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WORLD MARITIME UNIVERSITY

Malmö, Sweden

**EXPLORATION OF OCCUPATIONAL SAFETY AND
HEALTH IN PAKISTAN'S SHIP BREAKING AND
RECYCLING INDUSTRY**

By

SHEHZAD AKBAR
Pakistan

A dissertation submitted to the World Maritime University in partial
fulfilment of the requirements for the award of the degree of

MASTER OF SCIENCE
in
MARITIME AFFAIRS

(MARITIME SAFETY AND ENVIRONMENTAL ADMINISTRATION)

2022

Declaration

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

(Signature): 

(Date): **20 September 2022**

Supervised by: **Capt./Dr. Raphael Baumler**

Supervisor's affiliation: **Professor WMU, Head of MSEA Specialization**

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Abstract

Title of Dissertation: **Exploration of Occupational Safety and Health in Pakistan's**

Ship Recycling Industry

Degree: **Master of Science**

This dissertation is an exploratory research on the Occupational Health and Safety in Pakistan's Ship Breaking Industry at Gadani. SBRI despite being the fully tax compliant industry of Pakistan has been subject to various challenges throughout its operations. These challenges inter alia include OSH of the Gadani workers.

There are various international instruments that regulate the ship breaking industry worldwide including the Basel convention and its technical guidelines, the Hong Kong convention and IMO guidelines, ILO's guidelines on Safety and Health in Shipbreaking, EU Ship Recycling Regulations etc. Whereas, various NGOs also provide standards and certifications for Shipbreaking industry e.g., ISO, ICS, Classification Societies.

In Pakistan, there are various regulatory instruments which address different aspects of the industry that is environment, occupational safety and health, taxes etc.; however, no singular framework exists to regulate the Shipbreaking Industry in entirety. Literature review for eleven different categories of OSH indicated implementation gaps for existing national and provincial regulations.

In order to ascertain current status of OSH in Pakistan's Shipbreaking Industry, primary data collection through a structured survey questionnaire was undertaken for the eleven categories identified in the literature review. Sample size of the data collection was 193 individuals that comprised of different employment categories including yard managers, supervisors, mechanics, cutters, helpers, loaders etc.

Analysis of the collected data indicated grey areas in different aspects like non-availability of standard written contractual agreements, wages for both daily and monthly wage workers, paid holidays for daily wage workers, standard job and safety training, medical and firefighting facilities, accommodation for daily wage workers. However, various categories also indicated improvement like level of education, availability of PPE, standard hours of work.

A roadmap is recommended to address OSH challenges faced by Pakistan's Shipbreaking Industry, which would also improve other inter-related aspects of the industry like training, environment, enforcement, improved efficiency, progress towards ratification of HKC etc.

KEYWORDS: *Occupational Safety and Health, Ship Breaking Industry, Ship Recycling Industry, Ship Breaking and Recycling Industry (SBRI), Gadani, Pakistan.*

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List of Abbreviations

BC	Basel Convention
BDA	Balochistan Development Authority
BEPA	Balochistan Environmental Protection Act
BEPC	Balochistan Environmental Protection Council
CA	Competent Authority
CHW-TSDF	Common Hazardous Waste Treatment, Storage and Disposal Facility
CNS	Central Nervous System
DWT	Dead Weight Tonnage
EoL	End of Life
EIA	Environmental Impact Assessment
EDI	Estimated Daily Intake
EPA	Environmental Protection Agency
ESM	Environmentally Sound Management
EU	European Union
FoC	Flag of Convenience
GEF	Global Environmental Fund
GT	Gross Tonnage
HKC	Hong Kong Convention
HR	Human Resource
HSE	Hull Safety and Environment
ICIMH	International Certificate on Inventory of Hazardous Material
ICS	International Chamber of Shipping
IEE	Initial Environmental Examination
IHM	Inventory of Hazardous Material
ILO	International Labour Organization
IMO	International Maritime Organization
IRRC	International Ready for Recycling Certificate
ISO	International Organization for Standardization
ITUM	International Trade Union Movement
LDT	Light Displacement Tonnage
MARPOL	International Convention for the Prevention of Pollution from Ships
MEPC	Marine Environment Protection Committee
NADRA	National Database and Registration Authority
NEQs	National Environmental Quality Standards
NGO	Non-Governmental Organization
NTUF	National Trade Union Federation
OSH	Occupational Safety and Health
PCBs	Poly-Chlorinated Biphenyls
PEPA	Pakistan Environmental Protection Act
PEPC	Pakistan Environmental Protection Council

PKR	Pakistani Rupees
PMoCC	Pakistan's Ministry of Climate Change
PMoIP	Pakistan's Ministry of Industry and Production
PMOP&HDR	Pakistan's Ministry of Overseas Pakistanis and Human Resource Development
POPs	Persistent Organic Pollutants
PPE	Personal Protective Equipment
PSBA	Pakistan Ship Breakers' Association
REC	Research Ethics Committee
SBRI	Ship Breaking and Recycling Industry
SENSREC	Safe and Environmentally Sound Ship Recycling
SoC	Statement of Compliance
SOLAS	International Convention on the Safety of Life at Sea, 1974
SOP	Standard Operating Procedure
SPSS	Statistical Package for the Social Sciences
SRF	Ship Recycling Facility
SRFP	Ship Recycling Facility Plan
SRP	Ship Recycling Plan
TDI	Tolerable Daily Intake
SRR	Ship Recycling Regulations
UN	United Nations
UNEP	United Nations Environment Protection
UNTCAD	United Nations Conference on Trade and Development
USD	United States Dollar
WMU	World Maritime University
WP	Work Package

Chapter 1 – Introduction

1.1 Background

The global shipping fleet as of 01 Jan 2021, consists of 99,800 ships of 100 GT and above, equivalent to 2,134,639,907 DWT (UNTCAD, 2021). Seagoing ships normally have a lifespan of 20-40 years thereon repair or overhaul becomes uneconomical (Sarraf et al., 2010). These ships also called End of Life (EoL) ships, are generally disposed of to a greater extent through Ship Recycling¹ and to a lesser extent through other commercial activities like hotels, museums, and artificial reefs for tourist attraction (Jain, 2017).

According to Hougee (2013) Ship recycling is an option for EoL Ships for sustainable socio-economic development of society. These sustainable socio-economic factors include, provision of:

- Jobs to hundreds of thousands of labours in developing countries like China, India, Pakistan and Bangladesh.
- Re-rollable scrap steel for iron and steel industries of ship recycling countries.
- Reusable machinery, equipment and other fittings to ship recycling countries.

In 2020, despite COVID-19 tonnage of Ship recycling grew by 44% globally as compared to the previous year reaching 17.401 million GT (UNTCAD, 2021), which highlights the significance of the Ship recycling industry.

¹ In the literature, terms: '*Ship Breaking, Ship Dismantling, Ship Recycling, Ship Scrapping, Ship Breaking and Recycling (SBR)*', have been used which refer to the same industry and process. Therefore, in the dissertation these terms will also be interchangeably used indicating to the same process.

1.2 History of Ship Breaking and Recycling Industry

Prior 1970s, recycling of ships was undertaken in highly mechanized dry dock facilities, mostly in industrialized European countries i.e. UK, Germany, Spain and Turkey. During 1980s, the industry shifted to east Asian countries i.e. South Korea, Taiwan, China and Japan, due to the availability of cheaper labour and marginal resource requirements. However, with the implementation of stricter international regulations on toxic decontamination and precautions for preventing accidents lowered profit margins for the shipbreakers. Therefore, the industry further moved in the late 1980s to other locations i.e. South-East Asian developing countries like Pakistan, Bangladesh, and India (P. Mishra & Mukherjee, 2008).

The modus operandi of Ship Recycling in the Indian subcontinent is primarily through beaching² which does not require large capital investments and infrastructures; however, it is a labour intensive method. The ships take more time to be dismantled but is cheaper and the local economies absorb larger quantities of extracted material (P. Mishra & Mukherjee, 2008).

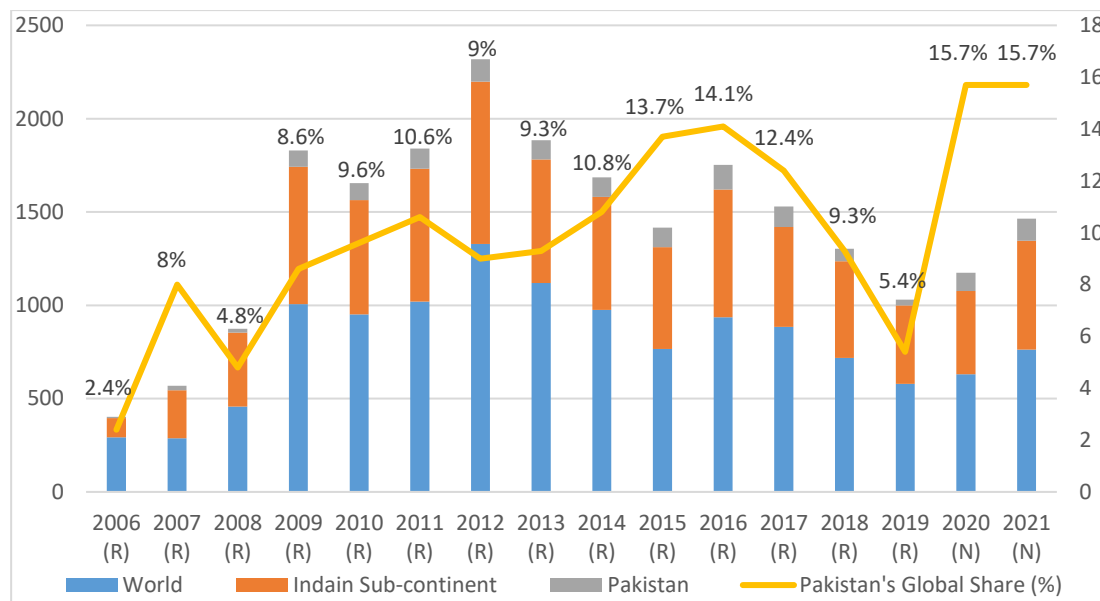
1.3 History of Ship Breaking and Recycling Industry in Pakistan

Pakistan's ship breaking industry has its origins from pre-partition era i.e. prior 1947. The industry is located on the beach of Gadani in the province of Balochistan, approximately 46 km northwest of Karachi, the largest city of Pakistan. There are 132 plots in the Gadani ship recycling yard and the beach front spans around 10 km. Annual dismantling capacity of the recycling yard is up to 125 ships of all sizes, including super-tankers and an LDT 1,000,000 Tons per year. In Pakistan, ship recycling is undertaken only through beaching method (Hameed, 2019). In 1978, the Government of Pakistan took several initiatives to boost the industry which included classification of Gadani ship breaking yard as a port, reduction of import tax and formulation of a dedicated organisation to look after the yard issues. The country witnessed boom in the ship breaking industry in 1980s, producing about 1 million tons of scrap and employing around 30,000 workers at its peak. However, in late 1980s fluctuations in tax and regulatory regimes combined with the competition from ship recycling yards of India and Bangladesh reduced ship scrap to only one-fifth of its peak production. Pakistan ship breaking industry (special procedures) rules, 1997

² Details of recycling methods available in Annex-1.

was implemented which imposed high taxes on the ship recycling industry. The high amount of tax along with competition from other countries brought the industry to a halt by 2000s (Sarraf et al., 2010). Recently, the industry regained its momentum upon reduction of taxes by the government (Ahmed & Siddiqui, 2013).

Figure 1 *Statistics of Ships Recycled*



Note. Statistics compiled by the author from NGO Sources. (R) – Data extracted from Robin Des Bois (<https://robendesbois.org/en/category/balisage/demolition-des-navires/>), and (N) – Data extracted from NGO Ship Breaking Platform (<https://shipbreakingplatform.org/resources/annual-lists/>).

1.4 Significance of Ship Breaking and Recycling Industry for Pakistan

The SBRI Gadani is one of the most tax paying industry of Pakistan, and therefore important for the country's economy. It provides an average of 15% raw (scrap) material to the domestic steel industry (smelters and re-rolling mills). The industry is 100% documented and tax compliant (import duty, income tax, sales tax, etc.) in the national steel sector (Hameed, 2019). An annual revenue generation of 5 billion PKR (approximately 4.7 million USD); wherein, 30% of the share is received by the Government of Balochistan is attributed to Pakistan's SBRI (Kanwar et al., 2014; Shah et al., 2017).

The industry is labour intensive and provides job opportunities to skilled and unskilled workers from all over the country. An estimated workforce of about 0.125 million people, including those directly (15000 at Gadani) and indirectly (approx. 0.11 million in 650 smelters & 450 re-rolling mills) involved, means reliance of an approx. 0.850 million dependent family members on Pakistan's SBRI (Kanwar et al., 2014).

Therefore, it is important for Pakistan to keep this industry by aligning with international standards, if not, the industry may move and lots of jobs and opportunities lost.

1.5 Research Aim and Objectives

Pakistan is among the top countries in the global SBRI. This industry is governed by various sets of national and provincial legislations apart from the international instruments that govern the industry. However, an implementation gap in various aspects of the SBRI exists, which inter alia includes the Occupational Safety and Health of the workers, which requires focused attention. The latest IMO instrument that is the Hong Kong Convention on Safe and Environmentally Sound Ship Recycling is expected to enter into force in coming years. Thereon, although Pakistan is expected to remain a destination for Ship recycling for ships from non-ratified countries or through re-flagging to FoC; however, formulation and revision of relevant national legislation for safe and environmentally sound recycling of ships is in the best interest of Pakistan. This will also allow Pakistan access to ships for recycling from countries that have already ratified or will ratify the HKC in the future. Upon setting the research objectives, the aim of this dissertation is:

“To analyse and identify gaps legislative and implementation gaps on occupational safety and health in the ship recycling industry of Pakistan and propose way forward”.

1.6 Research Questions

To achieve the aim and objectives of the research, the dissertation will focus on following aspects:

- What are the international regulatory instruments for Safe and Environmentally Sound Ship Recycling and Pakistan's regulatory framework that governs Ship breaking and recycling industry?
- What are the challenges in implementation of latest standard for occupational safety and health, in Pakistan's ship breaking and recycling industry?
- What is the way forward for implementation of Occupational Safety and Health standards in Pakistan's ship breaking and recycling industry?

1.7 Structure of the Dissertation

This dissertation consists of five chapters, described as under:

Table 1 *Structure of the Dissertation*

Chapter-1	Introduction
<ul style="list-style-type: none">• Covers background of the topic, identification of problem statement, aim, objectives and structure of the dissertation.	
Chapter-2	Literature Review
<ul style="list-style-type: none">• Focuses on international, regional and Pakistan's national regulations on ship recycling for identification of regulatory and implementation gaps in OSH in Pakistan's SBRI.	
Chapter-3	Research Methodology
<ul style="list-style-type: none">• Describes the research methodology adopted (mix method) alongwith process employed for collection of secondary and primary (survey questionnaire) data to undertake qualitative and quantitative research .	
Chapter-4	Data Analysis
<ul style="list-style-type: none">• Focuses on presentation and analysis of the data obtained from survey questionnaire.	
Chapter-5	Way Forward
<ul style="list-style-type: none">• Discusses the outcome of the research alongwith pertinent recommendations as a way forward for Pakistan to undertake recycling of ships in accordance with the OSH standards.	

Chapter 2 – Literature Review

2.1 Introduction

Various international and regional organizations have formulated different instruments to regulate recycling of ships in a safe and environmentally sound manner. This includes UNEP's Basel Convention (BC), IMO's Hong Kong Convention (HKC) and ILO's Guidelines for OSH in Ship Breaking. The three UN bodies have also been working together in the domain of ship recycling through Joint Working Group (2005a, 2005b, 2008). On the regional level, owing to significant international ship owning, EU regulations on ship recycling are important for EoL ships. Furthermore, various international organizations like ISO and Industry Working Group on Ship Recycling have also formulated standards and guidelines. In Pakistan, SBRI is also regulated through various national and provincial instruments; however, legislative and implementation gap persists which will be reviewed through respective legislation and literature available for the industry.

2.2 Key Guidelines and Conventions Applying to the Sector

2.2.1 Safety and Health in Shipbreaking – Guidelines for Asian countries and Turkey, 2004 (ILO)

Established in 1919, "ILO is the only tripartite UN agency which brings together governments, employers and workers of the 187 member states, to set standards, develop policies and devise programmes promoting decent work for all women and men"³.

Since the 1980s, ILO resolutions had been issued to enhance shipbreaking working condition. However, the ship breaking remains regularly questioned for labour abuse and poor OSH (ILO, 2000).

³ <https://www.ilo.org/global/about-the-ilo/lang--en/index.htm>

Currently, the SBRI is mainly concentrated in a few developing Asian countries due to low wages and compliance to international standards of safety, health, and environment (ILO, 2004). To support the betterment of working conditions in the sector, ILO adopted its *Safety and Health in Shipbreaking: Guidelines for Asian Countries and Turkey* in 2004. The document provides a framework to improve labour conditions in the industry but remains non-mandatory.

The guidelines are aimed towards enforcement of various measures to prevent and protect work-related hazards, injuries, ill health, and incidents in and around the workplace. The guidelines provide a recommended legal framework for national legislation in OSH⁴, and a guidance on safe ship breaking operations, which includes operational planning for three phases of ship breaking i.e. preparation, deconstruction and material (scrap) stream management (ILO, 2004).

Finally, it is important to recall, that the ILO fundamental conventions apply in the sector (e.g., against child labour or forced labour). Appendix-A to Annex-3 provides a list of the ILO fundamental and other conventions adopted by Pakistan.

