

Original Article

Perceptions of Sri Lankan Seafarers about the Necessity of Ratifying the Ballast Water Management Convention in Sri Lanka

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Abstract

The International Maritime Organization (IMO) developed and adopted the “International Convention for the Control and Management of Ships’ Ballast Water and Sediments” (Ballast Water Management Convention or BWM Convention) in February 2004 to prevent the uptake or discharge of invasive alien species and harmful aquatic organisms and pathogens within ballast water and sediments [5]. The BWM Convention entered into force on the 08th of September 2017. In 2020, 85 countries have ratified the Convention, representing 91.11 per cent of world merchant shipping tonnage [4]. Yet, Sri Lanka as a Flag State (FS) has still not ratified the BWM Convention [8]. This research explored the perception of the Sri Lankan seafarers about the necessity of ratifying the BWM Convention by Sri Lanka. The data for this qualitative/ quantitative study were gathered via interviews and questionnaires given to 80 merchant navy officers from both deck and engineering departments. Results of this study show that the Sri Lankan merchant navy officers bear the idea that Sri Lanka should ratify the BWM Convention as Sri Lankan waters receive ballast water from international vessels threatening the Sri Lankan marine ecosystems, economy and human

health. Findings of the study revealed most of the Sri Lankan merchant navy officers have identified the need of ratifying the BWM Convention to preserve the coastal and marine environment and protect the endangered and indigenous aquatic species living in Sri Lankan waters. The respondents also viewed that Sri Lanka as a Port State (PS) should establish port reception facilities and provide training for port state control officers. Most of the merchant navy officers highlighted the need of a national policy framework strengthened by scientific research to address the issue. The financial incapacity to develop a task force and a national strategy, as well as the financial inability to develop scientific research skills and continuous monitoring & training were identified by the respondents as the main challenges to ratify the BWM Convention by Sri Lanka.

Keywords: *Ballast Water Management Convention, Sri Lankan merchant navy officers, Sri Lankan Marine Ecosystems*

Introduction

More than 90% of the globally traded goods are transported through the ocean [8]. International trade by merchant ships has created many environmental issues threatening the marine eco-systems and organisms. One

of the major environmental threats that has caused the destruction of marine eco-systems is the improper discharge of ballast water by merchant shipping vessels.

From 1880's many vessels use water as ballast to maintain the stability and balance in sea going vessels. Ballast water is pumped into vessels to ensure safe operating conditions throughout a voyage. Ballast water reduces stress on the hull, provides transverse stability, improves propulsion and manoeuvrability, and compensates for weight changes in various cargo load levels and due to fuel and water consumption [4]. Also, vessels use water as ballast for its availability and the feasibility to load or discharge off a ship. Discharge of ballast water has been recognized as a major environmental threat as ballast water carry Invasive Aquatic Species (IAS) [6]. This mechanism has resulted in the translocation of marine species from their natural habitat to other oceans and water bodies around the world threatening marine ecosystems. It is estimated that up to 14 billion tons of ballast water are transferred globally each year, and 7,000 – 10,000 species of living organisms may be present in the ballast water at a given time [8].

