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ANALYSIS OF UNDERSTANDING CADETS OF PRIVATE MARITIME ACADEMIC ON BALLAST WATER MANAGEMENT CONVENTION

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ABSTRACT

Ships are the preferred transportation fleet for export-import activities compared to air transportation, because of their large carrying capacity, making them relatively more profitable. Ships without cargo to sail safely will add ballast water as a stabilizer. Ballast water often carries a variety of foreign microorganisms that can harm the landfill ecosystem. On September 8, 2017, the ballast Water Management Convention (BWMC) was enacted, to prevent the spread of pathogenic microbes that are very harmful to health and the environment. The purpose of the study was to determine the understanding of private academy cadets on the provisions of BWMC. Data were collected using questionnaires and in-depth interviews, then descriptive analysis was carried out. Respondents were cadets of private maritime academy in Central Java, a total of 35 respondents. 6 respondents were excluded because they gave dishonest answers, so the sample used was 29. From the conclusion that there were still many respondents who did not understand the provisions of BWMC, it was evident from the respondents' answers to several questions that none of them were correct. Such as the question of when the BWMC was promulgated, when Indonesia ratified the BWMC, and the question of the D-1 Standard and the D-2 Standard of the BWMC. However, there are 13.79% of respondents already have a concern about the dangers of ballast water and the importance of immediately handling ballast water. Our suggestion is to disseminate information to private academy cadets through seminars, special training on ballast water, or inclusion in marine pollution course materials.

Keywords: Ballast water, BWM Convention, marine pollution, Cadets of Private Maritime Academy, Socialization.

1. Introduction

The sea transportation mode, namely ships, is the main choice as a means of transportation for export-import activities, compared to air and land transportation modes. The large carrying capacity makes sea transportation more profitable from an economic point of view. Fugazza et al. (2017), and Erga et al. (2019) state that more than 80% of world trade commodities with high economic value are transported by ship. Indonesia as an archipelagic country, with 17,504 islands (Lasabud, 2013) is of course ideal for the use of ships as a means of transportation. In an unloaded voyage, the ship will carry a large amount of ballast water. Ballast water loading aims to maintain the balance of the ship so that the ship sails safely and comfortably. Ballast water is taken from port waters in an area after the ship has unloaded or is empty without cargo (Sayinli et al., 2021), which will then be discharged together with loading at theW next port. Ballast water is also useful for controlling the movement of ships while sailing or being hit by waves (Golash et al., 2018; Ardura et al., 2021).

It has been 100 years since the introduction of alien species through ships, but the first biological examinations taken from ballast water samples were only carried out in the 1970s. To date, more than 1,000 alien species have been introduced from ballast water, which also contains human pathogenic bacteria. According to Golash (2014). It is estimated that between 3,000-7,000 alien species travel around the world every day via ballast water. According to IMO (2019), there are around 10 billion tons of ballast water every year around the world. This equates to about 4 million Olympic-sized swimming pools.

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In his research, Rivera et al. (2012) found more live bacteria in ballast water. While the research of Dobbs et al. in 2013 found the potential for the spread of Vibrio cholerae bacteria to all ports in the world through ballast water. Meanwhile, Altug et al. (2012) in the Sea of Marmara Turkey in 2009 to 2010, studied foreign species originating from ballast water discharge and found 27 species of pathogenic bacteria in humans. In 2017, El-Husna et al. found pathogenic microbes in humans originating from ship ballast water at the port of Cilacap with no difference from pathogenic microbes on the coast of Cilacap. Then in 2022, El-Husna et al. examined ballast water discharged at the port of Tanjung Emas Semarang, and obtained the results of V. cholerae 800 cfu/100 ml sample, E. coli 400 cfu/100 ml sample and E. intestinal 300 cfu/100 ml sample, which exceeds the threshold of Standard D- 2 Ballast Water Management (BWM) Convention (IMO, 2009 & IMO, 2017).
Microbial performance standard in BWM Convention (D-2 BMWC)

Microbes category	D-2 Standard
Plankton, size > 50 µm / m3	< 10 viable cells
Plankton, size 10-50 µm / mL	< 10 viable cells
Vibrio Cholerae	< 1 cfu / 100 mL
Escherichia Coli	< 250 cfu / 100 mL
Intestinal Enterococci	< 100 cfu / 100 mL

cfu : colony formatting unit

The longer the microbial content in ballast water, the more various types. To address this, IMO adopted "The International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004" to become the Ballast Water Management Convention. The ballast water management convention came into force on September 8, 2017 (maritime journal article, 2017). Through the Secretary, General IMO is taking important steps to stop the spread of invasive species that can cause damage to local ecosystems, affect marine biodiversity and cause huge economic losses with the BWM Convention (Portonews article, 2017). This convention mandates IMO members who have signed to follow predetermined standards, the aim of which is to stop the spread of microbes so that damage to the marine environment due to ballast water does not occur (IMO, 2009., IMO, 2017).
Indonesia signed the charter of accession to the Ballast Water Management (BWM) Convention on November 24, 2015, in conjunction with the 29th International Maritime Organization (IMO) Assembly Session at IMO Headquarters, in London, England.

2. Method

The method used in this research is an analytic description. To obtain data using a questionnaire equipped with interviews with respondents. The study was conducted on 35 respondents of nautical cadets and private maritime academies of engineering. A total of 6 data were excluded from the calculation because of dishonest answers because it was possible to reduce the validity of the data. Then the processed data was obtained from 29 respondents.

