

Assessment of the Regulatory Frameworks Associated with the Ship Breaking and Recycling Industries in Bangladesh

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Abstract:

Background: The ship breaking and recycling industry (SBRI) is significant for Bangladesh's economy, but it poses safety and environmental risks due to hazardous materials stored in ships and inadequate disposal measures. Therefore, regulatory frameworks for SBRI in Bangladesh are crucial for worker safety and environmental protection. This study critically examines the extent to which environmental and occupational safety concerns originated from the SBRI has been addressed in national regulatory framework of Bangladesh. It also attempts to evaluate the degree to which Bangladesh's regulatory frameworks follow international agreements relating to SBRI. Content and thematic analysis of selected policy documents were adopted as review method. This critical review reveals that ship breaking and recycling regulations in Bangladesh mainly focus on labor rights and occupational health and safety, while environmental pollution control and conservation of coastal ecology and biodiversity are not adequately addressed. Though keeping aligned with the international conventions the recent core policies pertain to the SBRI such as Ship Reprocessing Act, 2018 and Ship Breaking and Recycling rules, 2011 made provision of inventory of hazardous materials, establishment of Treatment Storage and Disposal Facility (TSD) and establishment of training institute to get skilled workers there is lack of proper implementation guideline.

Key Word: Ship breaking, ship recycling, regulatory framework, policy, Bangladesh.

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I. Introduction

Ship dismantling is the process of demolishing an expired vessel's structure that involves the breaking up of ships for the recovery of raw materials, mainly scrap and other reusable materials. It includes a wide range of activities, from removing all gears and equipment to cutting down the ship's infrastructure. Though the industry has started developing from 1960s in Bangladesh, it boomed in 1980s and continuing the trend as lucrative business (Hossain et al., 2006). At present, Bangladesh is the second global leader in ship breaking after India. This sector has leveraged factors such as affordable workforce, favorable geographic location, suitable climate conditions, and reduced expenses to achieve financial gain.

The ship breaking industry in Bangladesh employs over 70,000 individuals directly, with an additional 250,000 people involved in supporting relevant activities (Rabbi & Rahman, 2017). Around 125 operating ship breaking yards are providing an estimated yearly revenue of approximately USD 2.4 billion. (Das & Shahin, 2019). Additionally, the Bangladesh government earns around BDT 10 billion annually in import duty, yards tax, and other taxes from this industry (Rabbi & Rahman, 2017). The demand for iron in infrastructure development is high, but virgin iron extraction from ore mining is decreasing. The ship-breaking industry in Bangladesh is a promising sector that provides raw materials for re-rolling mills and job opportunities for the poor (Ahamad et al., 2021). Bangladesh gets 80-90% of its steel from decommissioned ships (Rabbi & Rahman, 2017). Besides, it provides a variety of reusable and recyclable materials. Ship dismantling could be regarded as a pro-environment industry from the resource recovery decoupling perspectives (M. S. Hossain et al., 2016). So, ship breaking is supported from the sustainability concern.

Although ship breaking is a profitable industry for the country from economic aspects, a big concern is that it is a labor intensive and environmentally risky industry with high rate of occupational hazards. Shipbreaking generates a significant amount of waste, including hazardous substances such as POPs, asbestos, and noxious materials, as well as large quantities of oily debris. In Bangladesh, shipbreaking takes place on open beaches, posing a threat to both

human health and the marine environment. Workers frequently handling asbestos particles with their bare hands are highly at risk of having diseases such as asthma and mesothelioma (a rare cancer that affects the lining of the lungs) chest cavity or abdomen (Rabbi & Rahman, 2017). Mitra et al., (2020) identifies that total CO₂ emissions from metal gas cutting is significantly higher than nearby control area and diesel fuel emission is significantly higher than the electricity consumption. The investigations into the ship breaking industry have revealed that the primary causes of worker fatalities include the absence of ambulance services, insufficient emergency medical equipment, and inadequate funding for necessary medical care. Despite being illegal under the Labour Act of 2006, a considerable number of underage workers are another concern of these hazardous industries (Jenssen et al., 2022).

