

An Overview Of The Dockyard Industry In Bangladesh: A Review Study

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Abstract

Dockyards can be classified as one of the firstlings, most important and, extremely competitive markets in Bangladesh as well as in the world. The Dockyard industry plays a crucial role in supporting the military, stimulate shipping and industrial development, give rise to employment nationally and, provide support for overseas currency inflow; etc. This industry has been branded as one of the most promising industries from a global perspective which might help achieve strong economic development within a short period by continuing an upward trend of progress. The basic objectives of this study are to overview the potentials, performances and identify the problems related to this industry from our national perspective. Secondary data are used in this paper from various sources to support this study in establishing the national and international factors in comparison to the potential which may significantly encourage the dockyard industry performance, as well as the problems addressing assessments and measurements that affect within the industry and finding the answers accordingly.

Keywords: Dockyard, Ship repairing, Shipbuilding, Potentiality, Productivity

1. Introduction

A dockyard is an area that is designated for building, repairing, outfitting, and maintaining all kinds of floating sea-bound vessels, Portable Steel bridges, Steel towers, Mooring buoys, Landing pontoons, Gangways, Oil Bowser tanks, and all types of civil work machinery and workforce. One may be built on land, as well as on any body of water, and can be used by the military, a private party, a corporation, and also can be used by the public, often at a predetermined but suitable rate. The term “Shipyard” can imply the same concept but often refers specifically to the area being used for repairs. “Dockyard” is more commonly used in developing nations like Bangladesh, where it ultimately refers to a shipyard though tries to show slight distinguishments. On

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a broader scale, the terms are often used interchangeably, however specialized equipment needs to be built where shipyards exist, which is designed to aid in the transportation of vessels and corresponding parts, as well as to help in the construction process of newer ones. Cranes are often found near dockyards purposefully, which can float or be land-installed with access over the floating vessels. Ships and vessels are typically brought to land by way of a slipway, which is an incline built from the water to the land. Generally, giant enclosures must also exist where large vessels can be mended & painted, and worked, without interference from inclement weather.

Focusing on Bangladesh's dockyard history, the province of Bengal Subah had a large shipbuilding industry during the Mughal rule. During the sixteenth and seventeenth centuries shipbuilding output of Bengal was 223,250 tons annually. Bengali shipbuilding was advanced compared to European shipbuilding at the time due to a barrage of natural resources. Bangladesh now being a sovereign nation has a tremendous history of shipbuilding dating back to the early modern era. They now have over 200 shipbuilding companies, which are mostly concentrated in Dhaka, Chittagong, Barisal, Khulna, and Narayanganj. As of recent a few of these dockyards distinguishingly Ananda Shipyard & Slipway Ltd (ASSL) of Dhaka and Western Marine Shipyard (WMS) of Chittagong have attained the capability to manufacture export quality ships. Several more local dockyards are capable to build ships up to 10,000 tonnes capacity as per international standards. Our High-speed Shipyards have over 50 years of shipbuilding experience and in the public domain, the most significant is the Chittagong Dry Dock Limited (CDDL) which is the only dockyard, customized with modern facilities and equipped with advanced machinery and facilities to build up ocean traversing vessels with a capability of over 20000 tones. It earns millions of dollars by repairing local and international ships, and also garnering international recognition in the process. The oldest public Dockyard and Engineering Work Ltd (DEW) of Narayanganj, has been servicing new shipbuilding and repair sectors in this region since 1926. It's presently capable of building and repairing versatile types of vessels has gone up to 5000 tones.

These maybe glaring examples of success but, other publicly owned dockyards have become losing concerns due to the ongoing pandemic. The upcoming blue economy concept aids the dockyard and shipbuilding activities through increased production as well as increasing revenue. The world economy is directly interrelated with the Blue Economy initiative and the pandemic condition has directly affected both sides. If we want to turn things around, we must complete the blue economy goals and attain sustenance. This can be achieved by primarily increasing the production and performance of dockyards.

2. Methodology

The subsisting study presents an overview and demographical outline of the dockyard and shipbuilding sector in Bangladesh. The study is an ongoing analysis of dockyard and shipbuilding data. The character of data collected for the explanation of this research is qualitative data for a knowledgeable analysis. A Qualitative research design is developed for the study to allow the researcher to achieve data from existing review papers on this subject for analysis through the collection of secondary data. Secondary data were gained from various sources including journals, conference papers, and wide use of the internet, newspapers, and other related materials which were either published or remain largely unpublished. The obtained data were analyzed for the motion of the study in a qualitative method. Qualitative data analysis was used here to acquire absolute reasonable perceptives to arrive at the precise conclusion which was deemed by authors to be apt for garnering knowledge.

