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## Environmental protection in the Lithuanian Shipping Company (LISCO)

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**WORLD MARITIME UNIVERSITY**  
Malmö, Sweden

**“ENVIRONMENTAL PROTECTION IN THE  
LITHUANIAN SHIPPING COMPANY LISCO”**

By

**TADAS VAIVADA**  
Republic of Lithuania

A dissertation submitted to the World Maritime University in partial  
fulfilment of the requirements for the award of the degree of

**MASTER OF SCIENCE**

In

**GENERAL MARITIME ADMINISTRATION AND  
ENVIRONMENT PROTECTION**

**1998**

## DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

*Tuclas Varvade* Signature  
.....*5 November 1998*..... Date

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## ABSTRACT

Title of the Dissertation: **Environmental protection in the Lithuanian Shipping Company LISCO**

Degree: **MSc**

This dissertation provides an overview of the marine environment protection issue on the ships of Lithuanian Shipping Company.

The Lithuanian Shipping Company LISCO is the biggest shipping company in Lithuania. Until 1991 LISCO was a part of the USSR merchant fleet and could not carry out not only the whole policy of the company independently from Moscow but even a policy of environmental protection from pollution from ships.

After 1991, when Lithuania achieved independence from the USSR, LISCO has become an independent state company. LISCO has worked for only 7 years in the free shipping market, so, it is interesting to investigate what was done during the short period of time, is now being done and will be done in the near future in this field of activities. What kinds of environmental problems are facing LISCO? How are they solving these problems?

This study will analyse preparedness of Lithuanian Shipping Company to meet strengthening requirements for environmental protection and how it will affect LISCO itself.

This dissertation also identifies the weakest points regarding pollution on the LISCO ships, when ships' surveillance was carried out, and what kinds of

environmental protection equipment exist on LISCO ships. Is this equipment capable of ensuring required limits when wastes are discharged after treatment in the equipment?

The conclusions summarise what the situation in the company and on ships is at present. Recommendations suggest several proposals about how to ensure environmental protection and what kind of equipment could be possible to install on LISCO ships for better prevention of marine environment.

## TABLE OF CONTENTS

Declaration	ii
Abstract	iii
Table of Contents	v
List of Tables	vii
List of Figures	viii
List of Abbreviations	ix
<b>1. Introduction</b>	<b>1</b>
<b>2. Environmental regulation and guidance applicable to LISCO ships;</b>	<b>6</b>
2.1 The main regulations of international and regional conventions and documents;	9
2.1.1 The MARPOL 73/78 Convention;	9
2.1.2 Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (LDC), 1972;	11
2.1.3 International Convention Relating to Intervention on the High Seas in cases of Oil Pollution Casualties (INTERVENTION), 1969;	11
2.1.4 International Convention on Oil Pollution Preparedness, Response and co-operation (OPRC), 1990;	12
2.1.5 International Convention On Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978;	13
2.1.6 United Nations Conventions on the Law of the Sea (UNCLOS), 1982;	13
2.1.7 Convention on the Protection of the Marine Environment of the Baltic Sea Area (HELCOM),1972;	14

2.1.8 International statutes of pollution protection from ships;	14
2.1.9 Oil, sewage and garbage record books. Fulfilment of oil record book;	17
2.1.10 Shipboard oil pollution emergency plan;	21
<b>3. Environmental protection on LISCO ships;</b>	<b>25</b>
3.1 LISCO Safety Management System (SMS);	25
3.2 LISCO environmental protection policy;	28
3.3 Inspections of LISCO ships in foreign ports;	31
3.4 LISCO ships faults for environmental requirements. Reasons;	34
3.5 Control and responsibility of pollution protection on board LISCO ships;	38
3.6 Inspectors remarks for environmental protection after surveillance of LISCO ships;	42
3.7 Pollutants and garbage discharging from LISCO ships in foreign ports;	45
3.8 Environmental protection from oil pollution from ships;	50
3.9 Environmental protection from pollution by sewage;	52
3.10 Protection from garbage pollution;	54
3.11 Atmosphere non-pollution requirements and LISCO;	57
3.11.1 Atmosphere pollution by exhausted gases;	57
3.11.2 Atmosphere pollution by halons;	64
<b>4. Environmental protection equipment on the LISCO ships;</b>	<b>67</b>
<b>5. Recommendation for environmental protection equipment on board LISCO ships;</b>	<b>71</b>
5.1 Conclusions;	71
5.2 Recommendations;	73
<b>Bibliography</b>	<b>75</b>

## LIST OF TABLES

Table 1	Sanctions and penalties for violation in foreign countries	15
Table 2	Sample of completed page of Oil Record Book	20
Table 3	Surveyed LISCO ships and remarks for them	42
Table 4	Payments for discharge of bilge, sewage, garbage from LISCO ships in 1996	47
Table 5	Quantities of pollutants getting into atmosphere	58
Table 6	Harmfulness of halons	65
Table 7	Value of environmental protection equipment on all LISCO ships	69

## LIST OF FIGURES

Figure 1	Scheme of shipboard oil pollution emergency plan on LISCO ship	24
Figure 2	LISCO net profit and expenses for fuel during 1995-97 and forecast for 1998 if from 1998 had been entered into force regulations on fuel sulphur content for ferries in Baltic Sea	63
Figure 3	Quantitative changes of environmental protection equipment on the LISCO ships	68

## LIST OF ABBREVIATIONS

BIMCO	The Baltic and International Maritime Council
HELCOM	Convention on the Protection of the Marine Environment of the Baltic Sea Area
IACS	International Associations of Classification Societies
IMO	International Maritime Organization
INTERVENTION	International Convention Relating to Intervention on the High Seas in Case of Oil Pollution Casualties
IOPP	International Oil Pollution Prevention Certificate
LDC	Convention on the Prevention Of Marine Pollution by Dumping of Wastes and other Matter
LISCO	Lithuanian Shipping Company
MARPOL	International Convention for the Prevention of Pollution from Ships
MEPC	Marine Environment Protection Committee
MOU	Memorandum of Understanding
OPRC	Convention on Oil Pollution Preparedness, Response and Co-operation
ORP	Oil Record Book
PSC	Port State Control
SMS	Safety Management System
SOLAS	International Convention for the Safety of Life at Sea
SOPEP	Shipboard Oil Pollution Emergency Plan
STCW	International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
WMU	World Maritime University

## CHAPTER I

### 1. Introduction

With developing of present shipping business, increasing number of ships in the world, the question of ecology in this business becomes more and more important. Increasing transportation of cargoes by ships inevitably increases sea pollution.

More often ships break the statutes of sea environment and do a big harm for sea living and non-living resources. Therefore, a lot of states submit stricter requirements against sea pollution. But sea pollution, especially with oil products, constantly increases.

Using oil products and lubricants, leakage from fuel and lubricant systems, small spillage during maintenance, accidental spillage during the replacement of lubricants and cleaning filters, keeps occurring.

Let's ask, why seamen still pollute the sea. Ships sail in the sea not because of romanticism, but trying to get more profit. Ships captains count money, and any wasted minute in ports costs big sums of money. Seamen understand that they need to stay in ports unloading and loading cargoes, but they cannot understand delays for discharging polluted waters and that for that they have to pay pretty good sums of money. There are quite a lot of ports which refuse to take some kind of wastes. Where to put them? Very often these wastes are discharged over the ship side to sea. Very often profit aspiration prevail over civil responsibility.

Despite active control of Baltic sea waters and big penalties, spillage of oil and others substances which pollute environment still do not decrease. Not only eastern Baltic states control the sea ineffectively. According to unofficial data, western countries, having better technical means, can identify only 20% of sea pollution cases. Night and fog often hide the polluters.

Environmental protection inspectors more often punish for unintentional spillage of oil products, and these who spilled oil deliberately are not punished.

MARPOL 73/78 Convention and the Helsinki environmental protection commission established in 1979 have created stricter prevention measures for polluters of world oceans and also, the Baltic Sea.

After 15 years of work by these organisations it appears that it is impossible to stop increase of sea pollution. So now the biggest attention is paid not for prevention measures but to try to eliminate reasons which cause sea pollution.

Because Lithuania has joined all main conventions for environmental protection (MARPOL 73/78, HELCOM), the requirements of these conventions are applied to Lithuanian shipowners.

Strengthening market competition for transportation of cargoes and becoming more stricter requirements of environmental protection can cause additional difficulties for activities and development for Lithuanian shipowners. Therefore, according to the topic of this dissertation "Environmental protection in Lithuanian Shipping Company LISCO" the author will investigate what the situation is in the biggest merchant fleet owned by the Lithuanian company solving environmental protection problems.

The Lithuanian Shipping Company is the biggest shipping company in Lithuania. LISCO has about 40 ships including 6 ferries. Until 1991 LISCO was a part of the USSR merchant fleet and the heads of the enterprise could not influence what policies to execute, what kind of ships to build and what kind of equipment to fit on them, because all decisions were made in Moscow.

After 1991, when Lithuania achieved independence from the USSR, LISCO became an independent state company. LISCO has worked for only 7 years in the free shipping market, so, it is of interest to investigate what structure of environmental protection has been created in this company during the short period of time. What kind of environmental protection problems are facing LISCO? How are they solving these problems? Are international environmental protection requirements put into practice properly in LISCO?

Therefore, within this dissertation the author will identify the main international and national documents, treaties and conventions in the context of environmental protection which impact upon LISCO and to establish the facts of environmental pollution from LISCO ships with analysis of causes which occurred on LISCO ships and how was evaluated and the reasons for these causes.

Also it is important to represent an opinion of the inspectors who verified LISCO ships. The results of the inspections is like a mirror which shows the weakest points on the LISCO ships and in the company itself. Into this evaluation will include opinion of international organisations about reliability of Lithuanian shipowners and how they comply with the marine pollution prevention requirements.

Other important thing that has to be examined is LISCO environmental non-pollution policy and to make a comparison of this policy with international framework, especially emphasising how the ISM Code is being introduced in the

LISCO and on the LISCO ships, and to determine what environmental protection equipment is being used on the LISCO ships.

In on the final stage of this dissertation, conclusions, proposals and recommendations will be made about equipment that would be possible to introduce on the LISCO ships for better prevention of environmental pollution.

Environmental protection affairs are important not only for LISCO. New private shipping companies in Lithuania are trying to consult with LISCO when trying to solve environmental protection problems. These companies can get LISCO experiences in this field and adopt them to their own companies.

Also the author will analyse what was done, is being done and will be done in the future in LISCO company wanting to keep in position in the market and that strengthening requirements for environmental protection would not disturb normal LISCO activities.

The author had some difficulties in preparation of this dissertation. The theme of dissertation is very specific and emphasises only one company in one country. That creates some problems to collect necessary information about that company, because the company itself is not very big according to international standards. Therefore the largest part of the material that has been used in this dissertation was gained individually from the company during the breaks between studies in World Maritime University. Therefore, the approach and research method had been based on material that was collected from LISCO, on material which was available in WMU, and using internet.

The aim of this research was to focus on any valuable information in WMU and in LISCO company about marine pollution from ships which could be useful and for the author, and could be a good material for this dissertation.

The topic of this dissertation is very relevant for the author, who will be working in LISCO environmental protection department. The topic is also very useful for LISCO. The author has the opportunity to deepen his knowledge about LISCO environmental protection problems inside the company and on LISCO ships.

The author has a good chance to familiarise himself with international experience on how to prevent sea pollution from ships and what steps are being taken nowadays in international organisations to reach above aim. Therefore this work will be a good initial data base when the author starts work in LISCO environmental protection department and to make a comparison of LISCO activities in this field with international experience.

The outcome of this work will suggest what kind of changes LISCO needs in environmental protection policy and what kind of equipment could be introduced if the company wants to be able to compete in the shipping business.