The ship-breaking industry in Bangladesh is currently lacking in proper regulation, leading to poor working conditions and significant environmental pollution. When compared to other major shipbreaking nations, it is evident that Bangladesh's regulatory framework is inadequate. Therefore, national and international regulations are generally not implemented effectively in Bangladesh. (Shohedul et al., 2019). Furthermore, Bangladesh is not a signatory to the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, which establishes international guidelines for ship recycling that are both safe and environmentally sound. As a result, the industry in Bangladesh operates largely without international oversight (Gunbeyaz et al., 2019)

For a prolonged period, there was no legal framework for the ship recycling industry in Bangladesh. Instead the legal issues of the shipbreaking industries were used to deal with the regulatory framework formulated for different sectors of environment and labor relations such as the Bangladesh Environment Conservation Act 1995, Marine Fisheries Ordinance 1983, Labour Act 2006 etc. (Alam&Faruque, 2014). After extensive discussions with stakeholders, the government of Bangladesh established The Ship Breaking and Recycling Rules in followed by the Bangladesh Ship Reprocessing Act, 2018 as a legislation of the rule. The existence of multiple regulatory frameworks in Bangladesh can sometimes lead to contradictions and duplications in policies, resulting in non-compliance with ratified international conventions. In addition, laws may have grey areas that fail to address critical issues. To strengthen the legal framework governing the shipbreaking industry, it is essential to analyze national policies, identify grey areas, and fill policy gaps. In the same way to sign the Hong Kong convention, it is necessary to evaluate how well its provisions align with Bangladesh's national legal framework. To achieve this, a structured analysis comparing both national and international regulations is required. This study aims to identify policy gaps and overlaps through content and thematic analysis, which has not been done in any previous study. Main objectives of this study are to: i) identify the extent to which the environmental impacts, compliance and occupational safety issues related to SBRI has been national regulatory framework; and ii) evaluate the degree to which Bangladesh's regulatory frameworks are in compliance with international agreements relating to SBRI.

II. Material and Methods

Study Design

The current study critically reviewed the national policy documents (acts, rules, or directives) of Bangladesh to identify the government resolutions to environmental pollution, hazardous waste management, and labor rights issues related to ship breaking and recycling industry and compared them to relevant international treaties. The study design involved 4 steps to analyze the policy documents which are shown in Figure 1:

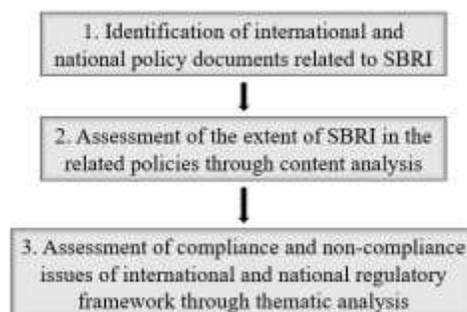


Figure 1: Study design for policy analysis review process

1. Identification of international and national policy statement related to SBRI

The first step is to find relevant national and international SBRI policy documents. This was accomplished through a detailed examination of key policy papers, such as international agreements, national laws and regulations, and policy statements issued by relevant organizations. The policies were reviewed under the following area of concern:

1. Environment
2. Waste management/ transboundary movement of Hazardous waste
3. Labor rights and Occupational safety
4. Comprehensive

National and international legal policy documents considered for this study were collected from online sources, such as websites of national and state level government agencies (relevant Ministries and Departments) within the country and international development agencies, i.e. UNEP, IMO, ILO and EC.

Table 1: Selected national policies within the mentioned theme

Theme	National regulatory frameworks related to SBRI
Environment	Coastal Zone Policy, 2005
	Territorial Waters and Maritime Zones Act 1974
	Bangladesh Environment Conservation Act, 1995(amendment, 2010)
Waste management/ transboundary movement of hazardous waste	Import policy Order, 2015-2018
	Marine Fisheries Ordinance 1983
Labor rights and occupational safety	Bangladesh labor Act, 2006
Ship recycling	The Ship Breaking and Recycling Rules, 2011
	The Ship Reprocessing Act, 2018

2. Assessment of the extent of SBRI in the related policies through content analysis

The purpose of the content analysis was to see if Bangladeshi national policies recognize the effects of SBRI on environmental pollution, hazardous waste management, labor rights, and occupational safety. International legal materials pertinent to the subject were also reviewed. To identify relevant policies for further thematic analysis, following key terms were used: Ship/Vessel, Ocean/Sea, Coast/Coastal, Hazardous waste, Hazards, Health, Safety, Accidents, Fire/Explosion, Risk, Heavy metal and Pollutant in relation to one or more of the contexts, Breaking/Recycling, Scrap, Pollution/contamination, Labor/Worker, Occupational, Work Place, Working Environment.

