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Overview of Garbage Management in the Passenger Ships That Leans on Port of Bima

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ABSTRACT
Assessment of garbage management in the ship needs to be done to prevent health risks that may arise from the garbage. To find out an overview of garbage management in the passenger ships that leans on Port of Bima. This study uses a qualitative method with a descriptive observational approach. The researcher observes the conditions and implementation of garbage management on the ships and conducted interviews with ship crews. The ships under study is a passenger ship that leans on Port of Bima. The results of observations and interviews that have been conducted are assessed based on the regulations for ship garbage management and then presented in the picture and descriptive. The results of this study is to explain that passenger of the ships is not qualified for several aspects of ship garbage management according to the regulations. Several aspects of ships garbage management are not qualified, such as the type and condition of bins are provided, lack of information like posters about garbage disposal for passengers, and garbage collection on the ship, as well as garbage disposal. While some aspects of garbage management that have met the requirements are ownership of the garbage management plan, the number of bins provided, and recording of the amount of garbage. Several aspects of garbage management in the passenger ships that leans on Port of Bima are not qualified according to the regulations. Therefore the company of shipowner's needs to make improvements to garbage management on the ships they have.

Keywords: *Garbage Management, Passenger ship, Port of Bima, Ship sanitation.*

1. INTRODUCTION

Indonesia as an archipelago has hundreds of thousands of islands spread from Sabang to Merauke. The islands are separated from each other by sea. Such geographical conditions make it a challenge to bring transportation that can connect the islands. Ships become an alternative mode of transportation that can be used to connect the islands. The relatively affordable price makes the ship as a transportation option to move from one island to another.

The ship has a close connection with public health because it can be the location of the transmission of various diseases. The small ship environment allows passengers to interact with each other, share food and drinks, and share public facilities. As a result, the ship becomes the location of the disease, because in the environment of the ship allows the transmission of disease from person to person that can be a source of disease outbreaks. Passengers can also be carriers for sick people, vectors or microbes from one place to another [1].

One of the factors that can cause health problems onboard is garbage. Unsafe garbage management and disposal can easily lead to adverse health consequences. Humans can be directly exposed both on ships and in ports. Exposure can also occur through disease-causing organisms or hazardous substances due to unsafe disposal [2]. The condition of bins that are not closed and made of non-waterproof material can be a breeding ground for disease vectors [3].

Various activities carried out on the ship produce different types and amounts of waste. The size of the ship significantly influences the amount of garbage produced [4]. Around 50-70 tons of garbage can be produced every week by ships carrying 3,000 passengers. This garbage consists of glass, tin, plastic, paper, cardboard, steel cans, kitchen grease, kitchen waste, and food scraps [5].

As a result, in addition to causing health problems, the garbage generated by ships also contributes to marine pollution. Food wrappers, food scraps, used beverage cans, beverage bottles, papers, old newspapers, cigarette butts are often thrown into the sea during the trip [6], [7]. Waste from food scraps sourced from ships can cause sedimentation, reduce water quality, affect marine biota, increase turbidity and damage fish health because it has inappropriate nutritional content [8].

Good garbage management can certainly prevent health and environmental problems caused by garbage from ships. Good garbage management must be based on applicable rules. Therefore, this research is intended to see the suitability of garbage management on ships with PM 29 of 2014 concerning Prevention of Maritime Environmental Pollution, and PM 37 of 2015 concerning Sea Transport Passenger Service Standards.

2. METHOD

This study uses a qualitative research design with a descriptive case study approach. Researchers explored the condition and implementation of ship waste management that leans on the Port of Bima. Data collection is done by in-depth interviews, observation, and collection of garbage management documents on the ship. The collected data is then analyzed and its compatibility with applicable regulations, namely: Ministry of Transportation Regulation No. 29 of 2014 concerning Prevention of the Maritime Environment, and Regulation of the Minister of Transportation No. 37 of 2015 concerning Sea Transport Passenger Service Standards. The results of the study are then presented in the form of descriptions and pictures. Presentation in the form of pictures is needed to provide a visual of the results of observations to strengthen the results of data collected from interviews and existing documents.

This research was conducted from April to July 2017 on 2 ships that leaned at the Port of Bima. The selection of ships is based on passenger load capacity, is ships with the highest passenger load capacity and the least cargo capacity. The vessels with the most capacity are 1000 type ships which have a maximum load of 1000 passengers and type 500 vessels which have a maximum load of 500 passengers.

