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Political and Economic Dimensions of the Dominance of Selected Asian Recycling Yards in the World

Abstract: India, Bangladesh, and Pakistan have dominated the global ship recycling market in the 21st century. A recycled ship provides steel and other metals for industrial reuse. In addition to economic gains, ship recycling affects the environment and workers' health. The article compares the changes in the policies of the governments of India, Bangladesh, and Pakistan regarding recycling shipyard operations from 2009-2022 in the context of international and EU law standards. It also shows the impact of international organizations, shipbuilding trade unions, Shipbreaking Platform non-governmental, Maersk shipping company, and Norway on the decisions of South Asian countries to make them ratify the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships. Analysis of the collected research material allows us to conclude that the governments of India, Bangladesh, and Pakistan have shown varying degrees of understanding of introducing legal regulations for safe ship recycling.

Keywords: *international law, trade unions, government policy, South Asian countries, ship recycling industry*

Introduction

Between 1945 and 1980, ship recycling centers were located in the United States and Europe. The gradual movement of the ship recycling industry to South Asian countries occurred in the late 20th century. It was related to lower labor costs and high local demand for recycled raw materials. Ship owners were interested in shipyards offering the cheapest ship dismantling. Ship recycling in South Asian countries poses a high risk to the life and health of shipyard workers (fatalities, injuries, chronic illnesses) and the environment.

The article aims to analyze the policies of the Indian, Bangladesh, and Pakistan governments in bringing the operations of recycling yards into compliance with the norms of international and EU law, as well as to show support given to Asian recycling yards by

international organizations, Maersk shipping company and Norway to reduce environmental pollution and increase the safety of their workers.

The article is divided into sections that refer to 1) the assumptions and significance of the Hong Kong International Convention, 2) the EU's policy towards ship recycling, 3) the decisions of the Indian, Bangladesh and Pakistan governments to bring the operations of recycling yards up to the standards of international law, 4) percentage participation of India, Bangladesh and Pakistan in ship recycling worldwide in the context of the development of their steel and metallurgical industries and the high number of accidents among shipyard workers.

The article presents the thesis that since the middle of the second decade of the 21st century, there have been changes in the policies of India, Bangladesh, and Pakistan regarding the operation of recycling yards. These countries' governments have decided to significantly reduce environmental pollution and increase the safety of recycling yard workers. The ongoing changes in the policies of Asian industrialized (industrial) states would not have been possible without the support of European post-industrial states. The assistance of the post-industrial states resulted from their willingness to take advantage of the offers of Asian recycling yards while respecting the principles of international and EU law. In addition, post-industrial countries have been aware that one of humanity's challenges is the slow depletion of natural resources with increased waste. Ship recycling based on the concept of the Circular Economy has been able to meet the above challenge.

This refers to the work of American sociologist Daniel Bell, who wrote *The Coming of Post-industrial Society*. *In social forecasting, it should be noted that post-industrial society uses new intellectual technology and modern management of enterprise development to improve the quality of life* (Bell, 1973, p. 43). Thanks to the prevalence of education and the development of science, post-industrial society, unlike industrial society, has a high level of environmental awareness and knowledge of the law, including labor law principles.

To verify the above thesis, the following research questions have been attempted to be answered: What decisions have been made by governments in India, Bangladesh, and Pakistan to enhance environmental safety and workers' rights during ship recycling? To what extent have IndustriALL Global Union, Shipbreaking Platform non-governmental organization, Maersk shipping company, and Norway been involved in the changes in the Asian ship recycling industry?

The interdisciplinary approach to the phenomenon under study imposed the use of research methods appropriate to political science (decision-making, comparative method), legal science (dogmatic method), and sociology (statistical method). The decision-making method was used to show the actions of the Indian, Bangladesh, and Pakistan governments to increase safety in environmental protection and worker's rights during ship recycling.

Using this method provided an opportunity to analyze the impact of decisions by international organizations, shipbuilding unions, Maersk shipping companies, and the Norwegian government on the operations of Asian recycling yards. The comparative analysis

provided an opportunity to present the differences and similarities in the policy decisions of the governments of selected Asian countries. A statistical method was used to illustrate the economic situation of recycling shipyards. The dogmatic method was applied to analyze international, EU, and national law norms.

