



Solid Waste Management: Compliance, Practices, Destination and Impact Among Merchant Vessels Docking in Iloilo Ports, Philippines

B.G.S. Sarinas^{1,*}, D.O. Docto^{1,2}, M.B. Dumaicos^{1,3} and J.R.P. Flores^{1,4}

ARTICLE INFO

ABSTRACT

Article history:

Received 18 June 2012;
in revised form 17 June 2012;
accepted 20 July 2012

Keywords:

Merchant vessels, solid waste,
compliance.

There are no or few existing studies exist on the solid waste management of ships in Fort San Pedro port (FSPP) and Dumangas port (DP), Iloilo, Philippines. Thus, this descriptive-survey determines the compliance and practices on ship's solid waste management, its impact to crew members on board the vessel and the fate of these solid wastes during docking. Nine ships served as samples, six of which are Ro-Ro from DP and three passenger-cargo vessels from FSPP. There were 141 crews were interviewed which comprise of six masters (four masters from DP and two from FSPP), three chief officers (two from DP and one from FSPP), 50 crew from Ro-Ro vessels at DP and 82 crew from passenger vessels in FSPP were interviewed on the impacts of solid waste management. The results showed a 100% compliance to solid waste management among vessels in both ports while in wastes practices' on board, specific garbage bins were used by these vessels. Consequently, these vessels upon reaching the receiving port, relinquish their solid wastes to the "Golden Dragon" that collects solid wastes. The present study showed that vessels in both ports observe the Annex V of the MARPOL 73/78 and reveals an eco-friendly shipping.

© SEECMAR / All rights reserved

1. Introduction

Garbage are present everywhere and their accumulation is unstoppable. They can pose hazards to human and wildlife and aesthetically displeasing (Horsman, 1982). Urban and rural areas are experiencing tons of garbage due to misinformed waste practices and effects to the environment.

Most people dumped their wastes or garbage in the bodies of water such as freshwater or to the marine environment. Gomez, Velazquez and Baniela (2004), enumerated various contaminants of the sea. One of the sea contaminants is the accumulation of garbage or solid wastes such as papers, tins, bottles, plastics and tires. Garbage from ships is harmful to the environment (IMO, 2010). Thus, the International Maritime Organization created the MARPOL 73/78, a convention by the International Convention for the Prevention of Pollution from Ships in 1973 which was modified by the Protocol of 1978

(MARPOL, 2006). MARPOL 73/78 regulates and prevents pollution by garbage from ships most especially plastics as amended in Annex V (IMO, 2010). MARPOL Annex V defines garbage as "all kinds of victual, domestic and operational waste excluding fresh fish and parts thereof, generated during the normal operation of the ship and liable to be disposed of continuously or periodically except those substances which are defined or listed in other Annexes to the present Convention" (MARPOL, 2006). In addition, the MARPOL Annex V prohibits all ships to dispose garbage at sea and "specific areas" such as the Mediterranean Sea area, Baltic Sea area, Black Sea area, Red Sea area, Gulfs area, North Sea, Wider Caribbean Region and Antarctic Area (MARPOL, 2006; IMO, 2010).

1.1. Statement of the problem

This study aimed to determine the solid waste management compliance, impacts, practices and destination among merchant vessels docking in Fort San Pedro port (FSPP) and Dumangas port (DP). Specifically, it sought answers to the following questions: a.) Do merchant vessels comply with the solid waste management as mandated by MARPOL 73/78? b.) What are the practices observed by the merchant vessels docking in Iloilo ports toward their solid wastes? c.) What are the

¹ John B. Lacson Foundation Maritime Univ. Arevalo. Sto. Nino Sur, Arevalo 05000 Iloilo, Philippines. Tel. (033) 336 07 21. Fax. (033) 336 10 82.

* Corresponding author. Researcher and Faculty, Email: bg_sarinas@yahoo.com. Tel. (033) 336 07 21. Fax. (033) 336 10 82.

² Dean of BSMT and Faculty, Email : on_process@yahoo.com.

³ Faculty, Email: on_process@yahoo.com.

⁴ Researcher and Faculty, Email: on_process@yahoo.com.

impacts of solid waste management to the crew of the vessel?
d.) To where do merchant vessels relinquish their solid wastes upon disembarkation in Iloilo ports?

2. Methods

2.1. Research design

This study utilized a survey research design (Fraenkel and Wallen, 2010) because it involves asking the same set of questions on compliance, practices, perceived impacts and fate of solid wastes on board the vessel to various crew of vessels in FSPP and DP.

2.2. Respondents

A total of 141 respondents were used in this study. In FSPP, two master mariner, one chief officer and 82 various crew were interviewed while in DP, four master mariner, two chief officers and 50 various crew were interviewed.

