Unravelling Socio-Economic and Ecological Distribution Conflicts in Ship-breaking in Bangladesh for Addressing Negative Externalities in Law and Policy Making

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ABSTRACT

Ship-breaking is widely known as a colossally dangerous and polluting activity. Bangladesh has emerged as the market leader in ship-breaking, producing the highest amount of steel from recycling End of Life ships owned by global owners. Economic contribution of ship-breaking in Bangladesh has been well documented from the report published under the auspicious of the Government and the International Governmental Agencies, but significant controversy exists to prove those data. In absence of detailed scientific investigation, uncertainty remains about the extent this industry is adversely impacting the coastal environments of Bangladesh. Notably, there is a huge polarization of data, and claim exists in the current body of literature in all these areas which oftentimes appear diametrically opposite. No substantial work about the social and human cost involved in ship-breaking in Bangladesh has, to date, been carried out from the level of government or from the level of any international organizations. Crafting policy and law by the government based on refutable or untested data seems

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unsustainable. This article takes the view that any programs of law or policy making should stand up to rigorous testing before substantial public money is spent on them. Importantly, scientific knowledge which is unbiased and representative of the viewpoints of multiple stakeholders creates more impact than the one put forward owing solely to their credibility or salience. The article postulates that little attention has been given to provide scientific underpinning of knowledge by engaging important stakeholders in the making of policy and law on ship-breaking arena of Bangladesh. The issues of negative externalities remained unexplored. Against a backdrop of such political fervency, the contribution of the domestic laws of ship recycling in Bangladesh to ensure safe and environmentally sound recycling of ships would not only remain insignificant but also questionable.

INTRODUCTION

Ship-breaking is a process of dismantling end of life vessels when their useful lives are over. After about 25 to 30 years of continuous operations at sea, a ship's maintenance cost increases considerably.[1] It becomes unseaworthy, dangerous for navigation—for both cargo and passenger at sea. The ship's insurance cost skyrockets and operating cost outweighs its income. The ship therefore becomes obsolete, is withdrawn from sea, and is sent to the dismantling yard for dismantling and for recovery of its resources for further use or resell.[2] This process is also called ship recycling or ship scrapping.[3] Getting a good grasp of the law of ship-breaking is inconceivable, without knowing clearly the perils involved in it and its environmental, social, and economic impact on the country who endues it. This article focuses on the beaching method of recycling of ships and the danger, from an environmental and social cost perspective, that is associated with it. The article also explores merits of ship-breaking to the Bangladesh economy. Notably, Bangladesh

1. *Life Cycle of a Ship*, SHIPPIPEDIA (2013), http://www.shippipedia.com/life-cycle-of-a-ship/.

2. Nick Logan & Ross Lord, *Ship-breaking: Newfoundland's Legacy With One Of the Most Hazardous Jobs*, (Sept. 12, 2013), https://globalnews.ca/news/837009/ship-breaking-newfoundlands-legacy-with-one-of-the-most-hazardous-jobs/.

3. *Id.*; *see also* Andreas Bargfried, *The Economics of Ship-breaking & Scrapping*, MARINELINK (Aug. 24, 2016), https://www.marinelink.com/news/economics-scrapping414382.

consistently remains the largest ship-breaking nation in the world since 2004, in terms of production of steel from End of Life (EOL) ships in LDT (Liquid Displacement Tonnage) measurement.[4] In 2018, Bangladesh recycled about 47.2% of the entire global merchant fleet tonnages.[5] Over the last three decades, almost 70–80% of world merchant ships have been recycled only in three developing countries of South Asia, namely Bangladesh, India, and Pakistan.[6]

A. BEACHING METHOD

Among all the prevalent methods of recycling of ships, beaching is the most treacherous but the least expensive method of recycling, and it is currently practiced only in Bangladesh, India, and Pakistan.[7] The beaching method is quite straightforward. Ships are run full steam ahead against the shore during high tide until it is finally grounded on the intertidal part of the beach.[8] When the tidal water recedes, the ship finds itself landed on the muddy flat beach.[9] The ship is gradually winched forward up the beach, bit by bit, with the help of semidiurnal tides as the cutting work progresses.[10] Thousands of unskilled, low skilled and semi-skilled workers in the soft, wet and muddy beach, in bare feet, continue to carry on the dismantling operations of the towering dead vessels—bolt by bolt, rivet by rivet—using mostly primitive instruments, such as chisel, hammer, wrenches and claw bars without any

4. *See Press Release—Platform Publishes List of Ships Dismantled Worldwide in 2019*, NGO SHIPBREAKING PLATFORM (Feb. 4, 2020), https://www.shipbreakingplatform.org/press-release-platform-publishes-list-of-ships-dismantled-worldwide-in-2017/.

5. U.N. Conference on Trade and Development, *Review of Maritime Transport 2019*, Sales No. E.19.II.D.20.

6. Maria Sarraf et al., *Ship-breaking and Recycling Industry in Bangladesh and Pakistan*, WORLD BANK (Dec. 2010), https://pdfs.semanticscholar.org/bb1e/462cfbf4021be0cddb264960d56a1962274c.pdf?_ga=2.187919725.494990208.1585538010-1963307885.1585538010.

7. *See generally* P. Manoj, *Supporters of Beaching Method of Ship Scrapping Claim Victory After Greenpeace's Faux Pas*, HINDU BUSINESSLINE (Nov. 19, 2018), https://www.thehindubusinessline.com/economy/logistics/supporters-of-beaching-method-of-ship-scrapping-claim-victory-after-greenpeaces-faux-pas/article25536252.ece.

8. Mathesh B. & Satheesh Babu P.K., *Energy Consumption for Ship Dismantling Through Beaching Method*, 1 IOSR J. MECHANICAL & CIV. ENGINEERING 64, 65 (2016).

9. *Id.*

10. *Id.*

mentionable protective gears and safety equipment.[11] According to media and NGO reports, the most sophisticated tool used in these beaches is the handheld blow torch.[12]

B. THE PERILS INVOLVED IN THE BEACH BREAKING OF SHIPS

Ship-breaking has been acknowledged by the International Labour Organization (ILO) as among the most dangerous occupations in the world.[13] The Global Trade Union '*IndustryALL*' has termed the occupation as "the world's most dangerous job."[14] The mechanical advantage of using heavy equipment leads to the reduction of a substantial number of labor force and the amount of hard work. However, in most of the yards in Chittagong, Bangladesh, the "heavy equipment" used is usually just "one large winch, some blowtorches, and maybe a bulldozer."[15] A winch is positioned at the dry part of the beach, to pull a large chunk of the ship's hull after it is separated from the vessel by using a gas cutter.

In the beaching method, the soft and muddy land does not allow using heavy duty cranes close to the ships being dismantled.[16] The aft portion of the ship, even in low tide, mostly remain under 5 to 10 feet of water. The loading of scrap metal onboard the truck used to be done manually, until very recently.[17] NGOs have reported that, in many cases, bunker fuel

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11. *Ship Recycling Practice and Regulation Today*, LLOYD'S REGISTER (June 2011), https://www.shipbreakingplatform.org/wp-content/uploads/2018/11/Ship-Recycling-Lloyds-Register-report-June-2011.pdf.

12. Thomas Muarvez, *The Ship Breakers*, YOUTUBE (2013), https://www.youtube.com/watch?v=PdYK2vb6McE. With some limited exceptions, this is the prevalent method of ship recycling in all shipbreaking fields in Chittagong, Bangladesh.

13. *Ship-Breaking: A Hazardous Work*, INT'L LABOUR ORG. (last visited Mar. 30, 2020), https://www.ilo.org/safework/info/WCMS_110335/lang--en/index.htm; *see also The Law*, NGOSHIPBREAKINGPLATFORM (last visited June 3, 2020), https://www.shipbreakingplatform.org/issues-of-interest/the-law/

14. *Special Report: Cleaning Up Shipbreaking the World's Most Dangerous Job*, INDUSTRIALL (Dec. 15, 2015), http://www.industriall-union.org/cleaning-up-ship-breaking-the-worlds-most-dangerous-job.

15. *Overview of Ship-breaking in Bangladesh*, SHIP-BREAKING IN BANGLADESH, https://shipbreakingbd.info/overview-of-ship-breaking/ (last visited Mar. 30, 2020).

16. *Ship Recycling: Reducing Human and Environmental Impacts*, at 3 (June 2016), https://ec.europa.eu/environment/integration/research/newsalert/pdf/ship_recycling_reducing_human_and_environmental_impacts_55si_en.pdf.

17. *Id.*

tanks are cut sideways during low tide to allow the rising tide to progressively wash out the oil tanks, eliminating the need for expensive cleaning.[18] Field survey reveals that the strict requirements of the law are not always followed.[19] For example, acquiring membership with an established trade body of Treatment Storage and Disposal Facility (TSDF) is a prerequisite to get authorization of ship recycling facility[20] but none of the yards in Bangladesh has affiliation with any such bodies as there is currently no TSDF exists in Bangladesh.[21] The ship recycling facilities currently relies on their own informal set up of such facilities.[22] Reportedly, burning to death by fire and explosion has remained the most frequent accident in ship-breaking facilities of Chittagong.[23] Usually, upon beaching, the bunker oil remaining on board is pumped out and sold to the local vendors. When the pump loses suction, the remaining oils, among other waste oil, is collected by hand pump and stored in drums. These oil drums are again carried manually from the ship and rolled across the intertidal zone of the beach towards the facility.[24]

As the oil transfer process is carried out manually without

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18. Although this has not been a prevalent practice in all yards. Michael Galley, *Shipbreaking-A Convenient Washing of Hands?* 12 MOUNTBATTEN J. LEGAL STUD. 96, 100 (2010).

19. *Waste management dysfunctional at most shipbreaking yards*, BASEL ACTION NETWORK (Mar. 12, 2019), https://www.ban.org/news/2019/3/12/waste-management-dysfunctional-at-most-shipbreaking-yards (claiming that tests are "barely done to certify hazard-free ships").

20. Bangladesh Ship-breaking and Ship Recycling Rule 2011, rule 15.1(b).

21. Ship Recycling, *Bangladesh passes bill to improve working conditions in* shipbreaking, SAFETY4SEA (Jan. 25, 2018), https://safety4sea.com/bangladesh-passes-bill-to-improve-working-conditions-in-shipbreaking/; *see also* Aiswarya Lakshmi, *Next Step for Ship Recycling in Bangladesh*, MARINELINK (Nov. 10, 2016), https://www.marinelink.com/news/bangladesh-recycling-ship418093.

22. Email correspondence and Telephonic interview with Deputy Director, Md. Fardoush Anwar Department of Environmental Lab in Chittagong, Bangladesh (June 3, 2020) [hereinafter Interview with Anwar] (on file with author).

23. NGO Shipbreaking Platform, *Update on Shipbreaking in South Asia from the NGO Shipbreaking Platform*, 9 S. ASIA Q. UPDATE (Apr. 2016), http://www.shipbreakingplatform.org/shipbrea_wp2011/wpcontent/uploads/2016/04/SOUTH-ASIA-QUARTERLY- UPDATE-9-final.pdf.

24. Daniel Miller, *World's Biggest Ship Graveyard—Where Huge Tankers and Cruise Liners Are Scrapped on the Shorefront and Workers Toil For £2 a Day*, DAILY MAIL (May 14, 2013), https://www.dailymail.co.uk/news/article-2324339/Worlds-biggest-ship-graveyard--huge-tankers-cruise-liners-scrapped-shorefront-workers-toil-2-day.html.

proper supervision or caution, spillage on the beach therefore remains unavoidable. Until a vessel touches the beachhead, it will have its main and auxiliary machinery remaining operational. As a result, significant amounts of oil remain necessarily in the engine room machinery system. In an old ship, various leakages across the engine room piping system are almost an inevitable phenomenon. In the beaching method, it is therefore almost impossible to avoid releasing used and dirty oil into the marine environment.[25] Throughout the breaking operations, workers go through a challenging process. The labyrinthine workplace exposes the workers to a non-ergonomic and toxic environment,[26] including difficulty in accessing the ship with mechanical aids and even when emergency lifesaving equipment are required.

1. ASBESTOS POISONING IN BEACH BREAKING YARDS

Asbestos is a cancer-causing lethal substance, and medical science has revealed that there is no degree of exposure to asbestos that is not considered as dangerous.[27] Almost all ships built before the 1970s used asbestos as heat insulation material in the engine room hot piping system and the vessel's accommodations.[28] Asbestos is present in almost all vessels and cleaning of asbestos is an essential part of ship recycling process.[29] Asbestos, when agitated in the recovery process, creates thin dust and fumes which remain in suspension for a

25. *The Problem*, NGO SHIPBREAKING PLATFORM (last visited Jan. 27, 2020), https://www.shipbreakingplatform.org/our-work/the-problem/.

26. *See* JUDIT KANTHAK & NITYANAND JAYARAMAN, GREENPEACE, SHIPS FOR SCRAP III: SHIPS FOR SCRAP STEEL AND TOXIC WASTES FOR ASIA 11 (2001).

27. *How Much Asbestos Exposure Is Harmful?*, ASBESTOS NETWORK: ASBESTOS EXPOSURE ARCHIVES (Sept. 11, 2017), https://www.asbestosnetwork.com/blog/2017/09/how-much-asbestos-exposure-is-harmful-there-is-no-safe-amount.shtml.

28. *See* Midori N. Courtice et al., *Asbestos-Related Disease in Bangladeshi Ship Breakers: A Pilot Study*, 17 INT'L J. OCCUPATIONAL & ENVTL. HEALTH 144, 144 (2011); Tarek Mahmud, *Asbestos: The Slow Poison Killing Ship-Breaking Workers*, DHAKATRIBUNE (Feb. 2, 2017), http://www.dhakatribune.com/bangladesh/environment/2017/02/02/asbestos-slow-poison-killing-ship-breaking-workers/.

29. Aege Bjørn Andersen, *Worker safety in the ship-breaking industries*, INT'L LABOUR OFF. (Feb. 2001) at 5, https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/publication/wcms_110357.pdf.

long time.[30] Inhalation of dust by the workers in the process virtually remains unavoidable because of lack of basic safety equipment,[31] lack of awareness,[32] and extensive occupational exposure necessarily involved in ship-breaking works. If asbestos is separated from the ship's structure, after watering them down, the impact can be lessened,[33] but complete isolation from the asbestos fumes in the manual cutting process remains a difficult task because in general the workers wear no personal protective equipment (PPE), such as helmets, goggles, gloves, shoes, respiratory devices, etc.[34] It has been reported by Greenpeace that asbestos is carried on the personal clothing of the workers into their housing several miles away from the Ship Recycling Facility and, in many cases, have contaminated the entire residential environment of the workers.[35] In Chittagong, Bangladesh, a study has revealed critical level of asbestos poisoning among the ship-breaking workers, in which 33% of the workers are affected by asbestosis.[36]

In most of the yards, workers are provided with insufficient personal protective gears and equipment, such as boiler suits and safety shoes, while at work.[37] A vast majority of workers use their personal clothing irrespective of the nature and the location of the work or the standard of recycling facilities.[38] Workers with

30. Zunfeng Du et al., *Hazardous materials analysis and disposal procedure during ship dismantling*, 131 RESOURCES, CONSERVATION, AND RECYCLING 158, 162 (2018).

31. *Science for Environment Policy: The Future for Bangladeshi ship recycling: a critical scenario analysis*, EUR. COMMISSION (June 2016), https://ec.europa.eu/environment/integration/research/newsalert/pdf/future_for_bangladeshi_ship_recycling_critical_scenario_analysis_55si8_en.pdf.

