition of words or other insignificant short words that people say to win time when they are forming their answer. The reason for why everything was not transcribed is the fact that the focus is not on analysing the interview as a situation or the persons involved, but to research the contents of the interviews.

Thematic analysis was used as a method for the analysis. In thematic analysis the interview transcription or other empirical material is organised into themed categories. Themes refer to specific patterns which can be found in the data. Thematic analysis is quite close to content analysis, but it pays more attention to the qualitative aspect of the material, whereas, in content analysis, the researcher can, for instance, count how many times a certain words are repeated. (Yardley and Marks, 2003: 56–58).

Thematic analysis can be data driven or theory driven (Boyatzis 1998). In data driven analysis, connective or divisional factors are searched from the transcription, whereas in theory driven analysis, themes can be formed on the basis of the theory or framework of the research. In this research, both data driven and theory driven analysis were employed. Originally interview themes were based on themes brought up in earlier research. These themes were analysed, but also new themes were added to the analysis, as they were emphasised in the interviews. The themes used are based mostly on clear topics that came up in the discussion or, for example, on a complete answer to a question, rather than on trying to find certain code words in the transcription. This is because it was considered that, as all the discussed topics are closely related to each other, it might be more worthwhile to make the analysis based on larger parts of a transcription, as opposed to counting words.

Separate interview transcripts were combined into thematic groups. Firstly, the data was themed on the basis of themes used in the interview questions. This was done in order to exclude all the parts of the transcripts that were not significant for the analysis. Also new themes, such as CSR, were added, because some issues were emphasised significantly in the interviews. Next, the data was combined under themes.

The first phase was originally made for the purposes of the cost-effectiveness study that was conducted using the same empirical material. The material includes plenty of details, which were grouped under themes in the first phase of the analysis. In the second phase, these themes were reprocessed. The amount of material was reduced as information was combined into entities. The final analysis concludes the results from the themes that are demonstrated in table 3.2. Themes which can be seen on the left side of the table have been divided into subthemes (on the right side of the table). Many of the subthemes are overlapping, so in the results, the themes have been merged into even smaller summaries.

Table 3.1. Themes and subthemes used in the analysis.

Theme	Subtheme
The Gulf of Finland	<ul style="list-style-type: none"> • Special characteristics • Overall safety level • Threats
Governance types	<ul style="list-style-type: none"> • Regulatory instruments • Economic instruments • Information instruments
Criteria for efficiency of policy instruments	<ul style="list-style-type: none"> • Efficiency • Economic efficiency • Acceptability • Enforcement • Lateral effects • Incentive and innovation effects
New forms of governance and manners of improving maritime safety	<ul style="list-style-type: none"> • CSR and safety culture • Co- and multi-governance • PSSA status • Cooperation and lobbying • Harmonisation

The results of the study illustrate patterns that were found within and between the themes formed. All of the themes included issues that were close to some other themes, so by describing these relations and causalities, the final results could be made.

Yardley and Marks (2003: 58) recognise the same issue that was noticed in the making of this research: not many guides about thematic analysis have been written, and the

research literature, too, describes the use of the method rather poorly. This can be considered as a negative issue: how can the method be used systematically if it is not explained properly? On the other hand, as there were no precise instructions for using the method, the analysis could be applied quite freely to the needs of the research.

4 RESULTS

4.1 Interviewees

Interviewees represented their organisations, so the answers to the questions were mostly formed by the general opinion of the organisations. Interestingly, even though the number of interviews was relatively limited and the interviewees represented three different respondent groups, their answers were notably similar.

Naturally, it came up that companies wish for less safety related costs, but it was also mentioned by the interviewees that companies do understand where the costs for safety come from and do not consider them too high or burdening. Companies that complain about safety regulation probably value profit or something else more than safety. Most of the interviewees mentioned that an accident would be more expensive than preventive measures, so the costs or other pressures posed by safety procedures were considered to be suitable. Despite the profit seeking nature of companies and the fact that companies are likely to aim to provide as positive an image of their operations as possible, it seemed that the interviewees were thinking similarly about the importance of shipping safety.

The reasons for the similar answers can be pondered. It is possible the similarities are due to the background of the interviewees: several of them are seafarers, so they have practical experience of the shipping industry. Alternatively, it can be expected that all of the interviewees are familiar with the current development of laws and shipping policies, so the answers were probably based on them. Furthermore, almost all of the interviewees mentioned a project or other form of cooperation in which they are participating, so it is likely they are familiar with the efforts that are being made in relation to maritime safety.

The analysis does not categorise opinions of different respondent groups (division to authorities, shipping companies and interest groups). This is because even though each of the interviewees has agreed to have their name published as an interviewee for this research, it was promised that otherwise the respondents cannot be recognised from the text. As the number of interviews is very limited, respondents could probably be recognised if the results were presented through a classification of the interviewees.

4.2 Maritime safety in the Gulf of Finland

In conclusion of the interviews, it can be stated that the interviewees consider that safety level is generally good in the Baltic Sea, as the companies which originate from the region mostly comply with the regulations, and a common interest towards safety does exist. None of the interviewees acknowledged specific large deficiencies in the safety policy system, but as an accident risk exists, developing the regulatory system should be continuous. It was acknowledged that the existing maritime safety policy instruments are so comprehensive that there is no need for implementing completely new policy

instruments. On the other hand, all the existing instruments were considered to be important for safety, so neither should any of the existing instruments be removed.

It was mentioned in the previous paragraph that interviewees acknowledged that the companies from the states surrounding the Baltic Sea have a high interest towards maritime safety. That does not signify that the interviewees considered that it would be enough to protect the sea area, as vessels from every country and company with varying safety levels and interests towards safety can visit the sea area. Safety is an issue of a very large scale and this was also acknowledged by the interviewees. Several of the interviewees noted that it is not enough if safety related efforts are made nationally or regionally if the impacts do not reach the international level. Of course, local initiatives are supported, but the efforts should be placed on influencing the maritime safety work of the European Union and the IMO.