2.2.2 The Basel Convention on the Control of Transboundary Movement of Hazardous Waste, 1989 (UNEP)

Since 1980s, management of hazardous waste has been included in the three priority areas of UNEP. The BC was adopted on 22 March 1989, as a response to global outcry in 1980s against discovery of deposits of toxic waste material imported into Africa and other developing countries from abroad. The convention subsequently entered into force on 5 May 1992. It is the most comprehensive global environmental agreement on hazardous material and other wastes (Basel Convention, 1989). Pakistan acceded to the BC on 26 July 1994, with subsequent entry into force on 24 October 1994. Presently, there are 189 states party to the convention⁵.

The BC aims to safeguard human health and environment against the harmful consequences from production, transboundary movements and management of hazardous material and other wastes (Basel Convention, 1989). The BC secretariat has formulated various guidelines for management of hazardous material and other

⁴ The terminologies 'Occupational Safety and Health (OSH)' and 'Occupational Health and Safety (OHS)' are used interchangeably in the literature. However, ILO being the pioneer for labour rights uses OSH, and will also be used in this dissertation.

⁵ <http://www.basel.int/Countries/StatusofRatifications/PartiesSignatories/tabid/4499/Default.aspx>

wastes which includes the *Technical Guidelines for the Environmentally Sound Management (ESM) of the Full and Partial Dismantling of Ships*. These guidelines afford guidance to the states with existing or planned ship recycling facilities. It provides information and advice on practices, procedures, and processes required for ESM of hazardous material and other wastes at such facilities, combined with environmental performance monitoring and verification (UNEP, 2003).

The Basel ban amendment was adopted on 22 November 1995 at Geneva, and subsequently entered into force on 5 December 2019. Presently, there are 101 states party to the amendment⁶. The amendment prohibits trade of hazardous material and other wastes between party and non-party states (Basel Action Network, 2019).

2.2.3 The Hong Kong Convention on Safe and Environmentally Sound Recycling of Ships, 2009 (IMO)

IMO is a specialized UN agency, which regulates maritime transportation. After entry-into-force of the IMO convention in 1958, the organization inter alia has been involved in matters concerning prevention and control of marine pollution from ships⁷. IMO heeding to its responsibility towards rising concern about safety, health, welfare and environment related matters in the SBRI, which also contributed towards sustainable development and being the best option for EoL ships, adopted the HKC in May 2009. However, the convention has not yet entered-into-force.

The HKC is aimed at ensuring EoL ships when being recycled, do not pose any avoidable risks to safety and health of humans and to the environment. It is the first international instrument which is aimed to address all aspects related to ship recycling starting from ship building, its operations and till the dismantling phase. This includes replacement of hazardous material in ship construction and maintenance with less hazardous or ideally non-hazardous material (Hong Kong Convention, 2009). The convention sets out various conditions for ship owners, ship recycling states and Ship Recycling Facilities (SRFs) for safe and environmentally sound recycling of ships⁸ (ILPI, 2016). However, the convention has been critiqued for not having a clear stance on the environmental hazard associated with the beaching

⁶ <http://www.basel.int/Countries/StatusofRatifications/BanAmendment/tabid/1344/Default.aspx>

⁷ <https://www.imo.org/en/About/HistoryOfIMO/Pages/Default.aspx>

⁸ Briefly described in Appendix-C to Annex-3.

method⁹. IMO has also formulated various guidelines to assist in implementation of the HKC's technical standards¹⁰.

With 93% global share, Bangladesh, India, Pakistan and Turkey are top four countries for ship recycling. Wherein, Turkey and India are among the 17 countries that have already ratified the HKC. Whereas, Bangladesh is pursuing ratification of the HKC by 2023 through national legislation and its implementation (Bangladesh Ship Recycling Act, 2018). This will satisfy third condition of the entry into force. Further, ratification of this IMO instrument by large ship owning flag states like Marshall Island and Liberia could satisfy the second condition of the HKC. Hence, enabling entry-into-force requirements. Upon entry-into-force, the convention will enforce no more favourable treatment for EoL ships and SRFs of non-party states.

2.2.4 EU Regulations for Ship Recycling

EU endeavours to remain ahead of IMO in formulation and implementation of legislation. Adoption of the HKC by IMO in 2009 apart from being a positive step towards safe and environmentally sound recycling of ships was also criticized for its soft laws as compared to the BC. Non-entry into force and criticism led European Commission to the adoption of EU Ship Recycling Regulations (SRR), which subsequently entered-into-force on 30 December 2013 (Pastorelli, 2014).

The regulation is more stringent and is aimed at early ratification of HKC both within EU and third party states through implementation of adequate measures to EoL ships and SRFs on the basis of HKC (European Union, 2013). Therefore, EU ship owners have to ensure the preparation of EoL ships for recycling in accordance with these regulations. This includes provision of necessary information of the specific EoL ship to SRF, notification of intent to recycle to respective administration, provision of up-to-date IHM, minimize cargo residues, fuel and waste material onboard, and provision of ready to recycle certificate. SRFs have to develop SRP based on information provided for the specific-ship to the ship-owner which should include details of undertaking safe and environmentally sound recycling of the ship. Furthermore, EU ships are required to undergo a survey for verification of IHM compliance in accordance with the regulations. If South Asian SRFs continue to adopt

⁹ NGO Shipbreaking Platform, <http://www.shipbreakingplatform.org/new-ship-recycling-convention-legalizes-scrapping-toxic-ships-on-beaches-of-poor-countries/>

¹⁰ Listed in Appendix-C to Annex-3.

the beaching approach for ship recycling, they will likewise be unable to fulfil EU criteria (NGO, 2014). Therefore, since 31 December 2018, all large EU flagged vessels are required to undergo recycling in EU-approved SRFs (European Union, 2022). However, none of the Ship Recycling Yards in Bangladesh, India and Pakistan are included in the EU-approved list of SRFs¹¹.

EU owns about 40% of the world fleet, with this comes an ethical responsibility to push for sustainable ship recycling. Topped by the Greek shipping companies, most EU-flagged EoL ships are being recycled outside the EU, primarily in the South Asian beaching SRFs. A total of 271 European-owned and/ or flagged vessels were sold for recycling in 2018-19. This accounts for about 1/3rd of the global tonnage sold for recycling to beaching yards. Only 10 out of 271 vessels sailed under a European flag during their last voyage. Also, 27 vessels were swapped to a non-EU FoC¹² only weeks prior beaching for recycling to by-pass the EU law (NGO, 2019). Therefore, despite formulation of EU ship recycling regulations implementation issues persists in the EU flagged vessels destined for dismantling.

2.3 Non-Governmental Standards Addressing Ship Recycling

2.3.1 International Organization for Standardization (ISO)

Established in 1946, ISO is an autonomous non-governmental international organization with a membership of 167 national standards organizations¹³. The organization gathers experts for knowledge sharing and development of International Standards¹⁴ that provides solutions to global challenges. Up till now, ISO has formulated a total of 24432 standards and comprises of 808 committees/ sub-committees¹⁵.

There are different series of standards which are also relevant to the SBRI. The ISO 30000 Series (Ship Recycling Management Systems) was specifically formulated to enable Ship Recycling Industry to undertake safe and environmentally

¹¹ The current list published on 28 April 2022, comprises of 46 SRFs worldwide, including 37 yards in Europe, 8 yards in Turkey and 1 yard in USA (European Union, 2022).

¹² Top five FoC for EoL ships include Comoros, Liberia, Palau, Panama and St. Kitts and Nevis (NGO, 2019).

¹³ One member for each country.

¹⁴ An International Standard is a document containing practical information and best practice. It often describes an agreed way of doing something or a solution to a global problem.

¹⁵ <https://www.iso.org/about-us.html>

sound recycling of ships. The series comprises of different standards (listed in Appendix-D to Annex-3). Other ISO standards applicable to the industry include ISO 9001-2015 (Quality Management Systems), 14001-2015, (Environmental Management Systems), and ISO 45001-2018 (Occupational Health and Safety Management Systems)¹⁶. Various yards at SBRI Gadani also undertake these non-mandatory certifications.

2.3.2 Industry Working Group on Ship Recycling

The International Chamber of Shipping (ICS) is a global trade association which represents 80% of the global commercial shipping. The organization aims to represent industry's interests in maritime affairs including shipping regulations, technical matters, and development of best practices. In an effort to show the industry's commitment to the IMO on matters of Ship Recycling, ICS established an Industry Working Group on Ship Recycling in 1999. The Working Group has published three guidelines on Ship Recycling for ship-owners (listed in Appendix-E to Annex-3) (ICS, 2001, 2009, 2016). The 2009 (1st edition) and 2016 (2nd edition) guidelines were formulated after the adoption of HKC as a preparatory measure for its entry-into-force, which also indicates the shipping industry's commitment towards adherence to IMO's HKC requirements. The 2016 guidelines, provides procedural approach including preparation of IHM, and an SRP for the ship-owners (ILPI, 2016).

2.4 Conclusion of International and Regional Instruments for Ship Recycling

Safe and environmentally sound recycling of ships is important for ship breakers and the environment. Various international and regional organizations like IMO, UNEP, ILO, EU, ISO, ICS, etc. are working actively towards achievement of this objective through formulation of various instruments. However, without dedicated efforts from ship owning and SRF states this objective cannot be achieved. The required efforts inter alia include, ratification of international ship recycling international, formulation of respective national legislation, and its implementation.

¹⁶ OHSAS 18001 replaced by ISO 45001 series.

2.5 Pakistan's Ship Breaking and Recycling Industry (SBRI)

There is significant literature available online for Ship Recycling being undertaken worldwide and in Pakistan. The literature review on Pakistan's SBRI includes relevant national/ provincial instruments, scholarly articles, and reports. Literature identified through various sources available online discusses different aspects of Pakistan's SBRI in varying extent is summarised below:

Table 2 *Identified Literature on Pakistan's SBRI*

Literature on SBRI in Pakistan	Legislative & institutional framework	Economic Aspect	Environmentally Safe Management of Hazardous & Other Wastes	Occupational Safety & Health	Process & Current Practices	Training
Shahid, 2005	✓	✓	✓	✓	✓	
Sarraf et al., 2010	✓	✓	✓	✓	✓	✓
Watkinson, 2012	✓		✓			
Ahmed & Siddiqui, 2013		✓			✓	
Galley, 2014		✓		✓	✓	
Kanwar et al., 2014	✓		✓	✓	✓	✓
ILPI, 2016	✓			✓		
Shahzad & Javaid, 2016		✓		✓	✓	
Butt et al., 2016	✓		✓	✓	✓	
Shah et al., 2017		✓		✓		
S. Mishra, 2018	✓		✓			
Hameed, 2019	✓	✓		✓	✓	
Ali & Pearce, 2020	✓	✓	✓		✓	
Kakar et al., 2020			✓			
Zarqa et al., 2021	✓		✓			
Kakar et al., 2021			✓			
Boviatsis et al., 2022	✓			✓	✓	

2.5.1 Pakistan's SBRI Gadani

According to the world bank report (Sarraf et al., 2010), out of 132 plots at SBRI Gadani, approximately 2/3rd are private owned; whereas, remaining 1/3rd yards are owned by Balochistan Development Authority (BDA). There are approximately 30 ship breaking companies active at Gadani which operate on leased plots from local landlords or BDA. An average of 3 plots is used by each company, with bigger companies using up to 4 or more plots.

Figure 2 *Stakeholders of Pakistan's SBRI*



2.5.2 National and Provincial Frameworks for Pakistan's SBRI

Pakistan's SBRI is being regulated by various national and provincial regulations which cover various aspects like OSH, environment protection, tax, leasing of land etc. However, there is no comprehensive national or provincial legislation that covers SBRI in its entirety (Kanwar et al., 2014; Zarqa et al., 2021).

Eighteenth amendment to the Constitution of the Islamic Republic of Pakistan (1973) was undertaken in 2010. The amendment inter alia also afforded provincial autonomy in various aspects. This led to devolution of 17 federal ministries. The functions of these ministries were devolved to either provincial ministries or reallocated to other divisions within federal government (Rumi et al., 2014).

Ship Breaking has been accorded the status of an industry. The sector falls under Pakistan's Ministry of Industry and Production (PMoIP); however, the ministry has not formulated any policies or legal framework to regulate the industry (Watkinson, 2012).

The Federal Ministry of Labour and Manpower that dealt with OSH of labour across the country was devolved on 1 July 2011. However, seven wings of the ministry were retained by the federal government (Rumi et al., 2014).

Similarly, Federal Ministry of Environment was also devolved on 1 July 2011. However, 14 out of 18 environment related aspects were retained in other federal ministries. In 2012, the Federal Ministry of Disaster Management was reorganized as the Ministry of Climate Change which took over a number of environment related issues (Rumi et al., 2014).

In the province of Balochistan, the department of Industries and Commerce deals with the SBRI Gadani and developed some regulations. The department of Labour and Manpower in the province has the responsibility to address OSH¹⁷. Finally, the department of Environment, Sports and Youth Affairs deals with environment issues in the province including shipbreaking¹⁸. The Balochistan Coastal Development Authority holds the responsibility for coordination, development and environment protection of coastal areas of Balochistan including SBRI Gadani. This inter alia includes provision of basic necessities, infrastructure, educational and technical institutions (Balochistan Coastal Development Authority Act, 1998).

From tax and business development point of view, Pakistan's SBRI is subject to strict customs check under the Customs Act, 1969; and the Balochistan Ship-Breaking Industry Rules, 1979 empowers the Balochistan Development Authority to lease coastal land for ship recycling yards (Balochistan Development Authority Act, 1974; Kanwar et al., 2014; Zarqa et al., 2021).

Although various national and provincial instruments are available implementation and enforcement seem insufficient (Butt et al., 2016). Therefore, improvement requires formulation of industry specific regulations targeting decent

¹⁷ <https://balochistan.gov.pk/departments-page/>.

¹⁸ Ibid.

working conditions and safe and environmentally sound recycling of ships in line with national and international instruments. (Kanwar et al., 2014). It is envisaged that PMoIP will formulate required national legislation for SBRI Gadani to increase the industry's standards as per the requirements of the HKC (Watkinson, 2012).

2.5.3 Environmentally Sound Management (ESM) of Hazardous Material and Other Wastes

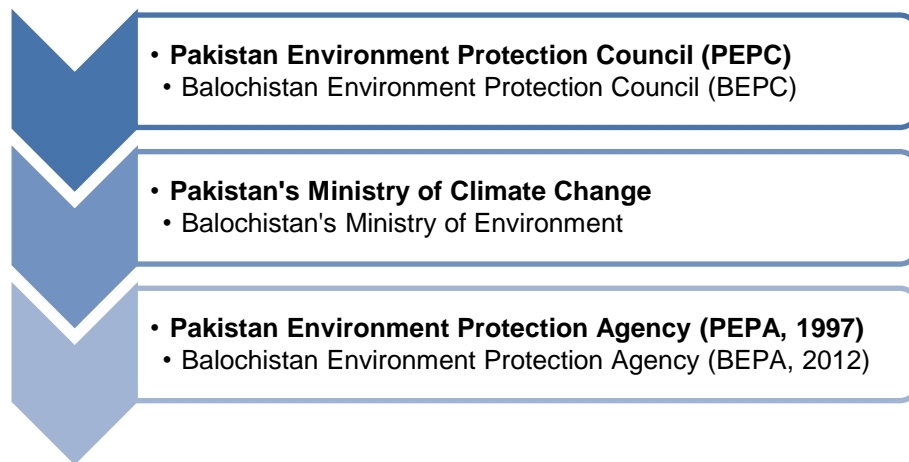
In addition to affect the environment and communities neighbouring SBRI, ESM of hazardous material and other wastes is closely related to the OSH of workers. Therefore, institutional and regulatory framework in Pakistan and the Balochistan province that regulates environmental aspect of the SBRI alongwith review of available literature is considered essential to enable better understand of safety and health risks associated with handling of hazardous material and other wastes by SBRI Gadani workers.

Pakistan Environmental Protection Council (PEPC) is the highest authority that deals with the environment related issues in the country. Under PEPC, Pakistan's Ministry of Climate Change (PMoCC), inter alia, formulates national policy, plans, strategies and programs related to environment protection, preservation and pollution control; and coordinates, monitors and implements environmental agreements with other states, international organizations and forums (PMoCC, 2021). The ministry regularly attends IMO meetings, and also participated in BC sponsored Ship Recycling workshop in Turkey (2010). PMoCC is not the focal point for and in-charge for matters pertaining to the IMO or its conventions. However, as Pakistan's principal ministry for multinational environmental accords to which the country is a party, its function as a supervisor of environmental protection is essential. PMoCC's function with respect to the HKC is likely to be through federal and provincial Environmental Protection Agencies (EPA) (Watkinson, 2012).

Formulated through Pakistan Environment Protection Act (PEPA), Pakistan EPA works under PMoCC, and approves Environmental Impact Assessment (EIA) and Initial Environmental Examination (IEE) prior to initiation of projects anticipated to cause environmental repercussions. The agency is also responsible to formulate National Environmental Quality Standards (NEQS); however, as of now facilities for storage, treatment, recycling or disposal for hazardous materials and other wastes

are not covered in NEQS (Kanwar et al., 2014). Other functions of the agency includes issuance of certificates to environment labs, gap identification and initiation of legislation for environment protection, increase public awareness, undertake measures for prevention of accidents and disasters detrimental for the environment, increase public awareness, and encourage NGOs and local organizations for pollution prevention and control and sustainable development (PEPA, 1997). However, post 18th amendment in the constitution, Balochistan EPA formulated under provision of PEPA directly deals with environment related matters at SBRI Gadani instead of Pakistan Environment Protection Agency (PEPA, 1997; BEPA, 2012; Watkinson, 2012).