The strategy for searching key terms in electronic policy papers included measuring the number of times each term was cited and assessing the context to confirm SBRI relevance. To improve search results, synonyms were utilized. Policies with no key term mentions were omitted from further examination, whilst those containing key term mentions were examined in greater depth. When searching within electronic documents (e.g. PDF, word documents), it was possible the similar word with different meaning within the search of key terms. For example, using the search term “ship*” will find the words “shipping”, “shipment” etc. The word that does not represent ship as a scrap vessel to be recycled was carefully avoided from counting. In the same way other terms found in count were also carefully scanned and taken into consideration only if it has relation to shipbreaking and recycling activities.

3. Assessment of compliance and non-compliance issues of national policy documents and comparison with the international regulatory frameworks

Once the national policies dealing with SBRI within any of the four mentioned topical area was found it was then examined in greater depth and compared with the relevant international policies (Presented in table 2) to find out the policy gaps. In this step an assessment of how compliance issues related SBRI are being addressed in three specific areas: i) controlling environmental pollution, ii) managing hazardous waste, and iii) ensuring occupational safety and health through thematic analysis. Policy documents were searched for evidence of compliance issues on the list,

with detailed information on compliance options recorded. To discover gaps in national policy, international and national policy papers were compared.

Table 2: Selected international regulatory frameworks related to SBRI compliance issues

Theme	Regulations/ Conventions
Waste management/ transboundary movement of Hazardous waste	Basel Convention on the control of Transboundary Movements of Hazardous Waste and Their Disposal, 1989
	EU Waste Shipment Regulation, 2013
Labor rights and Occupational safety	Safety and health in shipbreaking: Guidelines for Asian countries and Turkey, 2003
Ship recycling	Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009

III. Resultand Discussion

Finding of content analysis to assess the extent of SBRI in the relevant national policy documents

After searching the documents with the ship breaking and recycling industry related key terms the table A. 1 (see Appendix A. 1) was derived. In the following paragraphs the context of use the major key terms in our selected legal framework is discussed.

Ship breaking or ship recycling:The term mostly found in the Ship Breaking and Recycling Rules, 2011(SBRR, 2011) followed by the Ship Recycling Act, 2018 (SRA, 2018) as these regulatory frameworks are formulated based on this sector. After the SBRR, 2011 this is mention in the Bangladesh Environment Conservation Act, 1995 (ECA, 1995) which is amended in 2010; Coastal Zone Policy, 2005 (CPZ, 2005) and the Import Policy Order (2015-2018) in context with the interest of this study mentioned in the method section. Bangladesh Labor Act, 2006 also mentioned the term but only to address ship breaking as an industry. The term is completely absent in rest of the policy documents reviewed.

Coast or Coastal:This term was searched with the aim to find how pollution in coastal environment due to ship breaking activities are addressed in national policy level. Though it frequently appeared in the Coastal Zone Policy, 2005, four times found in the context of ship breaking industry as the policy is oriented on comprehensive coastal zone management. SBRR, 2011 also mentioned the term in the context of pollution control of coastal environment. The term comes in Territorial Waters and Maritime Zones Act, 1974 and Import Policy Order (2015-2018) but in a different context. It is completely absent in the SRA, 2018

Hazard and risk:Only in SBRR, 2011 and SRA, 2018 cited the terms hazards and risk in the context of environmental or occupational health hazards and risk from ship breaking and recycling activities. Coastal Zone Policy, 2005 used them to address the hazards from and risk of natural disaster.

Hazardous waste:Mentioned in only the SBRR, 2011 and ECA 1995 from management perspective for the environmental safeguard.

Waste:The term comes mostly in SBRR, 2011 followed by the SRA, 2018 and ECA, 1995 in the context of waste management in ship recycling activities.

Health and safety:Mostly used in SBRR, 2011 and Bangladesh Labor Act, 2006 addressing the occupational health and safety. Also mentioned in the SRA, 2018. The terms come in the Import Policy Order (2015-2018) significantly but in a different context. ECA used the term safety to address environmental safety. In the remaining documents reviewed, it is completely absent. Thus, it could be said that ‘occupational health’ and ‘work place safety’ issue has always been present in labor and industry related documents.