The research material used in this study included documents produced by the International Maritime Organization (IMO), the International Labor Organization (ILO), the United Nations (UN), the European Union (EU), the NGO Shipbreaking Platform, the Organization for Economic Cooperation and Development (OECD) and academic articles (Ahmed, 2020; Pastorelli, 2014; Misra, 2019; Das, 2019). The state of research on issues related to the shipbreaking industry shows it in the context of international laws, the impact of shipbreaking methods on the environment, the safety of shipyard workers, and the use of ship scrap in the steel industry. Problems related to the policies of the Bangladesh and Pakistan governments on safe and environmentally sound ship recycling have been the subject of limited academic work (Mikelis, 2019; Buerk, 2006).

This article refers to publications on implementing a closed-loop economy, considered a sustainable development strategy (Kulczycka, 2009).

The chronology adopted in the article covers the period 2009–2022. The beginning caesura of the article is related to the enactment of the International Convention on Safe and Environmentally Sound Recycling of Ships at the diplomatic conference in Hong Kong (HKC). The end caesura relates to the current situation of the ship recycling industry in South Asia.

The Hong Kong International Convention against Prevention of Hazards to Human Life and Health as well as to the Environment during ship recycling

Issues related to the negative impact of the ship recycling industry on the environment and human health have been discussed in the IMO, ILO, and UN activities. The work of the international organizations resulted in the development of the HKC, which was adopted at a diplomatic conference in China in May 2009. The HKC referred to the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal by design. An analysis of the 2009 Convention's provisions revealed that the document's parties considered recycling the best solution for inactive ships. The Hong Kong International Convention did not prohibit the scrapping of ships by the beaching method, i.e., deliberately stranding a ship. Workers dismantled ships using torches, ropes, and bare hands. This method was practiced in India, Bangladesh, and Pakistan, where fatalities or injuries to shipyard workers were common. In the EU countries and Turkey, the scrapping of small ships was done in a dry dock, allowing all debris to be safely removed from the ship.

The construction of a dry dock required a significant financial investment, which industrial countries in South Asia could not afford.

According to the HKC, ship recycling consists of the complete or partial dismantling of a ship at a Ship Recycling Facility to recover materials for reprocessing, using, or removing hazardous materials. The 2009 Convention established enforcement mechanisms for ship recycling (Hong Kong, 2009). Detailed guidelines were addressed to ship owners (over 500GT), shipyards, and recycling facilities. The HKC's goal was to legally sanction the sale of ships for scraps that have hazardous substances for the environment and humans. To reduce accidents, workers were trained in health and safety.

Once the Convention enters into force, its provisions will cover the design, construction, operation, and preparation of ships for safe recycling for the environment and human health. Parties to the convention were required to restrict the use of hazardous materials installations. A list of hazardous materials had to be kept on board the ship throughout its operation. An annex to the convention included a list of hazardous materials whose use was prohibited. Scrap yards were required to submit a ship recycling plan. After the 2009 Convention entered into force, ships were to be recycled only at scrap yards authorized by the competent authority. The HKC was to enter into force 24 months after the following conditions were met: 1. ratification of the convention by a minimum of 15 countries; 2. having a merchant fleet of 40% of the gross tonnage of the world merchant fleet by the countries ratifying the convention; 3. a maximum annual recycling volume of not less than 3% of the total tonnage of the ratifying countries. Once the 2009 Convention enters into force, all IMO member states must recycle their ships at shipyards following the HKC requirements.

By October 2022, Belgium, Congo, Croatia, Denmark, Estonia, France, Germany, Ghana, India, Japan, Luxembourg, Malta, the Netherlands, Norway, Panama, São Tomé and Príncipe, Serbia, Spain and Turkey joined the convention (Ship, 2022). India's accession to the HKC marked a significant step in improving international ship recycling standards regarding occupational health and safety and environmental protection. This was made possible by the ongoing modernization of India's shipyards.

In India, the Alang Sosiya Ship Recycling and General Workers Association (ASSRGWA), whose activities were supported by the International Federation of Industrial Workers' unions – IndustriALL Global Union, played an essential role in promoting the 2009 Convention. The ASSRGWA organized training for recycling yard workers, which resulted in improved awareness of workers' rights and increased occupational health and safety. The workers' union in India has significantly improved the working conditions of recycling yard workers and environmental protection (IndustriALL, 2021). At the same time, the Danish shipping company – Maersk developed its Responsible Ship Recycling Standard program (RSRS), the implementation of which was expected to ensure the development of the ship recycling industry in India under standards and procedures required worldwide. Maersk recycled its ships at its shipyards in Alang and audited them. Maersk's commitment to recycling shipyards helped India implement the RSRS and ratify the HKC (Moller, 2021).