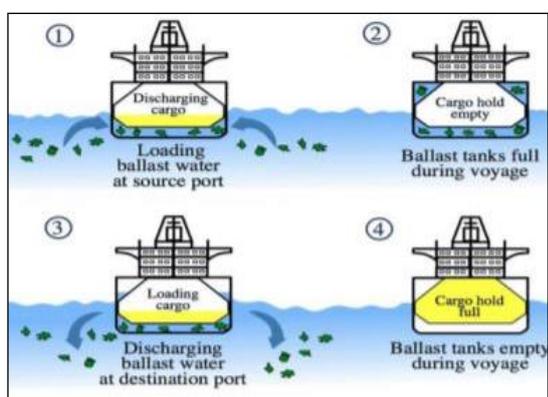


Fig. 01 The process of loading and discharging of ballast water

To reduce the likelihood of new invasions, ships are increasingly being required to manage their ballast water prior to discharge in coastal waters [1]. As a result, Marine Environment Protection Committee (MEPC) and the Maritime Safety Committee (MSC) of International Maritime Organization (IMO) have been taking actions to prevent, minimize and eliminate the threats associated with the discharge of ballast water to main water bodies. The first guidelines were adopted on 27th November 1997 by Resolution A868 (20) and were then developed as the new Ballast Water Management (BWM) Convention. The International Convention for the Control and Management of Ships' Ballast Water and Sediments was adopted in February 2004 in a Diplomatic Conference setting standards for improving BW management worldwide [8]. When a country ratifies the Convention, it will enter into force after 12 months from the date of ratification [8]. As of 2020, 85 countries have ratified or acceded to the Convention with 91.11% of the world's merchant shipping gross tonnage [4].

Many countries have ratified the BWM Convention as a precautionary measure to protect their marine environments. According to the convention, all vessels are required to manage their ballast water according to a certain standard. The BWM Convention comprises of Articles and an Annex which include requirements in the regulation of ballast water and sediments. Under the annex, Section D Standards focuses on the ballast Fig. 01 The process of loading and discharging of ballast waterwater exchange standard and a ballast water performance standard.

D1	D2	D3	D4	D5
Ballast water exchange standard	Ballast water performance standard	Approval requirements for ballast water management systems	Prototype ballast water treatment technologies	Review standards by the organization
Exchange efficiency: 95% volumetric exchange	Ships conducting BWM shall discharge <10 viable organisms per cubic meter ≥ 50 micrometres in minimum dimension.	Include systems which a) Make use of chemicals or biocides b) Make use of organisms of biological mechanisms c) Make use of organisms which alter the chemicals or physical characteristics of ballast water	Allows for ships participating in a programme approved by the administration to test and evaluate promising ballast water treatment technologies	IMO is required to review the ballast water performance standards
Ships exchanging BW by the pumping through method: 3x the volume of each ballast water tank	Ships conducting BWM shall discharge <10 viable organisms per millilitre <50 micrometres in minimum dimension		It allows promising ballast water treatment technologies to have a leeway of five years before having to comply with the requirements	The review should look into: a) Safety considerations b) Environmental acceptability: not causing more or greater environmental impacts than it solves c) Practicability: compatibility with ship design and operations d) Cost effective e) Biological effectiveness: removing or rendering inactive harmful aquatic organisms and pathogens in ballast water.
Pumping through less than three times the volume: Accepted if the ship demonstrates at least 95% volumetric exchange	Ships conducting BWM shall discharge ≥ 10 micrometres n minimum dimension			The review should include a) A determination of available technology to achieve the standard b) An assessment of the above-mentioned criteria c) An assessment of the socio-economic effect(s) specifically

				in relation to the developmental needs of developing countries, particularly small island developing States
	Indicator Microbes need to be			
	a) Toxicogenic <i>Vibrio cholerae</i> (O1 and O139): <1 colony forming unit (cfu) per 100 millilitres or < 1 cfu per 1 gram (wet weight) zooplankton samples			
	b) <i>Escherichia coli</i> <250 cfu per 100 millilitres			
	c) Intestinal Enterococci < 100 cfu per 100 millilitres			

Table 01 Annex D Standards in Ballast Water Management Convention

The necessity of the implementation of the BWM Convention in Sri Lanka is a timely requirement. Therefore, the present study summarizes perceptions of Sri Lankan merchant navy officers about the necessity to ratify the BWM Convention in Sri Lanka.

Problem Statement

Sri Lanka is an island nation which has seven main ports including the port of Colombo, Trincomalee harbor, port of Galle, and port of Hambantota, port of Point Pedro, Kankasanthurai harbor and Oluvil harbor. Due to Sri Lanka’s strategic location in the center of the Indian ocean at the crossroads of the major shipping routes, more than 4000 ships annually reach all the ports in Sri Lanka [7].