Some deficiencies within the maritime safety policy instruments were named by the interviewees. Based on the research by Kuronen and Tapaninen (2010), interviewees were asked whether they consider ship reporting to be burdening for the shipping companies. Opinions mostly stated that, generally, reporting is not burdening, but when reports have to be made very often, for instance when arriving on the Gulf of Finland from Southern Europe, the workload is larger as several reports have to be provided to different authorities. This and the repetitiveness of ship inspections were mentioned in several interviews. As an improvement for the system, in many occasions, it was suggested that data transmission systems should be harmonised and automated so that reports would move automatically from vessels to the authorities. Regarding ship inspections, authorities would be aware of which parts of vessels have been inspected in the previous port. It cannot be stated that suggestions for decreasing the workload would be due to the companies' aspiration for fewer regulations, as the interviews included a lot of discussion about improving the efficiency of the instruments that fall under the responsibility of the authorities. Authorities operate with a limited budget so the efficiency of policy instruments is important.

The increasing amount of traffic was mentioned as a threat for maritime safety in the Gulf of Finland. This is because interviewees believed that growth in traffic can increase the possibility of an accident regardless of the efforts to prevent such incidents from happening. Also globalisation or internationalisation can be mentioned as threats, as crews are more mixed than ever and vessels from all around the world can enter the sea area. Few interviewees noted that having many nationalities in crews does not automatically pose a threat to the safety, as the preconditions for operations are strict and quality education is offered in many countries around the world. Instead, it was noted that the conditions in the Gulf of Finland can be harsher than crews expect or are aware of, and in these cases high quality vessel traffic services and accident preparedness are required of the surrounding states.

Safety culture not only on board ships but also at the company level was considered to be very important for maritime safety. This is because many decisions that have an impact on safety are made on the corporate level. For instance, a vessel crew cannot make the final decision on whether and when deficiencies in a vessel are repaired. That

decision is made by the management, as are also are the decisions concerning, for instance, crew issues such as the competence demanded of the crew and the number of crewmembers on board a ship.

It was acknowledged that safety culture does not depend on the size of the shipping company. Also some large companies are known for having deficiencies which compromise safety. Interviewees acknowledged that, unfortunately, companies with more interest in making profit than in safety do exist, and they sail in the same seas as actors who make efforts to maintain a high level of safety. Although it seems that there is also a demand for those low cost safe shipping companies, generally several interviewees estimated that positive performance in safety and environmental matters is increasingly valued by the industry.

Several interviewees acknowledged human error as a significant threat for safety. Decreasing human error was considered to require change in the mindset of seafarers. Interviewees stated that if the seafarers value safety, safety procedures are probably more likely to be performed properly. In some of the interviews it was also mentioned that the industry is very old fashioned, which means that also the conceptions regarding safety can be traditional. Because of this, some seafarers do not like being regulated as they believe in the freedom of the seas, which is a principle that stresses the freedom to navigate the oceans.

4.3 Regulation types

Positive and negative aspects were found in all regulation types. The effectiveness of regulatory and economic instruments was acknowledged: companies must comply with the rules or they will be punished. Despite their compulsoriness, regulatory and economic instruments were acknowledged to also provide some benefits to companies, so compliance should not only be an obligation. For instance, providing reports to authorities when arriving to a sea area may improve the fluency of port operations, which, again, may save the companies' money as the time spent in the port is made shorter. Despite the benefits and the mandatoriness, it was acknowledged in the interviews that non-compliance of the rules does happen.

In the interviews, there was no discussion related to how companies' compliance with the rules could be increased. Neither was there discussion concerning whether punishments, such as fines, should be larger, or how the situation could be improved. It was acknowledged that the situation is not simple, as also the authorities in some locations neglect their responsibilities and thus enable poor performance from shipping companies. Despite the fact that some shipping companies show poor responsibility, many other companies do comply with the rules and some have even made safety their asset in competition.

Information instruments, which include the voluntary activities of companies as well as CSR, were mentioned frequently in the interviews. This indicates that instruments which provide space for companies' self-regulation and voluntary initiatives are

considered positive by the maritime experts. Many of the instruments, which were suggested as potential tools for improving maritime safety in the future, were found to be efficient in maintaining and improving maritime safety, and besides they often provide some additional benefits, which can encourage companies to better performance. For instance, almost all of the interviewees mentioned an initiative planning a service that would provide vessels additional information about weather and other conditions in turn for the mandatory reports that ships send to authorities.

Overall, it seems that the role of authorities is changing from surveillance to a service providing actor aiming to encourage companies to better performance instead of just commanding and monitoring. Several interviewees mentioned in some form that a system in which an actor can gain benefits by indicating responsibility in their operations can contribute positively to safety. As an example the fairway due system which is in use in Sweden can be mentioned. Several of the interviewees agreed that a similar system, which could, for instance, set lower dues to environmentally friendly or safe companies, could encourage companies to act more responsibly, but at the same time it was acknowledged that converting the basis of the decades-old fairway due system would not be easy. For instance, at the moment fairway dues in Finland depend on a vessel's ice class, and because of this companies may use certain vessels when calling to Finnish ports. The due system has structures which can make large modifications difficult to perform. Yet some of the interviewees considered that the fairway and port due system should be renewed somehow.

Interviewees noted that Finland has, for a long time, been known for high prices and strict regulations. Today, international regulations have been adapted, so this should no longer be the case. Interviewees considered that, as Finland still retains some of this kind of reputation, the cost-levels should be maintained at the current levels. This is because maritime traffic is an industry which is easily influenced by changes of conditions, such as economy, new transportation routes and so on. A rise in costs could harm the competitiveness of companies and the whole maritime industry in Finland. Interviewees stated that the risk exists, as there are countries with cheaper prices close to Finland. However, as Finland is almost like an island, the goods that are coming to the country are most likely to arrive through Finnish ports, so the threat of decreasing transportation volumes should not be substantial..

4.4 Information instruments – CSR and safety culture

The interview questions in this study focused mainly on the existing regulatory and economic instruments. Yet, as earlier mentioned, companies' voluntary activities were brought up on several occasions. Each interviewee eventually mentioned Corporate Social Responsibility (CSR) at some point of the interview, though it was not brought up in the questions or otherwise by the interviewer.

Information instruments were considered to have the most potential to improve safety in the future. One of the biggest reasons for this is the voluntariness of implementing information instruments. Voluntariness provides space for specialisation and the

possibility to decide the level of the implementation. Also economic, reputational and other benefits that can be gained with information instruments, such as standards, were considered to increase the efficiency of implementation. Concerning benefits, it was also mentioned that responsibility can act as an asset in the competition between companies. Regarding some cargo types, such as oil, customers have very high safety demands. Companies must fulfil these demands if they wish to remain competitive and receive orders from these customers.