Figure 3 *National / Provincial Environmental Protection Authorities*



A list of national and provincial legislations for environment protection identified and available online is as under:

Table 3 *National / Provincial Legislation for Environment Protection*

<i>Pakistan's National Legislation for Environment Protection</i>
<ul style="list-style-type: none"> • Pakistan Environmental Protection Act, 1997 • Environmental Tribunal Rules, 1999 • Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations, 2000 • Environmental Sample Rules, 2001 • The Pollution Charge for Industry (Calculation and Collection) Rules, 2001 • Hazardous Substances Rules, 2003 • Handling, Manufacture, Storage Import of Hazardous Waste & Hazardous Substances Rules (Draft), 2022
<i>Balochistan's Provincial Legislation for Environment Protection</i>
<ul style="list-style-type: none"> • Balochistan Environment Protection Act, 2012 • Balochistan Hazardous Substances Rules, 2020 • Balochistan Environmental Sample Rules, 2020 • Balochistan Environmental Tribunal Rules, 2020 • Balochistan Environmental Pollution Charge for Industry (Calculation and Collection) Rules, 2020 • Balochistan Environmental Protection (Administrative Penalty) Rules, 2020 • Balochistan Environmental Protection Agency (Review of IEE and EIA) Regulations, 2020 • Balochistan Environmental Protection (Registration of Environmental Consultants) Regulations, 2021

Note. List of National and Provincial Environmental Legislation compiled from Government of Pakistan and Balochistan official websites (<https://pakistancode.gov.pk/new/LGu0xAD>, <https://pabalochistan.gov.pk/new/acts/>).

Management of hazardous material including its import/export is prohibited in Pakistan except under a license given by the federal or provincial government in accordance with any national instrument or a bilateral, multilateral or regional agreement. The license specifically requires ‘*Prior Informed Consent*’ in accordance with the BC, alongwith provision of information regarding characteristics and quantity of hazardous waste, waste management plan, safety plan, port of entry/exit in Pakistan, transportation details, notification of major incidents, condition of premises, and an annual report to be submitted to EPAs covering afore stated details (PEPA, 1997; Hazardous Substances Rules, 2003; BEPA, 2012). Presently, ‘*Handling, Manufacture, Storage Import of Hazardous Waste and Hazardous Substances Rules (2022)*’ is under process of approval for subsequent implementation.

2.5.3.1 Prosecution of Contravention to Environmental Laws

Disposal of hazardous materials like asbestos, POPs, PCBs, and waste oil in ship recycling can have adverse effects on the environment (Du et al., 2018). SBRI in Pakistan is also faced with these challenges. Contravention or failure to comply to hazardous waste regulations is liable for penalisation as per provision in PEPA (Section-17) and BEPA (Section-25). Environmental Sample Rules (2001) also provision federal or provincial EPAs to enter, inspect, and take possession of articles for evidence that are in contradiction to the PEPA or BEPA and liable for prosecution under an environment tribunal in accordance with the Code of Criminal Procedures, 1989 (Environmental Tribunal Rules, 1999; Watkinson, 2012; Balochistan Environmental Tribunal Rules, 2022).

2.5.3.2 Risk to Human Health and Environment – the case of mercury poisoning

Hazardous waste from SBRI Gadani affects the coastal waters of Balochistan, which is renowned for its wide variety of marine biodiversity including 350 different species of fish. Bioaccumulation of heavy metals (Mn, Cd, Pb and Ni) in edible muscle tissues of seven fish species were found to be within Tolerable Daily Intake (TDI) for Estimated Daily Intake (EDI) of humans. Seawater in vicinity of SBRI Gadani needs to be continuously monitored to avoid higher concentrations of pollutants being detrimental to human health (Kakar et al., 2020).

Recently, workers in the SBRI including that in Pakistan are also effected by mercury poisoning¹⁹ (ILO, 2022). The Floating Storage and Offloading (FSO) Tanker (J.NAT) bound for dismantling at Gadani in 2021 contaminated workers and the environment. While removing the mercury-contaminated oil sludge workers reported breathing difficulties, severe burning and rashes on face and hands. Upon indication, dismantling work was discontinued by authorities (EEB, 2021); however, the damage to the safety and health of workers and the environment had already been done.

It is estimated that 1500 tons of mercury-contaminated oil sludge was disposed of illegally through dumping at sea or land¹. This indicates that the environment regulation did not succeed to preserve the area from such acute pollute. It suggests gaps in implementation of national and provincial regulations.

¹⁹ Mercury poisoning in various occupations remains significant which can lead to serious health impacts like Central Nervous System (CNS) toxicity, skin and eye irritation, gastrointestinal disturbances, lung damage, immune system dysfunction, kidney damage etc.

Furthermore, elevated concentrations of Mercury (HgT) (4 to 50 times) and Methyl-Mercury (MeHg) (3 to 30 times) in sediments of SBRI Gadani (Kakar et al., 2021), which indicates an implementation gap for ESM of hazardous material and other wastes.

2.5.3.3 Hazardous Waste Management Directorate

PMoCC secured USD 75,000 funding from UNEP to establish Waste Management Directorate in the PMoCC. The directorate is envisaged formulate National Hazardous Waste Management Policy and related legislation²⁰. However, the directorate has not been established yet. Upon establishment, it will be responsible for undertake technical work related to management of all kinds of waste (PMoCC, 2021).

2.5.3.4 Hazardous Waste Management Facility

A document for the project titled “Establishment of Common Hazardous Waste Treatment, Storage and Disposal Facility (CHW-TSDF)” was formulated and submitted to seek funding from UNEP’s Global Environment Fund (GEF). Site allocation for establishment of CHW-TSDF at SBRI Gadani for handling of waste has also been finalized (PMoCC, 2021). However, there is no physical progress on the project as yet.

2.5.4 Occupational Safety and Health (OSH) in Pakistan’s Ship Breaking Industry

Pakistan has been a member of ILO since 31 October 1947. The country has ratified 36 ILO conventions which includes 8 fundamental conventions²¹; however, it has not ratified any of the OSH instruments of ILO^{22 23}. Presently, Pakistan’s Ministry of Industry and Production (PMoIP) and Ministry of Overseas Pakistani and Human Resource Development (PMOP&HRD) deals with matters pertaining to OSH.

²⁰ <https://open.unep.org/project/PIMS-01967>.

Project title: ‘Operationalization of the Special Programme to support institutional strengthening at the national level to enhance the implementation of the Basel, Rotterdam and Stockholm conventions, the Minamata Convention on Mercury and the Strategic Approach to International Chemicals Management’.

²¹

https://www.ilo.org/dyn/normlex/en/f?p=1000:11200:968679279410:::P11200_INSTRUMENT_SORT:3

²²

https://www.ilo.org/dyn/normlex/en/f?p=1000:11210:968679279410:::P11210_INSTRUMENT_SORT:2

²³ Summary of ILO conventions ratified by Pakistan is at Appendix-A to Annex-3.

The constitution of Pakistan, 1973 remains the prime authority for protection of fundamental rights which is also applicable to the Ship Recycling Industry. OSH is being dealt through various laws in Pakistan both at federal and provincial levels; however, no single comprehensive legislation that covers OSH at workplace (Kanwar et al., 2014; Zarqa et al., 2021). A list of identified national and provincial legislation that deals with OSH is as follows:

Table 4 *National / Provincial Legislation for OSH*

Pakistan's National Legislation for OSH
<ul style="list-style-type: none"> • Workmen Compensation Act, 1923 • Children Pledging of Labour Act, 1933 • Pakistan Factories Act, 1934 • Payment of Wages Act, 1936 • Employers Liability Act, 1938 • Employment (Record of Services) Act, 1951 • Minimum Wages Ordinance, 1961 • The Apprenticeship Ordinance, 1962 • Employees Social Insurance Ordinance, 1962 • Control of Employment Ordinance, 1965 • West Pakistan Hazardous Occupations Rule, 1963 • Provincial Employees Social Security (Occupational Diseases) Regulations, 1967 • Industrial and Commercial Employment (Standing Order) Ordinance, 1968 • Minimum Wages for Unskilled Workers Ordinance, 1969 • Workers Welfare Fund Ordinance, 1971 • Workers Children (Education) Ordinance, 1972 • Employees Cost of Living (Relief) Act, 1974 • Labour Laws (Amendment) Act, 1976 • Employees Old Age Benefit Act, 1976 • Employment of Children Act, 1991 • National Vocational and Technical Training Commission Act, 2011 • Industrial Relations Act, 2012
Balochistan's Provincial Legislation for OSH
<ul style="list-style-type: none"> • Balochistan Factories Act, 2021 • Balochistan Board of Technical and Vocational Training Act, 2021 • Balochistan Minimum Wages Act, 2021 • Balochistan Payment of Wages Act, 2021 • Balochistan Industrial and Commercial Employment (Standing Order) Act, 2021 • Balochistan Industrial Relations Act, 2022 • Balochistan Worker's Welfare Fund Act, 2022

Note. List of National and Provincial Environmental Legislation compiled from the Government of Pakistan (<https://pakistancode.gov.pk/new/LGu0xAD>, <https://environment.gov.pk/>), and the Government of Balochistan official websites (<https://pabalochistan.gov.pk/new/acts/>).

A total of 11 different categories of Occupational Safety and Health in Pakistan's SBRI Gadani were selected for literature review which will subsequently be analyzed for present status of implementation through primary data.

2.5.4.1 SBRI Gadani and its Workers

At SBRI Gadani, ship breaking is undertaken through contractors. The primary contractor is hired by the ship breaking company. Thereon, various sub-contractors are hired by the main contractor who are responsible for different jobs. Further contracting or hiring is done by the subcontractors (Butt et al., 2016). SBRI Gadani employs around 12,000 to 15,000 depending upon presence of ships for dismantling (Kanwar et al., 2014).

Demography of Workforce

Various studies point towards different demographic spread of workers at SBRI Gadani. World bank study indicates that majority of the workforce (up to 75%) at SBRI Gadani comprise of migrant workers, that come from other parts of Pakistan (Sarraf et al., 2010). Wherein, more than half belong to the province of KPK (52.2%); whereas, rest of the workforce belongs to the province of Punjab (25.7%), Balochistan (14.6%), and Sindh (6%) (Kanwar et al., 2014).

Level of Education

More than half (58%) of the workforce at SBRI Gadani are uneducated. 36.5% have undertaken education till primary level (5th grade) or middle level (8th grade); whereas, only 5% of the workforce is educated till secondary level (10th grade) or higher level education (Kanwar et al., 2014).

2.5.4.2 Child Labour

National legislation of Pakistan allows employment of children (below 15 years) and adolescent (between 15 and less than 17 years) under particular working conditions (Employment of Children Act, 1991). However, workers at SBRI Gadani also handle hazardous waste, for which employment below 18 and above 60 years is not allowed (Hazardous Substances Rules, 2003).

In the literature, it has been said that women and children are not employed in the SBRI Gadani (Sarraf et al., 2010; Kanwar et al., 2014). However, several adolescence (15 to less than 17 years) workers are employed at SBRI (Kanwar et al., 2014).

2.5.4.3 Occupational Experience

More than half (55%) of the workforce at SBRI Gadani undertake employment in the industry due to limited employment opportunities in other sectors, approximately 1/3rd (31%) of the workforce was referred for employment in the industry; whereas, only 14% choose this industry for employment by themselves (Kanwar et al., 2014).

Most of the workforce (92%) is new to the industry; whereas, remaining of the which is a limited number, have been employed for longer durations (Kanwar et al., 2014). No further, occupational background of the workforce is available in the literature.

2.5.4.4 Contractual Employment and Minimum Wages in Pakistan and Balochistan

Contractual Employment

According to the Balochistan Industrial and Commercial Employment Act (2021), a worker is defined as “*any person employed in any industrial or commercial establishment to do any skilled or unskilled, manual or electrical work or work that involves any expertise or specialized or technical knowledge or work of the same or similar nature for hire or reward*”, which may be hired by an employer under one of the following six categories:

Table 5 *Types of Workers in National / Provincial Legislation*

Types of Workers
<ul style="list-style-type: none">• Permanent Workers• Probationer• Badlis• Temporary• Apprentice• Contract Workers

Note. Types of workers are classified in The Industrial and Commercial Employment (Standing Orders) Ordinance, 1968, (<https://pakistancode.gov.pk/new/LGu0xAD>) and Balochistan Industrial and Commercial Employment Act , 2021 (<https://pabalochistan.gov.pk/new/acts/>). Definitions of six categories of workers is at Annex-4.

Majority of the workers at SBRI Gadani are hired by contractors on daily wages without written agreements or appointment letters, with no specific skill requirements or medical screening. Some workers including technicians receive short-term contracts of 3-6 months; whereas, long term contractual employment is rare. This generally results in a temporary and indirect relationship with respective ship breaking yard owners, which also undermines workers' basic labour rights (Kanwar et al., 2014; Zarqa et al., 2021).

To dismantle a ship, it takes between 100 to 200 workers (Ahmed & Siddiqui, 2013), and approximately 2 to 3 months, which means that the workers are not hired by the sub-contractors for more than 3 months and are not eligible for benefits like social security, medical insurance, etc. (Butt et al., 2016) in accordance with the Balochistan Industrial and Commercial Employment Act, 2021.

Minimum Wages

In accordance with the Balochistan Minimum Wages Act (2021), since 1 April 2022, minimum wages of unskilled workers has been set at PKR 961.53/- per day and PKR 25,000/- per month (26 working days). Whereas, minimum wage for piece rate workers is PKR 120.19/-²⁴. This need to be ascertained for SBRI Gadani workers.

2.5.4.5 Hours of Work and Rest in Balochistan

According to the Pakistan Factories Act (1934) and Balochistan Factories Act (2021), hours of work and rest, applicable for adult workers is summarized as under:

²⁴ <https://efp.org.pk/wp-content/uploads/2022/07/Balochistan-Minimum-Rates-of-Wages-Notification-2022.pdf>

Table 6 *Hours of Work and Rest in National and Provincial Legislation*

Hours of Work	Hours of Rest
Hours / Day <ul style="list-style-type: none"> • 9 hrs (Max) • 10 hrs (Seasonal Factories) Hours / Week <ul style="list-style-type: none"> • 48 hrs • 50 hrs (Seasonal Factories) • 56 hrs (Seasonal Factories - Technical Reasons) Overtime <ul style="list-style-type: none"> • Allowed for adult workers 	No work period to exceed <ul style="list-style-type: none"> • 6 hrs with prior 1 hr rest interval • 5 hrs with prior ½ hr rest interval • 8-½ hrs with prior two ½ hr intervals Spread Over of Rest Hours <ul style="list-style-type: none"> • Not more than 10½ hrs • Not more than 11 hrs (seasonal factories)

Note. Statistics adapted from Pakistan Factories Act, 1934, (<https://pakistancode.gov.pk/new/UY2FqaJw1-apaUY2Fqa-b56X-sg-iiiiiiiiiiiiii>) and Balochistan Factories Act, 2021, (<https://pabalochistan.gov.pk/new/acts/>).

At SBRI Gadani, standard timing of work is from 7 am to 4 pm, which corresponds to 8 hours work including one hour of lunch break which is in accordance with national regulations of the Factories Act, 1934 (Kanwar et al., 2014). An additional 4 hours of work is a common practice which is paid at the same rate (Sarraf et al., 2010). Generally, work continues up till 7 pm or occasionally even 10 pm; however, exact employment conditions including number of working hours per day and working days per week have not been ascertained (Kanwar et al., 2014).

2.5.4.6 Holidays and Leave in Balochistan

The Pakistan Factories Act (1934) and Balochistan Factories Act (2021) provision leave for all type of workers. This includes following types of leave:

Table 7 *Types of Leave in National and Provincial Legislation*

Types of Leave
<ul style="list-style-type: none"> • Weekly paid holiday (if not then compensatory holiday) • Annual paid holidays (20 days) • Casual and sick leave (Annual - 15 days) • Payment of Wages Act, 1936 • Festival holidays (declared by Government) • Quarantine Leave

Note. Adapted from Pakistan Factories Act, 1934, (<https://pakistancode.gov.pk/new/UY2FqaJw1-apaUY2Fqa-b56X-sg-iiiiiiiiiiiiii>), and Balochistan Factories Act, 2021, (<https://pabalochistan.gov.pk/new/acts/>).

Non-contractual workers are not accorded paid holidays and continue to work 7 days a week, with Sunday being a shorter work day (6 hours). This practice will not be possible under a contractual work agreement (Kanwar et al., 2014).

2.5.4.7 Risks Related to Recycling activities (Accidents and Exposure to Hazardous Waste)

Dismantling work is commenced by workers at SBRI Gadani prior to complete removal of hazardous waste including highly flammable fuels and their fumes (Hameed, 2019). This is primarily due to non-availability of NEQS for handling, storage, treatment, disposal/recycling facilities for hazardous waste (Watkinson, 2012; Kanwar et al., 2014), and is also evident from various accidents involving fire and mercury poisoning of workers in SBRI Gadani in 2021.

Accidents, casualties and occupational diseases are not systematically documented by companies and authorities (Kanwar et al., 2014). Due to non-availability of comprehensive and consolidated data on OSH, news and NGO reports are the only source of data on accident but are not always fully reliable and precise:

Table 8 *Accidents at SBRI Gadani*

Incident Report	Date	Ship	Ship Type	Accident Type	Causalities
Voytenko, 2016 Hasnain et al., 2019	1 Nov 2016	Aces	Tanker	Fire	26 to 29 Dead 66 Injured
Industriall, 2018	8 Jan 2017	-	-	Falling from ship	1 Dead
Schuler, 2017 Industriall, 2018	9 Jan 2017	Chaumadra	LPG Tanker	Fire	5 Dead 1 Injured
Schuler, 2018	11 Oct 2018	-	Tanker	Fire	-
Schuler, 2018 Industriall, 2018	14 Oct 2018	-	Tanker	Fire	7 Injured
Industriall, 2018	2 Nov 2018	Mistral	-	-	5 Injured
EEB, 2021	2021	J.NAT	FSO Tanker	Mercury Poisoning	Health issues

Note. List of accidents compiled from various news and NGO sources.

