Problems & Prospects of Bangladesh Shipping Industry: A Comparative Overview
Wahidul Sheikh Shemon¹

Abstract
Bangladesh is traditionally a ship building nation and has a rich heritage of timber shipbuilding of many hundred years. Germanischer Lloyd has declared Bangladesh as a shipbuilding nation of international standards in September 2008. She is presently contributing to the shipbuilding industries globally through its exported workforce. These facts do not speak only of a heritage but of an inbuilt ability of shipbuilding of people of this region. For the development of shipbuilding industry we need to generate adequate demand in the local and foreign market, elevated engineering skills, reasonable infrastructure, long term government policy support along with attractive investment climate. National and international issues and factors which apparently do not encourage shipbuilding in Bangladesh need to be addressed. Impacts of those issues will be evaluated and measures towards finding a solution will be incorporated. In this paper at first, an overall picture of this industry has been depicted by identifying the actual shipbuilding practice in both public and private sector. Relevant data have been explored through extensive review of literature, field visits, interacting with shipyard and ship owners. The potentiality, capability and problems of the shipbuilding sector of Bangladesh have been identified.

Keywords: Shipbuilding, Class ship, potentiality, labour cost, productivity.

Introduction
Shipbuilding is a growing industry in Bangladesh with great potentials. Bangladesh has a long history of shipbuilding dating back to the early modern era. However, shipbuilding has become a major promising industry in recent years when the locally made ships began to be exported. The optimism about this industry arose from the success attained by a number of local entrepreneurs who brought the name and fame to Bangladesh as a country with great potentials in shipbuilding by building and handing over some ocean-going vessels to overseas buyers. Since then, the shipbuilding in Bangladesh did not have to look back and now new opportunities are knocking at the door to flourish this industry further. It has 9,000 sq km of territorial waters, 720 km long coastline. It has 700 rivers that come down from the surrounding countries and which provide 24000 km long inland waterways.

At present about 10,000 inland and coastal ships have been working all over the country, which carry more than 90% of total oil product, 70% of cargo and 35% of passengers. More than 150,000 skilled and semi-skilled workers are employed in this labour intensive sector. Two million people are related directly or

¹Lecturer, Department of Business Management, Bangabandhu Sheikh Mujibur Rahman Maritime University, Bangladesh
indirectly with shipbuilding industry. All inland and coastal ships are constructed and repaired locally in Bangladeshi shipyards. Recently Bangladesh has successfully exported her first ocean going ship to a high-end market like Denmark competing with giant competitor like China, India and Vietnam in 2008. Bangladesh has now over 200 shipbuilding companies, mostly concentrated in Dhaka, Chittagong, Narayanganj, Barisal and Khulna. However, due to global nature of this industry, an assessment of suitability to modern shipbuilding in terms of global standard is of prime importance.

In this report, an effort has been made to evaluate the present shipbuilding industries in Bangladesh. At first, an overall picture of this industry has been depicted by identifying the actual shipbuilding practice in both public and private sector. Relevant data have been explored through extensive review of literature, field visits, interacting with shipyard and ship owners. The potentiality, capability and problems of the shipbuilding sector of Bangladesh have been identified & some recommendations have been made in line with this report.

Methodology Used For Data Collection

Data were collected through extensive review of literature, field visits, survey, consultations and meetings with Government Authorities, Shipbuilding Associations, existing and upcoming shipyards and its related stakeholders. Private and public shipyards around the country were visited to collect primary data and information about the local shipbuilding practice through interacting with structured, unstructured and open ended questionnaires. Secondary information about shipbuilding tradition and potentiality of Bangladesh and other nation of the world were collected from both external and internal means. Shipbuilding process (such as ship design, steel treatment, plate and section preparation, welding quality, steel work, fabrication, outfitting work, hull erection and launching) was observed to assess the standard of work. Primary and Secondary data about labour, labour hour and labour cost were collected to assess the labour productivity of local shipbuilding industries and to evaluate the standard of local shipyards and comparing them with other shipbuilding nations.

Professional participations were conducted through Information, Questionnaire and Interviews. The organizational set up, working environment; management practices, performance and future vision of local shipyards were compared with other shipbuilding nations.
Historical Background

Because of the revering geography of Bangladesh, ships have been playing a major role in the trade affairs of the people of this country since the ancient times. According to the accounts of the 14th century Moroccan traveller Ibn Batuta, there used to be large fleets of warships docked in various ports of the country. A medieval European traveller Caesar Frederick documented that the port city of Chittagong was a manufacturing hub of large ships during the mid-15th century. The volume of shipbuilding swelled extensively during the Mughal period. During the 17th century, the shipyards of Chittagong used to build warships for the Sultan of Turkey.

