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Implementation IMO Regulation of Ballast Water Management at Inaport 2nd Jakarta Based Environmental Risk Assessment

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Abstract. This study aims to analyse the application of the rules of IMO (International Maritime Organization) relating to ballast water management to vessel back at the port in the operational area of Inaport 2nd Jakarta. IMO rules governing vessel ballast water management, are applied internationally starting September 8, 2017. Data samples are taken from the number of vessel visits, especially international vessel routes that visited in 2012-2016 and disposed of ballast water at the operational port of Inaport 2nd. The analytical method uses qualitative and deterministic based on the formulation of IMO MEPC 56/23 ANNEX 2. The volume of discarded ballast water is varied for 10% of vessel visiting up to 60% of the vessels visiting, with the increment of 5 to 25 tons of ballast water which is disposed of by each vessel. In 2016, for 60% of vessel that visited and disposed of 25 tons, the waters of Inaport 2nd would receive 48,741.06 kL of ballast water. The increase in the number of vessel and the amount of ballast water that is disposed of will increase the potential of invasive follow-up species to local streams and increase marine pollution in the port area.

1. Introduction

The vessel is a floating building that moves dynamically with humans and goods transported and moved from one place to another. As part of a huge quantity of products and human transport systems, the vessel must be safe and secure until the goal is to move the cargo. The vessel as a means of transportation must be protected starting from the shipbuilding process to the operational stage of the vessel so that it is seaworthy. Likewise, environmental protection due to vessel operations. Protection of people, goods and the environment due to vessel operations requires rules, both nationally and internationally. Non-compliance with national and international regulations resulted in legal risks, including the prohibition of sailing, the detention of vessels and crew, fines.

International and national vessel companies must comply with international and domestic rules; these rules are in the form of law and regulation. This rule is internationally grouped, promulgated and organised by an international maritime institution, namely the International Maritime Organization (IMO). This organisation is a combination of several countries in managing maritime and then generally regulated in IMO. IMO, in carrying out its duties and functions to form several committees, as well as a

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combination of several committees with different objectives, the different purposes are based on differences in their interests, including: (i) the MSC (Marine Safety Committee) this committee deals with and engages in safety, both vessel safety, people and the environment. This committee has also produced several rules, either in the form of conventions or codes, one of which is a convention on life safety at sea or known as the SOLAS (Safety of Life At Sea) convention. (ii) the MEPC (Marine Environment Protection Committee) working area of this committee is specifically tasked and focused on environmental protection due to the operation of the vessel and other floating equipment; this committee has produced a regulation on environmental protection called MARPOL (Marine Pollution) in 1973, then an amendment in 1978.

Some research that has been done by people related to Environmental Risk Assessment in shipyard companies, among others, uses several methods. Green shipbuilding and recycling related analysis uses literature review, and focuses on the by-products of shipyard companies, in the form of water, air and soil pollutants, to increase socio-economic factors [10]. Evaluating the chemical content of 12 metal concentrations in sediments on the coast of Karachi, Pakistan, this study uses the Numerical Quality Sediment Guidelines approach, due to the operation of shipyard companies [6]. Risk assessment on the transport of gas hydrate using the semi-quantitative risk method to determine the risk index of 80 risks identified, three risks cannot be accepted, 28 risks can be accepted but in the ALARP risk level [9]. Assessment of environmental pollution due to the operation of shipyard companies in South Korea, the characteristics of pollutants include dust, odour and noise [3]. Conducted research on the effects of contaminants, especially water pollution near shipyard operations and other scrap industries around West Bengal India and their impact on the DNA of workers involved in shipyard companies [7]. Study of absence rates due to illness in the private sector in Greece, by taking data samples on shipyard company workers and data from insurance [4].