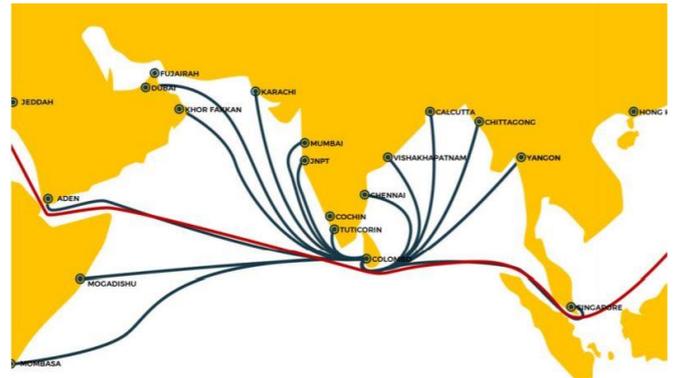


Fig. 02 Strategic location of Sri Lanka

Sri Lankan waters receive an estimated 826,600MT of ballast water annually [10]. Even though Sri Lanka has ratified certain IMO’s conventions and protocols such as

MARPOL 73/78, OPRC, SOLAS and STCW, Sri Lanka as a as Flag State (FS), Port State (PS), and Coastal State (CS) has still not ratified the BWM Convention [8]. Due to the country's failure to ratify the BMW Convention, the marine environment in Sri Lanka is under a great threat as Ballast water transfer is the main reason for the spread of IAS and Harmful Aquatic Organisms and Pathogens (HAOP) in Sri Lankan waters.

Significance of the Study

This empirical study is significant for legal and policy making processes in Sri Lanka related to protection of Sri Lankan marine ecosystem. Less research has been conducted on the necessity of ratifying the BWM Convention in Sri Lanka and on the perceptions of seafarers about the need of ratifying the BWM Convention in Sri Lanka. The existing lack of knowledge and awareness about marine pollution and the destruction of marine ecosystems in Sri Lanka and the persistent necessity to plan and implement policies to protect the rich marine biodiversity in Sri Lanka is not much studied. Therefore, this research will fill the existing gap between in the necessity of protecting the marine ecosystems and the requirement of planning and implementation of legal policies to protect the marine biodiversity that is often being affected by the discharge of ballast water in Sri Lankan waters by sea-going commercial vessels. This research will also serve as a working document for policy makers and other relevant authorities when instrumenting policies and regulations to prevent “the introduction, control or eradicate IAS from entering into marine ecosystems” [9] in Sri Lankan marine environments. Furthermore, this research will also facilitate other countries who have still not ratified the BWM

Convention and will provide insights into the necessity of ratifying the BWM Convention.

Aims and Objective of the Study

The main aims of this study are:

1. To highlight the importance of the ratification of BMW Convention in Sri Lanka.
2. To emphasize the necessity of ratifying the BWM Convention in Sri Lanka.

The main objectives of this study are to

1. Understand the perception of Sri Lankan seafarers about the ratification of Ballast Water Management Convention in Sri Lanka.
2. Determine the main obstacles to ratify the Ballast Water Management Convention in Sri Lanka.
3. Analyze the environmental threats that exist due to the failure of ratifying the Ballast Water Management Convention in Sri Lanka.

Methodology

Data for this qualitative/ quantitative study were gathered via an online questionnaire (Google form) with open ended questions. The questionnaire included 25 items arranged under three sub-headings. A Likert scale was constructed [2] to measure the level of agreement of seafarers in ratifying the BMW convention in Sri Lanka. These qualitative data will be converted to quantitative data using a coding system for a more accurate evaluation. The results of gathered data from the questionnaire will be analyzed through multiple representation methods such as tables, bar charts and pie charts. In addition, structured interviews were conducted by randomly selecting respondents from the determined sample. The sample of this study

consists of 80 merchant naval officers. 40 junior merchant naval officers of sea experience below 30 months and 40 senior merchant naval officers with more than 30 months of sea experience representing both engineering and deck departments were selected using random sampling technique. The overall response rate was 92 per cent. To analyze primary data that were collected from the above sample, Statistical Package for Social Sciences (SPSS) Software Package version 23 was used. To collect secondary data, the researcher has used magazines, journals, annual reports and other published and unpublished written materials collected from libraries and online sources.