Despite the voluntariness, it seems that some boundaries and rules for the implementation of voluntary activities are desired. This may be because with a set goals or rules, companies can evaluate the success of the effort and their position in competition. Although activities may be voluntary or responsible, it seems that the activities are always conducted with expectations for benefits.

Even though it was realised that CRS does not signify instant economic savings and it can be rather costly to companies, it was believed that the investments will return back to the company in the long term. It was recommended that companies should become more proactive in safety matters. For instance, if a company has additional crew training, it can decrease accidents on board resulting in sickness leaves, which is positive for the company economically and also in terms of reputation.

Information instruments were considered to encourage companies to make their own safety innovations, as not everything is strictly regulated. It was also believed that indicating responsible behaviour could possibly be used for delaying the implementation of mandatory regulations. Some interviewees mentioned that the maritime authorities in Finland are changing their approach towards risk-based monitoring, which means that authorities focus monitoring and inspections to vessels and companies that are known for poor safety culture and deficiencies. Based on profiles that are compiled by authorities, vessels indicating positive performance can be targeted with ship inspections less often.

Basically risk-based monitoring can be considered as an increase of self-regulation, as with their own actions, companies can impact on the monitoring that authorities direct at the company. Interviewees considered that risk-based monitoring encourages actors to responsible performance, as companies gain direct benefits. For instance, a ship inspection will always interfere with the operations, as the vessel must stay in port. Being inspected less often results in savings and, in addition, may help to gain the trust of customers and other stakeholders.

Based on the interviews, it seems that companies' voluntary actions are more favoured than implementing new rules and regulations. Interviewees mentioned that there is no need for implementing more safety policy instruments. The field is already wide and almost everything is regulated. Instead, the existing instruments should be revised in order to achieve better efficiency. If the system is based on the voluntary activities of companies, it provides more space for innovation, specialisation and for seeking a competition advantage in safety and environmental friendliness.

The same can be stated regarding co-regulation and multi-regulation, as it could be clearly understood from the interviews that the shipping industry finds it important to be able to take part in decision-making, and authorities are putting forward a change in their status, as they are aiming to become more like service producers, rather than actors demanding more and more information and other things from companies.

4.5 Criteria for effectiveness

4.5.1 Efficiency

Based on the interviews, it can be stated that efficiency is a crucial aspect for policy instruments: if the instruments cause a large amount of work but do not improve safety remarkably, they can be considered as a burden and should be removed, improved or replaced with another instrument. The common belief among the interviewees was that the impacts of regulations are investigated before they come into force, so, in general, actors can rely on the efficiency of regulations.

The interviewees acknowledged that policy instruments can be efficient in many different ways. Efficiency can be attained with a single act, such as making structural changes to vessels, or with continuous efforts, such as using common routeing, having proper connections between authorities and vessels (e.g. AIS) or with safety management.

Making structural changes to vessels were acknowledged to be often very costly, but at the same time they were regarded as worthwhile, as they have improved maritime safety significantly. Implementing double hulls to tankers was mentioned as an example of a structural change which can decrease the scale and impacts of an oil accident remarkably. For these benefits, interviewees considered structural changes very efficient, despite the possible great costs.

Vessel routeing was considered to be an efficient passive instrument that continuously sustains safety at a high level. Routeing does not require continuous maintenance, and vessels routes can be reviewed from nautical charts in which the lanes and other markings can be found.

Implementation of the International Safety Management Code (ISM Code) was presented as an example related to how much the implementation of an instrument matters to its efficiency. It was stated that the implementation of the ISM Code has been significant for operational safety, but in vessels in which the ISM Code has not been implemented properly, the effects are likely to have remained low and the procedure may seem like a burden. Instruments are often designed to benefit companies, not to cause annoyance with extra obligations or costs, but how well the companies exploit the benefits of instruments depends largely on their culture.

The efficiency of maritime safety policy instruments was considered lower if the instruments cause repetitive or overlapping tasks. For instance, ship inspections and

vessel reporting were stated to include repetitiveness. Interviewees criticized the fact that same parts of a vessel may be inspected several times, while some parts of the vessel are rarely inspected. However, the interviewees did not criticise having several inspection systems (PSC, FSC), as it was noted that not all inspecting actors do their work properly. As a solution for repetitiveness and overlapping work, improving information sharing and communication between actors were suggested. If information about vessel inspection moved fluently from authority to authority, repetitiveness could be reduced and vessels could be inspected more efficiently. In addition, it was suggested that vessel inspections should concentrate on vessels and companies known for deficiencies. Regarding ship reporting, the interviewees wished that reports moved automatically from vessel to port authorities in order to avoid having to send the report separately to each authority when arriving to a water area.

Overall, the interviewees emphasized that policy instruments could be made more efficient by increasing cooperation between the actors as well as by automating and harmonising the instruments. In conclusion, vessels often sail with a minimum number of crew members, so it is significant that instruments are efficient to allow the crew to concentrate properly on their task without being burdened with certain procedures.

4.5.2 Economic efficiency

Interviewees considered the economic cost-effectiveness of maritime safety policy instruments to be relatively important. This is especially due to the fact that if the costs and workload are great but the instrument does not produce notable benefits to the company, non-compliance is more likely to happen.

Regarding any instruments and regulations, the interviewees found that the costs should be justified and equivalent for every actor. What could be inferred from some of the interviews was that the forthcoming environmental regulations are considered to be unfair, as their costs will be a lot higher for companies from certain regions. Because of the new regulations, some companies must make large investments which may challenge their competitiveness.

Several interviewees stated that costs and safety should never be a trade-off. However, the industry witnesses many companies that only aim to reduce their costs, even if it happens at the expense of safety. An accident is always more expensive than preventive activities. If an accident occurred, the costs would not be merely economic: also the reputation of the company would suffer, which might result in the end of the company's operations.

It can be concluded that making maritime safety policy instruments is very important because of the nature of the industry. Cost-effectiveness, meaning that as large an output as possible is achieved with as little input as possible, can increase compliance with regulations.

4.5.3 Acceptability

The acceptability of instruments seems to be very important in shipping. The industry is known for disastrous accidents which have resulted in hundreds of casualties and environmental disasters. Laws must be acceptable to the industry. Otherwise non-compliance can easily occur.