Research into environmental pollutant factors, especially the effect on the DNA of workers exposed to paint particles in the industry [2], this study compared workers exposed to paint particles and workers not exposed to paint particles within a week of working time. An Ecological Risk Assessment study to assess risks to the environment using the Relative Risk Model combined with the Monte Carlo method [1]. Analysis of environmental influences in the form of pollutant material due to the ship breaking process of animal and plant life in the waters around the ship scraping process. The analysis was carried out based on recorded data statistics, published data and direct observation data using remote sensing [5].

Referring to the regulations of IMO (International Maritime Organization) which has been classified since 2004, that all types and types of vessels with sizes above 400 GT (Gross Tonnage) and have non-domestic vessel routes, must undergo inspection and have certificates relating to BWM (Ballast Water Management). Vessels with a size below 400 GT (Gross Tonnage) can follow the inspection requirements and have a document in their own country, where the vessel is registered. These provisions can be adopted by the government of the Republic of Indonesia, domestic (domestic) vessels can follow the rules that will be made by the Government of the Republic of Indonesia itself [12].

The adverse impact of the commercial ship of deballasting on the aquatic and economic ecosystems of the Tanjung Emas Port in Semarang has been analyzed by Tjahjana [13]. Based on the study, ballasting and deballasting to vessels that were disposed of containing invasive species, so that further processing was necessary. The presence of invasive species, proposed a model of ship water management in Inaport 3th can be carried out by accommodating vessel's water in a shelter, then processing it with a capacity of 51,090 m3 per month or 81,744 kL per month. Based on data from the IMO (International Maritime Organization), in one year, for vessels sailing in the waters around the world, the vessels contain 10 billion tons of water ballast. Thousands of marine species will also contain the vessel's ballast water with micro size in it and included in the voyage until the destination port. Based on data from the IMO

(International Maritime Organization) also, that per day, in one-hour duration of 7,000 species moved from one water location to another due to ballasting and deballasting processes [11].

2. National and International Rules of Ballast Water Management

As a State with a maritime basis, the Government of the Republic of Indonesia has regulated the territorial waters owned by Law Number 6 of 1996 concerning Indonesian Waters. Law Number 6 of 1996 concerning Indonesian Waters as an integral part of Law Number 17 of 1985 concerning the Ratification of the United Nations Convention on the Law of the Sea (United Nations Convention on the Law of the Sea). The Government of the Republic of Indonesia has also regulated the process and procedures for vessel operations in the form of Law Number 17 of 2008 concerning shipping. Support for Law Number 17 of 2008 concerning ship is Law Number 43 of 2008 concerning State Areas. In line with these laws and regulations, the government has also issued Government Regulations. Government Regulations that regulate include: (i) Government Regulation Number 19 of 1999 concerning Control of Sea Pollution and/or Destruction, (ii) Government Regulation Number 21 of 2010 concerning Maritime Environmental Protection [14].

Internationally the legislation relating to ballast water management is regulated by the IMO (International Maritime Organization). These laws and regulations were born from an international convention, which was agreed upon at a Diplomatic conference held at the headquarters of the IMO (International Maritime Organization) in London, England on February 13, 2004. IMO enacted regulations relating to ballast water management (International Maritime Organization) aims to minimise the risk of new invasive species entering other waters. The IMO (International Maritime Organization) regulation which regulates ballast water management, is divided into two parts. Standard D-1 (Ballast Water Exchange), which is still valid to date is carried out by rinsing the water three times in the sea which is more than 200 nautical miles from the beach with a depth of more than 200 meters. The next standard is Standard D-2 (Ballast Water Treatment). This standard requires the treatment of ballast water which is found to contain more than ten microorganisms per cubic meter which is more than or equal to 50 microns. With this water treatment, there will be no more microorganisms that will escape to the new environment, so that environmental damage can be prevented.

