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MARITIME ORGANISATIONS SET UP FOR PROVIDING SAFETY AND ANALYSIS OF THE MARITIME SAFETY AT THE BALTIC SEA

Magistritöö

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ABBREVIATIONS

ABS – American Bureau of Shipping

AIS – automatic identification system

BA- British Admiralty

BV – Bureau Veritas

CCC – Carriage of Cargoes and Containers

CLL - International Conventionon Load Lines

COLREG – Convention on the International Regulations for Preventing Collisions at Sea

CS - Classification Society

DNV – Det Norske Veritas

DOC - Documents of Compliance

DPA – Designated Person Ashore

EMA – Estonian Maritime Administration

EMSA - European Maritime Safety Agency

ENC – electronic navigation chart

ESIB - Estonian Safety Investigation Bureau

GDP - gross domestic product

GOFREP – Gulf of Finland Reporting System

GT - Gross tonnage

HTW - Human Element, Training and Watchkeeping

IACS – International Association of Classification Societies

IALA – International Association of Lighthouse Authorities

IHO – International Hydrographic Organization

III - Implementation of IMO Instruments

ILO – International Labour Organization

IMO – International Maritime Organization

IMSO - International Mobile Satellite Organization

INMARSAT - Convention on the International Maritime Satellite Organization

ISM - International Safety Management

ISO – International Standardisation Organization

ISPS – International Ship and Port Facility Security Code

LNG – liquefied natural gas

LR – Lloyd's Register

MEPC - Marine Environment Protection Committee

MOU – memorandum of understanding

MSC - Maritime Safety Committee

MT – Motor Tanker

NCSR - Navigation, Communications and Search and Rescue

NGO - Non-governmental organization

PIANC - International Navigation Association

PPR - Pollution Prevention and Response

R&D - Research and development

RINA – Registro Italiano Navale

RMRS - Russian Maritime Register of Shipping

SAR - International Convention on Maritime Search and Rescue

SDC - Ship Design and Construction

SMS – safety management system

SOLAS - International Convention on Safety of Life at Sea

SSE - Ship Systems and Equipment

STCW – International Convention on Standards of Training, Certification and Watchkeeping for Seafarers

TEN-T - trans european network

UKHO - United Kingdom Hydrographic Office

VTMIS - vessel traffic management and information system

VTS – vessel traffic service

WTO - World Trade Organization

DEFINITIONS

“aid to navigation” means an object that is visually recognisable according to the characteristics published in navigational information and that is constructed, adapted or installed for facilitating navigation;

“cargo ship” means a ship, including a high-speed craft, which is not a passenger ship;

“domestic voyage” means a voyage in sea areas from a port of a Member State to the same or another port within that Member State;

“fishing vessel” means a vessel equipped and used for catching fish and other living resources for commercial purposes;

“gross tonnage” means the gross tonnage of a ship determined in accordance with the International Convention on Tonnage Measurement of Ships, 1969 or, in the case of ships engaged exclusively on domestic voyages and not measured in accordance with the said Convention, the gross tonnage of the ship determined in accordance with national tonnage measurement regulations;

“international voyage" means a voyage by sea from a port of a Member State or any other State to a port outside that State, or vice versa;

“mobile offshore drilling unit” means a vessel capable of engaging in drilling operations for the exploration for or exploitation of resources beneath the seabed such as liquid or gaseous hydrocarbons, sulphur or salt;

“particularly sensitive sea area” means an area that needs special protection through action by IMO because of its significance for recognized ecological or socio-economic or scientific reasons and which may be vulnerable to damage by international maritime activities;

“passenger ship” means a ship, including a high-speed craft, carrying more than 12 passengers, or a passenger submersible craft;

“ro-ro passenger ferry” means a seagoing passenger vessel as defined in Chapter II-1 of SOLAS, in its up-to-date version;

“special area” means a delimited water area that is intended for certain activities or an area where an activity is prohibited or in respect of which restrictions are applied;

“white List” it means that the IMO has deemed it to be in full and complete compliance with STCW convention.

INTRODUCTION

Autot gives some facts about Estonia:

- The total length of the coastline is 3794 km;
- There are 1520 islands and islets;
- There are shallow waters with numerous banks and rocks;
- ~50 million tonnes of cargo shipped in 2013;
- There were ~9 million passengers in 2013;
- There were ~up to 15 thousand ship visits in 2013.

... and about The Gulf of Finland:

- Covers ~ 30 000 km^2;
- Average depth ~ 37,5 m;
- Lots of shallows and underwater rocks;
- Constitutes ~ 5% of the Baltic Sea.

The goals of the research work are:

1. To describe and assess the organisation of sea traffic safety of the marine transport sector and to describe the role of maritime organisations at advancing the sea traffic safety.
2. To analyse the safety of traffic at the Baltic Sea (including the Gulf of Finland)
   In the Master thesis, the author will expose the tasks, objectives and topicality of the sea traffic safety.

The earlier and pioneering attempts to estimate the risk levels of running the ships, for the purpose of insurance of the vessels, were passive in nature - only the actual state of a given vessel was established, with the security of exploiting the ship being appraised subjectively. The operators however were quick to realise that more efficient measures must be employed, to set down the objective indicators of the ships' security of use, i.e. to elaborate the technical norms of compliance which the ships must be able to meet. Thence the

development of classification of vessels, with the vessels distributed into categories and groups, in conformity with certain demands to their structure, strength, age and place of building. Upon wish of the ship owners, those groups of vessels were assigned a respective class from a certain classification society – the latter were private companies operating independently of one another. However the shipwrecks of the recent centuries convinced the humankind to regulate the safety of sea traffic on an international level, i.e. to compile and to implement the mandatory minimum set of international standards and norms, which every ship engaged in international traffic must comply with. To solve that task, such organisations as IMO and EC were evolved.

Raising of the safety level of passenger ferries and cargo vessels and ensuring the sea traffic safety is achieved by well-oiled cooperation between administration, ports, PSC and classification societies of the countries of domicile of the ports. Analysis of statistics of PSC and FSC shows that the root cause of flagrant violations and detaining of vessels in ports lies hidden in the human factor. Regardless of applicable conventions and strict rules put in place, many ship owners and crew members continue ignoring certain established laws, resolutions and understandings. Those laws have not been established for nothing however. It is the errors and technical disorders and failures which cause accidents and breakdowns at sea. By reason of the foregoing, new laws and conventions are being worked out, or else the existing regulations are made harsher.

Sea traffic has significantly increased at the Baltic Sea in the recent 10 years. Presently the Baltic Sea is among the sea basins of the most lively sea traffic and among those of the most polluted ones.

A problem calling for special attention is the difficulty of providing security and safety at sea. The largest risk on the Gulf of Finland is potential large scale pollution with oil. Sea traffic of the Baltic Sea is becoming ever more congested; therefore the risk of contamination of the waters with oil is growing. The Baltic Sea witnesses minor pollutions with oil every year, while the major catastrophes have been averted, until now. The tonnage of tankers sailing on the Baltic Sea is increasing. It is of utmost urgency to elevate the level of anticipating and prevention of oil accidents by contributing to safety of carriage of cargo on sea.

In the Gulf of Finland with its numerous isles, the oil may very quickly spread to coastline and cause significant damage to biota and natural objects. Low temperature of the

water will slow down the rate of evaporation of oil, with the great number of isles or abundance of ice making battle with oil pollution complicated.

All countries bordering on the Baltic Sea are interested in decreasing the pollution of marine environment, incl. prevention of spill-over and effluence of hazardous wastes. In conformity with the comprehensive marine policy, increasing of the level of joint monitoring of the sea, boosting efficiency of control systems and laying the fixed sea routes would significantly raise safety at sea. The role of human factor, being a complicated and multifaceted question, is affecting the health of people working at sea and is often directly accountable for safety of traffic and of the environment.

Whilst many flag States and owners are meeting their international obligations, their efforts are constantly undermined by those who do not play the game according to the rules. When operators break the rules on safety and environmental protection, they put crews and the environment at risk and in addition benefit from unfair competition.

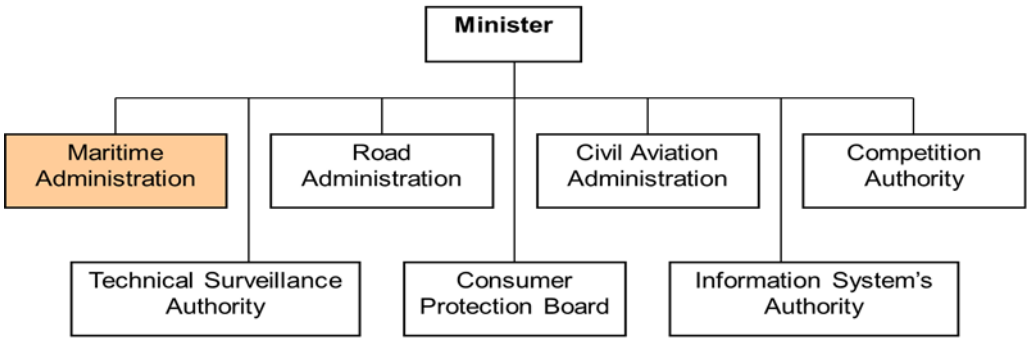
1. MARITIME ORGANISATIONS'S ROLE IN THE DEVELOPMENT AND ENSURING OF MARITIME SAFETY

1.1 Estonian Maritime Administration

EMA is the national maritime safety administration in Estonia. EMA is a governmental agency that operates within the area of government of the Ministry of Economic Affairs and Communications. The main principal aims of the administration are to ensure safe navigation in Estonian territorial and inland waters, and to perform Flag State Implementation and Port State Control activities. Additionally, the administration carries out the installation and maintenance of aids to navigation, performs hydrographic surveys, compiles both electronic and paper navigational charts and distributes publications concerning safe navigation. It also monitors vessel traffic in Estonian waters through the radar and AIS network and arranges icebreaker service in ice conditions[1].

Author presents EMA structure in figures 1 and 2[2]:

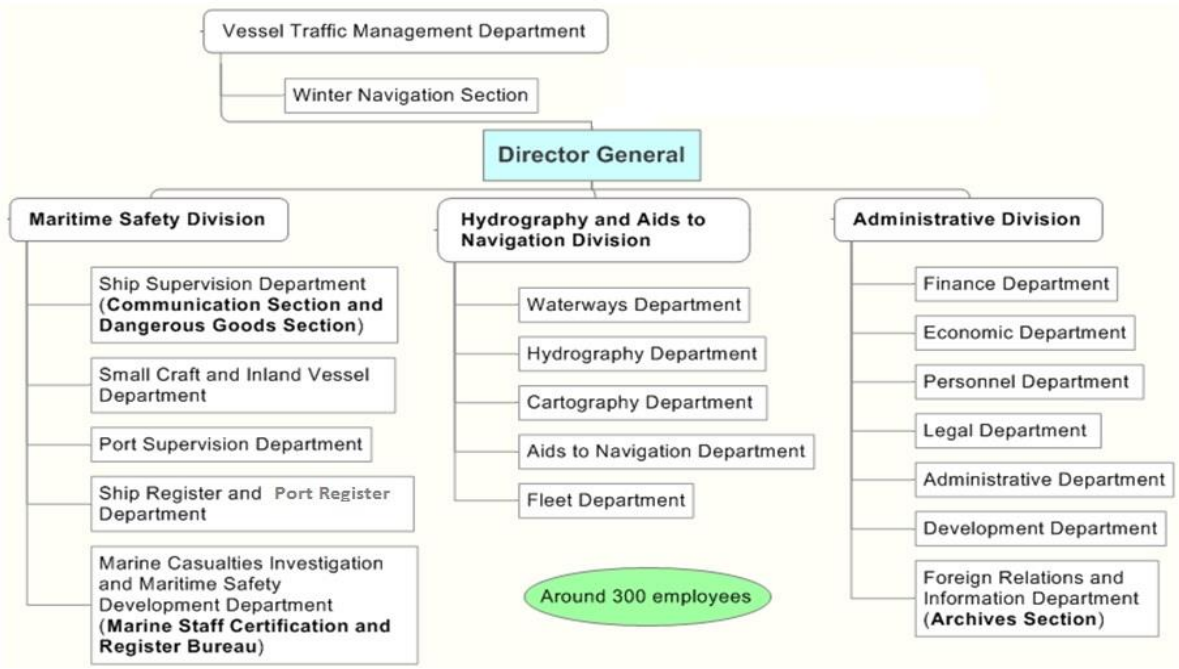
Figure 1



[1] Efficient Sea. http://www.efficiensea.org/default.asp?Action=Details&Item=397 (08.04.15)

[2] Matso J. (2014). Presentation: Estonian Maritime Administration. Tallinn

Figure 2.