Acceptability affects compliance with regulations, so it is an important factor. Acceptability can also be related to costs. If costs become high enough, the transport routes may be changed and companies may begin to use ports with lower costs. However, interviewees considered this to be rather unlikely, as the most convenient route for transporting goods to Finland are the Finnish ports.

Generally, the international maritime regulations should be accepted by the industry, as the IMO members represent the opinion of the industry. Yet, international decision-making seems to be slightly distant from the industry. Interviewees acknowledged that individual states should become more proactive in lobbying towards the IMO. State authorities and other actors should cooperate more with other states that have similar interests, so that their opinions would be better heard by the decision-makers. It was suggested that higher acceptance and non-compliance with regulations could be achieved if the maritime industry was included in the decision-making more efficiently than it is at the moment.

4.5.4 Enforcement

Interviewees considered that the costs of safety instruments should not be so high as to burden any companies. Costs may seem larger for smaller companies, which do not necessarily have a possibility to plan their expenditure on the long term, but it was evaluated that neither should they be burdened by the current regulations. Interviewees emphasised that regulations are planned so that their enforcement is possible for all companies and that they may even provide benefits to the company.

Instead, the interviewees indicated that more than outer obstacles, the companies' inner interest in implementing the safety policy instruments may have an impact on the enforcement of regulations. Results related to the safety culture of shipping companies are described in chapter 4.2.

The implementation of safety policy instrument can impact on how beneficial companies consider certain instruments to be. It was acknowledged that policy instruments are usually designed so that, in addition to fulfilling the requirements set by authorities, they can provide benefits to shipping companies. For instance, the International Safety Management Code (ISM Code), when added to the safety benefits, was considered to increase the fluency of operation when implemented properly. If not, the ISM Code can seem like a burden that does not have much use except to please authorities.

Misbehaviour may result if companies do not consider that they can benefit from the implementation of the instruments. This is one reason for why authorities increasingly aim to provide services and benefits back to vessels. An example from literature was introduced to the interviewees. It was about the questionnaire results by Kuronen and Tapaninen (2010), in which ship reporting was claimed to be burdening to vessels. This argument was mostly rejected by the interviewees. Instead it was emphasised that this is probably related to the working culture on board. Ship reports can be filled beforehand and then sent to authorities when entering sea area. Often officers seem to fill in the report at the last possible minute, when there might be other critical issues to attend to, for instance activities related to navigation in poor weather. Interviewees stated that if the working culture was improved, complaints about reporting probably would not exist.

4.5.5 Lateral effects

Many of the maritime safety policy instruments provide lateral effects. For instance, the relation between safety and environmental friendliness was mentioned. For example, a system in which port dues are dependent on the environmental friendliness of the vessels was considered to encourage companies to good behaviour beyond following regulations. Not only does the system decrease costs for companies and provide resources for the maintenance of port facilities, but it can also decrease pollution and the other environmental impacts of shipping.

4.5.6 Incentive and innovation effect

Based on the interviews, incentive and innovation effects can be considered very important in shipping. It could be estimated that an instrument is likely to be effective and beneficial for a company if it encourages voluntary experimentation. Innovations by companies can benefit the common good, as good procedures can be adapted more widely at some point. Incentive and innovation effects can be related to the voluntary activities of companies, which were discussed more thoroughly in 4.4. Companies' own innovations and other efforts to improve safety were considered to provide a competitive advantage.

4.6 Special measures for improving the maritime safety

Interviewees were sceptical about the potential of the PSSA status as a safety improving instrument. The significance of the status was recognised, and it was found positive that the status has made it possible to implement stricter rules on the Baltic Sea. However, it was noted that the PSSA related instruments were planned already before the designation and the status is perhaps less known in the operational level than the individual instruments are. Seafarers comply with the given rules without thinking further and that is enough as long as the rules really are followed.

One of the interviewees mentioned that, for instance, Australia has made demands regarding piloting in its PSSA. Implementing this kind of measures requires uniform opinion from the surrounding countries, which can be difficult to achieve. Russia does not take part in anything that is related to PSSA and therefore it was mentioned in the interviews that the maritime safety protection efforts should be concentrated on activities which also Russia approves. Interviewees agreed that if Russia was to join the status, it would have done so by now. One of the interviewees stated that when PSSA was designated, Russia did not join the effort, as the country considers PSSA to be a political status. Another interviewee mentioned that if PSSA status was to be developed further, should be evaluated whether developing it bothers or benefits the work of HELCOM.

Interviewees did not find PSSA's potential as a safety improving measure very high, also because it is a regional effort. Regional regulations, branding the status in the area or other efforts were not considered to be advantageous because seafarers and ships arrive to the area from all around the globe. Interviewees considered that it would be more beneficial for safety if, for instance, some training regarding sailing in the ice conditions was added to the STCW. This way the special areas, such as the Baltic Sea, would be better noticed by the IMO.

5 DISCUSSION

5.1 Current maritime safety governance system

Shipping is strongly regulated with the regulatory and economic instruments while the information instruments have a smaller regulatory role. However, the voluntary actions of companies seem to be continuously gaining a larger significance. In accordance with the literature, corporate social responsibility and the self-regulation of companies were emphasised in the interviews.

Literature and interviews both recognise aspects that make each instrument category efficient. Regulatory and economic policies are considered efficient because they must be complied with, or otherwise a punishment will follow. In turn, according to interviews, information-based instruments are considered to be efficient particularly because of their voluntariness. Voluntary activities can improve the common good, but they can also benefit companies, so it is beneficial for the companies to do these activities.

Generally, the traditional means of governance, which include regulatory and economic instruments, were considered to be efficient by the interviewees. Similarly, as it was stated in the scholars' evaluation of the criteria for instruments' efficiency, also the interviews reached the conclusion that instruments act as dynamic group in which the parts of the group complement each other. This means that varying characteristics can impact on the efficiency of individual instruments and the possible deficiencies of single instruments can be tolerated if some other instruments increase the overall efficiency of the maritime safety policy instrument system.

Because of the small size of the sample, and because interviews always include personal beliefs and opinions, based on the empirical material of this research it cannot be stated validly which factors have an impact on the efficiency of each maritime safety policy instrument or which instruments are the most or least effective. However, the factors that were mentioned on several occasions during the interviews can indicate issues that improve instruments' efficiency.