Post 2016 accident, ship breaking operations were stopped by the Federal and Provincial Governments, and an investigation was undertaken. Thereafter, various Standard Operating Procedures (SOPs) were introduced, which inter alia included, availability of firefighting arrangements, ambulance, first aid rooms, and provision of safety equipment with each yard; wherein, first inspection for implemented measures was planned in January 2017 (Butt et al., 2016).

In addition to accidents, SBRI Gadani workers are facing contaminants dangerous for their health as previously reported.

2.5.4.8 Safety Equipment Available in Yards

Handling of hazardous waste require safety precautions, which inter alia includes, use of protective clothing and PPE and adequate supply of fresh water for their washing; training and supervision by qualified supervisors (Hazardous Substances Rules, 2003).

However, OSH is a neglected aspect at SBRI Gadani. Most workers are not provided with safety equipment; whereas, few firms that do provide safety equipment is limited to safety gloves and googles, that too are not replaced when required (Hameed, 2019).

2.5.4.9 Training of Ship Breakers

National Vocational and Technical Training Commission Act (2011) and Balochistan Board of Technical and Vocational Education Act (2021) provide necessary legislation for vocational training of Pakistan's SBRI workforce. However, subsequent to closing of Ship Breakers College, which afforded technical training to new employees; SBRI workers undertake on-job training alongside more skilled and experienced workers. Only those employees with the highest expertise and longest tenure perform demolition work on the ship itself. Workers progress in their career depending on years of employment (Sarraf et al., 2010). Furthermore, a training strategy focusing on availability of training facility and train-the-trainers strategy was recommended by the world bank study (Sarraf et al., 2010); however, no steps have been taken in this aspect.

Current literature shows that only a quarter of the workers claim awareness of workplace hazards, primarily due to lower level of education and training. Workers

employed for longer durations are trained in safety and emergency drills; however, quality of this training is not ascertained and records of same are also not available (Kanwar et al., 2014). This results in unsafe practices and accidents at SBRI.

2.5.4.10 Medical Facilities and Emergency Preparedness in the Yards

Hazardous Substances Rules (2003) require availability of firefighting/emergency equipment and First-Aid medical facility with essential antidotes supervised by qualified staff within premises of the SBRI Gaddani; whereas, medical check-up of every worker at the time of employment and thereafter once a year is also required.

Contrary to the requirements, despite an adequate building of the medical facility at Gadani town, it is equipped to offer only first aid treatment, with no ambulance and an intermittently available staff. Gadani workers are taken to medical facility at Hub Power Plant for treatment which is not adequately equipped to handle fatal injuries, and nearest hospitals that can handle fatal injuries are at Karachi at a distance of about 50 km (Butt et al., 2016). An ambulance is maintained at SBRI Gadani by the labour union for more than 10,000 workers. First-Aid boxes available in most yards are insufficient considering the hazards associated with SBRI (Sarraf et al., 2010).

SBRI Gadani has one fire truck for firefighting; which is supported by fire trucks from Hub Power Plants and Karachi City in case of an accident (Butt et al., 2016), is not considered adequate vis-à-vis hazards associated with the industry. The firefighting arrangements maintained by yards are either non-existent or comprise of obsolete equipment (Sarraf et al., 2010).

In case of an accident onboard a ship being dismantled, casualties need to be carried across the beach due to no access for ambulance and fire-brigade (Sarraf et al., 2010). Claims of majority yard owners to have plans in place and workers trained for emergency situations, is contrary to the state of available firefighting and medical arrangements (Kanwar et al., 2014).

2.5.4.11 Living Conditions in the Yards

Balochistan Coastal Development Authority is responsible for development of SBRI Gaddani including provision of basic necessities like clean drinking water, drainage, electricity etc. (Balochistan Coastal Development Authority Act, 1998).

However, despite paying a huge amount of tax (50 PKR per ton to the Government of Balochistan and 8000 PKR to the Federal Board of Revenue); wherein, 50% of the revenue has to be re-invested by BDA in upgradation of local infrastructure; however, Gadani lacks basic necessities like water supply, housing, and electricity (Butt et al., 2016).

Shared accommodation is provided to most of the workers within the yard premises, which is constructed on temporary basis from material salvaged from ships. This living arrangement is without basic facilities of clean drinking water, drainage, steady electricity etc. (Kanwar et al., 2014). The living conditions are slightly better in SBRI Gaddani as compared to those present in Bangladesh (Sarraf et al., 2010). Rest of the workers live in nearby villages and Gaddani town (Shahid, 2005).

Majority of the work force drinks water from tanks which are reportedly unclean. The lowest wage workers spend around 20% of their monthly income on food which is usually prepared by themselves to save money (Kanwar et al., 2014). There are also number of inexpensive restaurants and shops available in vicinity of SBRI Gadani which cater for the food requirements of the labour (Shahid, 2005; Kanwar et al., 2014).

2.5.5 Pakistan Ship-Breakers' Association (PSBA)

The PSBA represents SBRI Gadani at provincial and national level, and continues to endeavor for participation in legislation related to the industry. The association has been striving for improvement of infrastructure, basic necessities and training of workers to improve OSH and environmental protection (Shahid, 2005). However, these developmental plans are not entirely possible without involvement of federal and provincial governments including allocation of resources and provision of subsidies. Recent concern of PSBA on *National Hazardous Waste Management Policy, 2022* under process at PMoCC indicates that PSBA which is a major stakeholder of SBRI Gaddani was not included in the consultation process (PSBA, 2022).

2.5.6 Labour Unions in Gadani Ship Breaking Yards

According to Balochistan Industrial Relations Act, 2022, a '**trade union** means any combination of workers or employers formed primarily for the purpose of regulating the relations between workers and employers, or workers or employers, or

for imposing restrictive conditions on the conduct of any trade or business and includes a federation of two or more trade unions'. Wherein, a trade union with 1/5th representation of workers in an organization or a group of organizations can be certified as a collective bargaining agent.

Most workers at SBRI Gaddani are hesitant from involvement in Labour Union activities (Kanwar et al., 2014). There are two major labour unions at SBRI Gaddani, which are discussed below:

- Recognized in 1981, the '*Ship Breaking Labour Union Gadani*' is the major labour union at SBRI Gadani, which runs its affairs through its two offices at SBRI Gaddani and Hub city; however, it is not part of the International Trade Union Movement (ITUM). Formally accepted as collective bargaining agent in 1986, the union participates in tripartite meetings held with Government of Balochistan and PSBA. It allegedly works under the influence of PSBA that was established to counter other unions, and comprises of trusted workers; wherein, leadership of the union is nominated instead of being elected, due to which it has also been called a 'pocket union'. The union conducts monthly meetings and also an annual meetup. With an annual budget of 100,000 PKR, the union receives an amount of 3000 PKR per beached ship from PSBA for smooth provision of labour, and a monthly membership fee (20 PKR) from workers. The union successfully bargained 40% wage increment, improved working conditions and medical facilities in 2009-10. On average, the union also submits one lawsuit to the court each month (Sarraf et al., 2010; Kanwar et al., 2014; Butt et al., 2016).
- The "*Ship Breaking Democratic Workers Union*" is the second largest labour union, which is also part of the National Trade Union Federation (NTUF)²⁵. It is a relatively new union with a 250 membership (as of Dec 2012) and has an office in vicinity of SBRI Gaddani which operates from 0800-1700 hrs, with only one staff. The union is not recognized by PSBA and has faced repercussions by local authorities for alleged illegal strike resulting in several arrests and injuries. This was also challenged by NTUF in the Balochistan High

²⁵ The NTUF has a head office at Karachi, with approximately 80 affiliated unions in the country, representing around 0.1 million workers. The organization is also affiliated with the global union IndustriALL (former IMF or International Metal- workers' Federation).

Court. The union receives a monthly membership fee of 50 PKR; whereas, no funds are received from PSBA. Since 2009, 32 lawsuits were successfully filed by NTUF in Balochistan Labour Court at Quetta (provincial capital), which led to reparation of 0.3 to 0.5 million PKR from yard owners and the government. An additional 30 cases were also filed by NTUF in the Workers' Welfare Department at Islamabad (federal capital) (Kanwar et al., 2014).

2.5.7 Classification Societies

Different classification societies offer Statement of Compliance (SoC) to yards that are compliant with different regulations for example HKC, EU SRR etc. ClassNK, a Japanese classification society also issues SoC to Ships due for recycling as well as SRFs around the world that are compliant with the HKC requirements (ILPI, 2016). As of mid-August 2022, ClassNK has issued SoC to 54 SRFs (50 SRFs in India, 3 SRFs in Turkey, and 1 SRF in Bangladesh). Pakistan has also authorized ClassNK for issuance of SoC to SRFs at SBRI Gadani. However, no yard has been issued with SoC up till now²⁶.

²⁶ <https://www.classnk.or.jp/hp/en/activities/statutory/shiprecycle/index.html>

Chapter 3 – Research Methodology

3.1 Introduction

“Research methodology is a way to systematically solve the research problem” (Kothari, 2004). The research can be conducted through different methods that are available through associated science, selection of which is primarily dependent on the method’s ability to achieve the research aim and its objective (Gray, 2004).

3.2 Research Design

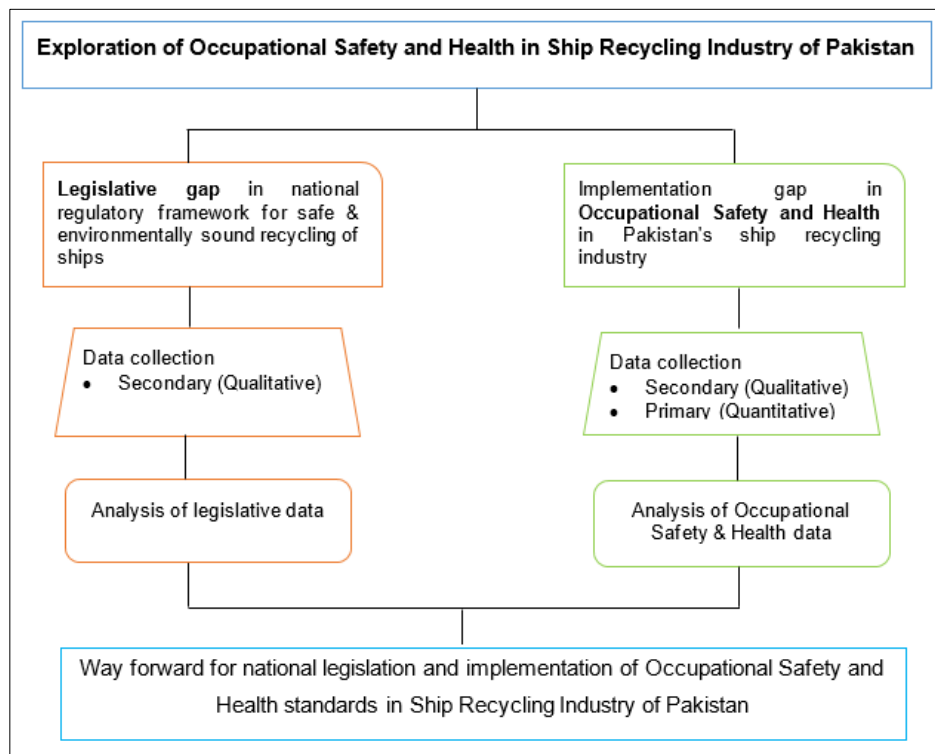
The research design for the dissertation is based on a *mix method* which combined qualitative and quantitative methods.

The mix method approach was considered essential due to the fact that at the onset of this research a clear picture of international regulatory instruments and national legislation of Pakistan primarily covering the OSH in ship recycling needs to be drawn through qualitative method.

Thereafter, implementation of existing national regulatory instruments that govern SBRI in Pakistan was undertaken through qualitative analysis of existing literature on Pakistan’s SBRI.

Finally, a quantitative method to obtain latest implementation statistics which was obtained through primary data collection in the form of a survey questionnaire was employed. The focus of this research method has been to assess the OSH.

Figure 4 *Flow Chart for Dissertation*



3.3 Data Collection

3.3.2 Data Collection – Secondary data (Qualitative)

Collection of secondary data for qualitative and legal research included international regulatory instruments that regulate SBRI worldwide including UNEP's Basel Convention and its guidelines, IMO's HKC and its guidelines and ILO's OSH in shipbreaking guidelines for Asian countries and Turkey. The national (both federal and provincial) legislation that was identified and available online included legislation which regulate OSH at SBRI Gadani as well as environmental aspects which effects the SBRI Gadani workers. Scholarly articles, study reports from various national and international organizations, and news from reputed organizations that covered Pakistan's SBRI were collected for qualitative analysis.

3.3.1 Data Collection - Primary Data (Quantitative)

Collection of primary data was undertaken for OSH aspect in Pakistan's SBRI as part of the quantitative research. A structured survey questionnaire was prepared to target workers from SBRI Gaddani (Annex-7). Upon accordance of approval from

the WMU Research Ethics Committee (REC). For all participants to be able to fill the survey questionnaire, it was also translated into local language (Urdu). The survey questionnaire was then e-mailed to a local source (audit and certification providers for Ship Breaking Yards at Gadani) at Karachi, Pakistan. Keeping in view the SBRI Gadani workers minimum level of education and ability to use software, the survey questionnaire was printed for being hand-filled by the participants. A total of 30 yards at SBRI Gaddani were approached for data collection; however, only 23 yards allowed collection of data, due to active ship breaking operations in rest of the yards. A sample size of 193 participants was acquired; wherein, the participants included all type of workers at SBRI Gaddani ranging from the supervisors down to the helpers. The filled forms were then scanned and e-mailed back for subsequent data analysis. Hard and soft copy of the filled survey questionnaire were also disposed of to fulfil the ethics obligation.

The survey questionnaire was structured in following eleven categories related to OSH of workers at SBRI Gaddani:

Table 9 *Occupational Safety and Health Categories for Research*

• SBRI Gadani Workforce
• Child Labour
• Occupational Experience
• Contractual Employment and Wages
• Hours of Work and Rest
• Holidays and Leave
• Accidents
• Safety Equipment
• Training
• Medical Facilities and Emergency Preparedness
• Living Conditions

3.4 Data Analysis

Qualitative analysis of legal and secondary data was undertaken primarily for institutional and regulatory framework for OSH supported by environmental aspect in Pakistan's SBRI.

Quantitative analysis of primary data collected through survey questionnaire was undertaken using *IBM's Statistical Package for the Social Sciences (SPSS)* software. The survey questionnaire was formulated under eleven main themes for OSH (Figure-4). Results of the data analysis were then compared against existing data to ascertain current implementation trend in Pakistan's SBRI.

The qualitative and quantitative data analysis was then used to propose a way forward in legislation and implementation for Pakistan's SBRI against international instruments for safe and environmentally sound recycling of ships.

3.5 Ethical Considerations

Ethical considerations were taken care of during conduct of the research due to involvement of workers from SBRI Gaddani as participants in survey questionnaires. The WMU REC reviewed the survey questionnaire for collection of primary data to ensure adherence to highest ethical standards in accordance with the university protocol²⁷ prior accordance of approval. Ethical rights of participants that were taken care of included principles of anonymity, confidentiality, right to withdraw from the study, and data protection. A consent form was also provided to the participants for their willingness to participate and usage of provided data for the dissertation²⁸. No alterations or additions were made to the data received from the participants. Whereas, all material was deleted after award of degree.

²⁷ WMU REC approval request for Survey Questionnaire is at Annex-5.

²⁸ Consent form provided to participants of Survey Questionnaire is at Annex-6.

3.6 Limitations

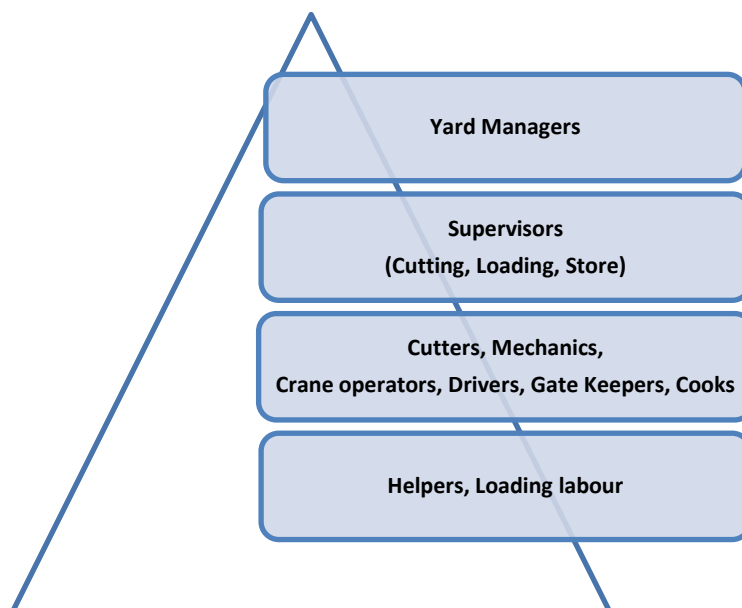
Sufficient literature is available on various aspects of Ship Recycling worldwide including legislation, economic aspect, OSH, ESM of hazardous and other wastes, and training. However, comparatively less data is available for same aspects of SBRI in Pakistan. Primary research (survey questionnaire) was undertaken through local representatives, which took considerable time and efforts. On-site presence of the researcher during data collection phase could have enabled more sample size including interviews. Furthermore, the research was also faced with availability of limited time for its completion.

