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THE INTERNATIONAL REGULATORY FRAMEWORK OF SHIP-BREAKING, RECYCLING INDUSTRY AND DOMESTIC CHALLENGES OF PAKISTAN

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ABSTRACT

The process of demolishing end-of-life ships is known as ship breaking and further process is taking place as recycling for either a source of parts for re-use or for the extraction of raw materials, mainly scrap. This lowers the demand for mined iron ore and reduces energy use in the steelmaking process. The ship breaking industry was on peak and No.1 sector around the world but it become down and down due to high tax rates, no proper safety measures, unavailability of proper education and training of the engaged workforce. It is estimated that around 600 to 700 ships are recycled in south Asia with the engagement of low paid labor. According to latest data released by the NGO Ship breaking Platform, 7376 ships are dismantled in 2019 from which 6944 (91%) are dismantled in South Asia. The ship breaking industry of Pakistan hosted retired ships before the independence of country and was most efficient till 70s to 80s and the Gadani port was then considered the largest ship-breaking industry in the world which employed more than 30,000 workers⁴ but since 2012 to 2019 total 783 (11.3%) ships are dismantled on the costal yards of Pakistan. The research paper analysis the International Regulatory Framework of Ship-Breaking, Recycling Industry and Domestic Challenges of Pakistan through a comprehensive legally binding regime for regulating risks associated with ship-breaking activities in 2006 by the International Maritime Organization (IMO). Afterward, the Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships was adopted in May 2009. Formerly, the Basel Convention on the Control of Transboundary Movement of Hazardous Waste and their Disposal, 1989 (the Basel Convention) was only applicable international convention.

Keywords: Shipbreaking, Ship Recycling, Beaching, Hong Kong Convention, Pakistan Ship Industry.

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⁴Ship Breaking Is an Important Source of Steel | The Financial Daily.” n.d. Accessed November 21, 2019.

<https://thefinancialdaily.com/ship-breaking-important-source-steel/>

INTRODUCTION

The method of dismantling obsolete vessel is characterized as ship breaking, demolition, dismantling and scrapping, and presently introduced underneath the much tag of ship recycling(A. Goleman; Daniel; Boyatzis 2019). In the past, ship-breaking was very frequent commercial and profitable business in many developed countries and was a highly organized activity carried out at yards. Due to the increasing environmental health and safety standards concern in developed countries, this industry is shifted to developing states like in Asia, particularly Pakistan, India, Bangladesh, Turkey, and China. The ship-breaking zones of such developing countries disassemble and recycle approximately 600-700 heavy ships every year(Engels 2013).Additional major catalytic factors for this industrial shift to developing countries include low-cost and ample labour, negligent environmental laws and increase in steel demand(Endangered and Council 2007).

Ship-breaking involves a chronological chain of activities in the intertidal areas on the beaches and on seashore(Ahmed 2020). Before laid ashore of end-of-life-ship, hazardous chemicals,

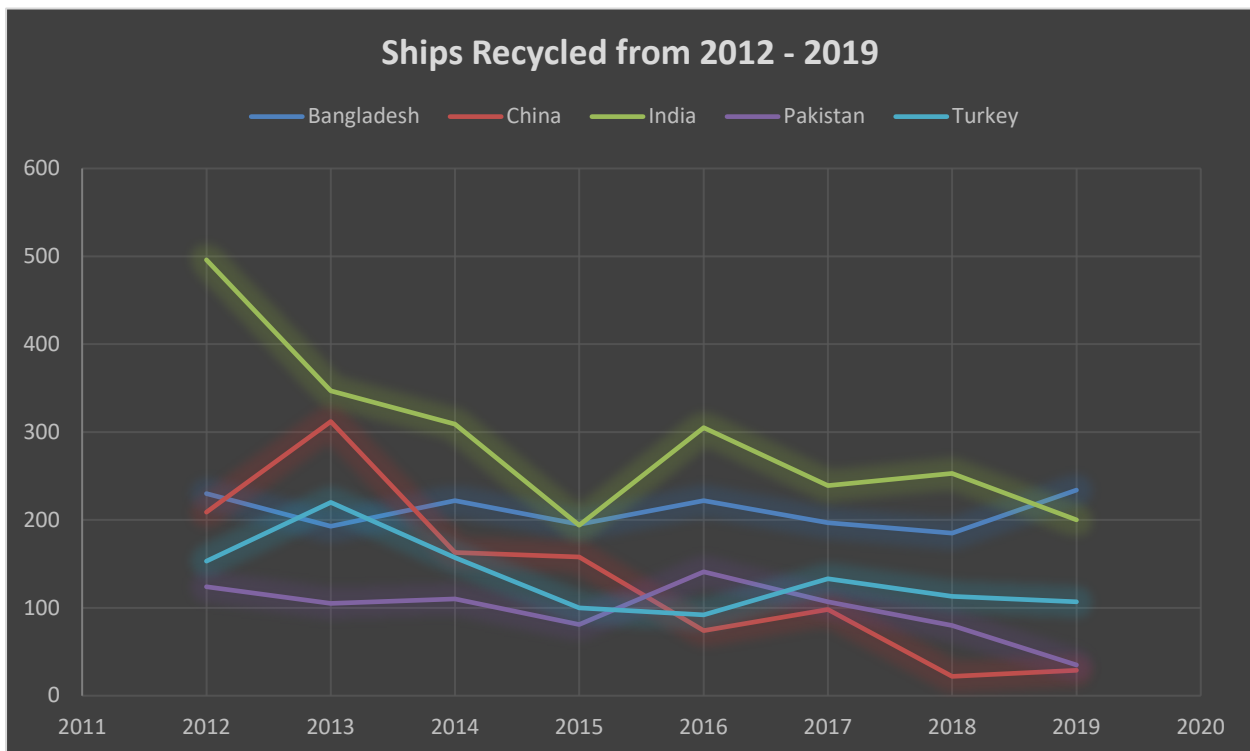


Figure 1: Ships Demolished and Recycled in Asia from 2012-2019

oily substances, and other perilous supplies are wasted into the seawater to make the vessel ready for dismantling. This method rigorously damages the water quality of the shore and inversely impacts the marine ecosystem. The breaking ship is not merely a problem for developing countries but developed countries are also facing difficulty in the waste disposal of their obsolete vessels(Zhang 2020). Due to severe domestic environment and labour laws, it is becoming almost difficult to domestically dispose-off the increasing number of retired ships.

Ship-breaking activities in Pakistan provide opportunities and challenges at same time. This study evaluates the sphere of the existing regulatory framework for shipbreaking industry in Pakistan and its consistency with international regulatory requirements. This study also probe relevant international regulatory instruments that counsel the fundamental criterion for regulating the industry of shipbreaking and assesses the legal regulations of the Pakistani shipbreaking industry which contrary to these international guidelines. Despite of various basic provisions in laws and regulations addressing the ship-breaking activities, there is a dire requisite for sector specific regulations to guarantee decent working environment and safe dismantling operations integration with national legislations and international obligation. The core objective of this assessment is to exhibit that the shipbreaking instruments in Pakistan can integrate the core of the international obligations to abate the environmental destruction caused by shipbreaking industry. This study achieves that the Pakistan should either improve its relevant laws or sanction new legislation under guidance of the *Basel Convention (BC)*. This reform is significant if Pakistan wants to sustain a long-lasting industry capable of serving its need and engage its ample labour manpower at no cost of damaging the coastal are which is one of the most important natural resources.