32. *Asbestos in the Ship-breaking industry of Bangladesh: Action for Ban*, ASIA MONITOR RESOURCE CENTRE (Mar. 01, 2007), https://amrc.org.hk/content/asbestos-ship-breaking-industry-bangladesh-action-ban [hereinafter *Action for Ban*].

33. Du, *supra* note 30, at 163.

34. Andersen, *supra* note 29.

35. KANTHAK & JAYARAMAN, *supra* note 26, at 11.

36. Mahmud, *supra* note 28.

37. *Four More Shipbreaking Workers Die in Bangladesh*, ENVTL. NEWS SERV. (Apr. 04, 2014), https://ens-newswire.com/2014/04/04/four-more-shipbreaking-workers-die-in-bangladesh/.

38. *See id.*; *cf.* K. Shahriar Iqbal et al., *Identifying and Analysing Underlying Problems of Shipbuilding Industries in Bangladesh*, J. MECHANICAL ENGINEERING, Dec. 2010, at 147, 152 (asserting that most local shipyards are not maintaining the safety standards required by European buyers).

proper safety footwear are hardly observed.[39]

2. CHILD AND ADOLESCENT WORK AT SHIP-BREAKING YARDS IN CHITTAGONG

It has been claimed in NGO reports that up to 25% of ship-breaking workers are below the age of 18.[40] Other sources claim that ship dismantling work is so laborious that child labor is notably absent for practical reasons[41] and because of the complexity of the job, women are underrepresented in such works.[42]

C. OCCUPATIONAL HAZARDS IN SHIP-BREAKING

The ship-breaking workers of Bangladesh are exposed to a shockingly poor employment and workplace condition. The wages of the workers in Bangladesh vary from BDT 200 to 500 per day[43] (approximately USD 3 to 6 per day) depending on the area, nature of the work, and experience. About 75% of the workers are temporary who work on a no work no pay basis.[44] Experiences do not seem to make any material difference in setting better conditions of work or wages which differ vary little between temporary workers.[45] The workload remains excessive, even for the labors involved in the secondary cutting area on the

39. *See also* Iqbal et al., *supra* note 38; *cf.* Kazi A.B.M. Shameem, The Role of Ship-breaking Industry in Bangladesh and Its Future with Special Emphasis on Capacity Building Through Education and Training (2012) (unpublished M.S. in Maritime Affairs dissertation, World Maritime University) (on file with The Maritime Commons: Digital Repository of the World Maritime University) (noting that safety requirements are not often adhered to and that there is a high number of foot injuries among workers).

40. *Childbreaking Yards: Child Labour in the Ship Recycling Industry in Bangladesh*, INT'L FED'N FOR HUM. RTS., at 15, https://www.fidh.org/IMG/pdf/bgukreport.pdf (last visited May 12, 2020).

41. M. Shahadat Hossain et al., *Occupational Health Hazards of Ship Scrapping Workers at Chittagong Coastal Zone, Bangladesh*, 35 CHIANG MAI J. SCI., 370, 370, 374.

42. *Action in shipbuilding and shipbreaking*, INDUSTRIALL (Nov. 07, 2019), http://www.industriall-union.org/action-in-shipbuilding-and-shipbreaking.

43. Hossain et al., *supra* note 41 at 376; *see also Economic Data*, BANGL. BANK (last visited Apr. 3, 2020), https://www.bb.org.bd/econdata/exchangerate.php (showing that, as of March 25, 2020, 1 USD is equivalent to 80 BDT approximately).

44. Hossain et al., *supra* note 41 at 370, 374.

45. *Id*. at 376.

beach. Research has shown that 89% of workers leave the workforce before ten years of their services, mainly because of their health deterioration.[46] Most of the workers are non-unionized temporary workers.[47] Almost 100% of the facilities in Chittagong use contractor's services[48] to recruit workers despite there being no lack of supply of laborers throughout the year.[49] Trade unions and other rule-respecting organizations are not at all welcome.

Accidents are improperly reported as yard owners often give misleading information to hide the case of accidents in their yards.[50] About the number of death at ship-breaking facilities, there are no official statistics maintained.[51] Oftentimes there is no proper record kept of employees supplied by the contractors in these South Asian ship-breaking facilities[52] including record of payment, working hours or their services.[53] Therefore, it requires almost no effort by the yard owners to deny the existence of an employment relationship in case of death or injury of workers.[54]

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46. *Id.* at 375.

47. LEADING ROGUE STATE: THE U.S. AND HUMAN RIGHTS (Judith Blau et al. eds., 2008), at 167.

48. *Cf. Action for Ban*, *supra* note 32.

49. Ruhan Rabbia & Aevelina Rahmanb, *Ship-breaking and Recycling Industry of Bangladesh; Issues and Challenges*, 194 PROCEDIA ENGINEERING 254, 255 (2017) (pointing out that in Bangladesh workers are desperate for work and available for work at a very cheap rate); *see also* SYED AHMED & MD. REZAUL KARIM KHAN, EMPLOYMENT AND UNEMPLOYMENT SITUATION IN BANGLADESH: A DISMAL PICTURE OF DEVELOPMENT 2 (noting that Bangladesh is a labor surplus country); *Worker Rights Violation*, SHIP-BREAKING IN BANGL., https://shipbreakingbd.info/worker-rights-violation/ (last visited June 07, 2020) (claiming that ship-breaking workers are easily replaceable to the yard owners; if one is lost, they know another 10 is waiting to replace him due to the lack of work. The Government collects the taxes and turns a blind eye.)

50. Staff Correspondent, Chittagong, *Shipbreaking Yards: No let-up in deaths*, DAILY STAR (Jan. 30, 2018, 12:50 AM), https://www.thedaily star.net/frontpage/shipbreaking-yards-no-let-deaths-1526998.

51. John Vidal, *'This is the world's cheapest place to scrap ships'*, GUARDIAN (Dec. 02, 2017), https://www.theguardian.com/global-development/2017/dec/02/ chittagong-shipbreaking-yards-legal-fight.

52. Interview with Md. Shahin, Coordinator in Bangl., NGO Ship-breaking Platform, (Aug. 10, 2016) (on file with author) [hereinafter Interview with Shahin].

53. *Investigation Report: Where do the "floating dustbins" end up? Labour Rights in Shipbreaking Yards in South Asia: The cases of Chittagong (Bangladesh) and Alang (India)*, INT'L FED'N FOR HUM. RTS. (2002), at 59, https://www.fidh.org/IMG/pdf/bd1112a.pdf.

54. Interview with Shahin, *supra* note 52.

In most of the cases, workers' families are paid off when the cause of the accident is obvious, such as from an explosion or fire, to minimize the number of incidents reported at the yards.[55] Compensation, which is staggeringly low, is used as a settlement to avoid going to trial. Workers' families, who are too vulnerable both financially and socially, with little or wrong information, and are often illiterate, accept this option as the better of the two evils. Workers accept settlement at roughly $1,200 for loss of life.[56] Legal recourse usually requires spending time, money, and energy which often does not make sense for victims or their families to choose that course. Despite malpractices in accident disclosure,[57] on average 20–25 deaths per year have been recorded in Chittagong consistently over the last 20 years.[58] The condition of workplace in ship-breaking fields in Chittagong is believed to be the worst among the South Asia for many years.[59] Local practices cause numerous accidents including fire and explosions, suffocation, falling from heights, and falling steel beams.[60] A report from a case study suggests that accidents and

55. *See* Damien A. Devault, Briac Beilvert & Peter Winterton, *Ship-breaking or Scuttling? A Review of Environmental, Economic and Forensic Issues for Decision Support*, 24 ENV. SCI. & POLLUTION RESEARCH 25745 (2016).

56. E-mail from Md Ali Shahin, Coordinator in Bangl., NGO Ship-breaking Platform, (Sept. 8, 2017) (on file with author).

57. Staff Correspondent, *supra* note 50; *see also* Md. Saiful Karim, *Violation of Labour Rights in the Ship-Breaking Yards of Bangladesh: Legal Norms and Reality*, 25 INT'L J. OF COMP. LABOUR L. AND INDUS. REL. 379, 388 (claiming that, in general, workers' deaths are effectively concealed and in most cases, not even the victims' families are informed); Anwar Hussain, *Poor workplace safety plagues ship-breaking industry*, DHAKATRIBUNE (Apr. 08, 2019), https://www.dhakatribune.com/bangladesh/nation/2019/04/08/poor-workplace-safety-plagues-ship-breaking-industry (reporting that accidents are not reported by the ship recycling yard owners to the relevant governmental agencies despite it is required by law).

58. *See* Devault et al. *supra* note 55, at 25745; in particular, Karim, *supra* note 57 at 388; Staff Correspondent, *supra* note 50; *cf.* RAMAPATI KUMAR, SHIP DISMANTLING*:* A STATUS REPORT ON SOUTH ASIA 25 (Johan Bentinck & Paul R. Holmes eds., Euroconsult Mott MacDonald & WWF-India) (2013) (claiming the number of deaths as up to forty per year).

59. *See Three-Quarters of Ship Dismantling in 2016 Was 'Dirty' Says Ship-breaking Platform*, INS. MARINE NEWS (May 19, 2017), https://insurancemarinenews.com/insurance-marine-news/three-quarters-of-ship-dismantling-in-2016-was-dirty-says-shipbreaking-platform/.

60. *See also* Wei-Te Wu et al., *Mortality Among Shipbreaking Workers in Taiwan–A Retrospective Cohort Study from 1985 to 2008*, 56 AM. J. INDUS. MED. 701, 707 (2013); *Safety and health in shipbreaking: Guidelines for Asian countries and Turkey*, INT'L LABOUR OFF. (2004), AT 4–8, https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/normativeinstrument/wcms_107689.pdf (stating that hazardous

illnesses in ship-breaking yards are very common because of the engagement of unskilled labor force, lack of training, inadequate safety and emergency rescue system, lack of supervision, and lack of enforcement of the regulatory provisions.[61]

Even though environmental laws exist, their enforcement is debatable. Some writers prefer to call these pieces of legislations as "paper tigers"[62] while others use terms such as "management myopia"[63] of the environmental managers in the developing countries. There exists a substantial gap between the legacy and the reality.[64]

D. ENVIRONMENTAL HAZARD IN SHIP-BREAKING YARDS IN BANGLADESH

In South Asian ship-breaking states, the environmental concerns have been less spotlighted than the health of the workers in ship-breaking fields.[65] Greenpeace has noted that the migration of ship-breaking has followed the same global track as the movement of hazardous wastes around the world, which always tends to follow the path of least resistance.[66] This means the more impoverished a country is, the more waste it will gain.[67] All old ships contain hazardous substances such as asbestos, lead paint, heavy metals, Polychlorinated Biphenyls (PCBs), Polycyclic Aromatic hydrocarbons (PAH), and many more toxic substances.[68] When ships are manually dismantled, it is

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occupation has been concentrated in a few developing countries, mainly in Asia, which effectively means South Asian countries like Bangladesh, India and Pakistan where controversial tidal beaching is the predominant method of recycling of ships).

61. Hrudanand Misra, *Skill and Education in Income Determination: A Case Study of Unorganized Workers of Alang*, 51 INDIAN J. LAB. ECON. 949 (2008).

62. Devault et al., *supra* note 55, at 25758.

63. Sangeeta Sonak et al., *Shipping Hazardous Waste: Implications for Economically Developing Countries*, 8 INT'L ENVTL. AGREEMENTS 143, 155 (2008).

64. Karim, *supra* note 57.

65. *See* Devault et al., *supra* note 55, at 25746.

66. GREENPEACE, SHIPBREAKING: A GLOBAL ENVIRONMENTAL, HEALTH AND LABOUR CHALLENGE 4 (2000).

67. *Id.*

68. *See also* Devault et al., *supra* note 55, at 25746 ("[S]crapyards are sources of heavy metals, PCBs, PAHs, asbestos, radioactive materials, CFCs, and other halogenated compounds, PBBs, PBDEs, PCBs, chlorinated naphthalene, inflammable coatings, pesticides (mainly antifouling), clinical waste, chlorinated paraffins (non-exhaustive list) under liquid (including oils),

impossible for workers to remain disassociated with such toxic substances.[69]

Airborne particulate matter pollution from ship-breaking yards is also important and a cause for concern.[70] Chlorofluorocarbons (CFCs) and other halogenated compounds used in refrigerated vessels and air conditioning system are still found in these vessels because CFCs and halogens were banned only in 1985 by the Montreal Protocol.[71] Since the 1970s, refrigerated ships began to be replaced by container ships because of the emergence of the refrigerated container which became apparent since early 1990s.[72] A study predicts that ship-breaking will likely endanger the environment with CFC and other halogenated compound emissions until 2039.[73]

Several studies have found that trace metals in the air of ship-breaking yards were two times more contaminated than in the reference areas, and was higher than the levels considered acceptable by the United States Environmental Protection Agency (U.S. EPA) or the World Health Organization (WHO).[74] That magnitude is significantly higher than the report of other studies carried out in India and Pakistan.[75] The air contamination and its impact on biota is an emerging concern, especially for birds.[76] Moreover, SRFs are close to ports with active fisheries, and the seashore is the feeding, resting and nesting place for many marine and terrestrial birds.[77]

Gas tankers contain volatile hydrocarbons. There is a lack of quantitative data about the contamination of airborne hydrocarbon. However, it has been reported that such compounds substantially contribute to workers' health issues.[78]

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solid (ashes, residues or sediments) or gaseous form.").

69. GREENPEACE, *supra* note 66, at 2.

70. *See* Devault et al., *supra* note 55, at 25741 (2016).

71. *Id.* at 25746–47.

72. *Id.* at 25746.

73. *Id.* (calculating that some of these refrigerated vessels may operate at sea for up to 50 years since the time of their built in 1989).

74. Shaik Basha et al., *Heavy Metal Content of Suspended Particulate Matter at World's Largest Ship-Breaking Yard, Alang-Sosiya, India*, 178 WATER AIR SOIL POLLUTION 373 (2007).

75. *Id.*, at 382 for Table V.

76. Richard E. Brown, Joseph D. Brain & Ning Wang, *The Avian Respiratory System: A Unique Model for Studies of Respiratory Toxicosis and for Monitoring Air Quality*, 105 ENVTL. HEALTH PERSPECTIVES 188 (1997).

77. Devault et al., *supra* note 55, at 25747.

78. *See* Wei-Te Wu et al., *supra* note 60.

Sources of organic chemicals are numerous in SRFs.[79] The rinsing of oil tanks by the rain or the sea water causes a great deal of seawater contamination. Tankers hold up to 1,000 cubic meters of residual oil generally after unloading.[80] Petroleum hydrocarbons of very high concentration have caused severe pollution of surface water.[81] Contaminations of coastal water through PAHs and trace metals have been noted to be ten to one hundred times higher near the facility areas than the reference areas.[82] Some studies have suggested that ship-breaking landfills and surrounding areas can be counted among the most contaminated environments in the world.[83]

Greenpeace has observed that throughout the ship-breaking yards, the workers were given no information regarding the hazardous materials that they are handling or the safety measures that working in such environments require.[84] Exposure to heavy metal such as lead, asbestos, arsenic, and chromium has reportedly caused serious diseases including anemia, asbestosis, skin cancer, paralysis, and liver cancer.[85] Dioxin is another identified toxic substances found in the ship-breaking yards.[86] These are "potent carcinogens" that suppress the immune system and is suspected to cause prenatal and postnatal effects on the nervous system of the child.[87] It is accumulated in the fat tissue of the body.[88] A study on animals has shown a drastic reduction in the formation of sperm as a result of dioxins.[89]

Persistent Organic Pollutants (POPs) are extremely harmful to the environment and the wildlife. These chemicals

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79. Devault et al., *supra* note 55, at 25748.