Chapter 4 – Data Presentation and Analysis

4.1 Quantitative Data Analysis

Survey questionnaire was filled by a total of 193 respondents of different categories (Figure-4) from 23 out of 30 companies at SBRI Gadani. Whereas, data from rest of the yards could not be collected due to ongoing ship breaking operations. A sample size of 193 is comparable to previous studies in other countries such as Bangladesh (IMO-NORAD, 2016a). Various questions were not answered by some respondents, which will not be included in the statistical analysis. The data analysis is undertaken for 11 aspects of OSH selected in literature review, and corresponds to the answers and feedback provided by the respondents. To better understand the feedback provided by the respondents, the local representatives (auditors and certification providers for SBRI Gadani) were also cross questioned to determine different facts.

Figure 5 *Spread of Data Collection*



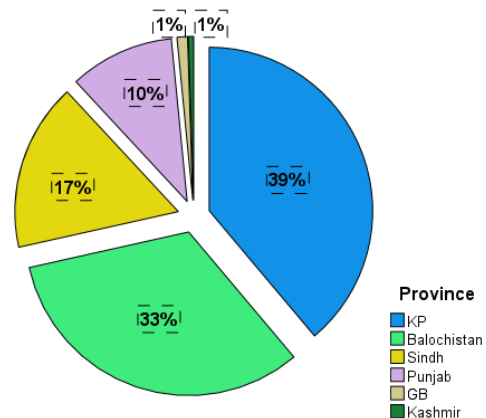
4.2 Analysis of Selected OSH Categories for SBRI Gadani Workers

4.2.1 SBRI Gadani Workforce

Demographic Trend

The demographic trend in the workers at SBRI Gadani indicates that most of them (72%) belong to the province of Khyber Pakhtunkhwa (KP) and Balochistan, followed by a significantly less number (27%) of workers from Sindh and Punjab; whereas, very few (2%) workers belong to the province of Gilgit Baltistan (GB) and Kashmir. Previously most of the workers belonged to the province of KPK (Kanwar et al., 2014).

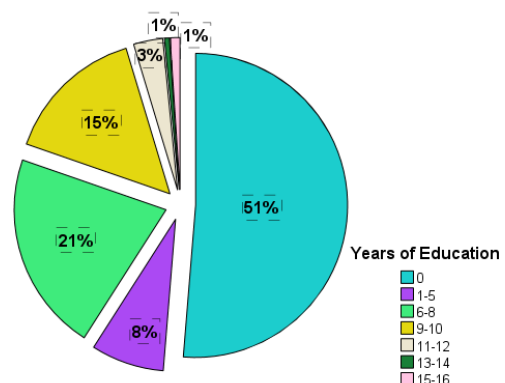
Figure 6 *Demographic Trend of SBRI Workers*



Level of Education

More than half of the workers at SBRI Gadani have low-level of education. While, 47% have undertaken education ranging from primary, middle, secondary and higher secondary level. Whereas, only 1% each have undertaken Bachelor and Masters level of education (in management positions). There is a 7% decrease in the number of least educated workers; whereas, educational statistics for sub-categories of undergraduate level has considerably improved.

Figure 7 *Level of Education of SBRI Workers*



Analysis

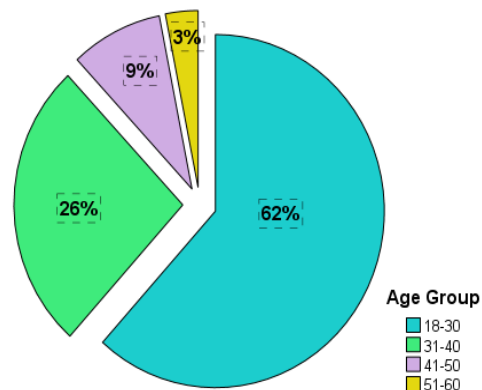
Reduction in migrant workers in the Gadani Ship Breaking Yards is visible, wherein, local workers from the suburbs of Gadani have doubled. This is a significant change, compared to the last available statistics (Kanwar et al., 2014).

The sample showed an overall improvement in the educational level of the workforce at SBRI Gadani compared to previous studies which seem to mirror the betterment of education in the country.

4.2.2 Child Labour

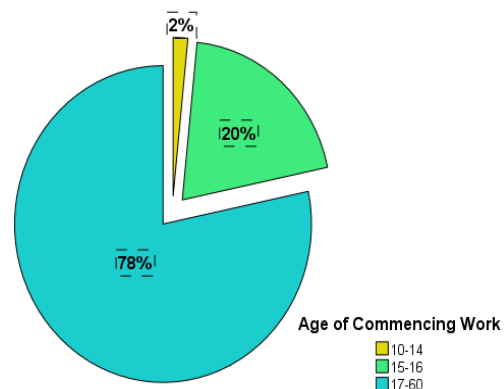
The current data indicates that there are no women, children (less than 15 years) and adolescents (15 and less than 17 years) currently employed at SBRI Gadani. However, this could not be verified from ID. Employment of no workers below 18 years and above 60 years is also in accordance with the requirements of Hazardous Substances Rules, 2006.

Figure 8 *Age of Respondents*



Notably, 2% of the respondents stated that they began working in the industry before their 15 years' birthday (childhood), and 20% of the sample workers indicated that they started to work in the industry between 15 and 17 years old. This is consistent with previous work (Kanwar et al., 2014).

Figure 9 *Age of Commencing Work for SBRI Workers*



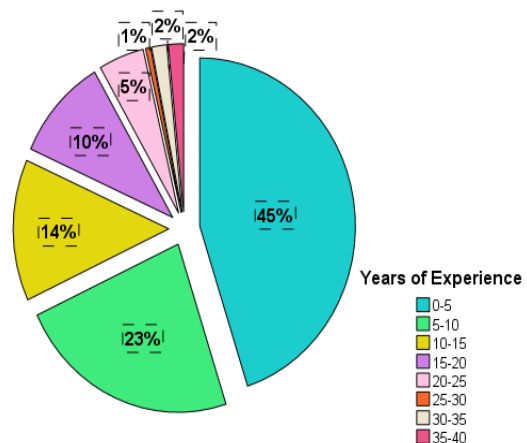
Analysis

The sample indicates no presence of child labour, and under/over age employment. It indicates adherence to the national labour and hazardous substances regulations. However, record keeping of the workers was not available and certain workers declared having started to work before 18 years old. Therefore, additional research is needed to confirm the findings.

4.2.3 Occupational Experience

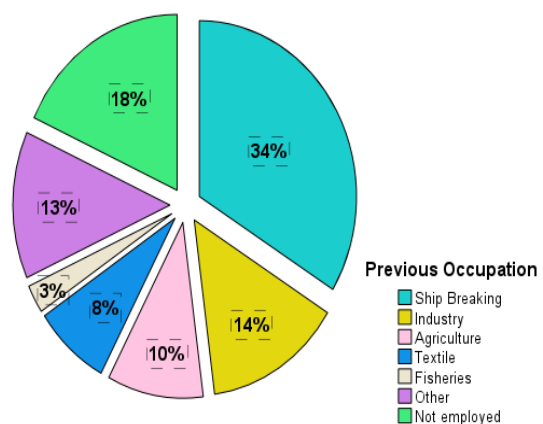
About 45% of the workforce is new to the industry with up to 5 years of experience, which usually perform jobs of helper, cutter, loading labour etc. Workers with experience of 5 years and above were analyzed to perform all types of jobs which includes helper, cutter, supervisor, loading labour, loading supervisor, manager etc. 10% workers at SBRI Gadani have been affiliated with the industry for 20-40 years, which is a significant time given to the industry.

Figure 10 *Experience of Workers*



More than half (52%) of the workforce at SBRI Gadani, either started working in the Ship breaking industry as their first employment (18%), or previously worked in another yard at SBRI Gadani (34%). Remaining half of the workers migrated from other sectors such as agriculture, textile, industry, fisheries etc.

Figure 11 *Previous Occupation of Workers*



Analysis

For more than half of the workers, ship breaking is their first sector of occupation. This suggests that the sector seems, to a certain extent, able to attract and retain workers.

4.2.4 Employment Conditions and Wages

Workers at SBRI Gaddani seem usually hired by sub-contractors and yard owners verbally. Notably, written contracts seem exceptional. The researchers identified two categories of “oral agreements” which both associated with wage: daily wage and monthly (fixed) wage agreements.

Daily Workers

Numerous sub-contractors hire their workers on daily wage rates. In the sample, 79% of the respondents were employed through this type of agreement. These workers are usually employed for the duration of the dismantling process of a ship. Daily workers' category includes helpers, cutters, supervisors, loading labour etc.

Such workers are issued with a work identification card from the sub-contractor on weekly basis and are usually paid on weekly, fortnightly or monthly basis.

Monthly (Fixed) Wage Contracts

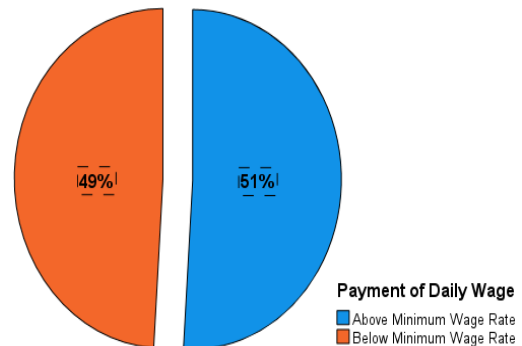
21% of the respondents declared being paid monthly. However, it does not signify that they possess written agreements. More interesting, it seems that these workers are given job letters (written agreements) only prior Annual Certification Audit by independent auditors. Management positions and qualified workers such as yard managers, Health Safety and Environment (HSE) operators, crane and winch operators, mechanics, store keepers, gate keepers, drivers, cooks, medics, etc. are usually employed on such terms.

Assessment of Wages in Comparison to Minimum Wage

Only two workers did not provide their wage. Out of the 191 detailing their wages, 151 workers were paid on a daily basis and 40 on a monthly basis. Only daily workers had access to overtime.

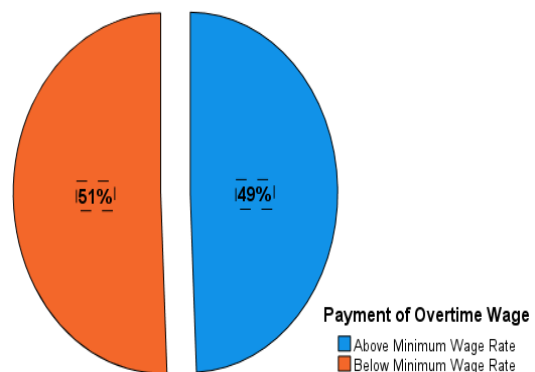
The daily wage rate depends upon skill level (cutters, supervisors etc.). Workers' wages range from 666 to 1570 PKR. 51% of the daily wage workers are being given wage equal to or above minimum daily wage rate; whereas, 49% are paid under the minimum wage (i.e 961.53 PKR/day) set by the Government of Balochistan²⁹.

Figure 12 Wage Rate for Daily Workers



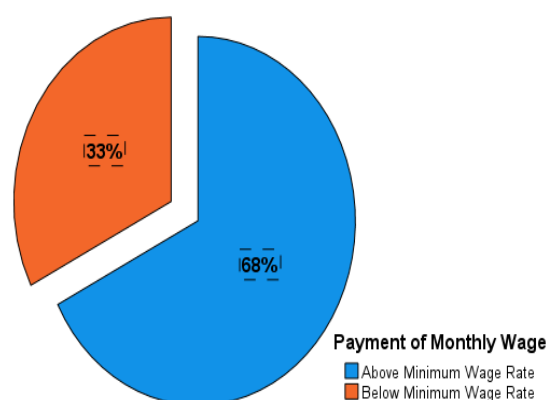
Overtime work payment rate depends on skill level of the worker, and ranges from 53 to 200 PKR/ hour. 49% of the daily wage workers are being given wage equal to or above minimum daily wage rate; whereas, 51% of the daily wage workers receive overtime wage below Balochistan minimum wage (i.e 120.19 PKR/hour)³⁰.

Figure 13 Wage Rate for Overtime (Piece Rate) Work



Monthly (fixed) wage of SBRI workers' ranges from 18,000 to 80,000 PKR, which includes managers, crane and winch operators, mechanics, drivers, gate keepers, store keepers, cooks, etc. 67% of the monthly wage workers are being given wage equal to or above minimum monthly wage rate; whereas, 33% are paid below Balochistan's minimum wage (i.e 25,000 PKR/month)³¹.

Figure 14 Wage Rate for Monthly Contract Workers



²⁹ <https://efp.org.pk/wp-content/uploads/2022/07/Balochistan-Minimum-Rates-of-Wages-Notification-2022.pdf>

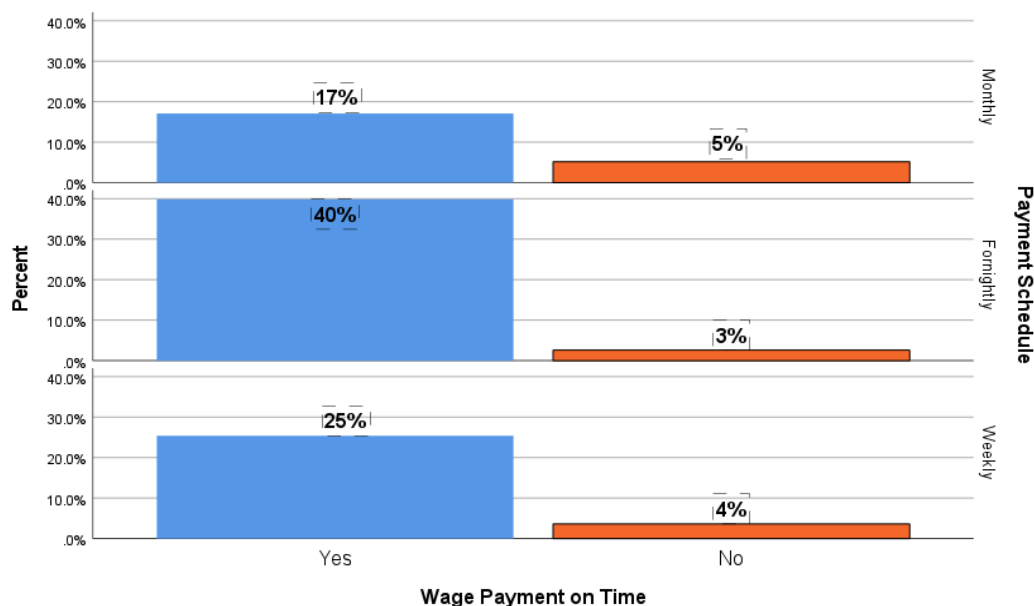
³⁰ Ibid.

³¹ Ibid.

Additional Information Collected

More than 92% of the workers also confirmed that a wage register is being maintained by their employers. Whereas, more than 82% of the workers indicated timely payment of wages.

Figure 15 *Payment of Wages by Categories (Monthly, Fortnightly and Weekly)*



Analysis

Written contractual employment seem scarce among SBRI Gadani workers and only issued to pass audits. This situation generates unstable working conditions and affect workers' labour rights. The current practice seems breaching the 2021 Balochistan Industrial and Commercial Employment Act which stipulates that "Every worker at the time of his appointment, transfer or promotion shall be provided with an order in writing, showing the terms and conditions of his service" (Article-3 in Schedule standing order section).

The data extracted from the sample suggests that the minimum wage required set by the Government of Balochistan is not always implemented at SBRI Gadani.

Despite being paid on time, ship breaking workers are precarious workers with low salaries and unstable working arrangements. This may not only affect their labour rights but also their own and family wellbeing.

4.2.5 Hours of Work and Rest

During collection of data, a general lack of awareness regarding standard hours of work, overtime work, and hours of rest as per national and provincial legislation was observed.

Hours of Work

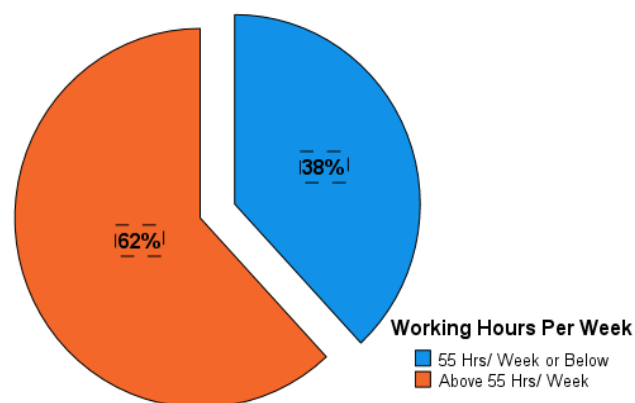
The sample indicated that a standard 8 hours work day is observed at yards of SBRI Gadani. Six working days per week (Monday to Saturday) makes a total of 48 hours of work per week. This is accordance with Pakistan Factories Act (1934) and Balochistan Factories Act (2021).

Whereas, overtime work undertaken by workers varies from 1 to 5 hours per day. This makes a total of minimum 6 and maximum 30 hours of overtime work per week (6 days).

Hence, total minimum working hours for workers at SBRI Gadani is 48 hours per week (with no overtime work), and maximum working hours for workers is 78 (with 30 hours of overtime work per week).

According to the sample, 61% of workers undertake more than 55 hours of work per week which is associated with increased risk of heart disease and stroke as highlighted by WHO-ILO study (Pega et al., 2021).

Figure 16 *Hours of Work per Week*



Hours of Rest

A half hour lunch break (1300-1330 hrs) is provided to workers in the yards on Monday to Thursday and Saturday. Whereas, on Friday the workers are provided a longer lunch break of about 2½ to 3 hours (1200-1430/1500 hrs), to enable the workers to offer prayers in the mass gathering at Masjid. Further, investigation for hours of rest was not undertaken, which essentially pertains to the overtime work period. There was general absence of display of period of work, in accordance with the regulations.