Table 1: List-of-all-ships-dismantled-all-over-the-world (2012 to 2019)⁵

List-of-all-ships-dismantled-all-over-the-world (2012 to 2019)									
Country	2012	2013	2014	2015	2016	2017	2018	2019	Total
Australia							2		2
Azerbaijan						1	1	1	3
Bangladesh	230	193	222	195	222	197	185	234	1678
Belgium	3	2	6	3	4	3	4	5	30
Brazil							1	1	2
Canada	2		3			4	4		13
China	209	312	163	158	74	98	22	29	1065
Cuba						1	3	1	5
Curacao		1					2		3
Denmark	21	16	19	17	10	14	12	4	113
Dominican Republic	2			2					4
Ecuador	2	1				1	1	1	6
France	1				1		5		7
Greece				1				1	2
Iceland						2		1	3
India	496	347	309	194	305	239	253	200	2343
Indonesia	1		5	5		6	7	4	28
Japan		1	1					1	3
Latvia		1				3		1	5
Lithuania		2	2	2	1		1	2	10
Mexico	2				1			1	4
Namibia		1						1	2
Netherlands			2	2	2	3	1	3	13
Nigeria							3	1	4
Norway			2	2	1		1	6	12
Others	2	1	1		1	1	4	2	12
Pakistan	124	105	110	81	141	107	80	35	783
Panama								2	2
Philippines	1			1	2	1			5
Romania	1		2					1	4
Russia					2	1	6	5	14
South Korea		2	1	2	1	3	1	5	15
Spain	1	1	2	1	1		2	3	11
Sweden		1		1					2
Turkey	153	220	157	100	92	133	113	107	1075
UK			2	1	1	1	5	1	11
Ukraine	2					1			3
Unknown			12			4	11	6	33
USA		4	3	1		11	14	9	42
Vietnam		2	2						4
Grand Total	1253	1213	1026	769	862	835	744	674	7376

Shipbreaking Industry in Pakistan

The shipbreaking industry in Pakistan is situated in Gadani, Balochistan. The 10 kilometers long beach-front hosts around 130 old and retired ships. It produces million tons of scrap material every year which supports the steel industry of Pakistan. The industry on the Gadani coast started in 1947, before the independence of country and was most efficient till 70s to 80s

⁵Source: Annual Lists of Scrapped Ships, available at <https://shipbreakingplatform.org/resources/annual-lists/>

and the Gadani port was then considered the largest ship-breaking industry in the world which employed more than 30,000 workers (“Ship Breaking Is an Important Source of Steel | The Financial Daily” n.d.). The industry was considered remarkably mechanized activities, as compare to other industrialized states mainly in the US, UK, Italy and Germany. In 1992, the ship-breaking industry of Pakistan lost its competitiveness to India and Bangladesh due to comparatively excessive taxes on this sector. But in 2012 brought added extra business to the Gadani port again, which reflects the peak in the total number of ships dismantled in the year of 2012.

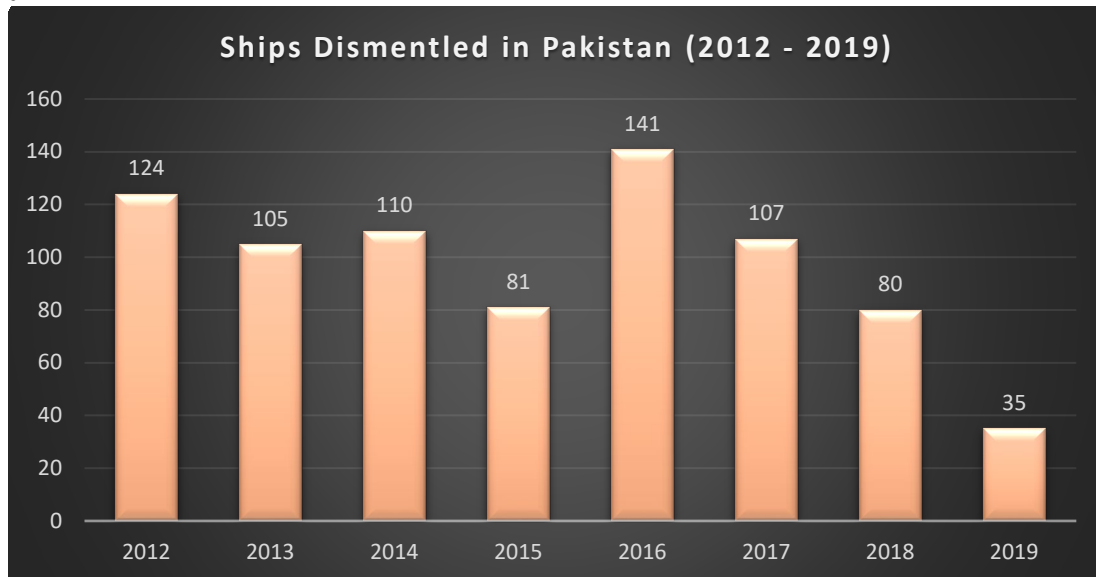


Figure 2: Ships Demolished in Pakistan (2012-2019)

The Government of Pakistan earns heavy revenue from this industry and now the stakeholders encouraging the ship-breaking industries through minimizing the tax rates. The government authorities should enforce strict rules and regulations on the operations of industries, to make the industry sustainable with minimum employee and environmental damage or it pose a serious threat to the existence of industry and the environment as a whole.

Since early 1980s, there followed a general trend of shipping old merchants ships for scraping to the yards of Pakistan, Bangladesh, India, Vietnam, the China and Philippine where health and safety standards are nominal and workforces are despairing for job and the profit rate was pretty high (Industries and Environmental 2011). It is also estimated that 100,000 above workers are working at yards all around the world and the estimated 45,000 ships worldwide, from that around 700 ships are retired every year (Barua, Rahman, and Molla 2017). At the expiration of their traveling life, ships are traded for scrap so that the valuable steel of about 95% of ships' mass can be recycled (IMO MEPC 44th Session 2000). As this activities present both opportunities and challenges for our coastal zone management. To meet the high demand for scrap materials needs to be balanced with the adverse impact on the coastline environment and on workers' health (LEIPOLD 2006) (“SHIP BREAKING INDUSTRY AND ITS IMPACT | Buy Essay Club” n.d.).