The Royal Navy had many warships built in Chittagong, some of which were also used in the Battle of Trafalgar in 1805. Khulna Shipyard, the first modern shipyard of Bangladesh, was established in 1957, constructed by a German firm. Initially a private concern, the shipyard was later nationalized and came under the control of Bangladesh Navy in 1999.

During Pakistan period public sector enterprises dominated the shipbuilding Industry. There are more than fifty shipyards concentrated at Dhaka, Chittagong, Narayanganj, Barisal and Khulna regions where inland costal and fishing fleets are being built. In 1979, FAO funded contract for supply of 8 food grain carrying vessels to Bangladesh Inland Water Transport Corporation (BIWTC) was secured by High Speed Shipyard, Narayanganj. Mitsui Engineering and Shipbuilding Industry of Japan entered into a joint venture in shipbuilding with High Speed Shipyard and constructed 4 deep sea fishing vessels. Recently some shipbuilding industries including Ananda Shipyard and Slipways Ltd, Dhaka and Western Marine Shipyard Ltd, Chittagong have come up with modern shipbuilding facilities that enabled them to receive export orders. However in 2008, Ananda shipyard exported her first ocean going ship Stilla Marriage to Denmark and earned reputation for Bangladesh as the ship exporting country in the world.

Present Status of Bangladeshi Shipbuilding Industry

There are more than fifty shipyards in Bangladesh and a hundred of shipbuilders or contractors and marine workshops are actively involved in shipbuilding activities. 70% of the shipyards are located in and around Dhaka, 20% are in Chittagong and 10% are in Khulna and Barisal. Almost all inland/coastal/bay crossing ships are constructed and repaired locally in these shipyards. Local shipyards can design and fabricate ship up to 3500 DWT to fulfil the demand of local market. Few local shipyards are capable of making ships up to 10,000 DWT (deadweight tonne) as per international standard. Most of the Shipyards are
operating under individual management with nominal supervision of government. All inland and coastal ships are built by local shipyards, and the number of vessels built per year counts an average of 250. They employ huge number of skilled, semi-skilled and unskilled labour. Most of the private shipyards use plate, engine, component and machinery of old merchant ships which are collected from Bhatiary ship breaking industries.

Recently few local shipyards have attained the capability to manufacture the ships of 10000 DWT. Nearly fifty thousand skilled workers and one lac semi-skilled workers, are now working in these industries. There are eleven local shipyards of international standard capable of making ships up to 10000 DWT. These are:

a. Ananda Shipyard and Slipways Limited, Dhaka;
b. Western Marine Shipyard Limited, Chittagong;
c. Khulna Shipyard Limited, Khulna;
d. Karnafuly Slipways (Pvt) Limited, Chittagong;
e. Highspeed Shipbuilding and Engineering Works Limited, Narayanganj;
f. Dhaka Dockyard and Engineering Works Limited, Dhaka;
g. Dockyard and Engineering Works Limited, Narayanganj;
h. Chittagong Dry Dock Limited, Chittagong;
i. Narayanganj Engineering and Shipbuilding Ltd, Narayanganj;
j. Chittagong Shipyard Ltd, Chittagong; and
k. Basundhara Steel and Engineering Ltd, Narayanganj.

On the basis of modern shipbuilding requirement, the shipyards of Bangladesh can be categorized into 4 classes. Figure 1 shows the distribution.

a. **Class A** - Shipyards which are ready for construction of ships (Small & Medium Category) of international standard.

b. **Class B** - Shipyards with some renovation & expansion program will be ready for construction of ships (Small & Medium Category) of international standard.

c. **Class C** - Proposed shipyards which are coming in production of ships (Small & Medium Category) of international standard very soon.

d. **Class D** - Remaining shipyards which can make inland vessels under local regulatory standard.
Type and Sizes of Ships in Bangladesh

On the capability of the technological compatibility of shipbuilding, past & present trend, ability of the existing shipyards of Bangladesh and the interest of new comers in shipbuilding, it is anticipated that Bangladesh can build various types of ships (small & medium category) for both inland and sea going. The present facilities will limit the size of the vessel up to 10,000 DWT, but if expansions programme of various shipyard are taken in consideration, Bangladesh will be able to build up to 50,000 DWT vessels in near future.

A number of diversified types of vessels are built in various shipyards around the Bangladesh, such as: multipurpose vessel, fast patrol boat, container vessel, cargo vessel, tanker, dredging barge, ferry, passenger vessel, landing craft, tourist ship, tug boat, supply barge, deck loading barge, pleasure craft/hatch, crane boat, speed boat, deep sea trawler, self-propelled barge, inspection vessel, cargo coaster, troops carrying vessel, double decker passenger vessel, hydrographic survey boat, pilot boat, hospital ship, water taxi, etc.