Convenience sampling was employed to select the respondents that are available during the sampling. These merchant vessels were classified as passenger-cargo vessels. The two identified ports in Iloilo were Fort San Pedro port (FSPP) and Dumangas port (DP). Sampling was done in the month of December 2011.

2.3. Data-gathering instrument

A researcher-made questionnaire-checklist was made to answer the problems of the study. The checklist contained consists of questions if the vessel complies with the solid waste management as mandated by MARPOL 73/78, varied management practices of solid wastes as specified by MARPOL 73/78 (MARPOL, 2006) and impacts of solid waste management to the crew of the vessels. In addition, the master mariner was asked as to where do they relinquish their solid wastes upon disembarkation or upon arrival in the receiving port.

2.4 Data collection

The researchers asked permission from the Philippine Ports Authority (Region 6) to have an access in the said merchant vessels docking in FSPP and DP. The answers of the respondent was collected to determine if the vessels comply with the solid waste management as mandated by MARPOL 73/78, as to what practices was made in the list of garbage specified by the MARPOL 73/78 and the impacts of solid waste management to the crew of the vessel. In addition, the fate of the solid wastes generated from each merchant vessel was determined.

2.5. Data analysis

The descriptive analysis was used to analyze the data gathered, specifically frequency count to answer the research problems.

3. Results

3.1. Compliance, practices, destination and impact among merchant vessels docking in Fort San Pedro Port (FSPP)

Three officers from three passenger-cargo vessels were interviewed in Fort San Pedro Port (FSPP) namely: two Masters from NN M/S St. Peter the Apostle and M/V St. Michael the Archangel and one Chief Officer of M/V Filipinas Cebu. The list of garbage is from the list of MARPOL: plastics, paper/cardboard, metals, glass, food wastes, wood, pain containers, fertilizers and pesticide containers, batteries and old medicines.

Table 1: Solid Waste Practices of M/V St. Michael the Archangel, M/S Saint Peter the Apostle and M/V Filipinas Cebu Docking in FSPP.

	Incinerator	Dumped in the Ocean	Ports Facility
1. Glass			██████████
2. Paper/Cardboard			██████████
3. Metals			██████████
4. Plastics			██████████
5. Food wastes			██████████
6. Wood			██████████
7. Paint containers			██████████
8. Fertilizer and pesticide containers			██████████
9. Batteries			██████████
10. Old medicines			██████████

The shade of black indicates the responses of the officers from three passenger-cargo vessels in FSPP.

The result showed that 100% of the vessels comply with the solid waste management. It was found out that each vessel has specified garbage bins for every waste collected. This result is also strengthened by the fact that the practice of these passenger-cargo vessels does not dumped their garbage in the ocean, but instead, they hand over these packed garbage to the port’s facility called the “Golden Dragon.” This is true for NN M/V St. Peter the Apostle and M/V St. Michael the Archangel except for M/V Filipinas Cebu because they have their own waste services in the port as supervised by the Cokaliong shipping company. Table 1 below shows the solid waste management practices of the three passenger-cargo vessels docking in FSPP.

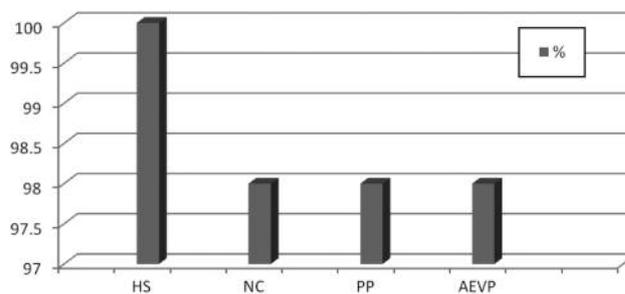


Figure 1: Percentage Distribution of Impacts on Solid Waste Management among Six Vessels in FSPP

With regards to the impacts of solid waste management among the crew of three vessels in FSPP, generally, almost all of the crew have the positive impacts of solid waste manage-

ment and these impacts are: health and sanitation (HS) was observed (100%), showed neatness and cleanliness (NC) which is 98%, pests are prevented (PP) which is 98% and finally, 98% for aesthetic value to the passengers (AEVP). Figure 1 shows the percentage distribution of impacts of solid waste management among various crews in FSPP.

3.2. Compliance, practices, destination and impact among merchant vessels (Ro-Ro) docking in dumangas port (DP)

Six officers were interviewed from the six Ro-Ro passenger vessels in Dumangas port (DP) and these comprise mainly of four Masters of M/V Marie Teresa, LCT Holy Family Navistar, Lakbayan Uno and LCT Arc Angel Navistar and two Chief Officers of LCT Sr. Sto. Nino and M/V Maria Beatriz. It was revealed that 100% or 6 out of 6 Ro-Ro vessels comply with the solid waste management as imposed by the MARPOL. This is however, supported by the fact that these Ro-Ro vessels have the corresponding garbage bins for specific garbage type as with the passenger-cargo vessels docking in FSPP. This is to note that these Ro-Ro vessels do not dump their garbage in the ocean except in one vessel. Their paper wastes are incinerated and dumped in the ocean, that is 12 nautical miles away from the land where it is allowed by the MARPOL Annex V of the IMO rules (MARPOL, 2006). Moreover, all of these vessels hand over their on board solid wastes when they reach the receiving port, that is, in DP. It was also found out that this kind of practice was mandated by the Philippine Ports Authority (PPA), Iloilo. This is to fully ensure that plastics should not be dumped in the ocean as strictly imposed by the MARPOL Annex V.