Regarding regulatory and economic instruments, interviewees recommended developing instruments into a direction that will provide the private sector with more possibilities (and responsibility) to take part in decision-making and governing operations. Concerning economic instruments, for instance due systems, in which the activities of companies can affect the amount of dues that are addressed at them, were favoured. Such a system can encourage positive performance and this was strongly emphasised as a factor that is important for an instrument's effectiveness.

Overall, increasing the automation and harmonisation of instruments and cooperation between national and cross-border actors were recommended. Cooperation should be increased between authorities but also between authorities and the private sector. In a sense, all of the mentioned factors could decrease both the work load of authorities and the work load on board and thus provide more time for other tasks. In the literature it

was mentioned that as machines have replaced humans in many tasks on board, the significance of human error in accidents has become more visible. Because of this, it can be stated that maritime safety is not improved merely by taking away the workload from the crew. Simply decreasing the work load does not mean that the spare time would automatically be used on other safety related tasks if interest towards safety procedures is minimal. Because of this, improving seafarers' mindset and the safety culture of shipping companies were emphasised in the interviews and the same can be understood also from the literature. It should be mentioned that more research is needed in order to find out how to change seafarers' mindset or how to improve the safety culture of shipping companies, as this research does not provide answers to these questions.

5.2 New manners of maritime safety governance

In the interviews it was concluded that the current safety regulation makes the system efficient enough and thus there is no need for implementing new instruments. Instead, engaging in voluntary initiatives should be encouraged. On the other hand, the interviews confirmed the problems mentioned in the literature. The literature states that the current maritime governance system does not seem to be as efficient as it should be, as non-compliance continues to encumber the shipping industry. Based on this research, it could be suggested that improving actors' possibilities to affect governance could increase compliance with regulations. This calls for increasing self-regulation or other forms of governance in which the private sector can participate more frequently than they can in the traditional hierarchical system.

Self-regulation and voluntary safety initiatives provide companies with more space for focusing on specific issues that are valued by the company and gives a possibility to specialise on matters that companies consider beneficial for their operations. In the interviews, it was considered that self-governance would bring companies closer to the authorities and improve the communication and cooperation between the two sides. Also, as companies' acts are often driven by the benefits that can be gained, companies can be expected to react faster to the changes of conditions than large international institutions. Because of this, it is positive if companies are offered space to execute their own safety procedures.

As mentioned in both the theory and the interview results, voluntary measures such as CSR initiatives are considered to have potential to improve maritime safety. Voluntary measures are different from traditional means of governance, which have often been commanding and mandatory. Information instruments are not something new, they have existed before, but their use and importance has been smaller than it is nowadays, or is likely to be in the future. Despite the support for companies' voluntary activities, it seems that both the literature and the interviews call for some sort of boundaries also for non-mandatory activities. In the case of CSR, these boundaries could, for instance, be defined standards or other measures that companies could aim to complete. If measures are defined, they provide guidelines for operations and their outcomes can be compared to those of other companies in the industry.

If one considers a situation where a company does not engage in voluntary safety initiatives merely because of the possible image related, economic or other benefits, it can be assumed that safety is valued in the company. Based on literature, it can be stated that if safety is valued on the corporate level, good practices are more likely to be implemented properly on the operational level, too. This is important, as interviewees stated that in the future safety levels cannot be improved significantly with the implementation of new measures. As it was mentioned, it was stated that improving the level of safety requires a change in mindsets. Mariners should accommodate the idea that maintaining a high safety level is important and safety procedures should be accepted as a part of daily routines, so that they would not seem like a burden.

In conclusion of the interviews, it seems that the shipping industry wishes for more possibilities to take part in decision-making. On the other hand, authorities seem to be willing to provide these possibilities in a form of increasing self-regulation and also by aiming to increase the dialogue between the authorities and the actors.

As mentioned in the discussion about the importance of safety culture, safety procedures are probably found less burdening if they are a part of daily routines. On the other hand, this is the same factor that, in the interviews, was considered to make PSSA less useful as a means to improving safety. It was stated in the interviews that the individual safety instruments that are part of the PSSA status are probably implemented as a part of daily routines, and as those instruments are probably better known than the status itself, it makes no use to develop the status any further. Though this was stated, it must be acknowledged that both the literature and especially the interviewees praised the importance of having such a status for the sea area. However, the status was proved to be unsuitable for the use that was considered for in this study. As a conclusion for the Baltic Sea PSSA status discussion, it can be stated that the PSSA status is a status, it does not include Russia and it should not be developed any further. Instead other ways to improve maritime safety should be used.

Interviews emphasised the significant work of the Helsinki Commission, so instead of playing around with PSSA it was recommended to push forward the work of HELCOM. Also in the literature HELCOM was acknowledged to be an important actor in the sea area. This is because its work has been going on for decades, many years longer than the maritime work of the EU, and also because Russia takes part in HELCOM initiatives.

6 CONCLUSIONS

The results of the research provide a more positive image of the safety situation in the Gulf of Finland than was expected. It seems that the maritime experts mostly agree with the literature. Even though all of the interviewees noticed that there are always possibilities for improvements, no serious deficiencies in the maritime safety policy system were recognised. Several interviewees considered that the current maritime safety policy instruments are comprehensive as a system, so the minor deficiencies regarding individual policy instrument can be tolerated. However, it was suggested in the interviews that the development of maritime safety policy instruments should be continued and existing instruments could be re-evaluated in order to achieve better efficiency. Making the system more efficient would release resources of both shipping companies and authorities to other tasks.

As a conclusion of the interviews, it can be suggested that the efficiency of the existing maritime safety policy instruments can be improved through cooperation, harmonisation, automation and decreasing repetitive tasks and the workload caused by safety procedures. Most of these can be accomplished through technological advances. The harmonisation of transmission systems nationally and on a larger scale would decrease the need for reporting and vessel inspections if the data moved automatically from vessels to authorities and back, as well as between different authorities.

The literature and similarly the interviews indicate that regulatory and economic instruments are considered to be efficient for governing the maritime industry, but already enough mandatory policies exist to provide a framework for safe maritime operations. Because of this, the importance of voluntary activities of shipping companies were emphasised in the question of improving maritime safety in the future. Improving maritime safety from the current level requires tackling the impact of human error in accidents. This means that all seafarers and shipping companies must learn to value safety and be willing comply with the existing rules and to make initiatives that go beyond the mandatory regulations. Responsibility and positive safety culture in shipping companies contribute positively to maritime safety.