Legal and Institutional Framework of Ship-breaking in Pakistan

Although the fact that ship-breaking activities have existed in Pakistan for years, the regulatory institutional laws of this industry are unclear and hardly any explicit regulations or guiding

procedures are found, only basic procedures of custom checks are mandatory. The Balochistan Ship-Breaking Industry Rules 1979 are limited to empower the Balochistan Development Authority (BDA) to lease lands for breaking ships. However, general legal provisions cover the entire ship-breaking industry. In addition, constitutional guarantee is the principal authority to the protection fundamental rights and it is applicable to the shipbreaking industry as well. Furthermore, concerns regarding controlling hazardous wastes, “The Hazardous Substances Rules 2003 under the Pakistan Environmental Protection Act 1997 (PEPA) can also be applied to the industry. With regards to occupational health and safety (OHS), a variety of Pakistani laws are of significance. However, there is no single, comprehensive law covering OHS at the workplace (Ghaffar 2009). The pieces of enactment which deal with aspects of occupational health and safety date back to the British colonial period, like the Workmen Compensation Act of 1923, the Laborers Act of 1934 and the Factories Act of 1934. After independence in 1947, the Rules to operationalize the Workmen Compensation Act was formulated in 1961, the West Pakistan Hazardous Occupations Rules in 1963, the Provincial Employees Social Security (Occupational Diseases) Regulations in 1967, and the Labor Laws (Amendment) Ordinance in 1972⁶. The Ministry of Labor and Manpower has prepared a draft Act for Occupational Safety and Health at Work Place in 2008.” The law covers the entire industrial sector commonly suffers from fragile enforcement and lack of monitoring structure of compliance. Although Pakistan is a member of International Labour Organization, it has not so far signed yet the ILO Convention on the Promotional Framework for occupational safety and health at the workplaces. Furthermore, the fact that most workers are hired without a permanent and direct relationship with an employer undermines their enjoyment of fundamental rights (“Pakistan – Sacked Shipbreaking Workers Reinstated | IndustriALL” n.d.).

Based on the 18th Amendment of the Constitution of Pakistan 1973⁷, such responsibilities for labor and environmental subjects had been transferred to the provincial governments, whereas other powers remain at the federal level. Now, there are shared responsibilities regards to ship-

⁶“The amendment in subject of Freedom of association, collective bargaining and industrial relations; Wages; Occupational safety and health; Employment accident and occupational disease benefit. Amends, inter alia, the Workmen's Compensation Act 1923. 18A and new Schedules I (list of injuries) and IV (compensation payable)), the Factories Act 1934 (LS 1946 - Ind. 1, 1947 - Ind. 3) (inserts a new Ch. III (Health and Safety) and amends ss. 58B, 60, 64 and 74), the Payment of Wages Act 1936 (LS 1936 - Ind. 1) (ends s. 1 and inserts a news. 21A), the West Pakistan Employees' Social Security Ordinance 1965 (No. X of 1965) (amends Ch. VA (Medical treatment of Domestic Servants)), the West Pakistan Industrial and Commercial Employment (Standing Orders) Ordinance 1968 (adds new ss. 7A, 10A (group incentive scheme), the Industrial Relations Ordinance 1969 (LS 1969 - Pak.2) (inter alia, amends ss. 2, 7, 7A, 22, 22A and 23, inserts new ss. 23A (shop stewards as link between labour and management), 23B (workers' Participation in management), 25A (redress of individual grievances) and 34A (raising of industrial dispute by a federation) and replaces ss. 26 (negotiations relating to differences and disputes) and 28 (notice of strike or lockout)) and the Workers' Welfare Fund Ordinance 1971 (No. XXXVI of 1971).”

⁷ “The Eighteenth Amendment of the Constitution of Pakistan was passed by the National Assembly of Pakistan on April 8, 2010, removing the power of the President of Pakistan to dissolve the Parliament unilaterally, turning Pakistan from a semi-presidential to a parliamentary republic. The bill reversed many infringements on the Constitution of Pakistan over several decades by its military rulers. The amendment bill was passed by the Senate of Pakistan on April 15, 2010 and it became an act of parliament when President put his signature on the bill on April 19, 2010. It was the first time in Pakistan's history that a president relinquished a significant part of his powers willingly and transferred them to parliament and the office of the prime minister.

breaking between the Balochistan Environmental Protection Agency (BEPA) and the Balochistan Development Authority (BDA) on the provincial level and on the Federal Level, various Ministries like as the Ministry for Ports and Shipping, the Social Welfare Department and the Ministry of Labour and Manpower(Ullah et al. 2016).

There was only one union of ship-breaking workers called “*Mazdur Union Gadani*” affiliate with IndustriALL⁸ which was formed after the former union-Gadani Ship-Breaking “*Democratic Workers Union*” was cancelled its registration by the government in 2009. Although the union was officially registered by the government authorities, Pakistan Ship Breakers Association (PSBA) does not recognize the union as negotiating partner of collective bargaining agreement (CBA)(PILER 2012). The union had officially 850 members and many more hidden members. The 8,000 around hidden members are the workers who are not able to register as official union member because of a threat of dismissed by the employers if they do so. The hidden members irregularly pay membership dues to the union and often come to the union asking for consultation/assistance/help(Baloch et al. 2013).

There was a significant achievement in May, 2018, when workers had received union registration and are now formally recognized as a collective bargaining agent at so called re-rolling mills near Pakistan's Gadani ship-breaking yard(Rights 2018).But still all re-rolling mill workers are precarious workers with no written contracts, not covered under the social security system, paid less than the statutory minimum wages and they are forced to work long hours with no protective equipment, the precarious workers face serious health and safety issues. In addition, they constantly face the risk of being fired without due process(News n.d.).

Regardless of various basic laws and regulations addressing the ship-breaking industry, sector specific regulation is urgently needed to guarantee decent working conditions with uncontaminated and safe recycling activities in compliance with the national regulation and international obligations. As reference, the two cases where specific regulations are absent. Firstly, the National Environmental Quality Standards (NEQS) do not yet cover facilities for hazardous waste storage, treatment, recycling or disposal(Committee and Lakha 1996).A second example of the asbestos use, the legal framework of Pakistan predates the acknowledgement of diseases related to asbestos(Mishra 2018); the federal bill defining the rules and regulations regarding the management of asbestos is therefore needed.

