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BW Convention Deficiencies Identified by Port State Control in Paris Mou Area

Abstract

The growth and development of maritime activities and the associated increase in the number of ships also increase the pressure on the marine environment. In addition to the positive impacts of maritime transport, including social and economic components, the threats to the marine environment, including ballast water, cannot be ignored. The objective of the Ballast Water Convention is to control and manage ballast water and sediments from ships, as they are recognized as pollutants. The aim of this paper is to present the implementation of the Ballast Water Convention in the Paris Memorandum of Understanding (MOU) area. The purpose of reviewing annual reports and inspection results from Paris MOU is to identify deficiencies in the implementation of requirements of the Ballast Water Convention. Since the Ballast Water Convention was ratified in September 2017, the recording of deficiencies in this category by Port State Control starts from that date. The analysis covers the period 2017-2022, with special focus on the most frequently identified deficiencies. The results show that the largest number of deficiencies was recorded in 2022 and that the most common deficiency throughout the years observed was the Ballast Water Record Book.

Keywords: ballast water, Ballast Water Convention, Paris Memorandum, inspection, deficiencies

1. Introduction

Invasive, non-native species pose a major threat to biodiversity worldwide [1]. The impacts of invasive species are diverse and can be classified as ecological, environmental, public health, cultural, and economic impacts [2]. The main transmission routes for invasive species are ships [3].

Preventive measures should be in focus when dealing with negative issues of ships' ballast water (BW) [4]. One of the legal instruments to prevent the spread of invasive species and potentially harmful pathogens is the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention), which entered into force on September 8, 2017. The Convention prescribes standards and procedures for the management of ballast water and sediments. Ballast water from ships must be managed in accordance with a BW management plan [5]. The BWM Convention also sets two standards for BW management: the exchange of ballast water in the open sea (D-1) and BW treatment with a specified maximum number of viable organisms that may be discharged (D-2) [5]. In 2024, all ships subject to the requirements of the BWM Convention should have approved ballast water treatment on board (D-2) [6].

Despite existing standards and good intentions to prevent the spread of unwanted organisms, some organisms can be transported, and meeting the goals of the BWM Convention is challenging [7]. Therefore, ship BW management must be as efficient as possible and minimize the possibility of spreading invasive species and potentially harmful pathogens.

More than 17,000 inspections of ships take place annually in the Paris MOU area, which includes 28 participating maritime authorities and covers the waters of the European coastal states and the North Atlantic basin from North America to Europe [8]. The aim of the harmonized system of port control inspection (PSC) of foreign ships is to ensure compliance with international safety, security, and environmental standards [8].

These standards are laid down in the Conventions adopted by the International Maritime Organization and the International Labour Organization, and the shipowner or operator is responsible for compliance with the international standards, while the flag State should ensure such compliance [8]. This system of ship inspection has proven to be one of the best tools in the European Union to verify the compliance of ships with the international standards [9].

Inspection of the ship's compliance with the BWM Convention includes verification of the presence of a valid ballast water management certificate and an approved ballast water management plan on board, inspection of the ballast water record book and/or sampling of the ship's ballast water [5]. A higher number of pollution prevention deficiencies were identified in 2018 than in 2017, which may be due to the newly introduced BWM Convention requirements [10].

The ballast water record book should record the intake of ballast water on board and all treatments with ballast water on board. It should then record the discharge of ballast water overboard, indicating that it is discharged into a reception facility, accidental or other unusual discharges of ballast water.

The ballast water management plan should include a detailed description of the actions to be taken to implement the ballast water management requirements and additional ballast water management practices for each individual ship [5].

The objective of this paper is to present the implementation of the BWM Convention in the Paris MOU through an analysis of the identified deficiencies related to pollution prevention requirements.