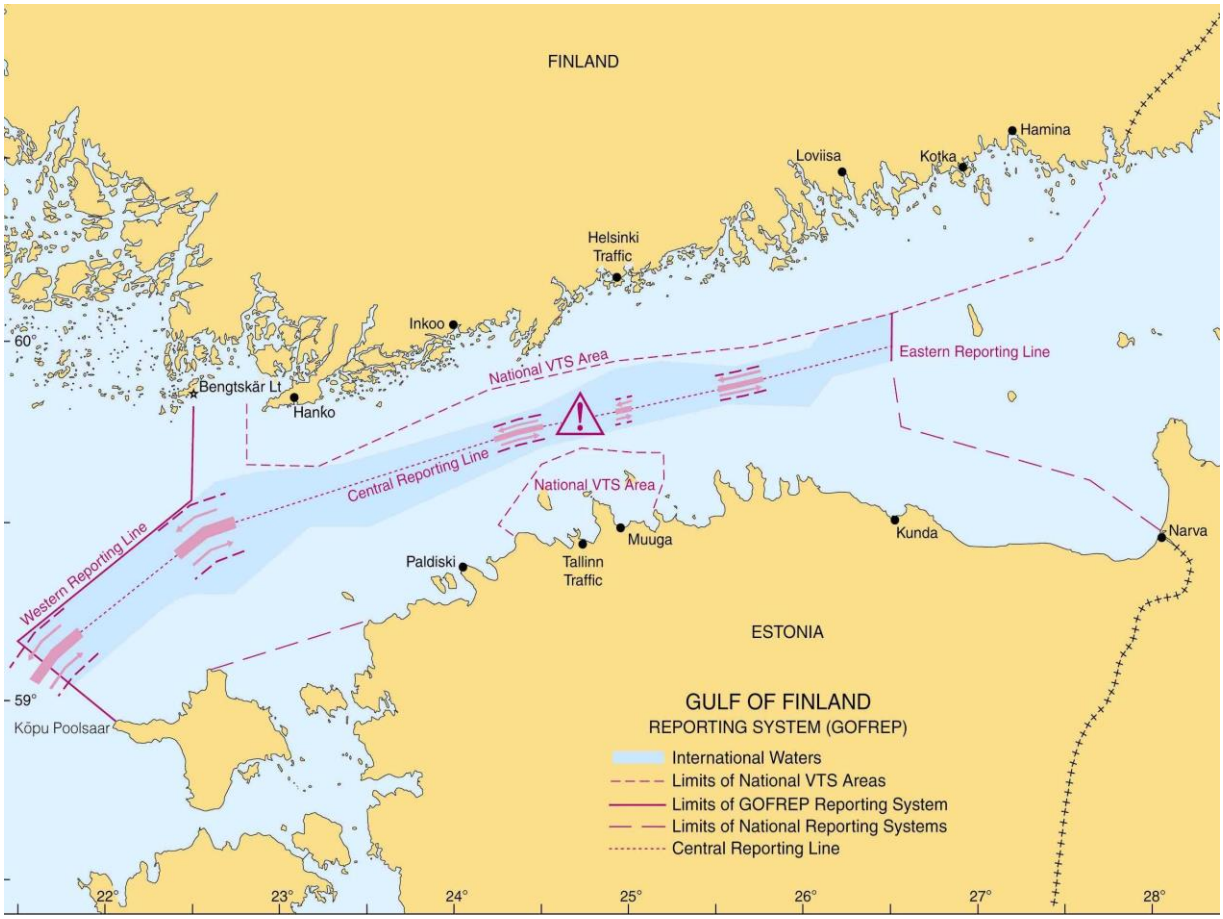


In 2002 the countries around the Gulf of Finland started to establish the VTMIS.

Maritime Administarion vessel traffic management includes VTS, GOFREP - agreement between Estonia, Finland and Russia, and the Ice Breaking Management. GOFREP is given in figure 3.

VTS is operating since 15 August 2003 and GOFREP was launched on 1 July 2004.

Figure 3



The history of the Estonian Maritime Administration dates back to 1918, when the newly independent Estonian State founded the Maritime Safety and Navigational Auxiliary Service office on November 13, 1918, as part of the Command of Tallinn Port (renamed the Ports Authority a month later)[3].

In addition to the existing authority, the new Pilots, Lighthouses and Aids to Navigation Authority office and the Board of Waterways, Ports' Dredging and Repair office were founded on February 1, 1919. In 1920 the General Authority of Maritime Issues, directly subordinate to the Ministry of Trade and Industry, was founded.

The General Authority of Maritime Issues was renamed the Waterways Authority in July 1929, and the Waterways Department in 1938. The most important tasks of the Department at that time were to organise vessel traffic at sea and on inland waterways, draw up new development projects for ports and maintenance plans for waterways.

[3] The history of the EMA. http://www.vta.ee/index.php?id=1766&highlight=HISTORY (08.04.2015)

Maritime office had to conclude its work on December 31, 1940, when the Ministry of Defence of the Soviet Union assumed the responsibility. The hydrography and aids to navigation sector was subordinated to the Hydrography Service of the Soviet Union Navy, cartography and navigational information to the Navy's central administrative board. Administration was re-established on 1 December 1989.

Administration is participating in the following Organizations:

- 1992 136th member country in the IMO.
- 1994 member of the IALA.
- 1997 the Administration represents the common interests of the Estonian maritime industry in the IHO.
- 2001 Estonia achieved full member status in PIANC.
- 2001 EMA became a co-operative member of the port state control organisation Paris Memorandum of Understanding.
- 2005 EMA became a full member of the port state control organisation Paris Memorandum of Understanding.
- 2007 Estonia is included in the "white list" .

Estonian Maritime Administration is a governmental agency that operates within the area of jurisdiction of the Ministry of Economic Affairs and Communications.

The main objective is to organize state supervision in order to ensure safe navigation in the Estonian territorial and inland sea and navigable inland waterways.

Tasks of the Administration:

1. To developing and to implement Estonian Government`s maritime policy
2. To ensure and to control maritime safety and pollution prevention both on Estonian and foreign vessels.
3. Maritime security.
4. Investigation of marine casualties.
5. Inspection of the transportation, handling and storing of dangerous goods on ships and port territories.
6. Issuing certificates and endorsements for seafarers.
7. Supervision over the maritime education/training institutions.
8. Safety on board recreational craft.
9. Aids to navigation in Estonian waters.

10. Hydrographical services, publishing charts and “Notices to Mariners”.
11. Icebreaking and vessel traffic services in Estonian waters.

The quality management system of the EMA has been approved by Lloyd’s Register Quality Assurance Limited. The following areas / processes have been certified at the EMA[4]:

- supervision over training and refresher courses for seafarers;
- certification of seafarers and related activities;
- ship supervision;
- port supervision.

The new Certificate is valid from 01 May 2014 to 30 April 2017.

The Maritime Administration began to improve its management system and implement the quality management system in 2001 in accordance with the requirements proceeding from the International Standard ISO 9001:2000. On 12 April 2002, the Certificate of Approval was issued by Lloyd’s Register EMEA Estonian branch. Thus, the EMA was the first governmental agency in Estonia to receive the Quality Management System Certificate of Approval. In 2009, ISO 9001:2008 requirements began to be applied.

Certification is required by the STCW Convention and Directive 2009/21/EC of the European Parliament and of the Council of 23 April 2009 on compliance with flag State requirements.

The EMA has formulated the following quality policy:

- ensure execution of state supervision in the field of maritime affairs and application of enforcement powers of the state on the bases and to the extent prescribed by law;
- ensure conditions for safe and secure vessel traffic in Estonian territorial and inland maritime waters and navigable inland waters;
- ensure the transparency of our activities and reliability through consistent improvement of the management system;
- activities are client-oriented because Administartion appreciates and meets the needs of the clients, trying to exceed their expectations.

State Port Register will provide an overview of all ports registered in Estonia, including maritime ports and inland ports. The register contains information about port location, port technical data, port services, port manager and harbour master.

[4] Quality Policy of the EMA. http://www.vta.ee/index.php?id=1757&highlight=quality (08.04.2015)

- the project started in june 2011;
- it is managed by EMA;
- the delivery of software was in june 2012;
- the cost was 128.000 EUR;
- it was developed by AS Datel;
- in two languages;
- it is official database for ports and in addition:
  - various applications can be submitted;
  - port inspection reports can be completed in the system.

Regular safety and security inspections are carried out in the 87 ports, which have been registered as providing port services for a fee. They include 26 ports with one or more port facilities within the meaning of EU Reg. 725/2004 (48 port facilities in total).

On average, 70 to 80 inspections are therefore carried out annually.

In addition, monitoring of 78 ports, which have been registered as providing port services free of charge, is carried out on a sample basis.

It is estimated that another 20-30 ports will have to be registered and proceedings have been opened with regard to many of them.

The total number of ports under supervision therefore amounts close to 200.

The electronic data processing tools in the new State Port Register have improved supervisory activities. Ship Register. Ships under Estonian flag are given in figures 4 and 5:

Figure 4. Ships GT 100-under 500

GT 100 – under 500	**2014**[5]		**2013**		**2012**	
Merchant ships	5	873	5	873	5	873
Passenger ships	9	1 867	9	1 867	8	1 728
Fishing vessels	38	5102	37	4985	38	5 106

[5] Ööbik M., Taveter A. (2015). Eesti laevaregistrid 2015. Tallinn

Figure 5. Ships GT 500 and over

GT 500 and over	2014		2013		2012	
Merchant ships	11	31374	13	34870	13	34 870
Passenger ships	16	301488	15	265570	15	254573
Fishing vessels	8	11349	8	11349	7	8999

Figure 6. Marine casualties 2013-2014

Marine casualties in 2013

Type of casualty	Estonian ships abroad	Estonian ships in Estonian waters
Less serious		4 – touch of bottom 1 – contact with quay 1 – during icebreaking contact with a foreign ship 1 – technical failure 1 – hull damage
Serious	1 – injury	
Very serious		1 – loss of life (pleasure craft)

Marine casualties in 2014

Type of casualty	Estonian ships in Estonia waters
Less serious	3-grounding 1-tehnical failure
Serious	2-collision or contact
Very serious	1-flooding of ships 1-loss of ships

Figure 7. Inspection of Estonian ships - FSC

	2014	2013	2012	2011
inspections	213	211	136	204
deficiencies	482	538	280	344
detentions	1	1	1	2

Figure 8. Inspection of Foreign ships - PSC

	2014	2013	2012	2011
inspections	193	154	115	199
deficiencies	151	150	99	131
detentions	0	1	1	1

Figure 9. FSC Main Deficiencies in 2013-2014

2013

Place	Code / Type of Deficiency	Quantity
1.	1500 / Navigation	124
2.	600 / Life Saving Appliances	68
3.	900 / General Safety	65
4.	1600 / Radio	58

2014

Place	Code / Type of Deficiency	Quantity
1.	1500 / Navigation	85
2.	900 / General Safety	83
3.	600 / Life Saving Appliances	69
4.	1600 / Radio	36

Figure 10. PSC Main Deficiencies in 2013-2014

2013

Place	Code / Type of Deficiency	Quantity
1.	1500 / Navigation	33
2.	600 / Life Saving Appliances	15
3.	ILO	14
4.	100 / Ship´s Certificates	13

2014

Place	Code / Type of Deficiency	Quantity
1.	1500 / Navigation	28
2.	200 / Training, Certification and Watchkeeping	20
3.	700 / Fire Safety measures	20
4.	600 / Life Saving Appliances	17

Figure 11. ISM/ISPS in 2013-14

Entity	ISM Audits in 2013	ISM Audits in 2014
Company	11	9
Ship	14	18

Entity	ISPS Audits in 2013	ISPS Audits in 2014
Ship	5	9

Author gives the number of performed ISM and ISPS audits in figure 11.

Responsible unit – Ship Supervision Department (24 employees) has also 2 subunits:

1. Communication Section.
2. Dangerous Goods Section.

During PSC - Paris MOU (and relevant EU) principles, rules and procedures are strictly followed.

The slogan of the quality policy of the EMA is SAFER SEAFARING.

1.2 Classification society

Classification is one element within the maritime safety regime. More than 90% of the world's cargo carrying tonnage is covered by the classification design, construction and through-life compliance Rules and standards set by the Classification society[6].

The purpose of a Classification Society is to provide classification and statutory services and assistance to the maritime industry and regulatory bodies as regards maritime

[6] Classification Societies. http://www.iacs.org.uk (17.04.2015)

safety and pollution prevention, based on the accumulation of maritime knowledge and technology.

The role of classification and Classification Societies has been recognized in the SOLAS and in the 1988 Protocol to the CLL.

Activities which generally fall outside the scope of classification include such items as:

- design and manufacturing processes;
- choice of type and power of machinery and certain equipment (e.g. winches);
- number and qualification of crew or operating personnel;
- form and cargo carrying capacity of the ship and maneuvering performance;
- hull vibrations;
- spare parts;
- life-saving appliances and maintenance equipment.

These matters may however be given consideration for classification according to the type of ship or class notation assigned.

One of the strategies of a Classification Society is environmental consciousness and ship efficiency. Heightened concerns at the impact of global shipping activities on the environment has increased environmental awareness, addressing the needs to improve ship's efficiency as the most effective means to reduce fuel consumption and atmospheric emissions. Environmental concerns also raised issues on safe and effective measures for ship recycling, as well as on discharge into the sea of hazardous substances. As recognized by the IMO and industry, there is a need to achieve an appropriate balance between safety and environmental regulations.

Others with a responsibility for or interest in promoting maritime safety include shipowners, shipbuilders, flag State Administrations, port State control authorities, underwriters, shipping financiers, charterers, and, of course, seafarers.

Only Member States can request EU recognition of a classification society and the enlargement of the EU may lead to additions to the EU recognized list. EU Member States can only authorize a classification society recognized by the European Union. The EMA has, on the authorization of the Government of the Republic, entered into an agreement for the

certification of ships flying the national flag of the Republic of Estonia with the following classification societies[7]:

- LR
- BV
- DNV
- ABS
- RINA
- RMRS

Author gives example for Classification Society as RMRS.

Classification society RMRS was established on 31 December 1913. Since 1969 RMRS has been a member of the IACS.

Main objectives:

- providing safety of life at sea;
- providing safe navigation of ships;
- safe carriage of goods by sea and in inland waters;
- promoting environmental protection.

Since 1993 RS has been maintaining the internal quality management system developed in compliance with ISO 9001. The RS quality management system has been certified and issued with the certificates: National Certification body Gosstandard of Russia Certificate and Independent Certification Body SAI Global Certificate. Since 1999 RS has been recognized by the European Union and acting in accordance with Regulation (EC) 391/2009.

1.3 European organizations and ports

1.3.1 European Commission

Author presents some general facts[8]:

- 23 out of 28 EU countries have a coastline;

[7] EMA webpage. http://www.vta.ee/index.php?id=802&highlight=%C3%BChing (08.04.2015)

[8] Maritime affairs. http://ec.europa.eu/maritimeaffairs/documentation/facts_and_figures/index_en.htm (08.04.2015)

- The EU's coastline is 7 times as long as the US' and 4 times as long as Russia's;
- The EU's maritime regions are home to almost half its population and account for almost half its GDP;
- In terms of surface area, there is more sea than land under the jurisdiction of EU countries;
- Including its outlying regions, the EU has the world's largest maritime territory.

Maritime transport has been a catalyst of economic development and prosperity throughout its history for Europe. Maritime Transport enables trade and contacts between all the European nations. It ensures the security of supply of energy, food and commodities and provides the main vehicle for European imports and exports to the rest of the world. Almost 90% of the EU external freight trade is seaborne. Short sea shipping represents 40% of intra-EU exchanges in terms of ton-kilometers. The quality of life on islands and in peripheral maritime regions depends on good maritime transport services. Each year, more than 400 million passengers embark and disembark in European ports. Overall, maritime industries are an important source of employment and income for the European economy[9].