## CHAPTER II

### 2. Environmental regulation and guidance applicable to LISCO ships

The main documents which regulate sea pollution from Lithuanian Shipping Company LISCO ships are follows (Seaman of Lithuania", 1996, No10):

1. International Convention for the Prevention of Pollution from ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78) and implementation recommendation of MARPOL 73/78 Annex V of environmental protection from garbage pollution from ships;

2. Convention on the Protection of the Marine Environment of the Baltic Sea, 1974 (Helsinki Convention);

3. Instruction on the sea pollution protection from LISCO ships. Internal document was prepared in Klaipeda Fleet Engineer Centre according to special LISCO order;

4. Ships oil pollution emergency plan. Prepared by Central Scientific Research Institute in Sankt Petersburg according to LISCO order. This plan is approved by the Administration;

5. Drainage and sewage water systems schemes. The ships masters prepare these and display them in a visible place. One copy is kept in the operation record book;

6. Oil Record Book. This book is a part ships official log-book and shall be in the Form specified in MARPOL 73/78 Convention in appendix III to Annex I;

7. Record books of operations with sewage water and garbage. LISCO ships official document;

8. Technology page. Fuel providing works on the ship. LISCO ships internal document provided by shipbuilding yard;

9. Report instruction about sea environmental pollution. LISCO instruction for ship heads how to prepare a report if environmental pollution from ship has occurred. Prepared according to General Principles for Ship Reporting System and Ship Reporting Requirements, including Guidelines for Reporting Incidents involving Dangerous Goods, Harmful Substances and/or Marine Pollutants adopted by the Organisation by resolution A.648(16);

10. Technology scheme of oily waters collection and transfer. LISCO ships internal document prepared for every ship individually according to their characteristics. Prepared by shipbuilding yards and LISCO engineers;

11. LISCO decree of sea pollution protection from ships;

12. Rules to prevent pollution from ships. Russian Register, 1993;

13. Sanitary rules for sea ships. Russian Register, 1991;

14. Registration rules of operation with oil, oil products and others harmful substances. Russian Register, 1993;

15. Instruction for Oil Pollution Emergency Plan. Prepared according to "Guidelines for the development of shipboard oil pollution emergency plans" which was developed by the Organisation;

16. IMO resolution A.741(18). International Safety Management (ISM) Code;

17. Carriage rules of dangerous goods. Russian Register, 1993;

18. International Convention for the Safety of Life at Sea (SOLAS), 1974;

19. Periodic control program for the sewage treatment equipment. LISCO internal document applied for every ship individually;

20. Instruction of chemical reagent usage for ships sewage treatment equipment. LISCO internal document;

21. Laboratory control methods for ships sewage cleaning equipment. Russian Register, 1993;

22. Periodic control program for garbage burning equipment. LISCO internal document applied for every ship individually;

23. Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (LDC), 1972;

24. International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (INTERVENTION), 1969;

25. International Convention on Civil Liability for Oil Pollution Damage (CLC), 1969;

26. International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC), 1990;

27. International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978, as amended in 1995;

28. United Nations Convention on the Law of the Sea (UNCLOS), 1982;

29. Environmental protection statutes of the Republic of Lithuania:

- "Regulation of fee for environmental pollution" No 1-1188;

- "Economical sanctions for accidental disposal of pollutants into atmosphere and for pollutants disposal in not proper place" No 1-1823;

-Decree No 416 that Republic of Lithuania has joined such international conventions: MARPOL 73/78, SOLAS 74 and STCW 1978;

-Decree of Government of the Republic of Lithuania No 458 about approval of accounting method for violation of environmental protection legislation.

Majority of these documents are on every LISCO ships, and the heads of the ship must be familiarised and follow not only the regulations of international agreements on the sea protection from pollution but also follow coastal countries laws and rules which protect the sea from pollution.

## **2.1 The main regulations of international and regional conventions and documents**

This section describes the main conventions and documents that regulate sea pollution from ships, and focuses on the most important regulations.

### **2.1.1 The MARPOL 73/78 Convention**

The MARPOL 73/78 Convention is the main International agreement which prohibits any spills of oil carried by ships, spills of harmful substances or sewage and garbage during the operation of the ship.

In the six annexes of the MARPOL 73/78 Convention are laid out rules which specify norms and preconditions for disposal of oil, noxious liquid substances, harmful substances in packaged forms, sewage water, garbage and atmosphere pollution.

The MARPOL 73/78 Convention specifies technical requirements for ships construction, for devices, for instruments and for equipment which ensure definite norms for implementation of special conditions and permissible disposal from ships.

It is forbidden to infringe any regulations of the MARPOL 73/78 Convention. Sanction for that infringement set ship flag state rules independently from that where such infringement occur.

Ships flag state is responsible for implementation of MARPOL 73/78 requirements on her own ships.

Convention provides such forms of illegal actions: disposal of oil, others harmful substances, sewage, garbage and disposal of liquid noxious substances.

The Convention regulations do not apply to discharge into the sea of oil or oily mixture necessary for the purpose of securing the safety of a ship or saving life at sea or the discharge into the sea of oil or oily mixtures resulting from damage to a ship or its equipment.

When ship is in the foreign port, port state-state competent inspectors can check validity of certificates. Certificates and oil and cargo operation books confirm that the ship satisfies the requirements of the MARPOL 73/78 Convention.

Organisations bodies can do the copies of records from record books and to demand that captain would confirm the records. At the same time they can inspect whether the ship has discharged any harmful substances in violation of the provisions of the regulations independently in what place it was done, i.e. even if it was in the open sea. Such inspection consist of survey of ship premises and equipment, and seizing the samples of oil to identify disposal.

In addition, the subject of state-ports inspections organs can be condition of ship and equipment. If the ship does not satisfy the standards, of the Convention and because of that a contamination can occur, port authority has the right to ensure that the ship shall not sail out until defects are rectified or let to sail to the nearest ships repair enterprise. Detentions of LISCO ships and ships with flag of Lithuanian Republic because of defect, will be dealt with in further chapters.

If it was discovered that prohibited disposal from ship has occurred, port state must inform the next port of call of that ship or to bring an action under the state

rules, or to report all information and evidences to flag state. In that case, when port state brings an action against ship, the flag state must be informed.

### **2.1.2 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (LDC), 1972**

The convention has a global character, and represents a further step towards the international control and prevention of marine pollution. It prohibits the intentional dumping of wastes and certain hazardous materials without competent organisation permission of state-Convention body.

Mentioned under wastes are prohibited to dump in whatever forms and in whatever conditions it would be:

- 1) chloro-organic combinations;
- 2) mercury and combinations;
- 3) cadmium and combinations;
- 4) steady plastic and other steady synthetic materials;
- 5) crude oil and oil assign to fuel, heavy diesel fuel, hydraulic lubricants and lubricants which has materials mentioned above in itself;
- 6) radioactive wastes with high radiation level;
- 7) any kind of materials which is meant for biological and chemical war.

### **2.1.3 International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (INTERVENTION), 1969**

This Convention gives special rights to the coastal state in special cases, when an accident of foreign a ship on the High Seas is threatening to pollute the beach and the coastal waters. In this case coastal state can take valid actions (even demolition of ship and cargo) to prevent or reduce the pollution.

#### **2.1.4 International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC), 1990**

The purpose of the Convention is to provide a global framework for international co-operation in controlling major accidents or threats of marine pollution.

Parties to the Convention will be required to establish measures for dealing with pollution incidents, either nationally or in co-operation with other countries.

Ships are required to carry a shipboard oil pollution emergency plan, the contents of which are to be developed by IMO. Operators of offshore units under the jurisdiction of parties are also required to have oil pollution emergency plans or similar arrangements which must be co-ordinated with national systems for responding promptly and effectively to oil pollution incidents.

Ships are required to report incidents of pollution to coastal authorities and the convention details the actions that are then to be taken. The Convention calls for the establishment of stockpiles of oil spill combating equipment, the holding of oil spill combating exercise and the development of detailed plans for dealing with pollution incidents. Parties to the Convention are required to provide assistance to others in the event of a pollution emergency and provision is made for the reimbursement of any assistance provided.

### **2.1.5 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978**

In 1978, IMO adopted the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), which established internationally-recognised minimum standards for seafarers. The Convention was considerably revised in 1995, when IMO adopted a new STCW Code, to which many technical regulations of the original STCW Convention have been transferred. The revised STCW entered into force on 1 February 1997.

The Convention establishes standards for the deck department, engine department and radio department and deals with all members of the ships complement. In each case the Convention prescribes minimum age levels, minimum periods of sea-going service and certification requirements

### **2.1.6 United Nations Convention on the Law of the Sea (UNCLOS), 1982**

One of the objectives of this Convention is to regulate questions about prevention of deliberate and not deliberate pollutants disposals and other sources of pollution.

UNCLOS Convention concentrates on defining the jurisdictional rights and obligations, both legislative and enforcement, of flag, coastal and port state.

According to the UNCLOS, coastal states have many rights and duties to protect and preserve the marine environment in the territorial sea, in the exclusive economic zone and on the continental shelf.

The coastal state can and must use all internationally agreed rules and standards, and, in some circumstances, must be not less effective than generally accepted international rules and standards. The coastal state, also, can inspect foreign vessels, and start investigation because of the infringements and even with detention of the ship.

#### **2.1.7 Convention on the Protection of the Marine Environment of the Baltic Sea Area (HELCOM), 1972**

The HELCOM Convention embrace various aspects, related with protection of Baltic Sea from oil pollution, noxious and hazardous substances, sewage water, garbage from ships, land, air, from drilling and other platforms and constructions.

The Convention requires to supply ports and terminals with reception facilities and regulates liability for damage, adjustments of arguments and others.

Permissible disposal in special areas of all kinds of wastes is regulated by the MARPOL 73/78 Convention.

#### **2.1.8 International legislation of pollution protection from ships**

Ships Masters must bear in mind that according to regulations of the United Nations Convention on the Law of the Sea each coastal state has a right to lay down within national jurisdictional zone more stricter requirements in respect of disposal of oil and other wastes than it provided by MARPOL 73/78.

Coastal states can use their own legislation (to detain or arrest ships, to begin investigation an to impose a penalty) for any kind of ships, if they violate an international agreements and national pollution prevention rules.

According to the statutes of some states, responsibility for disposal of wastes from ships and for violation of national rules is imposed on ship Master, independently of his guiltiness. Is enough for coastal state competitive organisations to prove the fact of prohibited disposal to put the Master on trial.

Coastal states statutes provide very strict sanction (penalties, ships arrest until the penalty will be paid and jail) for prohibited disposal of wastes and others violations.

Sizes of penalties and sanctions for violation of statutes and rules in foreign countries are represented in table 1 (source: LISCO documents):

Table 1. Sanctions and penalties for violation in foreign countries.

Source: LISCO documents

Country	Disposal of oil to the sea	Disturbance of inspector	Disposal of wastes and atmosphere pollution	Violation of ORB fulfilment	Hiding of information
1	2	3	4	5	6
Austral.	50,000 \$	2000 \$	5,000\$	5,000 \$	10,000 \$
Belgium	7,500 \$			500 \$	300 \$
UK	23,000 \$	50 \$		230 \$	90 \$
Greece	3,000-150,000\$				
Ireland	8,000 \$	100\$		8,000 \$	200\$
Italy	2,400 \$				
Canada	70,000\$		17,000\$		

Table 1.(Continued)

1	2	3	4	5	6
Liberia	2,500 \$			100 \$	
Holland	5,000- 12,000 \$	300 \$	12,000 \$	100 \$	
Norway	4 month in jail or penalty			penalty	3 month in jail or penalty
USA	25,000 \$ or 2y. in jail				10,000 \$ or 10,000\$ 1 year in jail
Finland	penalty or 2 years in jail				
France	till 160,000\$				

In some coastal countries there are prepared methods of penalties and sanctions. The basis of them are a scale of proportionality. If we know the kind and quantity of pollutant then with the scale it is very easy to establish amount of penalty. Methods are well grounded coefficient system, which enlarge amount of penalty depending on kind of pollutants, pollution place and pollution consequences: wharf wasted time, prohibition to sail in and sail out, occupying anchoring areas.

Penalties based on "the discretion of the port administration" is the most widespread form. Legislation of many states provide only the maximum penalty amount. In every case port administration lays down the amount of penalty depending how serious the infringement is.

Legislation of many states provide, that person responsible for the ship must immediately report to the government authorities of coastal states about wastes disposal in respect of extraordinary circumstances.

According to information from the Lithuanian Environmental Protection Ministry Klaipeda Regional Department Coast Guard service chief Vytautas Vozgirdas, maximum penalty in port of Klaipeda can reach even 2 million litas (0,5 million US dollars) for spilling of oil and oil products.