2. Material and methods

The total number of identified deficiencies and BWM Convention related deficiencies was taken from the available annual reports of Paris MOU for the period 2017-2022 [10]– [15]. The total number of BWM-related deficiencies was provided in the annual report. A more detailed search was performed using the Paris MOU deficiency statistics data [16], which means that only identified BWM related deficiencies in the pollution prevention category were considered. There is also a Documentation and Certification category that includes deficiencies related to the BW Management Certificate, which is not included in this analysis.

3. Results

Table 1 shows the total number of identified deficiencies for the period from 2017 to 2022. The table shows that in the period from 2017 to 2022, the total number of deficiencies decreased in 2020, which is related to the Covid 19 pandemic that caused disruptions worldwide. In addition, the largest number of deficiencies was found in 2022. For the total number of deficiencies related to the requirements of the BWM Convention and the prevention of pollution of the marine environment, the number of deficiencies identified ranged from 0.2% to a maximum of 1.7% (2021).

Table 1: Number of deficiencies from 2017 to 2022

| Year | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|--|-------------|-------------|-------------|-------------|-------------|-------------|
| Total number of deficiencies | 40871 | 40265 | 39821 | 28372 | 36272 | 47176 |
| Number of BWM pollution related deficiencies | 76 | 573 | 623 | 478 | 621 | 758 |

During the observation period, a total of 12 categories of deficiencies (Table 2) were identified in relation to the BWM Convention pollution prevention requirements.

Table 2: Categories of deficiencies

| | |
|----|--|
| 1 | Ballast Water Record Book |
| 2 | Ballast Water Exchange |
| 3 | Ballast Water Management Plan |
| 4 | Crew training and familiarization |
| 5 | Other - BWM |
| 6 | Ballast water discharge violation in ports |
| 7 | Ballast water management system |
| 8 | Conditions for exemptions |
| 9 | Sediment removal and disposal |
| 10 | Performance Standard not met |
| 11 | Construction dates applicable for BWM |
| 12 | Prototype ballast water treatment |

Figure 1 shows the total number of BWM-related deficiencies regarding pollution prevention during the monitoring period from 2017 to 2021. Considering that the BWM Convention entered into force in September 2017, the lowest number of deficiencies was identified in 2017, while the highest number of deficiencies was recorded in 2022.

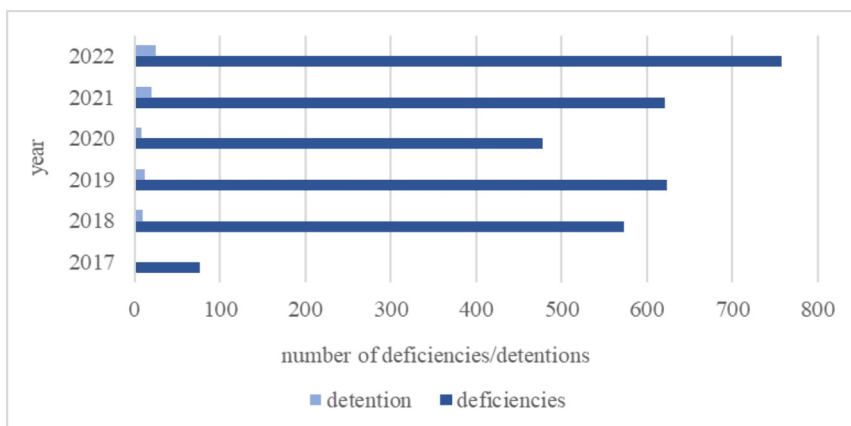


Figure 1: Number of BWM-related pollution prevention deficiencies and detentions in the period 2017 to 2022

Looking in detail at the deficiencies identified during the observation period, it can be seen that most of the deficiencies are related to the BW Record Book. Figure 2 shows the share of this deficiency category in the total number of deficiencies related to BWM Convention pollution prevention requirements. It can be seen that in 2019-

2021 the number of deficiencies related to the ballast water record book accounts for more than 50% of the total number of deficiencies.