The European Commission's objective is to protect Europe with very strict safety rules preventing sub-standard shipping, reducing the risk of serious maritime accidents and minimizing the environmental impact maritime transport. The Commission also works actively against piracy and terrorism threats. Another important activity concerns the social dimension, looking after working conditions, health and safety issues and professional qualifications of seafarers. Finally, the Commission works for the protection of citizens as users of maritime transport services, ensuring safe and secure conditions, looking after their rights as passengers and examining the adequacy of the public service maritime transport connections proposed by Member States.

The Commission has recently updated its strategic goals and recommendations for the EU Maritime Transport Policy until 2018. Action in the area of maritime transport aims at ensuring the long term performance of the European maritime transport system as a whole to the benefit of all other economic sectors and of the final consumer. The Commission supports actively the efforts of the EU Member States and of the European shipping sector offering quality shipping services in Europe and all over the world.

[9] Maritime transport. http://ec.europa.eu/transport/modes/maritime/index_en.htm (08.04.2015)

Nearly 40% of the freight exchanges between the EU Member States are conducted by sea. Every year, 400 million passengers embark and disembark in European ports. The internal market for the provision of maritime transport services is of key importance for the performance of the European economy as a whole and for the quality of life and prosperity of maritime regions. Islands and peripheral regions are particularly dependent of maritime transport[10].

With over 80 % of world merchandise trade by volume being carried by sea, maritime transport remains the backbone supporting international trade and globalization. For the EU, which continues to be the most important exporter at world level and the second importer, maritime transport and all related shipping services are essential in helping European companies compete globally[11].

The Commission maintains a continuous dialogue with all the EU shipping and trading partners in the world, i.e. the USA, China, India, Japan or Russia in view of reinforcing the stability of the world seaborne trade system. Bilateral agreements and dialogue are key instruments to solve problems, lift restrictions to international maritime transport and promote quality shipping values all over the world. The Commission fully supports the efforts of the WTO to achieve a multilateral agreement at worldwide level, to the benefit of all nations in the world.

The European Commission also takes part in regular talks of international organizations, especially relating to issues such as safety, the protection of the marine environment or labour standards. It coordinates with Member States the EU positions when negotiating forums such as the IMO and the ILO where it contributed to the adoption of the Convention on Maritime Labour Standards on 23 February 2006.

In recent years, the European Union and its Member States have been at the forefront of improving maritime safety legislation and promoting high-quality standards. The aim is to eliminate substandard shipping, increase the protection of passengers and crews, reduce the risk of environmental pollution, and ensure that operators who follow good practices are not

[10] Maritime internal market. http://ec.europa.eu/transport/modes/maritime/internal_market/index_en.htm (08.04.2015)

[11] International Cooperation and Coordination. http://ec.europa.eu/transport/modes/maritime/international_en.htm (08.04.15)

put at a commercial disadvantage compared to those who are prepared to take short cuts with vessel safety[12].

Whilst many flag States and owners are meeting their international obligations, their efforts are constantly undermined by those who do not play the game according to the rules. When operators break the rules on safety and environmental protection, they put crews and the environment at risk and in addition benefit from unfair competition.

EU action in the field of maritime safety and protection of the environment generates significant added value to the international framework as looked after by the IMO. The transposition of IMO rules into the EU legal system ensures their enforcement across the entire EU. In addition, the EU plays an important role in improving international standards by initiating and contributing directly to their adoption at international level.

Shipping is of strategic importance to the EU economy: two billion tons of cargo are loaded and unloaded in EU ports every year while every year one billion tons of oil transits through EU ports and EU waters. This is why the EU is constantly developing and intensifying its maritime safety policy which the aim eradicating substandard shipping, essentially through a convergent application of internationally agreed rules.

The "Erika" and the "Prestige" accidents encouraged the EU to drastically reform its existing regime and to adopt new rules and standards for preventing accidents at sea, in particular those involving oil tankers. The EU considerably reinforced its legislative arsenal to combat flags of convenience and give Europe better protection against the risks of accidental oil spills. With the Third Maritime Safety Package adopted in 2009, the EU has completed this legislative arsenal covering all chain of responsibility of the maritime sector.

1.3.2 European Maritime Safety Agency

EMSA, as a body of the European Union, sits at the heart of the EU maritime safety network and fully recognizes the importance of effective collaboration with many different interests and, in particular, between European and international institutions, member states' administrations and the maritime industry[13].

[12] Safety and Environment. http://ec.europa.eu/transport/modes/maritime/safety/index_en.htm (08.04.2015)

[13] Baumard L., Macpherson A. (2014). EMSA 5-year strategy. Portugal

EMSA's activities can be broadly described as:

- Providing technical and scientific assistance to the member states and the European Commission in the proper development and implementation of EU legislation on maritime safety, security, prevention of pollution by ships and maritime transport administrative simplification;
- Improving cooperation with, and between, member states in all key areas;
- Providing operational assistance, including developing, managing and maintaining maritime services for ship monitoring;
- Carrying out operational preparedness, detection and response tasks with respect to pollution caused by ships and marine pollution by oil and gas installations.

Equally, it is important to note that the Agency's working environment reflects the initiatives launched by the EU in all policy areas related to the seas in order to strengthen Europe's competitiveness and sustainable growth. In this respect, contributing to the success of the Growth and Jobs Strategy is considered of particular relevance, in terms of defining an attractive framework for quality shipping and quality operators in Europe.

EMSA's mission statement is to ensure a high, uniform, and effective level of maritime safety, maritime security, prevention of, and response to, pollution caused by ships as well as response to marine pollution caused by oil and gas installations.

EMSA's vision is to promote a safe, clean and economically viable maritime sector in the EU.

EMSA's values are efficiency, effectiveness, transparency, flexibility, creating added value.

Europe's very identity is intertwined with both ocean and sea. Of 28 member states, 23 have a coastline. While the maritime sector has not been spared the effects of the challenging economic climate, the gross added value of this sector to EU is estimated at €500 billion including jobs for some five million people. The maritime sector is important for a number of policy areas including energy, transport, environment, fisheries and research. Europe will continue to assert itself as a leading player in the maritime world. 37% of the intra-EU exchange of goods goes through EU ports.

1.3.3 Ports

Europe's ports are vital gateways, linking its transport corridors to the rest of the world. 74% of goods entering or leaving Europe go by sea, and Europe boasts some of the finest port facilities in the world. Ports also play a crucial role both in the exchange of goods within the internal market and in linking peripheral and island areas with the mainland. But ports are not only great for moving goods around, they also generate employment; 1.5 million workers are employed in European ports, with the same amount again employed indirectly across the 22 EU maritime Member States[14].

Nevertheless the sector is facing major challenges in terms of hinterland congestion, traffic growth and investment. The EU needs good performing ports across all maritime regions. Bottlenecks in ports and their hinterland due to the lack of high quality infrastructure or low performing port services result in congestion and extra costs for shippers, transport operators and consumers.

The new guidelines for the development of the TEN-T have identified 329 key seaports along Europe's coastline that will become part of a unified network boosting growth and competitiveness in Europe's Single Market. The Connecting Europe Facility financial instrument will provide up to € 26 billion to support transport infrastructures, including ports and connections of port with the hinterland, for the period 2014-2020.

The Commission adopted on 23 May 2013 an initiative aimed at improving port operations and onward transport connections at these 329 key seaports. This initiative proposes an integrated strategy combining legislative measures and non-legislative measures.

1. The legislative measures take the form of a Regulation to be adopted by the European Parliament and the Council of Ministers. The proposed Regulation will introduce common rules on the transparency of public funding and the market access of port services. The rules on the market access of ports services will however not apply to cargo handling. This Regulation will protect port operators against legal uncertainties and unfair competition and help attract investors. The adoption of the Regulation will help provide a better allocation of scarce public funding and an effective and fair application of the State aid rules in ports. It was estimated that this Regulation could

[14] European Ports. http://ec.europa.eu/transport/modes/maritime/ports/ports_en.htm (08.04.2015)

save the European economy up to €10 billion by 2030 and help develop new short sea links.

2. This proposed Regulation complements the modernization of the state aid rules by the Directorate General for Competition through the development of the case law. The Commission is considering further clarification of the state aid rules applicable to port when the regulation will be adopted, notably by including certain port investments in the Block Exemption Regulation.
3. As other non-legislative measures, the Commission promotes and supports the social dialogue between port workers and their employees to address issues such as health and safety at work, training and qualifications. An EU social dialogue committee has been established and met for the first time on 19 June 2013.
4. The Commission will integrate ports in the future corridor work plans foreseen by article 46 of the TEN-T guidelines (Regulation 1315/2013) and will provide targeted grants and other forms of financial supports to port infrastructure projects by using the Connecting Europe Facility.
5. The Commission is undertaking a series of measures to simplify procedures in ports, in particular by avoiding unnecessary controls by customs for the movement of goods within the internal market. The main instrument to assess the EU status of goods will be a harmonized cargo manifest to be introduced in June 2015.
6. Finally the Commission supports initiatives to raise the environmental profile of ports by providing guidelines and promotes the exchange of good practices and will define a port research and innovation agenda which can be used in the Horizon 2020 programme to encourage innovation in ports.

Siim Kallas, Vice-President of the European Commission (2010-2014) said that ports have been the successful pioneers in Europe for interconnecting different forms of transport. Few other world regions can boast so many transports interchanges that link maritime together with rail, road and inland waterways[15].

The strength is that Europe is home to some of the best ports in the world. There is excellent shipping expertise and there is good potential for port industries to grow in all maritime regions. All the trans- European network ports have a role to play in facilitating

[15] Ports 2030 - gateways for the trans-European transport network. (2013). EC brochure

trade with the rest of the world and creating logistic chains than span different modes of transport. They are instrumental for promoting short sea shipping as an alternative to saturated land transport corridors and contributing to the territorial cohesion of the European Union.

The Union is highly dependent on seaports for trade with the rest of the world and within its Internal Market. 74% of goods imported and exported and 37% of exchanges within the Union transit through seaports. Ports guarantee territorial continuity of the Union by servicing regional and local maritime traffic to link peripheral and island areas. They are the nodes from where the multimodal logistic flows of the trans-European network can be organized, using short sea shipping, rail and inland waterways links to minimize road congestion and energy consumption.

When faced with the challenge of a fully integrated transport network, the Union's port system is confronted by structural performance gaps. Investments are needed to adapt port infrastructure and facilities to suit new transport and logistics requirements and absorb the expected growth of cargo for the next decade during a time of scarce public funding. If nothing is done an opportunity will be missed to increase options available to transport operators and shippers and create growth and jobs in coastal areas and across the Union as a whole.

This Communication reviews the European Port Policy and builds on the progress achieved. It accompanies and supplements a proposal for a regulation of the European Parliament and of the Council establishing a framework on market access to port services and financial transparency of ports. It identifies eight additional set of EU actions needed to further unlock the potential of ports. This revised European Port Policy covers the trans-European transport network seaports, which account for 96% of freight and 93% of passengers transiting through ports in the Union.

Author presents what the raise the environmental profile of ports is. EU ports, and especially the ports of the trans-European network, service a hinterland and a catchment area which go beyond their local and national borders. They are vital to the functioning of the European Union: approximately one out of every two tons of volume handled in ports comes from or goes to, by sea or land, a Member State which is different from the one of the port in which the goods transit. TEN-T is only as strong as its weakest link, so ports must perform well across the board. The absence of a fair level playing field ensuring consistency with the principles of the internal market in the port sector is at the core of the structural performance

gap between ports.

Diversity of governance models and ownership structures is an important feature of the European port system, with no two ports operating in exactly the same way. The European Port Policy respects that diversity and does not seek to impose a uniform model for ports.

Port activities give rise to significant impacts in terms of emissions, noise, water and soil pollution and fragmentation of habitats. Ports located close to densely populated urban areas may often have to balance the development and management of port activities with the preservation of natural habitats and the quality of urban life.

The Commission published guidelines in 2011 on implementing the Birds and Habitats Directives in estuaries and coastal zones, with a particular focus on striking the right balance between environmental protection and port development. Although it is for the European Court of Justice to interpret EU law, the application of the Commission's guidelines can provide a coherent framework for project developers and minimize the risk of litigation.

The Commission welcomes the initiatives taken by the port sector to promote excellence in environmental management and performance by publishing guides to good practices. A number of ports have already adopted plans to better manage their footprint on the environment and such initiatives should be encouraged.

Ports should consider whether to reward operators who anticipate or exceed the application of mandatory environmental standards and promote the use of door-to-door low-carbon and energy efficient logistics chains, e.g. short sea shipping. Although existing schemes introduced on a voluntary basis by a number of ports to raise their environmental image should continue to be supported, a more consistent application of such environmental variation of port infrastructure charges at a European or regional level would help to increase their effectiveness and transparency.

To encourage a more consistent application of environmentally differentiated port infrastructure charges, the Commission have proposed principles for environmental charging and promote the exchange of good practices by 2015. The Commission is reviewing of the Directive on port reception facilities in 2013/2014 with a view to further improving the effectiveness and efficiency of the system.

1.4 International Maritime Organization

Author concluded that due to the international nature of the shipping industry, it has long been recognized that action to improve safety in maritime operations is more effective if carried out at the international level rather than by individual countries acting unilaterally and without co-ordination.

It was against this background that a conference held by the United Nations in 1948 adopted a convention establishing the IMO as the first ever international body devoted exclusively to maritime matters[16].

In the 10-year period between the adoption of the convention and its entry into force in 1958, other problems related to safety but requiring slightly different emphasis had attracted international attention. One of the most important of these was the threat of marine pollution from ships, particularly pollution by oil carried in tankers. An international convention on this subject was adopted in 1954, and responsibility for administering and promoting it was assumed by IMO in January 1959. From the very beginning, the improvement of maritime safety and the prevention of marine pollution have been IMO's most important objectives. In the early 2000s, maritime security became another major focus for the IMO.

IMO is the only United Nations specialized agency to have its Headquarters in the United Kingdom. In June 2013 there were 170 Member States and three Associate Members. Its governing body, the Assembly, meets once every two years. Between sessions, the Council, consisting of 40 Member Governments elected by the Assembly, acts as IMO's governing body.

IMO is a technical organization and most of its work is carried out in a number of committees and sub-committees.

MSC was one of the main organs, along with the Assembly and Council, established by the 1948 Convention on IMO. Today, the MSC deals with all matters relating to the safety of shipping, as well as addressing maritime security issues and piracy and armed robbery against ships.