It is worth noting that since 2019, there has been a ban on the import of old ships to China. This ban did not apply to the export of Chinese ships to recycling yards. The reason for the Chinese government's decision was the desire to reduce environmental pollution caused by heavy metals, the high cost of ship dismantling, and falling steel prices. At the same time, the operation of recycling yards in China was not subsidized by the government (Nan, 2018). Since 2020, most Chinese-flagged ships began to go to recycling yards in India or Bangladesh, strengthening these countries' position in the global ship recycling market.

Ship recycling in the European Union policy

In 2007, The European Commission (EC) issued a Green Paper on Better Ship Dismantling and proposed an EU strategy a year later. The documents showcased measures by which the EU could contribute to making ship dismantling safer for the environment and human health. The aim of the EU strategy for better conditions for dismantling ships (linked to the EU by the flag or its owner) was to ensure that they are recycled in safe and environmentally sound facilities worldwide. A 2009 European Parliament (EP) resolution on the EU Strategy for Better Ship Dismantling called on member states to ratify the 2009 Convention.

Although the beaching method of ship recycling was condemned in the EP resolution, it was attractive to ship owners due to the low prices of services. It should be noted that some of the ships coming from the EU were scrapped in South Asian countries. Environmental protection and human dignity were violated during ship dismantling. In 2013, the EP and the Council of the European Union, to strengthen requirements and speed up ratification of the HKC, set out regulations containing principles of business operations of recycling yards. The EP and the Council of the EU regulation not only strengthened the requirements of the HKC but also set higher standards for occupational safety and environmental protection. These included toxic waste management, labor rights, and a ban on beach recycling.

The rules of the 2013 EP and the Council of the EU regulation applied to commercial vessels above 500 GT flying the flag of an EU member state and third-country vessels docking at ports of a member state (flying the flag of a non-EU country). The purpose of the 2013 regulation was to protect human life and the EU marine environment during ship recycling. Hazardous waste obtained during ship recycling was to be managed in an environmentally sound manner.

European list of ship recycling facilities

Ships flying the flag of an EU member state could only be recycled at a company on the EU list (Regulation, 2013). Ship recycling companies in third countries could be included in the European list after assessing their activities in the context of the EU requirements.

In December 2016, the EC created the European list of ship recycling facilities. The list included 18 ship recycling companies in the EU, i.e., Belgium, Denmark, France, the

Netherlands, Portugal and Spain. The European list of ship recycling facilities was updated several times between 2016 and 2022. The supplemented European list with new recycling facilities gave ship owners a wider choice of ship dismantling yards. In 2019, 20 Indian shipbreaking yards applied for admission to the European list of ship recycling facilities. The beach recycling practiced in India was not in compliance with EU requirements. Therefore, none of the Indian shipyards qualified for the European ship list.

In April 2020, the European list included 46 ship recycling companies (from Europe, Turkey, and the United States), and in December 2022, 45 entities. In 2022, compared to 2020, two shipyards in Turkey (Işıksan Ship Recycling in Aliğa and Simsekler Ship Recycling [Gemi Sokum Tersanesi in Aliğa]) were removed from the list (Mandara, 2022). The EC's decision was made because the shipbuilders' working conditions were not sufficiently protected, and there was a lack of transparency in ship dismantling operations. In December 2022, the EC included a shipyard in Bulgaria (Ship and Industrial Service Ltd. in Varna) in the list of recycling facilities. The frequent updating of the European list of ships shows how important the safety of shipyard workers and environmental protection were to the EU. The conditions set by the EU for recycling yards were not easy to meet, as evidenced by removing two Turkish shipyards from the list.

Including non-European ship dismantling yards in the European list of ship recycling facilities may increase their competitiveness against European players in the context of the international recycling market. This is all the more so since the EU report on the European list of ship recycling facilities found that "most EU member state facilities are not specialized scrap yards for the international market" (Report, 2020). These facilities would prefer to devote their time to ship repair and production, among other things.

European shipowners and the choice of recycling yards

The European list of recycling facilities was intended to ensure the health and safety of plant workers and environmental protection. Although EU countries were obliged to scrap ships at shipyards included in the European list of facilities, ship owners sometimes circumvented the EU law. The re-flagging of a ship by its owner would likely have been a sporadic occurrence if ship owners had been given incentives (such as tax credits) to use EU-approved shipbreaking yards.