80. *Environmental Pollution*, SHIP-BREAKING IN BANGL., https://shipbreakingbd.info/environmental-pollution/ (last visited June 07, 2020).

81. Chelladurai Raghunathan et al., *The Effect of Ship Scrapping Industry and Its Associated Wastes on the Biomass Production and Biodiversity of Biota in* In Situ *Condition at Alang*, 42 MARINE POLLUTION BULLETIN 462, 464 (2001).

82. Devault et al., *supra* note 55, at 25748.

83. *Id.* (citing Srinivasa Reddy et al., *Seasonal Distribution and Contamination levels of Total PHCs, PAHs and Heavy Metals in Coastal Waters of the Alang-Sosiya Ship-scrapping Yard, Gulf of Cambay, India*, 61 CHEMOSPHERE 1587–1596 (2005)) at 9.

84. *Id.* at 5.

85. *Id.* at 5–6.

86. GREENPEACE, *supra* note 66, at 4.

87. *Id.*

88. *Id.*

89. *Id.* at 6.

are highly toxic and remain in the environment for a very long time.[90] A recent study has confirmed that POPs, including Polycyclic Aromatic Hydrocarbons (PAHs), Hexachlorobenzene (HCB) and polychlorinated biphenyls (PCBs), were found at their highest levels in sites near the ship-breaking yards, while dichlorodiphenyltrichloroethanes (DDTs)[91] and short-chain chlorinated paraffin (SCCPs),[92] both pollutants, were at their highest levels in urban areas.[93] Readings for all these pollutants were at an all-time high when compared to similar studies conducted in other parts of Asia.[94] Bottom living organisms of ocean, also known as benthos, rely on ocean floor and play an essential role in the food chain, especially in the intertidal zone.[95] One study has revealed that the marine fisheries diversity of Chittagong coastal belt that hosts highly diversified marine water fishes, mollusks, and benthic organisms are under active threat of extinction at the moment due to the indiscriminate expansion of ship-breaking activities.[96] The activities are also a potential threat to the coastal habitats. The abundance and the pattern of distribution of benthic fauna in the sample areas and the reference areas demonstrate a difference in the wealth and the diversity of species, with a predominance of the pollutant indicating benthic fauna in areas where ship-breaking activities

90. Imrul Jobaid, Moniruzzaman Khan, A.K.M. Kamrul Haque & Istiaque Ahmed Shawon, *Ship Recycling and Its Environmental Impact: A Brief Overview of Bangladesh*, 16 IOSR J. BUS. & MGMT. 31, 33 (2014).

91. Dichlorodiphenyltrichloroethane is a very powerful insecticide, poisonous to animals and humans. It remains in the environment active for a very long-time and has been banned in the United States for most uses since 1972 but still in use in some countries where malaria is prevalent. *See What are the Pros and Cons of Using DDT for Malaria?*, WISEGEEK, https://www.wisegeek.com/what-are-the-pros-and-cons-of-using-ddt-for-malaria.htm (last visited June 07, 2020).

92. SCCPs are found world-wide in the environment, wildlife and humans. They are bio accumulative in wildlife and humans, are persistent and transported globally in the environment, and toxic to aquatic organisms at low concentrations. *See Short-Chain Chlorinated Paraffins (SCCPs) and Other Chlorinated Paraffins Action Plan*, U.S. ENVTL. PROTECTION AGENCY (Dec. 30, 2009), https://www.epa.gov/sites/production/files/2015-09/documents/sccps_ap_2009_1230_final.pdf.

93. Theresa H. Nøst et al., *High Concentrations of Organic Contaminants in Air from Ship-breaking Activities in Chittagong, Bangladesh*, 49 ENVTL. SCI. & TECH. 11372 (2015).

94. *Id.*

95. Prabal Barua, Syed Hafizur Rahman & Morshed Hossan Molla, *Heavy Metals Effluence in Sediments and Its Impact on Macrobenthos at Shipbreaking Area of Bangladesh*, 45 ASIAN PROFILE 167, 177 (2017), at 174.

96. *Id.* at 177.

are prevalent.[97]

Currently, ships are dismantled across the 16 kilometers long coastal belt of Chittagong.[98] These areas are highly polluted by numerous oil spills.[99] The coast of the ship-breaking area is inhabited by 20,000 poor fishermen families who depend on the availability of fish in the shallow coastal regions.[100] Greenpeace has reported that most of the fishermen of the region have had to change their profession and have either migrated or took an alternative occupation in and around the ship-breaking yards.[101] For the last two decades, various local and international environmental NGOs, independent researchers, writers and news media, have come forward with a plethora of reports and comments that clearly identify ship-breaking activity in the coastal belt of South Asia as a monument of abuse of human labor and the environment.[102]

E. THE IMO-MOI SENSREC PROJECT PHASE-I: A BRIEF OVERVIEW

The International Maritime Organization (IMO), and the Ministry of Industry (MOI) of the Government of Bangladesh (GOB), with financial support from the Norwegian Agency for Development Cooperation (NORAD), have recently completed a 30 month long study on the environmental and economic impact of ship-breaking activities in Bangladesh.[103] The report consists of the Package 1 of the project titled the "*Safe and Environmentally Sound Ship Recycling in Bangladesh – Phase I.*"[104]

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97. *Id.*

98. *Chittagong Ship-breaking Yard, Bangladesh*, SCRAP SHIP-BREAKING ONLINE (Feb. 2012), https://web.archive.org/web/20120201025411/http://scrapshipbreaking.com/2011/05/08/chittagong-ship-breaking-yard-bangladesh/.

99. GREENPEACE, *supra* note 66, at 4.

100. Barua et al., *supra* note 95, at 177.

101. GREENPEACE, *supra* note 66, at 4.

102. Rupa Abdi, *India's Ship-Scrapping Industry: Monument to the Abuse of Human Labour and the Environment*, IIAS NEWSLETTER (Nov. 2003), at 46, https://www.shipbreakingplatform.org/wpcontent/uploads/2018/08/IIASNEWS_monument_to_the_abuse_of_Human_labour.pdf.

103. MI News Network, *IMO: Bangladesh Ready For Next Phase To Make Ship Recycling Green And Sustainable*, MARINE INSIGHT (Mar. 2, 2017), https://www.marineinsight.com/shipping-news/imo-bangladesh-ready-next-phase-make-ship-recycling-green-sustainable.

104. *Id.* (The IMO reserved no responsibility about the report of the SENSREC project. SENSREC project was directed, supervised, managed,

1. THE ENVIRONMENTAL IMPACT STUDY: IMO-MOI SENSREC PROJECT

The report published under the auspices of the IMO and MOI offers a radical conclusion and has cast a severe challenge to the credibility of the established body of research and publications on the impact of marine and coastal pollution from ship-breaking activities in Bangladesh. This report claims, as its objective, to provide the latest and up-to-date information on such contamination in the country arising from ship recycling activities in Bangladesh.[105]

It was argued in the report that ship-breaking activity is not the only culpable contributor to the aggregate pollution in the coastal areas of the country, as widely believed by the entire world. Its principal reason for the conclusion is that many variables are present in the equation of the coastal pollution that are still unknown.[106]

The SENSREC Project Phase I report states that limited scientific studies were carried out in Bangladesh taking all the relevant variables into account.[107] The variables such as concentration of pollutions in different sub-systems, variations in species, changing patterns of land use, segregation of contamination from other land-based sources of pollution, such as non-ship recycling activities, biodiversity of the area, oceanography, water current behavior and its circulation, discharge through different point, and non-point sources and canals in the neighboring regions are mostly undiscovered to date.[108] According to the report, there exists other land source marine polluters including tanneries, garments, paper mills, clinker and cement industries.[109] Different point and non-point sources are also contributing to the aggregate pollution.[110]

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edited, and adopted by the top officials of the IMO, MOI, and the Executive Director of the largest cash buyer, GMS Leadership based in UAE. This interview outcome and the observation of the author has been corroborated with all the mainstream NGOs of Bangladesh, particularly YAPSA and BELA.).

105. M. SHAHADAT HOSSAIN, S. M. SHARIFUZZAMAN & SAYEDUR RAHMAN CHOWDHURY, ENVIRONMENTAL IMPACT OF THE SHIP RECYCLING INDUSTRY IN BANGLADESH FINAL REPORT FOR IMO SENSREC PROJECT PHASE I 16 (2016) [hereinafter IMO ENVIRONMENTAL IMPACT STUDY SENSREC PROJECT].

106. *Id.* at 11.

107. *Id.* at 16.

108. *Id.* at 105.

109. *See id.* at 10.

110. *Id.* at 21.

Activities of these sources and their contributions, as claimed in the report, were never determined or scientifically segregated by any study conducted previously.[111]

In the above study, notice has been drawn to the significant river discharges from the *Karnafully* river directly into the Bay of Bengal close to the ship-breaking areas.[112] River streams carrying untreated sewage, industrial effluents, and agrochemical residues all discharge into the nearby coastal waters.[113] It has therefore been, as commented, a difficult task to draw a clear picture of the pollution from ship-breaking activities and non-ship-breaking activities without conducting a detailed pollutant profiling investigation.[114]

Apparently, these claims run counter the existing body of knowledge available on the pollution arising from the ship-breaking operations in Bangladesh. Logically, these arguments should be equally applicable to all other neighboring countries such as India and Pakistan using beaching as their predominant method of recycling of ships.

It is noted that the SENSREC report was intended, as its objective, to provide updated information[115] but relied mostly on the existing data from previously conducted and published reports to substantiate its claim. This project has taken a stand to address and answer the negative findings of previously conducted research instead of providing new sets of data.

It was suggested in a previous study that increase in the footprint of ship recycling yards has resulted in the decline of coastal agriculture and mangrove forests.[116] These findings were contested in the SENSREC report with the argument that those studies failed to substantiate the claim by adducing any scientific evidence about this change in mangroves or other plant species.[117] The project report of SENSREC acknowledged that the coastal aquatic biodiversity such as phytoplankton, zooplankton, benthos, microbes, and valuable fisheries are expected to be affected by ship recycling activities, but limited

111. *Id.*
112. *Id.*
113. *Id.* at 21; M.J. Ahmed et al., *Physicochemical Assessment of Surface and Groundwater Quality of the More Magnificent Chittagong Region of Bangladesh*, 11 PAK. J. ANALYTICAL & ENVTL. CHEMISTRY 2, 1–11 (2010).
114. IMO ENVIRONMENTAL IMPACT STUDY SENSREC PROJECT, *supra* note 105 at 17.
115. *Id.* at 44.
116. *Id.* at 18.
117. *Id.*

scientific information is available to verify those assertions.[118] At the same time, the report drew attention to a positive assertion of another publication on the same point claiming the existence of useful abundance zooplankton and species richness, including the lower occurrence of benthos in the aquatic environment of the ship recycling area opposed to the control site.[119] Ironically, the SENSREC report did not question whether their claims were substantiated.

In 2010, *The Daily Star* reported that ten different coastal fish species had disappeared, and twenty-one species were under threat, rarely appearing in the *Fauzdarhat* area along the coastal strip of *Sitakunda* area[120] due to the massive environmental damage caused by ship recycling activities in Chittagong. The claim of *The Daily Star* was equally defended by the SENSREC report adducing similar arguments of lack of scientific study by pointing out an example of other potential causes, such as using 'stake fishnets' and 'fry catching nets' mentioned as one of the potential reasons for the reduction of fish.[121]

Although using such nets might be one of the reasons of such reduction of fishes, these devices are widely used (even though illegal in Bangladesh) across the country's lakes and rivers by fishermen[122] where alleged reduction of fish is not at all severe. In fact, Bangladesh is the third-largest freshwater fish producer country in the world[123] that includes its 700 rivers including tributaries.[124]

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118. *Id.* at 16.

119. *Id.* at 18.

120. *Ship-breaking yard pollution threatens extinction of hilsa*, DAILY START (Apr. 03, 2010, 12:00 AM), https://www.thedailystar.net/news-detail-132782 (reporting that 10 different species of seawater fishes have become extinct and 21 have become rare in the country due to the environmental damages caused by ship-breaking yards); *see also Chittagong ship-breaking yard*, TRIP2BANGLADESH.COM, http://www.trip2bangladesh.com/chittagong-ship-breaking-yard/ (last visited June 07, 2020) (reflecting that "Shitakundu" is the name of the local area in Chittagong, Bangladesh, where the ship-breaking activities take place).

121. IMO ENVIRONMENTAL IMPACT STUDY SENSREC PROJECT, *supra* note 105, at 11, 19.

122. Inam Ahmed & Sohel Parvez, *Current Nets 'Stay Legal': Banned Since 2002 but Exists to Date as 49 Lawsuits Await Verdict*, DAILY STAR (Aug. 26, 2012), http://www.thedailystar.net/news-detail-247043.

123. UNITED NATIONS, FOOD AND AGRICULTURE ORGANIZATION, THE STATE OF WORLD FISHERIES AND AQUACULTURE: MEETING THE SUSTAINABLE DEVELOPMENT GOALS 16 (2018).

124. *Bangladesh: River Systems*, COUNTRY STUDIES (2017), http://country

The SENSREC report accepted that ship-breaking areas are contaminated with heavy metals based on the earlier reports, but went on to argue that the exact quantity of metals and organic compounds such as Tributyltin (TBT), Polyvinyl chloride (PVC), PCB, PAH and radioactive wastes released from each shipyard are not available in the findings of those studies.[125] It is noted that ship-breaking yards in Chittagong are adjacent to each other, where two to three ships remain in each yard at a distance of one to five meters and sometimes there remains virtually no space between two beached vessels. How these pollutants are expected to be identified in a study, concerning pollutants from each ship, or each yard, is remarkably difficult to predict.

According to the SENSREC report, the World Bank in 2008–2009 had investigated the presence of PCBs in soils of ship recycling yards, and nothing was detected.[126] This study was in fact written in 2009 and the World Bank report also concluded that heavy metal contamination in Chittagong ship recycling yards is elevated to the level of typical industrial use[127] and that Bangladesh has limited capacity for laboratory analysis of the PCB.[128] The same report also mentioned that, according to the PCB inventory survey for the Stockholm Convention National Implementation Plan (NIP), it was estimated that Bangladesh had some 56 tons of PCBs, of which ship-breaking was estimated to contribute 22.5 tons,[129] almost 40% of the total PCB produced by the country. It is noted that this was assessed based on the data available from 1999–2004, when approximately 90 ships were recycled per year with each merchant ship containing 250–800 kilograms of PCBs.[130] Currently, Bangladesh recycles on average over 200 ships per year.[131] This trend was expected to increase in past 15 years.[132] World Bank also confirmed the consistency of previous reports on widespread heavy metal contamination of soil near the beaching areas in Chittagong

studies.us/bangladesh/25.htm.

125. IMO ENVIRONMENTAL IMPACT STUDY SENSREC PROJECT, *supra* note 105, at 21.

126. *Id.*

127. Sarraf et al., *supra* note 6, at 350.

128. *Id.* at 34.