2.1 List of questions I Answer the question by choosing one answer
- TA: totally agree
- A: agree
- QA: quite agree
- DA: don't agree
- D: disagree

1. What is your attitude towards the BWM Convention (TA, A,QA,DA,D)
2. What is your attitude if Indonesia makes derivative regulations of the BWM Convention (TA, A,QA,DA,D)
3. What is your attitude towards ships that do not meet the D-1 standard of the BWM Convention, do they need to be sanctioned (TA, A,QA,DA,D)
4. What is your attitude towards ships that do not meet the D-2 standard of the BWM Convention, are sanctioned (TA, A,QA,DA,D)
5. What is your attitude if to meet the D-2 standard of the BWM convention, ballast water treatment facilities are provided at the port (TA, A,QA,DA,D)

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2.2 Question list II Answer briefly and clearly
1. Since what date did the BWM Convention come into force
2. What date did Indonesia ratify the BWM Convention
3. Indonesia makes derivative regulations from the BWM Convention, which number is the regulation
4. In your opinion, what is the D-1 standard of the BWM Convention?
5. In your opinion, what is the D-2 standard of the BWM Convention?
6. For ballast water disposal, how far is the distance?
7. How deep is the ballast water discharge
8. How to treat ballast water before it is discharged, how many ways are there
9. In ballast water treatment using any chemical compounds
10. In your opinion, how important is ballast water treatment before disposal

3. Results And Discussion

3.1 Question Results I

On the question about the implementation of the BWM Convention, 15 respondents (51.72%) strongly agree and 14 respondents (48.28%) agree. On the question of the laws and regulations made by Indonesia regarding the BWM convention, 10 respondents (34.48 50 strongly agree, 17 respondents (58.63%) agree, and 2 respondents (6.89%) quite agree. On the question of sanctions that do not exchange air ballast 9 respondents (31.03%) strongly agree, 14 respondents (48.28%) agree, 5 respondents (17.24%) quite agree and 1 respondent (3.44%) disagrees. do not treat ballast water 7 respondents (24.38%) strongly agree, 15 respondents (51.72 5) agree and 6 respondents (20.69%) quite agree and there is 1 respondent (3.445%) does not answer. water treatment at the port 15 respondents (51.72%) strongly agree, 12 respondents (41.38%) agree, and 2 respondents (6.89%) quite agree.

3.2 Result of Question II

On the question of the date of entry into force of the bwm convention, the correct answer is 0%. 4 respondents (13.79%) answered incorrectly, 18 respondents (62.67%) answered they did not know, and 7 respondents (24.14%) did not know. For answers, on what date did Indonesia ratify the bwm convention, 16 respondents (55.17%) answered incorrectly, 4 respondents (13.79%) answered incorrectly and 9 respondents (31.03%) answered that they did not know. For questions about regulations which are derivatives of the BWM convention which answered correctly 1 respondent (3.44%) answered they did not know 16 respondents (55.17%), 12 respondents (41.37%) answered incorrectly. When asked about the standard of ballast water exchange, no one answered correctly, 18 respondents (62.67%) answered they did not know, 3 respondents (10.34%) answered forgot and 8 respondents (27.59%) said they did not know. Meanwhile, for the question of ballast water performance standards, 20 respondents (68.96%) answered they did not know, 2 respondents (6.89%) answered forgot and 7 respondents (24.14%) said they did not know. For knowledge about ballast water disposal, how far is it from the outermost land? 21 respondents (72.41%) answered they did not know, 2 (6.89%) answered forgot, 5 respondents (17.24%) did not know and 1 respondent (3.45%) answered incorrectly, while 0% answered correctly. For the question of the depth of ballast water discharge, 1 respondent (3.44%) answered correctly, 2 (6.68%) incorrectly, 16 (55.17%) did not know, 7 respondents (24.14%) did not know and 3 respondents (10.34%) forgot. On questions about ballast water treatment on ships, 2 (6.89%) respondents answered correctly, 3 (10.35%) respondents answered incorrectly, 14 (48.28%) did not know, 7 respondents (24.14%) do not know and 3 respondents (10.35%) forgot. When asked what chemical compound to use for ballast water treatment 1 respondent (3.45%) answered correctly, 2 (6.89%) answered incorrectly, 15 (51.72%) respondents answered they did not know, 6 respondents (20.69 %) answered that they did not know yet and 5 respondents (17.24 %) answered that they had forgotten. When asked how important it is that ballast water is treated before being discharged, 4 (13.79%) respondents answered correctly, 4 (13.79%) respondents answered incorrectly, 16 (55.17%) respondents answered they did not know, 3 respondents (10, 35 %) answered that they did not know and 2 (6.89 %) of respondents answered that they forgot.

4. Conclusion

The answer given implies that the respondent understands that the existing regulations are important to enforce considering that regulations are made to protect aquatic ecosystems from foreign microorganisms that can endanger the health and the environment from ballast water.

There is an answer that does not agree to the imposition of sanctions for those who do not exchange and treat ballast water, with the reason being for domestic shipping because the distance between islands is close so it is not possible to make an exchange. Meanwhile, the reason for doing processing on board is that there are still many ships that do not have processing facilities. Adding processing facilities is still not possible because it requires a lot of money so many ship owners do not do it.

From the respondents' answers, there are still quite a lot of people who do not understand the BWM Convention regulations. There are still incorrect answers, then wrong answers, no idea, and do not know it yet, and forgetting the answers dominate all questions.

The results of respondents' answers vary greatly in their level of knowledge, depending on their reading experience and experience while sailing. Those sailing in international waters usually have better experience in ballast water management on board. Many countries have enforced the provisions of this convention that require ships to meet existing standards. It is very important to provide cadets with an understanding of bwm conventions. Socialization can be through seminars, workshops, teaching materials, or familiarization while on board by ship management.

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