Analysis

Regulations on hours of work and overtime seem respected at SBRI Gadani. However, daily wage workers may be forced to work overtime due to compensate their wage rates. As per ILO analysis on excessive overtime, this finding confirms the low wages in the sector (Seo, 2011). 61% of daily wage workers that undertake more than 55 hours of work per week increases risk of heart disease and stroke effecting well-being of workers (Pega et al., 2021).

4.2.6 Holidays and Leave

Workers employed on daily wages reported non-paid days-off; whereas, workers on monthly contracts with fixed wages reported having a one paid day-off per week, and benefit from national bank holidays (national day, festival, religious days, etc.). Daily workers reported that they do not have paid leave. Absence of a legal (written) contract seem depriving workers from paid leave (annual/ festival/ sick/ casual leave and quarantine time).

Weekly day-off for daily and fixed wage workers is Sunday.

Analysis

Absence of legal (written) contracts seem affecting SBRI Gadani workers in having access to paid days-off and paid holidays. This situation may also affect their wellbeing.

4.2.7 Training

Due to non-availability of any vocational training center, no formal training is afforded to the workers at SBRI Gadani before joining the ship breaking yards. The only job-related and safety training that workers have before joining the ship breaking yards is if they were previously employed in any other industry/ sector with similar nature of work.

On-Job Training

SBRI workers upon joining the ship breaking yards undergo on-job training as helpers. Career progression of these workers is dependent on expertise gained and experience.

Safety Training

Safety training at yards of SBRI Gadani is generally undertaken prior conduct of Annual Certification Audit for yards (post 2016). However, most of the respondents (70%) did not undergo any sort of safety training.

Figure 17 *Safety Training of SBRI Gadani Workers*



There is no record keeping for both job and safety training; therefore, quality and statistics of training imparted by yards could not be verified.

Analysis

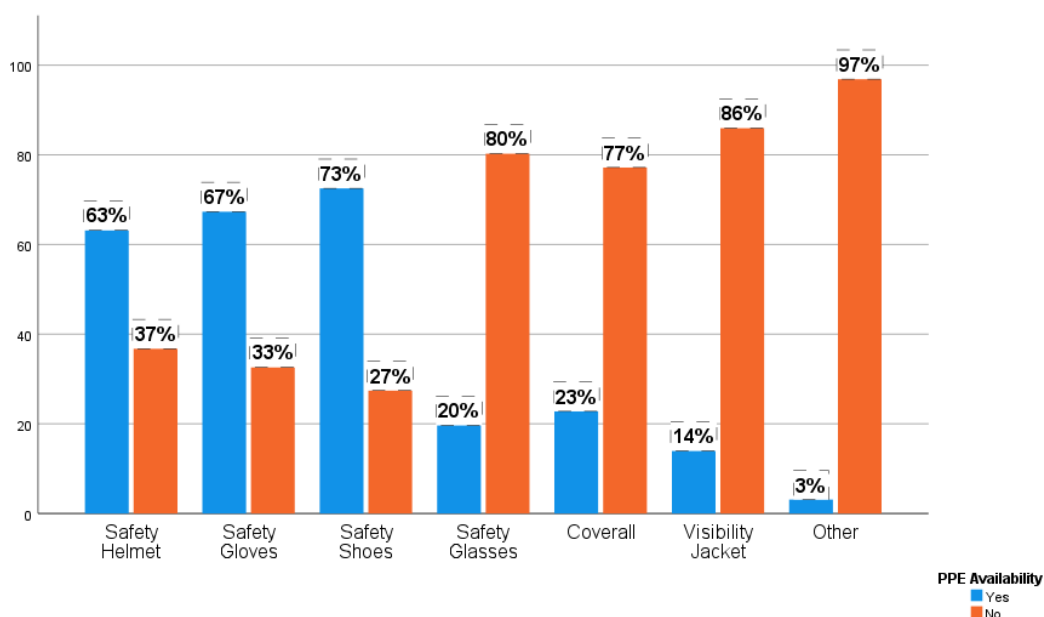
Non-availability of a vocational training institute for the fully tax compliant and one of the most revenue earning industry of Pakistan not only reduces efficiency of the industry but also contributes towards accidents. Notably, there is no systematic safety training according to participants.

4.2.8 Personal Protective Equipment (PPE)

All SBRI Gadani workers are provided with PPE for undertaking ship breaking operations. However, there is no standard for provision of PPE, and yards have their own policies. PPE depends are usually taken from ship stores. PPE is issued to workers on daily basis and may not be always in good and hygienic conditions.

Important equipment against hazardous substances such as breathing apparatus or full overall have not been reported by the workers in the sample. Only cooks reported having face masks.

Figure 18 *PPE Availability Statistics for SBRI Gadani Workers*



Analysis

Provision of standard safety equipment depend on ship availability but has been reported as insufficient. Sometimes, PPE seems unsuited to the tasks and risks to which workers are exposed to or of low quality.

4.2.9 Medical Facilities and Emergency Preparedness

Medical Facilities

A medical facility has been constructed at Gadani town by PSBA but seemed rarely used. Injured workers are usually sent to medical facility at Hub city (about 35 minutes from yards). Injured workers are transported by yards' vehicles not equipped with adequate medical equipment (and not ambulance).

Medical first aid equipment available in yards is usually taken from the medical supplies available on ships.

In accordance with PSBA policy, workers at SBRI Gadani are afforded with medical and financial compensation, only if the accident occurred within premises of the yard. No compensation is provided to workers even if they are transiting to or from the shipbreaking yards.

Firefighting Arrangements

Firefighting arrangements available with the yards are also taken from firefighting equipment available on ships. However, fire extinguishers do not seem to be maintained. Fire pumps and hoses are abundantly used during cutting process, with water taken from ship's ballast tanks.

According to ship breaking auditors, majority of the workforce is not familiar with the use of basic firefighting equipment like fire extinguishers. Furthermore, there is only one fire truck available at the Gadani fire station which is considered insufficient for hazards associated with the ship breaking industry.

Analysis

Medical and firefighting support seem currently inadequate in terms of equipment, organization and training capacity. Despite the present of firefighting equipment, lack of safety training previously reported questions the capacity of worker to efficiently operate such equipment.

4.2.10 Accidents at SBRI Gadani

During collection of data, cross questioning with workers indicated their reluctance in giving information related to work place accidents and injuries. Therefore, it was impossible to quantify the issue.

The only accidents reported included falling from heights and ladders, tripping onboard ships, injuries from falling of objects, etc. These accidents resulted in injuries which includes major and minor cuts and burns, and fractured bones (hands, feet, legs).

Electricity powered inside yards may create serious risks for workers including death as reported by the Auditor. Wiring of these generators is usually not secured, and is even submerged in water during rain.

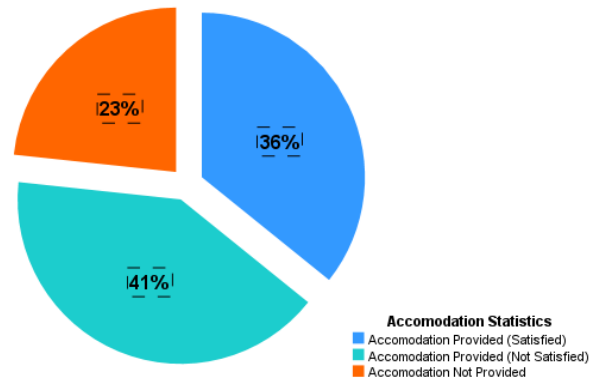
Analysis

Despite lack of reliable and well-maintained data, accidents are regularly reported in SBRI Gadani. To support effective risk management, a comprehensive monitoring and accident investigation mechanism are required.

4.2.11 Living Conditions

About 77% of the respondents in the sample indicated that they were provided accommodation at SBRI Gadani either inside or outside premises of the yards; wherein, 36% were satisfied with the standard of accommodation; whereas, 41% were not satisfied.

Figure 19 *Status of Accommodation for SBRI Gadani Workers*



Furthermore, no adequate rest area in the yard premises seems available for workers during working time. Workers rest under sheds made of metal plates or improvised shelters.

Living Conditions for Daily Wage Contract Workers

According to the auditor, daily wage contract workers hired by the sub-contractors live in a make-shift accommodation constructed outside the yard premises by the workers themselves, from wood and metal plates from ship's scrap material. The hygienic condition of the accommodation is not satisfactory, and lack basic facilities including electricity, water supply, beds, clean drinking water, washrooms etc. Workers also cook their food inside these shared rooms, due to non-availability of a cook house and dining facility.

Living Conditions for Monthly (Fixed) Wage Contract Workers

Monthly (fixed) wage contract workers live in two types of accommodation, that is either in free-of charge rooms within the yard premises, or in Gadani town on their own expense. The yard decides which worker will be provided accommodation within the yard premises and which worker will live outside. Inside the yard, the rooms have been reported as not satisfactory and over-populated.

However, certain workers such as yard managers are provided with better accommodation with facilities such as electricity, air conditioning, clean drinking water, washroom etc.

Each yard has its own cooking and dining facilities within yard premises, which provides free of cost food to the hired employees.

Analysis

Overall living conditions at SBRI Gadani are not satisfactory, primarily due to variation in contractual employment. Adequate living condition is basic, which affects the workers both physiologically and psychologically. Therefore, appropriate legislation with respect to labour employment through legal (written) contracts needs to be undertaken.

Chapter 5 – Conclusion and Way Forward

5.1 Conclusion of OSH in Pakistan's SBRI

Pakistan's SBRI holds 3rd largest share in the global ship breaking and recycling industry. However, it is among the non-parties to the HKC.

SBRI Gadani is a fully tax compliant industry in Pakistan. This important industry is faced with various challenges such as OSH, and ESM of hazardous material and other wastes.

Despite lack of consolidated data, several accidents at SBRI Gadani have been reported including major accidents resulting in many loss and injuries to the workers of SBRI Gadani.

Post 2016 accident, ship operations were discontinued. The operations resumed upon formulation of improved standards for the industry. This has resulted in some improvement in the industry. However, accidents continue to be reported which indicates further improvements are necessary.

Against this back drop, this research intended to explore OSH conditions in Pakistan's Ship Breaking and Recycling Industry.

The research focused on two aspects:

- National legislation that regulates Pakistan's Ship Recycling Industry; and,
- Assessment of workers conditions in yards.

Various national and provincial regulations cover OSH and Environmental aspects of the industry. Analysis of the regulations and literature review indicated regulatory (consolidated framework for OSH at workplace) and implementation gaps (contractual employment of labour and associated benefits like leave, minimum wages for workers, provision of adequate PPEs, medical and emergency preparedness in yards, etc.) which need to be addressed to enhance the industry's safety and environment friendly performance.

Collection of primary data indicated grey areas in implementation of different OSH aspects such as non-availability of written agreements, wages below minimum wage rate, lack of paid holidays, lack of on-job and safety training, inadequate medical and firefighting capacities, and accommodation for workers. However, some improvement has also been noticed such as level of education of workers, availability of PPE, and standard hours of work.

5.2 Roadmap for Formulation and Implementation of Regulatory and Institutional Framework for Pakistan's SBRI

A recommended roadmap for formulation and implementation of regulatory and institutional framework at Pakistan's SBRI Gadani both at national and provincial level is discussed in ensuing paragraphs.

Table 10 *Roadmap for Improvement in Regulatory and Institutional Framework for Pakistan's SBRI*

• Formulation of Ship Breaking Act
• Establishment of SBRI Directorate
• Standard lease of land to Ship Breaking companies
• Mandatory certification and audit of Ship Breaking Yards
• Re-opening of Ship Breakers' College and training curriculum
• Registration and database of SBRI Gadani workers
• Standardization of contractual employment and wages
• Upgradation of infrastructure at Gadani

5.2.1 Formulation of Ship Breaking Act

India (Ship Breaking Code, 2013; The Recycling of Ship Act, 2019) and Bangladesh (Ship Recycling Act, 2018) have already undertaken comprehensive national legislation specific to the SBRI. However, Pakistan's Ship Breaking Rules, 1979 do not cover all aspects related to SBRI.

Therefore, Pakistan Ship Breaking Act may be formulated with consultation of relevant stakeholders. The act should be in line with international instruments such as the HKC, BC, etc., and should include aspects such as OSH, ESM of hazardous

material and other wastes, taxation, data management, training, labour law, etc. relevant to the SBRI.

Implementation of this act will allow Pakistan's SBRI to prepare for entry-into-force of the HKC; wherein, no more favorable treatment will be afforded to non-parties. This will also allow Pakistan to secure and improve its share of the SBRI.

Subsequently, Government of Balochistan may also formulate its Ship Recycling Act in accordance with the national Ship Recycling Act.

A periodic review mechanism may also be formulated so as to timely incorporate amendments in the Act as and when required.

5.2.2 Establishment of SBRI Wing

Conversant with ships and their construction and breaking, the Ministry of Maritime Affairs would be in a good position to oversee Pakistan's SBRI. It would enhance compliance with the national and provincial legislation and facilitate the preparation for the accession to Hong Kong Convention.

A dedicated wing for SBRI may be established within the Ministry of Maritime Affairs, that will coordinate SBRI activities with all relevant government authorities like ministries of Planning, Development and Reform; Climate Change (for ESM of Hazardous and Other Wastes); Finance, Revenue, and Economic Affairs (Revenue Division); Industry and Production etc.

Subsequently, a dedicated wing may also be established under Balochistan Industry and Commerce department for SBRI. The wing will coordinate smooth functioning of SBRI with all relevant federal and provincial authorities Labour and Manpower department; Board of Revenue; Excise and taxation department; Environment department (BEPA for ESM of Hazardous and Other Wastes); Planning and development department; and BDA etc.

5.2.3 Standard Lease of Land to Ship Breaking Companies

Existence of a non-standard lease of land creates uncertainty for the ship breaking companies at SBRI Gadani, which also discourages them to invest capital in the ship breaking yards. A standard lease of minimum 20 years by land owners and BDA may be regulated to encourage ship breaking companies in upgradation of

infrastructure at SBRI Gadani, which will result in safe and environmentally sound recycling of ships.

5.2.4 Mandatory Certification and Audit of Ship Breaking Yards

Yards at SBRI Gadani undertake mandatory annual certifications; whereas, few yards also undertake non-mandatory ISO certifications. In addition to ISO certifications including ISO 9001-2015, 14001-2015, 30000 series, and 45001-2018, strict national or state monitoring is necessary. Annual audits by the Government of Balochistan SBRI wing may also be made mandatory complemented with at least one unplanned inspection per year. This will contribute towards enhanced safe operations at SBRI Gadani.

5.2.5 Re-opening of Ship Breakers College and Training Curriculum

Closure of Ship Breakers college has forced labour at SBRI Gadani to undertake unstructured on-job training; whereas, safety training is undertaken annually prior certification renewal at yards. The reopening of Ship Breakers College will stabilize the training system in the industry. In this regard, efforts by both the Governments of Pakistan and Balochistan are required including resource allocation (both financial and HR) and effective operationalization of the college.

For training at the Ship Breakers College, determination of curriculum for workers and safety training is necessary. Therefore, a framework for training of faculty (trainers) and workforce of SBRI Gadani needs to be developed. In this regard, IMO's SENSREC project of Bangladesh can be consulted which inter alia provides a training framework for trainers and sustainable training of SBRI workforce (IMO-NORAD, 2016a, 2016b, 2016c). The IMO's SENSREC Training curriculum is based on eight modules.

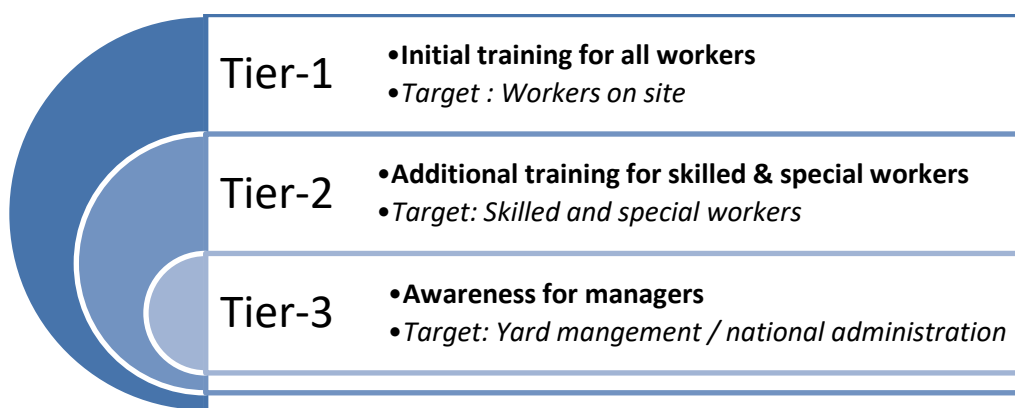
Table 11 *IMO's SENSREC Project WP4 - Training Curriculum*

Training Curriculum	
Module-1	Ship Recycling Administration and Regulative Framework
Module-2	Job Hazard Awareness – Hazard and Risks
Module-3	Environmental Awareness
Module-4	Inventory of Hazardous Materials (IHM)
Module-5	Personnel Protective and Safety Equipment
Module-6	Worker Wellbeing and Health
Module-7	Awareness and Handling of Hazardous Materials
Module-8	Vocational Education and Training

Note. Adapted from IMO-NORAD SENSREC project Work Package 4 report (<https://wwwcdn.imo.org/localresources/en/OurWork/PartnershipsProjects/Documents/Ship%20recycling/WP4b%20Pilot%20Training%20of%20Trainers.pdf>).

Subsequent to training of adequately qualified trainers, the document provides a three-tiered training system for SBRI workforce (depicted below), which is considered appropriate for training of Pakistan's SBRI workforce.

Figure 20 *IMO's SENSREC Project WP4 - Three Tiered Training System*



Note. Adapted from IMO-NORAD SENSREC project Work Package 4 report (<https://wwwcdn.imo.org/localresources/en/OurWork/PartnershipsProjects/Documents/Ship%20recycling/WP4a%20Curricula%20-%20Training%20strategy%20-%20Training%20needs.pdf>).