Findings

According to the findings of this study, the majority of respondents are junior merchant navy officers from the engineering department. The percentage of these respondents is 28 per cent. From the respondents who belong to the deck department, 53 per cent had sea experience of more than 30 months while 47 per cent of respondents were of less than 30 months of sea experience. Out of the respondents who belong to the engineering department, 49 per cent of respondents possessed more than 30 months of sea experience and 51 per cent of respondents from the same department had less than 30 months of sea experience.

According to sample data, 79 per cent of respondents strongly have agreed with the idea that Sri Lankan marine environment should be protected. According to research data, 68 per cent of respondents have highlighted that the discharge of engine bilge water as a main method that can cause marine pollution. 65 per cent of respondents stated that the use of noxious liquid substances as a method that can

result in the pollution of marine environments. 62 per cent of respondent have mentioned that the disposal of sewage as another cause of marine pollution and 63 per cent of respondents have stated that ballast tank waste as another reason for marine pollution. Emission of Ozon depleting substance was identified by 60 per cent of respondents as another main reason that causes marine pollution.

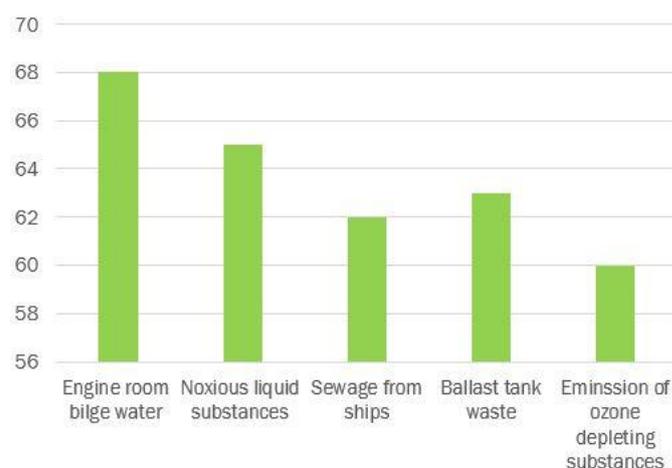


Fig. 03 Main methods of marine pollution

According to survey data, 58 per cent of respondents are not satisfied about the measures taken by the Sri Lankan government to protect the marine ecosystems in Sri Lanka.

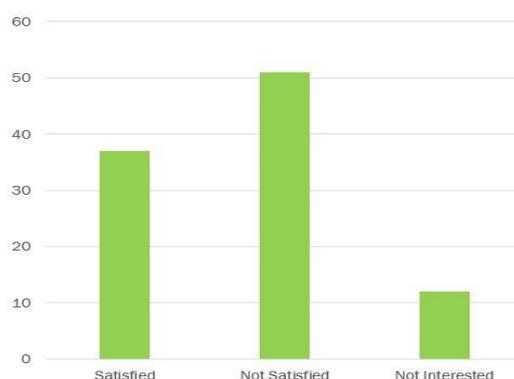


Fig. 04 Satisfactory levels of respondents about the measures taken by the Government of Sri Lanka to protect the marine environment

Furthermore, 85 per cent of the respondents are aware of the introduction of BWM Convention by IMO and 86 per cent of them have

identified the need to ratify the convention to prevent marine pollution. 92 per cent of respondents have stated that Sri Lanka's marine ecosystem is in a great danger due to Sri Lanka's failure to ratify the BWM Convention. Furthermore, 73 per cent of junior merchant navy officers and 63 per cent of senior merchant navy officers believe that Sri Lanka has the ability to make the necessary preparations to ratify the BWM Convention in Sri Lanka.