3. Result and Discussion

3.1 Ship Repairing in Bangladesh

3.1.1 Ship repairing history

Ship repair on the general notion includes everything from ship conversions, overhauls, maintenance programs, Mass maintenance, and minor equipment repairs. Ship repair is essential for the shipping and shipbuilding industry. Approximately 1/4th of the labor force private shipyards perform repair and conversion work. Currently, numerous ships require updates and/or conversions to meet safety and environmental regulations. With worldwide fleets getting out of touch with the times and with the increased costs for new ships, the situation is strenuous for shipping companies. On a global scale, conversion and repairing in shipyards are more profitable than newer constructions. In newer construction-based shipyards, repair contracts, overhauls and conversions also aid in stabilizing the workforce during periods of limited work, and newer construction augments the repairmen's workload. The ship repair processes are similar to processes for construction from scratch, with the general distinguishment being that it is carried out on a smaller scale and performed at a faster pace. The repair processes require a more timely coordination and an aggressive bidding criterion needs to be carried out for ship repair contracts. Repair work customers are generally the Military, commercial ship owners, and other marine structure owners.

3.1.2 Common types of repair work

Ships are similar to other types of machineries considering that they also require frequent maintenance and, sometimes, complete overhauls to remain operational/functional. Many shipyards draw up maintenance contracts with shipping companies, ships, and/or ship classes that identify more frequent maintenance work bound to functionality. Examples of such maintenance and repair duties can include:

1. Ballasting and repainting the ship's hull,
2. Maintenance in Freeboard, superstructure, interior tanks, and work areas,
3. Major machinery rebuilding and installation (e.g., diesel engines, turbines, generators, and pump stations, etc.) systems overhauls,
4. Maintenance and installation (e.g., flushing, testing & installation of a piping, new system installation, etc.),
5. Either adding new equipment or replacing outdated systems (e.g., navigational systems, combat systems and equipment, etc.),
6. Updating and maintaining Communication systems or updated piping systems,
7. Propeller and rudder repairs,
8. Modification and alignment or even creation of new machinery spaces on the ship when necessary. Etc.

3.1.3 Large repairs and conversion projects:

Large repair contracts and major conversions are common practices in the ship repair industry. Most of these large repair contracts are drawn up by shipyards having the ability to construct ships, although some formally renowned repair yards will perform extensive repairs and conversions.

Examples of usual major repairs stated in bound contracts are as follows:

1. Conversion of Supply ships to Medical Aid vessels (Hospital Ships)
2. Bisecting a Ship vessel and installing a new section in order to lengthen the hull of the vessel (see figure1)



Figure 1: Bisecting a ship in order to install a new section (Encyclopedia of occupation health and safety 4th Edition)

From Bangladesh's perspective, most of its shipyards have the ability to repair vessels but only a few of them can properly repair vessels. The Chittagong Dry Dock Ltd is the leads the race in repairing ships constituting around 70% of the whole repairing repertoire in Bangladesh.

The table below shows a year-wise count of repaired vessels in Chittagong Dry Dock Ltd from 2008 to 2019.

Ananda Shipyards and Engineering	DEW	KARNAFUL Y Shipyard (PVT)	Khulna Shipyard Limited	Chittagong Dry Dock Limited	Name of ship yard repair ship
17	12	8	12	24	2008
9	17	10	15	12	2009
13	20	8	11	13	2010
8	14	11	9	14	2011
13	15	14	13	17	2012
16	21	15	16	20	2013
14	9	12	18	23	2014
16	11	10	16	22	2015
19	14	17	20	26	2016
21	17	13	15	12	2017
14	19	16	23	31	2018
20	18	13	16	19	2019

Table-1: Number of repaired vessels in notable Dockyards of Bangladesh (2008-2019).
(Source: Respective Official websites)