In the interviews, more possibilities for shipping companies to influence decision-making were requested. This request is uniform with the literature, which suggests that in the future the hierarchical maritime safety governance system should be developed into a direction which involves the private sector, interest groups and other additional actors in the decision making. The literature and the interviews both requested more cooperation and negotiation between the authorities and the private sector.

Although significant similarities were discovered in the responses of the interviewees, the results of this research provide only suggestions about the state of issues. This is due to the small size of the sample and also because the empirical material was originally prepared for the use of another research. However, this study does indicate which issues could be researched in the future regarding the efficiency of the maritime safety regulatory system.

In the future, interesting aspects for research are the development of risk-based monitoring and the voluntary activities of companies. These two can be considered to support each other, so they could either be very successful, or after a while the system might move back towards the traditional manners of governance if companies do not indicate enough ability or interest towards self-regulation. In addition, more research should be conducted regarding improving the safety culture of shipping companies, as this research indicated that a positive safety culture can decrease the impact of human error in accidents.

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APPENDIX 1

THE LIST OF INTERVIEWEES

Titles of the interviewees may have changed after the interviews.

Sirkka-Heleena Nyman (Senior Adviser, shipping, Ministry of Transport and Communications), interviewed 11.6.2012

Sanna Sonninen (Captain, Director, Finnish Transport Safety Agency Trafi), interviewed 23.5.2012

Anita Mäkinen (Chief Adviser, Environment, Finnish Transport Safety Agency Trafi), interviewed 31.5.2012

Matti Aaltonen (Captain, Director, Finnish Transport Agency), interviewed 5.7.2012

Thomas Erlund (Captain, Head of Vessel Traffic Services, Finnish Transport Agency), interviewed 11.6.2012

Markku Mylly (Managing Director, Finnish Port Association), interviewed 23.5.2012

Olof Widén (Managing Director, Finnish Shipowners' Association), interviewed 22.5.2012

Carolus Ramsay (Captain, Safety and Security Manager, Finnlines), interviewed 15.6.2012

Jan Valtonen (Captain, Manager, Safety and Environment Designated Person Ashore, Neste Shipping), interviewed 11.6.2012.

APPENDIX 2

INTERVIEW QUESTIONS in Finnish

Kustannustehokkuus

1. Miten arvioitte meriturvallisuutta edistävän lainsäädännön ja muiden toimenpiteiden varustamoille aiheuttamaa kustannusrasitusta? Pitäisikö turvallisuuteen liittyvää kustannusrasitusta mielestänne pienentää nykytasolta, vai voidaanko sitä vielä suurentaa (olettaen että kaikki joutuvat tekemään saman)?
2. Miten meriturvallisuuteen liittyvät kustannukset ovat kehittyneet pidemmällä aikavälillä? Käytetäänkö meriturvallisuutta kehitettäessä (tarpeeksi) huomiota toimijoille aiheutuviin kustannuksiin?
3. Onko erityyppisten varustamoiden välillä eroja turvallisuuteen liittyvässä kustannusrasituksessa? Esimerkiksi bulk, tankkeri, matkustaja, kontti jne., tai vaikuttaako varustamon koko/omistus pohja asiaan?)
4. Voitteko antaa esimerkkejä mielestänne kustannustehokkaista ja/tai -tehottomista toimenpiteistä? Esimerkiksi päällekkäisyyden ja toiston poistaminen, raportoinnista tai alustarkastuksista.
5. Pitäisikö kustannusten kohdentumista kehittää jollain tapaa, esimerkiksi siten että vastuullinen maksaisi vähemmän? Esimerkkejä, minkä kustannusten kohdentumista voitaisiin kehittää? Esimerkiksi väylä- tai satamamaksujen osalta.
6. Onko mielestänne uusien onnettomuuksia ehkäisevien toimenpiteiden kustannuksia suhteessa hyötyyn selvitetty riittävästi? Kuinka onnettomuuksien ehkäisemisen kustannuksia voitaisiin mielestänne mitata/ arvioida? Mitä kustannuksia laskennassa pitäisi huomioida?
7. Mikäli uusia kustannuksia asetettaisiin, kuinka kustannusten sisältö voitaisiin selvittää maksajille siten, että uusien maksujen suorittaminen tuntuisi kannattavalta?
8. Jos satama- tai väylämaksuja nostettaisiin, olisiko sillä vaikutusta Suomeen saapuvan alusliikenteen kannalta? Valitsisivatko yritykset esimerkiksi muita kulkureittejä tai satamia, joilla kyseisiä maksuja ei tarvitsisi maksaa yhtä paljon?
9. Väylämaksuja on lähiaikoina korotettu, mutta korotuspaineita on edelleen. Minkälaisia vaikutuksia väylämaksujen korotuksella olisi? Mitä vaihtoehtoisia menetelmiä voitaisiin käyttää helpottamaan korotuspaineita? Esimerkiksi verotulojen käyttö merenkulun infrastruktuurikustannuksien kattamiseen.
10. Minkälainen vaikutus seuraavilla toiminnoilla olisi meriturvallisuudelle ja kustannusten muodostumiselle? Olisiko näille toimille tarvetta?
 - a) Kansallisen ja alueellisen päätöksenteon merkityksen ja mahdollisuuden kasvattaminen

- b) Alusliikenteen monitoroinnin ja VTS-keskusten valtuuksien lisääminen
- c) Miehistön kouluttaminen (Eryityisesti millä osa-alueella?)

Particularly Sensitive Sea Area, PSSA

Itämeri nimettiin erityisen herkäksi merialueeksi (Particularly Sensitive Sea Area, PSSA) vuonna 2005. PSSA:han liitetään aina lisäturvamääreitä, joilla merialueen turvallisuutta pyritään parantamaan. Suomenlahdella PSSA-lisäturvamääreiksi voitaisiin tulevaisuudessa liittää esimerkiksi reittijakojärjestelmän osia, jotka ovat jo nyt olemassa olevia, mutta eivät liity statukseen.