Fig. 05 Attitude of senior merchant navy officers about Sri Lanka's preparedness to ratify the BWM Convention



Fig. 06 Attitude of junior merchant navy officers about Sri Lanka's preparedness to ratify the BWM Convention

Many respondents believe that Sri Lanka as a FS, PS and as a CS should ratify the BWM Convention. 85 per cent stated that Sri Lanka

as a FS should introduce a government legislation to ratify the BWM Convention. 83 per cent stated that certification of flag ships as another measure that should be taken by Sri Lanka before ratifying the BWM Convention. Moreover, 83 per cent of respondents highlighted the necessity of training the crew members as a main area of improvement that Sri Lanka government should introduce as a FS before ratifying the BWM Convention. 73 per cent of respondents believed that Sri Lanka as a FS should also take measures to detect violations of regulations when vessels discharge ballast water.

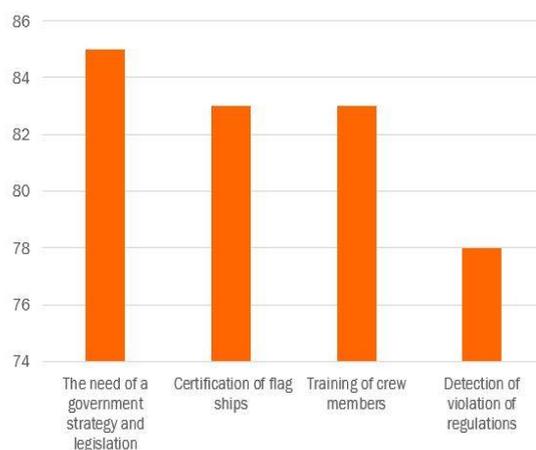


Fig. 07 The main areas of improvements that Sri Lanka should introduce as a Flag State to ratify the BWM Convention in Sri Lanka

Sri Lanka a PS should give proper training to port state control officers before ratifying the BWM Convention. 85 per cent of respondents of both senior and junior merchant navy officers believed Sri Lanka as a PS should establish sediment reception facilities and 84 per cent of respondents believed that Sri Lanka should build international corporation before ratifying the BWM Convention in Sri Lanka.

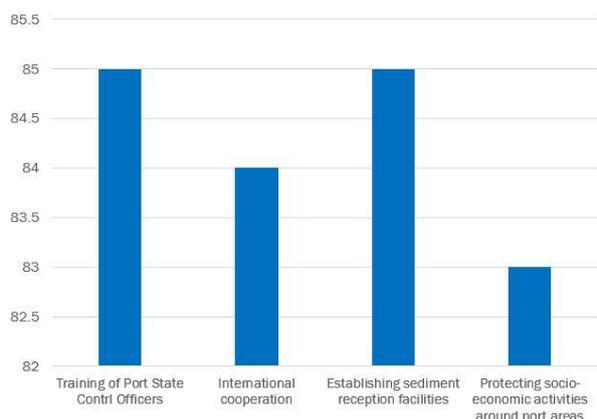


Fig. 08 The main areas of improvements that Sri Lanka should introduce as a Port State to ratify the BWM Convention in Sri Lanka

Moreover, as a CS, 87 per cent of respondents stated that Sri Lanka should take measures to develop scientific research on cost effective strategies to discharge ballast water and 85 per cent of respondents highlighted the necessity of building public awareness about the destruction of marine environment due to ballast water.

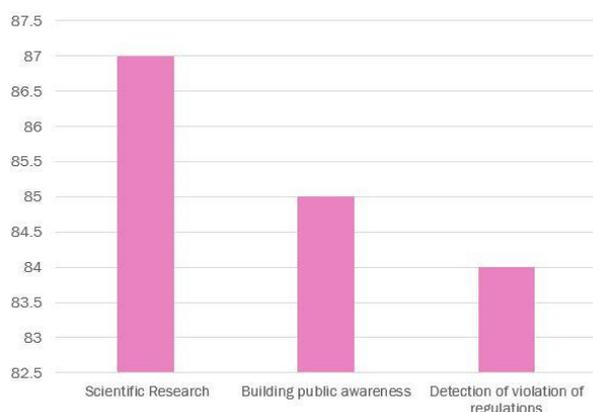


Fig. 09 The main areas of improvements that Sri Lanka should introduce as a Coastal State to ratify the BWM Convention in Sri Lanka