MEPC was established by the Assembly in November 1973. It is responsible for coordinating the Organization's activities in the prevention and control of pollution of the environment from ships.

[16] Что такое ИМО. (2014). IMO booklet. London.

There are seven sub-committees:

1. HTW Sub-Committee;
2. III Sub-Committee;
3. NCSR Sub-Committee;
4. PPR Sub-Committee;
5. SDC Sub-Committee;
6. SSE Sub-Committee;
7. CCC Sub-Committee.

The Legal Committee was originally established to deal with the legal problems arising from the Torrey Canyon accident of 1967, but it was subsequently made a permanent committee. It is responsible for considering any legal matters within the scope of the Organization.

The Technical Co-operation Committee is responsible for coordinating the work of the Organization in the provision of technical assistance in the maritime field, in particular to developing countries.

The Facilitation Committee is responsible for IMO's activities and functions relating to the facilitation of international maritime traffic. These are aimed at reducing the formalities and simplifying the documentation required of ships when entering or leaving ports or other terminals.

All the technical bodies of IMO, and the IMO Assembly, are open to participation by all Member Governments on an equal basis.

The IMO Secretariat is headed by the Secretary-General, who is assisted by a staff of some 300 international civil servants. The Secretary-General is appointed by the Council, with the approval of the Assembly.

IMO has promoted the adoption of some 50 conventions and protocols and adopted more than 1,000 codes and recommendations concerning maritime safety and security, the prevention of pollution and related matters.

The first conference organized by IMO in 1960 was, appropriately enough, concerned with maritime safety. That conference adopted SOLAS, which came into force in 1965, replacing a version adopted in 1948. The 1960 SOLAS Convention covered a wide range of measures designed to improve the safety of shipping. They included:

- subdivision and stability;

- machinery and electrical installations;
- fire protection, detection and extinction;
- life-saving appliances;
- radiotelegraphy and radiotelephony;
- safety of navigation;
- carriage of grain;
- carriage of dangerous goods;
- nuclear ships.

IMO adopted a new version of SOLAS in 1974. This incorporated amendments adopted to the 1960 Convention as well as other changes, including an improved amendment procedure under which amendments adopted by the MSC would enter into force on a predetermined date unless they were objected to by a specific number of States. The 1974 SOLAS Convention entered into force on 25 May 1980 and has since been modified on a number of occasions, to take account of technical advances and changes in the industry.

Other safety-related conventions adopted by IMO include CLL 1966 (an update of a previous, 1930, convention); the International Convention on Tonnage Measurement of Ships 1969; COLREG 1972, which made traffic separation schemes adopted by IMO mandatory and considerably reduced the number of collisions in many areas; and SAR 1979.

In 1976 IMO adopted INMARSAT and its Operating Agreement. The Convention came into force in July 1979 and later resulted in the establishment of the IMSO, which, like IMO, is based in London.

IMO has always attached the utmost importance to the training of ships' personnel. In 1978 the Organization convened a conference which adopted the first ever STCW Convention. The STCW Convention entered into force in April 1984. It established, for the first time, internationally acceptable minimum standards for crews. It was revised in 1995, giving IMO the power to audit the administrative, training and certification procedures of Parties to the Convention. The amendments entered into force in 1997. Following a comprehensive review, substantive revisions to update the STCW Convention, and its related STCW Code, were adopted in 2010, at a Conference held in the Philippines (the so-called "Manila amendments").

IMO limits pollution from ships. In 1954 a treaty was adopted dealing with oil pollution from ships. IMO took over responsibility for this treaty in 1959, but it was not until

1967, when the tanker Torrey Canyon ran aground off the coast of the United Kingdom and spilled more than 120,000 tons of oil into the sea, that the shipping world realized just how serious the pollution threat was. Until then many people had believed that the seas were big enough to cope with any pollution caused by human activity. Since then IMO has adopted a whole series of conventions covering prevention of marine pollution by ships, preparedness and response to incidents involving oil and hazardous and noxious substances, prevention of use of harmful anti-fouling systems and the international convention on ballast water management to prevent the spread of harmful aquatic organisms in ballast water.

The MERC deals with all issues relating to marine environment protection as it relates to shipping. The PPR Sub-Committee reports to the MEPC[17].

Protecting the environment from shipping is not just about specific regulations preventing ships dumping oil, garbage or sewage. It is also about the improvements in safety - from mandatory traffic separation schemes to the ISM Code and improving seafarer training - which help to prevent accidents occurring.

The preservation of Special Areas and Particularly Sensitive Sea Areas is an important aspect of IMO's work. IMO adopts and designates these areas - so that all Member States have an opportunity to view proposals and discuss any proposed measures, so that any which might impact on the freedom of navigation can be fully explored.

IMO's Technical Co-operation Programme is hugely important in ensuring Member States have the resources and expertise to implement IMO conventions relating to marine pollution prevention. Examples of programmes include: sensitivity mapping to identify which parts of a coastline are particularly vulnerable; training in oil spill response and contingency planning; and the GloBallast Partnerships Project which is addressing ballast water management issues to prevent the transfer of aquatic invasive species.

The IMO has a significant role to play in preserving the marine environment and ensuring that shipping does not have a negative impact. It is recognized that environmentally speaking in terms of energy needed for volume of cargo transported, shipping is one of the "greenest" transport methods.

IMO's mission statement, as stated in Resolution A.1060(28), which sets out the Strategic plan for the IMO (for the six year period 2014 to 2019): "The mission of the IMO as

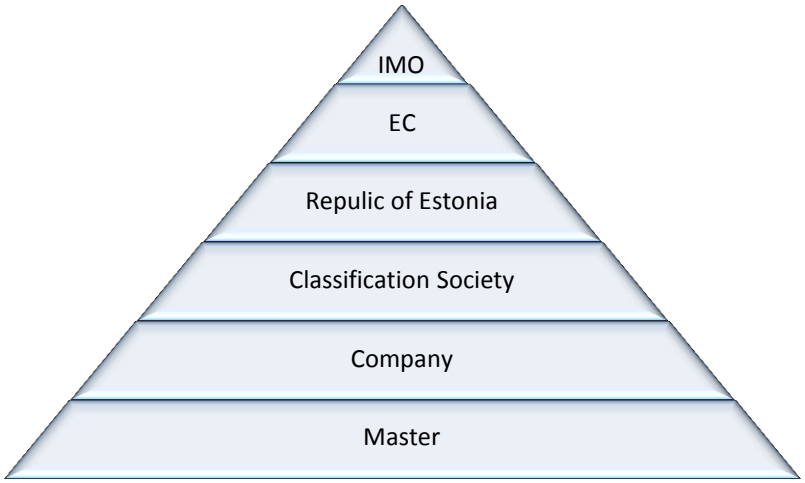
[17] IMO webpage. http://www.imo.org/About/Pages/FAQs.aspx (08.04.2015)

a United Nations specialized agency is to promote safe, secure, environmentally sound, efficient and sustainable shipping through cooperation. This will be accomplished by adopting the highest practicable standards of maritime safety and security, efficiency of navigation and prevention and control of pollution from ships, as well as through consideration of the related legal matters and effective implementation of IMO's instruments with a view to their universal and uniform application."

The overall objectives are summed up in the IMO slogan: safe, secure and efficient shipping on clean oceans.

2. FORMALIZATION OF THE MARITIME SAFETY REQUIREMENTS

Figure 12. Triangle of the requirement



Author describes the established requirements each piece of the triangle (figure12). The idea is that each structe expands established requirements. IMO adopts the minimum requirements; EC adopts a number of its regulations, expanding IMO requirements. Republic of Estonia adopts its acts, expanding EC regulations. Classification Society can add its requirements to existing rules. Company can toughen requirements inside of its organization. Master adds his instructions and rules based on his experience on board. Author gives examples of the ISM code.

2.1 IMO requirements

The ISM Code was adopted by the IMO as Resolution A.741(18), in November 1993. The ISM Code becomes mandatory to all ships since July 2002. The purpose of this Code is to establish a management system in shipping companies to ensure the safe operation of ships and the prevention of pollution. The Code was adopted by the IMO and reproduced in

Chapter IX of the SOLAS. Implementation of the ISM Code is obligatory in all the Member States[18].

On the evening of March 6, 1987, the cross-channel Ro-Ro ferry Herald of Free Enterprise, carrying more than 450 passengers, around 80 crew, more than 80 cars, and close to 50 freight vehicles, left the Belgian port of Zebrügge for the English port of Dover. Soon after the Herald of Free Enterprise passed Zebrügge's breakwater, water flooded into the ferry's lower car deck and destabilized it, causing it to sink in a matter of minutes. 193 lives were lost. The immediate cause of the accident was that the bow door remained wide open, allowing the great inrush of water as the vessel increased speed, while the fatigued assistant boatswain directly responsible for closing it lay asleep in his cabin. The public inquiry led by Justice Sheen revealed that the assistant boatswain's negligence was simply the last in a long string of actions that laid the groundwork for a major accident. The Sheen Report did not stop at identifying the shortcomings of the ship's master and his crew. The inquiry revealed that the shore management, Townsend Car Ferries Ltd., was just as blameworthy. Numerous memos written by Townsend ship's masters pointing out the need to implement safety-enhancing measures or address serious deficiencies on board their vessels went unheeded. The Report summed up the management's cavalier attitude towards safety in the following statement: 'From top to bottom the body corporate was infected with the disease of sloppiness[19].

The Herald of Free Enterprise was a modern ferry equipped with advanced technology and manned by a highly qualified crew. Only seven years prior to the accident, it was built in a German shipyard according to international maritime safety regulations. Why did it capsize? The general frustration in the shipping industry following the capsizing of the Herald of Free Enterprise is typical of the kind of accident that precipitated in a paradigm shift in maritime safety administration and the development of the ISM Code.

The old or existing paradigm was characterized by heavy reliance on technological innovation and detailed rulemaking as solutions to the challenge of promoting safety at sea. However, the series of major casualties that occurred with what seemed to be increasing frequency, heavier loss of life, and greater harm to the marine environment gradually pushed

[18] Safety management. http://www.imo.org/OurWork/HumanElement/SafetyManagement/Pages/Default.aspx (08.04.2015)

[19] Mejia M. Q. (2005). Evaluating the ISM Code using port state control statistics. Sweden

world shipping closer to the edge of the old paradigm. The new paradigm is characterized by the following:

- a migration from the prescriptive to the discretionary variety of administrative control;
- an increased focus on the human element;
- a wider application of macroergonomic principles;
- the institutionalization of third-party control;
- and the enrolment of a broad range of actors.

More than any other international maritime safety instrument adopted in the late 1980s, the ISM Code has come to symbolize the paradigm shift. The maritime community developed the ISM Code as an umbrella instrument to address maritime safety issues from a holistic perspective. The Code is a mandatory instrument that encourages the cultivation of a safety culture in the maritime industry by setting international standards for the safe management and operation of ships and for pollution prevention. It is implemented by the shipping company through SMS, the functional requirements for which include, inter alia, instructions and procedures to ensure safe operation of ships, defined levels of authority and lines of communication amongst shore and shipboard personnel, procedures for reporting accidents and non-conformities, procedures to respond to emergencies, and procedures for internal audits and management reviews.

This research intends to contribute to that segment of ISM Code research that seeks to evaluate the Code's performance as a regulatory framework. A great deal of time and financial resources has been allocated in drafting and implementing the ISM Code and the industry has high expectations on the Code's beneficial effects on maritime safety. While it is too early for a conclusive judgment of failure or success, a study would be useful towards confirming whether the Code is indeed a workable and enforceable regulatory framework that has the potential to achieve concrete results.

Of the numerous possible indicators that manifest the achievement of the objectives of the ISM Code, this research selects port state control inspection statistics. By being a random regime, PSC inspections offer a candid snapshot of the actual status of operational safety aboard the vessel and, by extension, the effectiveness of the Code. The PSC inspection's random character differs sharply with announced statutory surveys where ships are notified in advance that government-appointed surveyors are scheduled to inspect the vessel for the purpose of certification. The advance notice enables operators and crews to prepare the vessel

specifically for the appointed date. In contrast, PSC inspections are unannounced and therefore conducted on vessels in the normal daily mode of operations.

PSC statistics are by no means the only appropriate indicator of the level of the ISM Code's performance. Indeed this research emphasizes the fact that a comprehensive assessment of the ISM Code requires a combination of numerous criteria employing quantitative as well as qualitative analysis. However, in examining PSC statistics, this research explores the potential of random third-party inspections for providing an indication of the effectiveness of one the most important regimes in the present international legal framework for maritime safety.

2.2 EC requirements

EC Regulation 336/2006 applies to[20]:

- cargo ships and passenger ships, flying the flag of a Member State, engaged on international voyages;
- cargo ships and passenger ships engaged exclusively on domestic voyages, regardless of their flag;
- cargo ships and passenger ships operating to or from ports of the Member States, on a regular shipping service, regardless of their flag;
- mobile offshore drilling units operating under the authority of a Member State.

The Regulation does not apply to:

- ships of war and troopships and other ships owned or operated by a Member State and used only on government non-commercial service;
- ships not propelled by mechanical means, wooden ships of primitive build, pleasure yachts and pleasure craft, unless they are or will be crewed and carrying more than 12 passengers for commercial purposes;
- fishing vessels;
- cargo ships and mobile offshore drilling units of less than 500 gross tonnage;
- passenger ships, other than ro-ro passenger ferries, in sea areas of Class C and D as defined in Article 4 of Directive 98/18/EC.

[20] Regulation (EC) No 336/2006 of the European Parliament and of the Council of 15 February 2006

The objective of this Regulation is to enhance the safety management and safe operation of ships as well as the prevention of pollution from ships by ensuring that companies operating those ships comply with the ISM Code by means of:

a. the establishment, implementation and proper maintenance by companies of the shipboard and shore-based safety management systems;
b. the control thereof by flag and port State administrations.

2.3 Republic of Estonia requirements

The main law is Maritime Safety Act, which regulate[21]:

- the maritime safety of ships;
- the security of ships;
- technical supervision of maritime safety;
- seaworthiness;
- professional training of seafarers;
- requirements for manning of ships;
- watchkeeping;
- loading and unloading of ships;
- prevention of pollution from ships;
- monitoring of ships;
- notifications of arrival and departure of ships;
- pilotage of ships;
- marine casualty and marine incident safety investigation;
- recreational craft and other water craft and their navigational safety on navigable inland waters;
- ensuring the safety of vessel traffic on waterways.