Identification of Existing Shipyards

There are hundreds of shipyards and workshops in Bangladesh of which 124 have been reported to be registered with the Department of Shipping (shipyard statistics, 2012). Out of these shipyards, approximately 70% are located in and around Dhaka and Narayangong along the side of the river bank of Buriganga, Shitalakha and Meghna. About 20% shipyards of Chittagong division are located along the side of Karnapuli River and 6% are located along the bank of Poshur river of Khulna division and remaining 4% are located in Barishal division.

Fig.1: Categorization of shipyard in Bangladesh shown in the Pie-Chart.
(Shipyard Statistics, 2012). Almost all inland/coastal/bay crossing ships are constructed and repaired locally in these local shipyards.

**Type and Sizes of Ships that can be built in the Short, Medium and Long run**

On the capability of the technological compatibility of shipbuilding, past & present trend, ability of the existing shipyards of Bangladesh and the interest of new comers in shipbuilding, it is anticipated that Bangladesh can build various types of ships (small & medium category) for both inland and sea going. The present facilities will limit the size of the vessel up to 10,000 DWT, but if expansions programme of various shipyard are taken in consideration, Bangladesh will be able to build up to 50,000 DWT vessels in near future.

**Global trend of Shipbuilding Industry**

In the past, shipbuilding industry of the East enjoyed superiority and made the region leader of civilization. After World War II shipbuilding becomes a European Industry in which Britain took the lead. This is followed by Japan (1960s to 1980s). Then South Korea took the lead. Thus the world shipbuilding market is moving east and presently Japan and South Korea have nearly equal shares of 70 percent of that market. Now, the most rapid growth in market share observed and planned is in China. But, the countries where labor costs are going up are shifting their role from small to medium and large ships. The other emerging forces are Vietnam and India. In fact, emergence of Vietnam is largely a result of efforts by European countries to relocate their shipbuilding industry to low labor cost countries. India is another rising giant in shipbuilding industry where private entrepreneurs started establishing shipyards with government support and by now the country has come to a good position in the world’s shipbuilding countries and receiving orders of hundreds of millions of dollars. Thus, shipbuilding has shifted from Europe to Japan to Korea and these days are shifting to China and Vietnam and India and now in Bangladesh and the single most driving force behind this phenomenon is lower labour cost and overhead.

**Potentials of Shipbuilding in Bangladesh**

**Workforce**

Shipbuilding, an ancient assembling industry producing tailored products, accordingly having the largest human input per unit of produce, is always moving to countries with lower wages of required skills. Bangladesh has comparatively a lower cost of human inputs and can offer the best combination of cost, quality and productivity with its fast growing young workforce.
### Table 1: Comparison of Labour Costs

<table>
<thead>
<tr>
<th>Country</th>
<th>Average hourly rate of wage (in US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>0.5</td>
</tr>
<tr>
<td>India</td>
<td>1.0</td>
</tr>
<tr>
<td>China</td>
<td>1.5</td>
</tr>
<tr>
<td>Singapore</td>
<td>3.0</td>
</tr>
<tr>
<td>South Korea</td>
<td>6.0</td>
</tr>
<tr>
<td>Japan</td>
<td>12.0</td>
</tr>
<tr>
<td>Italy</td>
<td>13.0</td>
</tr>
<tr>
<td>France</td>
<td>13.0</td>
</tr>
<tr>
<td>Norway</td>
<td>14.0</td>
</tr>
<tr>
<td>Finland</td>
<td>15.0</td>
</tr>
</tbody>
</table>

### Figure 2: Hourly Labour Charge (in USD) for shipbuilding industry in Bangladesh

Productivity and Working hour in Shipyards

The productivity of Bangladeshi Shipbuilding labours is 11.43 which has been shown in Table 2 as compared with other countries. But proper training and automation of work will definitely improve the productivity. On the other hand average hourly labour charge in Bangladesh is only US$ 0.50 which has been shown in Table 1 as compared with other countries. This is also the lowest in the world.
Table 2: Comparison of productivity

<table>
<thead>
<tr>
<th>Country</th>
<th>Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>1</td>
</tr>
<tr>
<td>European countries</td>
<td>2</td>
</tr>
<tr>
<td>United States</td>
<td>4</td>
</tr>
<tr>
<td>India</td>
<td>10</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>11.43</td>
</tr>
</tbody>
</table>

So, the relative labour rate in Bangladeshi Shipyards is 0.50 which has been shown in Table 3 as compared with other countries. A drawn comparison of the coast and productivity of few shipbuilding countries and Bangladesh reveals that India and China, the nearest competitors, are 2.5 times away and Korea is 4 times away in terms of labour cost alone.