But there are exceptions, when wastes disposal is not classified as infringement of international agreements (LISCO, 1996, Environmental protection on LISCO ships):

- 1) when disposed materials is not included in the list of prohibited materials to dispose as per international agreements;
- 2) When disposed materials (according to international agreements) are within permissible concentration.
- 3) when disposal into the sea is necessary to ensure ship safety and human lives;
- 4) having special permission for disposal;
- 5) force-major consequences (storm and etc.);
- 6) when noxious substances are disposed in response to special circumstances;
- 7) in permissible scientific research cases.

### **2.1.9 Oil, sewage and garbage record books.**

#### **Fulfilment of oil record book**

Operations with oil, sewage water, noxious substances and garbage record books are ships documents and they are to be filled according to official order. Ships of Lithuanian Shipping Company have all these record books.

Operations with sewage water and garbage are registered in all LISCO ships (because crew, passengers and personnel total contain more than 10 people) when they are in territorial and inland waters. These books shall be preserved for a period of three years after the last entry has been made (LISCO, 1996, Environmental protection on LISCO ships,1.7)

When pollutants are discharged from LISCO ships to ship-collector or to port reception facilities they have to be registered as special pollutants discharge act. This act indicates the amount of every type of pollutants: oily water, sewage water, used lubricants, garbage, oily rags or oily mixtures in package.

In the oil record book there is a comprehensive list of items of machinery space operations which are, when appropriate, to be recorded in the Oil Record Book in accordance with Regulation 20 of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). The items have been grouped into operational section, each of which is denoted by a letter code (LISCO, Oil Record Book)

When ships engineers make entries in Oil Record Book (ORB), the date, Operational code and item number shall be inserted in the appropriate columns and the required particulars shall be recorded chronologically in the blank space. Each

completed operation shall be signed for and dated by the officers in charge. Each completed page shall be signed by the Master of the ship.

Table 2 shows a sample of completed page of Oil Record Book.

Records in Oil Record Book give opportunity for ship administration to present corresponding records as evidence in accident investigation and at the same time decline any pretensions because of infringement of MARPOL 73/78 Convention regulations.

The entries in Oil Record Book have to correspond with work time records of auxiliary mechanisms, pumps, separators, boilers and incinerators in Machinery Book, if incineration or centrifuging of oil or oily mixtures was done with these machines.

The entries in Oil Record Book must be clear legible. Is prohibited to make entries in pencil. An erroneous record, is to be crossed with thin and straight line and in such way that it would be possible to read through.

Oil Record Book also shall be kept on board the ship and shall be preserved for a period of three years after the last entry has been made.

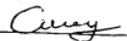
On the ships of Lithuanian Shipping Company all records in Oil Record Book, according to decree of LISCO Company President A.Anilionis, are written only in English. Such decree contradicts the requirements of MARPOL 73/78 Convention.

Table 2. Sample of Oil Record Book. Source: LISCO documents

Laivo pavadinimas APUOLE  
 Название судна  
 Name of ship  
 Saukimo signalas LJAU  
 Позывной  
 Distinctive numbers or letters

OPERACIJOS MAŠINŲ PATALPOSE (VISIEMS LAIVAMS)  
 ОПЕРАЦИИ В МАШИНЫХ ПОМЕЩЕНИЯХ /ДЛЯ ВСЕХ СУДОВ/  
 MACHINERY SPACE OPERATIONS (ALL SHIPS)

Data Data Date	Kodas (raide) Код (буква) Code (Letter)	Punktas (numeris) Пункт (номер) Item (Number)	Operacijų registracija ir atsakingo už operaciją asmens parašas. Регистрация операций и подпись ответственного за операцию лица Record of operations/signature of officer in charge
97.10.09	D	13	2 m <sup>3</sup>
		14	15 <sup>00</sup> -15 <sup>20</sup>
		154	from machinery space transfer to holding tank No. 1 iš mašinos skyriaus perkamuota į laikymo tanką 2 eng. [Signature]
97.10.10	D	13	2 m <sup>3</sup>
		14	15 <sup>00</sup> -15 <sup>20</sup>
		154	from machinery space transfer large water to holding tank No. 1 iš mašinos skyriaus perkamuota į laikymo tanką 2 eng. [Signature]
97.10.16	D	13	1 m <sup>3</sup>
		14	14 <sup>00</sup> -14 <sup>30</sup>
		154	from machinery space transfer to holding tank No. 1 iš mašinos skyriaus perkamuota į laikymo tanką total quantity in tank No. 1 - 0.2 m <sup>3</sup> total quantity in tank No. 2 - 1.5 m <sup>3</sup> total quantity in storage tank - 6.5 m <sup>3</sup> 2 eng. [Signature]
97.10.17	H	27	Lubricating oil bunkering Sutepimo tepalo bunkeruote
		27.1	p. Hull
		27.2	20 <sup>00</sup> -20 <sup>30</sup>
		27.4	EXXMAR XA - 3.4 m <sup>3</sup> EXXMAR 12TP3 - 1.0 m <sup>3</sup> (total quantity - 4.6 m <sup>3</sup> ) (total quantity - 2.1 m <sup>3</sup> ) 2 eng. [Signature]



Regulation 20 point 4 of Chapter II Annex I of MARPOL 73/78 Convention concretely states, that “the entries in the Oil Record Book shall be in an official language of the State whose flag the ship is entitled to fly, and for ships holding an International Oil Pollution Prevention Certificate, in English or French. The entries in an official national language of the state whose flag the ship is entitled to fly shall prevail in case of a dispute or discrepancy”.

Because Lithuanian Shipping Company ships have International Oil Pollution Prevention Certificate, then Oil Record Book should be filled in English and in Lithuanian.

If Oil Record Book is not filled in Lithuanian language there will arise a danger that a person who does not know English very well will incorrectly fill in the operation in English. In such a case the ship loses an official granted right to get out of problems if inspectors of environmental protection declare pretensions because the entries in the Oil Record Book and to avoid big penalties. This is the reason why the author's sample of Oil Record Book differs from ORB used in LISCO ships in such way that after entry of operation in English one line below is meant for operation in Lithuanian.

#### **2.1.10 Shipboard oil pollution emergency plan (SOPEP)**

Regulation 26 of MARPOL 73/78 Convention Annex I entered into force on 4th. April 1995. The regulation states that “every oil tanker of 150 tons gross tonnage and above and every ship other than oil tanker of 400 tons gross tonnage and above shall carry on board a shipboard oil pollution emergency plan approved by the Administration”.

Shipboard Oil Pollution Emergency Plan is inseparable part of ship Oil Pollution Prevention Certificate and this plan has to be approved by the Administration which can nominate a recognised organisation to act on its behalf.

According to order of Lithuanian Shipping Company plan SOPEP was prepared in Sankt-Petersburg by Central Marine Scientific Research Institute CNIIMF. Plan was prepared according to "MEPC.54(32) Guidelines for the development of shipboard oil pollution emergency plans preparation, 1992. These plans are prepared for every LISCO ship and are adapted to individual technical characteristics of that ship.

The purpose of this plan is to supply ships master and officers of the ship with recommendations how to immediately respond if an accident involving pollution from the ship has occurred or may occur which will lead to possible pollution.

The plan has all necessary information and instruction which are required by "Guidelines for the development of shipboard oil pollution emergency plans".

The plan represents a detailed description of the actions to be taken immediately by persons on board to reduce or control the discharge of oil following the incident

According to requirements of Regulation 26 MARPOL 73/78 Annex I plan is written in the working language of the master and officers.

Shipboard oil pollution emergency plan for LISCO ships consist of (LISCO documents,1993, Shipboard oil pollution emergency plan for LISCO ships):

1. Requirements for reports;

- 1.1 Reports cases;

- 1.2 Reports form and content;
- 1.3 With whom to enter into relations and keep in touch;
2. Oil spills control measures;
  - 2.1 Operation oil spills;
  - 2.2 Oil spills through accidents;
  - 2.3 Urgent activities;
  - 2.4 Used documents;
3. Ship activities co-ordination with national and local authority;
4. Additional information;
  - 4.1 Training and exercise;
  - 4.2 Used equipment in oil spill activities;
  - 4.3 Public information;
  - 4.4 Efficiency of plan.

Volume of this plan is rather wide and taking into account complex circumstances and many problems which have to be solved by heads of ship during an oil accident and attempting to avoid mistakes, time waste and misunderstandings at initial accident stage it is necessary to follow the sequence scheme of general events. This scheme is displayed in a visible place and is written in the crew's language.

Figure 1 shows a shortened and concise scheme of shipboard oil pollution emergency plan.

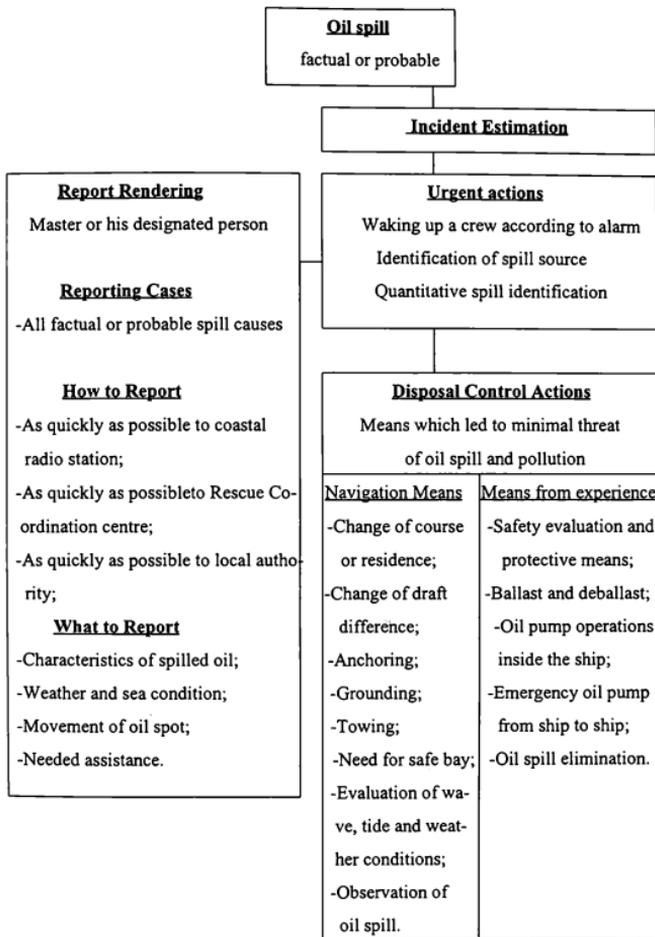


Figure 1. Scheme of shipboard oil pollution emergency plan. Source: LISCO documents

## CHAPTER III

### 3. Environmental protection on LISCO ships

#### 3.1 LISCO Safety Management System (SMS)

The Assembly of International Maritime Organization, on 4th September 1993, adopted Resolution A.741(18) (Marine Pollution Bulletin, 1998, No 6 "International-Safety Management Code (ISM Code) for the Safe Operation of Ships and for Pollution Prevention", which became mandatory when chapter IX "Management for the Safe Operation of Ships" of the SOLAS-74 Convention came into force. The amendments came into force under tacit acceptance in 1st July 1998.

The new chapter will apply to passenger ships and tankers from 98.07.01. Cargo ships and mobile drilling units of 500 gross tonnage and above from 1st July 2002.

By adding the ISM Code to SOLAS it is intended to provide an international standard for the safe management of ships and for pollution prevention. New regulations say that: "The company and the ship shall comply with the requirements of the International Safety Management Code"; "the ship shall be operated by company holding a Document of Compliance"; "a Document of Compliance shall be issued to every company which complies with the requirements of the International Safety Management Code"; This document shall be issued by the Administration (according SOLAS-74 -state government), or at the request of the Administration by another Contracting Government"; "A certificate, called a Safety Management Certificate,

shall be issued to every ship by the Administration or an organisation recognised by the Administration.

Earlier responsibility for safe operation of ship and for pollution prevention has fallen on the government of ship flag state and shipowners and ship operators have been kept aloof. Now policy of the world maritime society is changing in the main: responsibility for ships conditions and activities first of all falls on the company.