European ship owners often sold ships that were not intended for further operation. This situation created the possibility of scrapping a ship flying the flag of a non-EU country in shipyards not included in the European list of ship recycling facilities, namely in India, Bangladesh, and Pakistan. In 2020, ships destined for scrapping in South Asian countries had previously changed flags to the registers of Comoros, Gabon, Palau, and St. Kitts and Nevis (Prevljak, 2022). One reason for such actions was the lower cost of scrapping ships in South Asian countries than in Europe. Secondly, EU-approved recycling yards could not

scrap large ships (tankers, Capesize, Panamax bulk carriers, and container ships) owned by European ship owners.

According to data released by Shipbreaking Platform – an environmental NGO, at least seventeen ships deregistered from the European flag registry in 2021 before their final voyage to scrap yards. In this way, ship owners (from Greece, Cyprus, Germany, Spain, and France) circumvented the EU Ship Recycling Regulation (*The Toxic*, 2021), which requires EU-flagged ships to be recycled at facilities on the European list.

Policies of Asian countries towards activities of recycling yards

In the 2020s, the Indian, Bangladesh, and Pakistan governments sought to raise health and safety standards in shipbreaking yards and increase environmental concerns (Zajączkowski, 2011, p. 112). Influencing the policies of their governments were related to their efforts (particularly of India and Bangladesh) to join the HKC, protests by shipbuilding trade unions against unsafe working conditions in ship dismantling and the activities of Shipbreaking Platform – the international NGO, and of IndustriALL Global Union – the international organization of trade unions. To improve conditions for safe and environmentally friendly ship recycling, India received support from Maersk – the Danish shipping company, as a part of ongoing changes to the shipyard's organizational structure. Bangladesh received financial assistance from the Norwegian government.

The support given to ship recycling yards in India, Bangladesh, and Pakistan and their workers by international participants was in line with the goals of the HKC and with the tasks of the 2030 Agenda for Sustainable Development adopted by UN countries. Implementing the agenda's provisions for the ship recycling industry was expected to contribute, among other things, to decent working conditions, introducing innovation processes in the industry, providing quality education, and reducing environmental pollution – both the HKC and the 2030 Agenda for Sustainable Development set standards for sustainable ship recycling. (Weiland, 2021, p. 92).

Analyzing the decisions of the governments of India, Bangladesh, and Pakistan in bringing the operations of recycling yards into compliance with the provisions of the HKC, it is essential to note the differences between the policies of these countries.

India's governmental policy for safe ship recycling

From 2009 to 2013, the shipbreaking industry in India was under the Ministry of Steel. Prime Minister Narendra Modi's government, which wanted to increase the number of shipbreaking orders at Indian shipyards, implemented and ratified the HKC. In 2014, the government's first decision was to transfer the shipbreaking industry to the Ministry of Shipping. The position of Shipping Minister was taken by Nitin Gadkari, who was responsible for drafting the Ship Recycling Act in 2015. IndustriALL Global Union conducted a campaign for the

ratification of the HKC, during which the Government of India reported on the ongoing work on the Ship Recycling Act, which would lead to ratification of the Convention. At the same time, IndustriALL Global Union and ASSRGWA organized training sessions on occupational health and safety for workers at the Alang Ship Breaking Yard. It is worth noting that prior to the adoption of the HKC (in 2003 and 2006), shipyard owners (70% private) in Mumbai and Alang refused to allow shipyard workers (often uneducated, uninsured, illegally employed) to meet with IndustriALL Global Union representatives to receive training on workers' rights and employers' obligations. The employers' opposition to worker training was related to the concealment of a fact concerning the high number of fatalities during shipbreaking (*Special Report*, 2022). Beginning in 2017, Prime Minister Modi's government, under pressure from IndustriALL Global Union and ASSRGWA, decided that no person could be employed at a recycling yard without receiving safety training. Shipyard owners have been required to guarantee workers protective equipment.

In December 2019, the Indian Parliament passed the Ship Recycling Act, which the President signed. The adopted law introduced the provisions of the HKC. The government then ratified the convention. It is noteworthy that in the Indian legal system, international conventions were only recognized when they were included in national law through the adoption or amendment of a law by the parliament.

Both the 2009 convention and the 2019 law regulated the procedure related to ship recycling in the context of the shipyard owner's obligations (among others, to prepare a ship recycling plan and ensure the safe disposal of hazardous waste) and a ship (among others, to obtain a hazardous materials inventory certificate), and to conduct training among employees. Failure to comply with the shipyard or ship owner's obligations under the 2019 law could result in fines and even imprisonment.