3. Ballast Water as Marine Pollution in Inaport 2nd

Every day, an estimated 10,000 marine species are transported around the world in ballast water. This high level of invasive species being transported and discharged into inhabitable waters has called for legal action to take place. Conducting IMO MEPC 56/23 ANNEX 2 document, the overall probability of a successful invasion also depends in part on the number of organisms and the frequency with which they are introduced over the entire period of the exemption. Therefore, it is recommended that a risk assessment should consider estimates of at least the following four factors: (i) the total volume of water discharged, (ii) the amount of water discharged in any event (voyage), (iii) the total number of discharge events and (iv) the temporal distribution of discharge events [8].

The amount of water returned by vessels that were dumped at the Port under the auspices of Inaport 2nd from 2012 to 2016 was used for analysis. The ballast water discharged by the vessel in 2016 as in Figure 1 and Figure 2 is analysed based on International vessel visit data. This was done, because vessels with international routes were suspected to have had invasive follow-on species in the dumped water that was thrown away. Formulation of ballast water discharged by the vessel also includes a factor of 95% confidence level. Based on Figure 1 and Figure 2, the ballast water discharged by the vessel is increment for each vessel of 5 tons to 25 tons. The number of vessels that dispose of ballast is also propagated between 10% and 60% of the total vessel visits.

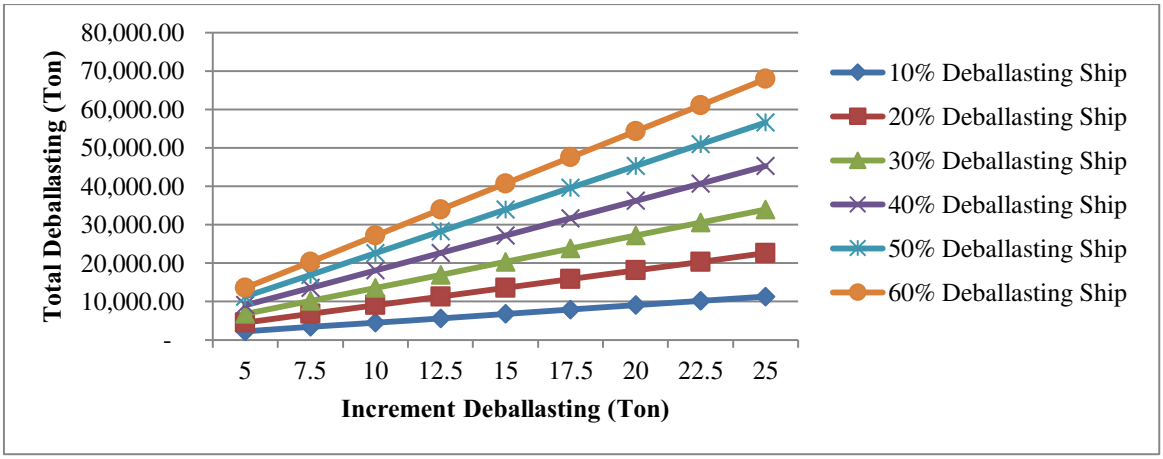


Figure 1. Deballasting of Vessel at 2016 (Ton)

