

Assessing Bangladesh's Ship Recycling Journey through the Hong Kong Convention: a Review

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Despite the significant contribution of the ship recycling sector to the global economy and industrial development (e.g., Bangladesh's USD 800 x 10⁶ turnover), concerns about safety and environmental impact necessitate a critical evaluation of current practices. While the Hong Kong Convention (2009) established a framework for safe and environmentally sound recycling, Bangladesh, a leader in this sector, faces challenges in aligning existing yards with these standards. This study aims to identify and address the challenges hindering Bangladeshi ship recycling yards from achieving compliance with the convention. Employing a comprehensive literature review technique, meticulously analysing relevant academic journals, industry reports and governmental regulations to identify existing knowledge gaps and best practices in achieving compliance with the Hong Kong Convention. The findings of the study encompass tailored recommendations, including the implementation of continuous monitoring for effective job scope management and transparent financial backing for yard enhancements. These insights can be served as a roadmap for advancing Bangladesh's ship recycling industry, fostering environmentally sustainable practices, ensuring worker safety and fostering sustained economic growth.

1. Introduction

Bangladesh has established itself as a significant player in the global ship recycling industry, dismantling approximately 47.2% of the world's vessels in 2018 (UNCTAD, 2020). With over 171 shipyards, of which 50 are active year-round, the industry is primarily concentrated in Shitakundo, Chittagong (Hossain, 2015). It began in the 1960s and flourished in the 1980s (Uddin, 2021). The country's leadership in shipbreaking can be attributed to several factors viz. cheap labour, lax enforcement of laws, a high percentage of young and even child labourers, informal labour arrangements, illiteracy, poor working conditions and limited safety knowledge. The lack of personal protective equipment (PPE) is expected due to cost concerns. While there have been attempts to implement safety regulations through the Bangladesh Ship Recycling Act 2018, enforcement remains limited. Bangladesh's geographical advantages, including its sloping seabed and tidal effects, make it an ideal location for shipbreaking. The high demand for steel further boosts the industry. Figure 1 shows a clear picture that the industry can play a significant role in the world economy. Ships, categorised by size (Gross tonnage - GT), fall into four groups viz. small (GT<500), medium ships (500≤GT<25000), large ships (25000≤GT<60000) and very large ships (GT≥60000) (European Maritime Safety Agency, 2017). Due to the prominence of the steel industry, steel-made ships are preferred for recycling, driving interest in their market stability. Large ships, rich in steel, are particularly preferred. Although small boats (<500 GT) often lack international trade, they represent a significant 37% of total vessels, underscoring their importance despite their low tonnage share. Very large ships, which are enriched in steel, comprise the largest share and are prominent for ship recycling.

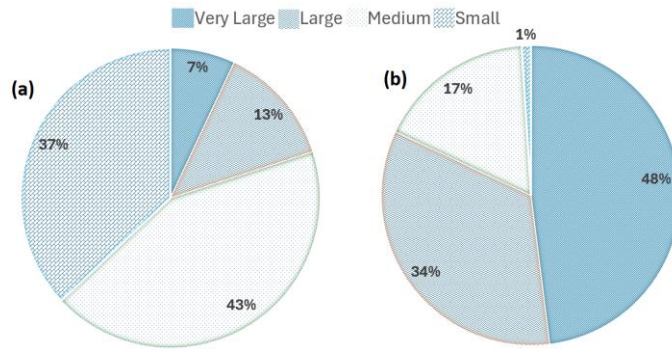


Figure 1: Distribution of the world fleet; a) world fleet: total number of ships by size in percentage b) world fleet: gross tonnage by size in percentage (European Maritime Safety Agency, 2017)