Ship recycling was supposed to comply with sustainable economic development principles and help minimize water and energy resource consumption. The 2019 law introduced principles for recovering and reusing materials (such as steel, copper, and aluminum) in an environmentally and human-safe manner. These measures were in line with the concept of a closed-loop economy.

According to Indian Shipping Minister – Mansukh Lal Mandaviya, the 2019 law aimed at increasing India's share of global ship recycling to 60% by 2024 (India passes..., 2020). At the same time, the government anticipated an increase in employment to 90,000 workers in the ship recycling sector.

Analyzing the research material, it should be noted that the Maersk shipping company supported the Modi government's decisions on environmentally and human-friendly ship recycling. Between 2016 and 2022, the company implemented its program to raise ship recycling standards at seven shipyards in Alang. Maersk's program coincided with the HKC's goals. During its implementation, Maersk handed over 16 ships for recycling to the shipyards in Alang, overseeing the ship dismantling process, especially hazardous waste management and worker safety. On Maersk's orders, several external audits were conducted

to ensure that the shipyards met requirements under the ongoing program to raise ship recycling standards. Maersk implemented a mobile health unit program under which 5,000 employees were trained. The measures taken by Maersk have contributed to a positive effect across the country. Over 90 shipyards, 120 operating in India, have been certified as HKC compliant (*In Alang ...*, 2019).

Bangladesh government decisions to improve ship recycling safety

From 2009 to 2022, ship scrapping in Bangladesh, like in India, supported the steel industry and generated significant employment. Ship scrapping and recycling came under the Ministry of Industry. In 2012, the government of Prime Minister Sheikh Hasina Wajed passed a regulation on rules for ship scrapping and recycling. The regulation aimed to raise safety, health, and environmental standards. It required shipyards to establish an asbestos removal center, conduct training, designate restrooms, and guarantee protective clothing for workers. Government regulation did little to affect shipyards' decisions to improve worker health, safety, and the environment. Making changes to the ship recycling process required financial support. Government subsidies could not cover all the planned investment costs of human and environmentally safe recycling at the time of the 2012 government regulation. The Ministry of Industry drafted the Ship Recycling Law, passed by Parliament in 2018. It was implementing the law to ensure safe ship recycling by 2023 by adopting the provisions of the HKC.

The 2018 law, compared to the 2012 government regulation, imposed a more comprehensive range of obligations on shipyard owners. Scrap yard owners were required to adopt safe and environmentally friendly methods for dismantling ships in a designated zone for the ship recycling industry in Chittagong Port, insure workers, and import certified ships. Violations of the existing law carried severe fines and even imprisonment for up to two years. Changes in the legislation meant that recycled ships had to have a hazardous materials list. Scrap yards were required to submit a ship recycling plan and an inventory of materials and equipment to the Ministry of Industry (*The Government...*, 2020).

The government established the Waste Treatment, Storage, and Disposal Facility to manage the waste generated from ship recycling under the 2018 law and the HKC. Bringing the ship recycling process in Bangladesh in line with the requirements of international law and, thus, transforming ordinary scrap yards into green yards requires labor and financial resources. The financial and organizational burden has discouraged shipyard owners from changing the ship dismantling process and expanding shipyard infrastructure. Norway provided financial support for scrap yards in Bangladesh, which, having a developed shipbuilding and shipping industry, was interested in recycling its old ships at shipyards in Chattogram. On July 24, 2020, the Norwegian government signed an agreement with the IMO to implement the SENSREC (Safe and Environmentally Sound Ship Recycling in Bangladesh) program. This was the third edition of the IMO-supervised SENSREC

program dedicated to hazardous waste disposal in Bangladesh. Norway donated around \$1.5 million to support improved ship recycling. According to Norway's Ambassador to Bangladesh – Sidsel Bleken, under the SENSREC program, Norway's financial assistance to ship recycling yards was expected to boost Bangladesh's national capacity for safe and environmentally sound ship recycling. The biggest problem for recycling yards in Bangladesh was the failure to guarantee safe working conditions, reducing deaths and injuries among shipyard workers (Mandra, 2020). Only the PHP Family shipyard was certified as a green facility under the HKC.

Pakistan government's efforts for safe and environmentally sound ship recycling

In Pakistan, as in India and Bangladesh, beaching is still the method of scrapping ships. The shipbreaking industry is located in the port of Gaddani. The most famous and one of the largest shipbreaking yards in the world is the Gaddani Ship Breaking Yard. As of 2021, about 40 smaller shipbreaking yards were operating in addition to it. Most of the demolition yards were owned by private entities.