3. RESULTS AND DISCUSSION

3.1. Garbage Management Plan (GMP)

The ship used as a research location is a ship owned by the same company. Therefore, the process of handling garbage on the two ships has no difference. The findings explain that the two vessels studied already have a Garbage Management Plan. The Garbage Management Plan includes disposal procedures, responsible officers, garbage collection procedures, garbage treatment procedures, garbage management training procedures, garbage disposal regulations and explanations for filling in the garbage record book.

Based on regulations, the Garbage Management Plan must at least include the following: garbage disposal procedures, there are officers appointed to be responsible, garbage collection procedures, garbage processing procedures and garbage management training procedures, garbage disposal regulations, and explanations for filling the garbage record book [9].

Almost all aspects of the Garbage Management Plan can be found at the time of observation. Starting from the disposal procedures, officers, collection procedures, disposal rules, and explanations for filling the garbage record book. But there is no visible training procedure for waste management. Based on the results of interviews conducted, this is because the officer responsible for processing waste on the ship is an outsourcing officer. Therefore, related to waste management training has become the responsibility of the outsourcing company.

The Garbage Management Plan is very important to be owned by the ship as the responsibility of the ship operator to provide a safe environment for passengers and crew. The ship can produce almost all types of garbage. Such garbage can contain harmful microbial pathogens and chemical and physical agents, which have the risk of direct or indirect exposure to garbage through contaminated environments or insects [1]. Management of unsafe ship garbage management can cause adverse health consequences. Humans can be exposed directly both on ships and in ports, as a result of unsafe ship garbage management [2].

Garbage Management Plan ownership does not mean making ship garbage management good. The implementation of the Garbage Management Plant so far has not been carried out optimally. The ship is considered to have a contribution to the presence of garbage in the sea at this time. Garbage generated onboard such as food wrappers, food scraps, used beverage cans, beverage bottles, paper, old newspapers, cigarette butts is often thrown into the sea during the trip [7], [10]. Other research also shows that plastic bottles and food wrappers become rubbish that is often illegally dumped into the sea. Therefore, each crew needs to be responsible for the waste generated on the ship by carrying out reduce, recycle, and reuse [11].

3.2. Garbage Disposal Poster

Observation results show that no garbage disposal posters were provided by the ship. This is certainly not by regulations that require ships to provide waste disposal posters. Garbage disposal posters should be available to provide information and education related

to disposing of garbage, especially to passengers. So this poster should be around the trash can provided for passengers.

Garbage disposal posters are needed to educate ship passengers about littering behavior. The behavior of passengers who littering is still often found on board. This is caused by the negative perception of passengers on safety and comfort on the ship [12]. Posters and leaflets are one of the good health promotion media to increase public knowledge [13]. Environmentally oriented posters can reduce garbage disposal behavior by up to 64%. Even more so if the poster is presented in the form of humor [14].

3.3. Garbage Facilities

Trash cans are facilities that must be provided by ships to maintain ship cleanliness. Based on the results of interviews, the ship always provides trash bins in locations where passengers are motivated, such as around the passenger bed, outside deck, and cafe. The number of bins provided is adjusted to the number of passengers. Observation results showed that the types of bins provided were mostly plastic bags and used barrels. Garbage bins provided are not distinguished between organic and non-organic bins. Also, plastic bins and used barrels are not closed.

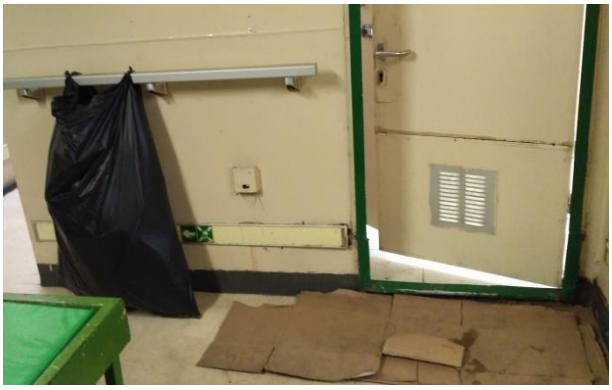

Figure 1. Plastic trash bin on the ship

According to the informant, the garbage bins that had been filled up earlier would then be collected in one part of the ship. The garbage collection uses plastic bags or used cardboard. Observation results show that at the temporary garbage collection location, garbage is piled in a condition that is not closed.