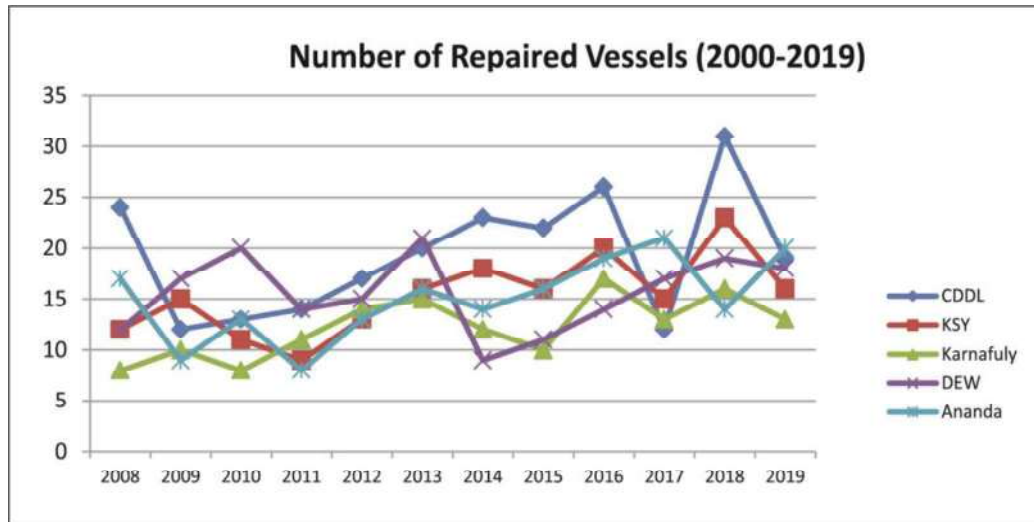


Figure 2: Year-wise number of repairing vessels in Notable Shipyards (2008-2019)
 (Source: Respective official website)

The graphical representation above shows that the numbers of repaired ships have an increase-decrease trend. The initial decade shows a more changing scenario with 2008 being the peak of its repair trend. In the latter decade, gradual progression was seen until 2016 before a collapse in 2017 but an epochal rise in 2018. The effect of the pandemic in the year 2019 is prevalent with reports suggesting ship repairs going downhill for the worldwide economic standstill.

3.2 Historical Trend Analysis of the shipbuilding industry in Bangladesh:

Shipbuilding is one of the fastest-growing industries in Bangladesh with huge potential. This industry has become a major economic contributor in recent years when the locally made ships began global exports. As previously stated, Bangladesh has over 200 shipbuilding companies established across the nation, with most being concentrated in the Dhaka, Chittagong, Narayanganj, Barisal, and Khulna regions.

Only as of recent, a few of its local shipyards have attained the capability to construct and manufacture ships of 10000 DWT and more. Providing a huge platform for employment, nearly fifty thousand skilled workers and over one lakh semi-skilled laborers, are now working in these industries. Putting a more accurate description, there are twelve local shipyards equipped with international standard pieces of machinery which are capable of making ships up to 10000 DWT which are shown in the table below:

Name of Company	Location of Shipyard/ Dock	Export Experience
Ananda Shipyards & Slipways Ltd.	Meghna Ghat, Narayanganj	✓
Western Marine Shipyards Ltd.	Kolagaon, Patiya, Chittagong	✓
Khulna Shipyard Ltd.	Khulna	✓
Narayanganj Engineering & Shipbuilding Ltd.	Nabiganj, Bandar, Narayanganj	
Karnafuly Shipyard (PVT) Ltd.	Chittagong	
High Speed Shipbuilding & Engineering Ltd.	Hosendi Bazar, Gazaria	
Meghna Shipbuilders & Dockyards Ltd.	Meghna Ghat, Narayanganj, Chittagong	
Dockyard and Engineering Works Ltd.	Kadamrasul, Narayanganj	
Chittagong Dry Dock Ltd.	East Patenga, Chittagong	
Bashundhara Steel & Engineering Ltd.	Katuail, Konda, Keraniganj	
TK Shipyard & Engineering Ltd.	Meghna Ghat, Munshiganj	
Prime Ship Building Ltd.	Gazaria	
Radiant Shipyard Ltd	Rupganj, Narayanganj	
DESH Shipbuilding & Engineering Ltd	Chittagong	
Three Angle Marine Ltd	Narayanganj	✓
Sea Plus Marine Services Power-system Engineering	Chittagong	
Bangladesh Inland Water transport Corporation	MGCM+R65, Bandar	
SRL COSMOS TRAWL Ltd.	Karnaphuli, Cittaogong	
Khan Brothers Ship Building Ltd.	Gazaria	
Magnific Engineering company	Chottogram	

Table 2 : Major shipbuilders in Bangladesh (Shipbuilding Report of Bangladesh, 2019.)

Ananda shipyard only executes selective projects since launch and presently makes 112th class vessels. The number of its projects is increasing with newer installations though the current pandemic situation has put a halt in its progression.

On 3 October 1999, the Bangladesh Naval Core took over the responsibilities for Khulna shipyard after which it has been making significant profits. The yard is presently making more than 25 class vessels with orders increasing on a positive note. It has many ongoing projects now.