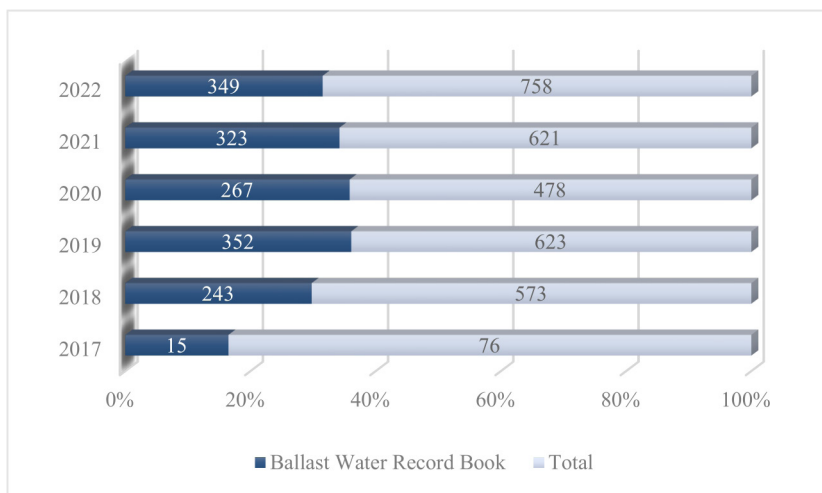


Figure 2: Number of deficiencies related to the BW Record Book in total number of BWM-related pollution prevention deficiencies from 2017 to 2022

In addition, Figure 3 shows the percentage of the Ballast Water Exchange deficiency category relative to the total number of deficiencies from 2017 to 2022 in relation to BWM-related pollution prevention deficiencies. Although the largest number was recorded in 2018, the largest contribution of deficiencies in 2017 was recorded in the BW Exchange category.

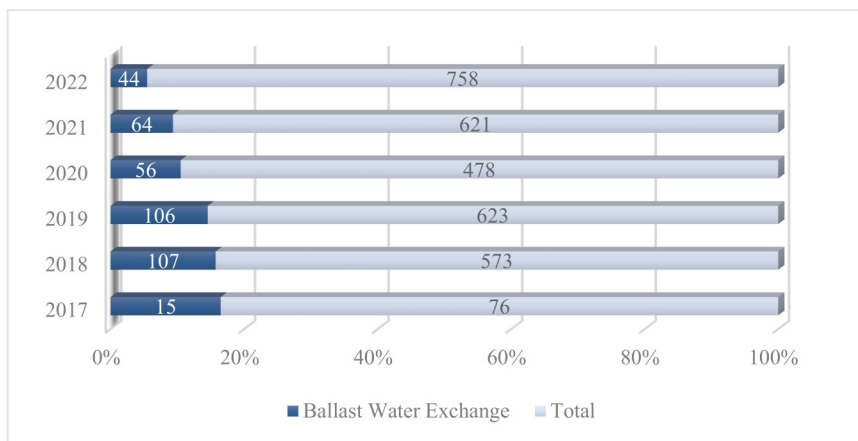


Figure 3: Number of deficiencies related to the BW Exchange in total number of BWM-related pollution prevention deficiencies from 2017 to 2022

The third most common deficiency found on ships is related to the BW management plan. Figure 4 shows the relationship between deficiencies caused by a BW management plan and the total number of BWM-related pollution prevention deficiencies. The largest number of deficiencies related to the BWM plan was identified in 2022.