129. *Id.*

130. *Id.*

131. Khandakar Akhter Hossain, *Ship Recycling Practice and Annual Reusable Material Output from Bangladesh Ship Recycling Industry*, 7 J. OF FUNDAMENTALS OF RENEWABLE ENERGY AND APPLICATIONS 1, 6 (2017).

132. *See* Sarraf et al., *supra* note 6.

which the SENSREC Phase I report has failed to note.[133]

The SENSREC report cited that during field visits in April 2016, in several of the upstream locations around ship-breaking areas, the abnormal color of water, such as yellow or black, was detected.[134] The discoloration of sea water near the ship recycling areas was argued to be related to the industrial or other discharges, not necessarily from the ship recycling.[135] The report did not provide any reason as to why an incident occurring at a distance from some unidentified source could be a more probable cause than an adjacent and identified source.[136] The claim of the research report supervised jointly by the MOI, Government of Bangladesh, and the IMO under the SENSREC project, appears to have offered a blind eye to the well-known principle of customary international law; the precautionary principle that was developed solely to address such a situation of scientific uncertainty.

Regarding sound pollution,[137] the SENSREC report maintains that as per the record with the Department of Environmental (DoE), sound levels during 2012–2016 in selected ship recycling yards were between 60 and 75 Decibel (dBa) which were within the limit permissible in Bangladesh law.[138] It should be noted that as a condition of yearly renewal of environmental clearances, yard owners are required to formally apply to the appropriate wing of the DoE for field testing at a date and time agreed by the DoE.[139] In such a process of renewal of environmental clearance, there is currently no legal requirement for any surprise visit.[140] There is no prohibition in law as well to arrange inspection when no ship recycling work is going on.[141] It is therefore not unlikely that

133. *Id.* at 18; *see also* IMO ENVIRONMENTAL IMPACT STUDY SENSREC PROJECT, *supra* note 105, at 34–35.

134. IMO ENVIRONMENTAL IMPACT STUDY SENSREC PROJECT, *supra* note 105, at 22.

135. *Id.*

136. *See id.* at 41.

137. *Id.* at 33.

138. *Id.* at 34.

139. Interview with Anwar, *supra* note 22.

140. Surprise visits of ship-breaking yards are made by the Department of Environmental (DoE) officials as part of their usual enforcement mechanism. Importantly, the office of the DoE responsible for such assignment is separate from the laboratory office of the DoE who are in charge of providing NOC and its annual renewal. In such a renewal of NOC informed visit of DoE lab officials are customary. *Id.*

141. *Id.*

attempts would be made by some unscrupulous yard owners to curb the flow of recycling works to avoid any adverse finding being taken by the DoE officials. It seems unlikely that the reporter has taken this matter into account.

Torch cutters are exposed to higher levels of noise[142] and the noise levels tend to be much higher in the primary and secondary zones of the yard, where the majority of ship recycling activities takes place.[143] The SENSREC report does not mention to which zone the data mentioned therein had been referred to. The report also ignored the fact of rising trend of sound level in every year.[144] In a recent study, claimed as the only scientific investigation of workers' exposures to noise in global ship recycling context,[145] it has been discovered that ship recycling workers are at high risk of occupational noise induced hearing loss.[146] Torch cutters are exposed to noise levels above the exposure limit values of 87 dB (A) and 140dB.[147] Furthermore, there is extremely poor occupational health compliance and protection in relation to noise within ship recycling industries.[148] The above research findings on the noise pollution in ship recycling industry is directly contradictory to the findings of the SENSREC report which hardly relied on some cogent data before making a conclusion on the level of noise in ship-breaking yards and its impact upon their workers.

The jointly conducted project of the government and the IMO has succumbed to some serious omission. The cost of human life and social stake involved in ship recycling, indisputably remain at the crux of the problem, but has not been considered in the SENSREC project. It has been commented by the NGOs and workers' representatives that safety at ship-breaking facilities has never been placed on the priority list of the government for an unknown reason and so is the IMO.[149] How far the SENSREC

142. Rafet Emek Kurt et al., *Investigation of Occupational Noise Exposure in a Ship Recycling Yard*, 137 OCEAN ENGINEERING 440 (2917).

143. *Id.*

144. IMO ENVIRONMENTAL IMPACT STUDY SENSREC PROJECT, *supra* note 105, at 34.

145. Kurt et al., *supra* note 42.

146. *Id.*

147. *Id.*

148. *Id.* at 440.

149. Interview with Rizwana Hasan, CEO, Bangladesh Environmental Lawyers Association, in Dhaka, Bangl. (Aug. 5, 2016) (on file with author) [hereinafter Interview with Hasan]. Advocate Syeda Rizwan Hasan is a leading environmental activist who spearheaded a legal battle in Bangladesh resulting

project would see the light of success in contributing future law and policy-making without inclusion of such vital factors is open to question.

It was observed in the SENSREC report that the semidiurnal mode of the tidal current changes direction in about every six hours.[150] This phenomenon causes dangerous dispersion of pollutants in the affected areas where much of the contaminants and fine grain materials find difficulty to settle down.[151] Despite this fact, considerably higher concentration of heavy metal in the sediment has been noted in the report.[152] Moreover, most of the parameter of pollutants are notably high around the vessel breaking areas, but the report repeatedly commented that the coastal environment of Chittagong has most likely been polluted from a mix of ship recycling wastes, industrial effluents, agricultural residues, land washout, port operation and domestic sewage.[153] The report did not substantiate its assertion by clarifying why the proximity of the accumulation of pollutants to the ship-breaking facility is not to be considered important in determining the likelihood of the overall responsibility of the industry in contaminating the coastal belts of the country. This contention contradicts its own assertion made at the later part of the report that emphasized the correlation between the activity and contamination, such as demonstrating the concentration versus distance from the potential sources to ascertain the cause and amount of pollution that each industry creates.[154]

Taking the example of Turkey, the SENSREC report has compared that concentrations of heavy metals such as mercury (Hg), cadmium (Cd), lead (Pb), chromium (Cr), Copper (Cu), Zink (Zn), manganese (Mn) and nickel (Ni) around Aliaga, ship-breaking facilities in Turkey were also higher in comparison to respective background levels.[155] Also, in Hong Kong, the concentrations of Cu (653 ppm), Pb (1485 ppm) and Zn (1622 ppm) according to the SENSREC report exceeded the general

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in increased government regulations and heightened public awareness about the dangers of ship-breaking. She was the recipient of 2009 Goldman Environmental Prize in Asia.

150. IMO ENVIRONMENTAL IMPACT STUDY SENSREC PROJECT, *supra* note 105, at 34.

151. *Id.* at 37.

152. *Id.*

153. *Id.*

154. *Id.* at 77.

155. *Id.* at 38.

environmental standards.[156] However, it has not been made clear that the circumstances of Chittagong and Hong Kong or Turkey are different and incomparable. Ship-breaking works in the Hong Kong and Turkey do not rely on tidal beaching and there is no dynamic water movement, as experienced in the South Asian facilities, where the tidal water changes direction every six hours, considerably restricting accumulation on the seafloor or intertidal mudflat.[157]

A comparative analysis has been drawn in the SENSREC report between the prevailing conditions of heavy metal accumulations in the ship recycling sites in Hong Kong and Turkey with that of Bangladesh. This analysis might give an impression that the condition of effluent discharge in Bangladesh is less harmful than that of Turkey and Hong Kong. It should be noted that the recycling load is almost 10 times higher in Bangladesh than that of Turkey,[158] whereas the production in Bangladesh is the highest in the world.[159] Logically, in a similar situation of non-turbulent coastal water conditions, Bangladesh would have gained at least 10 times higher concentration of heavy metals than in Turkey.[160] The ship recycling, relying on the dynamic character of the ebb and flow in the South Asian region, is unique and incomparable to other methods practiced elsewhere in the world. Accumulation of stock pollutant and heavy metal sediment does not take place in significant rate in the mud field of the coastal zone because of semidiurnal tidal current.[161] This does not necessarily mean that pollution is not happening. In fact, pollution being released continually and dispersed ultimately to the more significant part of the ocean body through the semidiurnal mode of ebb and flow.[162] This argument ignores the point that the world ocean

156. *Id.*; Chiu et al., *Characterization of Contamination In and Toxicities of a Shipping Area In Hong Kong* 142 ENVTL. POLLUTION 512, 512–20 (2006).

157. IMO ENVIRONMENTAL IMPACT STUDY SENSREC PROJECT, *supra* note 105, at 38.

158. *Platform publishes list of ships dismantled worldwide in 2017*, HELLENICS SHIPPING NEWS (Feb. 21, 2018), https://www.hellenicshippingnews.com/platform-publishes-list-of-ships-dismantled-worldwide-in-2017/.

159. *Id.*

160. *See* IMO ENVIRONMENTAL IMPACT STUDY SENSREC PROJECT, *supra* note 105, at 39.

161. DET NORSEK VERITAS (DNV), TECHNICAL SHIP-BREAKING PRACTICES/ON-SITE ASSESSMENT, BANGLADESH-CHITTAGONG, REP. NO. 2000–3158 33, http://www.shipbreakingplatform.org/shipbrea_wp2011/wp-content/uploads/2011/11/dnvbangladesh.pdf.

162. *See id.* (indicating that Tributyltin (TBT) may have been released into

may be a substantial depository for stock pollutants and toxic wastes, but its capacity is not certainly inexhaustible.

In 2015, a study conducted mostly by the researchers from Norway reported an exceedingly higher level of polycyclic aromatic hydrocarbons (PAHs) and short-chain chlorinated paraffin (SCCPs) in the air of Chittagong.[163] In particular, PCBs, PAHs, and HCB were discovered to be highest at sites near the ship recycling activities where DDTs and SCCPs were found higher in the urban areas.[164] The finding of this study has also been questioned in the SENSREC report,[165] arguing methodological limitations without going to the details and the true nature of the limitations.

It is apparent that the SENSREC report relied mostly on secondary data outdated by eight to ten years, or longer, and compared it with recent and primary data and seems to have rejected these primary findings, while offering no specific grounds.[166] The report concluded that until 2016, no precise information is available on the impact of pollution resulting from the ship recycling in Chittagong and other land sources and the contribution in pollution is therefore generally indistinguishable with other coast based industries operating in the country.[167] This finding sits quite inappropriately with most of the existing bodies of knowledge including the results of independent researchers,[168] NGO reports,[169] verdicts of the Supreme Court of Bangladesh,[170] and conventional wisdom prevailing over 40 years. Instead of providing a new set of data, as was its primary

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the sea).

163. Nøst et al., *supra* note 93, at 11374–75.

164. *Id.*

165. IMO ENVIRONMENTAL IMPACT STUDY SENSREC PROJECT, *supra* note 105, at 68.

166. *Id.*

167. *Id.* at. 22, 42, 80, 105, 106 (noting the difficulty to segregate the contribution to environmental pollution from ship-breaking industry with that made by other coast-based industry).

168. Md. M. Maruf Hossain & M. Mahmudul Islam, *Ship-breaking Activities and its Impact on the Coastal Zone of Chittagong, Bangladesh: Towards Sustainable Management*, RESEARCHGATE (July 2006), at 10, https://www.researchgate.net/publication/237549357_Ship_Breaking_Activities_and_its_Impact_on_the_Coastal_Zone_of_Chittagong_Bangladesh_Towards_Sustainable_Management.

169. *Investigation Report*, *supra* note 53.

170. Bangladesh Environmental Lawyers Association (BELA) v. Bangladesh, Writ Petition (Civil) No. 7260 (2008), Judgment of March 17, 2009, High Court Division of the Supreme Court of Bangladesh, at 9.

objective, the report seemingly has attempted to carry out a critical analysis of the existing body of knowledge and data.

It is quite relevant to note that in similar circumstance of severe coastal pollution by heavy metal from mixed sources, a group of renowned marine ecologists and chemists from Dokuz Eylul University Institute of Marine Sciences and Technology (IMST) in Turkey, having conducted a detailed scientific research, have attributed the principal liability for coastal pollution to the ship recycling activities.[171]

As noted, the volume of annual ship recycling works is in Bangladesh almost 10 times greater than that in Turkey[172] and naturally the heavy metal concentration and contribution to the soil and sea water pollution should be at least logically several times higher than the one in Turkey. Even within one tenth concentration of ship recycling activities compared to the position in Bangladesh, the Dokuz Eylul University Institute of Marine Sciences and Technology (IMST) in Turkey has successfully shown that it is not impossible to locate at least the principal contributor within a cluster of independent industrial polluters. Furthermore in India, under squarely similar situation like that of Chittagong in Bangladesh, the researchers have concluded categorically that oil and grease content in the sea water and the heavy metal concentration in the marine sediments are extremely higher than the permissible levels in ship-breaking yard region.[173] The SENSREC report seems to have failed to at least clarify the position of the ship recycling industry in this regard arguing that many variables for a robust understanding of the impacts of the ship recycling industry on the environment are still unknown.[174] Under this backdrop of limitation of scientific research and difficulty of improved understanding about separate contribution to the environmental pollution by different coast based industries, the SENSREC

171. Neser et al., *The Ship-breaking Industry in Turkey: Environmental, Safety and Health Issues*, 16 J. CLEANER PRODUCTION 350, 355 (2008).

172. Dr. Nikos E. Mikelis, *A statistical overview of ship recycling*, INT'L MARITIME ORG., http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.535.3401&rep=rep1&type=pdf, at 8 (last visited June 7, 2020) (noting that the annual production of steel from EOL ships in Bangladesh is almost 10 times higher than that in Turkey).

173. H.J. Jani et al., *Seawater quality and trends in heavy metal distribution in marine sediment along Alang Sosiya Ship-breaking Yard (ASSBY) region*, 10 ANALYTICAL CHEMISTRY: AN INDIAN J. 374, 380.

174. IMO ENVIRONMENTAL IMPACT STUDY SENSREC PROJECT, *supra* note 105, at 105.

Project Phase I draws a bizarre conclusion that the current aggregate coastal pollution around the ship-breaking sites in Chittagong, Bangladesh is still within tolerable limit[175] and may not be significantly detrimental to the environment.[176] The report arguably has blurred the distinction between ship-breaking and other pollutions given no specific standard has yet been adopted in relevant laws of Bangladesh about coastal and river water contamination in the context of semidiurnal tidal cycle.[177] The SENSREC report further suggested that any intervention against the ship-breaking industry would currently be inappropriate without detail and further study.[178] NGOs claim that this report attempts to deliver an intellectual shield, offering a green signal to the controversial beach breaking currently happening.[179] An apparent attempt to refute the long-standing challenge posed by the anti-beach breaking movement enduring both locally and around the world is therefore visible. It is a fit case of application of precautionary principle which is a broad epistemological, legal and philosophical approach that demands great caution, pausing and review before leaping into any innovations that may prove disastrous in absence of scientific evidence that proves the case otherwise.[180] Under the circumstances described how could such an astonishing and opposite conclusion be safely drawn by the SENSREC report in such an incredibly delicate issue is far from clear.

Evidently, the SENSREC project and its funds[181] were administered by the IMO with direct and professional guidance of the Ministry of Industry (MOI), Bangladesh, who jointly and closely supervised the study[182] under the close proximity of the

175. *Id.*

176. *Id.*

177. Interview with Anwar, *supra* note 22; Mikelis, *supra* note 172.

178. IMO ENVIRONMENTAL IMPACT STUDY SENSREC PROJECT, *supra* note 105, at 80.

179. Interview with Hasan, *supra* note 149.

180. *The Precautionary Principle*, UNITED NATIONS EDUC., SCI., AND CULTURAL ORG Mar. 2005), https://unesdoc.unesco.org/ark:/48223/pf0000139578; *see also* Rupert Read & Tim O'Riordan, *The precautionary principle under fire*, https://ueaeprints.uea.ac.uk/id/eprint/65524/1/Accepted_manuscript.pdf (last visited June 07, 2020).