11. IMO on korkein meriturvallisuuteen liittyviä päätöksiä tekevä elin. IMO ei kannata alueellista tai paikallista päätöksentekoa. Toimiiko PSSA-nimitys Itämerellä mahdollisuutena alueelliselle päätöksenteolle? Onko nykyistä laajemmalle alueelliselle päätöksenteolle tarvetta?
12. Kuinka hyvä tunnettavuus nimeämisellä tai siihen liittyvillä lisäturvamääreillä nykyään on? Ovatko merenkulkijat tietoisia liikkuvansa PSSA-alueella, vai noudatetaanko lisäturvamääreitä enemmän lähinnä osana aluksen tavallista turvallisuustoimintaa?
13. Onko Itämeren nimeämisellä PSSA-alueeksi mielestänne ollut vaikutusta meriturvallisuuden tilan parantumiseen? Millä tavalla? Mikä on yleinen ilmapiiri PSSA-statuksen liittyen, koetaanko alalla että statuksesta on ollut hyötyä meriturvallisuuden kannalta?
14. Minkälaisia kustannuksia PSSA-statuksen lisäturvamääreet aiheuttavat? Ovatko kustannukset mielestänne huomattavia? (Kustannuksina voidaan pitää esimerkiksi laitehankintoja tai käytettyä työaikaa, mikäli esimerkiksi raportointi vie runsaasti aikaa muulta työltä)
15. Kuinka PSSA:n vaikuttavuutta meriturvallisuutta parantavana statuksena voitaisiin parantaa? Tulisiko konseptia esimerkiksi brändätä enemmän suuntaan, joka toimisi julkisina ”kasvoina” meriturvallisuudelle, jotta sidosryhmät (esimerkiksi yritykset, merenkävijät, media, valtaväestö jne.) kiinnittäisivät enemmän huomiota Suomenlahden tilaan ja alusliikenteen turvallisuuskysymyksiin?

Gulf of Finland Reporting, GOFREP

Kurosen ja Tapanisen (2010) kyselytutkimuksen mukaan GOFREP:in on koettu parantaneen turvallisuustilannetta merialueella huomattavasti, mutta suurta kehityspotentiaalia vastaajat eivät usko ilmoittautumisjärjestelmällä olevan. Lisäksi osa vastaajista esitti ilmoittautumisen vievän paikoittain erittäin paljon aikaa.

16. Mikä olisi paras vaihtoehto kehittää GOFREP-järjestelmää turvallisuuden ja tehokkuuden lisäämiseksi: Järjestelmän muuttaminen pakolliseksi myös pienemmille aluksille (nykyisen rajan 300 DWT alentaminen), miehistön kouluttaminen, raportointivaatimusten karsiminen ajan säästämiseksi, järjestelmällä

kerätyn tiedon hyödyntäminen, ilmoittautumisjärjestelmän kansainvälistäminen vai jokin muu?

17. Suomenlahdella toimiva GOFREP-järjestelmä on kehitetty merialueen tarpeita vastaavaksi. Kehitteillä on koko ajan laajempia alueita kattavia järjestelmiä. Tuovatko kansainväliset ilmoittautumisjärjestelmät enemmän lisäarvoa vai lisätyötä ja kustannuksia nykyiseen GOFREP-järjestelmään? (Lisäarvo voi olla esimerkiksi tietojen hyödyntämiseen liittyvää & turvallisuuden paranemista, toisaalta edelleen raportointivelvollisuudet, laitehankinnat, ylläpitokustannukset ja koulutuksentarve saattavat lisääntyä).
18. GOFREP-järjestelmää on aikaisemmin pystytty kehittämään Suomenlahdella vain muutaman valtion haluamaan suuntaan. Heikentävätkö kansainvälisten järjestelmien synnyttämät vaatimukset tähän asti itsenäisesti tehtyä T&K-toimintaa? Voiko kattava alusliikennettä kuvaava tietokanta olla jopa turvallisuutta heikentävä?
19. Kurosen ja Tapanisen (2010) tuottaman kyselyn mukaan osa aluksien henkilökunnasta kokee raportoinnin erittäin työllistävänä. Oletteko sitä mieltä että nämä mielipiteet ovat aiheellisia ja kuinka olisi mahdollista keventää GOFREP:iin liittyvää työmäärää?
20. Alusten ilmoittautuminen ja AIS-informaatio liittyvät ensisijaisesti alusten turvallisuuden parantamiseen. Kerättyjä tietoja voidaan kuitenkin käyttää myös tutkimukseen, jolla voidaan esimerkiksi kehittää olemassa olevia tietojärjestelmiä. Käytetäänkö GOFREP-järjestelmään ja AIS-informaatioon perustuvaa tietoa mielestänne tällä hetkellä tarpeeksi tutkimukseen? Olisiko jokin aihepiiri jota kannattaisi tulevaisuudessa tutkia tai kehittää?

Vessel Traffic Service, VTS

Kurosen ja Tapanisen (2010) merenkulun ammattilaisille suorittamassa tutkimuksessa osa vastaajista oli sitä mieltä, että VTS-keskusten aktiivisuudessa on eroja ja jotkut Itämeren VTS-keskuksista voisi toimia aktiivisemmin kuin ne tällä hetkellä toimivat.

21. Kurosen ja Tapanisen (2010) kyselyssä vastaajat korostivat sää- ja muiden olosuhdetietojen välittämisen tärkeyttä. Ovatko VTS-keskukset se toimija, jonka tulisi välittää tietoa yhä enemmän tulevaisuudessa, vai olisiko parempi kehittää edelleen muita keinoja vaihtaa tietoa (esimerkiksi internetpohjainen sovellus)?
22. Onko VTS-keskusten aktiivisuudessa parantamisen varaa liittyen navigointitiedon lähettämiseen aluksille vai onko kyse enemmänkin merenkulkijoiden odotuksista, jotka ovat VTS-keskusten perustehtävän mukaisia velvollisuuksia suurempia?
23. Tulisiko VTS-keskusten valtuuksia ohjailta alusliikennettä lisätä, tulisiko toimintaa kehittää enemmän lennonjohtoa vastaavaksi? Minkälaisia vaikutuksia valtuuksien lisäämisellä olisi keskuksissa tai aluksilla?

24. Onko VTS-keskusten järjestely nykyisellään tehokas? (määrä, sijainti, työmäärä, yhteistyö) Onko havaittu että nykyisellä sijoittamisella olisi jo saavutettu positiivisia tuloksia? VTS-keskusten määrä on suunniteltu vähennettävän kolmeen (Hki, Turku, Lappeenranta) tämän vuoden aikana. Keskusten vähennyksellä saadaan aikaan noin 10 henkilötyövuoden supistukset. Mitä vaikutuksia muutoksella tulee varustamoille olemaan?