Table-3: Cost-effectiveness

<table>
<thead>
<tr>
<th>Country</th>
<th>Weighted labour rate</th>
<th>Weighted productivity</th>
<th>Weighted average output cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>0.5</td>
<td>1.0</td>
<td>0.50</td>
</tr>
<tr>
<td>India</td>
<td>1.5</td>
<td>1.2</td>
<td>1.25</td>
</tr>
<tr>
<td>China</td>
<td>1.5</td>
<td>1.4</td>
<td>1.07</td>
</tr>
<tr>
<td>Korea</td>
<td>6.0</td>
<td>3.0</td>
<td>2.00</td>
</tr>
<tr>
<td>Singapore</td>
<td>4.0</td>
<td>2.0</td>
<td>2.00</td>
</tr>
<tr>
<td>Germany</td>
<td>15.0</td>
<td>5.0</td>
<td>3.00</td>
</tr>
</tbody>
</table>

Cost Analysis of Export Ship Manufacture

Additional financial cost of ship manufacture in Bangladesh is about 15% to 20% (Bank Interest 3% to 6% + Bank Guarantee 8% to 16% + L/C Commission 4 to 8% + other charges 1%) higher than the other competing countries like China, Korea, Japan, India, Vietnam etc. Again tax on imported shipbuilding machineries and components enhances the costing to a further extent. On the other hand, India has only 10% financing cost and a 30% cash subsidy and is altogether about 30%-40% ahead in ship building business of Bangladesh. So, only low labour cost cannot promote the survival of Bangladesh in the shipbuilding industry. Again, at
present Bangladeshi component manufacturers and shipyards can manufacture 50% of the total material, machineries and equipment for the local inland and coastal vessels built in Bangladesh and the rest must be procured either from foreign market or second hand market at Bhitiary. This proportion for an international standard vessel to be built in Bangladesh is at present 10%-15%, which if properly ventured by experienced foreign manufacturer, can be taken to 45%. Share of the local contribution for export quality ship built by the Bangladeshi shipyards is about 40% of total ships' cost.

**Figure 3:** Global shipbuilding share in million DWT by nations, 2012

Once Europe was the market leader but now it is replaced by South Korea and China. If consider the shipbuilding industry with a product life-cycle perspective, the prospect and challenges of Bangladesh can be easily realized at a glance.

**Figure 4:** Shipbuilding Lifecycle around the world

**Demand of global shipbuilding**

Shipyards in Japan, China, Korea, India, Singapore and Vietnam are booked up to 2012 with minor exception as some yards have been affected by the cancellation
of orders due to economic recession. Presently the demand for new shipbuilding has superseded the capacity of the shipyards. However, traditional market leaders of world shipbuilding industry are over-booked primarily for construction of large ships. So the ships’ buyers/ entrepreneurs are in search of new, suitable and reliable markets in Vietnam, Bangladesh, India, Brazil, Pakistan, Turkey, etc. As a result shipbuilding capacities are rapidly expanding in Asian Countries. It is estimated that shipbuilding demand increases 5% annually and number of shipyards is not increasing. Again new regulations of International Maritime Organization (IMO) have made it almost impossible to have the older ships upgraded and thus have to be replaced by new ships. Presently world turnover and movement of goods has been increased manifold in the last few years. As a result, demand of ship and shipbuilding activities have been increased multifariously.

Trend Analysis of Shipbuilding in Bangladesh & World

As per World Trade Organization (WTO), global shipbuilding market size is US$ 1,600 billion. If only 1% market share can be captured by Bangladesh, it will be worth US$ 16 billion. If we can grab 1% of the global order for only small ships market the amount will be worth US$ 4 billion. Two leading local shipyards, Ananda and Western Marine have bagged orders to make 41 small vessels worth about US$ 0.6 billion mainly from European buyers. Again, by 2025 the world will need more than 20,000 vessels, mostly small to medium sized and all single hull tanker will be replaced by double hull as per IMO rules. So small and medium shipbuilding market is flourishing and future of Bangladeshi shipbuilding is brightening day by day. Bangladesh is suitable for small and medium combine cargo vessel, multipurpose vessel and oil tanker up to 15000 DWT and some extend to 25000 DWT, However it predicts that small cargo and containership market will also be feasible for Bangladesh in coming years.

Table 5 shows year-wise contract for number of vessels in world shipbuilding market and the share received by some major shipbuilding countries and Bangladesh during 2007 to 2014.