Another requirement of the Estonian Republic is Decree No. 3 (09.01.2006) established by the Minister of Economic Affairs and Communications. The Decree describes

[21] Meresõiduohutus seadus. Vastu võetud Riigikogus 12.12.2001 - RT I 2002, 1, 1

the procedure for the maritime safety audit of operators and their ships and the format of audit certificates[22].

2.4 Classification society requirements

1. IACS No 9 "PROCEDURAL REQUIREMENTS FOR ISM CODE CERTIFICATION".

   This document and its Annexes provide the Classification Societies with procedures and criteria for the conduct of audits to verify compliance with the requirements of the ISM Code and for the issuance of the corresponding DOCs and SMCs including short term and interim DOCs and SMCs. Also provided are procedures governing the actions to be taken by Classification Societies when deficiencies associated with the ISM Code are identified by Port State Control Officers[23].
2. IACS Recommendation No 41 "GUIDANCE FOR IACS AUDITORS TO THE ISM CODE".

   All the information found in this guidance, including the objective evidence examples described, is considered as additional data to assist the auditors in conducting audits, and should not be taken as a rule[24].
3. IACS Recommendation No 92 "IACS GUIDELINES FOR ISM CODE AND ISPS CODE ALIGNED AUDITS AND SMC AND ISSC EXPIRATION DATES ALIGNMENT".

   These Guidelines contain the recommendations applicable when a Company requests alignment of ISM Code and ISPS Code audits or alignment of the expiry dates of the Safety Management Certificate and the International Ship Security Certificate[25].

[22] Reederi ja tema laeva meresõiduohutusalane auditeerimise kord ja auditeerimise tunnistuste vormid. Vastu võetud Riigikogus 09.01.2006 nr 3 - RT I 2011, 6, 7

[23] IACS No 9 (Rev. 2 Sept 2012) - Procedural Requirements for ISM Code Certification

[24] IACS Recommendation No 41 (Rev. 4 Dec 2005) - Guidance for IACS Auditors to the ISM Code

[25] IACS Recommendation No 92 (2006) - Guidelines for ISM Code and ISPS Code aligned audits and SMC and ISSC expiration dates alignment

2.5 Company requirements

The ISM Code requires every Company to develop, implement and maintain SMS which includes these functional requirements[26]:

- A safety and environmental protection policy;
- Instructions and procedures to ensure safe operation of ships, and protection of the environment, in compliance with relevant international and flag State legislation;
- Defined levels of authority and lines of communication between, and amongst, shore and shipboard personnel;
- Procedures for reporting accidents and non-conformities with the provisions of this Code;
- Procedures to prepare and respond to emergency situations;
- Procedures for internal audits and management reviews.

Another requirement of the ISM Code is for the ship to be maintained in conformity with the provisions of relevant rules and regulations and with any additional requirements which may be established by the Company.

Company provides additional safety instructions, recommendations and manuals for crew and staff. For example, DPA can provide scheldue, which shows the expiry dates of the ship and crew sertificates.

2.6 Master requirements

By ISM code is established that the Company, taking into account its organization, type of ships and service, should define and document the responsibilities and methods expected by the Master to carry out these functions.

Master establishes his instructions and rules based on his experience on board. Author gives example: the company established that the seaman has to makes rounds every 4 hours. The captain could tighten the rules and require from seaman to the rounds made every 2 hours for safety providing.

[26] Resolution A 741 (18). Adopted on 4 November 1993 by IMO

The Master, as responsible person onboard, should inform the Company whenever there are deficiencies in the SMS relevant to the ship's operation.

The Company should establish in the SMS that the Master has the overriding authority and the responsibility to make decisions with respect to safety and pollution prevention and to request the Company's assistance as may be necessary.

3. ANALYSIS OF THE BALTIC SEA IN THE PRESENT AND IN FUTURE

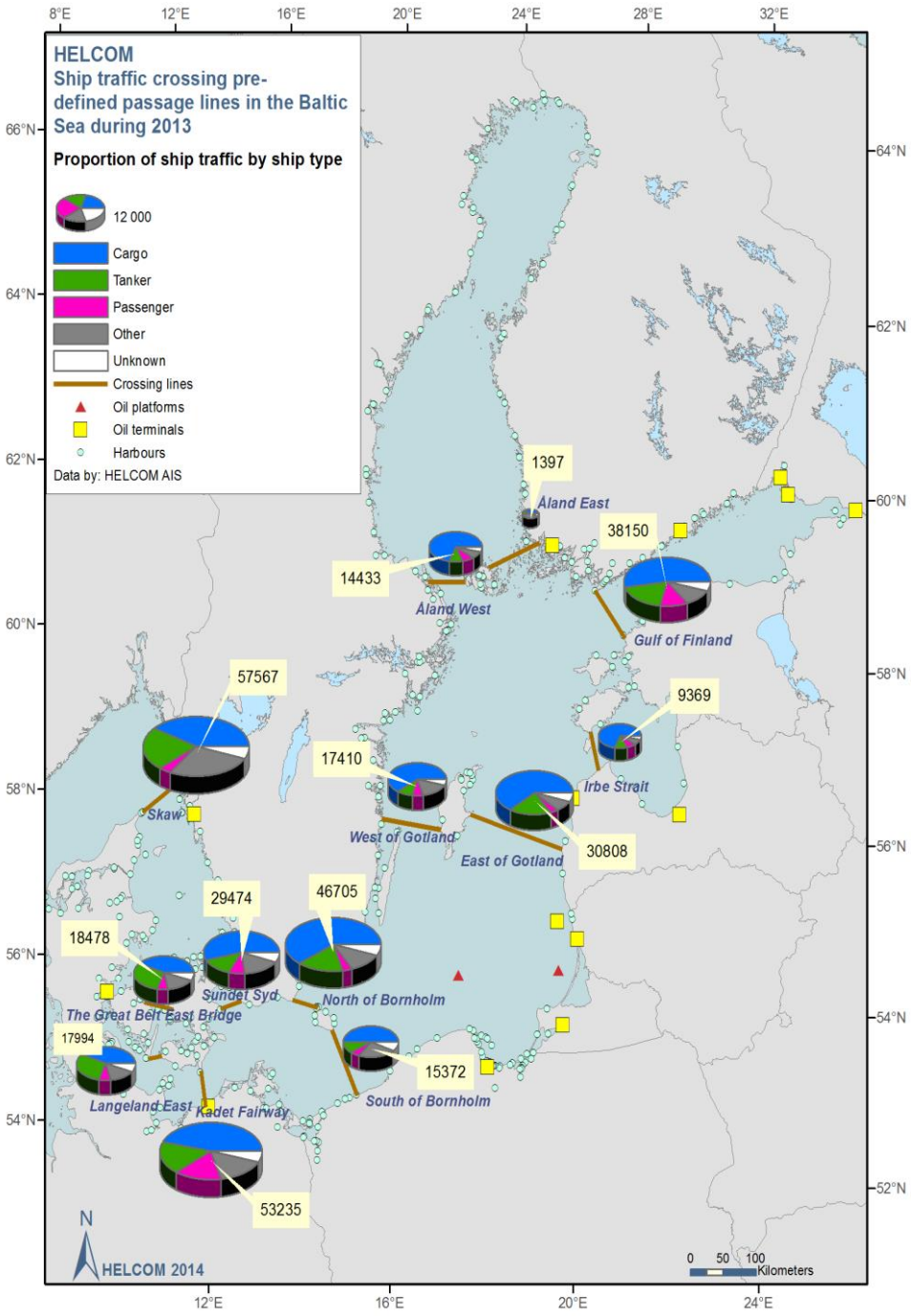
3.1 HELCOM

Author considers, that the Baltic Sea is one of the most highly trafficked seas in the world. Moreover, the Baltic Sea is shallow; the fairways in some places - in particular through the Danish straits - are quite narrow, and the marine environment most sensitive to pollution. In the northernmost parts of the Baltic, ice is frequently a challenge to navigation. At the same time, the amount of and also the size of vessels are growing, and shipping is most important to the economy of the countries of the Baltic Sea Region.

Ship traffic in Baltic Sea. There is a number of ships crossing AIS fixed lines in the Baltic Sea in 2013 according to the type of the vessels (figure 13)[27].

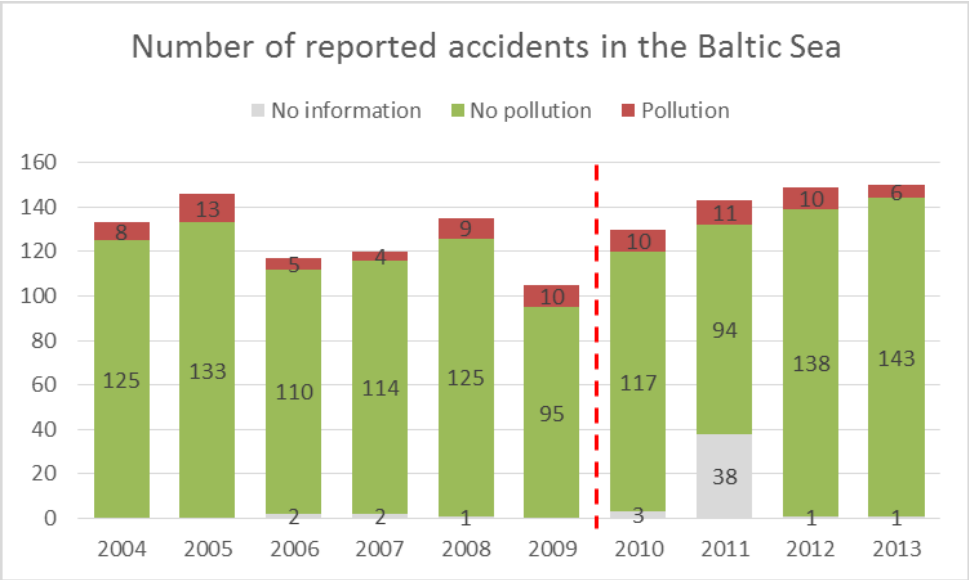
[27] Laura M., Kaitaranta J. (2014). HELCOM annual report on shipping accidents in the Baltic Sea in 2013. Helsinki

Figure 13. Ship traffic predefined passage lines in tne Baltic Sea during 2013



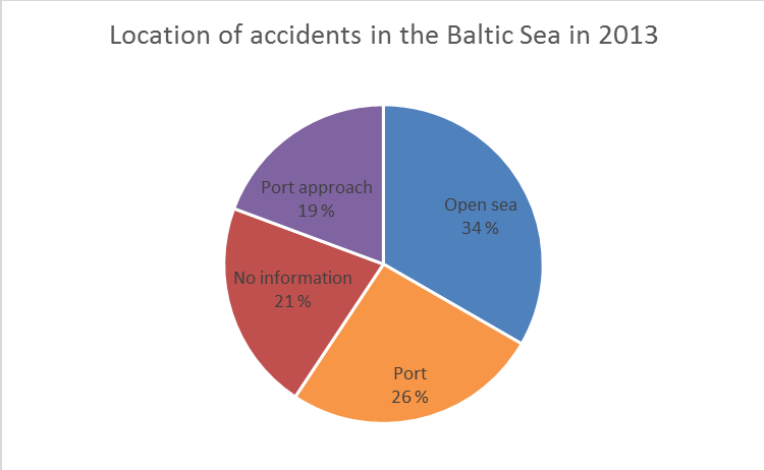
According to the reports from the Contracting States 150 ship accidents occurred in the Baltic Sea area in 2013, which is the highest recorded number in the last ten years (figure 14). The number of accidents in the Baltic Sea has shown a slight increase in the last three years. Compared to 2010 the total number of accidents increased by 15% in 2014.

Figure 14. Number of reported accidents in the Baltic Sea in 2013



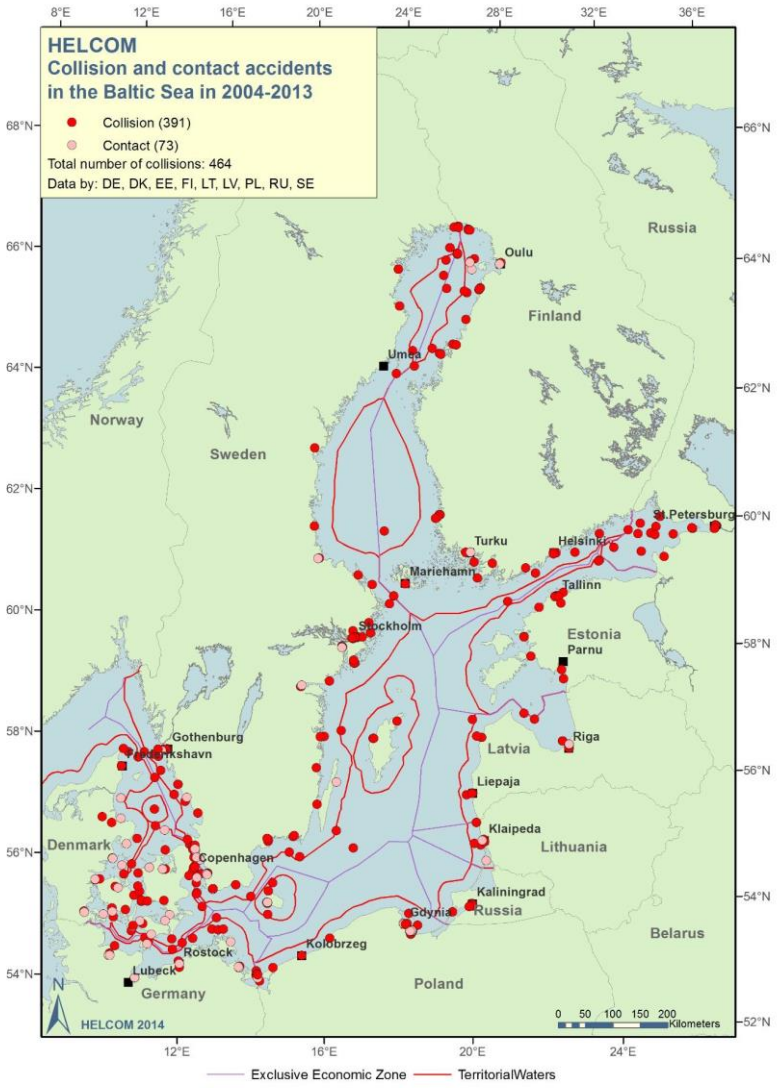
A more detailed categorization of the location of the accidents – open sea, port approach and port - was introduced for the reporting in 2012. Most accidents in 2013 occurred close to shore (26% in port and 19% in port approach) and 34% occurred in the open sea (figure 15). However for 21% of the accidents the location of was not specified.

