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PREVENTION OF THE MARINE ENVIRONMENT POLLUTION IN THE COASTAL AREA OF ALBANIA

Summary. Water space on the globe occupies a total area of about 360 million km², which constitutes 70% of the Earth's surface, becoming the most important mode of transportation in the field of import and export trade. Our daily lives are closely linked to the sea, where water surfaces have become an important part of people's lives around the world. However, the current situation of the marine environment is not optimistic, marine pollution has become a significant topic in today's society. All marine pollution incidents such as oil spills or leaks, chemical incidents, plastic pollution, air pollution from ships, etc., have caused significant and difficult recovery of the marine environment. Today, a special attention is being given to the prevention and control of the appearance of these marine pollutions, as well as the management of polluted waters. The MARPOL Convention is the main

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international convention covering the prevention of pollution of the marine environment by ships from operational or accidental causes. The aim of this study is to give an overview of the existing marine pollution in the coastal part of Albania and develop solutions to existing problems. The Republic of Albania has acceded to this convention, has drafted national legislation as well as management plans for the prevention of marine pollution.

Keywords: marine pollution, prevention of marine pollution, MARPOL Convention, environmental safety, safety of marine ecosystems, harbour

1. INTRODUCTION

Sea transport, in general, is a relatively small contributor to marine pollution from human activities. The deteriorating state of the world's marine environment is directly and continuously and intensively linked to anthropogenic impacts [1-3]. Some of the most visible impacts on the marine environment include overexploitation of marine resources, dumping of harmful substances (including rubbish, plastics, and materials from marine pollution accidents), pollution due to carbon release, massive noise for the underwater world, such as even physical disturbances on the coast [4-8]. Lately, it seems like humanity is racing against time to start managing the marine environment in a more sustainable way. It is likely that continued unsustainable use of water resources and space will cause an irreversibly degraded pattern.

Thus, the fate of the marine environment depends on the ability and will of the human being to abandon the destructive path of development and find solutions that would allow the combination of increased use of marine environmental services for humanity with management based on science, protection and restoration of the marine environment [9].

Marine pollution is a problem that has been going on for generations [10]. The marine environment is used for the transport of goods and/or passengers, for the performance of water sports activities, for scientific and archaeological research, maritime tourism, but it has often been and continues to be a depository for plastic, industrial and chemical waste and sewage [11]. Unfortunately, for years, the marine environment has not been treated as the valuable resource it is, but rather as the largest storage site in the world. Maritime transport exerts pressure on the marine environment. Oil pollution, underwater noise, the transport of non-indigenous species, and pollution from chemicals used on ships' hulls (antifouling) are all issues that can negatively impact animals and organisms living underwater.

The water space is the largest area and the most important part on earth. Water spaces receive various substances that flow into the ocean from land, but the ocean itself does not undergo significant changes.

However, in recent decades, with the development of world industry, sources of pollution from land, ships, marine incidents, pollution of the marine environment is becoming more and more serious, facing a great challenge, which is gradually affecting the marine environment [12-14]. In the face of increasing marine pollution, the protection of the marine environment should now be considered as one of the most essential topics of human development [15].

The International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention covering the prevention of pollution of the marine environment by ships from operational or accidental causes. The MARPOL Convention was adopted on 2 November 1973 at the IMO [16-23]. In 1997, a Protocol was adopted to amend the Convention and a new Annex VI was added, which entered into force on 19 May 2005. MARPOL has been updated with amendments over the years [24].

Albania is a member of the United Nations Convention on the Law of the Sea 1982, and thus has the obligation to protect and preserve the marine environment against pollution. Pollution itself means the introduction by man, directly or indirectly, of substances or energy into the marine environment, which damage sea and coastal resources, reduce the quality of seawater, endanger human health, and hinder marine activities and fishing.

2. MATERIALS AND METHODS

A combination of qualitative and quantitative methods was used in this paper. Multiple sources of information from the International Maritime Organization, from the General Maritime Directorate have been used.

The study of theoretical concepts was also used in relation to the predictions made by the MARPOL Convention for the prevention of marine pollution from ships.

Albania has a member of the United Nations Convention on the Law of the Sea since 1982 and has acceded to the MARPOL Convention with all 6 of its annexes, from which comes the obligation to protect and preserve the marine environment against pollution.