<table>
<thead>
<tr>
<th>Year</th>
<th>World Total (Vessel Number)</th>
<th>China</th>
<th>Japan</th>
<th>Korea</th>
<th>Bangladesh</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>2500</td>
<td>16.00</td>
<td>20.80</td>
<td>9.20</td>
<td>0.08</td>
</tr>
<tr>
<td>2008</td>
<td>2250</td>
<td>11.11</td>
<td>22.22</td>
<td>10.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2009</td>
<td>2850</td>
<td>16.29</td>
<td>22.58</td>
<td>16.45</td>
<td>0.10</td>
</tr>
<tr>
<td>2010</td>
<td>3000</td>
<td>20.25</td>
<td>21.79</td>
<td>13.08</td>
<td>0.10</td>
</tr>
<tr>
<td>2011</td>
<td>3950</td>
<td>20.78</td>
<td>13.25</td>
<td>12.73</td>
<td>0.03</td>
</tr>
<tr>
<td>2012</td>
<td>5050</td>
<td>29.38</td>
<td>14.85</td>
<td>14.85</td>
<td>0.35</td>
</tr>
</tbody>
</table>
The table shows how China and Korea take over Japan after 2010. The world market shows an upward trend and so does the relative share of Bangladesh. Bangladesh got a jump in receiving orders in 20012 and got a little slack afterwards due to the world recession. But in 2014 it bounced back as the demand for small and medium vessels increased due to recession.

<table>
<thead>
<tr>
<th>Year</th>
<th>World Total (Vessel Number)</th>
<th>China</th>
<th>Japan</th>
<th>Korea</th>
<th>Bangladesh</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>6600</td>
<td>33.33</td>
<td>11.21</td>
<td>19.70</td>
<td>0.08</td>
</tr>
<tr>
<td>2014</td>
<td>5400</td>
<td>30.00</td>
<td>16.50</td>
<td>13.33</td>
<td>0.57</td>
</tr>
</tbody>
</table>

**Figure 6:** Year-wise contract for number of vessels and country’s share

**Global Recession and Position of Bangladesh**

It is nice to mention that the market of small-ships and vessels of various types is remaining unaffected by ongoing global recession. Recession has caused a drop in demand for large vessels. Global giant shipbuilders cannot capitalize on this new market demand, as their projects will prove to be unfeasible because of the high overhead costs they already beared. So far Bangladesh does not face any blow like cancellation of orders.

Expert views that orders for small ships have gone up because of the global financial crisis; so demand for small vessels will continue and activities of Bangladeshi shipyard will remain on. It is good time for us to prepare for the future with the help of government so that local shipyards can receive orders after recovery from current recession.
Forecast of Local and Global Shipbuilding in Gross Tonnages

It may be said that in the year of 2025 shipbuilding capacity of Bangladesh and world will be 1.0 and 92.5 million gross tonnages respectively. So Bangladesh is going to achieve the capacity of 1.50% of global shipbuilding share within 2025. Forecast of local and global shipbuilding in gross tonnages.

Underlying Problems of Shipbuilding in Bangladesh

a. General Problems in Bangladeshi Shipbuilding. In the past, shipbuilding industry of Bangladesh failed to keep pace with consistency due to lack of proper government and private initiatives as well as anti-industry mindset of the nation. This has ultimately caused non-penetration in international business as a shipbuilding nation. In future, some issues like safety, efficiency and environmental concerns will turn this sector into a more innovative one, which may enable the new generation to face the challenges to resolve the problems arising out of it. Countries with large population like Bangladesh may feel encouraged to come forward in labour intensive shipbuilding sector due to their abundant manpower. Currently the world is passing through economic recession. Shipping and shipbuilding of the world are affected from this recession resulting cancellation of new building orders at least for the time being. The present shipbuilding sector in Bangladesh is not that big industry and only a few ship yards are involved in exporting ships, but revenue generated from this sector is promising. In spite of enormous possibilities of expanding shipbuilding industry in Bangladesh there are also some problems. These existing problems of this sector may be categorized in the following broad headings:

- Financial problem
- Human Resource Development problem
- Infrastructure problem
- Marketing problem
- Management problem
- Technical problem
- Quality control problem
- Delay delivery problem
- Pricing problem
- Safety, health, and environmental aspect
- Economic recession and its effect on Bangladeshi shipbuilding
b. **Financial problem.** Shipbuilding is capital and labour intensive industry. The local commercial banks are not individually capable of making required investment in this industry. There is dearth of capital and investment especially when the scale of investment is to the tune of 100 to 1000 crore or more because of the risk is considered too high for both the entrepreneurs and bankers.