Figure 15. Location of accidents in the Baltic Sea in 2013



Author analyzed the map of collisions in 2004-2013 (figure 16) and concluded that approaches to ports to the Gulf of Finland is one of the most risky areas for ships to collide.

Figure 16. Collision and contact accidents in the Baltic Sea in 2004-2013



The number of collisions in the Gulf of Finland has reduced considerably during the last ten years and in 2013 only three (5%) collisions were reported in the area. For the time period 2004-2013 on average 10% of all reported collisions took place in the Gulf of Finland. Figures 17 and 18 show the number and spatial distribution of collisions in the Gulf of Finland.

Figure 17. Collision and accidents in the Gulf of Finland

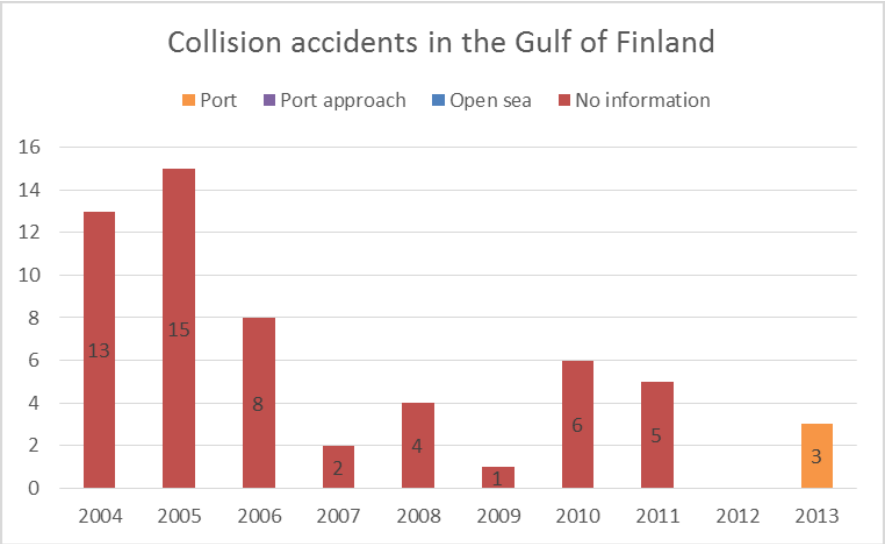
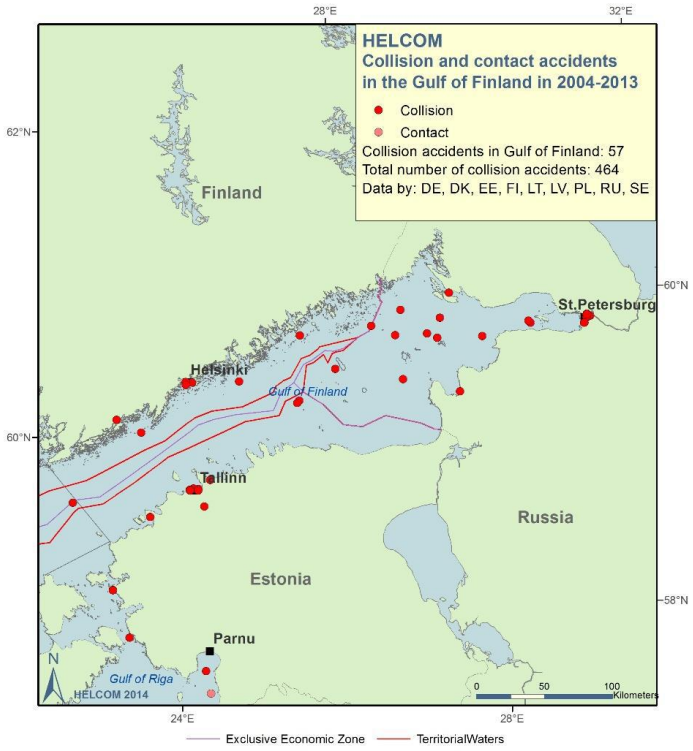


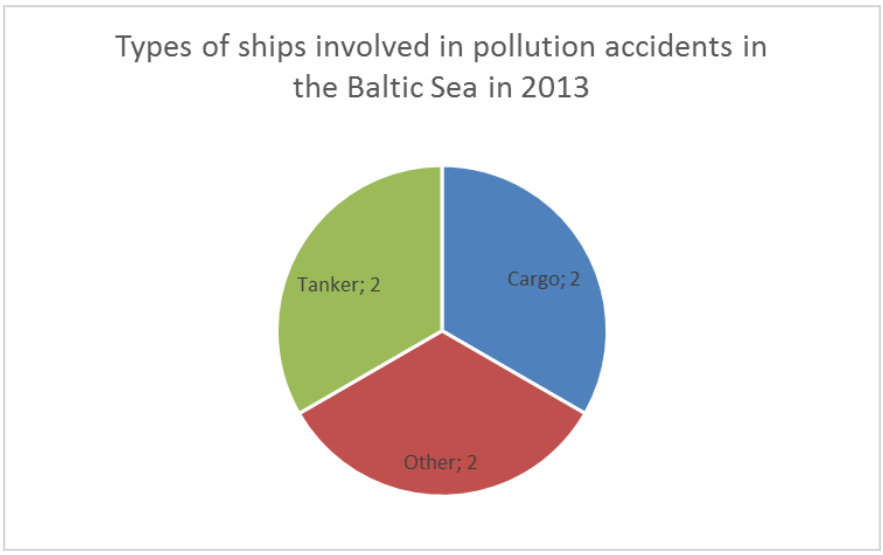
Figure 18. Collision and accidents in the Gulf of Finland in 2004-2013



According to the 2004-2013 data, 4,7% of the reported accidents ended up with some kind of pollution. In 2013 the percentage was 4%, with 6 out of the total 150 reported

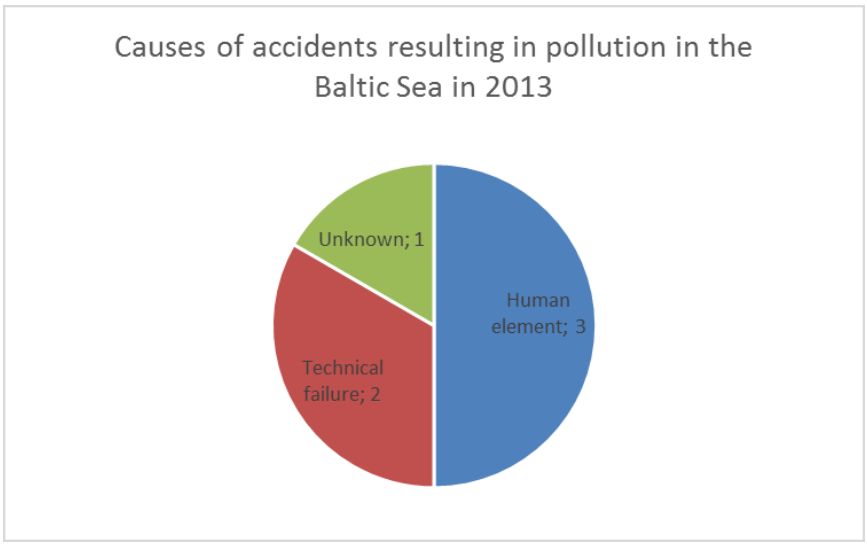
accidents resulting in pollution. The type of vessels involved in pollution accidents in 2013 were two cargo ships, tankers and other ships, respectively (figure 19).

Figure 19. Typesof ships involved in pollution accidents in the Baltic Sea in 2013.



The main cause of the pollution accidents was human error but also technical failure leading to leakages played a part (figure 20).

Figure 20. Casues of accidents resulting in pollution in the Baltic Sea in 2013



Special characteristics such as low salinity, small water volume, restricted connection to the ocean, seasonality and the ice cover during winter make the Baltic Sea highly

vulnerable to the effects of oil spills which makes swift response very important. Intensive regional cooperation in the field of response and preparedness to spills in the Baltic Sea has been carried out within HELCOM since the 1970s. Due to such cooperation efforts the oil recovery rate in the Baltic Sea is generally much higher than the global average and, as proved by previous pollution accidents of regional importance, it can reach as much as 50%.

3.2 Consequences of violations of the requirements

Author presents reports regarding some accidents in the Gulf of Finland in Estonian waters. There were no groundings involving substantial pollution or loss of life. Author considers that should take into account that human factor can lead to more serious consequence.

3.2.1 MT Pacific Empire

The biggest ship reported to have been significantly damaged was the 59,200 GT double hulled crude oil tanker Pacific Empire, which ran aground in the Gulf of Finland off the island of Aegna, Estonia, on 2nd January 2010. The tanker, which sustained significant damage below the waterline, had strayed into shallower waters while maneuvering to anchor at the designated anchorage to await a pilot[28].

The ship was in a good technical condition and the hull, mechanisms and equipment were consistent with international requirements. The crew of the ship was assembled in accordance with the requirements of the STCW convention. But despite that, the ship ran aground, mostly due to human errors[29]:

1. Captain's incorrect evaluation of the situation whilst lowering anchors and maneuvering with the marine propulsion with low intermittent gears at the anchorage (the gear was changed for seven times between 5:21 - 5:31 AM), which could have been due to a little experience with the given ship (5 months). On the basis of the data given in table of the ship's manoeuvre elements (the necessary distance for carrying

[28] Maritime accident review 2010. (2011). EMSA

[29] Kaurla P. (2010). Juurdluskokkuvõtte nr. 1/2010: Mt Pacific Empire madelikulesõit Muuga lahel 02.10.2010. Ohutusjuurdluse Keskus. Tallinn

out a rotation on a high gear is 0,36 M and 0,32 M on a low gear), can be said that the late manoeuvre to the right carried out by the captain in the immediate vicinity of the shore to turn the ship against the wind for a second time anchor lowering was an unjustified risk. The drift of the wind (NE-6 balls) was not taken in account. In the captain's opinion, one of the reasons of running aground was a current. As there are no currents with considerable speeds in the Gulf of Finland, a chapter, article 1.4, "Factual Information" about the currents on the Gulf of Finland, from the pilot book of the British Admiralty, has been added to disprove the captain's opinion.

2. The captain not paying enough attention on the warnings given by the operator of Vessel Traffic Service while maneuvering at the anchorage and approaching the coast at a dangerous distance.
3. The late launching of the anchor and not long enough anchor chain. As the length of an anchor chain shackle was about 25 - 57 m and only two of them were launched, the anchor could not have engaged with the bottom of the sea (the depth below the keel was approximately 30 - 45 m). According to a good seamanship, the captain should have been guided by the norms of great depths (45 - 100 m), which, in such cases, suggest to lower 6-7 shackles of anchor chain.
4. Ship's supply of necessary sea charts, like the A-part of Chapter VII, Section A-VIII/2, paragraph 5 of the STCW codex requires. The positioning of the ship took place on a sea chart, which was missing the necessary information about the anchorage "I". The captain should have waited for the arrival of the maps he had ordered.
5. Inadequate positioning of the ship by the navigators during maneuvering at the anchorage "I", which was conducted on the sea chart number 2248, onto which the location of the ship was designated only to the inner anchorage of the ship (05:00 AM) and 1,5 minutes before running aground (05:30 AM). That kind of positioning can be regarded as inadequate as the requirements of the A-part of Chapter VIII, Section A-VIII/2, paragraph 24 of the STCW were not complied.
6. An observer was missing on the deck of the ship whilst sailing in an area with limited visibility (it was snowing occasionally), unlike the COLREG Convention's Rule 5 "Observation" and Part A, Chapter VIII, Section A-VIII/2, paragraphs 14, 15 and 45

of the STCW Codex require. The documents handed out by the investigators lack any kind of information about the presence of observers on the deck.

7. The running aground of the tanker was indirectly affected by:

- the recommendation of the pilotage to guide the ship, arriving to the harbour of Muuga for the first time, independently to the anchorage "I", which was situated 3,5 M towards Muuga Harbour from the reception area, knowing that the ship was lacking the smaller scale map of entering Muuga Bay.
- the warnings of the custody operator of the VTS were given in a form (in a calm voice) to which the navigators did not pay the necessary attention. The intervention should have been more resolute with a wording emphasizing an immediate danger.

Author concluded that the running aground of MT Pacific Empire took place because of circumstances caused by human errors. The first try of anchoring failed because the lowering of the anchor was started late and the ship started to move towards another anchored ship due to the drift caused by the wind. The second try closer to the shore to turn the ship against the wind to make it to the anchorage again took them to swallow waters because the evaluation of the situation by the navigators was incorrect.

Moreover, the captain's decision to move to the anchorage independently without the smaller scale map of entering Muuga Harbour on the recommendation of the operator of Tallinn VTS turned out to be an unjustified risk. Waiting for the release of the pier would have been more sensible in the given occasion. The navigators did not pay the necessary attention to the warnings of the operators of Tallinn VTS because they were given out in a calm fashion, hence the captain did not apprehend the danger nor could he evaluate the situation adequately.

3.2.2 MT Kyeema Spirit

Another accident happened on 24 September 2012. The Crude Oil Tanker Kyeema Spirit dragged her anchor in Estonian territorial waters East of Isle Aegna and subsequently run aground while trying to leave the anchorage „I". The weather conditions had been

deteriorating since the vessel anchored in calm conditions on the previous day to near gale winds (14-17 m/s) and rough sea on the night of the accident[30].

The vessel sustained damage to her hull. There were no personal injuries and no damage to the environment. No other vessels were involved in the accident.

M/t Kyeema Spirit arrived to Estonian territorial waters in ballast condition on 23rd September and anchored 8 nm from the harbour to await berth at Port of Muuga for cargo loading. The following night the wind speed increased and the vessel's anchor started dragging. The Captain decided to leave the anchorage until the weather would improve. While manoeuvring to leave the anchorage area the vessel run aground.

Estonian Safety Investigation Bureau opened a safety investigation to determine the causes of the serious maritime accident. The casualty was caused by human erroneous action, usage of outdated navigational chart information and adverse weather conditions.