Between 2009 and 2022, old ships containing toxic substances (mercury) were sent to Gaddani Ship Breaking Yard. The shipyard's workers were unskilled people from poor regions of Pakistan. Therefore, in 2009, the shipbreaking union at the Gadani Ship Breaking Yard campaigned for a 40% wage increase, better working conditions, and increased access to medical facilities. In 2013, a workshop for shipyard workers on safe and environmentally friendly ship recycling was organized at the initiative of the IMO and Pakistan's Ministry of Maritime Affairs. Despite the workers' greater awareness of their rights, the shipyard owner did not respect them. It is worth noting that ship recycling at the Gadani shipyard is done through subcontractors hired by the shipyard owner. According to the labor union, the owner of the Gadani shipyard did not take adequate measures to minimize fatal accidents and did not provide personal protective equipment. Another problem with the Gadani shipyard's operations was the lack of capacity to treat hazardous waste.

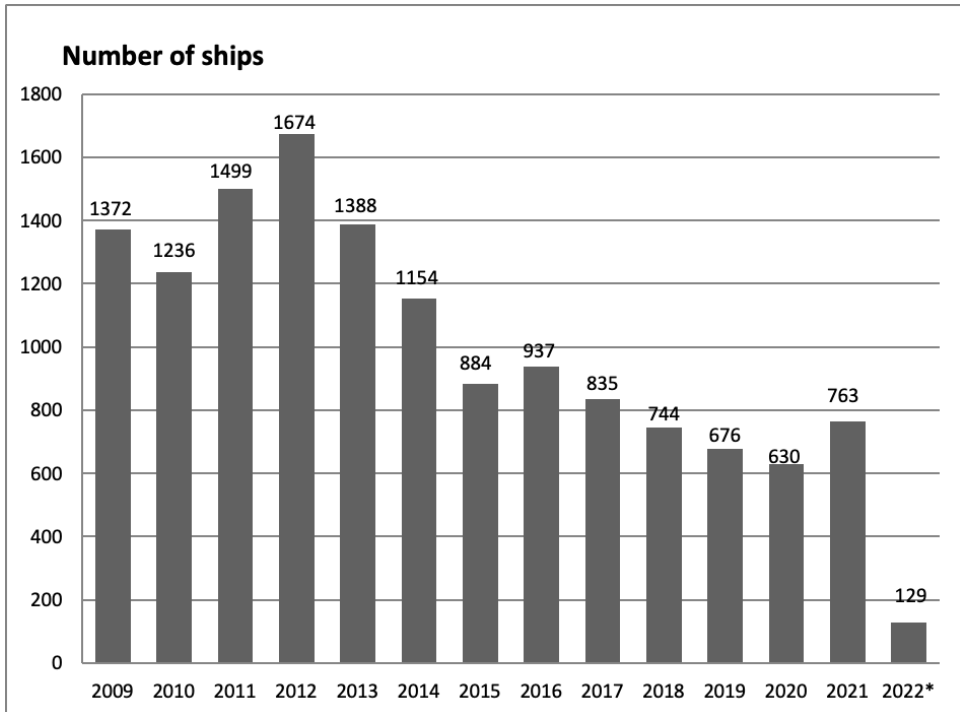
The Pakistan National Trade Union Federation, affiliated with IndustriAll, expressed strong concerns about systemic violations of fundamental labor rights and occupational health and safety. Pakistan lacked clear laws governing the safe dismantling of ships for humans and the environment. In turn, the 2008 Occupational Safety and Health Act was not being complied with by the owner of the Gadani shipyard. This was evidenced by the fact that most workers were temporarily contracted and not granted social benefits (Shipbreaking, 2016). To meet international standards, Pakistan, wanting to comply with HKC requirements, will have to modernize the Gadani shipyard and smaller shipyards. A big challenge will be creating a hazardous waste treatment zone. In October 2022, during the Tradewinds Ship Recycling Forum, Vice Chairman of the Pakistan Shipbreakers Association – Asif Khan, announced that the Pakistani government, together with the association, had

decided to ratify the Hong Kong Convention and was working on a draft law to implement the convention’s provisions.

Share of India, Bangladesh, and Pakistan in global shipbreaking

There was an apparent decline in ship scrapping between 2009 and 2022 (Chart 1). The impact of the decline in ship scrapping was related to the consequences of the 2007–2009 global economic crisis, the decline in freight and charter rates for bulk carriers and container ships, and the crisis in the cruise and offshore ship and tanker industries during the COVID-19 pandemic. In 2021, ships worth more than \$1 billion were transferred to shipyards. Between 2017 and 2021, the average age of retired ships increased in 2017–27.5 years; 2018–28.7 years; 2019–29.1 years; 2020–29.9 years; 2021–30.2 years.