181. *See Safe and Environmentally Sound Ship Recycling in Bangladesh*, INT'L MARITIME ORG., http://www.imo.org/en/OurWork/PartnershipsProjects/Pages/Ship-recycling.aspx (last visited June 07, 2020).

182. Please see the acknowledgement of both IMO Environmental Impact Study SENSREC Project and Economic Impact Study of SENSREC project phase I at *Safe and Environmentally Sound Ship Recycling in Bangladesh*,

higher-ups of GMS leadership,[183] one of the largest cash buyers in the world in ship recycling industry until the final adoption of the report.[184] The top officials of the most influential cash buyer[185] and the IMO through the former head of its ship recycling division[186] were able to make a constant and joint contribution to this report, whereas the NGO and other concerned stakeholders reportedly had never been invited for consultation and had no role to play in the preparatory stage of the SENSREC report.[187] The SENSREC report was adopted and published under the auspices of government of Bangladesh and the International Maritime Organization (IMO). NGO maintains that the report published by the competent global standard setting organization for maritime affairs such as IMO[188] and the Ministry of Industry,[189] which is the competent authority for the regulation of domestic ship recycling in Bangladesh, certainly has important policy implication on ship

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supra note 181.

183. IMO ENVIRONMENTAL IMPACT STUDY SENSREC PROJECT, *supra* note 105, at 4; Helal Ahammad & Mohammad Sujauddin, *Contributions of Ship Recycling in Bangladesh: An Economic Assessment*, *Final Report for the IMO-NORAD SENSREC Project*, INT'L MARITIME ORG. [IMO] (2017), at vi, http://www.imo.org/en/OurWork/PartnershipsProjects/Documents/Ship%20recycling/WP1a%20Economic%20Impacts%20Study.pdf [hereinafter Economic Impact Study SENSREC Project 2017] (The lead consultant of the SENSREC project was the former IMO head of Ship Recycling and is currently the non-executive Director of the largest cash buyer, GMS Leadership.); *Green Experience*, GMS LEADERSHIP, http://www.gmsinc.net/gms_new/index.php/gms-experience (last visited Apr. 21, 2020).

184. *Why GMS*, GMS LEADERSHIP, http://gmsinc.net/gms/whygms.php (last visited Apr. 21, 2020).

185. *Id.*; *see* Anil Sharma, *Dr. Anil Sharma, GMS Among Most Influential People in Shipping*, HELLENIC SHIPPING NEWS (Dec. 21, 2016) http://mfame.guru/dr-anil-sharma-gms-among-influential-people-shipping/#.

186. *Green Experience*, *supra* note 183.

187. Interview with Shahin, *supra* note 52.

188. Secretariat of the International Maritime Organization (IMO), Implications of the United Nations Convention on the Law of the Sea for the International Maritime Organization, INT'L MARITIME ORG. (Jan. 30, 2014), http://www.imo.org/en/OurWork/Legal/Documents/LEG%20MISC%208.pdf (Noting that IMO is a designated by UNCLOS as the "'competent international organization' in connection with the adoption of international shipping rules and standards in matters concerning maritime safety, efficiency of navigation and the prevention and control of marine pollution from vessels and by dumping").

189. Bangladesh Ship-breaking and Ship Recycling Rule 2011, §§ 2 (XVII), 3 (noting that Ministry of Industry, through its Ship Recycling Board, is the competent authority regulating ship recycling industry in Bangladesh including adoption of all necessary rules).

recycling matters in Bangladesh. Direct consultation with major stakeholders such as Environmental Non-Governmental Organization (ENGOs), Workers Associations, would have been appropriate to ensure fairness and integrity of this report of great public importance but no major consultation took place during its preparatory stages.[190]

It is apparent that the claims of the SENSREC project raise alarming questions about the underlying purpose of the project; whether it was directed to evaluate the cost and benefits of ship recycling activities in Bangladesh[191] and thereby assisting the industry to become more sustainable[192] by pointing out the room for the reduction of the environmental and social cost involved in ship recycling or merely to track the culpability of other industrial activities. Approach of this report on pollution seems irrelevant to its actual commitment.

Non-compliance with regulations and anarchy in other industries, it is submitted, does not logically validate the lawlessness prevailing in ship recycling industry. The report has attempted, as argued by leading NGOs, to tear down the large body of research findings that already have been incontrovertibly established. The wealth of evidence and pieces of literature have vividly pictured the ship recycling on the beaches of South Asia as a closed, toxic, dirty and colossally dangerous activity.

2. THE ECONOMIC IMPACT STUDY: IMO-MOI SENSREC PROJECT

To single out the merits of ship-breaking, Work Package 1 of the SENSREC Project Phase I—namely the contributions of ship recycling in Bangladesh and it's economic assessment—has been chosen for discussion. According to the SENSREC report, the industry has generated a very impressive economic output consistently for the last three decades and has produced yearly

190. *Id.*; I have been emailed by NGO Ship-breaking Platform who confirmed that, while adopting the primary legislation on ship recycling in Bangladesh by the government (namely Ship Recycling Act 2018) little or no consultation took place with their main counterpart in Bangladesh. E-mail from Nicola Mulinaris, Communications and Policy Officer, Ship-breaking Platform (Mar. 27, 2016, 22:14) (on file with author).

191. Economic Impact Study SENSREC Project 2017, *supra* note 183.

192. IMO ENVIRONMENTAL IMPACT STUDY SENSREC PROJECT, *supra* note 105, at 44.

aggregate economic value worth BDT 53.3 billion (equivalent to USD 770 million) estimated in 5 years period from 2010 to 2015.[193] The report also claims that ship-breaking provides a vital source of revenue for the government through custom duties and other charges associated with various regulatory compliance schemes.[194] From this industry, currently, the annual earnings of the government of Bangladesh, through income and other taxes, have been approximately BDT 5 billion (equivalent to USD 68 million).[195]

The ship-breaking industry offers jobs to many skilled, semiskilled, and predominantly unskilled workers of Bangladesh who arrive from across the country.[196] The report claims, in 2015, this number was estimated in the range of 25,000 to 40,000 in full-time equivalent.[197] The industry creates many indirect jobs through other linkage industries. For example, there are approximately 500 rerolling mills, each of them employs approximately 400 workers[198] and primarily survives on the feedstock materials coming from the ship recycling industry. There are also retailers involved in selling steel bars produced by these rerolling mills who, on average, employ two to five workers in each of their retail stores.[199]

The report claims that the ship-breaking industry bestows indirect contribution to the national economy by supporting a host of upstream and downstream activities along the supply chain[200] including ship building, ship repair, and domestic steel manufacturing industries. Almost 90% of all the materials recovered from a recycled ship constitutes scrap metal.[201] Scrap metal retrieved in this way is used directly as feedstock for domestic steel mills.[202] This fulfills over 50% of the demand of feedstock for the entire steel manufacturing industry of the country.[203] It is therefore apparent that import dependency has substantially been reduced due to the supply of raw materials, leading to the huge savings of foreign currency. The production

193. Economic Impact Study SENSREC Project 2017, *supra* note 183, at viii.
194. *Id.*
195. *Id.* at viii.
196. *Id.*
197. *Id.*
198. *Id.* at 57.
199. *Id.*
200. *Id.* at ix.
201. *Id.*
202. *Id.*
203. *Id.*

of steel scrap at these recycling yards causes substantial additional value and creates tremendous employment opportunities predominantly for low skilled workers. It is pointed out in the SENSREC economic study that for every BDT 1,000 additional value brought out by the ship recycling industry, a sum of BDT 2,000 of additional value takes place across the supply chain in both downstream and upstream activities linked to ship recycling.[204] The additional value incorporates income from salaries, the acquiring of new properties, revenue from additional business taxes and others.

A substantial amount of non-ferrous metal is recovered in the SRFs, estimated at 7,500 MT in 2015[205] with a value amounting to approximately BDT 1.2 billion at the yard gate.[206] Numerous complete machines are recovered as well as components of engines, spare parts, hardware, and ship components such as steel pipes, life boats, anchors, propellers, and workshop materials, such as chain block and tools.[207] These, according to the report, were estimated, BDT 7.6 billion (equivalent to USD 111 million) at the 'yard gate' in 2015.[208] The ship-breaking industry in Bangladesh remains a vital source for affordable spare parts and equipment for small scaled enterprises across the country.

Traditionally, Bangladeshi ship breakers have preferred to import, for recycling, some of the largest types of vessels in the world, including super tankers, ULCC, VLCC,[209] Mother Vessels of general cargo, container, bulk carrier, Roll-on/Roll-off (Ro-Ro), and Oil-Bulk-Ore (OBO) vessels.[210] While Chinese and Indian businessmen stopped importing big ships, some Bangladeshi industrialists began to import them being allured by huge amount of profit in this business.[211] This preference has allowed

204. *Id.*
205. *Id.*
206. *Id.*
207. *Id.*
208. *Id.*
209. VLCC or Very Large Crude Carriers and ULCC or Ultra Large Crude Carriers are the largest operating cargo vessels in the world. With a size in excess of 250,000 Dead Weight Tonnage (DWT), these giant ships are capable of carrying huge amount of crude oil in a single trip and are also known as Supertankers. *See VLCC and ULCC*, MARITIMECONNECTOR, https://maritime-connector.com/wiki/vlcc/ (last visited June 07, 2020).
210. *See id.*
211. *Workers in Shipbreaking Industries: A Base Line Survey of Chittagong (Bangladesh)*, YOUNG POWER IN SOC. ACTION (2005), at 22, https://shipbreakingbd.info/Baseline.pdf.

the recyclers to set aside a handsome margin of profit by producing a more massive amount of scrap steel in the facility at their behest, making the quick and short-term investment worthwhile.[212] Except in 2006 and 2015, Bangladesh imported fewer numbers of ships compared to its chief and neighboring competitor, India, but it produced more volume of recycling in LDT measurement.[213] In 2015, the ship recycling industry imported 222 ships; more than half of them belonged to the category of larger vessels available in the world, each ship weighing in average 20,000 LDT and producing in aggregate 2.4 MT of scrap metals in LDT.[214] This figure has placed the country once again at the top position in the world, labeling Bangladesh as the country with highest recycling capacity in the current global ship recycling marketplace.[215] The trend has been consistent over the last decades[216] and, in 2016, the country broke its previous record, recycling 9.5 million metric tons of scrap metals[217] from the EOL ship recycling, utilizing just half of its total available capacity.[218] In 2015, the figure was 6.7 million metric tons.[219] In 2017, Bangladesh remained in top position in the world produced over 6.5 million tons of recyclable steel from EOL ships.[220] In 2018, Bangladesh sold 8.6 million tons for demolition, which is about 47.2% of the total global tonnage recycled in 2018.[221]

Domestic demand for scrap iron depends, among other things, on the market for feedstock in the local steel

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212. Economic Impact Study SENSREC Project 2017, *supra* note 183, at 4.

213. Gerostergiou, Ship-breaking: A Study on the Demolition Market, 87 (2012) (Unpublished Master's Thesis, University of Piraeus) (on file with Dione, University of Piraeus).

214. Economic Impact Study SENSREC Project 2017, *supra* note 183, at 3.

215. Gerostergiou, *supra* note 213, at 3.

216. *Id.* at 3.

217. NGO SHIP-BREAKING PLATFORM, 2016 LIST OF ALL SHIPS SCRAPPED WORLDWIDE - FACTS AND FIGURES, 1 (2017), https://www.shipbreakingplatform.org/wp-content/uploads/2019/01/Stats-Graphs_2016-List_FINAL1.pdf.

218. *See* Sarraf et. al, *supra* note 6, at 16.

219. NGO SHIP-BREAKING PLATFORM, 2015 LIST OF ALL SHIPS SCRAPPED WORLDWIDE - FACTS AND FIGURES, 1 (2016), http://www.shipbreakingplatform.org/shipbrea_wp2011/wpcontent/uploads/2016/02/Stats-Graphs_2015- List_FINAL.pdf.

220. NGO SHIP-BREAKING PLATFORM, 2017 LIST OF ALL SHIPS SCRAPPED WORLDWIDE - FACTS AND FIGURES, 1 (2018), https://www.shipbreakingplatform.org/wp-content/uploads/2019/04/NGO-Shipbreaking-Platform-Stats-Graphs-2017-List-UPDATED.pdf.

221. U.N. Conference on Trade and Development, *Review of Maritime Transport*, 35, U.N. Doc. UNCTAD/RMT/2019/Corr.1 (Jan. 31, 2020).

manufacturing industries, worker's wages, cost of regulatory compliance and operating cost of the ship recycling facilities.[222] The demand for feedstock in domestic steel manufacturing units is also greatly influenced by the price of the iron scrap in the international market.[223] Bangladesh has no iron mines of its own.[224] Moreover, due to the absence of any sizeable rerolling mill that can directly melt or process imported iron ores, the high-quality ready steel scrap of EOL ships is of high demand as feedstock in the steel manufacturing industries, that yield reinforced bar, used extensively in the domestic construction industry.[225] It has been shown in the SENSREC report that the import dependency of scrap steel in Bangladesh has successively been reduced[226] and has been replaced proportionately by the import of scrap ships into the country. According to a study, between 2006 and 2015, the average yearly import of the scrap ship into the country by ship recyclers grew almost twice in 10 years from 1.25 million LDT to 2.4 million LDT.[227]

The SENSREC report noted that in 2000, import of oil tankers consisted of 57% of the total EOL ships imported in Bangladesh.[228] This preference for tankers is not devoid of reason. Katie Paul noted that Bangladesh was the only ship recycling country during these periods where gas free certificates for oil tankers were not required before the import of ships for scrapping.[229] This gave Bangladesh a competitive edge over its competitors to import more tankers.[230] On the other hand, the tanker owners earned extra USD 2 per metric ton for choosing Bangladesh as a destination for recycling as there is no necessity for the ship owners to detoxify the ship or obtain safety certifications prior to sale.[231]

It is worth mentioning here that India, until recently, used

222. Economic Impact Study SENSREC Project 2017, *supra* note 183, at 8.

223. Mikelis, *supra* note 172, at 9.

224. Anbarasan Ethirajan, *Bangladesh's Ship-breaking Industry Picks Up Pace Again*, BBC (Aug. 6, 2012), https://www.bbc.com/news/business-19107373.

225. Economic Impact Study SENSREC Project 2017, *supra* note 191, at 16.

226. *Id.* at 54.

227. *Id.* at 3, 21.

228. *Id.* at 18.

229. Katie Paul, *Exporting Responsibility: Shipbreaking in South Asia-International Trade in Hazardous Waste*, 34/2 ENVTL. POL'Y & L. 73, 75 (2004).