5.2.6 Registration of SBRI Workers and Accident/ Incident Database

Registration of all SBRI Gadani workers may be undertaken. A single database would list all approved workers. The database may be connected with the national database (NADRA) for verification of legal documents of workers. Following advantages are envisaged through establishment of the database:

- Ensure no child labour is undertaken at SBRI Gadani.
- Professional training record of workers.
- Occupational experience of the workers.
- Streamline career progression of workers.
- Streamline standard wage system.
- Record of contractual employment of workers.

Furthermore, the lack of consolidated database on accident/ incident has been highlighted. It is necessary to develop such database in order to collect feedback on past challenges and develop sound risk management options.

5.2.7 Standardization of Contractual Employment and Wages

Necessary national and provincial legislation may be undertaken to enforce compulsory contractual (written) employment for workers of SBRI Gadani to ensure labour rights of the workforce. The contractual employment of SBRI Gadani workers may also be linked to compulsory training through vocational training institute and periodic refresher training.

Despite minimum wage for unskilled workers in Pakistan and Balochistan is set at 25,000 PKR; however, implementation gap exists. Therefore, enforcement of minimum wage for 48 hours work week (8 hours of work in 6-day week) should be ensured to improve OSH conditions in the industry. Whereas, wage for overtime work be made over and above the minimum wage.

Furthermore, necessary legislation may be undertaken to limit maximum hours of work in a week to 55 Hours including overtime work. This will reduce risk of heart diseases in workers of the ship breaking industry in accordance with the WHO-ILO study.(Pega et al., 2021).

5.2.8 Upgradation of Infrastructure at Gadani

As per regulations a portion of the revenue generated from the industry is supposed to be invested in the improvement of infrastructure of Gadani (Butt et al., 2016). However, this is not visible in practice. Governments of Pakistan and Balochistan should invest in upgradation of this essential industry to ensure its perpetuation in a competitive environment.

In addition to productive investments (cranes, machines, etc.), the Governments should consider the betterment of working and living conditions including housing complex for SBRI Gadani workers, adequate medical facility and fire brigade station with requisite equipment, fire tenders, ambulances, and manpower to enable handling of fatal injuries and response to emergencies.

5.3 Recommendations for Future Research

The exploration of OSH in Pakistan's Ship Recycling Industry was undertaken remotely with support of external persons. Therefore, the data collection process could not be strictly monitored.

This distance and lack of available resources resulted in limiting the scope of research to eleven categories of OSH.

Therefore, there is a requirement of further research not only in the OSH aspect of Pakistan's SBRI but also ESM of hazardous materials and other wastes, and economic aspects of the industry etc.

The research on Pakistan's Ship Breaking Industry will not only assist national and provincial authorities to put forth focused efforts in improvement of the completely tax compliant industry of the country, but also prepare Pakistan for entry-into-force of the HKC.

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Annexes

Annex-1: Methods of Ship Recycling

There are four methods for recycling ships presently employed worldwide. These methods are briefly described as under:

Dry Docking

Dry docking method is used at a few places in Europe. In this method, the vessel is sailed into the dry dock and de-flooded to provide a dry surrounding. The ship is gradually dismantled from the top-down. Upon completion, the dock is cleaned and re-flooded. This method is environmentally sound due to enclosed recycling facility with a very low risk of pollution. However, factors like associated infrastructure, maintenance of dock, capacity for surplus docking etc. the method is not cost-effective and available in countries with labour wages on higher side. Therefore, vessels recycled through this method are very less. The method is not commercially available except for occasional recycling of government-owned and salvaged vessels (Litehauz, 2013).

Pier Breaking / Alongside

Pier breaking / alongside method for ship recycling is used in China, Europe and the US. In this method, the ships are secured alongside a quay, wharf or a similar structure. The ship is dismantled top-down till bottom of hull. Thereafter, the remaining part is lifted and placed onshore or sent for docking. This method is undertaken in sheltered waters which makes pollution control easier and can be undertaken in port facilities worldwide. Pier breaking is primarily used in China and to some extent in Turkey (Litehauz, 2013).

Landing / Slipway

Landing / slipway method for ship recycling is used in Turkey. In this method, ships are sailed against shore or slipways that are concrete structures spreading into the water mass. Slipway sites have a minimum tidal effect which makes the inter-tidal zone predictable and provides better pollution control measures. During dismantling the vessels are gradually heaved-in and pieces removed through onshore mobile cranes or barges, which may also be supported through a temporary jetty or quay (Litehauz, 2013).

Beaching

Beaching is the most widely used method worldwide for ship recycling. This method is specifically used in South-East Asian countries i.e. Pakistan, Bangladesh and India. During last 25 years, this method has contributed 60-90% of the global ship recycling. In this method, ships are lightened through removal of non-essential ballast, cargo etc. and sailed full steam into the tidal flat during spring tide to recycling yards with a gradual gradient. The beached ship has dry access for workers, which is dismantled top-down from bow to stern. In beaching ships are also gradually heaved-in through winches and dismantled in parts (Litehauz, 2013).

Annex-2: Ship Recycling Statistics

Table 12 *Statistics of Ships Recycled*

Year	Number of Ships Recycled Worldwide	Indian Sub-Continent		Pakistan	
		Number	Percentage	Number	Percentage
2006 (R)	293	103	35.1%	7	2.4%
2007 (R)	288	257	89.2%	23	8.0%
2008 (R)	457	397	86.9%	20	4.8%
2009 (R)	1006	736	73.2%	87	8.6%
2010 (R)	952	611	69.3%	91	9.6%
2011 (R)	1020	711	69.7%	108	10.6%
2012 (R)	1328	871	65.6%	120	9.0%
2013 (R)	1119	662	59.2%	104	9.3%
2014 (R)	975	606	62.2%	105	10.8%
2015 (R)	766	545	71.1%	105	13.7%
2016 (R)	936	684	73.1%	132	14.1%
2017 (R)	885	535	60.5%	110	12.4%
2018 (R)	718	518	72.1%	67	9.3%
2019 (R)	579	421	72.7%	31	5.4%
2020 (N)	630	446	70.8%	99	15.7%
2021 (N)	763	583	76.4%	119	15.7%

Note. Statistics Combined by the Author from NGO Sources. (R) – Data extracted from Robin Des Bois (<https://robindesbois.org/en/category/balisage/demolition-des-navires/>), and (N) – Data extracted from NGO Ship Breaking Platform (<https://shipbreakingplatform.org/resources/annual-lists/>).

Annex-3: International Regulatory Instruments for Ship Recycling

Table 13 *List of Appendices to Annex-3*

<i>Appendix</i>	<i>Title</i>
Appendix-A	Pakistan's Status of Ratification of ILO Conventions
Appendix-B	The Basel Convention on Transboundary Movement of Hazardous Waste, 1989 (UNEP)
Appendix-C	The Hong Kong Convention on Safe and Environmentally Sound Recycling of Ships, 2009 (IMO)
Appendix-D	ISO Standards
Appendix-E	Industry Working Group Guidelines on Ship Recycling

Appendix-A: Pakistan's Ratification Status of ILO Conventions

Table 14 *List of ILO Conventions Adopted by Pakistan*

S No	Convention Number	Convention Title	Entry Into Force	Date of Ratification	Status
1.	C029	Forced Labour Convention	1930	23 Dec 1957	In Force
2.	C087	Freedom of Association and Protection of the Right to Organize Convention	1948	14 Feb 1951	In Force
3.	C098	Right to Organize and Collective Bargaining Convention	1949	26 May 1952	In Force
4.	C100	Equal Remuneration Convention	1951	11 Oct 2001	In Force
5.	C105	Abolition of Forced Labour Convention	1957	15 Feb 1960	In Force
6.	C111	Discrimination (Employment and Occupation) Convention	1958	24 Jan 1961	In Force
7.	C138	Minimum Age Convention	1973	06 Jul 2006	In Force
8.	C182	Worst Forms of Child Labour Convention	1999	11 Oct 2001	In Force
1.	C081	Labour Inspection Convention	1947	10 Oct 1953	In Force
2.	C144	Tripartite Consultation (International Labour Standards) Convention	1976	25 Oct 1994	In Force
1.	C001	Hours of Work (Industry) Convention	1919	14 Jul 1921	In Force
2.	C004	Night Work of Young Persons (Industry) Convention	1919	14 Jul 1921	Abrogated
3.	C006	Night Work of Young Persons (Industry) Convention	1919	14 Jul 1921	In Force
4.	C011	Right of Association (Agriculture) Convention	1921	11 May 1923	In Force
5.	C014	Weekly Rest (Industry) Convention	1921	11 May 1923	In Force
6.	C015	Minimum Age (Trimmers and Stokers) Convention	1921	20 Nov 1922	Abrogated
7.	C016	Medical Examination of Young Persons (Sea) Convention	1921	20 Nov 1922	Abrogated
8.	C018	Workmen's Compensation (Occupational Diseases) Convention	1925	30 Sep 1927	In Force
9.	C019	Equality of Treatment (Accident Compensation) Convention	1925	30 Sep 1927	In Force
10.	C021	Inspection of Emigrants Convention	1926	14 Jan 1928	Abrogated
11.	C022	Seamen's Articles of Agreement Convention	1926	31 Oct 1932	In Force
12.	C027	Marking of Weight (Packages Transported by Vessels) Convention	1929	07 Sep 1931	In Force
13.	C032	Protection against Accidents (Dockers) Convention (Revised)	1932	10 Feb 1947	In Force
14.	C041	Night Work (Women) Convention (Revised)	1934	22 Nov 1935	Abrogated
15.	C045	Underground Work (Women) Convention	1935	25 Mar 1938	In Force
16.	C059	Minimum Age (Industry) Convention (Revised)	1937	26 May 1955	Denunciation
17.	C080	Final Articles Revision Convention	1946	25 Mar 1948	In Force
18.	C089	Night Work (Women) Convention (Revised)	1948	14 Feb 1951	In Force
19.	C090	Night Work of Young Persons (Industry) Convention (Revised)	1948	14 Feb 1951	In Force
20.	C096	Fee-Charging Employment Agencies Convention (Revised) <i>Has accepted the provisions of Part II</i>	1949	26 May 1952	In Force
21.	C106	Weekly Rest (Commerce and Offices) Convention <i>The Government has declared that the Convention also applies to persons employed in the establishments specified in Article 3, paragraph 1(c).</i>	1957	15 Feb 1960	In Force
22.	C107	Indigenous and Tribal Populations Convention	1957	15 Feb 1960	In Force
23.	C116	Final Articles Revision Convention	1961	17 Nov 1967	In Force
24.	C118	Equality of Treatment (Social Security) Convention <i>Has accepted Branches (c) and (g)</i>	1962	27 Mar 1969	In Force
25.	C159	Vocational Rehabilitation and Employment (Disabled Persons) Convention	1983	25 Oct 1994	In Force
26.	C185	Seafarers' Identity Documents Convention (Revised), as amended	2003	21 Dec 2006	In Force
		Amendments of 2016 to the Annexes of the Convention No. 185	2016	08 Jun 2017	In Force

Note. Statistics taken from official ILO website (https://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO:11200:P11200_COUNT_RY_ID:103166).

Appendix-B: The Basel Convention on Transboundary Movement of Hazardous Waste, 1989 (UNEP)

Objectives of the Convention

Main objectives of the Basel Convention with regards to hazardous wastes and other wastes are (Basel Convention, 1989):

- Generation is reduced to a minimum.
- Availability of adequate disposal facilities for environmentally sound management manner as near as practicable to source of generation.
- Reduction in transboundary movement in accordance with environmentally sound and efficient management.

According to the convention 'waste' is defined as, '*substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law*'. Hence, EoL ships destined for ship breaking are included in the definition of 'waste' and would be regulated by relevant regulations of the convention if it falls under the category of hazardous waste (Bhattacharjee, 2009).

The convention for regulating transboundary movement of hazardous wastes and other wastes, inter alia, requires following:

- Appropriate legal, administrative and other measures including designation or establishment of a **competent authority** and a **focal point** for implementation and enforcement of the provision of the convention by party states.
- **Import and export prohibition** of hazardous waste to states not party to the convention.
- A **Prior Informed Consent (PIC)** by importing and transit states, a contract between the exporter and the disposer with information of environmentally sound management of the hazardous wastes and other wastes, and a notification mechanism for undertaking this activity.

- ***Environmentally sound and efficient management of hazardous wastes and other wastes*** to safeguard human health and the environment from negative consequences of waste material.
- Exporting state has a '***duty to re-import***' in the event of an illegal transboundary movement of hazardous waste or other wastes due to actions of exporter or generator, which is a criminal act. Hence, national legislation of the party states should also cover prevention and punishment for illegal traffic.

Technical Guidelines for the Environmentally Sound Management (ESM) of the Full and Partial Dismantling of Ships, 2003 (Basel Convention - UNEP)

Environmentally Sound Management

The technical guidelines provide guidance to the states with existing or planned facilities for ship dismantling. It provides information and recommendations on procedures, processes and practices required for ESM at such facilities, alongwith monitoring and verification on environmental performance (UNEP, 2003). ESM is defined in the BC as *"taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes"*.

Requirement of impermeable floors for complete containment of ship at all stages of ship breaking makes 'Beaching' as not an acceptable form of environmentally sound dismantling of ships (UNEP, 2003). However, this criterion is enforced on a rather few EoL ships and faces enforcement challenges for the global merchant fleet (Bhattacharjee, 2009).

A ship arrives and is beached on its own power for recycling. This means that a vessel must be in a ship-shape condition and in conformity with all valid certificates until beached. Hence, it is still subject to international regulations for shipping including SOLAS and MARPOL. MARPOL Annexes I, II, IV, V and VI require establishment of appropriate waste-reception facilities for ship-generated waste (UNEP, 2003). Pakistan is also party to the MARPOL convention and status of ratification is as under:

Table 15 *Pakistan's Status of MARPOL Annexes*

MARPOL Annex	Date of Entry Into Force	Pakistan's Status	Date of Entry Into Force in Pakistan
Annex-I	02 Oct 1983	Accession	22 Feb 1995
Annex-II	02 Oct 1983	Accession	22 Feb 1995
Annex-IV	27 Nov 2003	Acceptance	27 Nov 2003
Annex-V	31 Dec 1988	Acceptance	22 Feb 1995
Annex-VI	19 May 2005	-	-

Note. Statistics taken from IMO's GISIS Database
(<https://gisis.imo.org/Members/ST/Ratification.aspx?cid=169>)

Occupational Safety and Health

Absence or inadequacy of fundamental safety measures endangers well-being of the workforce. The vessel and onboard systems may itself offer possible dangers due to the absence of guiding principles governing proactive onboard steps prior to dismantling. For instance, making sure that workers have adequate breathing environments in confined places. Basic risk-reduction or elimination steps are frequently disregarded, which leads to accidents. Lack of: facilities, safety oversight, and coordination across working operations all constitute risk factors that may result in accidents and physical injury.

The exposure to dangerous chemicals and the type of job activities are the key issues of health concern (hard manual labour involving heavy lifting, etc.). Additional issues include residences near the demolition site, a lack of sanitary facilities, and widespread exposure to toxins from the site through discharges into the sea, the land, and the air. Most vessels contain, Carcinogens and other toxic pollutants including PCB, PAH, heavy metals, and asbestos which pose a risk to both employees and the local community. Sustained exposure to these chemicals can have long-term consequences, which are generally well understood. They have a serious negative influence on health and can be passed on to future generations.

Appendix-C: The Hong Kong Convention on Safe and Environmentally Sound Recycling of Ships, 2009 (IMO)

Entry-Into-Force Requirements

Article 17 of the convention provides enter into force criteria, 24 months after the date on which the following conditions are met:

- 15 States become party to the HKC.
- Party States own 40% GT of the world's merchant shipping.
- Combined maximum ship recycling volume of the States during last 10 years is not less than 3% GT of their combined merchant shipping.

Requirements for Ship Recycling States

To ensure safe and environmentally sound recycling of ships, states party to the convention with existing or planned SRFs will be required to:

- Undertake necessary legislation to ensure SRFs are designed, constructed and operated i.a.w the HKC.
- Formulate a procedure to authorize SRFs.
- Formulate a procedure to ensure SRF's compliance with the HKC.
- Establish or designate a competent authority(ies) and a focal point for implementation and enforcement of the provisions of the HKC.

Requirements for SRFs

To ensure safe and environmentally sound recycling of ships, SRFs of party states will be required to:

- Be situated within jurisdiction of the party state and authorized to undertake ship recycling with a maximum validity of 5 years.
- Acceptance of EoL ships that are in compliance with the convention and which the SRF is authorized to recycle.
- Formulate and implement a Ship Recycling Facility Plan (SRFP) which covers safety and training aspects of workers, human health and environmental protection, roles and responsibilities of individuals, monitoring and reporting mechanism, emergency preparedness and response and record keeping.

Requirements for Ships Recycled at SRFs

To ensure safe and environmentally sound recycling of ships, requirements for ships due for recycling are:

- Development of a Ship Recycling Plan (SRP) specific to each ship due for recycling with consideration of information provided by ship owners i.e. IHM, International Certificate on Inventory of Hazardous Material (ICIHM) etc.
- Notification to competent Authority (CA) for ship recycling intent by SRF. This should include details of Flag state, ship, owner and company, classification society, IHM and SRP.
- Tacit or explicit approval of SRP by CA, which should be made available for final survey of the ship.
- Upon receipt of '*International Ready for Recycling Certificate*' (IRRC) by the ship, SRF will report to CA alongwith a copy of IRRC. Thereon, ship recycling is commenced.
- Upon completion of recycling, a '*Statement of Completion*' is issued by CA to SRF alongwith a copy to IRRC issuing administration.