International legal framework involving to ship-breaking

The shipbreaking industry is a recently developed industrial sector. It is first time in the meeting of Marine environmental protection committee (MEPC) of IMO in its 44thsession, March 2000 that the issue of implementing safety guiding principle in scrapping ship was upraised(Rahman and Mayer 2016). The assembly has adopted resolution A.962 (23) of Guidelines on ship-recycling in 2003(IMO 2003). But later on it was amended by Resolution A.980 (24)(Engels 2013). The said guidelines were addressing to all stakeholders of the industry including the

⁸*IndustriALL Global Union is a global union federation, founded in Copenhagen on 19 June 2012. The IndustriALL represents more than 50 million working people in more than 140 countries, working across the supply chains in mining, energy and manufacturing sectors at the global level. This is the result of a merger between three former global union federations: 1. IMF, International Metalworkers' Federation, 2. ICEM, International Federation of Chemical, Energy, Mine and General Workers' Unions, 3. ITGLWF, International Textile, Garment and Leather Workers' Federation.”*

port, flag and recycling countries, inter-governmental organizations and commercial bodies such as ship builders, ship repairs, ship owners and ship dismantling zones. By developing these guidelines IMO relied on the “Industry Code of Practice” on Ships Recycling(IMO 2004), these guidelines are produced by the Basel Convention(Convention 2007) that focused on the issues related to the ship recycling facilities, and also the guidelines of the International Labor Organization that addressed working conditions at recycling yards(“Convention MLC, 2006 - Maritime Labour Convention, 2006 (MLC, 2006)” n.d.). The Ship Recycling Plan (SRP) for recycling facilities before when the ship enters into the ship recycling yard is to develop with the consultation of ship owners. The methods and procedures of marking and safe removal of the toxic and hazardous substances, health and safety of the workers, viable environmental practices and works that may be done before and on arrival of the ships at the recycling yards be clearly mentioned (Jain and Pruyun 2017). The National Assembly of Pakistan adopted a new legally binding instrument 981 (24)9 and introduced a new procedure on Recycling of Ship, which requires prior availability of the plan for the preparation, operation, construction and design of ships for safe recycling; and the establishment of enforcement body to control and regulate recycling of ships. The Marine Environment Protection Committee(MEPC) in its 55thsession had also developed the draft “Ship Recycling Regulations” for International shipping and recycling activities and also called upon an international conference to discuss the possibilities of adopting the convention on ship recycling(Rahman and Mayer 2016). Consequently Hong Kong Convention for the “Safe and Environmentally Sound Recycling of Ships 2009” comes into existence and plays a prevailing role in regulating and controlling the industries of ship scrapping (Jain and Pruyun 2017).

International Laws under IMO and ILO:

The Universal Declaration of Human Rights (UDHR) adopted in 1948 stipulate in Article 25, the right to have an “adequate standard of living healthy life”. In reference to the Stockholm Declaration of 1972(United Nations 1972)and the Rio Declaration of 1992 (Brisman 2011), the United Nations Human Rights Commission ratified a resolution regarding the adverse effects of handling the toxic and hazardous wastes on the enjoyment of human rights and appointed a special rapporteur for investigation and provide details to the Commission. The Rapporteur identified ship-breaking as a new set of trafficking waste and declared that retired ships are considered as hazardous waste and in 1990s, this issue of human rights in ship-breaking zones then got the attention of the international community and also pushed by the NGOs actions(Heidegger 2015).

The Basel Convention

The United Nations Environmental Program (UNEP) adopted the “*Basel Convention (BC) on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal*” in 1992, following several trafficking scandals of hazardous waste in the late 1980s¹⁰. The Convention incorporates numerous concepts for protecting the environment and human health against the

⁹The Resolution A.981(24) New Legally Binding Instrument on Ship Recycling is available at [http://www.imo.org/en/KnowledgeCentre/IndexofIMOResolutions/Assembly/Documents/A.981\(24\).pdf](http://www.imo.org/en/KnowledgeCentre/IndexofIMOResolutions/Assembly/Documents/A.981(24).pdf)

¹⁰Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal is available at <https://www.basel.int/Portals/4/Basel%20Convention/docs/text/BaselConventionText-e.pdf>

dangers of hazardous waste: The control system for trans-boundary movement of hazardous waste, the minimization of hazardous waste and waste self-sufficiency, the Prior Informed Consent (PIC) procedure, and the environmentally sound management (ESM) of Hazardous wastes which ratified by 180 countries and is therefore global in scope(Alloway, B. J and Ayres 1993). The Basel Convention covers end-of-life Ships when contains hazardous substances; still, both the ESM and PIC are hardly applied for ships scrapping. The Prior Informed Consent procedure is rarely followed due to vague who the exporting country is if there is no flag states and port states have “no obligations” under the Basel Convention. While other side, the importing countries like Bangladesh, Pakistan and India are state parties to the Basel Convention and these all do not comply with their ESM obligations.(Iqbal and Heidegger 2013).

As so far the Basel Convention remains the only international regulation which aims to protect developing countries from the dumping of hazardous wastes exported from industrialized countries and has effectively been used in court cases in South Asia, the NGO Ship-breaking Platform is continuously demanding that the Convention should be enforced for end-of-life ships(“Ship Recycling: The Relevance of the Basel Convention” n.d.).

In 1995, State parties to the Basel Convention adopted an amendment, banning the export of wastes intended for recovery and recycling to developing countries. In order for the Ban Amendment “the Ban” to enter into force yet 15 more countries need to ratify it(Pratt 2009). While at the European level, the Ban Amendment has been incorporated into the European Waste Shipment Regulation (WSR), implication that the European Union Member States are not allowed to export toxic wastes to developing countries.¹¹ However, the definition of “exporting state” both under the BC and under the WSR only comprises the port of dispatch. As most ships are sold for scrapping once they are outside an EU port, the Ban Amendment is rarely enforced for ships(CIEL 2011).

In 2002, the Basel Convention adopted the *Technical Guidelines for the Environmentally Sound*

Management (ESM) of the Full and Partial Dismantling of Ships, a document for countries that already have or are establishing ship dismantling facilities(Kumar 2013). The Guidelines provide information and recommendations on procedures, processes and practices that must be implemented to attain safe and environmentally sound ship dismantling. The Guidelines also provide advice on monitoring and verification on environment performance. Moreover, they outline a phase-out for the beaching methods following a ten-year transitional phase(Qayum and Zhu 2018).

In 2007, the Secretariat of the Basel Convention (SBC) launched the Global Program for Sustainable Ship Recycling in order to encourage collaboration between key stakeholders to facilitate improvements in workers’ health and safety and environmental conditions. The SBC

¹¹UNEP / LITEHAUZ (2013) *Feasibility Study for Ship Dismantling*; and UNEP / Roy Watkinson (2012) *Case Study to Develop Models of Compliant Ship Recycling Facilities*.

has offered a variety of technical capacity building activities upon Basel Parties' request. It has lately published a case study and a feasibility report on alternatives to the beaching method, which offers guidance to Pakistan on how to make shipbreaking yards compliant(UNEP 2010).

Hong Kong Convention

The International Maritime Organization (IMO) decided to develop a new global ship breaking regime in 2005 (Argüello Moncayo 2016). The International Convention for the Safe and Environmentally Sound Recycling of Ships was adopted by a diplomatic conference under the auspices of the IMO in Hong Kong in 2009 (Gunbeyaz, Kurt, and Baumler 2019). Guidelines supporting the Convention have been developed by the IMO. The Hong Kong Convention is not expected to enter into force before many years (NGO_Shipbreaking_Platform 2016). Until now only Norway had acceded to the Hong Kong Convention in 2013 and several other States have signed it. So far, none of the shipbreaking countries in South Asia have signed or acceded to the Convention(Galley 2014).