Numerous scholars have extensively studied the detrimental effects of hazardous conditions in Bangladesh's ship recycling industry on health (Du et al., 2018), the environment (Das and Shahin, 2019) and the economy (Uddin, 2021). A significant deficiency lies in effectively implementing established conventions. Challenges like inadequate waste management systems and lack of worker training hinder convention compliance. A lack of foresight among stakeholders and policymakers exacerbates issues, including insufficient medical facilities and mismanagement of yard infrastructure. Addressing these challenges is crucial for creating a safer, more sustainable ship recycling industry in Bangladesh. In light of these significant research gaps, there exists a pressing need to address the underlying disparities and shortcomings in alignment with the convention's principles. By doing so, it can pave the way for a safer, more sustainable ship recycling industry in Bangladesh, one that prioritises the well-being of workers, the protection of the environment and the overall economic prosperity of the nation.

2. Current scenario of the industry

The ship-breaking and recycling industry contributes significantly to local industries, particularly steel and iron, by providing a substantial portion of raw materials, given the country's lack of domestic iron ore sources (Sunaryo et al., 2021). Recent data indicates that Bangladesh leads in ship recycling prices at the beginning of 2022, showcasing its dominance in the industry. From Table 1, the display of ship demolition prices within the context of significant ship recycling nations clearly indicates that Bangladesh had a strong start in 2022. The shipbreaking industry faces challenges, including the reluctance of owners to invest in modernising yards, declining scrap prices due to COVID-19 and environmental concerns.

Table 1: Demolition price in January 2022

Country	General cargo (USD/LT LDT) *	Tanker (USD/LT LDT)
India	570	580
Bangladesh	595	605
Pakistan	585	600
Turkey	320	330

Data source: (Athenian Shipbrokers S.A., 2022)

*Long Ton Light Displacement Tonnage

Efforts have been undertaken to improve the industry through Norway's financial assistance for hazardous waste management, government initiatives like the Ship Recycling Board, and the formation of the Bangladesh Ship-building and Recycling Board to oversee standards (IMO, 2015). Laws such as the Ship-Breaking and Ship-Recycling Rules 2011 and the Ship Recycling Act 2018 are geared towards improving environmental standards (Rahman et al., 2019). After ratification in 2023, the Ministry of Industries plans to enforce the Hong Kong Convention (IMO, 2023). A study highlighted the need to update occupational training in the ship recycling industry to meet international standards, given its critical role in the global economy (Gunbeyaz et al., 2019). The Hong Kong Convention mandates an Inventory of Hazardous Materials for ships, including those destined for recycling. It requires comprehensive documentation and periodic surveys. Proper safety guidelines and PPE

remain deficient in many yards, posing risks to workers' health and the environment (Das and Shahin, 2019). The proximity of shipbreaking activities to residential areas compounds these issues. To ensure compliance with both domestic and international regulations, proficient national administrations must supervise ship recycling facilities in alignment with the guidelines established by the International Labour Organization (ILO). Material flow analysis tools can optimise yard business productivity and cost-effectiveness. Shipowners must select recycling facilities carefully, considering their waste management, hazardous material handling and pollution prevention capabilities (Fariya et al., 2022). Constructing recycling yards equipped with standardised containers, storage tanks and sufficient drainage systems can enhance the safety and environmental sustainability of ship recycling practices.

3. Recycling method and recycled items

This review highlights the complex challenges in ship recycling, emphasising the presence of hazardous materials in ships. The ship dismantling process comprises various stages, from the arrival of the ship to the separation of scrap as depicted in Figure 2.