IMO Guidelines for Safe and Environmentally Sound Recycling of Ships

IMO has developed a total of six guidelines provide clarity, interpretation and uniformity in processes for technical matters resulting from the HKC provisions. Wherein, four guidelines (S.No.1-4) have been developed to assist member states in implementation of the HKC's technical standards; whereas, two guidelines (S.No.5-6) have also been developed to assist member states in implementation of the HKC after entry into force, which includes:

Table 16 *IMO Guidelines for Safe and Environmentally Sound Recycling of Ships*

S No	IMO Guidelines	Year	IMO Resolution
1.	Guidelines for the Development of Ship Recycling Plan	2011	MEPC.196(62)
2.	Guidelines for Safe and Environmentally Sound Ship Recycling	2012	MEPC.210(63)
3.	Guidelines for the Authorization of Ship Recycling Facilities	2012	MEPC.211(63)
4.	Guidelines for the Development of the Inventory of Hazardous Materials	2015	MEPC.269(68)
5.	Guidelines for the Survey and Certification of Ships under the HKC	2012	MEPC.222(64)
6.	Guidelines for the Inspection of Ships under the HKC	2012	MEPC.223(64)

Note. List of Guidelines compiled from official IMO website (<https://www.imo.org/en/OurWork/Environment/Pages/Ship-Recycling.aspx>).

Appendix-D: ISO Standards Related to Ship Recycling

Table 17 *ISO 30000 Series (Ships and Marine Technology - Ship Recycling Management Systems)*

ISO Standard	Title
ISO 30000:2009	Specifications for management systems for safe and environmentally sound ship recycling facilities
ISO 30002:2012	Guidelines for selection of ship recyclers (and pro forma contract)
ISO 30003:2009	Requirements for bodies providing audit and certification of ship recycling management
ISO 30004:2012	Guidelines for the implementation of ISO 30000
ISO 30005:2012	Information control for hazardous materials in the manufacturing chain of shipbuilding and ship operations
ISO 30006:2010	Diagrams to show the location of hazardous materials onboard ships
ISO 30007:2010	Measures to prevent asbestos emission and exposure during ship recycling

Note. List compiled from ISO official website (<https://www.iso.org/>)

Appendix-E: Industry Working Group Guidelines on Ship Recycling

Table 18 *Industry Working Group Guidelines on Ship Recycling*

Reference	Title
ICS, 2001	The Industry Code of Practice on Ship Recycling
ICS, 2009	Guidelines on Transitional Measures for Ship-owners Selling Ships for Recycling (In Preparation for the Entry into Force of the IMO Hong Kong Convention and the EU Ship Recycling Regulation)
ICS, 2016	Shipping Industry Guidelines on Transitional Measures for Ship-owners Selling Ships for Recycling (In Preparation for the Entry into Force of the IMO Hong Kong Convention and the EU Ship Recycling Regulation)

Annex-4: Categories of Workers in National and Provincial Legislation

1. **Permanent**

“A *Permanent worker* is a worker who has been engaged on work of permanent nature likely to last for more than nine months and has satisfactorily completed a probationary period of three months in the same or another occupation in the same industrial or commercial establishment or different establishment under the control and ownership of the same employer, including breaks due to sickness, accident, leave, lock-out, strike (not being an illegal lockout or strike) or in voluntary closure of the establishment; and includes a badly who has been employed for a continues period of three months or for one hundred and eighty three days during any period of twelve consecutive months:

Provided that the employer controlling or owning different establishments may transfer the worker with his consent from one establishment to the other” (Balochistan Industrial and Commercial Employment Act, 2021).

2. **Probationer**

“A *Probationer* is a worker who is provisionally employed to fill a permanent vacancy in a post and has not completed three months’ service therein. If a permanent employee is employed as a probationer in a higher post he may, at any time during the probationary period of three months, be reverted to his old permanent post” (Balochistan Industrial and Commercial Employment Act, 2021).

3. **Badli**

“A *Badli* is a worker who is appointed in the post of a permanent worker or probationer, who is temporarily absent” (Balochistan Industrial and Commercial Employment Act, 2021).

4. **Temporary**

“A *Temporary worker* is a worker who has been engaged for work which is of an essentially temporary nature likely to be finished within a period not exceeding nine months” (Balochistan Industrial and Commercial Employment Act, 2021).

5. **Apprentice**

“An *Apprentice* is a person who is an apprentice within the meaning of the Apprenticeship Ordinance, 1962 (LVI of 1962)” (Balochistan Industrial and Commercial Employment Act, 2021).

6. **Contract Worker**

“A *Contract worker* means a worker who works on contract basis for a specific period of not less than three months:

Provided that the maximum length of contract including renewals shall not exceed 12 months. On completion of 12 months employment, whether under one contract or multiple simultaneous contracts, such worker shall acquire the status of a permanent worker, and entitled to the benefits of a permanent worker:

Provided further that the contracts shall be considered simultaneous if a new contract or renewal of an earlier contract is concluded within two months of the expiry of earlier contract” (Balochistan Industrial and Commercial Employment Act, 2021).

Annex-5: WMU Research Ethics Committee Protocol



WMU Research Ethics Committee Protocol

Name of principal researcher:	SHEHZAD AKBAR
Name(s) of any co-researcher(s):	N/A
If applicable, for which degree is each researcher registered?	MSc – Maritime Safety and Environmental Administration
Name of supervisor, if any:	Capt./Dr. Raphael Baumler
Title of project:	Safe and Environmentally Sound Recycling of Ships – Challenges and Way Forward for Pakistan
Is the research funded externally?	No
If so, by which agency?	N/A
Where will the research be carried out?	WMU
How will the participants be recruited?	To be confirmed
How many participants will take part?	To be confirmed
Will they be paid?	No
If so, please supply details:	N/A
How will the research data be collected (by interview, by questionnaires, etc.)?	Questionnaires
How will the research data be stored?	In my personnel laptop kept under password
How and when will the research data be disposed of?	Data will be permanently deleted upon completion of MSc in Nov 2022
Is a risk assessment necessary? If so, please attach	N/A

Signature(s) of Researcher(s):

Date: 01 April 2022

Signature of Supervisor:

Date: 01 April 2022

Please attach:

- A copy of the research proposal
- A copy of any risk assessment
- A copy of the consent form to be given to participants
- A copy of the information sheet to be given to participants
- A copy of any item used to recruit participants

Annex-6: Consent Form



Dear Participant,

Thank you for agreeing to participate in this research survey, which is carried out in connection with a Dissertation which will be written by the interviewer, in partial fulfilment of the requirements for the degree of Master of Science in Maritime at the World Maritime University in Malmo, Sweden.

The topic of the Dissertation is *"Exploration of Occupational Safety and Health in Pakistan's Ship Breaking and Recycling Industry"*.

The information provided by you in this survey will be used for research purposes and the results will form part of a dissertation, which will later be published online in WMU's digital repository (maritime commons) subject to final approval of the University and made available to the public. Your personal information will not be published. You may withdraw from the research at any time, and your personal data will be immediately deleted.

Anonymised research data will be archived on a secure virtual drive linked to a World Maritime University email address. All the data will be deleted as soon as the degree is awarded.

Your participation in the survey is highly appreciated.

This research has been approved under WMU ethics. For additional questions or concerns, please contact:

Student's name	Shehzad Akbar
Specialization	Maritime Safety and Environmental Administration
E-mail address	w1011450@wmu.se

You can also contact research supervisor

Supervisor's name	Capt./Dr. Raphael Bumler
Position	Head of MSEA Specialisation
E-mail address	rb@wmu.se

* * *

I consent to my personal data, as outlined above, being used for this study. I understand that all personal data relating to participants is held and processed in the strictest confidence, and will be deleted at the end of the researcher's enrolment.

Name:

Signature:

Date:

Annex-7: Survey Questionnaire

SURVEY FORM - GADANI SHIP BREAKING YARD (PAKISTAN)

سرورے فارم - گڈانی شپ بریکنگ یارڈ (پاکستان)

Date / تاریخ : _____

Questions / سوالات	Answers / جوابات
1. Biographic data / ذاتی معلومات	
a. What is your age? آپ کی عمر کتنی ہے؟	
b. What is your province of origin? آپ کس صوبہ سے تعلق رکھتے ہیں؟	
c. What is your level of education? آپ کی تعلیم کتنی ہے؟	
d. What is your marital status? کھا آپ شادی شدہ ہیں؟	
e. What is the size of your family? آپ کے گھر میں کتنے افراد ہیں؟	
f. How many members of your family work? آپ کے گھر میں کتنے افراد کام کرتے ہیں؟	
g. Is any of your family member working with you in the ship breaking yard? کھا آپ کے گھر کا کوئی اور فرد آپ کے ساتھ شپ بریکنگ یارڈ میں کام کرتا ہے؟	
2. Accommodation / رہائش	
a. Is accommodation provided to you by the ship breaking yard? کھا آپ کو شپ بریکنگ یارڈ کی طرف سے رہائش مہیا کی گئی ہے؟	Yes / ہاں
	No / نہیں
b. If yes, is the accommodation inside the ship breaking yard? اگر رہائش مہیا کی گئی ہے تو کھا وہ شپ بریکنگ یارڈ کے احاطے میں ہے؟	Yes / ہاں
	No / نہیں
c. If no, is the ship breaking yard paying accommodation allowance? اگر رہائش مہیا نہیں کی گئی تو کھا شپ بریکنگ یارڈ رہائش کا الاؤنس ادا کر رہا ہے؟	
d. If yes, how much is the accommodation allowance? اگر ہاں، تو کتنا الاؤنس ادا کیا جا رہا ہے؟	
e. If you are living outside, how far is the accommodation from the yard? اگر آپ کی رہائش شپ بریکنگ یارڈ سے باہر ہے، تو وہ کتنی دور ہے؟	
f. What is the mode of transportation for going to the work? آپ اپنی رہائش سے شپ بریکنگ یارڈ میں کام کرنے کے لئے کس طرح پہنچتے ہیں؟	
g. What is the standard of housing being provided by the yard? اگر رہائش شپ بریکنگ یارڈ کی طرف سے مہیا کی جا رہی ہے تو اس کا کھا معیار ہے؟	

3. Previous occupation / گزشتہ پیشہ			
a. Were you previously employed?	Yes / ہاں		
کیا آپ پہلے کبھی اور کام کرتے تھے؟	No / نہیں		
b. If yes, what was the occupation?	Agriculture / زراعت		
اگر ہاں، تو کس پیشے سے منسلک تھے؟	Textile / ٹیکسٹائل		
	Industry / صنعت		
	Other / کوئی اور		
4. Experience in Ship Breaking Yard / شپ بریکنگ یارڈ میں کام کرنے کا تجربہ			
a. What is your total experience in the ship breaking yard?	(yy / mm) / (سال/مہینے)		
آپ کا شپ بریکنگ یارڈ میں کام کرنے کا کل کتنا تجربہ ہے؟			
b. For how long have you been working in the yard in the present employment contract?	(yy / mm) / (سال/مہینے)		
آپ موجودہ کنٹریکٹ میں شپ بریکنگ یارڈ میں کتنے عرصے سے کام کر رہے ہیں؟			
c. At what age have you started to work in the yard?			
آپ نے کس عمر میں شپ بریکنگ یارڈ میں کام شروع کیا تھا؟			
5. Current position in the ship breaking yard / شپ بریکنگ یارڈ میں موجودہ عہدہ			
a. What is your current position in the yard?	Manager / مینجر		
آپ شپ بریکنگ یارڈ میں موجودہ طور پر کس عہدہ پر کام کر رہے ہیں؟	Supervisor / سپروائزر		
	Cutter / کٹر		
	Other / کوئی اور		
6. Training Information / پیشہ ورانہ تربیتی معلومات			
Job Training / پیشہ ورانہ تربیتی	a. Have you undertaken any job training related to ship breaking?	Yes / ہاں	
	کیا آپ نے شپ بریکنگ سے متعلق کوئی تربیت حاصل کی ہے؟	No / نہیں	
	b. If yes, where was the training undertaken?		
	اگر ہاں، تو کس جگہ تربیت حاصل کی تھی؟		
	c. When was the training undertaken?		
	تربیت کب حاصل کی تھی؟		
	d. Who sponsored the training?		
	تربیت کرنے کے اخراجات کس نے اٹھائے تھے؟		
Safety Training / حفاظتی تربیت	e. Have you undertaken any safety training related to ship breaking?	Yes / ہاں	
	کیا آپ نے شپ بریکنگ سے متعلق کوئی حفاظتی تربیت حاصل کی ہے؟	No / نہیں	
	f. If yes, where was the training undertaken?		
	اگر ہاں، تو کس جگہ تربیت حاصل کی تھی؟		
	g. When was the training undertaken?		
	تربیت کب حاصل کی تھی؟		
	h. Who sponsored the training?		
	تربیت کرنے کے اخراجات کس نے اٹھائے تھے؟		

7. Contractual agreement / کٹریکٹ		
a. Were you given a work contract? آپ کو کٹریکٹ کب دیا گیا تھا؟	Yes / ہاں	
	No / نہیں	
b. Who awards contracts? کٹریکٹ کون دیتا ہے؟	Yard Owner / بارڈ کا مالک	
	Yard Manager / بارڈ مینجر	
	Sub-contractor / سب کٹریکٹر	
c. Work undertaken is according to contract? کام کرنے کی نوعیت کٹریکٹ کے مطابق ہے؟	Yes / ہاں	
	No / نہیں	
d. What are the number of working hours per day? بارڈ میں دن میں کتنے گھنٹے کام کرتے ہیں؟		
e. What are the number of working hours per week? بارڈ میں ہفتے میں کتنے گھنٹے کام کرتے ہیں؟		
f. Do you work overtime? کام آپ اور ٹائم کرتے ہیں؟	Yes / ہاں	
	No / نہیں	
g. How many hours do you work overtime per day? آپ دن میں کتنے گھنٹے اور ٹائم کام کرتے ہیں؟		
h. Does the yard provide medical insurance? کام بارڈ آپ کو میڈیکل انشورنس مہیا کر رہی ہے؟	Yes / ہاں	
	No / نہیں	
8. Payment / تنخواہ کی ادائیگی / اجرت		
a. Is your wage fixed? کام آپ کی اجرت / تنخواہ مقرر ہے؟	Yes / ہاں	
	No / نہیں	
b. What is the wage system? اجرت / تنخواہ کی ادائیگی کا کس طرح کا نظام نافذ ہے؟	Daily / روزانہ	
	Weekly / ہفتہ وار	
	Monthly / ماہانہ	
c. What is the rate of your wage? آپ کی اجرت / تنخواہ کی شرح کیا ہے؟		
d. Do you get paid on time? کام آپ کو وقت پر اجرت / تنخواہ کی ادائیگی کی جاتی ہے؟	Yes / ہاں	
	No / نہیں	
e. What is the payment rate for overtime? اور ٹائم کرنے کی اجرت / تنخواہ کی شرح کیا ہے؟		
f. Is a register of wage being maintained in the yard? کام بارڈ میں اجرت / تنخواہ کی ادائیگی کا رجسٹر برقرار رکھا جاتا ہے؟	Yes / ہاں	
	No / نہیں	

9. Accidents (Worker) / حادثات (مزدوروں کے)		
a. Did you have any accident while working in the yard? کيا آپ بارڈ میں کام کے دوران كهي كسي حادثے سے دوچار ہوئے ہیں؟	Yes / ہاں	
	No / نہیں	
b. If yes, what type of accident was it? اگر ہاں، تو وہ كس قسم كا حادثہ تھا؟		
c. What type of injury was sustained? حادثے كے نتيجے میں كس قسم كے زخم آئے تھے؟		
d. Who bears treatment cost of workers who have accidents? دوران كام بارڈ میں كسي حادثے كی صورت علاج كا خرچہ كون برداشت كرتا ہے؟		
e. Workers who have accidents receive any compensation? بارڈ میں كسي حادثے سے درپيش لوگوں كو كسي قسم كا برجاء ادا كيا جاتا ہے؟	Yes / ہاں	
	No / نہیں	
f. If yes, what type of compensation is provided? اگر ہاں، تو كس قسم كا برجاء ادا كيا جاتا ہے؟		
g. If the compensation is provided in monetary terms, then how much is the amount? برجاء مالی امداد كی صورت میں كتنا ادا كيا جاتا ہے؟		
10. Accidents (Co-workers) / حادثات (ساتھی كاركن)		
a. Did any of your co-worker had any accident? كيا كهي آپ كے ساتھی كاركن كے ساتھ بارڈ میں كولي حادثہ پيش آيا ہے؟	Yes / ہاں	
	No / نہیں	
b. What type of injuries were sustained? حادثے كے نتيجے میں كس قسم كے زخم آئے تھے؟		
c. Age of the worker who had accident? حادثے سے دوچار شخص كی عمر كيا تھی؟		
d. What type of type was he doing? حادثے سے دوچار شخص كس نوعیت كا كام كر رہا تھا؟		
e. The individual had prior job training? حادثے سے دوچار شخص نے اپنے كام سے متعلق ٹريننگ كی ہوئی تھی؟	Yes / ہاں	
	No / نہیں	
f. The individual had prior safety training? حادثے سے دوچار شخص نے حفاظتی ٹريننگ كی ہوئی تھی؟	Yes / ہاں	
	No / نہیں	
11. Personnel Protective Equipment (PPE) / كام كرنے والوں كے حفاظتی آلات		
a. Do you have PPE? كيا آپ كے پاس كام كرنے كے حفاظتی آلات موجود ہیں؟	Yes / ہاں	
	No / نہیں	
b. If yes, what type of PPE? اگر ہاں، تو كس قسم كے حفاظتی آلات موجود ہیں؟		
c. Who pays for / provides PPE? ہم حفاظتی آلات كون مہيا كرتا ہے يا ان كی ادائیگی كون كرتا ہے؟		