Labor or worker:Most emphasized in the Bangladesh Labor Act, 2006 as it is the sectorial legal frame work. Next emphasized in the SBRR, 2011 and SRA, 2018 depicting labor right issues are significantly addressed here. Import Policy Order (2015-2018) and Coastal Zone Policy, 2005 also mention the terms but not in the context of labor right.

Marine biodiversity:None other but only the Coastal Zone Policy, 2005 slightly mentioned the term. It indicates that the concern of conserving ‘marine biodiversity’ from industrial activities is not properly addressed in national level policies.

Pollution and pollutants: Most emphasized in the ECA, 1995 and then comes in the Coastal Zone Policy, 2005, the SBRR, 2011 and the Chittagong Port Authority ordinance, 1976.

Content analysis of national policy documents with respect to the key compliance areas:

The findings of the search of the extent the compliance issues of interest have been addressed in SBRI related national policies are summarized in Table 3. The analysis of compliance issues in national policy documents revealed that some issues were addressed more thoroughly than others depending on the policy area. Environmental pollution control was not adequately covered, while labor rights and occupational health and safety were mainly addressed in ship breaking and recycling regulations. Hazardous waste management and transboundary movements were emphasized across multiple policies including the Ship Reprocessing Act (2018), Ship Breaking and Recycling Rules (2011), the Bangladesh Environment Conservation Act, (1995), the Import Policy Order (2012-2015), the Marine Fisheries Ordinance (1983) and the Chittagong port Authority Ordinance (1974). Overall, the policies addressed issues relevant to their specific purposes. The management and transboundary movements of hazardous waste received the most attention among the three areas analyzed.

Table 3: Identification of key compliance areas addressed in selected policy documents

Compliance Issues		Policy Documents								
		SBRR, 2011	CPZ, 2005	ECA, 1995	TWMZA, 1974	BLA, 2006	IPO, 2012-2015	MFO, 1983	CPAO, 1976	SRA, 2018
Environment	Environmental Pollution control (air, water and soil)	X	X	X	X				X	X
	Manage oil spillage	X	X							
	Coastal land pollution control	X	X	X				X	X	
	Environmental monitoring	X		X						
	Certification and environmental Audit	X		X						X
	Bio-diversity conservation		X					X		
Waste management/transboundary movement of hazardous waste	Solid waste management	X		X					X	X
	Safe and environmentally sound handling of hazardous materials	X		X			X			
	Restriction on trans-boundary movements of hazardous materials	X		X			X	X	X	
	Management accidental waste releasing									
Labor rights and Occupational safety	Basic workplace facilities	X	X			X				X
	Competence and training	X				X				X
	Emergency preparedness and response plan	X				X				X
	Availability and use of PPE	X				X				
	Accident reporting and record keeping	X				X				X
	Labor insurance/ Compensation	X				X				X

Comparison of compliance issues with international regulatory framework

The study collated national policies with international legal frameworks by searching for key compliance issues and analyzing directions at both national and international levels. Thematic analysis was used to present findings based on topical areas of compliance issues.

Findings on compliance issues from environment perspective:

Table 4 represents summery of our key findings on issues regarding environmental compliance. Here we see the SBRR, 2011 address all the issues in general addressed in the Hong Kong convention, 2009 (HKC, 2009) and in the

EU Regulation, 2013 (ER, 2013). From the detailed study we made, found that the EU Regulation is aimed at facilitating early ratification of the Hong Kong Convention both within the Union and in third countries by applying proportionate controls to ships and ship recycling facilities on the basis of that Convention.

According to the HKC 2009 mandate (regulation 8 to 12), ships to be sent for recycling will have to meet certification standards, including carrying out an inventory of hazardous materials, specific to each ship. Ships will have to have an initial survey to verify the inventory of hazardous materials, surveys during the life of the ship, and a final survey prior to recycling. Ship recycling yards must be authorized and will be required to provide a ‘Ship Recycling Plan’. The same requirements are also mandate in the SBRR, 2011 in its section 9 and 10. HKC, 2009 urges to conduct operations in order to minimize the amount remaining fuel oil prior to entering the Ship Recycling Facility as same SBRR, 2011 mandate. All other national policy considered in this section has provision on prevention of pollution of environment due to any industrial activities which can be imposed on the ship breaking in general as an industry. Core policies related to SBRI and environmental conservation such as SRA, 2018; SBRR, 2011 and ECA, 1995 made it obligatory to obtain an Environmental Clearance Certificate (ECC) prior to establish an industry from Department of Environment (DoE) which means ECC has to issue for the breaking yard. But in section 3(3.3) of SBRR, 2011 state that DoE may issue an ECC for particular ship after initial examination that is contrary to the previous statement. The Coastal Zone Policy, 2005 mentioned the coastal areas as biodiversity hotspot and emphasis to take measure to conserve this. But, the national legal frameworks regulating the SBRI that are considered here do not prioritize that much the issue of coastal ecology and biodiversity.