Besides, consortium financing is time consuming and a complex process, which is not so favorable for making investment in this sector. There is no standard framework for forming consortium and as a result when a shipbuilding contract is obtained, the time lag of securing finance by forming consortium kills the contract.

High rate of interest is applied on industrial and working capital loan. Existing rate of interest, ranging from 12% to 16% for industrial and working capital loans, is not suitable for the development of this sector. Whereas 7% rate of interest on export credit is prevailing for other export sectors like ready-made garment sector.

As the buyers do not accept the guarantee provided by the Bangladeshi commercial banks, counter guarantee has to be given from the foreign banks. As a result, guarantee from both local and foreign banks is mandatory for export of ships from Bangladesh. The prevailing cost of bank guarantee due to double bank guarantee system has become a real burden for local shipyards. Bank guarantee for export of ships from Bangladesh is about 16% (local 4% and foreign 4% for two year period). Such bank guarantee requires equivalent amount of advance payment and price of raw materials received by the builders from the importing company. Bank guarantee commission for other sectors in Bangladesh is charged at the rate of 1% - 2%. On the other hand, it is 0% in other competing countries like Korea, China, Japan, India etc. Commission at the rate of 0.20% is charged by banks of other competing countries for opening import L/C whereas 1% per quarter i.e. 1×4 ×2 years = 8% is charged by the Bangladeshi commercial banks. The breakup of the cost incurred for payment of interest and service charges indicates that the additional financial cost of ships built in Bangladesh is about 15 to 25% (bank interest 3 to 6% + guarantee 8 to 16% + L/C commission 4 to 8% + other charges 1%) higher than the other competing nations like China, Korea, Japan, India, Vietnam, Brazil etc.

c. **Human Resource Development Problem.** The number of available graduates, skilled supervisors, foreman, specialized welders, cutters, fitters, machine operators and other technical skilled manpower...
that are required for shipbuilding and allied industries are far less than the minimum requirement. Substantial number of skilled manpower leaves the country for overseas employment for better opportunities. The local shipyards lack of dedicated human resource department. Government also does not have long-term vision as well as accomplishing her mission for human resource development for the country. In fact, everything is running in Bangladesh on ad-hoc basis.

d. Technical Problem. There is insufficiency in the number of ancillary industries to support the shipbuilding industry as backward linkage by providing service and supplying ships’ components. The local shipyards are having lack of research and development (R&D), which ultimately fail to bring about any innovation and technological development for price competitiveness in international ship markets. At present Bangladesh is not working in the field of ship design, though skilled manpower is available. As a result, lack of adequate and expert design firms and expertise in design are an impediment for high value added product. Moreover, most of the local shipyards are lacking of modern shipbuilding tools, machineries and technology. At the same time lack of expert machine operators is found in the most local shipyards. Local shipyards owner consider every human resource development program as money drain, not gain. That’s why they are maintaining poor training facilities of the technical personnel. Despite long heritage, Bangladesh has failed to keep pace with consistency with the continuous technological development of global shipbuilding industry.

Bangladesh does not produce inert gases. Therefore production with aluminium and other similar works suffer. Importation of inert gases is insufficient and schedule of import is planned for monopoly profiting. Non-availability of inert gases in local market put obstacles for these projects. Other required gases are also not easily available.

In a ship, there are about 4000 different components, which are to be installed within a very limited space of the ship. Unlike land installation, electrical fitting and installation are very delicate in ships and needs more precision. There is a lack of skilled manpower in Bangladesh in such specified field and particularly in electrical installation and fitting.

Lack of model testing and other facilities in Bangladesh also matter. The age of the Department of Naval Architecture and Marine Engineering in Bangladesh University of Engineering and Technology is 35 years. Towing tank was expected by the Department since its establishment. But
the hope has never seen the light. NDT and Design Lab facilities are also poor in every institutions and shipyards around Bangladesh.

e. **Infrastructure Problem.** Access to the rivers and sea, that is, foreshore for shipbuilding entrepreneur is restricted by bureaucracy problem like unfriendly attitude of the administration toward local shipbuilding. Impositions of foreshore charges, which are abnormally high as well as the charges on erected installations such as service jetty, etc. are also high and in some cases duplicate charges are imposed. The lack of electricity and gas supply is a major impediment which hinders the setting up of shipbuilding industries in Bangladesh. Existing ban on importation of rail and sheet pile imposed by railway authority also obstructs developing this industry. Under the present import policy and foreign currency regulation, import on CIF basis is not permissible. But this industry cannot run under such a rule. Shipbuilding industry needs a lot of components, parts and accessories leading to emergency import during the construction period. Existing facilities are not adequate for emergency import requirements.