230. *Id.*

231. *Id.* Ship-owners choose to scrap tankers in Bangladesh because they are not required to detoxify or obtain safety certifications prior to sale; in doing so, they save about US $2 per ton. *See id.* at 75.

to require the owners of foreign EOL tankers to export ships to India only after cleaning the cargo tank, and slope tank, from the point of origin.[232] India also maintained restriction for quite some time against import of tankers after several occasions of accident connected to tanker recycling.[233] NGO activists in India, and even the Indian government itself, remained strong advocates on the international level for pre-cleaning of oil tankers before their importations to Indian territories.[234] There was clear directive of the Indian Supreme Court upon the government to negotiate in the appropriate international forum.[235] For example the directive of the Indian Supreme Court required the Indian government to participate in international meetings on ship-breaking at the level of the International Maritime Organization and the Basel Convention's Technical Working Group with a clear mandate for the decontamination of ships of their hazardous substances such as asbestos, waste oil, gas and PCBs prior to exports to India for breaking.[236] Due to serious pressure exerted by the countries with active shipping interest and ship-owners in all relevant IMO meetings, no compulsory pre-cleaning regime was incorporated in the Hong Kong Convention.[237] For the same reason above, Indian proposal requiring ship-owners to send their tankers to the recycling state with condition of ready for hot work and gas free certification had been vetoed in the IMO forum.[238] Instead, a compromised version was adopted in the international law that required tankers to be sent as such only if the domestic law requires it.[239] This measure effectively has created a condition of race to the bottom among the few competitor recycling states of South Asia.[240] Subsequently it appeared that, amidst fierce competition

232. SAIFUL KARIM, PREVENTION OF POLLUTION OF THE MARINE ENVIRONMENT FROM VESSELS, 96 (2015).

233. Hasan Muhammad Abdullah, M. Golam Mahboob & Ahammad Al Biruni, *Drastic Expansion of Ship-breaking Yard in Bangladesh: A Cancerous Tumor to the Coastal Environment*, 236 (2010), http://www.benjapan.org/iceab10/64.pdf.

234. KARIM, *supra* note 232, at 94–95.

235. Research Foundation for Science Technology National Resource Policy v. Union of India, (2005) ¶ 30, WP 657/1995.

236. Research Foundation for Science v. Union of India and Anr, Writ Petition (Civil) No. 657 of 1995 (2007), Judgment of June 09, 2007, Indian Supreme Court, at 8.

237. KARIM, *supra* note 232, at 94–95.

238. *Id.* at 96.

239. *Id.*

240. *Id.*

with Bangladesh and other neighboring competitors,[241] Indian policy makers discontinued their plan to introduce such a pre-cleaning regime in their domestic ship recycling regulations. Accordingly, India did not require EOL tankers to be made ready for gas free or hot work certification from the port of origin, in tandem with Bangladesh in their Ship-breaking Code (Revised) 2013.[242] In the recently enacted Recycling of Ships Act 2019, the requirement remained unchanged.

In the ship recycling process of Bangladesh, nothing, in fact, goes to waste, except items such as asbestos, glass-wool, and other hazardous wastes that constitutes 5% of the total recoverable items.[243] Interestingly, the sand, mud and soil on the beach soaked with oils from the engine room and machineries have market demand, regularly collected by vendors, and sold by the yard owners.[244]

Many upstream activities and businesses receive valuable output, as well as providing significant input to the ship recycling industry including various commercial banks, insurance companies, oxygen plants, construction companies, and different utility and regulatory services.[245]

Numerous studies have suggested that the rate of steel consumption per person in a community is proportional to the growth of GDP of a country, and this continues to grow until the GDP reaches a particular threshold value.[246] Bangladesh is a growing developing country with a relatively stable economy.[247]

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241. Paul, *supra* note 229, at 75 (noting that Bangladesh does not require the owners of tankers to detoxify or obtain safety certifications prior to sale to Bangladeshi ship breakers).

242. *See* SBC (Revised) Codes 5.3.2. and Recycling of Ships Act 2019 (noting that neither of these codes and Act require the tanker to be ready for gas free and hot work certification prior sending them to Bangladeshi ship breakers).

243. R. Scott Frey, *Breaking Ships in the World-System: An Analysis of Two Ship-breaking Capitals, Alang India and Chittagong, Bangladesh*, CENTER FOR THE STUDY OF SOC. JUST. (May 2013), http://trace.tennessee.edu/cgi/viewcontent.cgi?article=1001&context=utk_cssjpapers; Sarraf et. al, *supra* note 6.

244. Peter Gwin, *The Ship-Breakers*, NAT'L GEOGRAPHIC (May 2014), https://www.nationalgeographic.com/magazine/2014/05/The-Ship-Breakers/.

245. Economic Impact Study SENSREC Project 2017, *supra* note 183, at 57.

246. *See* Cutler J. Cleavland & Matthias Ruth, *Indicators of Dematerialization and the Materials Intensity of Use*, 2 J. INDUS. ECOLOGY 15, 25 (1999); *see generally* Julia K. Steinberger & Fridolin Krausmann, *Material and Energy Productivity*, 45 ENVTL. SCI. TECH. 11169, 11169 (2011).

247. *See* Saiful Karim, *Environmental Pollution from the Shipbreaking Industry: International Law and National Legal Response*, 22 GEO. INT'L ENVTL. L. REV. 185, 219 (2010).

The SENSREC report pointed out that Bangladesh is still far behind the other South Asian countries in consuming steel per person.[248] It has been suggested that steel consumption per person in Bangladesh is expected to grow up to 50 KG by 2022.[249] Half of the merchant fleets operating currently in international waters would become obsolete within the next five to ten years.[250] It has therefore been asserted that the potential of the boundless supply of the EOL vessels, and the favorable condition prevailing in the region would unite and flourish the prospect of the industry further in near future. It was predicted that this promising outlook would lead to the widening and deepening of the base of this industry.[251] As noted earlier, the prediction has begun to materialize. Bangladesh alone processed almost half of the world's obsolete shipping tonnage last year in 2018.

The above economic study of the SENSREC project prepared and adopted under the auspices of the IMO and Government of Bangladesh looks impressive, but many of its claims seem inflated and appear contradictory to the claims made in several independent research publications and NGO reports. For example, one focus of the report was the claim of employment opportunities provided by the ship recycling industry, which is reported to be 25,000 to 40,000 directly employed full-time equivalent jobs as per the SENSREC report.[252] Whereas a recent report, when Bangladesh is at its peak in world ship recycling, there are 3,000 permanent and 5,000–7,000 temporary workers engaged in the ship-breaking yards in Chittagong in total,[253] which is just one fourth of the minimum range indicated by the said government and IMO report. The Institute of Global Labor and Human Rights claims this figure as 12,500 only.[254]

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248. In 2008, the per capita steel consumption in the Philippines, Indonesia, and India were 39 kg, 38 kg, and 45 Kg, respectively. Vietnam, Malaysia, and Thailand consumed much more, estimated at 200 kilograms per person. Bangladesh was 25kg in 2008. Economic Impact Study SENSREC Project 2017, *supra* note 183, at 59–60.

249. *Id.* at 60.

250. *Id.* at 61–62.

251. *Id.* at 60.

252. *Id.* at viii.

253. Anwar Hussain, *Ship-breaking industry: Minimum wage still a far cry*, DHAKATRIBUNE (Dec. 25, 2019, 9:37 PM), https://www.dhakatribune.com/business/2019/12/25/ship-breaking-industry-minimum-wage-still-a-far-cry (considering that there are in average 6,000 full time equivalent workers engaged in ship-breaking industries in Bangladesh).

254. *Murder in the Shipbreaking Yards*, INST. FOR GLOB. LABOUR AND HUM. RTS. (Nov. 30, 2015), https://issuu.com/iglhr/docs/murder_in_the_

Moreover, the SENSREC report included in the overall figure, all the white-collar employees ranging from management and administrative roles to technical and supporting jobs.[255] The technical and supporting jobs include the post of supervisors, foremen, cutters, fitters, wire experts, and their helpers.[256] Other than the administration, including the supervisor and foreman, a bulk of the people are field workers who are the primary concern of the international communities. Field workers are supplied by outside contractors, which happens in about 99% of cases in all yards.[257] If 20% out of 32,000 as per the said report, belongs to the full-time employees, there should be an average of 740 people at a time working in an SRF, and the figure should reflect 150 full-time employees per yard given there are approximately 50–60 yards are currently operating.[258] These claims also seem to be sharply inconsistent with the claim of leading environmental and labor rights activists, including the media and news reports.[259] Again, the report claims that steel scrap recovered from ship-breaking accounts for 50 to 60% of the domestically sourced feedstock of steel manufacturing in Bangladesh.[260] The NGO groups claim this is little over 30%.[261] Other reports also support this assertion and claim even less than this figure.[262] Even Bangladesh Ship Breakers Association (BSBA) claimed this as 25–30% only particularly when BSBA was alleged to be involved with price fixing in steel by illegal monopoly during the regime of Caretaker Government in Bangladesh.[263]

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shipbreaking_yards at 18.

255. Economic Impact Study SENSREC Project 2017, *supra* note 183, at 47.

256. *Id.*

257. *Id.*

258. Anwar Hussain, *Ship-breaking Yard Labour Organization Demands Workplace Safety*, DHAKATRIBUNE (Sept. 13, 2019), https://www.dhakatribune.com/bangladesh/nation/2019/09/13/ship-breaking-yard-labour-organization-demands- workplace-safety.

259. Interview with Hasan, *supra* note 149; Interview with Shahin, *supra* note 52; *see also* S. M. Mizanur Rahman et al., *Uncovering Discursive Framings of the Bangladesh Shipbreaking Industry*, SOC. SCIENCES (2018), https://webcache.googleusercontent.com/search?q=cache:YQYeRWg2laYJ:https://www.mdpi.com/20760760/7/1/14/pdf+&cd=5&hl=en&ct=clnk&gl=bd&client=firefox-b-d, ¶¶ 4.1, 4.2, 4.3.

260. Economic Impact Study SENSREC Project 2017, *supra* note 183, at ix.

261. Interview with Hasan, *supra* note 149.

262. Karim, *supra* note 57, at 394.

263. S. Rizwanna Hasan, *Ship-breaking: Irony of "Iron"*, DAILY STAR (July 4, 2008), http://www.thedailystar.net/law/2008/07/04/index.html.

F. THE ANALYSIS OF THE FINDINGS OF THE SENSREC PROJECT REPORT

It appears from the above discussion that the SENSREC project evaluated the economic contributions and environmental impacts of the beach breaking of ships in Bangladesh in convoluted and superlative terms but remained silent in examining the cost to human life and the effects on the occupational health and safety of workers. This is one of the two underlying and burning issues currently at hand about the ship recycling in Bangladesh. The Chief Consultant and the other higher-ups of the SENSREC project in Bangladesh were asked by the NGOs in disseminating workshop conducted in Dhaka on 15 June 2016 about this omission, but they were seen not having any reasonable reply on the matter.[264] The existing research claims that about 10,000 workers were permanently injured and almost 700 were killed in the last three decades.[265] This problem of occupational health and safety in all the ship-breaking fields across South Asia attracted formidable criticism and international attention. Numerous judicial, administrative and legislative efforts[266] have been taken over the last decades, but

264. Md. Shahin of YPSA, Dissemination Workshop, IMO SENSREC Project Phase-I, DHAKA (June 15, 2016) (questionnaire & answer session with Yasmin Chowdhury, Project Director).

265. Karim, *supra* note 57 at 380.

266. *Worker Rights Violation*, *supra* note 49; *see also Workers in Shipbreaking Industries*, *supra* note 211, at 24–27; *14 govt high officials face contempt rule*, DAILY STAR (Apr. 12, 2016, 3:21 AM), https://www.thedailystar.net/backpage/14-govt-high-officials-face-contempt-rule-1208011 (noting that 14 govt high officials face contempt rule for ignoring workers safety at ship-breaking facilities and disregard to the environmental safeguards in ship-breaking in Bangladesh); *Press Release – Bangladesh High Court issues contempt rule against 14 Governmental Officials: ministries and shipbreakers asked to account for non-compliance with 2009 judgment*, NGO SHIPBREAKING PLATFORM (Apr. 12, 2016), https://www.shipbreakingplatform.org/press-release-bangladesh-high-court-issues-contempt-rule-against-14-government-officials-ministries-and-shipbreakers-asked-to-account-for-non-compliance-with-2009-judgement/ (Ms. Rizwan Hasan, CEO of BELA, commenting that impunity the owners of ship-breaking yards enjoy due to their political connections must end. We cannot accept any more deaths of laborers and someone has to finally take responsibility for the fatal accidents); *Challenges before ship-breaking industry*, FIN. EXPRESS (July 14, 2018, 10:41 PM), https://thefinancialexpress.com.bd/editorial/challenges-before-ship-breaking-industry-1531411490 (Implies that Act and rules adopted to safeguard ship-breaking workers and environment in Bangladesh are not properly implemented.) For penal and administrative actions against shipbreakers, *see Waste management dysfunctional at most shipbreaking yards*, BASEL ACTION NETWORK (Mar. 12, 2019), https://www.ban.org/news/2019/3/12/waste-

the casualty rate in Chittagong ship-breaking yards has remained consistent, and the death toll is still soaring.[267] Human rights and labor right activists around the world published reports that tend to suggest accountability of governmental authorities and ship yard owners for their gross omission and inaction resulting in non-stop deaths of workers.[268] The Institute of Global Labor and Human Rights alleges this as willful blindness and so is a 'deliberate killing' or 'murder' in the ship-breaking yards.[269] The sustainability of this labor-intensive industry without guaranteeing worker's safety and fundamental right to life at the ship-breaking fields, as many experts comment,[270] is virtually unthinkable.

Several other scholars have raised the issue of the cogency of the material flow analysis,[271] which grounded the basis of the assertion made in the economic impact study of the SENSREC project. It is not disputed that a significant amount of scrap steel is processed through many scaled-down and unsupervised re-rolling mills. These unregulated foundries do not follow standard steel manufacturing guidelines to produce iron bar for the construction industry.[272] These productions do not go through any formal quality checking or authentication by any recognized authority.[273] It has been argued that, as a potential earthquake-prone country, Bangladesh could experience complete devastation in the steel manufacturing marketplace,[274] and the SENSREC economic study has apparently failed to disclose this point.[275] The country has experienced many harrowing collapses of the high-rise building due to the use of weak construction materials, especially iron bar of inferior quality.[276] These facts would undoubtedly add negative value in the overall economic

management-dysfunctional-at-most-shipbreaking-yards.

267. MD. SAIFUL KARIM, SHIPBREAKING IN DEVELOPING COUNTRY, A REQUIEM FOR ENVIRONMENTAL JUSTICE FROM THE PERSPECTIVE OF BANGLADESH 6 (2018).

268. *Murder in the Shipbreaking Yards*, *supra* note 254, at 10, 15, 16.

269. *Id.*

270. Interview with Hasan, *supra* note 149.

271. *See* Nadim Khandaker, Letter to the Editor, *Comment on "Ship-breaking and the Steel Industry in Bangladesh: A Materials Flow Perspective" An Argument for Saving the Baby While Throwing Away the Bathwater with Caveat*, 21 J. INDUS. ECOLOGY 204, 204 (2016).

272. *See id.*

273. *Id.* ¶ 2.

274. *Id.*

275. *Id.*

276. *Id.*

calculation if the reporter had not passed over the issue silently.

Bangladesh is mostly boarded by India and to some extent by Myanmar to the south-east. A substantial quantity of scrap metal is regularly smuggled to the Indian and Myanmar territories.[277] A material flow analysis taking no account of these facts would possibly produce a wrong result. The steady increase in the steel consumption per person in Bangladesh and possible future prediction based on this track record of consumption may not be as accurate as it is expected or claimed.