Before arriving to Estonian waters the Captain decided to anchor at the South East area of "I" anchorage in approximately 59°34,9'N; 024°50,0'E due to the disused submarine cable which was marked to the UKHO BA chart 2227. This position would have been about 1 nm from the 10 m contour of the Isle of Aegna. 1.5 h before arriving to the anchorage area, after the duty officer contacted the Estonian VTS, the Captain was notified about vessel Genmar Spyridon laying at anchor in his chosen area. He reassessed the anchoring options taking into account the disused cable on the chart and decided to anchor close to the Northern limit of the "I" anchorage which was already taken by Brovig Fjord. After having an overview of the situation he chose the anchoring position which he took as the safest possibility under the circumstances.

If the charts would have been updated according to the correction, which EMA made public in 2002, it would have been most likely that the Captain would have chosen another anchoring location more East to keep well clear of the shoal contour.

On UKHO charts anchorage „I" is not properly visible although the Estonian Chart 610 covers the whole entrance to port of Muuga. According to EMA UKHO commonly uses the layout of the national charts when updating its own charts of the area. This has not been done yet for the entrance of Muuga on UKHO BA charts although Muuga is a big port with daily heavy traffic.

[30] Haug J. (2014). Report nr. 1893/2012: Grounding of m/t Kyeema Spirit. 2012. Estonian Safety Investigation Bureau. Tallinn

Crew's actions were following. The Captain's previous experience according to his own words when manoeuvring Kyeema Spirit was that the vessel had always responded well which gave him a false sense of security about the vessels manoeuvrability. He did not take sufficiently into account the wind surface of the vessel, weather conditions and small surrounding area for navigation. The Captain of Kyeema Spirit was also aware of the Genmar Spyridon repositioning two times during the night and having similar wind surface and characteristics as Kyeema Spirit.

It was the Captains decision to remain at anchor off lee shore and in the vicinity of hazards in conditions exceeding their ability to get underway safely. Also when giving orders about the anchor chains length he probably did not make any calculations which resulted in the chain not being given out enough and ultimately starting to lift the anchor shank and loosing holding power.

Although the anchorage area can be allocated by the agent, VTS, pilot, etc. - the safety of the vessel and decisions remain the Captains responsibility. Prior to arrival the Captain was advised by the agent BMS to head for anchorage „I". On previous visit with the same vessel the Captain used anchorage „K", which is partly covered from the Northernly winds by the Isle of Prangli. During this voyage the local agent company referred the Captain to use anchorage "I" which can be entered without using a pilot and, respectively, without additional expenses.

On 23rd of September the vessel reached Tallinn anchorage „I" and was anchored 5 shackles in water at the depth of 38 m at the Captains orders.

According to the common formula for calculating the minimum number of shackles required for calm weather. The scope of cable used by the Kyeema Spirit - 5 shackles in the water - was inadequate with Teekay Shipping's SMS manual's "Use of Anchors Procedure". The depth of water was about 38 m (readings from echo sounder). Using the common formula for calculating the minimum number of shackles required for calm weather should be about 9.2 shackles. Deciding not to let out enough anchor chain resulted in lifting the anchor shank and loosing holding power.

Using the correct scope is essential in the maximum holding power of the anchor, particularly in adverse weather conditions. If less cable is used, the effects of yawing caused by the wind and the effects of pitching caused by the swell, increase the risk that the cable will be lifted from the seabed.

The work and rest hours timetable for 96 h before the grounding indicate that fatigue was not a factor in this accident.

Estonian Safety Investigation Bureau's investigation determined as the main cause of the accident failure of the crew to maintain safe ground-clearance during manouvering.

The Captain lost his situational awareness due to being overconfident in his skills based on previous experiences on the vessel.

Contributing factors:

- Near gale wind, rough sea.
- UKHO chart No 2227 varied from Estonian National chart and did not cover the entrance to Muuga including the anchorage area in a user friendly way.
- Usage of outdated navigational maps, caused by publisher's delay in updating their charts according to the national corrections available to them. Captain's decision to agree with the local agency's recommendation to use anchorage „I" which is off lee shore instead of anchorage „K" which the Captain had used on a previous visit to Muuga and would be safer choice with Northerly winds and large wind surface due to vessel's ballast condition.

After this accident there were actions taking by EMA and UKHO regarding correction of the chart. Also EMA gave some safety recommendations. As for company no indications of actions taken were known to ESIB. Author thinks that first of all company have to consider errors, because the accident was caused by human erroneous action such as usage of outdated navigational chart information.

3.3 Maritime safety in the Baltic Sea in the future

Author presents three alternative scenarios for the development of maritime safety and security in the Baltic Sea in 2025. The three scenarios respectively represent preferred, possible and undesired future options.

Each scenario consists of a general description, a list of general issues affecting maritime safety and security settings and a list of maritime safety and security issues. In the end of the chapter is a short summary and comparison of the three scenarios[31].

[31] Storgård J., Lappalainen J., Wahlström I., Kajander S. (2012). Scenarios for development of maritime safety and security in the Baltic Sea region. University of Turku: Centre for Maritime Studies.

Scenario 1: The Baltic Sea - model region for safe shipping.

"The Baltic Sea - model region for safe shipping" in 2025 pictures a positive development within the Baltic Sea Region from today to 2025. The region has developed favorably both politically and economically. A lot of efforts have been paid to reduction and hindrance of environmental degradation whereby the Baltic Sea and surrounding areas are in better environmental state compared to the present situation. The regulative framework offers good prospects for companies, organizations and citizens to operate. The consequent positive development has been a result of active cooperation between the Baltic Sea states including politicians, authorities, researchers, NGO's, other stakeholders and citizens. The positive development in the Baltic Sea Region has also been supported by global stability in politics and economics.

The well-being of the region reflects on maritime safety and security as well. No major security threats prevail and the number of accidents is low. This has been achieved by active and close co-operation in safety and security issues and through improved information sharing, further development of e-Navigation and other new navigational aids. Furthermore the augmentation of safety culture and safety management in shipping has had an important role. The competency of crews is therefore of high level and it is attractive for young people to have a maritime career. The ships operating in the Baltic Sea are generally high standard ships.

General development in the Baltic Sea Region:

- Stable political conditions;
- Prosperous area with diversified economic structure;
- New industries and technologies add to the welfare of the region;
- Harmful environmental effects of shipping are minimized;
- NGO's have an active role in society;
- "All on board" - Good co-operation among all the Baltic Sea states, maritime stakeholders and citizens;
- Resources are effectively utilized on a Baltic Sea scale;
- There are no major security threats in the Baltic Sea area;
- Vivid passenger traffic at sea e.g. due to increasing share of wealthy ageing population in the Baltic Sea Region.

Maritime safety and security issues:

- The number of accidents is low despite of increased traffic and larger ships;
- Safety and security related resources are utilized effectively in good understanding and co-operation in the Baltic Sea Region;
- All ships operating in the Baltic Sea are high standard ships;
- Effective information sharing, vessel traffic management and e-Navigation in the Baltic Sea Region, e.g. sharing route planning information, traffic separation schemes, VTS etc.;
- Crew competence is of high level due to the good quality training, safety management and safety culture in shipping;
- Near miss and incident data is shared and lessons are learnt in proactive way;
- "Zero or low emission" ships are replacing the old vessels;
- LNG is increasingly carried/used as a fuel, as well as other types of zero or low emission fuels;

Scenario 2: Business growing as it is in the Baltic Sea.

"Business growing as it is" describes a situation in 2025 where the development witnessed over the past decades continues. The trade in the Baltic Sea area and that in particular of oil transports is increasing. Welfare is however not equally distributed or spread. Unequal living standards lead to political instability which in turn causes increasing criminality and other unwanted phenomena in the society. Climate change raises concerns which are manifested in the activities of NGO's leading to a growing number of environmental regulations and restrictions.

Fierce economic competition in shipping continues. Shipping companies strive to find savings by minimizing the size of crews and employing low-cost workforce on board. This increases the risk of fatigue and incompetence on board which in turn adds to the likelihood of accidents. The number of human errors is reduced through increased use of technology, which may partly succeed yet easily leading to over-reliance on technology. Maritime safety and security issues are over-regulated causing frustration among companies which in turn results in an augmented level of ignorance or non- compliance among seafarers and shipowners. In addition, more resources are required from public administration to implement and control all the regulations. A maritime career is no more attractive than today.

General development in the Baltic Sea Region:

- Increasing trade;

- Inequality in economic development leads to political instability;
- Criminality, especially organized crime is increasing;
- Concerns about climate change lead to increasing amount of environmental regulations, potentially to over-regulation;
- Environmental over-regulation leads to illegal pollution.

Maritime safety and security issues:

- The amount of maritime transportation increases;
- The amount of oil tanker traffic increases;
- Larger ships induce an increased need for dredging and towage;
- Crew fatigue is a major issue due to lower manning levels;
- Crew competence is also a major issue, larger ships and new technologies induce new crew skill and competence requirements and challenges;
- Reliance on technology causes weakening of traditional navigation skills;
- Human errors cause numerous accidents;
- Safety culture is of poor level;
- The growth in commercial shipping causes safety risks for other users of the sea such as pleasure boating and fishery. Undeclared dangerous cargoes pose a risk to maritime safety and security;
- Over-regulation of maritime safety and security.

Scenario 3: Major disasters in the Baltic Sea.

In "Major disasters in the Baltic Sea 2025" the future development in the Baltic Sea area is mainly negative due to the enduring economic and political crisis at global level. The economic downturn leads to political instability, bringing about growing criminality, illegal immigration, human trafficking and other large scale security threats. Instable states are not able to regulate and control risks effectively. The threats of climate change materialize and extreme weather conditions become more frequent. Other environmental degradation furthermore adds to the misery of the Baltic Sea Region, which e.g. is no longer attractive for tourism.

In these circumstances shipping becomes a risky business and shipping companies avoid large-scale investments and expenses. Unstable states are not able to control maritime traffic properly and maritime safety and security are not actively developed. This leads to a high accident probability even if the amount of traffic decreases. Shipping cannot be

considered an attractive career choice which reflects in poor motivation and seafaring competence among staff.

General development in the Baltic Sea Region:

- Global economic crisis spreads to the Baltic Sea Region;
- Economic crises causes major political instability;
- The amount of passenger and cargo traffic decreases;
- Organized crime and other criminality increase because unstable states cannot effectively manage their controlling authorities and systems (coast and border guards, customs, police etc.);
- Human trafficking and illegal immigration are major problems in the region;
- The likelihood and amount of cyber threats affecting maritime safety increases;
- Climate change increases extreme weather conditions and phenomena.

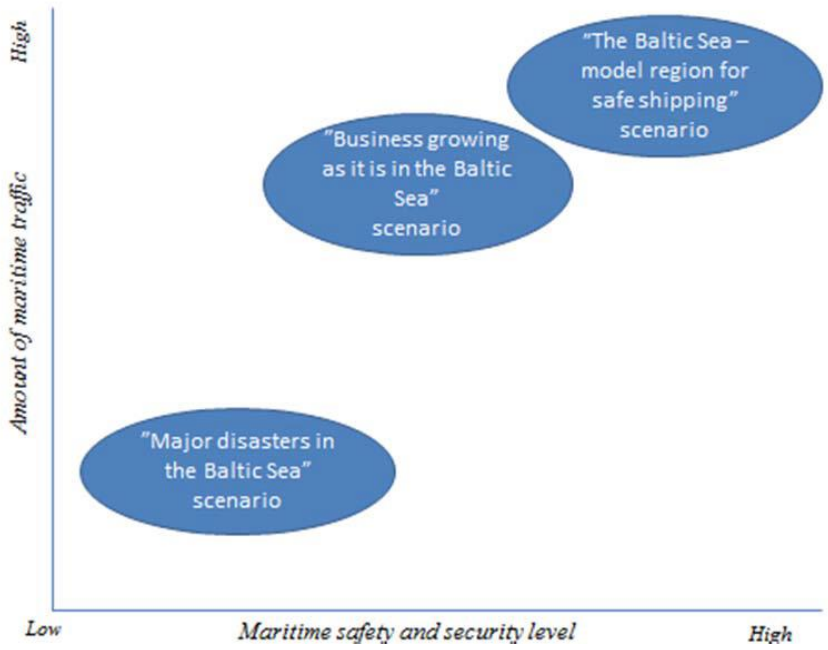
Maritime safety and security issues:

- Probability of accidents at sea is high;
- Security risks are high and ships can be targets for terrorist attacks or hijacking;
- Undeclared dangerous cargoes, such as illegal weapons, increase the risks of maritime traffic;
- Shipping companies use old and sub-standard ships to reduce costs and potential losses;
- Surveillance systems are not working properly or are not interconnected between countries;
- Shipping becomes more dangerous and does not attract competent and motivated seafarers.

From the above author confirms the following. In "The Baltic Sea - model region for safe shipping" scenario the starting point is a dense Baltic Sea maritime traffic and an advanced maritime safety and security level. In the "Business growing as it is" scenario there is likewise dense traffic but the level of maritime safety and security is not equally good compared with the first scenario. The scenario "Major disasters in the Baltic Sea" describes a situation where there may be less maritime traffic while the level of maritime safety and security level is poor. It is generally believed that the level of maritime safety level is linked to the amount of maritime traffic: more traffic means more risks. The connection between

traffic density and the level of safety and security is, however, not that straightforward in the future as is seen in the scenarios (figure 21).

Figure 21. Comparison of three maritime safety and security in 2025 scenarios with regard to maritime safety and security level and the amount of maritime traffic



Because the future is always uncertain, and it is logically impossible to know it beforehand, scenarios should not be taken as forecasting the future as such. In most cases there are numerous complex and intertwined factors and trends which affect the future development. A scenario is thus always a simplification of a complex reality. It is very unlikely that any of the alternative scenarios is going to realize fully, but rather as a partial combination of each future scenario drawn up. In addition, it is likely that there will also appear other factors ahead that are totally unpredictable today.

The "Business growing as it is" scenario pictures the most likely development if the settings remain and the existing trend continues more or less unchanged compared to the past ten years. If major improvements are made in the Baltic Sea Region cooperation and new approaches for the governance of maritime safety and security are developed, the Baltic Sea would be able to reach "The Baltic Sea - model region for safe shipping" scenario. "Major disasters in the Baltic Sea" could realize if the development on the global level is negative

when considering economy, politics and climate change, and adequate measures to counteract the situation are not taken by the coastal states.