The NGO Platform calls for the co-existence of the Basel and Hong Kong Conventions and to combine elements from both. The Hong Kong Convention does not give an equivalent level of protection for developing countries alone from toxic waste coming from industrialized countries, lacks important elements such as the waste prevention, polluter pays' principle, and provisions regarding downstream management of waste. The Hong Kong Convention comprises requirements for ships such as having an Inventory of Hazardous Materials (IHM) prior to recycling and for ship recycling facilities, as well as reporting requirements. The Convention requires ship recycling facilities to be authorized by the authorities. The facilities are required to implement a Ship Recycling Plan(SRFP) (Alexopoulos 2014)which covers protection of human health and the environment, workers safety and training, roles and personnel responsibilities, emergency response, and structures for monitoring, reporting and recordkeeping.

Even though the Hong Kong Convention does not rule out the practice of beaching as noncompliant, only few Chinese ship recycling yards have issued a declaration of compliance so far. If Pakistani yards try to comply with the HKC, the yards must be upgraded for all the above-mentioned specifications.

Position in Pakistan

Pollutant and dangerous scrapping has been a key area of concern for Pakistani ship recycling industry as the Gadani yard operate directly on the beach, without any impervious and drained operating areas to protect the sand and sea from pollution. As there is no infrastructure to deal with hazardous waste in Gadani, dangerous and other pollutants such as residue oils, PCBs and asbestos are simply dumped behind the shipbreaking area. At present, the main regulatory requirement is the issuance of "No Objection Certificate" by the Balochistan Environmental Protection Agency (BEPA) to start any beaching and breaking process (Sarraf et al. 2010). The NOC is issued after submission of an impact assessment. Either an initial environmental examination is performed and submitted to the federal agency or, where the project is likely to cause an adverse environmental effect, an environmental impact assessment is carried out and approval is obtained from that agency (Sarraf et al. 2010).

The waste pollution generated from the industries of ship-recycling is only regulated through imposing strict Laws regarding the disposal of hazardous wastes from such industries into the water of coasts. The Pakistani ship-breaking sector is covered by waste trade and international environmental laws. Compelling the international regulatory framework, first and foremost the Basel Convention, Pakistan as a state party to the Convention has to ensure that its ship-breaking zones, exercise the environmentally sound management (ESM) of hazardous and toxic wastes as laid down in the BC and the technical guidelines. The European Union has adopted a Regulation on Ship-Recycling which will allow European Union flagged ships to be dismantled only through compliant facilities. In the case of that, the Pakistani ship-breaking yards need to be upgraded fundamentally to meet such standards to dismantle ships bearing flag of The European Union Member States in the future. Additionally, the Hong Kong Convention proposes the authorization of requirements, facilities for their process as well as a plan for ship recycling for every sort of vessel. With regards this the Pakistan can maintain its competitiveness pursue early compliance with the provisions under the Hong Kong Convention, which need to be combined with the already binding obligations legally under the Basel Convention. In order to comply with its legally binding and future obligations such as the EU ship recycling regulation, the Hong Kong Convention. The Pakistani ship breaking industry needs to adopt more advanced procedures, as practiced by other countries of the world such as Turkey or China, and shift its activities from dismantling ships directly on the beaches to arrangements that allow for the pollutants containment, proper management of hazardous wastes, safe usage of heavy equipment and the prompt access of emergency recovery and response in accident cases. Detailed guidance has been provided amongst others by the above-mentioned ILO and Basel Guidelines as well as by the Secretariat of the Basel Convention by through recent studies on compliant facilities.

The Basel Convention has ratified by the Pakistan; however, a compliance mechanism is yet to be enacted. Furthermore, there is no specific regulation solely for the industry in compliance with the Basel Convention and the imminent Hong Kong Convention. Normally, the enforcement of the law which is already exists such as the Pakistan Penal Code, the Factories Act 1934 and the Pakistan Environmental Protection Act 1997 are weak. Such legal instruments are implemented to a certain extent, for case with regards to compensation claims, wage negotiation or working hours. The *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal* adopted by The United Nations Environmental Program (UNEP) in 1992 following various trafficking scandals of hazardous waste in the late 1980s. The Convention combines several concepts to protect the environment and human health against the risks of hazardous waste: the minimization of waste self-sufficiency and hazardous waste, trans-boundary movement of hazardous waste control system, including the procedure of prior informed consent (PIC), and the environmentally sound management (ESM) of wastes. It has been ratified by 180 countries and is therefore global in scope. The Basel Convention covers end-of-life vessels when these consist of hazardous materials; however, both the prior informed consent and environmentally sound management are seldom implemented for ship dismantling in Pakistan. PIC is rarely followed as it is vague who the exporting state is if there is no flag states and port state have any obligations under the BC.

Since 2008, the implementing Act for the latter has been pending at the Parliament, as Pakistan has neither ratified the Convention on Promotional Framework for Occupational Safety and Health (No. 187)¹² nor the Occupational Safety and Health Convention (No. 155).¹³

Pakistan Legal Regime and Marine Pollution

In Pakistan, an executive action or legislative approval is required to implement the international treaties (Razzaque 2004). Through the discussion, this is unfolded that the international instruments relating to marine pollution are not enough for Pakistan and needed to be signing or ratifying, pertinent municipal law incorporating the provisions of such international instruments are in dire need of amendment by the national legislatures. In Pakistan there is no specific law that would compel marine pollution but there are several related laws having some provisions regarding administer and avoidance of maritime pollution. The environmental protection, safety, rehabilitation and development of the environment for the prevention and it manages all forms of pollution in general are partially covered in Pakistan Environmental Protection Act, 1997 (PEPA). In Section 11 of the PEPA Act prohibits discharge of any waste or sewage or noise or air pollutant beyond the National Environmental Quality Standards. The Federal Government may impose charges for the violation of the provisions. Section 12, requires the Environmental Impact Assessment (EIA) in cases of projects prone to skeptically affect the environment. In Section 13, also puts prohibition of import of harmful waste into Pakistan and on its territorial waters, special economic Zone and significant waters. It is also prohibited in section 14 to produce, gather, dispatch, transport, treat, dispose of, store, handle or trade in any harmful material except in accordance with law or through a license issued by the federal government PEPA 1997.

The Maritime Security Agency Act, 1994 of Pakistan Section 10, specifies that the agency is responsible for the regulation and protection of the maritime benefit of Pakistan and to highlight and implement national jurisdiction and sovereignty in the marine zones. The functions of the Agency contain enforcement of international laws, agreements and conventions on and under the water in the oceanic zones. It is liable to support other departments and agencies of the Government to care for and preserve the quality of maritime life and to avoid and manage maritime disasters including marine pollution in and on the proximity of ports, harbors, coastal areas, estuaries and other areas of maritime zones. The Agency functions contain execution of international laws, conventions and agreements under and on the water in the territorial maritime zones. The department also responsible to support other governmental departments and agencies to preserve the quality of maritime life and to manage maritime disasters including marine pollution at its harbors, ports, coastal areas, estuaries and other specific areas of maritime zones. Under Section 12 of this Act, power of searches, arrest, etc: the officers and members of the staff may conduct examinations, inquiries, inspections, search, investigation, seizures and arrests for prevention, recognition and control of breach of any law for the time being in force within the territorial marine zones and for that intent, the officers and members of the staff may board any vessel excluding ships, vessels or

¹²The Promotional Framework for Occupational Safety and Health Convention, 2006 is an [International Labour Organization](#) convention concluded in 2006, which entered into force in 2009. As of October 2016.