There should be a proper association of export oriented shipbuilding industries in the country to maintain mechanism for proper implementation, monitoring and updating strategy for ship export. Other than government owned dry-dock, none of the shipyards have the dry docking facilities. Most of the shipyards are located in and around Dhaka, far away from the sea. This is not a good approach to develop shipyards for building sea going vessels. The rivers and channels are frequently silted. It is very difficult to maintain channel for desired level of navigability for ships manoeuvre. The restricted draught (Maximum 4.0 to 4.5 Meters) is the limitation to the size of a ship that can be built in these shipyards. Bridges and overhead cables may induce new restriction to the ship size that may be built in a shipyards located in the hinterland. There is no adequate backup industry to produce required standard of MS plate need for ship construction.

So, a proper and long term planning is required to promote this industry in coastal area like Patuakhali, Bhola, and Chittagong etc. When this industry evolved, most of the shipbuilding firms concentrated in Dhaka because they were to meet the local demand which was not more than 5000 dwt. But now we are to build ship more than 10000 dwt for international market. So gradually the international market oriented shipbuilding firms have to shift their facilities towards coastal area mentioned above.
f. **Management Problem.** Most of the local shipyards do not follow corporate management culture. Family members and friends occupy the important managerial appointment like director, executive committee member etc. of the local shipyards. Such family and friend management culture is one of the hindrances to the development of the industry and also will not commensurate with international arena. Poor communication between upward and downward grid in the managerial chain exists. Middle management neither enjoys any financial authority nor decision-making process (with little exception in few shipyards). As a result, poor command and control as well as negligible dedication of the employees toward the organization observed.16 Most of the local shipyards practice one man show management culture. Every decision comes from owner as per his/her desire and wish.

Many of the owners do not care about the welfare of the employees. So poor job satisfaction observed in most of the shipyards and employees do not feel belongingness to the organization. As a result huge absenteeism and turnover of labours and skilled manpower observed. Workforce never enjoys fringe benefit and other labour welfare activities like medical, pension, travel and daily allowance, accident and other compensation etc. Most of the labours are employed in casual basis. Every valued customer looks at the quality of management. How is the management performing? What are the managerial tools that are using by the yards to ensure continuous improvement of product? Are the managerial staffs responsible and capable enough to solve the day-to-day problems? Is the management prompt to solve the daily problem? But it is really discouraging that answers to those questions are negative for most of the local shipyards. The government policies are complicated and not very pleasant in supporting the expansions of the industry as a whole.

g. **Safety, Health and Environmental Aspect.** Safety, health and environmental (SHE) aspects of using various shipbuilding materials in the shipyards including the affect of harmful substances and related exposure in movement of materials and also the required measures were identified. Only a few shipyards have been found to be conscious about safety, health and environmental aspects, which are again at average level. The shipbuilders are more engaged in enhancing their skill in technology, financing and marketing. Safety, health and environment are yet to be recognized as important issues in all spheres of the society. The long term effect of safety, health and environmental measures are yet to be understood. Proper awareness and training and govt. regulations are required for improvement of the SHE aspects.
The regulations are to be made in a way that the prospective shipbuilders do not take these as hindrance. These aspects should be shipbuilder friendly, specially, because Bangladesh has just started developing the export oriented shipbuilding industry. The foreign buyers have a major role in enhancing the level of SHE in the builders yard. Currently, nothing allures more public attention than the environmental aspect. In the shipbuilding process, many working procedures are polluting if proper preventing measures are not in place. Among them, the process of shot blasting, plate and section preparation, welding and painting is the most significant troublemaker. In case of shot blasting in open air, the controlling and diminishing of waste, which is dust and sound, require expensive appliances. The costs to reduce pollution absolutely go to the accounts of the shipyards. Such additional expenses are unavoidable in developed countries. In shipyards paints are widely used. These paints contain volatile organic compound (VOC). VOC is an element that produces Ozone by responding to sunlight. Developed countries like countries in European Union limited the quantity of emission or disposal of contamination of this kind. It is possible to use the paints that contain no VOC, but the expenditure for painting of the ships will go high.

h. **Quality Control Problem.** Lack of quality control groups and their work and capability are in question. A number of questions against them are raised by the foreign ship owners or by their representatives. But many of the local shipyard owners are failed to satisfy them. Shipyards must remember that quality accelerate entire process to get the next contract\textsuperscript{18}. Lack of sincerity of workers due to poor job satisfaction and working environment limits the opportunity of further development. The owners do not bother about working environment due to the availability of labour with lower cost.

