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Should chemical tankers' tank cleaning waters be banned from discharging into the sea?



Şengül Şanlıer

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ABSTRACT

Entering of chemical substances into aquatic environment occurs either by involuntary accidents or discharging of chemical wastes resulting from tank washing operations of tankers carrying chemicals. MARPOL 73/78 Convention strict regulations on discharging of chemical residues left in their tanks to the sea, but permits the discharging of such residues provided certain conditions are met. In the present study; the period from 1996 to 2016 is examined and the number of new tankers participating in the chemical tanker fleet and the distribution of these tankers according to dwt tonnage is shown. The tanker fleet which consisted of 1.882 ships in 1966 reached 3.923 units in 2016. Accordingly, the volume of chemical merchandise carried by sea was 132 million tons in 1996, but it reached 287 million tons in 2016. According to the order books, it is understood that these figures will increase even more. The increase in the number of tankers and the growth of the capacities means that more chemical substances are transported at the same time and the tonnage of the chemical waste discharged to the sea is also on increase. Based on the scientific background which proves that chemicals cause biological accumulation and acute and chronic toxicity on aquatic life, and the results of chemical tanker development over the last 20 years that has been presented; It is necessary for maritime authorities to reconsider the legal arrangements for allowing chemical tankers to discharge chemical wastes from tank washing waters to the sea.

1. Introduction

As a result of industrialization, a large number of chemicals have begun to be produced for use in various industries. For transporting these chemicals to larger distances at larger amounts, maritime transportation provides the solution at the lowest cost. Today, 16% of chemical commodities are traded via sea and by chemical tankers (Cunha et al., 2015). Chemical tankers usually carry hundreds of different substances in their tanks on the same routes among the ports, such as organic and inorganic chemical substances, vegetable oils and lube oils. Tank washing operations are crucial in chemical tankers so that after each different chemical substance being transported, the tank is ready for the next substance and the purity of the new cargo is not harmed by the previous one.

Discharging of chemical residues left in tanks to the sea following tank flushing operations causes pollution in the aquatic environment and the international concern to emerge. The International Maritime Organization (IMO), which is a specialised body of the United Nations and responsible for maritime conventions, related standards and their global applicability, organized an international conference, in 1973 at which these issues were debated. In this conference, MARPOL 73/78 conventions on marine

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environment, including the prevention of pollution caused by operational or accidental spill from vessels, were accepted (Nauke and Holland, 1992; Wells et al., 1999). The Annex II of the MARPOL 73/78 Convention, which consists a total of six annexes, contains the rules for the prevention of pollution from liquid chemical substances carried in bulk and the restrictions on toxic liquids which may be discharged to the sea by tank washing or ballast operations of chemical tankers (IMO, 2006).

While IMO is preparing conventions for the prevention of damages that may be brought to the water by the chemicals transported by tankers on the one hand, on the other hand, refers to the recommendations of The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), which is today known as a consultation organization, to determine the harm that these chemicals will cause to the aquatic life. GESAMP evaluates the specifications of chemicals polluting the seas and publishes them in the form of a report on damage assessment procedures (GESAMP, 2002).

Despite the work of all these organizations and restrictions brought by existing conventions, chemical residues in tank washing waters still continue to be allowed to be discharged into the sea as it is thought that they do not pose a significant hazard to the aquatic environment (IMO, 2006). Indeed, legal restrictions include very strict measures and chemical concentrations in the waste discharged into the sea are very low. What is ignored during the granting of this permit, but what is very important, is the development of sea-based transportation of chemicals?

In this study, firstly, the effects of the discharged chemicals on the aquatic organisms were investigated according to the GESAMP damage assessment procedure, and also the restrictions on discharge by the MARPOL 73/78 contract for chemical residues left in tanks of tankers carrying chemical products. Secondly; the evolution of chemical tanker fleet and marine chemical transport between 1996 and 2016 has been demonstrated based on data from Clarksons Research, which is accepted as the most important authority in the world which provides the most reliable information to global maritime industries. Finally, the effects of chemicals on the aquatic organisms are presented according to the results obtained by scientists.

The purpose of the work presented is to draw attention to the development of the chemical substance transport in the last 20 years and thus the amount of waste discharged to the sea, in the light of all this information, during the preparation of contracts and procedures; to invite the scientists and experts to consider the development of chemical tankers while evaluating the subject and to reconsider the experts, relevant authorities and organizations on whether the existing regulations are sufficient.

2. International regulations on the transport of chemical substances

2.1. MARPOL 73/78 Convention

The MARPOL Convention was enacted on November 2, 1973, covering the prevention of pollution, both operational and accidental, caused by vessels in the marine environment. Due to the increase in the number of tanker accidents, especially in 1976–1977, an additional protocol to the contract was prepared in 1978 and this convention, now known as MARPOL 73/78, entered into force on October 2, 1983. Today, Annex II of the MARPOL 73/78 Convention, which is consisting of a total of six annexes, contains rules on the prevention of pollution from chemical substances carried by ships in bulk. In Annex II, Rule 6.1, four categories are assigned according to the toxicity of hazardous chemical substances (IMO, 2006).

- *Class X*; Which gives major hazard to both marine resources and human health or other legal uses of the seas,
- *Class Y*; Hazardous to marine resources, human health or other legal uses of seas,
- *Class Z*; Giving minor hazards to marine resources and human health, or other legal uses of the seas,
- *Other Substances (OS)*; Chemical substances that do not harm marine resources, human health, usefulness of the seas and other legal uses when discharging into the sea during tank cleaning or ballast discharging processes.

MARPOL 73/78 Annex II Regulation 13/1 and 13/2 lay down the standards for the discharge of chemicals and allow the sea to be discharged if the following criteria are met.

- (a) *the ship is proceeding en route at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;*
- (b) *the discharge is made below the waterline, taking into account the location of the seawater intakes;*
- (c) *the discharge is made at a distance of not less than 12 nautical miles from the nearest land in a depth of water of not less than 25 m.*

For vessels carrying class D chemicals, the 25 m rule contained in item (c) is not required, although the items (a) and (b) above are equally valid.

The Annex II of the MARPOL 73/78 Convention refers to the classification of tankers that carry chemical substances as bulk cargo, referring to “International Code For The Construction And Equipment Of Ships Carrying Dangerous Chemicals In Bulk (IBC Code)”. The IBC Code has been prepared to ensure transport in accordance with the characteristics of various chemicals and to minimize the potential adverse effects on the ship, its crew and the marine environment. The list of chemicals for which this code applies is given in Chapter 17, while the list of chemicals for which the code is not applied is provided in Chapter 18. According to IBC code, chemical tankers are divided into three classes (IMO, 2007).

Type 1 Tankers: those which have very serious damage to the marine environment and safety in the event of any cargo leaks,
Type 2 Tankers; which is quite harmful to the marine environment and safety in the event of any cargo leakage,

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