APPENDIX 3

INTERVIEW QUESTIONS in English

Economic cost-effectiveness

1. How would you evaluate the cost burden which legislation and other measures aiming to improve maritime safety cause shipping companies? Should the safety related cost burden be decreased from the current level, or can it be further increased (assuming that changes would concern all actors)?
2. How have maritime safety related costs developed in the long term? Are costs for actors taken into account enough when maritime safety legislation is developed?
3. Are there differences in the safety related cost burdens between different types of shipping companies? For example bulk, tanker, passenger, container and so on. Or does the size or ownership structure of a shipping company make a difference?
4. Could you please provide examples of instruments that are cost-effective and/or decrease cost-effectiveness? For example issues related to the removal of overlapping and repetition from operations, ship reporting or vessel inspections.
5. Should the allocation of costs be somehow developed, for example by allowing responsible actor to pay less? Could you please provide some examples of how, for example, fairway and port dues could be developed?
6. Do you believe that the costs of new accident prevention measures have usually been researched sufficiently before their implementation? How could the costs of accident prevention measures be measured/evaluated? Which costs should be noticed in the calculations?
7. If some new costs were set, how could their composition be clarified to paying actors in a manner that would make the disbursement feel reasonable?
8. Would it influence vessel traffic arriving to Finnish ports if port and fairway dues were raised? Would companies shift their operations to other routes and ports were fees not as high?
9. Fairway dues have recently been raised but pressure for further raises does exist. What kind of effects would raising fairway dues have? What kind of alternative methods could be used to ease the pressure of raising dues? For example using tax revenues to cover the infrastructure costs of maritime transportation.
10. What kind of effect would the following functions have on maritime safety and the formation of costs?
 - a) Increasing the significance and possibility of national and regional decision-making
 - b) Increasing the mandate of vessel monitoring and VTS-centres
 - c) Crew training (Especially which themes?)

Particularly Sensitive Sea Area, PSSA

The Baltic Sea was designated as a Particularly Sensitive Sea Area (PSSA) in 2005. PSSA designation always includes Associated Protective Measures (APMs) that aim to improve safety in the sea area. In the future, for example, some parts of Traffic Separation Schemes that already exist but are not a part of the Baltic Sea PSSA could be added to APMs.

11. IMO is the highest decision-making organ related maritime safety issues. IMO does not favour regional or local decision-making. Does PSSA-status work as a possibility for regional decision-making in the Baltic Sea? Is there a need for more extensive regional decision-making?
12. How well-known is the designation nowadays or the APMs related to it? Are seafarers aware that they are sailing in an area designated as a PSSA or are they more likely to act accordingly to APMs as a part of vessel's ordinary safety activities?
13. Do you believe that designating the Baltic Sea as a PSSA has improved the level of maritime safety? In what way? What is the common ambience related to the PSSA-status, does the industry find the status important for safety?
14. What kind of costs do APMs related to the PSSA status cause? Do you consider these costs to be high? (For example equipment acquisitions or working hours used for reporting, if they take excessively time from other tasks can be considered as costs.)
15. How could the significance of the PSSA as a maritime safety improving status be increased? Should the status concept be, for example, branded more to a direction where it could work as a public "face" of maritime safety so that interest groups (for example companies, seafarers, media, public) would pay more attention to the state of the Baltic Sea and to the safety related questions of maritime traffic?

Gulf of Finland Reporting, GOFREP

According to the questionnaire conducted by Kuronen and Tapaninen (2010), GOFREP has been considered to increase safety in the sea area significantly, but the respondents of the survey do not believe that reporting system has a high potential to increase the level of safety more if further developed in the future. Some of the respondents claimed that reporting takes a considerable amount of time on the bridge.

16. What would be the best way to develop GOFREP in order to increase safety and efficiency: Making ship reporting compulsory also to smaller vessels (lowering the current level of 300 DWT), crew training, decreasing reporting requirements in order to save time, utilising the information collected with GOFREP, making the reporting system common internationally or something else?

17. In the Gulf of Finland, GOFREP has been developed to meet the requirements of the sea area. The development of reporting systems covering wider sea areas is continuous. Are international reporting systems more likely to provide added value or extra work and costs compared to the current GOFREP? (Added value can, for example, be related to utilising collected information and increasing safety level. Alternatively, obligations to report to higher level, equipment and maintenance costs and need for training may increase).
18. So far GOFREP has been developed to a direction desired by only few countries. Can the possible requirements set by international systems harm the so far independently conducted research and development activities? Can a comprehensive marine traffic database end up being a security threat?
19. According to a questionnaire study conducted by Kuronen and Tapaninen (2010), some of the seafarers find reporting burdening. Do you find these statements justified and how could it be possible to ease the workload caused by reporting?
20. Ship reporting and AIS-information's primary purpose is to improve maritime safety. Added to this, data collected from the vessels can be used for research that aims to develop existing systems. Do you think that data related to ship reporting and AIS-information is efficiently used for research purposes? Do you find that there is a certain theme that should be further researched in the future?

Vessel Traffic Service, VTS

According to the study conducted with experts of maritime industry by Kuronen and Tapaninen (2010), some of the respondents considered that the activity of VTS-centres differs and that some of the VTS-centres in the Baltic Sea could operate more actively than they do at the moment.

21. In the survey by Kuronen and Tapaninen (2010), respondents emphasised the importance of efficient data transferring related to weather and other conditions at sea. Do you think that in the future VTS-centres should be the actor providing even more of this information than they do now, or would it be better to further develop some other methods for exchanging information (for example an internet based application)?
22. Do you find that there is room for improvement in the VTS-centres' activities to send navigation data to vessels, or is the question rather about seafarers having larger expectations than what is written as the basic mission of VTS?
23. Should the authority of VTS operators be increased and VTS be developed to resemble air traffic control? What kind of influence would the increased authority have on VTS-centres or aboard vessels?
24. Is the operation of VTS-centres efficient at the moment? (Amount of centres, location, workload, cooperation) Have some positive results already been perceived with the current placement of centres? There has been plans to reduce the number of

VTS centres to three (Helsinki, Turku and Lappeenranta) during the current year. It is believed that a reduction of ten working years will be achieved with the reduction of the number of VTS centres. How are these reductions going to affect shipping companies?



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