Quality is the prime requirement of shipbuilding industry. A ship, which plies on the sea far away from the shore for quite a many days at a stress, must have to be flawless. Quality in a shipyards usually maintain by quality control group of shipyard itself, by the classification society and by the owners’ representative. This is very demanding that everyone in the system must be cautious, dedicated as well as prepared to undergo strenuous activities. A chain of such professionals is necessary. But it is missing in local shipyards. It needs time to develop such quality assurance activities in local shipyards\textsuperscript{19}. 
Bangladesh is lacking in the safety culture. Safety is a long-term investment. Though the initial cost for safety assurance may be high, the gain in the long run is accumulative and it adds to the quality. Bangladesh has to be competitive with the other shipyards around the world. Government may sponsor benchmarking activities.

**Challenges in Bangladeshi Shipbuilding**

Challenges of Bangladeshi shipbuilding have been illustrated below:

a. Like Bangladesh, many other countries such as Vietnam, Brazil, India, Indonesia and Turkey are also trying to capture the surplus global shipbuilding market.

b. Draining out skilled manpower from local to foreign shipbuilding industry is a usual and unavoidable threat for local shipyards.

c. More than 80% of raw materials and ship’s components are in import-based for export oriented Bangladeshi shipbuilding. Ultimately unit price of export ships and foreign dependency increases.

d. Most of the shipbuilding nations have developed close links between shipbuilding and support industry for reducing delivery time. But due to non-availability of industries of classified marine equipment and limited infrastructure in Bangladesh the delivery time is deferred and shipbuilding cost in increased as compare to the competitors.

e. To accelerate the shipbuilding activities, most of the shipbuilding nations maintain a good relation between shipbuilding industry and other supportive industries. But due to lack of quality local marine industries and poor infrastructures, local shipbuilding fails to achieve her goals. As a result, shipbuilding cost and ship delivery time increases.

f. Overall management practice and planning process for most of the shipyards is not up to the international standard. Lack of expert financial personnel, absence of corporate management culture, poor forecasting process and central decision-making culture in day-to-day matter make local shipyards handicapped.

g. Absence of adequate backward linkage industries is also a main cause of delaying delivery and adding extra cost of export ships.
h. Scarcity of sufficient land in Bangladesh, deficiency in power supply and weak infrastructure facilities are the major impediments for rapid development of shipbuilding industry.

i. Due to the global economic recession both ship and steel market have become unstable. As a result cancellation of a contract in shipbuilding industry is one of the recent enormous threats to local shipyards.

j. Europeans are the valued customers for Bangladesh. They put the condition that 60%-65% of the total contract value is to be imported from abroad. But the equipment manufacturers of foreign countries do not place competitive offers for Bangladeshi shipbuilders; rather they quote higher cost on imported items that increases ship’s price.

k. Most of the shipyards are located at the banks of few rivers around Dhaka, which are far away from the sea. These rivers are losing their navigability due to continuous filtration. As a result the restricted draught (maximum 4.0 to 4.5 meters) dictates the size of a ship that can be built in these shipyards. Again bridges and overhead cables may induce further restriction to the ship size built in most of the local shipyards.

l. Now-a-days quality is very demanding and everyone in the system must be dedicated. A chain of such professionals is necessary, but it is missing in local shipyards. Again lack of adequate quality control group and their performances and capabilities in the local shipyards are in question.

m. Financial matter like lack of adequate working capital, high rate of interest on industrial and working capital loan, high bank guarantee margin and high import LC margin make shipbuilding industry of Bangladesh a cumbersome and complicated enterprise.

Shipbuilding is a semi high-tech and capital-intensive sector. It is both promising and challenging industry in the World. Bangladeshi shipbuilding is not in competitive and international standard and also is in vulnerable stage.

**Conclusion**

Shipbuilding industry plays an important role in assisting national defence, promoting shipping and industrial development, increasing employment and foreign currency inflow. It is therefore an attractive industry for Bangladesh.
Bangladesh shipbuilding is capable of producing international standard ship of small to medium category and at present, more than 25% shipyards are ready or to be ready with little renovation for construction of small and medium sized vessels of international standards. Productivity of Bangladeshi work force in shipbuilding is 11.4 which are lowest in the world. It is essential to upgrade the productivity through conducting training program, incorporating process enhancement, modernizing yard facilities and employing more integrated production technology, otherwise it is difficult to sustain in this competitive industry in the long run. Bangladesh is a developing country. Each and every citizen of this country expects the overall development of the country. But in most of the cases it is not materialized in reality. In the past, we failed several times to take the advantages and lucrative opportunities of modern trade and commerce due to the delay in our response. For this reason, our overall economic development has undoubtedly been interrupted. So the concerned authorities have to be watchful and careful to take the opportunity to push the shipbuilding sector ahead as a thrust sector through fixing the identified problems leaving no delay.

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