¹³Occupational Safety and Health Convention, 1981 is an [International Labour Organization Convention](#), number 155. It was established in 1981, with the preamble stating: Having decided upon the adoption of certain proposals with regard to safety and health and the working environment.

crafts of Armed Forces of Pakistan.

The chapter 43 of the Pakistan Merchant Shipping Ordinance, 2001 is dealt with the Prevention of Pollution from Ships. Section 554 of this ordinance stipulates that the discharge of garbage and disposal of sewage into the sea water is prohibited from any ship except as specified under the convention. The garbage record book and garbage management plan to be maintained. If garbage or sewage is disposed-off or discharged into the sea, the owner or the master of the ship shall be responsible to a fine extended to 10,000 USD(Pakistan 2001). Similarly, Section 555 and 556 dealing with Prohibition against discharge of oil, noxious liquid pollution from ships explains that no oil or noxious liquid or similar harmful substances is discharged into the sea from any ship. It is also described that ships shall be equipped with preventive installations to ensure the ill residues on board and their discharge. If oil or similar toxic substance is discharged into sea water, the owner or the master of the ship shall be liable for not less than two years imprisonment and fine which shall be 50,000 to 100,000 USD and if the negligence continued than the additional fine 10,000 USD may be charged for every day. 562 and 568 explains in detail about the Inspection and control of ships with respect to prevention of pollution and dumping in sea water. While the Pakistan Ports Act, 1908 covers only the port area and the main purpose of the Act is to make possible shipping not to protect the maritime environment like as in section 21, which prohibits the release of ballast or waste into port that provides both imprisonment and fine for an act of throwing of ballast or waste or any such thing or discharge of any oil or water mixed with oil. The Territorial Waters and Maritime Zones Act, 1976 of Pakistan defines territorial waters section 2, the contiguous zone in section 4, the continental shelf in section 5, the Exclusive Economic Zone in section 6 and provides for the specification of limits of historic waters by the Government in section 7. While section 8 prescribes rules for the delimitation of maritime boundaries between Pakistan and states having coasts opposite or adjacent to Pakistan. Other provisions deal with offences, regulation making powers of the Federal Government to make policy for the maintenance and safety of the maritime environment and avoidance and administer of maritime pollution but no such policy has been made till now. Pakistan has further drafted the Environmental National Action Plan for ground based activities to protect the maritime environment. The National Oil Contingency Plan is based on the Oil Pollution Preparedness, Response and Co-operation (OPRC) 1990. Back in 1994, the Marine Pollution Control Board was established to monitor and protect marine environment. Due to financial constraints Pakistan has not ratified the MARPOL¹⁴ 97 Annex VI as ratification requires investing on port reception facilities and the proper disposal of the oily hazardous waste and ballast into territorial water. As Pakistan is a signatory to MARPOL 73/78 Annex V but due to lack of finance adequate trained manpower to implement that. However provisional measures have been taken which obviously do not fulfill the complete requirements but is a step towards improvement. Based on requirements of MARPOL the concern authorities have formulated a number of checklists for the shipping companies and the Mercantile Marine Department to ensure effective implementation for

¹⁴MARPOL is the main international convention aimed at the prevention of pollution from ships caused by operational or accidental causes. It was adopted at the International Maritime Organization (IMO) in 1973. The Protocol of 1978 was adopted in response to a number of tanker accidents in 1976–1977. The 1978 Protocol was absorbed into the parent Convention and the combined instrument entered into force in 1983. In 1997, a Protocol was adopted to amend the Convention and a new Annex VI was added, which came into force in May 2005.

The MARPOL convention. Sewage treatment plants were installed on board ships flying Pakistan flag (Sayied 2007).

CONCLUSION

This study finds that due to the ship-breaking and recycling industry, large amounts of hazardous waste is disposed-off into the Pakistani coastal water that damages the marine environment and cause of pollution. The level of harm is not addressed in this paper so as to avoid diverting the legal framework of this paper to more of biological one. The disposal of wastes, the pollution from land-based sources and oil pollution from vessels are the main threats to sustaining a healthy environment around the world. The recent developments in industrialization field that the commencement of ship-breaking and recycling industries, these are also one of the major causes for the marine pollution because huge amount of hazardous waste is being disposed-off into the oceanic water which may adversely affect to ecosystem of marine. Regarding the disposal of hazardous and toxic wastes from the ship-breaking and recycling industries into the marine water can be controlled and regulated only by imposing strict laws. The Pakistani ship-breaking industry is covered by waste trade law and international environmental laws, most importantly the Basel Convention. Pakistan has to implement the Environmentally Sound Management (ESM) standard practices of controlling hazardous wastes as laid down in the Basel Convention and the Technical Guidelines as a state party to the Convention. Additionally, according to the Hong Kong Convention the endorsement of facilities, supplies for their operations as-well-as a ship recycling plans for every ship is also become obligatory for Pakistani ship workers. In order to fully maintain its competitiveness seek early compliance and comply with the obligations placed on Pakistan by the international legal framework and given many negative impacts of ship-breaking industry on environment, existing laws related to this industry and environmental laws should be amended accordingly or separate legislation should be adopted to address the labour, environmental and all other aspects of ship-breaking industry. Along with the provisions mentioned above, such proposed legal framework should be clearly defined the roles and responsibilities to the related stakeholders as it would be difficult to operate the ship-breaking and recycling industry without clear legislative framework.

The International Labour Organization (ILO) has also provided suggestions on safe and sound ship-breaking processes comprising the handling of hazardous materials, pre-emptive and protection methods for workers against various hazards along with competency-based training program suggestion. The International Labour Organization also unanimously recommended a set of standards to manage the waste disposal and Ship recycling in 2004 outlined in "*Safety and Health in Shipbreaking: Guidelines for Asian Countries and Turkey*". The Guiding criterion suggests a domestic framework with significant general rights and responsibilities for labors, owners and regulatory bodies in ship dismantling. But since 2008, the implementing Act for the latter is in pending as Pakistan has neither ratified the Promotional Framework for Occupational Safety and Health Convention nor the Convention on Occupational Safety and Health.