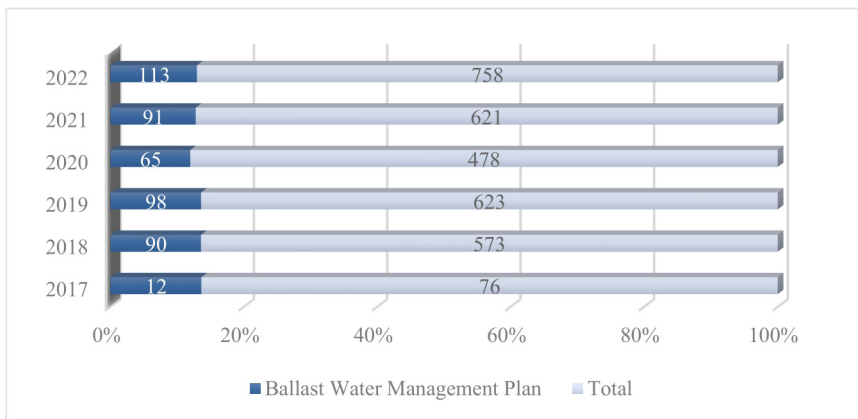


Figure 4: Number of deficiencies related to the Ballast water management plan in total number of BWM-related pollution prevention deficiencies from 2017 to 2022

Other deficiencies that were significant during the observed period include crew training and familiarization, ballast water discharge violation in ports and ballast water management system. In the last two years, there has been a significant increase in two deficiencies ballast water discharge violation in ports (2017-3, 2018-10, 2019-4, 2020-9, 2021-19, and 2022-24) and ballast water management system (2018-1, 2019-2, 2020-9, 2021-25 and 2022-94). The number of deficiencies in crew training and familiarization has also increased since the first year observed (2017-7, 2018-24, 2019-36, 2020-52, 2021-58, and 2022-52).

4. Discussion

To determine compliance with the pollution prevention provisions of the BWM Convention, the BW management plan, the BW management system, the BW record book and the crew members' knowledge of the systems used on board a ship are checked [6].

The total number of deficiencies related to BWM Convention requirements was less than 2% during the observation period. However, the number of BWM Convention pollution prevention deficiencies from 2017 to 2021 is increasing, apart from 2020 (pandemic year). As expected, the lowest number of deficiencies was recorded in 2017, as only 3 months were included, while the highest number of deficiencies was recorded in 2022.

During the observed period, most deficiencies relate to the BW record book, BW exchange, and BW management plan. There is also a significant increase in BW management system deficiencies in 2022. Most of the shortcomings concern the record and the procedure [6].

The most frequent deficiency is related to the BW record book, with continuous increase in the observed years, with the exception of 2020 (pandemic year). In 2019-2021, the number of deficiencies related to the ballast water record book accounts for more than 50% of the total number of deficiencies. BWM-related deficiencies include: *incorrect, improperly completed or missing entries of all ballast water movements (inboard, treatment, circulation, discharge), or the BWM record book itself is missing* [17].

BW exchange deficiencies are decreasing with the largest number recorded in 2018. The deficiencies in this category mean that there was an incorrect exchange of BW, i.e. *water was not exchanged at all or the amount of water exchanged was insufficient* [17].

The deficiency BWM plan shows an upward trend with the largest number in 2022. The most common BWM plan deficiencies are: *the plan was not approved, it is incorrect or it is missing* [17].

As the time for implementation of the BW management system approaches for most ships, an increase in the number of deficiencies in the BW management system is to be expected. An increasing number of deficiencies have been identified, with most deficiencies identified in 2022. Any BW management system should be tested under various environmental conditions prior to approval [18]. In 2019, the American Bureau of Shipping reported that a large number of BW management systems have some operational issues, which can result in ships not complying with regulations [6].

As any new system on board a ship requires familiarization and training of the crew, a lack of this can also lead to problems and non-compliance [17]. During the observed period, the number of deficiencies in crew training and familiarization has increased.

5. Conclusions

The Paris MOU applies to all EU waters and the harmonized port control inspection system can serve as a good pollution prevention mechanism. Therefore, it is necessary to identify the most common BWM-related pollution prevention deficiencies in order to minimize them. Some of the processes required under BWM are quite new and the crew needs some time to master them as well as possible. During the period observed, crew training and familiarization was noted as being a significant deficiency over the past 3 years. In addition, BW record book entries were one of the main deficiencies throughout the observation period. The deficiencies identified can be reduced by increasing crew training not only on the process itself, but also on the importance of pollution prevention.

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