1. SENSREC PROJECT OF THE IMO AND STAKEHOLDERS CONSULTATION

In the questionnaire session of the dissemination workshop of the SENSREC project titled "Safe and Environmentally Sound Ship Recycling in Bangladesh Phase-I" (SENSREC PROJECT), convened by the MOI Bangladesh on June 15, 2016, at the Pan Pacific Sonargaon Hotel, Dhaka Bangladesh,[278] several flaws were identified by NGOs who happened to be present in the workshop.[279] Some issues of considerable importance were noted from the ongoing debate as well as the questionnaire session in the seminar.

It was observed that no mainstream NGOs were consulted[280] during the preparatory stage of the project contrary to what has been claimed in the report.[281] NGOs could not make an informed opinion about the report before it was finally presented and adopted in the dissemination workshop where their attendance was requested by the government.[282] Severe limitations on the sampling test were alleged, due to insufficient budget.[283] It was, however, pointed out by the NGO present before the workshop that research findings and earlier publications took well into account the margin of error due to

277. *Id.* ¶ 3.

278. IMO Dissemination Workshop, Safe and Environmentally Sound Ship Recycling in Bangladesh, Phase-I, SENSREC Project Bangladesh, Dhaka, Bangladesh (June 15, 2016).

279. *Id.*

280. E-mail from Nicola Mulinaris, Communications and Policy Officer, Ship-breaking Platform (Mar. 27, 2016, 22:14) (on file with author).

281. Interview with Hasan, *supra* note 149; *see also South Asia Quarterly Update*, NGO SHIP-BREAKING PLATFORM (Nov. 17, 2016) https://www.shipbreakingplatform.org/wpcontent/uploads/2018/08/SAQUFINAL11.pdf.

282. Interview with Shahin, *supra* note 52.

283. *Id.*

other land source marine pollution in the Bay of Bengal and this cannot be the sole ground to challenge the whole existing body of research and data available.[284] Although economic and environmental impact assessment of ship-breaking happened to be the agendas of the dissemination workshop, there was no agenda to address the impact of ship-breaking on the health and safety of workers at any stage of the SENSREC project even on the day of dissemination workshop.[285] The issue of safety and health of ship-breaking workers of Bangladesh was not considered in any of the phases of the SENSREC project.[286]

Saving the life of workers from casualties, protecting the environment, and preserving the economic potential of ship-breaking are no less significant than each other. It is observed that research, report and publications under the auspices of a specific stakeholder group often tend to represent their respective interests, downplaying the factors that do not support their findings and conclusions.[287] There are many stakeholder

284. Interview with Hasan, *supra* note 149.

285. The program agenda of SENSREC project Phase-I and its list of participants is on file with the author.

286. *See* the SENSREC Deliverables at *Safe and Environmentally Sound Ship Recycling in Bangladesh*, *supra* note 181.

287. Noting that shipbreaking becomes a case for politics in which NGOs tend to establish unacceptability and officials to focus reasons for acceptability, *see* S. M. Mizanur Rahman et al., *supra* note 259, ¶¶ 4.1, 4.2, 4.3 (noting also that Cash buyers claiming no acknowledgement by NGOs about the rampant development made by ship recycling industry while maintaining that journalist oftentimes do not consider positive attribute of the ship recycling industry. It also has been claimed that almost 80 of out of 120 ship-breaking yards in India have been already made compliant with Hong Kong Convention standard but NGO maintains constant criticism. *See* Paul Bartlett, *GMS hits out over BBC documentary on ship recycling industry*, SEATRADE MARITIME NEWS (Apr. 05, 2020), https://www.seatrade-maritime.com/environmental/gms-hits-out-over-bbc-documentary-ship-recycling-industry. NGO, on the other hand, maintains that in absence of well worked out Treatment Storage and Disposal Faculty (TSDF), beaching yards in the intertidal zones of the beach are getting HKC certified are utterly questionable ,which reflects the poor international standard set by the IMO vide the Hong Kong Convention. See *NGO Shipbreaking Platform Raises Bangladesh Concerns*, MARITIME EXECUTIVE (Dec. 07, 2017, 8:39 AM), https://maritime-executive.com/editorials/ngo-shipbreaking-platform-raises-bangladesh-concerns. For study funded by NGOs, *see* Hossain & Islam, *supra* note 168; *see also* M. MARUF HOSSAIN, SHIP-BREAKING ACTIVITIES: THREAT TO COASTAL ENVIRONMENT, BIODIVERSITY AND FISHERMEN COMMUNITY IN CHITTAGONG, BANGLADESH (2010) (noting that the report published under the auspices of YPSA concludes in page 51 that ship-breaking operation involves serious environmental hazards and recommended drydock to carry on ship-breaking in Bangladesh instead of using sea beaches for such activities). Young Power in Social Action (YPSA) in its publication mentions that 90% steel are supplied in Bangladesh from shipbreaking industry

groups with conflicting interests which have been identified in field surveys, desk studies, publications, and reports from different government and non-government organizations.[288] Oftentimes, data and publication report from one stakeholder have been found to sharply contradict with other adversarial groups. For example, as noted above, numerous studies carried out from 2006 to 2010 funded by a leading NGO, YPSA,[289] and recent SENSREC project, funded by the foreign donors with active shipping interest and administered and managed by the government of Bangladesh in 2016,[290] met with contrasting

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of the country. *See* Md. Arifur Rahman & Muhammed Ali Shahin, *Shipbreaking in Bangladesh: Challenge and its future*, 1 SOCIAL CHANGE 115, 116. On the other hand, in an allegation of price fixing against the Bangladesh Ship Breaker's and Recycler's Association (BSBRA), it has claimed that the Association controls only 25–30% of the total demands of the country. *See* Hasan, *supra* note 263. For study funded by NORAD and managed by Bangladesh Government and IMO, *see* Environmental Impact Study, IMO-NORAD SENSREC Project 2016 and Economic Impact Study, IMO-NORAD SENSREC Project 2017 at 33, 105. This study maintains that ship-breaking generated pollution such as water contamination, noise contamination, heavy metal sediment are all within tolerable limit.

288. M. Mizanur Rahman et al., *supra* note 259, ¶¶ 4.1, 4.2, 4.3; *see also Demand for immediate, thorough, effective and impartial investigation and protection of human rights defenders*, NGO SHIPBREAKING PLATFORM (Apr. 23, 2014), https://www.shipbreakingplatform.org/wp-content/uploads/2018/08/Letter-to-Prime-Minister-Abduction-Abu-Bakar-Siddique.pdf (noting that even the leading environmental activists of the country often have come across in antagonistic relationship with business tycoons whose business objectives do not go along with their campaign for safer ship recycling and cleaner environment).

289. *See* Hossain & Islam, *supra* note 168; *see also* HOSSAIN, *supra* 287.

290. *See* Sefer A. Gunbeyaz, Rafet E. Kurt, & Raphael Baumler, *A Study on Evaluating the Status of current Occupational Training in the Ship Recycling Industry in Bangladesh*, WMU J. OF MARITIME AFF. (Feb. 12, 2019) On an additional note, please see the concern expressed by leading NGOs to the Head of the Government of Bangladesh, Prime Minister Sheikh Hasina, about IMO prospective funding to the government allegedly attempting to legalize the status quo of the ship-breaking industry in Bangladesh. *See* https://www.shipbreakingplatform.org/wp-content/uploads/2018/08/Letter-Bangladesh-PM_Shipbreaking1.pdf. Noting also that SENSREC project is funded by the Norwegian Agency for Development Cooperation (Norad), which is a directorate under the Norwegian Ministry of Foreign Affairs (MoFA). *See Norwegian Agency for Development Cooperation (NORAD)*, DONOR COMMITTEE FOR ENTERPRISE DEV., https://www.enterprise-development.org/agency-strategies-and-coordination/norwegian-agency-for-development-cooperation-norad/ (last visited June 17, 2020). Noting also that Norway belongs to one of the giant shipping nations in the world. *See The Norwegian fleet now ranks as number five in the world of shipowning nations*, NORWEGIAN SHIPOWNERS ASSOCIATIONS (last visited June 17, 2020).

result on self-same matters. This is not to challenge the credibility of the work as sample quality and variables might of course change over time. However, the substantial polarization in scientific research findings coupled with the information collected from interviews in the field survey by me during May 2016 through August 2016 with different key personnel in both Government and non-Government level fills the air with an impending, innovative, and elegant scholarly battle. This intellectual battle under the auspices of authoritative sources, such as Government of Bangladesh and IMO, appears to have added a new dimension to the pre-existing conflicts between stakeholder's in operational level.

There is no one in Bangladesh who argues that ship-breaking should be stopped. Even the most prominent activists against beach breaking in the country, Bangladesh Environmental Lawyers Associations (BELA) and the Young Power in Social Action (YPSA), take the view that they are not opposed to ship-recycling, but that the nation must ensure a minimum safeguard for the environment and safety of workers.[291] It appears that environmental disaster creates an intractable intergenerational problem which the country cannot afford to resolve. The CEO of BELA maintains that if the nation cannot afford to ensure the minimum environmental safeguard, then the ship-breaking operation must stop.[292] The IMO SENSREC project coordinator and the head of ship recycling, based in London, Nikos Mikelis argued that the environmentalists present Bangladesh with a false choice.[293] The comment of this top-notch IMO official, Dr. Nikos Mikelis, is worth mentioning: "They say, they are happy to have the industry, but not on the beaches. Where do they want it? In the mountains?"[294]

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291. Bangl. Envtl. Law. Ass'n v. Gov't of Bangl., Writ Petition (Civil) No. 7260, (2011) (Bangl.).

292. Krista Mahr, *Syeda Rizwana Hasan*, TIME (Sept. 22, 2009), http://content.time.com/time/specials/packages/article/0,28804,1924149_1924153_1924207,00.html.

293. *Ship-breaking in Bangladesh: Hard to Break*, ECONOMIST (Oct. 27, 2012), https://www.economist.com/news/asia/21565265- controversial-industry-says-it-cleaning-up-its-act-activists-still-want-it-shut-hard-break.

294. *Id.* This is the comment of the IMO head of ship recycling. He is named as the father of the Hong Kong Convention and significantly contributed in the adoption of the HKC. He later joined as the Non-Executive Director of the largest cash buyer GMS Leadership. All cash buyers have significant business interest in the sustenance of the beaching methods of ship-breaking in South Asia as these allow them to make maximum profit by sending their ships to the

Being a newly transitioned developing country, Bangladesh may not just switch to the expensive dry-docking method[295] right away, which would, at least theoretically, addresses the controversy in coastal pollution and worker's safety. In the current economic and political climate, acceding to such a demand of the environmentalists may lead to a complete shutdown of the ship recycling activity in Bangladesh.[296] However significant economic benefit to this poverty laden

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sub-standard and inexpensive beaching facilities. On the other hand, NGO runs *off the beach* campaign that strongly opposes beach breaking of ships. Mr. Mikelis, by his comment, "*They say, they are happy to have the industry, but not on the beaches. Where do they want it? In the mountains?*" has tacitly reject NGO's move towards *off the beach* campaign and signals IMO support in legalizing beach breaking of ships. It feels that IMO, in association with Cash buyers, is one of the major proponents of beaching method of ship recycling. Note that under E.U. law (EUSRR), beaching is indirectly banned for ships carrying E.U. flags. *See* Kim Jefferies, *'Beaching of vessels for shipbreaking – legal, illegal or somewhere in between?*, GARD (Aug. 15, 2018), http://www.gard.no/web/updates/content/26050185/beaching-of-vessels-for-shipbreaking-legal-illegal-or-somewhere-in-between. In China, breaking ships in beaching method is illegal. *See Substandard shipbreaking: a global challenge*, NGO SHIPBREAKING PLATFORM (Feb. 2017), https://www.shipbreakingplatform.org/wpcontent/uploads/2019/01/Worldwide-overview_FINAL_2017.pdf.

295. Sameh A. Rassoul Hendawi, *Dry-Docking: A Ship-Owner's Accounting Dilemma*, PRACTICEADVISOR (May 24, 2018), https://www.cpapracticeadvisor.com/accountingaudit/news/12414328/drydocking-a-shipowners-accounting-dilemma (noting that Dry Docking is an essential process for all shipping companies that own ships, regardless of the type of ship; each ship should be operated through a set of regulations set by the IMO and the U.S. Coast Guard primarily to emphasize on safety prospects for ships, crew and environment, so complying with those regulations is mandatory by all ship-owners. The construction and operation of dry dock is an expensive task. Notable dry dock is hardly used for ship-breaking nowadays, being very expensive, given the nature of the ship-breaking industry).

296. Noting that use of expensive dry-dock in developed country does not make economic sense when cheap methods of ship-breaking on the beach are available internationally. *See* Michael H. Gavshon, *The Ship Breakers*, YOUTUBE (2013), https://www.youtube.com/watch?v=PdYK2vb6McE. Ship recycling in 1970 used to be done by developed countries. This business has been migrated to the underdeveloped country due to increase in cost to maintain environmental safeguard and higher safety demanded by the laws of those developed counters. The labor cost is extremely low in third world developing country. It therefore does not make sense to break ships in dry docks of western developed country, whereas open beaches are ready to be used by third world nations like Bangladesh, India and Pakistan where there is minimum cost of infrastructure. Notably, global ships owners have to pay to dismantle their obsolete ships where as in Bangladesh, India and Pakistan they get handsome amount of money by selling their ships to these poorer nations. Using dry docks therefore does not make any economic sense to the global communities.

developing country from ship recycling is well documented[297] and severely restricts the strength of such arguments. On the other hand, the government of Bangladesh finds it difficult to curb this business in toxic wastes as it would deprive the countrymen of their much-needed economic opportunity. Still, the government cannot ignore the drastic and lasting effect on its environment.[298] These limitations seem to put a bridle on the policymakers, permitting the recyclers to run full steam ahead. Eventually, the government responds in compulsion and attempts repeatedly to bring down the curtains, coming to a fuzzy conclusion that it is not a good idea to face the challenge of improving environment and occupational health as long as development has not been attained. A sharp conflict among the dominant stakeholders is visible. It is submitted that this dilemma and restlessness in the choice of policy making of the government, unless addressed in a scientific manner, is likely to prove fatal to the accomplishment of a sustainable law in such an exceedingly debatable area.

2. THE DILEMMA IN SHIP-BREAKING IN BANGLADESH

Bangladesh is widely believed to be predominantly a capitalist society.[299] Several renowned environmental economists have demonstrated that in an environmental dispute, in such a capitalist society, conflict among dominant stake holders, who cherish diametrically opposing views, remains.[300] The government charged with social development, and the leaders in business do not necessarily have to develop a rapport to combat the green activists. In the capitalist developing society, with a development model based on economic

297. Ahammad & Sujauddin, *supra* note 183, at 57.

298. The Honorable High Court Division of Bangladesh Supreme Court mentioned that articles 31 & 32 of Bangladesh's Constitution encompass within its ambit the protection and preservation of environment, ecological balance free from pollution of air and water, sanitation without which life can hardly be enjoyed. Any act or omission contrary thereto will be violation of the said right to life. *See* Md. Nahid Hosen, *The expansion of the term "Right to Life"*, DAILY OBSERVER (Nov. 19, 2015, 12:00 AM), https://www.observerbd.com/2015/11/19/121581.php.

299. Alyssa Ayres, *Bangladesh: Capitalist Haven*, FORBES (Oct. 28, 2014), https://www.forbes.com/sites/alyssaayres/2014/10/28/bangladesh-capitalist-haven/#e10fa3d145e6.