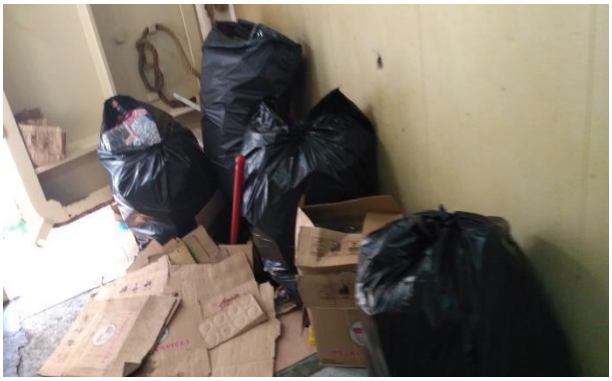

Figure 2. Garbage dumb

The results of this study indicate that the trash can provided by the ship is by the quantity requirements, but does not meet the quality requirements. The ship party places trash bins in almost every location where passengers are active. However, the trash bin provided by the ship does not distinguish between organic and non-organic trash bins which will facilitate the process of sorting garbage. This certainly does not meet the requirements, where the ship does not only provide trash bins but must distinguish between organic and non-organic bins [9],[15].

Also, garbage that is stored in temporary garbage dumps does not meet existing requirements. Garbage storage space should be well-ventilated, temperature and humidity-controlled. Wet waste must be stored in a closed and refrigerated room. The room must be of sufficient size to accommodate untreated garbage for a certain period and must be separated from the food preparation and storage area [2].

The results of this study are the same as those on other ships, which found that the quality of damaged bins is not made of strong, rustproof, water-resistant, easily cleaned and closed materials. Also, there are no different bins available for organic and inorganic bins, as well as wet and dry rubbish [16]. This resulted in the passengers and crew of the ship only littering or throwing garbage into the sea [7], and caused discomfort for ship passengers [17].

Uncovered trash conditions can be a breeding ground for insects, rats and others that can be vectors in the spread and transmission of disease [3], [18]. Garbage can quickly decompose due to the activity of microorganisms to produce methane gas, which is H2S gas which can be toxic to the body. The spoilage of garbage also creates odors which will certainly disturb the comfort [19].

3.4. Garbage Facilities

The results of observations and interviews show that garbage collected in temporary garbage collection sites will be disposed of when the ship has arrived at the port.

Before waste is unloaded from the ship, it must be recorded in the ship's Garbage Record Book. The Garbage Record Book contains the amount of garbage dumped, the day and date discarded, and the location of the garbage dumped. The Garbage Record Book is signed by the officer in charge when the trash is disposed of. After that, the garbage is then unloaded from the ship and then transported by truck to be disposed of at the final disposal site.

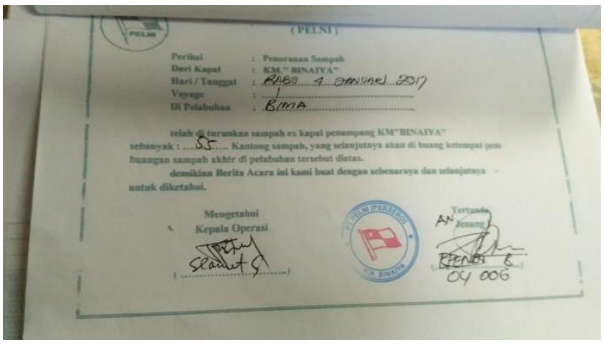

Figure 3. Garbage record book

These findings are by regulations that require every ship to have a Garbage Record Book. Garbage Record Book ownership is very important as a form of responsibility for the ship to prevent environmental pollution. Considering that marine garbage originates from ships, it is indicated that it is caused by illegal garbage disposal by the ship's crew [11].

Garbage Record Book is one that will be inspected by port officials as a form of enforcement and control of the prevention of maritime environmental pollution. If the inspection results show that the ship disposed of garbage that is not allowed at sea, it can result in the ship being unable to continue shipping [20]. Waste management by the Garbage Record Book and Garbage Management Plan will be able to prevent marine pollution from ships by 48.6% [21].

4. CONCLUSION

Garbage management on ships based on applicable regulations has not yet been carried out to the full. So far, several aspects such as ownership of the GMP, and the GRB have been able to be implemented by the ship. However, the provision of posters for garbage disposal, provision of rubbish bins, conditions for rubbish bins and temporary garbage storage has not yet been carried out properly. Therefore, the Ministry of Transportation needs to supervise the implementation of waste management to comply with existing regulations. The supervision can also involve other ministries so that the implementation of waste management on the ship runs optimally. Other ministries that can be involved are the Ministry of Environment and the Ministry of Health, bearing in mind that the waste generated by ships can harm the environment and health.

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