The Assembly of IMO asked governments to apply ISM Code as quickly as possible (but not later than 1 July 1998). According decision of Transport Ministers of states of Europe's Union ISM Code was applicable from 10 July 1996.

Many Governments have already announced that they will implement the Code rigorously, which means that ships which do not carry the necessary certification could be barred from entry into foreign ports. Many protection and indemnity clubs have said that they will regard compliance with the Code as a condition for cover (Marine Pollution Bulletin, 1998, No 6).

The IMO survey suggests that the around 1,791 (78%) of an estimated 2,306 shipping companies operating under the flags of the States approached have complied with the Code by the deadline of 1 July 1998.

The Minister of Transport of Lithuania in 16 January 1996 with statute Nr. 20, realising the requirements of International Management Code for the Safe Operation of Ships and for Pollution Prevention, passed an order to confirm the documents of safety management system for the Republic of Lithuania. These documents regulate certification of merchant ships and shipping companies for their compliance of safety management system requirements (according to requirements of Chapter IX SOLAS-74).

Lithuanian Shipping Company and LISCO ferries were attested by 10 July 1996 and got documents of compliance.

What is the ISM Code, the requirements of which LISCO and their ships have to comply with?

The purpose of this Code is to provide an international standards for the safe management and operation of ships and for pollution prevention. Recognising that there are not similar shipping companies or shipowners and that the ships operate under a wide range of different conditions, the Code is based on general principles and objectives.

The cornerstone of good safety management is commitment from the top. In matters of safety and pollution prevention it is the commitment, competence, attitudes and motivation of individuals at all levels that determines the result.

The Code has thirteen chapters:

1. General;
2. Safety and environmental protection policy;
3. Company responsibilities and authority;
4. Designated person(s);
5. Masters responsibility and authority;
6. Resources and personnel;
7. Development of plans for shipboard operations;
8. Emergency preparedness;
9. Reports and analysis of non conformity;
10. Maintenance of the ship and equipment;
11. Documentation;

12. Company verification, review and evaluation;
13. Certification, verification and control.

The purpose of Safety-Management System (SMS) of the Republic of Lithuania is to ensure safety at the sea, avoid accidents, deaths and sea pollution (Seamen of the Lithuania, 1996. No 10).

The purpose of LISCO legislation (Lithuanian Shipping Company, 1996. Safety Management System) is to get profit from transport business. Accordingly the purpose of safety-management system of LISCO Company and ships is to reach necessary safety and environmental protection standards and maintenance of the high level. This is the main condition to maintain company's competition in transport service market and reach maximum profit.

### **3.2 LISCO environmental protection policy**

Based on the previous section, LISCO has thirteen ISM Code chapters, according to the title of this dissertation, the most interesting is the second chapter- "Safety and environmental-protection policy".

The main task of the environmental protection policy of Lithuanian Shipping Company is to protect the sea environment from pollution (Lithuanian Shipping Company, 1996, Safety Management System). Reaching this goal LISCO implemented these requirements:

1. International Convention for the Prevention of Pollution from Ships, MARPOL 73/78;
2. Convention on the Protection of the Marine Environment of the Baltic Sea Area;

3. Environmental Protection Decrees and Orders of Government of the Republic of Lithuania.

In order to achieve the laid-out task, LISCO raised these requirements (Lithuanian Shipping Company, 1996. Safety Management System):

1. Normative base supplement and maintenance in up-to-date level (international, regional, national and local requirements, norms, statutes, instructions and recommendations). Presentation of these original documents to ships and to coastal services;

2. Formation of scientific support perspective plans. Link with scientific research and projected organisations. Agreements signing and the control of their implementation;

3. Environmental protection knowledge examination of ship leading officers accepting them to the company or transferring to other work;

4. Ships crew verification through sea protection from pollution statutes implementation and existence of normative documents;

5. Environmental pollution cases investigation, identifying guilty persons and punishing them. Setting measures which do not permit repetition of any violation;

6. Supply ships with necessary work and technical, operation documentation.

In addition, the President of Lithuanian Shipping Company A. Anilionis in 19 April 1996 promulgated an order Nr.20A " For sea prevention from pollution from ships" which orders:

1. To masters of LISCO ships, chiefs of services and departments to control how in ships and coastal departments are executing international and national agreements, requirements and regulations for protection of sea and environment from pollution;

2. To masters of ships to control:

- 2.1 Collecting ship garbage into separate, accurately marked tankages (containers), to collect separately food remnants, plastic and other garbage;
- 2.2 Discharge to port reception facilities of sewage, oil polluted and faecal waters, oily rags, garbage, food remnants or incineration of mentioned above remnants if on the ship has proper equipment and to record this kind of operation in the record book;
- 2.3 Sealing of valves of drainage and waste systems through which is disposed sewage and oily waters after cleaning, writing this operation in record book;
- 2.4 Existence of documents of sea environment protection from pollution, that every time it would be possible to present them to the inspector;
- 2.5 Good condition of ship technical means which guarantees sea protection from pollutants;
- 2.6 Crew training to protect sea environment from pollution;
- 2.7 Proclaim an order, by which:
  - identify garbage collecting and storage places in the ship and mark these places with tables in Lithuanian and English languages;
  - designate responsible persons for packing and discharging of tankages and their good condition;
3. To technical director A.Gedgaudas, Shipping Safety Department Director E.Astikas Through superintendents and masters-inspectors:
  - 3.1 To control, that in LISCO ships, there would be properly managed documentation of sea environment protection from pollution from ships;
  - 3.2 To guarantee, that masters-inspectors and superintendents would participate in investigations of LISCO ships offences, implementing requirements of sea environmental protection from pollution;
4. To the head of technical section L.Kachan:
  - 4.1 To examine documentation of proposed equipment's and means to install in the ship;

4.2 To control how on LISCO ships install and improve means of sea environment protection from pollution;

4.3 Reading concrete proposals of Shipping Safety Department and ships technical exploitation service, prepare draft of orders to punish for not executing requirements of sea environment protection from pollution;

4.4 To verify, how ship officers are acknowledged with crew actions to protect sea environment from pollution and with regulated standard documents;

4.5 To supply ships and concerned persons with required documentation.

### **3.3 Inspections of LISCO ships in foreign ports**

Ministry of Transport of the Republic of Lithuania got a letter (which was later addressed to LISCO) in 25th June 1996 from Paris Memorandum Of Understanding Port State Control section secretary H. E. Huibers.

Emphasising that the committee, based on statistic data, made a conclusion that the condition of inspected ships of some states is constantly bad, and ships of these states continually exceed average high per cent of detention for a few recent years. That means that ships, with flag of these states, which were detained more often than the average index, will be inspected first by the Port State Control. The committee informed that Lithuania is one of such states, among the states which signed Paris Memorandum, and from 1st July 1997, ships with Lithuanian flag will be one of first in the inspections list.

Prior order of verifying will be cancelled when, based on three years results, detention per cent of ships with Lithuanian flag will become lower than the average.

Detention of ships with Lithuanian flag has not become lower but has increased.

If we will look into the list of states whose ships were detained more often than average index, from 22 such states in 1992-93, ships with Lithuanian flag was on 20th place (10,84 per cent), and in 1993-96 took 15th place (18,93 per cent when average detention percentage was 16,63) (Paris Memorandum of Understanding on Port state Control, 1997, Annual Report).

In the article of "Klaipeda" newspaper of 19th July 1996 it was stated that "during 1994-96 years in foreign ports was detained 16 ships with Lithuanian flag were detained, 6 of these was LISCO ships, 2 of the "Transport Fleet" and others of private owners. Here we see, ships of "Lithuanian Shipping Company" were detained more often.

But according to the latest 1997 annual report of Paris Memorandum Of Understanding detentions percentage (15,57%) of ships with Lithuanian flag for 1994-97 do not exceed average detention percentage - 16,42% and our ships will not be targeted as priority cases in 1998-99. But in the author's opinion this detention percentage of Lithuanian ships is still too high and any moment Lithuania can return to the "black list".

According to these facts the author asked an opinion of the head of Technical Section in LISCO L. Kachan, who is also responsible for environmental protection on LISCO ships.

He advises to estimate critically these facts, because it is a result of too much diligent work of inspectors in foreign ports from which results also depends their salary.

After the collapse of the Soviet Union there appeared a lot of new states, whose influence in the International Maritime Organization is very weak. That is why, for inspectors to catch (according to the head of LISCO Technical Section) a “weak fish” is easiest, and they look into these shipping companies like looking through a magnifying glass.

According to L. Kachan “Lithuanian Shipping Company” keep on to international norms of shipping safety and sea environment protection not less strict than shipping companies of the Western states, but here arises a question of authority of state in the maritime organisations, with which flag ship is entitled to fly.

But L. Kachan recognised that some of these expressed pretensions are right and in time to what is responding as possible faster.

In addition, in Klaipeda city Environmental Protection Department the author made an inquiry of the head of Coast Guard Service, Head of State inspector V. Vozgirdas, how ships of “Lithuanian Shipping Company” keep to requirements of environmental protection in Klaipeda port.

According to the inspector, for about eight years there are no faults in the requirements of environmental protection, with the exception of few little remarks. Despite that are verifying every ship which enter into Klaipeda port. Before a good 11-12 years, faults was quite often present on the LISCO ships.

According to V. Vozgirdas the reason of that was improved discipline on ships, began to estimate a job, stricter sanctions, and higher penalties for pollution in Klaipeda port.

However, time after time LISCO ships get penalties for infringement of environmental protection requirements if not in Klaipeda port then in some foreign ports.

### **3.4 LISCO ships faults for environmental requirements. Reasons**

According to information of the head of Technical Section L. Kachan, who is also responsible for environmental protection on LISCO ships, below mentioned facts are the faults which occurred during 1994-97:

1. On 25th April 1994 during the port stay of LISCO ship "Kapitonas Stulovas" in the USA port Wilmington, a section of special inspectors of US Coast Guard arrived on board.

Ship was checked particularly accurately. In the protocol was written, that the following were absent: record of checking emergency control equipment, some life-buoys and two sea logs. Besides, not all life jackets had been marked, separators of oily waters did not fit the requirements, crew could not prove that annihilation plastic wastes on ship and etc.

Total penalty sum - 18,000 USA dollars.

As a result of this event and more frequent checking , especially in the USA and Canada ports, LISCO ships are sent a radiogram. Ships are ordered to take care, that ships should comply with requirements of SOLAS and MARPOL 73/78 Conventions. Ships are required to inform LISCO leaders immediately about checking of every ship.

2. On 9th April 1995, during the call of LISCO ship "Kapitonas Vavilovas" in Rotterdam port, about 20 litres of cooling lubricant, was spilled due to loose pipes of the main refrigerator. Master was fined 1000 US dollars penalty.

3. On 31st October 1994, during the call of LISCO ship "Apuole" in the port of Ventspils (Latvia), port surveillance chief inspector checked how ship complies with the requirements of MARPOL 73/78. When the Oil Record Book was checked, it became clear that a new Oil Record Book was started on 1994.01.20. It was filled by second engineer R.G. During the first half 1994, (1994.01.20-1994.07.14) the ship received and consumed 592 tones of heavy fuel.

During fuel separation, amount of sludge was 5,92 tones (1 per cent of consumed fuel). But in the Oil Record Book, there were no records about sludge amount, though it is required to write such records not less than one time per week. Sludge was discharged with sewage waters and did not point amount of sludge in Oil Record Book and instead of code "C" was marked code "D". MARPOL 73/78 prohibits this.

Inspector considered this non-observance of regulations as a fault. Initial penalty sum was 44,000 latas (7.5 latas for 1 kilogram non registered sludge) - it is about 105,000 USA dollars.

After written explanation of chief engineer A.S., inspector taking into account that he worked as chief engineer for a short time (1994.09.01-10.31) and that there were no others breaches of MARPOL 73/78 regulations, the inspector inflicted the lowest penalty - 500 USA dollars for incorrect official registration of MARPOL 73/78 documents (the biggest penalty is 3,000 USA dollars). Because, ship could be detained in port if the penalty had not been paid, chief engineer A.S. immediately paid it.