The Government of Bangladesh handed over Narayanganj Engineering and Shipbuilding Ltd; Narayanganj to Bangladesh Navy on 7th December, 2006; since when, this organization has been progressing quite significantly. The yard has more than 8 ongoing projects.

On 7 December 2007, Dockyard And Engineering Works Ltd was also handed over to the Bangladesh Navy. From then, it is regaining its standard. This shipyard participated in constructing the Pabna Class river patrol boats from 1972 till 1977, which are the first Bangladesh-made warships.

Finally, on 23 December 2015, Chittagong Dry Dock Ltd was brought under the Bangladesh Navy administration. In 2014, this dock started the construction for its first cargo ship. The yard is making more than 20 class vessels and many more are ongoing projects.

Among these notable shipyards, Ananda Shipyard and Slipways Limited and, Khulna shipyard are the most productive of the bunch. They produce 75% of the vessel in Bangladesh and earn huge foreign revenues. Here we show a figure of production vessel of those two shipyards in the year range of 2008-2018.

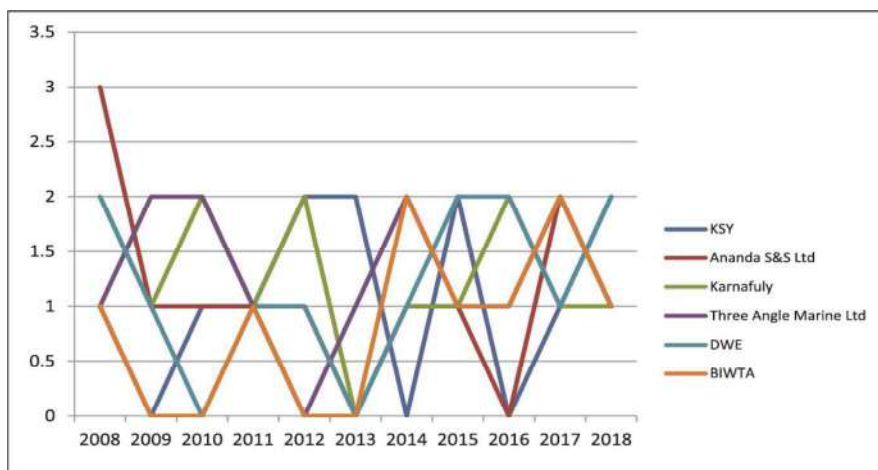


Figure 3: Ship Construction of Notable Shipyards in Bangladesh (2008-2018).

[Source: Respective official websites and reports].

3.3 Potentiality of the Shipbuilding industry in Bangladesh:

The exponential rise of the shipbuilding industry in Bangladesh can be termed as a glorified means of export diversification and residual progression. In a short period of time, this highly potent industry has garnered a stellar reputation in the global competitive market. As ship construction is a high return investment if a healthy market of shipbuilding could be introduced, there lies an enormous opportunity for economic expansion through employment opportunities, export earnings and proper trade deal opportunities, etc. (Islam, 2017) Due to the huge demand for quality vessels of small and medium-size in the global market, shipbuilding could establish itself as one of the major bases for foreign export earnings. Initially, a few small boats were exported to Mozambique and a few others to the Maldives, but the paradigm shift came when Bangladeshi shipyards started receiving European orders. After this and subsequent series of events, the government of Bangladesh formally recognized the shipbuilding industry as a major platform for economic sustenance and declared this industry as the “thrust sector” due to its potential role in the export business.



Figure 4: General SWOT analysis for Shipbuilding industry of Bangladesh. (Authors interpretation)

3.3.1 Wage costs and Lower effective cost:

Though Shipbuilding is one of the most labor-intensive industries, Bangladeshi laborers are still cheaper than Chinese, Korean and Japanese. Their labor share is a powerful asset as it primarily depends on the wage levels in total production cost and the labor intensity of the production process. The fast-growing young workforce of Bangladesh has comparatively lower human cost input which ensures the best amalgamation of overall cost, quality, and productivity. The Productivity of Bangladesh in shipbuilding is almost similar to India which is considered the most efficient producer from the south-Asian region. The closest cost and productivity comparisons of the shipbuilding industry with its competitors can be summarized to India being 2.5 times less productive & efficient and, Korea being 4 times more expensive than Bangladesh concerning labor force thus, highlighting huge positives on Bangladesh's behalf. It is therefore, an attractive industry for Bangladesh whose geographical advantage aids to establish the shipyards for small, medium-size vessels easily.