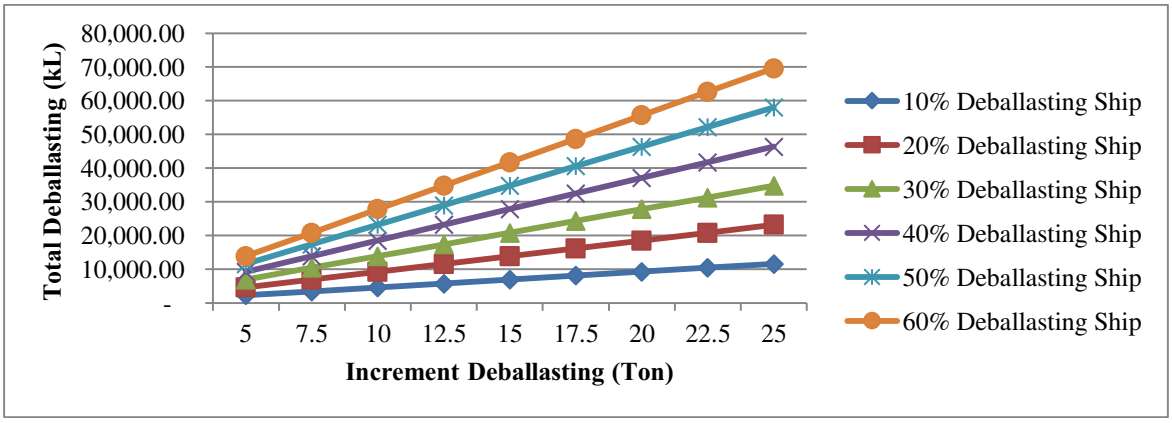


Figure 2. Deballasting of Vessel at 2016 (kL)

4. Result and Discussion.

Based on figures 1 through 2 which take data samples of international route vessel visits, the potential increase in pollutants due to the disposal of ballast water and sediment discharged by the vessel will continue to increase. This indication can be seen with the continued increase in world trade and will have a logical impact on the environment at the port of destination. Increased maritime technology and the development of world trade will also be followed by the development of shipbuilding technology and will lead to a diversity of vessel types and an increase in the main size of vessels. The increase in the size of the main vessel built will be followed by an increase in the volume of water returned by the vessel. This will lead to an increase in the amount of water replaced by vessels exchanged and disposed of at the destination port. So that the potential for increased pollutants from ballast and sediment-water, will be even more enormous, this is what the Government and port managers must anticipate.

Regarding rules, that the Government of the Republic of Indonesia has just ratified the IMO rules relating to the Ballast Water Management in November 2015. Stretching of ballast water management in ports managed by Inaport is still not much done by the port operator. This indication can be seen from the human resources of port managers in the effort to implement Ballast Water Management; not all understand the international rules. Regarding regulations in government legislation, it has not yet been

compiled, so it needs hard work again in its realisation. Socialization and implementation need to be carried out immediately, both by the government as regulator and by the port operator.
Continuing to increase vessel visits, especially international route vessels, there is an excellent potential for increased water to be returned to vessels that are disposed of at Inaport 2nd in Jakarta. This increase also has the potential to increase the risk of pollutants, especially invasive follow-up species and the potential for sediment to be discharged from the vessel. We have to capture these opportunities, as an advantage, in managing the vessel's water ballast. By the results of the MEPC 71 trial on 03-07 July 2017 where the implementation schedule of the Ballast Water Management Treatment System (BWMTS) was a vessel's water treatment system before being disposed of by sea, due to the vessel being added some loads to the vessel. This ballast water must be treated before being discharged into the sea again, because it is indicated that invasive species are included in the ballast water. This invasive species will become a predator at the port or sea where the water is discharged from the vessel. Ballast Water Management Treatment System (BWMTS) in the form of a set of equipment to process water in vessels. This can be seen from the potential for water to be returned by vessels that are disposed of in port waters totalling 47,552.25 tons, equivalent to 48,741.06 kL based on 60% of vessels that discharge water and assume that each vessel throws 25 tons of deballasting

5. Conclusion

Based on the results of the discussion above, some conclusions can be drawn from the results of this study, including:

1. Although it has ratified the IMO rules relating to Ballast Water Management, the implementation of the regulation has not been entirely carried out, including in terms of the readiness of human resources.
2. Increased vessel visits, especially international routes vessels will also increase pollutant potential due to ballasting and deballasting activities. This solution is in the form of invasive and sedimentary species due to water discharge from vessels.
3. In 2016, there was a potential for water to be returned by vessels that were disposed of 47,552.25 tons, equivalent to 48,741.06 kL into the waters of Inaport 2nd. The ballast water are calculated based on 60% of the vessels that dispose of ballast water and the assumption that each vessel discharged 25 tons of deballasting.

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