In the investigation of this event it was established, that: inflicted penalty for non-observance of the fulfilment of Oil Record Book by previous chief engineer M.N. and second engineer R.G. Present chief engineer A.S., accepting the ship, did not pay attention to it.

Because above mentioned reasons, from second engineer R.G., chief engineer M.N. and chief engineer A.S. were imposed with a penalty of one month salary for non-infringement with oil operations and for infringement of Statute of Service on the Ship.

So, lately authority of all states control operations with oily wastes are more stricter. Case of "Apuole" ship has showed that on some ships do not keep an order of register operation with sludge.

Second paragraph of code "C" of Oil Record Book point that quantity of oil residues (sludge) retained on board at the end of a voyage registered constantly, but not more frequently than once a week. When ships are on short voyages, the quantity should be recorded weekly.

Inspectors orientates to one per cent sludge of heavy fuel norm per day and to work time of the main diesel engine per day. Quantity of collected sludge has not to exceed sludge tank capacity. Sludge must be discharged to reception facilities, burning in incinerators, transferring to boiler fuel tank and later burning.

Prohibited to pump over sludge from sludge tank to oily waters collection tank and discharge this mixture to reception facilities. Sludge and leaked fuel must be recorded in one of the IMO official languages.

4. Basing on investigation facts and documents which were got from ship, it was established that:

On 5th September 1996, in Thames river road, pumping fuel in to the ship "Marijampole" a little amount of heavy fuel was spilled on deck and collected using rags and auxiliary means.

Heavy fuel was not spilled from ship. That was confirmed by the local pilot, who was on board the ship, and representatives of port administration who were sent by special cutter.

Sailing in Dover strait, master entered into communication with DOVER MRCC coastal service, which sent an aeroplane to the ship sailing area. After that, DOVER MRCC recognised, that they do not have any claims on "Marijampole".

Although researches of England Administration confirmed, that was found identical type of fuel on the sea surface, LISCO refused to take responsibility for spilled fuel in the sea according to factual documents which was obtained from the ship.

LISCO has not got yet information about the course of further events.

5. On 9th February 1997 the ship "Kapitonas Daugela" was calling in Terneusen (Holland) sluice, across the ship's portside, it was noticed that there was an oil spot from the front tug. Pilot was informed. But coastal workers stated that they saw lubricant leaking from the ship. On the portside was found 3-4 liters of lubricant-water mixture. Representatives of port authority arrived directly on ship for first investigation.

An investigation established, that at that time third engineer pumped over lubricants from 200 liters barrels into lubricant tanks. Due to negligence was spilled

about 10 liters of lubricant and 5 liters of this amount fell into the water. Ship got penalty of 3,000 USA dollars.

Because this event third engineer got severe reprimand and was imposed with a penalty of two month salary.

### **3.5 Control and responsibility of pollution protection on board LISCO ships**

Ship master is responsible for implementation complex of measures for protection from pollution from ships of the Lithuanian Shipping Company (LISCO, 1996, Environmental protection on LISCO ships). Ships master also must constantly look after improvement of crew knowledge and skills.

Lithuanian Shipping Company, as shipowner, is responsible for ship technical supply with devices and equipment which protect sea from oil pollution, noxious substances, sewage waters and garbage. Also, shipowner is responsible for timely delivery of spare parts and materials which needs to ensure normal work of these devices.

Before ship will come to sea, ship master must make sure, that condition of ship and equipment comply with requirements of national statutes and international conventions. After discover of imperfections, which may be reasons of wastes disposal, master must inform about that to LISCO and to take measures to eliminate defects.

Special attention needs to be turned to oil and cargo record books filling, because records of these books may have an essential influence in investigation of

supposed disposal of pollutants. Every entry in the book is witness of facts. Entries in the book must be done in time, and strictly in accordance to regulations of books filling.

It is to be remember that in objective description of factual operations in the book may be denied with others evidence. On the other hand, correct entries may be evidence of ship not being guilty.

To monitor the requirements of international regulations, coastal states are constantly watching ships behaviour at the sea far from the coast. Photographs, readings of oil detection equipment together with inspection results are sufficient evidence of fault confirmation and punishment of the guilty when the ship arrives in port.

State control execute international agreements and obligations of water protection from pollution authorising official persons of Ministry of Environment and they have a right to (Environmental protection on LISCO ships,1996, 2.1):

- 1) detain, make visits or survey ships for exposure of circumstances of disposal of noxious substances, noxious mixtures;
- 2) check implementation of water protection means and equipment condition on ship;
- 3) verify registration of operation with noxious substances and noxious mixtures in ship documents;
- 4) draw up a statement of inspections results;
- 5) give indications for elimination of infringements of detected regulations of coastal waters protection from pollution;
- 6) make copies of ship documents and to insist that master would certify them and to make a copies of international certificates of sea protection from oil, noxious liquid substances, sewage waters and garbage pollution;

7) detain ships if they disposed prohibited substances in territorial sea or did not make necessary means to protect environment from possible disposal of pollutants;

8) make persons guilty for pollution or violation of statutes to be administratively responsible, or, in some cases, to trial.

Classification Societies execute functions of technical supervision in sphere of sea environment protection from pollution from ships.

Lithuanian Shipping Company ships are classed mostly with Russian Register of Shipping and few a ferries (“Kaunas”, “Klaipeda”, “Vilnius” and in 1996-97 new built few universal ships (“Gediminas”, “Asta”, “Aukse”) are classed with Lloyds Register of Shipping.

Requirements of Russian Register is written in valid Regulations of Protection from Pollution from Ships (Russian Register of Shipping, 1993):

According to common superintendance work functions, to competence of Register, the following apply:

1) superintendance of sea protection equipment from pollution protection, production test and exploitation;

2) certification and licence of equipment of sea environment protection from pollution certification and distribution according to Resolutions of IMO and Marine Environment Protection Committee;

3) ship building and construction supervision according to requirements of MARPOL 73/78 Convention;

4) issue to ships of International Oil Pollution Prevention (IOPP) Certificates according to MARPOL 73/78 Convention and Register Regulations;

5) investigation and co-ordination of Shipboard Oil Pollution Emergency Plans.

The Russian Register is responsible to supervise:

- 1) Oil separating equipment (till 100 oil parts per million);
- 2) Oil filtering equipment (till 15 oil parts per million);
- 3) Oil discharge monitoring and control systems and signalling equipment;
- 4) Oil-water interface detectors;
- 5) Standard discharge connection and ships discharge pipeline for oily mixtures;
- 6) Oily mixtures pumping and disposal systems;
- 7) Tanks crude oil washing systems;
- 8) Ventilating and washing equipment;
- 9) Residues discharge system for liquid noxious substances;
- 10) Sewage water treatment plant, including collection tanks with pipelines, pumps, electric equipment, control and regulate equipment;
- 11) Standard discharge connection and sewage water discharge pipeline;
- 12) Garbage treatment and incinerating equipment;
- 13) Garbage collection equipment.

### **3.6 Inspectors remarks for environmental protection after surveillance of LISCO ships**

These remarks was made after surveillance of LISCO ships to verify how they keep to requirements of environmental protection. Surveillance execute LISCO executives responsible for implementation environmental protection requirements on the ships. Ships was surveyed in 1995-97 and remarks for them are showed in table 3.

These remarks are not official and are purely for information to get a general picture of ships in this field. These inspections are trying to find out imperfections in environmental protection, before inspectors of some foreign ports find them.

Table 3. Surveyed ships and main remarks for them. Source: LISCO documents

No	Ship	Date of survey	Remarks
1	2	3	4
1.	Nida	17.05.96	1) Oil Record Book isn't signed by master; 2) Not written operation code with sludge;
2.	Sventoji	24.11.95 10.10.96	1) Used halon R12; 2) ORB is not signed; 3) Not correct records in ORB ;
3.	Rusne	18.07.97	1) Executing writing of co-ordinate. Does not need; 2) Lost certificate of oil separator;
4.	Venta	16.01.97	1) Put in order file-folder with documents;
5.	Ignalina	17.11.95 13.06.95	1) Put in order documents; 2) Disconnect tank hose; 3) Does not connected separator FDN-1C;
6.	Neringa	26.02.97	1) Documentation in terrible condition; 2) On the ship is not normative documents of environmental protection from oil pollution; 3) In the International Oil Pollution Prevention Certificate is written 100 p.p.m.. Factual have to be 15 p.p.m.;
7.	Marijampole	01.02.96	1) Put in order documentation; 2) Change all conventional documents;

Table 3. (Continued)

1	2	3	4
8.	Pakruojis	27.06.96	1) Entries in ORB are written rarer than one time per week; 2) Complete documentation according to LISCO order;
9.	Kupiskis	20.05.96	No remarks
10.	Kursenai	16. 02 96	1) On the ship no damper in sludge discharge pipeline; 2) Not complete documents of environmental protection from oil pollution; 3) Receipt of discharged bilge water and sludge must be together with ORB;
11.	Kretinga	21.02.96	No remarks;
12.	Kedainiai	28.02.97	No remarks;
13.	Kelme	18.05.96	No remarks;
14.	Kapitonas Sevcenko	08.02.95 29.05.96 21.03.97	1) Put in order sludge discharge receipts; 2) Burning of oily rags is written in ORB; 3) Receipts keep together with ORB;
15.	Kapitonas Stulovas	24.07.97	1) Not properly storage receipts of discharged bilge water; 2) Sludge records only one time per passage; 3) Does not written number of sludge tank;
16.	Kapitonas Izmiakov	27.03.96	Mistakes of ORB fulfilment: - not correct paragraphs; - not accounted sludge quantity per week; - after pumping do not specify quantity of remained bilge water;

Table 3. (Continued)

1	2	3	4
17.	Kapitonas Daugirdas	04.07.95  12.12.97	1) No entries in ORB of discharged bilge waters; 2) Not complete documentation according to LISCO order; 3) In ORB is written incineration of oily rags. It is not necessary; 4) Last page of ORB not signed by master;
18.	Kapitonas Lucka	03.08.96  05.07.97	1) In ORB is written incineration of oily rags. It is necessary to write it in to the sewage and garbage record book; 2) Not correct fulfilment of ORB. Mixing code and cipher;
19.	Kapitonas Domeika	13.09.97	1) In ORB is written incineration of oily rags;
20.	Kapitonas Andzi- jauskas	26.06.97	1) Not correct fulfilment of ORB; 2) Too small capacity of sludge tank; 3) Lost certificates for separator, filter and discharge control equipment;
21.	Kapitonas Kaminska	03.01.98	1) Bilge water control discharge equipment does not work;
22.	Voke	14.04.96	No remarks
23.	Musa	23.06.96  04.07.97	1) ORB was fulfilled one time per two weeks; No remarks;
24.	Kernave	26.06.96	1) In the ORB was not pointed (under cipher 15.4) common quantity of residues;

Table 3. (Continued)

1	2	3	4
26.	Veliuona	17.05.97	1) In the Shipboard Oil Pollution Emergency Plan: -no marks about training exercise; -no marks about equipment; 2) In ORB is written incineration of oily rags;
27.	Medninkai	12.09.97	No remarks;
28.	Vilnius	16.01.97	No remarks;
29.	Klaipeda	20.03.96 03.09.97	1)In ORB is written incineration of oily rags; No remarks;
30.	Kaunas	25.02.97	1) Not correct fulfilment of ORB,
31.	Siauliai	20.04.96	1) Device OILMAT 80 does not works; 2) To install oil discharge monitoring and control system;
32.	Panevezys	04.12.97	1) To install new separator DVZ;
33.	Mindauga	19.04.97	No remarks;
34.	Palanga	22.11.96	1) Separator SFC-5 does not works properly: There is a need of filter material;

### 3.7 Pollutants and garbage discharging from LISCO ships in foreign ports

The master of Lithuanian Shipping Company ship, before proceeding to a foreign port, must check the port's means for pollution prevention and means for pollutants and garbage discharging. He also has to get from LISCO possible ports of

call for pollutants discharging for port reception facilities (Environmental protection on LISCO ships, 1996, 3.6).

Port must ensure reception from ship all polluted water, noxious substances and their mixtures, garbage and to have necessary water cleaning means.