Table 4: Key complacence issues addressed in legal framework of national and international regulatory frameworks from the environment perspective.

Compliance Topic	Key Compliance Issues	International Regulatory Framework		National Regulatory Framework				
		HKC, 2009	ER, 2013	SRA, 2018	SBRR, 2011	CPZ, 2005	ECA, 1995	TWMZA, 1974
Environment	Environmental Pollution control (air, water and soil)	X	X	X	X	X	X	X
	Manage oil spillage	X	X		X	X		
	Manage Chemical pollution	X	X		X		X	
	Manage coastal land pollution	X	X		X	X		
	Bio-diversity conservation					X		
	Monitoring environmental parameters	X	X		X		X	
	Certification and environmental Audit	X	X	X	X		X	

Findings on compliance issues from waste management/ transboundary movement of hazardous waste perspective:

Summary of findings on compliance issues regarding the waste management are presented in table 5. It was revealed in policy assessment that all the included policy documents impose restrictions on the transboundary movements of hazardous materials. HKC, 2009 made restricted its parties to use and permit specific hazardous materials on ship dismantling yards (Rgulation-4). Basel convention by the statement of its article 4 restrict Parties export of hazardous wastes and other wastes to the Parties which have prohibited the import of such wastes, and are unable to manage those waste. All the international legal frame work listed in table 5 and also the SBRR, 2011 mandate the availability of ‘Inventory of Hazardous Materials’ of a ship in its different phase of life cycle. According to the SBRR, 2011 it is obligatory to submit the ‘Inventory of Hazardous Materials’ to obtain ‘No Objection Certificate’ (NOC) from Ship Building and Ship Recycling Board (SBSRB). However, by the mandate of Ship Reprocessing

Act, 2018 the SBSRB had been replaced by the Bangladesh Ship Reprocessing Board (BSRB) by the mandate of which has lesser but effective jurisdictional outreach. SBRR, 2011 made compulsory in its section 18(iv) to yard owner to must maintain register for each kind of wastes generated from every ship dismantling in a prescribed manner. Each yard must have an authorization for handling Hazardous waste generated from ship recycling activities issued by the DOE and registration as member of the Hazardous Waste Treatment, Storage and Disposal Facility (TDSF). Section 7(2) of the Bangladesh Ship Recycling Act, 2018 states that the government will take all the effective steps within the five years of the formulation of the act to comply with the HKC, 2009. The act permits the government to issue guidelines or instructions that reflect existing laws and regulations related to the gathering, preservation, and handling of all forms of waste produced by ship recycling operations. The Act also mandates that the government construct a Treatment Storage and Disposal Facility (TSDF) for managing waste generated by ship recycling activities by 2021. To comply with this issue first Bangladesh need to establish the facility.

Table 5: Key complacence issues addressed in legal framework of national and international regulatory frameworks from waste management/ transboundary movement of hazardous waste perspective

Compliance Topic	Key Compliance Issues	International Regulatory Framework			National Regulatory Framework				
		BC, 1989	HKC, 2009	ER, 2013	SRA, 2018	SBRR, 2011	ECA, 1995	IPO, 2015-2018	MRO,1983
Waste management/ transboundary movement of hazardous waste	Waste management (solid and liquid)	X	X	X	X	X	X		
	Safe and environmentally sound handling of hazardous materials	X	X	X		X	X		
	Restriction on trans-boundary movements of hazardous waste	X	X	X		X	X	X	X
	Management accidental waste releasing	X							

Section 20 of ECA, 1995 empowers the government to make rules for carrying out the purpose of Act, for determination of environmental standards, regulation of industry, determination of safe procedures for the use, storage, import, export, transportation, disposal and dumping of hazardous substances, making list of hazardous waste, determination of the standards for effluent and discharge etc. But the specific emission standards for the SBRI is not established yet from national perspective. Not any policy in national level specified the obligation of taking responsibility of the accidental releasing of hazardous materials.