The government of Pakistan has to set Rules and regulations for controlling and managing of hazardous wastes, under binding obligation of the Basel Convention and instantly develop a proper authorization and inspection structure to ensure the environmental conservation, proper

management of hazardous materials and reporting procedures. It also depends on the government's capacity like as the Department of Environment and other related stakeholders to incorporate the core principles of the Basel Convention through legislation at the domestic level. It is also fact that the aliened government departments of Pakistan have not taken required steps in this regard; due to organizations associated with ship-breaking industry persistently suffer from a lack of capacity, manpower, resources, equipment and required facilities. Such gaps in the system need to be adequately and quickly addressed. However, the economic attraction of ship-breaking for a least developing country like as Pakistan and the adequate capability to enforce an effective and efficient legal system drive into a regulatory cul-de-sac. The Pakistan's economy continues to benefit economically from this industry as it offers jobs and financial means to the less developed countries while remain highly profitable alike to other countries in South and South East Asia. Thus, it is undesirable for Pakistan to completely give up from this industry. Despite of that, like other countries in the region, Pakistan has dearth of the capacity to implement and enforce minimum environmental, health and safety standards. While mechanisms exist under the Basel Convention to provide capacity building programs and transfer of technology in developing countries has been rendered inadequate by a severe lack of funding.

The Technical Co-operation Trust Fund (TCTF), the funding mechanism of the Basel Convention mainly aimed on capacity building in developing countries, this is voluntary and therefore it financed under the Fund are completely dependent on the discretion of developed countries (Widawsky 2008). Unfortunately, the issues of ozone depletion or climate change impacts are unquestionably global, the harm caused in the waste transfers case is often localized in the developing countries and consequently the incentives for developed countries are lessened to provide financial assistance. In 2006, the TCTF only received only 1,194,273 USD in the voluntary contributions head, while the operations' expenditure exceeded this amount by US\$634,306 (BASEL 2006). In 2008 US\$2,601,141 (BASEL 2008) and in 2009 voluntary contributions increased to US\$4,166,719 (BASEL 2009), while the expenditure necessary to continue its operations exceeded this amount by US\$1,762,357, which mean that this little increase for the activities running under the Trust Fund. This Fund is for providing financial assistance for the preparation of waste management plans, the development of national laws and regulations, capacity building and technology transfer, the documentation to treaty bodies, as well as emergency and clean-up while occurring the violations and disasters. The role of financial assistance such as TCTF is important as per above discussed vulnerabilities but to achieve the goals of the Basel Convention, the Technical Fund for both capacity-building initiatives and the operation of the Regional Training Centers is necessary.

Accepting and endorsing the Corporate Social Responsibilities (CSR), the shipping companies should handover their retired ships only to those yards that comply with the criteria provided in technical guidelines of IMO, ILO and The Basel Conventions. Shipbuilders, together with Ship-owners commit to the improvement of unpolluted and environmentally sustainable ships in order to avoid future disposal challenges. Accountable management of retired ships must incorporate international and national regulations with due consideration of the ecological, economic and social consequences of international trade of hazardous waste.

Delaying to enhance the capacity to meet the requirements with environmentally sound management in the ship-breaking and recycling industry, it became risking to operate the ship-

breaking industry in Pakistan and also will obstacle other countries to export toxic trade obsolete ships to such country that fail to comply with the requirements of Environmentally Sound Management.

REFERENCES AND BIBLIOGRAPHY

- A. Goleman; Daniel; Boyatzis, Richard; Mckee; Annie. 2019. *Shipbreaking to Sustainable Ship Recycling. Journal of Chemical Information and Modeling*. Vol. 53.
<https://doi.org/10.1017/CBO9781107415324.004>.
- Ahmed, Ishtiaque. 2020. "Ungovernable Ships at the End of Their Lives and the Response of the Hong Kong Convention : A Critical Appraisal of the Treaty on Ship-Breaking from the Perspective of South Asian Ship-Break." *Santa Clara Journal of International Law Manuscript* 18 (2): 124–74.
- Alexopoulos, Aristotelis B. 2014. "The Recycling of Ships" 4: 27–37.
- Alloway, B. J and Ayres, D. C. 1993. "Wastes and Their Disposal." *Chemical Principles of Environmental Pollution*, 263–79. https://doi.org/10.1007/978-94-011-2148-4_7.
- Argüello Moncayo, Gabriela. 2016. "International Law on Ship Recycling and Its Interface with EU Law." *Marine Pollution Bulletin* 109 (1): 301–9.
<https://doi.org/10.1016/j.marpolbul.2016.05.065>.
- Baloch, Rafiq, Nasir Mansoor, Deputy General Secretary, Mushtaq Ali Shan, Basheer Mehmoodani, Tahir Khan Sawati, and General Secretary. 2013. "Report : Research Mission on the Situation of Shipbreaking Workers in South Asia," no. November: 4–8.
- Barua, Prabal, Syed Hafizur Rahman, and Morshed Hossan Molla. 2017. "Heavy Metals Effluence in Sediments and Its Impact on Macrobenthos at Shipbreaking Area of Bangladesh Heavy Metals Effluence in Sediments and Its Impact on Macrobenthos at Shipbreaking Area of Bangladesh." *Asian Profile* 45 (2): 167–79.
- BASEL. 2006. "Technical Co-Operation Trust Fund (TCTF) 2006.Pdf."
<http://archive.basel.int/convention/contributions/fsBD2006.pdf>.
- Brisman, Avi. 2011. "Rio Declaration." *Encyclopedia of Global Justice*, 960–61.
https://doi.org/10.1007/978-1-4020-9160-5_648.
- CIEL. 2011. "SHIPBREAKING AND THE BASEL CONVENTION_ ANALYSIS OF THE LEVEL OF CONTROL ESTABLISHED UNDER THE HONG KONG CONVENTION," no. April.
- Committee, Environmental Standards, and Shams Kasim Lakha. 1996. "Revised National Environmental Quality Standards (Neqs)," no. April.
- Convention, Basel. 2007. "The Global Programme for Sustainable Ship Recycling."
"Convention MLC, 2006 - Maritime Labour Convention, 2006 (MLC, 2006)." n.d. Accessed November 21, 2019.
https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C186.
- Endangered, The Canadian, and Species Conservation Council. 2007. "Annual Report Annual Report." *COSEWIC Annual Report*, no. June: 2007–8.
- Engels, Urs Daniel. 2013. *European Ship Recycling Regulation*. https://doi.org/10.1007/978-3-642-35597-4_4.
- Galley, Michael. 2014. *Shipbreaking: Hazards and Liabilities. Shipbreaking: Hazards and Liabilities*. <https://doi.org/10.1007/978-3-319-04699-0>.
- Ghaffar, Sajeela. 2009. "Ohs Practices in Food Industry : A Case Study From Pakistan."
- Gunbeyaz, Sefer A., Rafet E. Kurt, and Raphael Baumler. 2019. "A Study on Evaluating the