The International Maritime Organization's Marine Environment Protection Committee (MEPC) held its forty-first session at the IMO Headquarters in London from 30 March to 3 April 1998 (BIMCO Bulletin, 1998, No 2).

At this session Finland informed the meeting that discharges of oily wastes had been a problem in the Baltic Sea area. For this reason, the Baltic Sea states have elaborated new provisions in the Helsinki Convention, and also a number of new HELCOM recommendations which should lead to a reduction of illegal discharges from ships using ports of the Baltic States. Finland and other Scandinavian countries stated that the most essential means to promote use of reception facilities in the Baltic Sea Area were the main principles of mandatory discharge of ship generated waste before leaving port, and the new harmonised fee system.

The new fee system, the so-called "no-special-fee" system, means that a waste fee, irrespective of the amount of waste actually disposed of by the ship, is included in the port fees. The new provisions and HELCOM recommendation were adopted by the Baltic Sea States and the European Commission. The new provisions enter into force on 1 January 2000.

At present, the ship master has to make an application to port dispatcher about discharging of accumulated ship wastes, oil products, bilge and sewage, others noxious substances and garbage. Port does this kind of work and charges the shipowner's.

The ship will not be allowed to sail if collection tanks are filled with bilge, sewage and garbage, and the ship does not have the MARPOL 73/78 equipment, which permits disposal according to regulations of mentioned convention and national statutes.

Also, very important, that before sailing to port, master must make sure that ship systems, through which can be disposed pollutants, and over board fittings are closed and sealed. Sealing device has to be checked by chief engineer.

In the table 4 is a list of LISCO ships, which discharged various quantities through 1996, of bilge, sewage and garbage in Klaipeda and few foreign ports, and prices of these services. It looks strange that pollutant discharging was very rare. It can be explained that almost all ships have had necessary equipment for pollutants treatment and their disposal conditionally clean in the high seas.

Environmental protection equipment which exists on LISCO ships will be dealt within chapter 4.

Table 4. Payments for discharge of bilge, sewage, garbage in 1996. Source: LISCO documents.

Port of discharge	Ship	Date	Pollutants	Quantity tonnes	Price, US \$
1	2	3	4	5	6
S. Petersburg	Merkine	14.01.96	b/w	83	2988 \$
		26.01.96	b/w	70	2520 \$

Table 4. (Continued)

1	2	3	4	5	6
Muga (Estonia)	Merkine	17.10.96	sludge b/w garbage	1 57 0,5	572 \$
Klaipeda	Pasvalys	10.01.96	b/w garbage	65 0,5	651 \$
Klaipeda	Kreva	10.05.96	b/w	115	1138 \$
S. Petersburg	Kreva	09.02.96	b/w	20	720 \$
Klaipeda	Kreva	03.05.96	b/w	30	297 \$
Remi	Kreva	04.10.96	b/w	15	630 \$
Muga	Kernave	13.01.96	b/w	15	225 \$
Archangelsk	Kernave	14.10.96	b/w	20	411 \$
Klaipeda	K. Izmiakov	29.03.96	b/w	40	415 \$ 60 \$
		31.03.96	sludge garbage	2 1	
Klaipeda	Musa	21.04.96	b/w	15	50 \$
Klaipeda	K. Stulpinas	26.03.96	b/w	333	3296 \$
Klaipeda	Kedainiai	23.03.96	sludge b/w	7 15	222 \$ 140 \$
		29.03.96	b/w garbage	14 0,2	
Bizerta	K. Panfilovas	13.05.96	b/w	407	4029 \$
Nantes	K. Panfilovas	14.03.96	sludge	7	73 \$
Klaipeda	Medininkai	15.03.96	sludge	5	74 \$

Table 4. (Continued)

1	2	3	4	5	6
Klaipeda	Nida	14.05.96	sludge	3	
		24.05.96	b/w	5	
			garbage	3	
			s/w	3	60 \$
		17.05.96	b/w	30	297 \$
		18.05.96	b/w	57	567 \$
		26.05.96	b/w	45	445 \$
Klaipeda	Kelme	19.05.96	b/w	25	247 \$
Klaipeda	Nida	24.05.96	b/w	5	
			garbage	3	
			s/w	3	60 \$
Klaipeda	K. Stulpinas	21.05.96	b/w	140	1386 \$
Klaipeda	Rusne	02.06.96	b/w	403	2634 \$
Klaipeda	Rusne	29.05.96	b/w	131	1296 \$
S. Petersburg	Birzai	30.05.96	b/w	28	487 \$
Klaipeda	Merkine	07.03.96	b/w	60	560 \$
Klaipeda	Klaipeda	14.06.96	b/w	220	2178 \$
	Rusne	19.06.96	b/w	15	148 \$
Klaipeda	Pakruojis	30.07.96	b/w	15	
			sludge	6	208 \$
Klaipeda	Ignalina	16.06.96	b/w	23	
			sludge	7	302 \$
Klaipeda	K. Daugela	27.06.96	b/w	110	1285 \$
		29.07.96	b/w	70	693 \$
		22.07.96	b/w	95	940 \$
Koccola	K. Izmiakov	26.02.96	sludge	312	6000 \$

Table 4. (Continued)

1	2	3	4	5	6
Ashdot	Venta	19.04.96	garbage b/w	2 1	159 \$
Archangelsk	Kernave	02.08.96	b/w s/w	15 6	1097 \$
Klaipeda	K. Domeika	18.08.96	garbage sludge b/w	1 3 504	5453 \$
Nantes	Pakruojis	10.05.96	b/w	35	6340 \$
Archangelsk	Veliuona	21.03.96	s/w	26	1118 \$
Klaipeda	K. Kaminskas	04.08.96	b/w	45	445 \$
Klaipeda	Siauliai	26.09.96- 26.11.96	b/w sludge garbage	244 5 3	2168 \$
Klaipeda	Voke	02.12.96	b/w sludge garbage	20 5 1	256 \$
				Total:	55.339\$

### 3.8 Environmental protection from oil pollution from ships

Because regulations of MARPOL 73/78 Convention and the Convention on the Protection of the Marine Environment of the Baltic Sea Area HELCOM-74 are mandatory for Lithuanian Shipping Company ships, then in these subchapters the author will set forth newest and most important requirements for sea protection from pollution by oil, sewage and garbage.

Regulations for discharging oily-mixtures (MARPOL 73/78 Convention):

From a ship of 400 tons gross tonnage (not oil tanker) whilst outside the special area, can discharge into the sea collected oily mixtures if such conditions are satisfied:

- 1) the ship is proceeding en route;
- 2) the oil content of the effluent without dilution does not exceed 15 parts per million;
- 3) the ship has in operation oil filtering equipment;
- 4) the filtering system is equipped with stopping device which will ensure that the discharge is automatically stopped when the oil content of the effluent exceeds 15 parts per million;
- 5) the ship is not within a special area.

These above mentioned amendments entered into force in 6 July 1998.

Before 6 July 1998 it was permitted to use oil-water separation equipment with an output of 100 parts per million. Until this date (6 July 1998) or until equipment of filtering and control system it was permitted to discharge oily mixtures with condition that:

- 1) The bilge water does not originate from cargo pump-room bilge's;
- 2) The bilge water is not mixed with oil cargo residues;
- 3) the ship is not within a special area;
- 4) the ship is more than 12 nautical miles from the nearest land,
- 5) the ship is proceeding en route;
- 6) the oil content of the effluent is less than 100 parts per million;
- 7) on the ship operate oil-water separating and oil filtering equipment which comply to Register requirements;

Within a special area any ship of 400 tons gross tonnage (not oil tanker) is allowed to discharge collected oil-mixtures with condition that:

- 1) the ship is proceeding en route;
- 2) the oil content of the effluent without dilution does not exceeding 15 parts per million;
- 3) the filtering system is equipped with a stopping device which will ensure that the discharge is automatically stopped when the oil content of the effluent exceeds 15 parts per million.

### **3.9 Environmental protection from pollution by sewage**

Regulations of MARPOL 73/78 Convention for discharging sewage is applied to followed ships:

- a) 1) new ships of 200 tons gross tonnage and above;
- 2) new ships less than 200 tons gross tonnage which are certified to carry more than 10 persons ;
- 3) new ships which do not have measured gross tonnage and are certified to carry more than 10 persons;
- b) 1) existing ships of 200 tons gross tonnage and above, 10 years after the date of entry into force MARPOL 73/78 Annex IV;
- 2) existing ships of less than 200 tons gross tonnage which are certified to carry more than 10 persons, 10 years after the date of entry into force of MARPOL 73/78 Annex IV;
- 3) existing ships which do not have a measured gross tonnage and are certified to carry more than 10 persons, 10 years after the date of entry into force MARPOL 73/78 Annex IV.

Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention, 1974) does not specify applications for “new ships” or “existing ships”. All ships are treated the same - just “ships”.

According to Helsinki Convention, 1974, the provisions of Regulation 7 (Sewage) shall apply to :

- a) ships of 200 tons gross tonnage and above;
- b) ships of less than 200 tons gross tonnage which are certified to carry more than 10 persons;
- c) ships which do not have a measured gross tonnage and are certified to carry more than 10 persons.

Sewage treatment plant (comminution and disinfection) has to be approved by the Administration and must to ensure permeability and cleaning level which would not exceed followed indexes (LISCO, 1996. Environmental protection on LISCO ships):

- requirement of biological oxygen (SPKs) - 50mg/litter;
- suspended substances - 100mg/litter;
- Koli-index - 2500

If for desinfection of sewage water is used chlorine, then level of free chlorine in discharged water has to be 1,5-5mg/litter.

Convention on the Protection of the Marine Environment of the Baltic Sea Area and MARPOL 73/78 Convention prohibit to discharge sewage into the sea with the same exceptions when:

- 1) the ship is discharging comminuted and disinfected sewage using a system approved by the Administration;
- 2) sewage is discharged through comminution and disinfection equipment approved by the Administration with condition that:
  - a) ship is en route and proceeding at not less than 4 knots speed;
  - b) substances are discharging at a distance of more than four nautical miles from the nearest land;
  - c) sewage is not discharged instantaneously but at a moderate rate;

3) sewage which is not comminuted or disinfected is discharged with condition that:

- a) ship is en route and proceeding at not less than 4 knots speed;
- b) substances are discharged at a distance of more than 12 nautical miles from the nearest land;
- c) sewage has to be discharged at a moderate rate.

Disposal of sewage in territorial and inland waters is not indicated in MARPOL 73/78 and Helsinki Convention. Sewage disposal in territorial and inland waters is regulated by states national regulations

Sewage can be disposed after treatment in territorial and inland waters only in these cases (LISCO, 1996. Environmental protection on LISCO ships):

1) water is discharged after the treatment in comminution and disinfection plant under above mentioned conditions:

- 2) ship is en route and proceeding at not less than 4 knots;
- 3) sewage has not to be discharged instantaneously, and the effluent has not produce visible floating solids in, nor cause discoloration of the surrounding water.

Such ships, which under these conditions can not discharge sewage in territorial and inland waters, all ship collected waters must be transferred to the port reception facilities or to be disposed more than 12 nautical miles from the nearest land.

### **3.10 Protection from garbage pollution**

In accordance with regulation 9 of Annex V MARPOL 73/78 all ships of 400 gross tonnage and above and every ship certified to carry 15 persons or more must provide a Record Book of Operations with Garbage to record all disposal and

incineration operations. The date, time, position of ship, description of the garbage and the estimated amount incinerated or discharged must be logged and signed

There are three zones for protection from garbage pollution from ships, in which disposal conditions are different:

- 1) high sea outside special areas;
- 2) within special areas;
- 3) territorial and inland waters.

According to Helsinki Convention Regulation 8 (Garbage), "the Contracting Parties of this Convention, also being parties to MARPOL 73/78, apply in conformity with that agreement the provisions of Annex V of MARPOL 73/78 for the prevention of pollution by garbage from ships". That means that in the Baltic Sea valid only MARPOL 73/78 requirements to prevent pollution by garbage, and Helsinki Convention does not indicate any other special requirements

*Garbage disposal outside special area:*

In the high sea, outside special area, it is prohibited to dispose from any ships:

- 1) all plastics, including but not limited to synthetic ropes, synthetic fishing nets and plastic garbage bags;
- 2) when the garbage is mixed with other discharges having different disposal of discharge requirements the more stringent requirements must be applied.