Figure 1. Number of ships scrapped in the world from 2009 to 2022

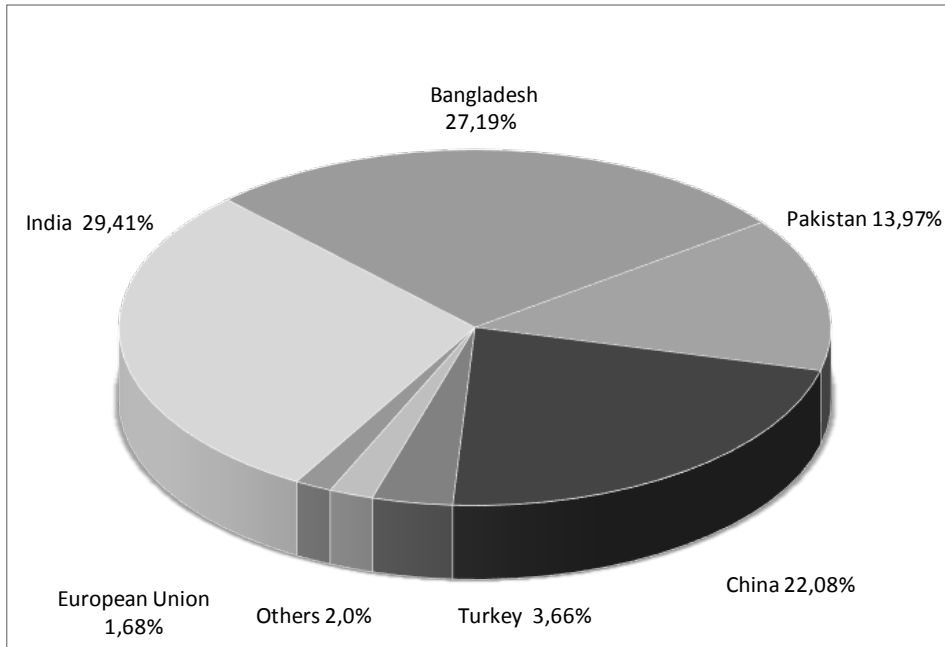


Source: own study: *The Toxic*, 2021; Buchholz, 2019; *Shipbreaking*, 2017; *Special Report*, 2022 (*Refers to the first quarter of 2022).

From 2009 to 2015, the percentage share of India, Bangladesh, and Pakistan in ship recycling worldwide was – 70.57%, as shown in Chart 2. Considering 2016–2022, India reached a dominant position in the global ship recycling market ahead of Bangladesh and

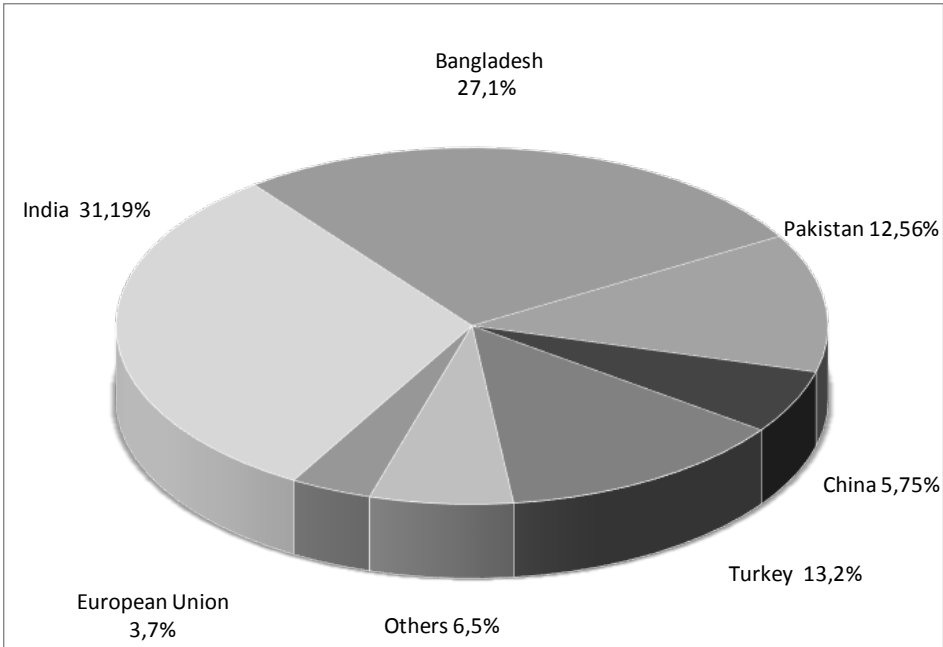
Pakistan (Chart 3). The exception was 2019 (India scrapped – 200 ships; Bangladesh – 236, and Pakistan – 35) and 2021 (India scrapped – 210 ships; Bangladesh – 254, and Pakistan – 119). This slight fluctuation in favor of Bangladesh shipyards' performance was due to their lower ship recycling costs compared to quotes of shipyards from India. The increase in ship recycling costs in India was due to the implementation of the HKC. Comparing 2009–2015 with 2016–2022, it is essential to note that the apparent decline in China's share of global ship recycling was affected by the ban on importing old ships into the Chinese market. At the same time, there was an increase in Turkey's share of global ship recycling in 2016–2022 compared to earlier years (2009–2015) due to the inclusion of Turkish shipyards in the European list of ship recycling facilities. In addition, most cruise ship owners in Turkey have decided to recycle ecologically. At the same time, the share of EU countries in the global ship recycling market was insignificant compared to South Asian countries.