300. Raúl R. Cordero, Pedro Roth & Luis Da Silva, *Economic Growth or Environmental Protection? The False Dilemma of the Latin-American Countries*, 8 ENVTL. SCI. & POL'Y 394 (2005).

success, the government and the leaders in business both possess a shared belief that environmental regulations automatically inhibit the economic growth that a developing society has every right to pursue.[301] Therefore, the government tends to take a lackadaisical approach to environmental regulation.[302] On the other hand, environmental advocates believe that a drastic slowdown to the machinery of development or economics is desirable if the government fails to adopt the cautionary approach favoring environmental ethics, inhibiting the industry from excessive discharge of stock pollutants or widespread consumption of finite natural resources.[303] In this broad political debate, both sides tend to win by projecting quantitative relationship between development and the restriction on the discharge of pollution which they believe inversely proportional to each other.[304] Typically, such an attempt is well visible in ship-breaking arena of Bangladesh, as seen from the discussion above where the government and the NGOs have taken diametrically opposing views.

Field investigation reveals that stakeholders, direct beneficiaries of the industry such as Ship Recycling Facility (SRF) owners, organizations linked to this industry, and personnel either directly or indirectly benefit from the industry, and even the Ministry of Industry, Bangladesh (MOI), who has a constitutional vision in honing the economy of the country through industrial operations, seem to downplay the importance of the environment and tend to focus more on the economic contribution that ship-breaking brings to the national economy. Interestingly, the government seems to be playing the role as figurehead and a mouthpiece for ship recycling industry.[305]

It is important to note that no one in the industry denies that ship-breaking contributes to the pollution, but it seems that it's not an immediate priority of the governmental authorities to show tough-mindedness against the ship-breaking industry now, as they are trying hard to meet the challenge of globalization[306] with limited resources given that ship-breaking is contributing

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301. *Id.*

302. *Id.*

303. Jonnalagadda Rajeswar, *Conservation Ethics Versus Development: How to Obviate the Dichotomy?*, 9 SUSTAINABLE DEV. 18 (2001).

304. Cordero, Roth & Silva, *supra* note 300, at 394.

305. KARIM, *supra* note 267 at 6.

306. Wahiduddin Mahmud, *Bangladesh Faces the Challenge of Globalization*, YALEGLOBAL ONLINE Oct. 22, 2003), https://yaleglobal.yale.edu/content/bangladesh-faces-challenge-globalization.

to the much-needed economic interest of the country. The government believes that the loss of such a business opportunity would deprive a large section of people from the constitutional right to earn their livelihood, which is an essential commitment of the government to fulfill. On the other hand the CEO of the leading NGO, BELA, argues that the contribution of ship-breaking to the national GDP of Bangladesh is not as significant as claimed by the government given the amount is less than nugatory in relation to the overall GDP of the country.[307] There appears to be a clear exchange of accusation.

The doctrine of sustainable development is a crucial concept to overcome such issues. The classic dichotomy of environment versus development is now bewildering Bangladesh in policy and law making regarding the ship-breaking industry. According to the World Commission on Environment and Development, sustainable development is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[308] It offers a development strategy which balances the exploitation of finite natural resources, and decisions on investment and institutional changes are made in harmony with the present and the future needs of the society.[309] It causes not only developing countries to form their development strategies but also encourages developed countries to rebuild their societies.[310] Essentially, this involves setting an environmental goal by establishing a benchmark of pollution, selecting tools or criteria for defining such goal, and adopting an appropriate regulation to fulfill that strategy and ensure its guaranteed enforcement.[311] This theory of ecological economics sees the environment as a commodity that cannot be exploited free of charge.[312] The cost of exploiting the natural resources or emission of stock pollutant is not essentially zero.[313] Therefore, in a crisis of natural resource scarcity, the market

307. Interview with Hasan, *supra* note 149.

308. World Comm'n on Env't and Dev., *Our Common Future*, ch.2 ¶ 1, U.N. Doc. A/42/427 (Aug. 4, 1987).

309. Himesh Shivappa, *Dilemma of Development and Environment: A Perspective*, 80 CURRENT SCIENCE 1101, 1102 (2001).

310. *See generally* Sandra Alker & Adrian McDonald, *Incorporating Sustainable Development into Redevelopment*, 11 SUSTAINABLE DEV. 171–82 (2003).

311. Cordero, Roth & Silva, *supra* note 300, at 397.

312. *Id.* at 393.

313. *Id.* at 394.

would provide an automatic response.[314]

It appears that an intervention by the government is crucial to solve the issue of externalities that the industrial activities of ship-breaking in Bangladesh may be producing due to their widespread use of natural resources. A desirable environmental goal can only be attained if appropriate policies based on scientific data and technological capabilities can be properly synchronized, followed by implementation of the plan through adoption and enforcement of regulations. This strategy searches for optimum allocation of the level of pollution and the rate of resource consumption.[315] This allocation would consider the aggregate value produced by the industry, followed by a subtraction of the cost of releasing stock pollutants into the environment or depletion of natural resources.[316]

Different studies using graphical models based on available emission data of stock pollutants and capitalist development models based on the GDP growth have successfully shown that environmental guardianship and economic development are not mutually exclusive under the concept of sustainable development.[317] However, their relation has often been misunderstood by both environmental activists and business leaders along with some governments,[318] and Bangladesh is not an exception. In a newly transitioned developing country such as Bangladesh, the absence of public awareness, the actions of political power linked to the industrial activities, and the lack of financial capability and technology pose a complex set of challenges to create a well-designed regulation. Effective regulations and removing the uncertainly, the free market causes can only be solved by setting a benchmark for pollution.[319] It is imperative, therefore, to assess the type of development that

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314. *Id.*

315. *See* Michael Jacobs, *The Limit to Neoclassicism: Towards Institutional Environmental Economics*, *in* SOCIAL THEORY AND THE GLOBAL ENVIRONMENT 281–304 (Michael Redclift & Ted Benton, eds., 1994).

316. *See id.*

317. Heather Tallis & Stephen Polasky, *Here's How We Can Balance Conservation and Development*, WORLD ECON. F. (Oct. 16, 2018), https://www.weforum.org/agenda/2018/10/can-we-balance-conservation-and-development-science-says-yes/.

318. *See* Yossi Sheffi, *Profits v Planet: Can Big Business and The Environment Get Along?*, GUARDIAN (Sept. 7, 2018), https://www.theguardian.com/environment/2018/sep/07/profits-v-planet-can-big-business-and-the-environment-get-along.

319. *See generally* Jacobs, *supra* note 315.

is just and appropriate for an individual country or region.[320]

To safeguard the environment and health of the workers from ship-breaking activities, the Ministry of Industry of Bangladesh adopted a framework regulation titled The Ship-breaking and Recycling Rules, 2011 ("SBRR 2011").[321] Simultaneously, another regulation was passed by the Department of Environment (DoE) titled Hazardous Waste and Ship-breaking Hazardous Waste Management Rule 2011 ("HWR 2011").[322] Both have been fully enforced since December 2011.[323] The Bangladesh Ship Recycling Act 2018 was enacted in March 2018.[324] Besides these rules on ship recycling in Bangladesh, several other laws and regulations are also relevant, and generally apply to other industries alike. The recent draft report on the current domestic framework legislations on ship-breaking in Bangladesh submitted to the IMO SENSREC Project Management Office by the consultants under its Phase II of SENSREC Project reveals a substantial gap between the domestic standard and the one expected by relevant international laws.[325] The domestic legislation was prepared quite hastily[326] by the government of Bangladesh (GOB) having

320. Shivappa, *supra* note 309, at 1102.

321. Shameem, *supra* note 39, at 43.

322. *See* MICHAEL GALLEY, SHIPBREAKING: HAZARDS AND LIABILITIES 17 (2014).

323. *See id.*; *see also* Shameem, *supra* note 39, at 43.

324. *Bangladesh Passes Bill to Improve Working Conditions in Shipbreaking*, *supra* note 21.

325. The Report submitted to IMO Head Quarter through the Ministry of Industry (MoI) Bangladesh.

326. *See* Mahfuzul Haque, *Occupational Health and Safety In The Ship-Breaking Industries of Bangladesh*, *in* GOVERNANCE IN SOUTH ASIA 163–71 (Rumki Basu & M. Shamshur Rahman, eds., 2017) The Bangladesh Supreme Court issued directives to the government, including closure of all ship-breaking yards operating without clearance from the Department of Environment (DOE) which applied to all yards, as none had a clearance certificate. The Ministry of Environment and Forestry (MOEF) was directed to frame a rule governing the hazardous waste industry in line with the Environment Conservation Act 1995, Basel Convention 1989, Factory Act 1965 and Labor Act 2006 within three months of the judgment. A year after the judgment, the government could not comply with directions, and the condition of the shipyards remained unchanged. Finally, in December 2011, the government submitted a domestic regulation on ship recycling titled the Ship-breaking & Recycling Rule 2011 (SBRR 2011). This is the first framework regulation adopted by a national government that predominantly relies on the tidal beaching method. Another regulation, the Hazardous Waste and Ship-breaking Waste Management Rule 2011 (HWR 2011), was also adopted by the DOE. This regulation implemented the Basel Convention in the ship-breaking industry and other industries dealing with hazardous waste.

been directed by the Supreme Court of Bangladesh in a Writ Petition filed by BELA. The CEO of BELA, along with other leading NGOs and environmental activists, claim that they were not at all associated in any stage of the preparation of these regulations and minimal or no stakeholder consultation, if any, was involved.[327] Detailed analysis of the interest of stakeholders in ship-breaking in Bangladesh and the discussion of existing laws forming the ship recycling regime in Bangladesh is therefore necessary. It is important to unravel whether and where the country has set its benchmark of pollution from ship recycling and curbed the social and environmental injury produced by this activity. The aggregate value produced by the industry from ship-breaking has been well documented; however, the social cost and the cost of releasing stock pollutants in the environment and the depletion of natural resources seem uncertain. In absence of such data, setting parameters at an appropriate level would be better addressed by the free, fair and equal participation of all stakeholders in the environmental decision-making process, because they are indisputably in the best position to decide the appropriate benchmark. It is important to single out how far the existing laws have addressed the conflicting claims between stakeholders, what type of bargaining power each stakeholder had, and how much of it has been reflected in the content of the laws and the law-making process.

Ship recycling is, by necessity, an international industry where multinational players play parts from different parts of the world. A domestic law constructed under this sustainable and green development model may fail in the absence of an efficient and binding international regime in the global ship recycling marketplace to curb unfair competition and control pollution. For example, if Bangladesh wishes to address this local pollution problem and social disaster or its resource scarcity, it would not be possible for Bangladesh to solve these problems unilaterally without facing competitive disadvantage in the global market. The existence of adequate international law and the optimum harmonization of domestic law with its foreign counterparts are crucial to govern the international players.

To this effect, under the auspices of the IMO, the Hong Kong Convention for the Safe and Environmentally Sound Recycling

327. Interview with Shahin, *supra* note 52; *see also* Interview with Hasan, *supra* note 149.

of Ships was adopted in 2009.[328] To many, this was a welcomed addition to govern the international industry, but the convention has not been enforced yet. Many expect that the ratification and enforcement of this convention would significantly improve the situation, but several conflicts of interests between different stake holders in this international industry also have been noted. Since the adoption of this convention, it is believed by some representatives of ship-breaking communities that the convention may go against the interests of the countries, such as by placing unwarranted burden on recyclers.[329] Presumably, for most of the beach breakers, it would be impossible to fulfill the conditions of the convention, particularly in the near future. On the other hand, one of the principal stakeholders, the ship-owners, have been left with no significant responsibilities at all. Furthermore, the interests of South Asian recycling countries, who have led this international business for the last three decades and who are essential to ratification, have complicated the process due to their economic vulnerability and internal complex policy choices.

The opinion of the South Asian ship recyclers seems to be changing favorably towards ratification.[330] Contrastingly, there is growing opposition by environmental and human right activists who do not support ratification. They argue that the convention is pro-business to an extreme level and does not protect the interest of the weakest shareholders, such as laborers and the environment.[331] A detailed stakeholder analysis is

328. *The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships*, INT'L MAR. ORG., http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/The-Hong-Kong-International-Convention-for-the-Safe-and-Environmentally-Sound-Recycling-of-Ships.aspx (last visited Apr. 2, 2020).

329. *See Shipbreakers from India, Pak and Bangla Plan United Front*, ECON. TIMES (Mar. 2, 2010), http://articles.economictimes.indiatimes.com/2010-0302/news/27611337_1_imo-convention-iron-steel-scrap-pravin-nagarsheth.

330. *See India Prepares to Ratify the Hong Kong Convention*, MARITIME EXECUTIVE (Feb. 12, 2017), https://maritime-executive.com/article/india-prepares-to-ratify-the-hong-kong-convention#gs.aC0XgBM; *see also* Anil Sharma, founder and CEO GMS Leadership, Presentation at 6th Annual Invest in International Shipping Forum: Ship Recycling: Headline Risk or Opportunity? (Mar. 9, 2012) (available at http://forums.capitallink.com/shipping/2012newyork/pres/sharma.pdf).

331. Jim Puckett, Speech at the International Conference on the Safe and Environmentally Sound Recycling of Ships (May 13, 2009), http://www.shipbreakingplatform.org/shipbrea_wp2011/wpcontent/uploads/2011/11/speech-given-by-the-BGO-on-the-breaching-methomd-may-131.pdf; *see* Interview with Hasan, *supra* note 149.

therefore necessary to understand where international law stands and how it has set its benchmark of pollution and addressed the conflicting interests between international stakeholders.

CONCLUSION

It is apparent that the economic contribution of ship-breaking in Bangladesh has been well documented from the report published by the government and international governmental agencies, such as the IMO, but significant controversy still exists regarding proof of the data as claimed in the report. In absence of a detailed scientific investigation, there remains uncertainty about how much the ship-breaking industry is adversely impacting the coastal environments of Bangladesh. Notably, there is a stark polarization of data in different reports and it oftentimes appears diametrically opposite. Regarding the social and human cost involved in ship-breaking in Bangladesh, no substantial work has been carried out by the government or by any international organization. Crafting policy and law based on refutable or a lack of scientific data is unsustainable. Law or policy making should require rigorous testing before substantial public money is spent on this.[332] Recent studies have shown that the most important factor that offers scientific impact was the legitimacy of knowledge.[333] Additionally, scientific knowledge, which is unbiased and representative of the viewpoints of multiple stakeholders, creates more impact than the one put forward relying solely on one person's credibility or salience.[334] These vital issues regarding negative externalities within primary stakeholders remain unexplored, and there has been no attempt to support law or policies with scientific knowledge through engaging important stakeholders. The domestic laws of ship recycling in Bangladesh lack significance, and it is questionable whether they ensure safe, environmentally sound, and

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332. Jennifer Guay, *Evidence Based Policymaking: Is There Room for Science in Politics?*, APOLITICAL (Oct. 7, 2018), https://apolitical.co/solution_article/evidence-based-policymaking-is-there-room-for-science-in-politics/.

333. Pauline Gerrard, *How Scientific Knowledge Can and Should Guide Policy-Making*, INT'L. INST. FOR SUSTAINABLE DEV. (Oct. 6, 2017), https://www.iisd.org/blog/how-scientific-knowledge-can-and-should-guide-policy-making.

334. *Id.*

sustainable recycling of ships.