- Status of Current Occupational Training in the Ship Recycling Industry in Bangladesh.” *WMU Journal of Maritime Affairs* 18 (1): 41–59. <https://doi.org/10.1007/s13437-019-00164-0>.
- Heidegger, Patrizia. 2015. “IBA - Turning the Toxic Tide - Environment, Health and Safety Law Committee Newsletter Article, 2015, September.” 2015. <https://www.ibanet.org/Article/Detail.aspx?ArticleUid=16F44397-B9D9-47C1-A118-426DA77D9001>.
- IMO. 2003. “Resolution A.962(23) - IMO GUIDELINES ON SHIP RECYCLING” Resolution (December).
- IMO MEPC 44th Session, Greenpeace Report. 2000. “Shipbreaking: A Global Environmental, Health and Labour Challenges,” no. March: p5, p6.
- Industries, Ship Recycling, and I T S Environmental. 2011. “SHIP RECYCLING INDUSTRIES AND ITS ENVIRONMENTAL IMPACTS: A COMPARITIVE STUDY.”
- Iqbal, Kanwar Muhammad Javed, and Patrizia Heidegger. 2013. “Pakistan Shipbreaking Outlook: The Way Forward for a Green Ship Recycling Industry – Environmental, Health and Safety Conditions.” *Sustainable Development Policy Institute and NGO Shipbreaking Platform Joint Position Paper*, no. October. http://www.shipbreakingplatform.org/shipbrea_wp2011/wp-content/uploads/2013/10/SDPINSP-Pakistan-Position-Paper-For-Printing.pdf.
- Jain, Kanu P., and Jeroen Pruyn. 2017. *An Overview of the Global Ship Recycling Industry. Reference Module in Materials Science and Materials Engineering*. Elsevier Ltd. <https://doi.org/10.1016/b978-0-12-803581-8.10396-0>.
- Kumar, Ramapati. 2013. “SHIP DISMANTLING A Status Report on South Asia.” *EU-India Action Plan Support Facility - Environment*.
- LEIPOLD, ANDREW D. 2006. “RECIDIVISM, INCAPACITATION, AND CRIMINAL SENTENCING POLICY.” *UNIVERSITY OF ST. THOMAS LAW JOURNAL* 3 (3): 536–58. <https://doi.org/10.1525/sp.2007.54.1.23>.
- Mishra, Shreya. 2018. “Non-Entry into Force of the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009: An Analysis from the Perspective of India, Pakistan and Bangladesh.” *Journal of International Maritime Safety, Environmental Affairs, and Shipping* 2 (1): 22–30. <https://doi.org/10.1080/25725084.2018.1490240>.
- News. n.d. “Pakistan: Shipbreaking Workers Win Union Rights | IndustriALL.” IndustriALL. Accessed November 21, 2019. <http://www.industriall-union.org/pakistan-shipbreaking-downstream-industry-workers-win-union-rights>.
- NGO_Shipbreaking_Platform. 2016. “Substandard Shipbreaking : A Global Challenge,” no. February.
- Pakistan. 2001. “Pakistan Merchant Shipping Ordinance.” <http://www.ahmedandqazi.com/actsandregulations/shippingLaws/merchantShippingOrdinance2001.pdf>.
- “Pakistan – Sacked Shipbreaking Workers Reinstated | IndustriALL.” n.d. Accessed December 4, 2019. <http://www.industriall-union.org/pakistan-sacked-shipbreaking-workers-reinstated>.
- PEPA. 1997. “Pakistan Environmental Protection Act (PEPA) - 1997.” *Ministry of Environment*, no. 3: 01–25. <http://www.environment.gov.pk/act-rules/envprotact1997.pdf>.
- PILER. 2012. *Labour Rights in Pakistan Expanding Informality and Diminishing Wages*. <http://piler.org.pk/pdf/Labour Rights in Pakistan Expanding Informality and Diminishing Wages.pdf>.
- Pratt, Laura A. 2009. “Decreasing Dirty Dumping? A Reevaluation of Toxic Waste Colonialism

- and the Global Management of Transboundary Hazardous Waste.” *William and Mary Environmental Law & Policy Review* 35 (2): 581–623.
<https://doi.org/10.2298/JMMB121013038C>.
- Qayum, Sara, and Weidong Zhu. 2018. “Ship Breaking Industry of Pakistan and Its Environmental Effect on Marine Life and Humans.” *Indian Journal of Geo-Marine Sciences* 47 (7): 1335–44.
- Rahman, S. M. Mizanur, and Audrey L. Mayer. 2016. “Policy Compliance Recommendations for International Shipbreaking Treaties for Bangladesh.” *Marine Policy* 73: 122–29.
<https://doi.org/10.1016/j.marpol.2016.07.012>.
- Razzaque, Jonna. 2004. “Public Interest Environmental Litigation in India, Pakistan and Bangladesh.” In , 25:1–2.
<http://sage.cnperreading.com/paragraph/download/10.1177/026272800502500110>.
- Rights. 2018. “Occupational Safety and Health Rights.” *BANGLADESH OCCUPATIONAL SAFETY, HEALTH AND ENVIRONMENT (OSHE) FOUNDATION*, 2018.
- Sarraf, Maria, Frank Stuer-Lauridsen, Milen Dyoulgerov, Robin Bloch, Susan Wingfield, and Roy Watkinson. 2010. “The Ship Breaking and Recycling Industry in Bangladesh and Pakistan.” *Report No 58275-SAS*, no. December: 106.
<https://doi.org/https://doi.org/10.11588/xarep.00003749>.
- Sayied, Naved. 2007. “Environmental Issues in Coastal Waters - Pakistan as a Case Study,” 1–97. “SHIP BREAKING INDUSTRY AND ITS IMPACT | Buy Essay Club.” n.d. Accessed November 21, 2019. <https://buyessayclub.org/2017/09/28/ship-breaking-industry-and-its-impact/>.
- “Ship Breaking Is an Important Source of Steel | The Financial Daily.” n.d. Accessed November 21, 2019. <https://thefinancialdaily.com/ship-breaking-important-source-steel/>.
- “Ship Recycling: The Relevance of the Basel Convention.” n.d. Accessed November 22, 2019. <https://www.maritime-executive.com/editorials/ship-recycling-the-relevance-of-the-basel-convention>.
- Ullah, Zafar, Wen Wu, Peifang Guo, and Xie Xiaoru. 2016. “Coastal Zone Issues and Counter Measures through an Integrated Approach for Pakistan” V (January 2016): 69–79.
- UNEP. 2010. “Environmentally Sound Dismantling of Ships,” no. September.
- United Nations. 1972. “Declaration of the United Nations Conference on the Human Environment The United Nations Conference on the Human Environment , Having Met at Stockholm from 5 to 16 June 1972 , Having Considered the Need for a Common Outlook and for Common Principles to In.” *United Nations Environment Programme*, no. June: 1–4.
- Widawsky, Lisa. 2008. “In My Backyard: How Enabling Hazardous Waste Trade to Developing Nations Can Improve the Basel Convention’s Ability to Achieve Environmental Justice.” *Environmental Law* 38 (2): 577. <https://law.lclark.edu/live/files/17301-38-2widawsky>.
- Zhang, By Karen S. 2020. “Turning Trash Into Treasure — A Comparative Study of E-Waste Recycling in China and the U . S . Through Systems Thinking.”