Figure 2. Percentage share of each country in ship recycling in the world from 2009 to 2015



Source: own study: The Toxic, 2021; Shipbreaking 2017; Special Report, 2022.

Figure 3. Percentage share of individual countries in ship recycling worldwide in 2016–2022



Source: own study: *The Toxic*, 2021; *Shipbreaking*, 2017; *Special Report*, 2022.

In 2018–2021, there were 120 recycling yards in Alang (India), employing about 60,000 people (Special Report, 2022). In 2021, according to the World Steel Association, India was the world’s second-largest steel producer (9.8 million tons) after China, ahead of Japan (8.2 million tons) and the United States (7.5 million tons). At the same time, China produced 71.6 million tons of steel.

About 60 shipyards employing 40,000 people were operating in Chattogram (Bangladesh) between 2018 and 2022. For Bangladesh, ship recycling is an essential source of raw materials because it has no sources of iron, steel, or ore of its own. The ship recycling industry provides more than 60% of the raw materials for the steel industry in Bangladesh.

As of 2021, Gadani (Pakistan) shipyards employed nearly 20,000 people in about 40 scrap yards. Ship recycling in Bangladesh met 70% of the demand for steel and iron, supporting the steel industry. Many accidents, including fatalities, were damaged at scrap yards in South Asia. According to the Shipbreaking Platform non-governmental organization and the International Law and Policy Institute, between 2009 and 2022, the number of deaths among shipyard workers in India, Bangladesh, and Pakistan was 430 (Shipbreaking, 2016). During the same period, the number of injured in these companies amounted to 7,600 workers. Most of the deaths were caused by being struck by falling pieces of iron, burns, drowning, suffocation, and electrocution.

Conclusions

Between 2009 and 2022, the scrapping of ships from India, Bangladesh, and Pakistan using a primitive method called beach recycling posed a high risk to the health and safety of shipyard workers and the environment.

In the second half of the first decade of the 21st century, the International Maritime Organization, the International Labor Organization, and the European Union issued documents outlining guidelines for the safety of recycling yard workers and for preventing environmental damage. The position of the IMO, the ILO, and the activities of the Shipbreaking Platform non-governmental organization and IndustriALL Global Union – an international trade union organization, on friendly and safe ship recycling for workers and the environment forced the governments of India, Bangladesh, and Pakistan to implement changes in the operations of shipbreaking yards. Campaigns for safe ship recycling organized by shipyard labor unions and local NGOs have significantly impacted government policies. Defenders of safe and environmentally sound shipbreaking urged the Indian government to ratify the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships and to enforce it.

The Bangladesh government has passed relevant legislation to enable ratification of the HKC shortly. On the other hand, the Pakistani authorities have stated that they will decide to adopt a law to implement the HKC and then ratify it. Analysis of the collected research material allows us to conclude that the governments of India, Bangladesh, and Pakistan have shown varying degrees of understanding of introducing legal regulations for safe ship recycling. Thanks to the financial and organizational assistance provided to shipbreaking yards in India and Bangladesh by the post-industrial countries, there have been significant improvements in working conditions and environmental protection. To develop global, safe, and environmentally sound ship recycling, ship owners must return their ships to shipyards that meet international ship dismantling standards.

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