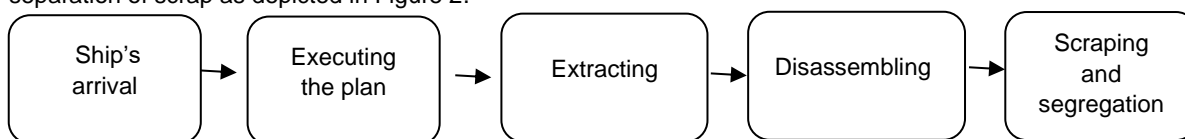


Figure 2: The Procedure of Recycling (Sunaryo et al., 2015)

Various factors affect the sustainability of ship recycling, including management, disposal of hazardous materials, energy consumption and more (Hiremath et al., 2016). Two cutting methods, plasma and oxyfuel are compared for environmental impact, with plasma cutting considered eco-friendlier (Gunbeyaz et al., 2022). Unethical profit motives persist in the industry. Health and safety concerns for workers are essential, with noise pollution, lack of awareness and accidents being prevalent issues (Zhou et al., 2021). The enforcement of the Hong Kong Convention has led developed countries to redirect ships towards South Asia, potentially worsening environmental repercussions. The significant contribution of scrap yards to steel resources in South Asia, coupled with varying prices for end-of-life ships, further complicates the situation (Schøyen et al., 2017). Studies have reported high levels of heavy metals in individuals living near shipwreck yards (Siddiquee et al., 2014). The adverse effects of ship dismantling, including pollution and health risks, are alarmingly high, making worker safety and medical facilities essential (Du et al., 2018). Behaviour-focused safety strategies have been suggested as a potential remedy (Tanha et al., 2022). These findings underscore the need for comprehensive improvements in ship recycling practices and regulations to mitigate environmental and health hazards.

4. Goal established by the Hong Kong Convention

The leading international regulations overseeing ship-breaking consist of the Basel Convention of 1989 and the Hong Kong Convention of 2009 (Mishra, 2018). ILO provided safety and health guidelines for shipbreaking in 2004. It is essential to acknowledge that the Hong Kong Convention has not yet been enacted. Presently, this convention has 22 contracting states, which collectively account for 45.81% of the world's tonnage (IMO, 2023). This convention aims to address various shipbreaking issues, focusing on environmentally friendly practices. In Bangladesh, ship recycling became an official industry in 1984 (Hossain, 2015). It faces challenges due to under-regulation and safety concerns. The regulatory framework in Bangladesh includes the Ship-breaking and Recycling Rules of 2011 and the Ship Processing Act of 2018 (Islam, 2019). The country has experienced fatalities and injuries in ship recycling yards, prompting scrutiny and legal actions, which are documented in Table 2.

Table 2: Death toll & injury from 2016-2021 (Abdullah et al., 2023)

Year	Death	Injury
2016	22	29
2017	15	22
2018	20	12
2019	24	34
2020	10	14
2021	14	34

The Hong Kong Convention emphasises proper ship and scrap yard preparation before ship breaking. Guidelines in Annex 2012 provide directives for establishing environmentally friendly ship recycling yards, with a critical component being the Document of Authorization to Conduct Ship Recycling (MEPC, 2012). This document outlines compliance guidelines and authorisations, with provisions for suspensions in cases of non-compliance. Resolutions such as MEPC.210(63) and MEPC.223(64) provide guidelines concerning ship recycling facility plans, facility management, vessel arrival, ship recycling methods, hazardous materials management, and certification (Irawati, 2019). These resolutions are all geared towards fostering safe and environmentally responsible ship recycling practices.

5. Challenges to implementing the Hong Kong Convention in Bangladesh after ratification

This study delves into the challenges that hinder the effective implementation of the Hong Kong Convention, which aims to promote safe and environmentally sound ship recycling practices. One of the primary roadblocks is the reluctance of crucial ship recycling nations, notably Bangladesh, China, India, Pakistan and Turkey, with Turkey being the sole member State among them (Islam et al., 2022).