Findings on compliance issues from Labor rights and Occupational safety perspective:

National policy documents of our consideration to assess the labor rights and he occupational safety issue with respect to the ship recycling industry was the Bangladesh Labor Act, 2006 and the shipbreaking and recycling rules, 2011. Among the international policy documents, we considered the International Labor Organization’s Safety and health in shipbreaking: Guidelines for Asian countries and Turkey, 2003 (ILO guidelines, 2003). We also considered the HKC, 2009 and ER, 2013 as they are comprehensive framework for SBRI. As we see in the table all the frameworks we consider comply with the compliance issues of our consideration in a broader extent. But in some cases, our national frame work does not comply with the ILO guidelines, 2003. This document direct to adopt appropriate tools, machines and equipment, including personal protective equipment, considering local conditions in user countries and, in particular, ergonomic implications and the effect of climate. But such factors are neither considered in the SBRR, 2011 nor in the SRA, 2018. Each frame work emphasized on keeping record of accident and disease in detailed but it is not made obligatory. As a result, reporting and recoding of accident incidents are denied by the yard owners. But compensation upon accidents are made obligatory. SBRR’ 2011 states that compensation will be calculated as per Bangladesh Labor

Act, 2006 (BLA, 2006). The Act also includes an obligatory insurance clause that requires yard owners to purchase life insurance in the names of all workers and employees in the yard. Though insurance is granted for accidental injury, disease and death, chronic diseases caused by the exposure of the pollutants produced in SBRI is not addressed in in core regulatory framework. Section 19 of the SRA, 2018 states that the Bangladesh Ship Reprocessing Board (BSRB) will establish training institute within the five years (approximately in 2023) of the act being effective. Workers must receive theoretical and vocational training for specialized skill development before their employment and SBRI. The concept of this training institute is a new addition in the national regulatory framework that may reduce accidental injury and death. However, the act lacks provisions for dealing with hazardous substances such as PCB, PVC, and asbestos, and does not mandate the provision of personal protective equipment (PPE) or first aid services for workers. Additionally, there are no specific provisions for female workers, wage boards, social welfare measures, provident funds, or child labor. The Act also ignores the right to form and participate in trade unions in the ship recycling industry. Although Bangladesh is a member state of international organizations like the International Labor Organization (ILO), International Maritime Organization (IMO), the Act does not provide any guidelines for coordinating with these organizations to ensure workers' health and safety and environmental protection

Table 6: Key complacence issues addressed in legal framework of national and international regulatory frameworks from labour rights and occupational safety perspective

Compliance Topic	Key Compliance Issues	International Regulatory Framework			National Regulatory Framework		
		ILO Guidelines, 2003	HKC, 2009	ER, 2013	BLA, 2006	SBRR, 2011	SRA, 2018
Labor rights and occupational safety	Basic workplace facilities	X	X	X	X	X	X
	Competence and training	X	X	X	X	X	X
	Emergency preparedness and response plan	X	X	X	X	X	X
	Providence and use of PPE	X	X	X	X	X	
	Accident reporting and record keeping	X	X	X	X	X	X
	Labor insurance/ Compensation	X			X	X	X

IV. Conclusion

Contribution of ship breaking and recycling industry in Bangladesh's national economy has a great significance. At the same time, it's adverse impact on environment and human health is also non-ignorable. This industry can be highly beneficial if a strong regulatory framework is adopted and properly implemented to minimize negative impacts. However, despite some noteworthy initiatives taken in the past decade to regulate this sector, significant shortcomings are still observed in the regulatory frameworks. The management of this industry to protect the environment is not adequately addressed in sectoral policies like the Bangladesh Environment Conservation Act, 1995 and Coastal Zone Policy, 2005. Furthermore, the core regulatory frameworks of SBRI, such as The Ship Breaking and Recycling Rules, 2011 and The Ship Reprocessing Act, 2018, do not fully address environmental and labor safety issues and are not in full compliance with international standards. If the government amends and adds more dynamic and modern provisions to the regulatory framework overall, it will increase the safety and security of workers and effectively work towards the complete conservation of the environment.

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