One of the most important decisions in Albania for the practical implementation of the Marpol Convention is DoCM no. 1104, dated 28.12.2015. For the adoption of requirements for the prevention of the discharge of waste, created by ships and surpluses from cargoes, into the sea. It provides for the determination, establishment and approval of requirements for the prevention of the discharge of waste, created by ships and surpluses from their cargoes, at sea, with the aim of protecting the marine environment from ships, during the use of the ports of the Republic of Albania. This decision applies to:

- a) all ships, including fishing ships and watercraft for entertainment, regardless of their flag, the call sign or activity within an Albanian port;
- b) all ports of Albania that are affected by the above ships.

3. RESULTS AND DISCUSSIONS

The Ministry of MIE, based on the MARPOL Convention, has licensed the following operators and all solid and liquid waste collection companies, approved and declared in GISIS. The Global Integrated Transport Information System (GISIS) constitutes a database not only for all companies collecting solid and liquid waste generated by ships. Company data can only be updated by states.

The companies licensed for Durres harbour are: “Marine Cleaning”; “Rada Oil” and “Coli sh.p.k”. The companies licensed for Vlora harbour are: “Delfini-1”, “Marine Cleaning”. The companies licensed for Saranda harbour are: “Finikas” and “Cogren”. “Marine Cleaning” is licensed by MIE with code VII licence. 5.2 and VII.5.3, which allow this entity to carry out the withdrawal of solid and liquid waste in all harbours of the country.

The special feature of this company is that in its headquarters, as a function of this activity, in addition to the criteria that must be met for licensing, it has equipment and technology for the destruction of liquid waste. Other companies are licensed under code VII.5.2 or VII.5.3 and to collect liquid waste they contract with licensed companies for their processing, while solid waste goes to the landfill of the respective municipalities.

Waste cleaning and treatment processes include:

- The collection of hydrocarbon residues on the surface of the harbour aquarium.

- Receiving waste water from the ships' deposits through special boats.
- Collection of all solid waste.
- Washing all sleeping and dining bedding.
- Cleaning the premises of ferries and ships.
- Water supply for ferries and ships.
- Waste treatment process.
- Treatment of waste water and hydrocarbons.



Fig. 1. Tools and equipment of “Marine Cleaning” Company



Fig. 2. View of the plants for primary and secondary treatment of bilge water

The plant and its processes are described in detail below.

The primary treatment of bilge water involves a mechanical procedure for large wastes, such as stones or granules, that may be present in these waters. Secondary treatment of bilge water involves separating it from oil and transporting it to plant storage.

Treatment of hydrocarbons:

Step 1: After the separation of the oil from the water, following decanting, it is transported to a warehouse where it is heated to a temperature of up to 40 degrees.

Step 2: It passes through two reactors, raising the temperature to 145 degrees Celsius. At this temperature, water no longer exists at this point.

Step 3: At this temperature, the filter powder is added and subsequently passed through two filters.

Step 4: Air pressure can result in the extraction of up to 80% of pure oil.



Fig. 3. Depuration plant for cleaning waste

Special sewers for the treatment of bilge water and hydrocarbons have also been built. Deposits are available, which are divided into: 5 deposits of 100 tons and 2 deposits of 300 tons. These deposits are of a high security level, in the event of an accident, the entire amount is collected through the sewers in an underground storage.



Fig. 4. Bilge water and hydrocarbon deposits

Aquarium maintenance: In 2009, began the cleaning of the aquarium in Durres harbour. Cleaning includes:

- Cleaning the aquarium from solid waste.
- Cleaning the aquarium from oily residues.
- Transfer and recycling in accordance with legislation.

Managing emergency situations with a marine incident with an oil spill in the aquarium. It is a special ship for port cleaning, which manages to clean the entire aquarium within eight hours. Subsequently, the ship retrieves the rubbish and deposits it on its deck. Ultimately, the waste is collected using a compactor and dumped in the waste area of the city.

Tab. 1

Cases of marine pollution in Albania from 2016-2020

Year	Place of occurrence
2016	Pollution occurred in the aquarium of PIA on 22.05.2016
	Pollution occurred in the aquarium of Saranda Harbour on 01.08.2016
	Pollution occurred in the aquarium of Durres Harbour on 22.10.2016. The incident occurred during the operation of unloading oily waste at the container terminal
2017	Assessment of the situation of the vessel in port and the compatibility of the manufacturer decommissioning with the "MARPOL" and SOLAS conventions [25]
2020	Verification of authenticity for possible GNV contamination. The pollution was claimed to be caused by sewage, but it was about turbidity of the water surface as a result of the work of the ship's propellers
2021	Pollution caused by the TITAN watercraft

The statistics in the Ports of the Republic of Albania regarding the discharge of Bilge/Sludge/Slope generate these data.