According to the respondents, the main obstacle to ratify the BWM Convention is the absence of a national policy. Moreover, 68 per cent of respondents believed that lack of

financial strength as another obstacle to ratify the BWM Convention in Sri Lanka. 65 per cent of respondents highlighted that lack of knowledge and training as well as inadequate research and development facilities as the main difficulties to ratify the BWM Convention in Sri Lanka.

Discussion

The results obtained from this study suggest that Sri Lanka as a FS, PS and CS should take measures to ratify the BWM Convention in Sri Lanka to prevent the destruction of marine ecosystems. These perceptions of the respondents of the study restate what [8] has rightfully stated as, “due to high risk for the country, immediate ratification of the BWM Convention is recommended for Sri Lanka. It is clear that ballast water leads to negative externalities for the whole social-ecological system [8] and Sri Lanka, as a nation, is responsible for the ratification of the Convention.

The effects of marine pollution are enormous. As Iduk & Nitonye [3] point out marine pollution mainly occurs through oily-water discharge from ships, tanker accidents, accidental spillage during terminal loading, wastewater discharged from ships, garbage and other solid waste and ballast-water discharged from ships at ports”. Their claim is further strengthened by the perspectives of the respondents who agreed with the idea that ballast water is a main cause of marine pollution.

As a FS, PS and CS, Sri Lanka should take necessary measures to ratify the convention “as an obligation to prevent, mitigate and finally eradicate the IAS carried by the ships' Ballast Water” [8]. Sri Lanka, therefore, should implement a policy making system to mitigate

and control the effects of marine pollution caused by the discharge of ballast water. Furthermore, certification of ships and training of crew members with necessary knowledge and practical training as well as monitoring and detection of violation of

Regulations should be practiced by Sri Lanka as a FS to prevent marine pollution caused by ballast water. [8] also writes that FSs have “the authority and responsibility to enforce such laws and regulations applying to the ship as well as to prevent and sanction violations”.

As a PS, when the violations have occurred by the foreign vessel in their jurisdiction causing any damage, “PS has the authority to precede investigations” [8]. Therefore, Sri Lanka as a PS should provide training to Port State Control Officers, enter into international collaborations to protect the marine ecosystems, establish sediment reception facilities in the ports and terminals. Protecting socio economic activities around the port area such as fishery is another responsibility that Sri Lanka bears as a PS that is responsible of preserving the aquatic animals and plants that can be destroyed due to invasive and harmful pathogens that are found in ballast water.

As a CS, Sri Lanka “should take all necessary measures to ensure the observation of international rules when exercising its rights and fulfilling its obligations” [8]. Moreover, Sri Lanka as a CS “should consider developing and implementing a control and monitoring program which could be part of an international management system” [8]. Accordingly, as a CS, Sri Lanka should take necessary actions to promote scientific research to protect marine ecosystems, build public awareness about preserving the marine life and conduct a risk assessment to determine the ways in which ballast water can be a

harmful threat to the Sri Lankan marine ecosystem.

Conclusion and Recommendations

The findings of this study prove that there is a pressing necessity to ratify the BWM Convention in Sri Lanka. The senior and junior merchant navy officers are in agreement with the idea that Sri Lanka as a FS, PS and CS should take immediate steps to ratify the BWM Convention in Sri Lanka overcoming the main obstacles such as absence of a national policy, lack of knowledge and training given to those who are directly involved in the sector and inadequate research and development facilities. This study recommends the government to introduce a proper policy as a main initiative to ratify the BWM Convention in Sri Lanka. Moreover, the government should build international corporation in the region to obtain financial aid and gain necessary knowledge and knowhow before ratifying the BWM Convention.

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