3.3.2 Expertise

Bangladesh has a significant number of qualified graduates from naval architecture and marine engineering and other affiliated subjects. Moreover, the introduction of offshore engineering as a discipline has also paved the way for further development. More than 55% of these bright minds are working with their full effort abroad with over 60% of them working in shipyards. A large number of experienced ex-mariners are also involved in these industries providing expertise and mentorship to newcomers. In Singapore, more than 30 % of the total workforces are constituted by Bangladeshis with Dubai and Persian Gulf-based shipyards also having more than 1/5th workforce from this country. (Shemon, 2017) The Productivity of the Bangladeshi workforce in shipbuilding is 11.4 which may be among the lowest in the world but a sign for much development to come. Nowadays Bangladesh's skilled personnel and experts are also increasing in numbers in countries like the USA, Australia and, Canada many of whom have returned, to be utilized as advisors, consultants, as well as high level qualified manpower in national projects; thus, paving way for better things to come.

4. Constraints in competing markets and technical limitations of the industry

The present scenario of the Shipbuilding industry shows many promises, but is ultimately let down due to unfurnished assets and technological implementations. The Bangladeshi industry is still a firm believer in grit over moderation which hinders their adoption of AI and other technologies that in most cases have been promoting success in other nations. Competitive nature of this market shows dominance of East Asian markets and European perseverance which at heart has been perpetually aided by implementing both green initiatives and state of the art building apparatus in recent

times. Of all aforementioned dockyards, only a hand few have experience in providing structural example of foreign earnings while rest are for mending local vessels. The few that are present tend to keep business to themselves generating revenue themselves but in the long term, not overly influencing the general industry. Technical limitations such as proper safety regulations and carcinogenic properties related to this field of work, when left unchecked has resulted in foreign investors providing only small incentives while these same invest more in other nations. Thus, if Bangladesh doesn't come on par with the times, all previously discussed opportunities will become banal and result in this industry being an example of underutilized purposes. This would ultimately result in an economic instability for the industry and Bangladesh as a whole.

5. Conclusion

Shipbuilding is a sophisticated and high-tech industry with the prospect of massive socio-economic implications. This industry plays a vital role in assisting the military, promoting industrial development, increasing employment and solidifying economic trade. Already having a lot of experience in building riverine and coastal vessels, it has recently received several orders for small ocean-faring vessels as well. Hence with the onslaught of recognition, it is essential to upgrade the productivity through conducting certain training programmes, incorporating process enhancement modules, modernizing yard facilities, and employing more integrated production technology, etc; otherwise, it is difficult to sustain in this competitive industry in the long run. This industry offers massive job opportunities, the scope for industrial development, a steady flow of foreign revenues and, many other bright opportunities for this country. Hence, the government should come up with policies to support and promote this growing industry to keep up with the times. Most importantly, shipbuilding has been recognized as a heavy-tech based industry all over the world, which provides solid ground for Bangladesh to expand upon as itself is yearning for technological sustenance. But where shipyards globally enjoy the lowest interest rates for reconstructing & developing their yards and executing their shipbuilding projects, Bangladeshi yards still fight to sustain in the industry due to its "Developing nation" notion. Common Work is abundant in these industries but due to competitive markets and underutilized technological notions, large projects are either rare or restricted to a handful of dockyards creating a sociological imbalance on the broader view. Since huge investments are needed in this capital-intensive shipbuilding industry, the government must work out a policy for the provision of long-term loans at the lowest rates of interest possible, to ensure sustainability in this massive and competitive international market. Potentiality is huge for this industry, but its external factors and weaknesses tend to diminish most of what it could achieve. Only when foreign investments will increase and more projects inflow, will this industry of many virtues truly prosper in attaining its ultimate goals.

6. Recommendations

To overcome the addressed problems and identify the opportunities in Bangladesh's dockyard industry, the following recommendations are suggested by the authors;

1. Government Financial support through easy loans with low-interest rates and long-term payment phases.
2. The development could be sustainable of this industry by being incorporated to upgraded levels of R & D and promotion of technological advancements.
3. The Dockyard industry deserves appropriate government support for the growth of backward linkages related to this industry, opportunities for employment expansion, and support in identifying key new sources of higher export revenue earnings.
4. Trained Worker and modern management practices provide technological enhancement, removes Low-productivity. If proper training programmes are ensured, the number of skilled workers will also see an exponential rise.
5. An effort should be made to promote and integrate better-related fields of study for this discipline to ultimately adopt improved knowledge and methods for practices. Etc.

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