It is permitted to dispose dunnage, lining and packing materials not less than 25 nautical miles from the nearest land.

Also, it is permitted to dispose into the sea, food wastes and all other garbage including paper products, rags, glass, metal, bottles, crockery if the nearest land is more than 12 nautical miles. If these garbage are passed through a comminuter or grinder (such garbage shall be capable of passing through a screen with openings no

greater than 25 millimetres) then is permitted to dispose them not less than 3 nautical miles from the nearest land.

*Garbage disposal within special area:*

Within special area is prohibited to dispose:

- 1) all plastic, including but not limited to synthetic ropes, synthetic fishing nets and plastic garbage bags;
- 2) all other garbage including paper products, rags, glass, metal, bottles, crockery, dunnage, lining and packing materials.

When the garbage is mixed with other discharges having different disposal or discharge requirements the more stringent requirements must be applied.

Within special area is permitted to dispose food wastes not less than 12 nautical miles from the nearest land.

Requirements for disposal of garbage in inland and territorial waters are not indicated in MARPOL 73/78 and Helsinki Conventions. These requirements are indicated only in states national regulations.

*Is prohibited in inland and territorial waters (LISCO, 1996. Environmental protection on LISCO ships):*

- 1) the disposal of all kind of wastes (includes comminuted)
- 2) the burial of ship wastes and other materials.

On 1st January 1995, HELCOM recommendation 14/8 entered into force, signed in 4th February 1993. Recommendation consolidate amendment of IV annex of Helsinki Convention and prohibit incineration of ships collected wastes in the

territorial waters of the Baltic Sea states. Recommending all wastes are collected in special containers fitted for the purpose, and later discharging them in some port.

From 1 July 1998, all ships of 400 gross tonnage and above and every ship certified to carry 15 persons or more will have to carry a garbage management plan, to include written procedures for collecting, storing, processing and disposing of garbage, including the use of equipment on board. The garbage management plan should designate the person responsible for carrying out the plan and should be in the working language of the crew (IMO News, 1998, No 2).

The regulation is important because it requires ship operators to track their garbage and take notice of what happens to it.

### **3.11 Atmosphere non-pollution requirements and LISCO**

#### **3.11.1 Atmosphere pollution by exhausted gasses**

With increase of cargo carriage by sea more and more pollutants emanate from burned ships fuel. Earlier sea was more polluting from land based, coastal cities by sewage and disposals from ships. Now becoming more important sea pollution from atmosphere. Earlier, due to the lower price of fuel, it was possible to choose ecological cleaner fuel. Now, in sharp conditions of market competition everyone is trying to get cheaper and of course more ecologically harmful fuel. Table 5 shows quantities of pollutants getting into atmosphere by burning 1 tonne of marine fuel (Sampson, 1998, Handouts).

Table 5. Quantities of pollutants getting into atmosphere. Source: Handouts of Prof. T.J.Sampson and LISCO documents.

Pollutants	Comparative pollutants disposal when was burned 1 tonne of fuel, kg	
	diesel fuel	marine fuel
sulphur oxides, SO <sub>2</sub>	3,9	23
nitrogen oxides, NO <sub>2</sub>	64	72
carbon monoxide, CO	9	8
hydrocarbons, CH	8	2.8
soot	6,1	12,1
ashes	-	0,5

Table 5 shows that burning marine fuel, environment gets 6 times more sulphur than burning diesel fuel. Sulphur combinations, get into atmosphere from ships diesel engines with exhausted gases, become a reason of "acid" rains. At the same time is doing harm not only for living nature but for all what man has created.

International organisations are trying more active to achieve the use of ecologically less harmful ships fuel.

A Conference of Parties to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78) in September 1997 has adopted new measures which will reduce air pollution from ships.

The air pollution rules are included in a new Annex (Regulation for the Prevention of Air Pollution from Ships) to MARPOL 73/78 (IMO News, 1997, NO 4).

The new Annex VI will enter into force 12 month after the date on which it has been accepted by not less than 15 states, the combined tonnage of which shall be not less than 50% of the gross tonnage of the world's merchant shipping fleet.

The Conference adopted a global cap of 4.5% m/m on the sulphur content of fuel oil. The Conference also adopted provisions allowing for special SO<sub>x</sub> "Emission Control Areas" to be established with more stringent control on sulphur emissions. In these areas, the sulphur content of fuel oil used on board ships must not exceed 1.5% m/m. The Baltic Sea is designated as a SO<sub>x</sub> Emission Control Area in the Protocol.

While ships are within SO<sub>x</sub> Emission Control Areas, at least one of the following conditions shall be fulfilled:

- a) The sulphur content of fuel oil used on board ships does not exceed 1.5%;
- b) An exhaust gas cleaning system is applied to reduce the total emission of sulphur oxides from ships to 6.0 g SO<sub>x</sub>/kWh or less;
- c) Any other technological method to limit SO<sub>x</sub> emission to a necessary level.

When the new amendment enters into force, quantity of sulphur content can not exceed 4.5% m/m. After five years this norm will be reduced to 4 per cent, and after five more years to 3.5% (Seamen of Lithuania, 1996, No 50).

In conventional areas there are limitation. As mentioned above, the sulphur content of fuel oil in Baltic Sea should not exceed 1.5% m/m. Scandinavian countries have proposed to restrict sulphur content in fuel for passenger ferries even no

more than 0.5% (Dubra, 1997, Our Sea). Nowadays, in the Baltic Sea it is prohibited to use fuel in ships internal combustion engines with more than 3.5% sulphur content.

The new Annex VI to the International Marine Pollution Convention, as modified by the Protocol of 1978 (MARPOL 73/78), has met with fierce criticism of the shipping industry and environmentalists alike.

Exhaust gas emissions from the engines of vessels contribute to global amounts of air pollution. However, the figures are relatively low compared with land based generators. Pollutants of most concern are sulphur dioxide and nitrogen oxides. According to the calculated data sulphur dioxide emissions from ships constitute only about 4% of the world-wide sulphur dioxide emissions from all sources and the actual harmful effects of such emissions are considerably less than those of land based sources as 75% of that emitted from ships falls into the ocean, never reaching land. Moreover, in environmentally vulnerable areas of northern Europe studies have shown that ships contribute only about 2% of the sulphur dioxide pollution (Sampson, 1998, Handouts)

According to the opinion of the Baltic and International Maritime Council (BIMCO) the aim of reducing the sulphur oxide (SO<sub>x</sub>) emission by 50 % by the year 2000 via control on the fuel quality would require that the sulphur content of bunker fuels be limited to 1.5% maximum. Such a constraint would prove very severe to the bunker supply industry, and would have a far-reaching effect on both cost and availability of bunker fuel. On the cost side it has been estimated that production of bunker fuels with a maximum sulphur content of 1.5% would increase cost by between USD 45-70 per tonne, which seems a high and unfair costly burden for the shipping industry compared to the very small environmental benefit (IMO documents, 1997, Submitted by BIMCO).

The proposal to require use of low sulphur fuel by all ships in controlled areas will place a significant burden on those ships that only enter such areas occasionally. It is predicted that the fuel required to be used in designated areas will be significantly more expensive than the grade in general use world-wide, and probably of limited availability in ports outside that area. It is recognised that some ships will trade continuously within a controlled area or for much of their time, and would find no problem in using the required grade of fuel at all times, provided that member states arrangements for the control of fuel oil quality are in place. However all other ships would need to carry a supply of the different and more expensive grade of fuel, to change over to, upon entry into a controlled area.

Quite apart from the above the consequences of this arrangement are many:

1. Serious difficulties will be experienced in effectively policing the timing of the changeover between fuels, and ascertaining its effectiveness. It will increase burdens placed on administrations who have to enforce the regulations, however this is to be done.

2. In areas where SO<sub>x</sub> emissions from ships are not controlled, sulphur oxides will still be detrimental to the world's atmosphere, and SO<sub>x</sub> emission control areas will not be airtight. Sulphur oxides created outside them will inevitably drift in.

3. The possibility of main and auxiliary engine breakdown will increase on change over from one grade to another.

4. Cylinder lubricating oils are usually matched to the chemical composition of the fuel used. Changing to another fuel at frequent and irregular intervals will be detrimental to engine reliability and performance.

5. There will be a loss of dead-weight capacity not least because caution will demand that spare fuel be held in both grades.

Designation of SOx emission control areas is of great concern, due to the need for special low sulphur fuel to be used in such areas and expected bureaucratic enforcement procedures. It can be considered that SOx emission control areas will not provide any real benefit for the environment, as, without enforcement through sampling of all types of fuel oil, the value of regulations will be doubtful.

According to that what was said above the cap should come into force on an agreed date, and with a realistic expectation that, as experience is gained and new technology is developed, implementation of further reduction in the SOx level can be planned. Indeed, a time table for review can be established at the time of implementing each step. This would avoid complications on ships, reduce difficulties for the enforcement agencies, and reduce costs to governments.

Ferries of Lithuanian Shipping Company are using fuel which factual sulphur content fluctuate from 1.7 till 2.8% m/m.

Wanting to carry on these requirements it would be necessary to use a special marine fuel, in which sulphur content would not exceed 1.5%. LISCO cargo-carrying and passengers ships, implementing requirements do not exceed 1.5 per cent of sulphur content in the fuel, would have special to order even a diesel oil, because many diesel fuel standards set 1-1.5 per cent of sulphur content.

According to got information, ferries of Lithuanian Shipping Company which proceed in Baltic Sea, during the year, burn 60 000 tons of marine fuel at a price of about 145 US dollars per tonne. Then the total price for ferries fuel is about 8 700 000 US dollars during the year.

With adoption of decision to reduce sulphur content in the fuel, LISCO will be compelled to buy a fuel at a price of about 220 US \$ per tonne. Total sum for fuel

during the year will increase to 13 200 000 US dollars. Obvious that expenses will increase by about 4 500 000 US dollars. Into this amount do not include other LISCO ships which also operate in the Baltic Sea. So, may assert that, expenses for the new fuel will increase on about 5 500 000- 6 000 000. Bearing in mind that net profit of Lithuanian Shipping Company for the 1997 was about 44 million litas - it is about 11 million US dollars, then new expenses for fuel would reduce net profit almost to half.

Figure 2 shows LISCO profit and expenses for fuel during 1995-1997 and forecast for the 1998 (if from 1998, restriction on sulphur content in the fuel enter into force).

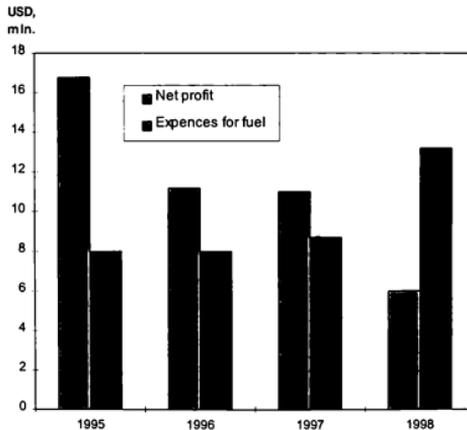


Figure 2. LISCO net profit and expenses for fuel during 1995-1997 and forecast for 1998 if from 1998, regulations on fuel sulphur content for ferries in Baltic sea enter into force. Source: LISCO documents

Probably with acceptance of restriction for sulphur content in fuel LISCO will not be ruined, but for small Lithuanian shipowners, whose ships proceed only in Baltic Sea, that could mean bankruptcy. Restriction aiming would be unprofitable not only for LISCO itself, but also for the state.

Of course, this does not mean that there is no need to improve Baltic Sea ecology, but it has not to be done hastily and compulsory by adopting proposals of Western and Scandinavian countries on restricted fuel content.

Nevertheless, in the nearest future, maybe after few years, Annex VI Regulation for the Prevention of Air Pollution from Ships of MARPOL 73/78 will come into force and we will have to agree with this and to take adequate measures for implementing it.

### **3.11.2 Atmosphere pollution by halons**

Annex VI of MARPOL 73/78 Convention “Regulation for the air Pollution from Ships” regulate not only sulphur content of fuel but also prohibits deliberate emissions of ozone -depleting substances, which includes halons and chlorofluorocarbons (CFCs). New installations containing ozone-depleting substances are prohibited on all ships, but new installations containing hydrochlorofluorocarbons (HCFCs) are permitted until 1 January 2020.