Several other critical issues cast doubt on the convention's effectiveness:

- Lack of global ship registration system: The absence of a worldwide ship registration system introduces uncertainty in terms of surveying, inspecting and reporting ship recycling activities. This gap hampers the convention's ability to monitor compliance effectively.
- Pre-scraping focus: The convention predominantly concentrates on the pre-scraping phase of ship recycling. It lacks explicit guidance on the proper handling of waste materials and hazardous substances after segregation, leaving an environmental gap (Sunaryo et al., 2021).
- Limited applicability: The convention applies exclusively to ships possessing 500 GT or greater. This limitation raises concerns about the environmental impact of smaller vessels, which might not receive adequate attention.
- Yard infrastructure management: Effective management and oversight are essential for ship recycling yard infrastructure. Without proper governance and authority, ensuring compliance with environmental and safety standards becomes challenging (Sunaryo and Pahalatua, 2015).
- Worker training and qualifications: The knowledge and training of workers, as well as the eligibility and competence of trainers and training institutes, play a pivotal role in ensuring the industry's effectiveness (Duan et al., 2023).
- Safety and medical care: Safety management and access to medical care are critical components for preventing injuries and saving lives in the inherently risky ship recycling industry (Hossain et al., 2011).
- Policy implementation: National policies and policymakers bear the responsibility of ensuring that regulations related to ship recycling are effectively implemented (Alam and Faruque, 2014).
- Stakeholder engagement: Engaging stakeholders and society is essential for creating awareness and garnering support for the ship recycling industry's future, which, in turn, attracts better investments (Marinho and Couto, 2022).
- Environmental protection: Safeguarding the environment is a top priority, and the convention places considerable emphasis on environmental preservation (Sierra and Suárez-Collado, 2021).

Regarding Bangladesh's Ship Reprocessing Act of 2018, while it represents a significant step forward, it has limitations. These limitations include a lack of comprehensive measures to address marine and ground pollution, the absence of standardised worker training and training institute requirements, and the oversight of critical aspects such as wage bonds, social welfare and provident funds (Sierra and Suárez-Collado, 2021).

6. Recommendation

After conducting the study, it becomes evident that collaboration is essential for success in the industry. To achieve this objective, various recommendations can be proposed:

- i. A governmental medical officer could be designated to assess the physical health of workers, ensuring that they are fit for their daily tasks and then reducing the likelihood of employing child labour.
- ii. The training institute may assign a firefighting instructor or a seasoned marine engineer to lead safety courses. With their expertise in safeguarding human life and knowledge of tool usage, marine engineers are well-equipped to provide the most effective training to workers.
- iii. Continuous monitoring by the authorised person is to be ensured so that the proper management of workers and the work is achieved most practically.
- iv. The yard owner could implement a reward or bonus system for groups of workers who uphold exemplary safety practices. Such incentives would energise the workforce and ultimately enhance the reputation of the yard owner.

- v. Financial institutions can offer accessible financial assistance to the yard owner, coupled with transparent oversight, to ensure proper cash flow management.

7. Conclusion

Enforcing laws and regulations within the ship recycling sector may pose challenges, but it is not insurmountable. By embracing innovative thinking and maintaining a vigilant approach, it is possible to surmount these obstacles. The crucial aspect is nurturing a comprehensive comprehension among stakeholders regarding the vital contribution of the ship recycling industry to attaining economic prosperity and environmental cleanliness. Financial support plays a pivotal role in this journey. When stakeholders recognise the importance of investing in environmentally friendly ship recycling practices, financial backing becomes more accessible. By combining these resources with proficient management, the diverse elements of the industry can be smoothly harmonised. Raising awareness among the workforce about the risks, rights and responsibilities associated with ship recycling is essential. When individuals engaged in shipbreaking grasp the significance of their tasks and their commitment to upholding safety and environmental norms, the industry can flourish. While the present data on waste management systems and skilled human capital highlights the limitations of this study, future research in these two areas is crucial and imperative. The successful implementation of the Hong Kong Convention is of utmost importance for the ship recycling industry in Bangladesh. It not only boosts the competitiveness of the sector but also guarantees its ongoing significance and sustainability. A greener future for Bangladesh, where economic growth goes hand in hand with environmental preservation, is within reach through the fulfilment of this convention.

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