Tab. 2

Discharges in Albanian seaports (2021-2022)

Durres harbour, 2021					Durres harbour, 2022			
Ships	Bilge	Sludge	Slope	Other	Bilge	Sludge	Slope	Other
Passenger	1088.66	774.69	0	38.96	1254	689	6.4	34
Tanker / Cargo	614	2022.22	128.596	2.15	705	2090	56	3.8
Vlora harbour, 2021					Vlora harbour, 2022			
Ships	Bilge	Sludge	Slope	Other	Bilge	Sludge	Slope	Other
Passenger	202.5	141	7.2	5.6	101	81	0	0.5
Tanker / Cargo	100	149	9	7.3	123	145	0	3.1

	Saranda harbour, 2021				Saranda harbour, 2022			
Ships	Bilge	Sludge	Slope	Other	Bilge	Sludge	Slope	Other
Passenger	0	0	0.02	19	2	2	0	20
Tanker / Cargo	3	6	0	1	1	73	0	1.2

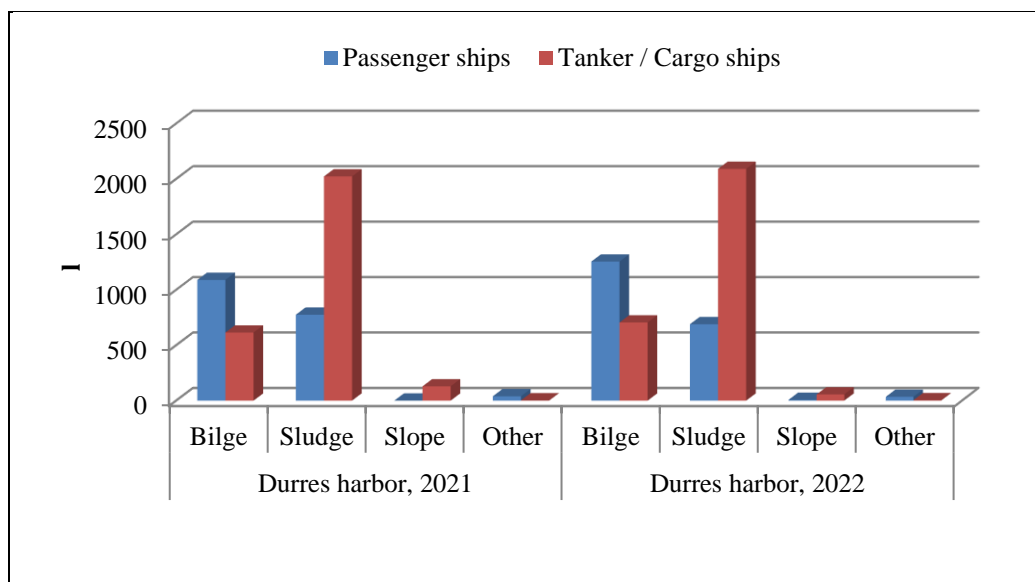


Fig. 5. Discharges from Durres harbour

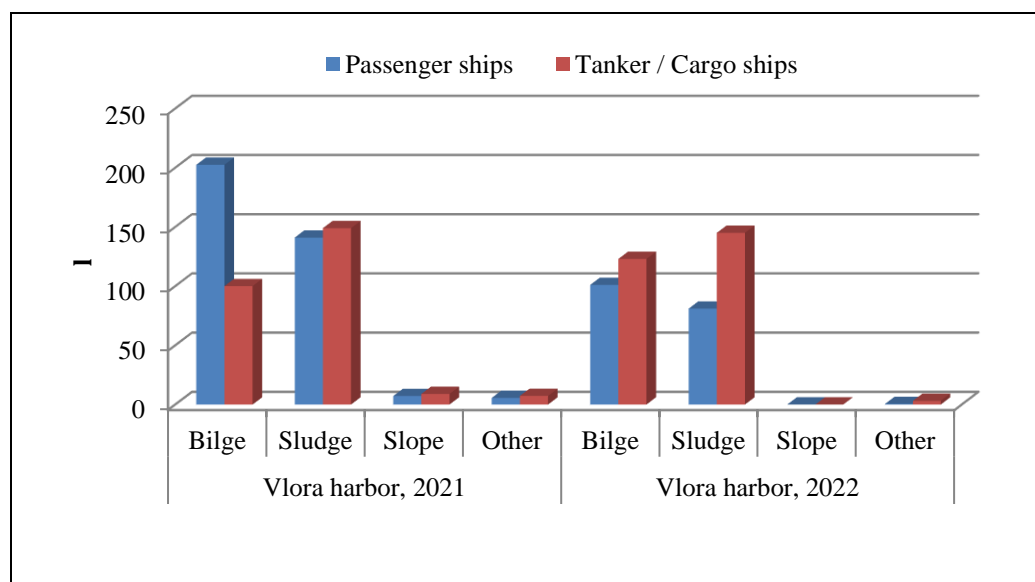


Fig. 6. Discharges from Vlora harbour

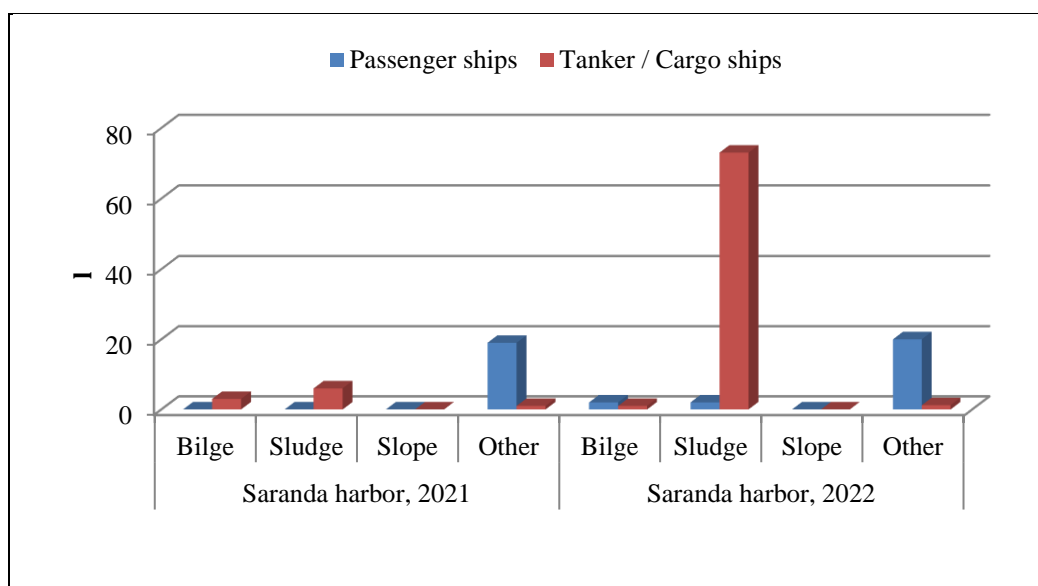


Fig. 7. Discharges from Saranda harbour

4. CONCLUSIONS AND RECOMMENDATIONS

The protection of the marine environment is a challenge faced not only by our country but by the entire globe. Of course, different countries have started to take measures for the protection of the marine environment as well as the implementation of a series of plans on the preservation of the marine environment. Some of the conclusions and recommendations drawn from this paper are given below.

Sensitizing policies should be created to minimize hydrocarbon pollution. It is essential to invest increasingly in the professional training of crew and captains, especially in those cases when the ships in which they work transport dangerous cargo.

Maritime transport operators should be sensitized regarding the responsibilities they have in case of pollution of the maritime space.

Continuous, accurate measurements of oil concentrations in water must be made through reliable devices in real time.

Long-term partnerships between industry, government, and local communities should be created to monitor environmental problems in the operation of crude oil terminals.

National coordination and implementation of environmental protection priorities, programs, and strategies with each regional unit. It is necessary that port structures have all the capacities to manage dangerous situations in the event of an oil spill at sea.

It is essential to adopt new technologies that minimize negative environmental impacts.

Perhaps the most effective approach to mitigate marine pollution is through the provision of environmental education.

People are often unaware of the sources and harmful effects of marine pollution.

All data and information should be shared with the public.

There is a need to categorize waste, since even though on the ship each waste is separated, in Albania the collection of waste is done in a common place (landfill of the respective municipality)

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