Chlorofluorocarbons, or CFCs, are a major concern because of their ozone-depletion potential and suspected global-warming potential. They are widely used in refrigeration and air conditioning plants, as well as insulation on ships and as blowing agents for thermal insulation materials for refrigerated transportation equipment. Their production and use is regulated by the Montreal Protocol, signed in 1987 and reviewed in June 1990 and November 1992 (Marine Log, 1993, No 10).

In November 1991, IMO adopted a resolution urging governments to prohibit the use of CFCs whose ozone depletion potential is greater than 5%

Lithuania, in December 1994, acceded to Vienna Convention for Protection of Ozone Layer and to the Montreal Protocol on Ozone Layer Depleting Substances and these amendments came into force for Lithuania from 18 April 1995.

The Montreal Protocol is an international environmental treaty, drawn up under the auspices of the United Nations, under which nations agreed to cut CFC consumption and production in order to protect the ozone layer.

Chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) emission in the air reduce ozone layer in atmosphere and this thinness can cause a serious influence on the environment of the world.

Main reasons of harmful emissions of CFC/HCFC are imperfection of refrigerating systems, low quality of maintenance and lack of knowledge of halons harmfulness for the environment.

Not all halons are harmful. Table 6 shows halons with comparable coefficient of harmfulness.

Table 6 Harmfulness of halons. Source: LISCO documents

Harm	Halons harmfulness coefficient				
	R11	R12	R22	123	134A
for ozone layer	1	1	0.05	0.02	0.00
influence for world warming	1	3	0.34	0.02	0.26

Nowadays, at the international level, there is a reduction in the production of harmful halons R11 and R12 (Sampson,1998, Handouts):

in 1993 production was reduced by 20 %;

in 1995 production was reduced by 50 %;

in 1997 production was reduced by 85 %;

in 2000 production will be ceased.

So, from the beginning of 2000 it will be prohibited to use halons R11 and R12.

In Lithuanian Shipping Company there are eleven ships on which it is necessary to change halon R12 to halon R22. It is mostly on "Kapitonas" type vessel (14.000 DWT). Change of halons on LISCO ships have began three years ago and already four ships have changed halons and refrigerating equipment. Halons on LISCO ships will be changed entirely by 2000.

In 1997, utilised quantities of halons on LISCO ships were as follows:

R12 - 4549 kg.;

R22 - 3175 kg.;

134A - 350 kg..

According to LISCO order, new ships will be equipped with new refrigerating equipment which absolutely satisfy requirements of the Montreal Protocol.

## CHAPTER IV

### 4. Environmental protection equipment on the LISCO ships

On the Lithuanian Shipping Company ships, environmental protection equipment, like ships by themselves, mostly are old. In spite of this, the technical condition and characteristics meet present international requirements.

According to requirements of MARPOL 73/78 Convention Annex I Regulation 9 the cleaning level of oil in the discharged oily water has not exceed 15 parts per million for ships built since 1993. For ships built up to 1993 these requirements already have entered into force since 6 July 1998. Till that time it was permitted to use equipment which would clean up oily mixtures up to 100 parts of oil per million. Because majority of LISCO ships was built before 1993, so these new requirements for them entered into force from 6 July 1998.

However, the Lithuanian Shipping Company earlier began to prepare, and did not wait till the requirements will come into force, because some ships were able to clean up oily mixtures only up to 100 parts of oil per million.

In about 1988, LISCO started to equip extra FDN type oil filtering equipment behind oily-water separating equipment on "Kapitonas" type ships which clean oily-water to 15 parts per million. 11 FDN type filtering equipment are needed to fitted on "Kapitonas" type vessels. Now seven are equipped.

On “Kapitonas” type ships oil discharge monitoring and control system “SERES” replaced “SALVIKO” oil discharge control and monitoring system, because “SALVIKO” company became bankrupt and it has become difficult to get spare parts. During 1994-1997, total 7 old “SALVIKO” apparatus were changed to the new “SERES” type apparatus.

In the new building and already built from 1993 ships all environmental protection equipment satisfy to MARPOL 73/78 requirements.

Incinerators are on all LISCO ships built after 1985. On the older “Kapitonas” type, ships have been started to be equipped with such incinerators (2 units). Because Convention on the Protection of the Marine Environment of the Baltic Sea Area has prohibited to burn garbage in territorial sea from 1 January 1995, then LISCO decided that is inexpedient to equip other ships with such incinerators.

Garbage is collected into containers on ships and discharged into ports reception facilities.

General change of ships environmental protection equipment value during 1994-97 is shown in figure 3.

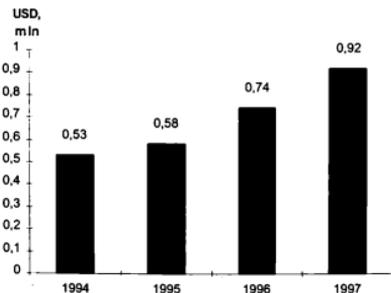


Figure 3. Quantitative changes of environmental protection equipment on the LISCO ships. Sources: LISCO documents

Such change can be explained that old ships now are being sold and LISCO is buying new ships on which the environmental protection equipment is of a higher quality.

In the table 7 is shown value of environmental protection equipment on all LISCO ships.

Table 7.Value of environmental protection equipment on all LISCO ships.

Source: LISCO documents

No	Name of ship	Equipment value \$	
		polluted water	air protection
1.	Mindaugas	37892	-
2.	Algirdas	37892	-
3.	Merkine	6829	-
4.	Kernave	7946	-
5.	Apuole	6829	-
6.	Veliuona	6829	-
7.	Medininkai	6829	-
8.	Kreva	6829	-
9.	Pakruojis	6764	-
10.	Venta	6764	-
11.	Kursenai	6764	-
12.	Kupiskis	8579	-
13.	Kretinga	6816	-
14.	Neringa	6816	-
15.	Ignalina	6969	-
16.	Mariyampole	8579	-
17.	Kedainiai	8579	-
18.	Sventoyi	6345	-
19.	Nida	6345	-
20.	Rusne	6345	-
21.	Siauliai	22285	17161
22.	K. Daugela	11045	29775
23.	K.Reutov	11045	-
24.	K.Chramcov	11045	-
25.	K.Dubin	11195	-

26.	K.Marcinkus	14990	-
27.	K.Mesceriakov	23645	-
28.	K.Kaminskas	19427	-
29.	K.Domeika	23645	29775
30.	K.A.Lucka	19115	29775
31.	K.Stulov	24180	29775
32.	K.Stulpinas	23457	-
33.	Klaipeda	38272	17161
34.	Vilnius	41349	17161
35.	Kaunas	45985	17161
36.	Voke	14779	9925
37.	Musa	14779	9925
38.	Vytautas	33987	-
39.	Gediminas	33987	-
40.	Palanga	28038	-
41.	Asta	39305	-
	TOTAL IN 1996:	709095 \$	207594 \$

## CHAPTER V

### **5. Recommendation and conclusions for environmental protection equipment on board of LISCO ships**

#### **5.1 Conclusions**

The equipment existing on Lithuanian Shipping Company "Kapitonas" type ships are capable to clean up oily-water mixture to 100 oil parts per million.

After 6 June 1998 requirement for all ships entered into force, independently from when the ship was built, that cleaning level of oily water will not be higher than 15 oil parts per million (MARPOL 73/78, 1997, Annex I).

Therefore, until this date all "Kapitonas" type ships had to be equipped with extra oily-water cleaning filters beyond oily-water separating equipment.

All others LISCO ships oily-waters separating equipment cleans oily waters to the required level - 15 parts per million. All these ships are not equipped with oily-water cleaning filters, because separate separators (BWEA, SKIT, DVZ) achieve required oily-waters treatment level.

On the three ships ("Kapitonas" type) it is necessary to equip oil discharge monitoring and control system, which automatically would close discharge or would give a signal, that immediately stops discharge if it exceeds permissible level of oily mixtures.

But now, quite a lot of Baltic ports (and Klaipeda also) have begun to apply "no-special-fee" system for called to ports ships. According to this system, whether the ship discharged accumulated wastes or not, the size of the fee remains the same. The advantage of this system is very likely to do away with those illegal discharges that would be caused by additional waste discharge fees. But there are disadvantages: at first, the system does not stimulate waste reduction measures onboard ships (there have, for instance, been several cases reported by Swedish ports where ships have neglected the maintenance of their bilge water separators because they do not have to pay for discharging the surplus water); secondly, ships may keep their wastes on board for discharge in a port, applying the no-special-fee system (BIMCO Bulletin ,1996, No 2).

But from the economic point of view it would be possible to install some equipment on ships, especially on ferries which would reduce the amount of sewage that accumulates inside ships. That will be dealt with in the next section of this chapter.

Because of the more restricted waste incineration on the ships (it is prohibited to burn garbage in territorial waters of Baltic Sea states) and for possible entry into force of Annex VI of MARPOL 73/78 Convention for Prevention of Air Pollution from Ships, Lithuanian Shipping Company decided that to install incinerators on the old ships would be too early. On the new building ships incinerators will be installed.

To avoid accumulated of ships wastes, it is recommended to have separate capacities for three garbage categories: plastic, food wastes and for other wastes which are permitted to be discharged into the sea. Such capacities should be supplied various places (engine room, dining-room, kitchen and etc.). Collected and separated garbage then would be discharged in the port.

## 5.2 Recommendations

During the use of engines on the ships sludge (result of separation of fuel and lubricants) and others oily remnants accumulate. Sludge which accumulates on the ships approximately consists of about 1% of consumed fuel. Therefore on ships (especially with powerful engines) it would be useful to install equipment-emulsifiers. Inside those emulsifiers it would be possible to prepare an emulsion from accumulated sludge which can be burnt in the auxiliary steam boilers. In such a way it would not be a need to discharge accumulated sludge in the port and it would also be useful.

Also, on the LISCO ferries it would be possible to install vacuum pump sewage system which would reduce amount of water from 10 to 1 litre prewashing one closet (Voloshin, 1987, Protection of the marine environment). That would reduce size of sewage collection tanks and to increase amount of transported cargoes a little.

For the purpose that LISCO ships should reduce contamination of atmosphere they should use more qualitative fuel with less sulphur content and to install on the ship selective catalytic reduction (SCR) converters for cleaning of exhausted gases.

Though selective catalytic reduction converters are one means of reducing NO<sub>x</sub> emissions, currently available units tend to be large, expensive and less than problem-free. LISCO has got a few proposals from foreign companies to install such equipment on LISCO ships. But these proposals still are not even at the consideration level, because still is not defined to what level exhaust gas has to be cleaned, and it would cost LISCO too much.

The stricter the limits on emissions, the more complex and expensive will be the steps needed to reduce emissions from oil-burning engines. This could make natural-gas-burning engines more attractive in the future.

A primary weapon in the battle against carbon oxide emissions is sound plant maintenance. This also applies to black smoke emissions and unburned hydrocarbons. The use of oxidising reactors to reduce the content of carbon monoxide and hydrocarbons in exhaust systems is also a solution.

Another way to reduce air pollution is utilisation of exhausted gases recirculation. Recirculating 15% of exhausted gases, oxygen amount in the air which gets in the cylinder reduces from 21% to 18%. Amount of nitrogen oxides in the exhausted gases fairly reduces, and consumption of fuel almost the same. These gases have to be cooled and cleaned. This causes some problems (Seaman of Lithuania, 1996, No 50).

One more way to reduce air pollution is utilisation of water-fuel emulsion. Water is combined with the fuel even up to 50%. In such way without increasing expenses for fuel, there is a reduction in the amount of nitrogen oxides in the exhausted gases. But this way can cause serious damage to the engine.

At the end the author want to say that during the study he has got quite a good impression about LISCO activities to protect marine environment from pollution from ships. In the author's opinion, in LISCO, all activities related with environmental protection are well co-ordinated and based on the professional relationship between workers of this company. This company is able to implement and comply with the newest environmental protection requirements and to compete in sharp conditions in the cargo transportation market.

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