During the arrival of the Ro-Ro vessels in DP, the PPA has a waste services facility that mainly collects the solid wastes of these vessels, and likewise with the FSPP, the name is called "Golden Dragon." Table 2 shows the practices of Ro-Ro vessels in DP on solid waste management.

Table 2: Solid Waste Practices of Six Ro-Ro Vessels Docking in DP.

	Incinerator	Dumped in the Ocean	Ports Facility
1. Glass			
2. Paper/Cardboard	■	■	■
3. Metals			■
4. Plastics			■
5. Food wastes			■
6. Wood			■
7. Paint containers			■
8. Fertilizer and pesticide containers			■
9. Batteries			■
10. Old medicines			■

The shade of black indicates the responses of the 5 officers while the gray shade indicates the response of one officer which is different from the rest of the vessels.

On the other hand, most of the impacts of solid waste management among crew showed positive impacts such as health and sanitation (100%), neat and clean (100%), prevention of pests (100%), adds aesthetic value to the passengers (96%) and deliver good services to the passengers (2%) as an

additional impacts of solid waste management. Figure 1 shows the percentage distribution of impacts of solid waste management among various crews in DP.

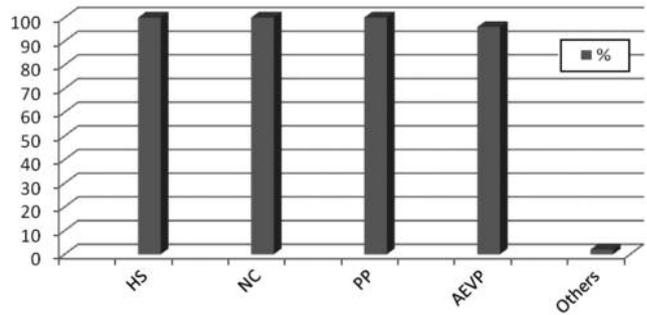


Figure 2: Percentage Distribution of Impacts on Solid Waste Management among Six Vessels in DP

4. Conclusion

The result of the study showed that the Philippines Ports Authority, Iloilo is strict when it comes to solid waste management. This is to ensure that the MARPOL Annex V of IMO is fully implemented most especially in the dumping of garbage in the ocean. The PPA provides each port with the service facility called Golden Dragon that caters the collection of the solid wastes from the docking vessels. In addition, all sampled vessels have garbage specific bins on board. This simply shows that vessels in Iloilo port (FSPP and DP) operates in accordance with the law and is eco-friendly. For further research, more merchant ships should be included in the study.

Acknowledgement

We would like to thank Dr. Mary Lou Lacson Arcelo, Chairman of the Board of Trustees, John B. Lacson Foundation Maritime University; Dr. Ronald Raymond L. Sebastian, CEO of John B. Lacson Foundation Maritime University; Atty. Lorna D. Gellada, Ph. D., Administrator/DQMR of John B. Lacson Foundation Maritime University-Arevalo and Dr. Melchor M. Magramo, Research Coordinator, John B. Lacson Foundation Maritime University-Arevalo for approving, funding and supporting this institutional research; Mr. Herbert Navarro, Terminal Manager of RoRo Dumangas Port, Iloilo, Philippines and Engr. Julius Gonzales, Terminal Manager of Fort San Pedro Port, Iloilo, Philippines for allowing us enter the port jurisdiction.

References

Fraenkel, J.R. and Wallen, N.E. (2010): *How to Design and Evaluate Research in Education*. 7th ed. International ed. New York: McGraw-Hill, Inc.

Gómez, J.I.G.; Velázquez, OH. and Baniela, S. I. (2004): The sea and its contaminants. *Journal of Maritime Research* 1(2), 85-93.

Horsman, P.V. (1982): The amount of garbage pollution from merchant ships. *Marine Pollution Bulletin* 13(5), 167-169.

International Maritime Organization (IMO) (2010): Prevention of Pollution by Garbage from Ships. Retrieved November 2011 from: <http://www.imo.org/Our-Work/Environment/PollutionPrevention/Garbage/Pages/Default.aspx>.

Marine Pollution (MARPOL) (2006): *Consolidated Edition*. International Maritime Organization, London. MPG-Books Ltd, Bodmin: United Kingdom.