3.4 Keys issues of the maritime safety in the Baltic Sea in the future

This part author presents some future key issues of maritime safety. Key issues of maritime safety and security have been grouped as follows:

- The human factor;
- Regulation and administration;
- Safety of ships and cargoes;
- Security;
- Traffic control systems and e-Navigation.

Author describes two keys of issues: the human factor and safety of ships and cargoes.

The maritime safety and security situation in the Baltic Sea Region is to a certain extent dependent on the amount of maritime traffic in particular when considering the large share of oil transports in the area. The economic pressure shipping industry is facing and the limited resources of public administrations furthermore set certain limitations to potential safety and security actions. In comparison with some other sea areas in the world, the Baltic Sea already has a relatively high maritime safety and security level and thus the question is not how to change the poor safety and/or security level into a good one, but rather how to maintain the current level and to ensure a continuous positive development[32].

3.4.1 The human factor

Traditionally technical factors have dominated in the maritime safety work. Although the importance of technical factors should not be underrated, a greater potential is found in human element factors. It is commonly repeated that the human factor causes the majority of accidents. The human factor is a more complex issue compared to technical questions, and consequently it is difficult to find good measures to tackle the related risks. The human factor

[32] Storgård J., Lappalainen J., Wahlström I., Kajander S. (2012). Scenarios for development of maritime safety and security in the Baltic Sea region. University of Turku: Centre for Maritime Studies.

is often tried to be harnessed and controlled with technical solutions instead of focusing on issues which actually cause human errors.

As for crew competence, it can be said that seafarers are employed from international crew markets and the quality of maritime education can vary considerably from one country to another. Issues such as language skills, nationality, social structures or culture differences may influence competence issues. In the Baltic Sea Region and especially in its northern parts, winter conditions increase the navigational challenges in the area. The worldwide shortage of competent and motivated seafarers is a problem that concerns also the Baltic Sea Region. Education and training of seafarers should be critically looked at to establish how the system could be improved and how the seafaring profession could become more attractive career choice among young people. To ensure suitable competence of seafarers in ice navigation is an issue which deserves particular attention not only from the Baltic Sea coastal states but the entire worldwide maritime education system as long as a large share of seafarers working in the Baltic Sea area come from Scenarios for the development of maritime safety and security in the Baltic Sea Region countries with no winter and ice condition experience. In general, better training of seafarers in hydrography could be facilitated to ensure proper utilization of hydrographical information in the printed seacharts as well as in the ENCs.

As for manning of vessels, it can be said that in many cases the number of crew members on board is restricted by the shipping companies to minimum manning levels. Manning costs can account up to 40 % of vessels' operating costs and economic pressures force shipping companies to reduce costs whenever possible. Minimum manning can be considered a risk to maritime safety, as it potentially adds to excessive workloads and human fatigue. Safety culture Safety culture means a system of shared and individual, interpretation, values, attitudes, and behavior related to work safety. It has individual, social and organizational layers which intertwine. Safety culture has a crucial role in comprehension of safety risks and how they are perceived. New approaches are needed in the adaptation and comprehension of safety culture in the maritime industry. Studies on maritime safety culture using cultural or social theories and methods would be a welcomed addition to maritime safety and security research.

Safety management system is in a crucial role when managing safety associated risks and promoting positive safety culture on the organizational level. The key feature of safety management is to strive for continuous improvement in safety and to proactively extract

knowledge from safety risks in in order to prevent serious accidents from happening. In shipping, safety management bases itself on the ISM Code which is part of the IMO´s SOLAS Convention. Some of the preconditions for safety management include senior management commitment to safety, no-blame culture and sufficient resource allocation. Studies on ISM Code implementation have demonstrated that the basic requirements of the ISM Code are generally fulfilled but the philosophy of continuous improvement has not been properly and full-heartedly implemented in the maritime industry. One means of proactive safety is extracting knowledge and learning from incidents and near miss cases. It is known however that incident and near miss reporting in shipping is not at an adequate level.

As for working conditions and working environment, it can be said following: working on a vessel means working in a very special working environment. Seafarers can spend many months on board, working in shifts accompanied by the same fellow workers 24 hours a day. Seafarers´ wellbeing can be improved by paying attention to ergonomics and/or to bridge and crew resource management, for instance. Upgrading and diversification of training in questions related to psychological issues (stress, homesickness, recovery from emergencies or accidents etc.) or social aspects of the job (working in multicultural settings, social relationships etc.) could enhance the mastering of the human factor in shipping.

Examples of future R&D needs:

- Education and training of seafarers;
- Psychological and social aspects of seafaring occupations;
- Maritime safety culture from cultural/social perspectives;
- Promotion of incident and near miss reporting;
- Emergency preparedness on board.

3.4.2 Vessel and cargo safety

Some projects have developed dynamic risk assessment systems which can in advance identify higher risk level vessels in order to intensify the follow-up and control of such vessels. However, there is still work to be done before these systems are deployed and utilized in practice.

Environmental requirements have caused maritime industry to look for alternative energy sources. The use of LNG as ship fuel has got great attention so far and in many Baltic

Sea countries LNG terminals are planned to be built. The safe delivery, storage, bunkering and use of LNG need to be assured. In addition to LNG, there are also other potential alternative fuels e.g. different biofuels.

The safe handling of alternative biofuels can also be an issue that needs special attention in the future.

During the past decades there has been a marked development and improvement in vessel structural design. This however does not imply that there would not be room or call for further improvement with regard to shipping induced environmental impact and durability of ship structures for example in accident situations or harsh weather conditions. Maintenance of vessels and equipment is an issue which requires constant attention. On the regulation side there is a trend towards goal-based standards which in short means that regulations set certain goals which shipbuilders, classification societies and other stakeholders can decide themselves how to achieve. Because goal-based standards in shipping form a relatively new issue, there are still issues that need further research and development.

Examples of future R&D needs:

- Ship safety in accident situations;
- Implementation of goal-based standards;
- Risks assessment for the whole Baltic Sea Region;
- Dynamic risk assessment systems;
- Risk management of new fuels;
- Effects of climate change on shipping.

CONCLUSION

The work consists of the following parts:

In the first part of the work the author presents the EMA, CS, EC and IMO. The author describes the activity of those organisations generally and comprehensively: why they have been set up; why they are needed; what their role is; and what the objectives set before them are.

In the second part of the work the author describes the establishment of demands to every parts of the triangle presented in the Master thesis. While the IMO establishes the minimum requirements, the EK is adopting a number of additional legal acts of its own. The Republic of Estonia may establish further requirements; the classification society may do the same and establish its own requirements. The shipping company may establish its own organisational requirements, and the ship master may set up instructions and guidelines basing on his experience, and complementing the aforementioned requirements. The author describes those requirements in the work and presents relevant examples. The author is positive that such “up-down” all-encompassing system of requirements is feasible and of utmost practicality.

In the third part of the work the author sums the analysis up: what requirements are fulfilled and what are neglected and for what reason. It is shown what the trespassing on requirements may result in. Examples are presented on reports of surveys of accidents on ships in the Gulf of Finland region. The author makes proposals in the work on how the high recurrence of infringement of laws and requirements may be effectively scaled down.

Author concluded that the responsibility for promoting maritime safety include shipowners, shipbuilders, flag State Administrations, port State control authorities, underwriters, shipping financiers, charterers, and, of course, seafarers.

Oil pollution, which is caused by accidental leaks of oil transported by tanker ships, is topical for all seas, especially for the Baltic Sea. It can be described with multiple reasons, which include a vast amount of ports, the relatively small depth of the sea and the small amount of oxygen in the water.

The main triggers of the danger of an oil leak:

- The use of oil tankers not complying with today's safety regulations;

- Dense and extremely intensive vessel traffic;
- Not adequate ensuring of the requirements of a navigational situation.

The evaluation of an emergency is mostly based on the reasons of the emergency (such as the damages of technical devices, external influences and errors of the crew) and the analysis of the conditions of the process.

The main reasons of pollution are cargo operations at the port terminals, during which a hose rupture may occur, damage of the loading equipment, overloading and damaging of the tanker ships during moorage.

The author supposes that liquidation and compensating the damages of oil pollutions are extremely expensive. The most economically efficient way of handling the problem is preventing the catastrophes, for example, supervising the surveillance and movement of ships and keeping up the communication between them would help to prevent mistakes in navigation. A joint cooperation between Estonia, other member states of the European Union and Russia is necessary for that.

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KOKKUVÕTTE

MERENDUSORGANISATSIOONID OHUTUSE TAGAMISEL JA LÄÄNEMERE MERESÕIDUOHUTUSE ANALÜÜS

Uurimistöö eesmärk on:

1. kirjeldada ja hinnata meretranspordi sektori meresõiduohutuse korraldust ning kirjeldada merenduse organisatsioonide rolli meresõiduohutuse arendamisel.
2. Läänemere (seahulhas Soome lahe) meresõiduohutuse analüüs.
   Autor näitab oma magistritöös meresõiduohutuse ülesandeid, eesmärke ja aktuaalsust.

Meresõidu arengus tehtud esimestel katsetel arvestada riskiastet – rakendati laevade kindlustamist – oli passiivse iseloom, kuna selle käigus fikseeriti tegelikult ainult laeva faktiline seisund ja kasutamiskindlust hinnati subjektiivselt. Seetõttu mõisteti kiiresti, et on vaja kasutusele võtta efektiivsemad abinõud ja võtta kasutusele laevade kasutamiskindluse objektiivsed näitajad, s.t. töötada välja tehnilised normatiivid, millele laevad peavad vastama. Nii hakkaski arenema laevade klassifitseerimine, kus laevad jaotati kategooriatesse ja gruppidesse, mis vastasid teatud nõudmistele nende konstruktsiooni, tugevuse, vanuse ja ehitamise koha osas. Laevaomanike soovi korral said need laevade grupid vastava klassi ühelt klassifikatsiooniühingutest, millised olid erakompaniid ja tegutsesid üksteisest sõltumatult. Kuid viimaste sajandite laevaõnnetused on veennud inimkonda reglementeerima laevasõidu ohutus rahvusvahelisel tasemel, s.t. koostada ja juurutada minimaalselt kohustuslik rahvusvaheliste standardite ja normatiivide kompleks, millele peab vastama iga meresõidulaev, mis sooritab rahvusvahelist reisi. Selle ülesande lahendamiseks kaasati sellised organisatsioonid, nagu IMO ja EC.

Reisi- ja kaubalaevade ohutuse astme tõstmine ja meresõidu ohutuse kindlustamine saavutatakse administratsiooni, sadamate, sadamariigi kontrollid PSC ja klassifikatsiooniühingute sujuvas koostöös. PSC ja FSC statistika analüüs näitab, et tõsiste rikkumiste ja laevade sadamas kinnipidamise põhjuseks on inimfaktor. Vaatamata kehtivatele konventsioonidele ja rangetele eeskirjadele, eiravad paljud laevaomanikud ja meeskonna

liikmed jätkuvalt mõningaid kehtestatud seadusi, resolutsioone ja konventsioone. Kuid kõik need seadused ei ole kehtestatud lihtsalt niisama. Just nimelt vead ja tehniline mittekorrasolek põhjustavad merel õnnetusi ja avariisid. Sellest tulenevalt töötatakse välja uusi seadusi ja konventsioone või karmistatakse juba kehtivaid eeskirju.

Laevaliiklus on Läänemerel viimase 10 aasta jooksul märkimisväärselt suurenenud. Praegu on Läänemeri kõige intensiivsema laevaliiklusega ja üks kõige reostatumaid akvatooriume.

Üks tähelepanu väärivaid probleeme on raskused, mis on seotud ohutusega merel. Kõige suurem risk Soome lahel on võimalik maštaapne naftareostus. Laevaliiklus Läänemerel muutub järjest intensiivsemaks ja selle tulemusel kasvab ka naftareostuse risk. Läänemerel toimuvad väiksemad naftareostused igal aastal, kuid suuri katastroofe on õnnestunud seni vältida. Läänemerel kurseerivate naftatankerite kandevõime aina suureneb. Esmatähtis on tõsta naftaõnnetuste ennetus- ja profülaktikataset panustades kaubavedude ohutusse merel.

Soome lahes, kus on väga palju saari, võib nafta väga kiiresti levida randadele ja põhjustada loodusele märkimisväärset kahju. Vee madal temperatuur aeglustab nafta aurumist ja saarte rohkus või jää teevad naftareostusega võitlemise keeruliseks.

Kõik Läänemere-äärsed riigid on huvitatud merekeskkonna reostumise vähendamisest, sealhulgas ka ohtlike ainete vette mitte sattumisest. Kooskõlas kompleksse merepoliitikaga ühise merevaatluse, kontroll-süsteemide ja maršruutide määramise efektiivsuse tõstmine suurendaksid märkimisväärselt ohutust merel. Inimfaktori osa, mis on keeruline ja mitmetahuline küsimus, mis puudutab inimeste tervist merel ning mõjutab sageli otseselt meresõiduohutust ja keskkonda.

Käesolev magistritöö koosneb järgmistest peatükidest:

Töö esimeses osas autor esitleb EMA, CS, EC ja IMO. Autor kirjeldab nende organisatsioonide tegevust üldiselt ja täielikult, miks nad on loodud ja milleks neid vaja on, milline on nende roll ja millised on neile püstitatud eesmärgid.

Töö teine osas autor kirjeldab nõudmiste kehtestamisest igale magistritöös toodud kolmnurga osale (struktuurile). Mõte on selles, et IMO kehtestab minimaalsed nõuded, EK võtab vastu veel rea oma õigusakte. Eesti Vabariik võib kehtestada täiendavalt oma nõuded, klassifikatsiooniühing – omad. Laevakompanii võib kehtestada oma organisatsiooni-siseselt mingid oma nõuded ja kapten kehtestab lähtuvalt oma kogemustest laeval täiendavalt eelnimetatud nõuetele mingid instruktsioonid ja nõuded. Autor kirjeldab töös neid nõudeid ja

tuuakse näiteid. Autor on kindlalt veendunud, et selline ülalt-alla laienev nõuete süsteem on väga praktiline ja toimiv.

Töö kolmandas osas autor teeb analüüs – milliseid nõudmisi täidetakse, milliseid mitte ja mis põhjusel. Näidatakse, milleni võib viia nõudmiste eiramine. Tuuakse näiteid uurimistulemuste ettekannetest õnnetustest laevadel Soome lahe regioonis. Autor teeb töös ettepanekuid, kuidas vähendada seaduste ja nõudmiste rikkumist.