

Chapter 2

Characteristics of Shipbuilding Industry

Abstract Shipbuilding industry has a very specific character as compared to that of any other manufacturing industry. Ship building involves usage of a wide range of equipment, materials and skills. The very size of ships makes it different from other industrial products. The huge size along with the required fittings and fixtures depending on the type of the vessel, it calls for a huge manhour requirement. It calls for a very wide variety of materials to be used in ship construction. As a very wide variety of materials are used it also calls for personnel with skills of various trades. It is not a mass production item, neither a show case item. It is a case of unit production. The ship builder gets only four inputs from the customer, i.e. the type of cargo, volume or weight of cargo to be carried, ship's route of operation and ship's cruising speed. Based on these, the builder needs to work out the entire design, build strategy, delivery schedule and cost of the ship. The ship builder also needs to guarantee that the vessel will deliver the required speed at the given loading condition.

Ships as a medium of large or bulk transportation will be ever present as long as human settlement is there on this earth. Global trade is going to exist and bulk import/export will remain economically and environmentally most viable through water/sea transport only. On the other hand as resources on land are getting depleted, more and more the focus is on offshore, be it energy, food, shelter, mineral, etc. Offshore units for oil and gas extraction, offshore energy firms, offshore fish firms, offshore mining, floating facilities, etc. are already there at different stages of usage/development. To support all these activities various types of specialised ships are also required. Lastly for a country's security and safety, a wide range of defence related ships are required. Thus it is very evident that ships will always play an important role as long as the human existence will be there in this earth. To cater to these needs shipbuilding industry will always exist. However for a given shipyard to flourish and exist, it needs to be competitive. This forces shipyards to improve productivity and thereby become more competitive. To make a product competitive one needs to understand the specific features of the product as well as that of the industry.

Shipbuilding industry has a very specific character as compared to that of any other manufacturing industry. Ship building involves usage of a wide range of equipment, materials and skills. The very different character of this industry can be understood through studying the following aspects.

Product size

The very size of ships makes it different from other industrial products. The size of a ship may vary from few meters to few hundred meters. A small river boat may be 3 m in length whereas an ocean going crude oil tanker may have a length in excess of 300 m. Here it needs to be understood that such a huge product is not only to be manufactured but also to be launched and put into water unlike any civil structure. Other large industrial products like railway locomotives or aircrafts though not at all comparable as far as the size is concerned, are put into service using their own power. Whereas ships are built on land and need to be put into water for its operation. Hence it involves not only construction but also launching and its subsequent operation.

Manhour requirement

The huge size along with the required fittings and fixtures depending on the type of the vessel, it calls for a huge manhour requirement. The production time of a ship from start to end may be anywhere from about 1 year to about 3–4 years. Unlike other manufacturing industries shipbuilding is still very much labour intensive because of the very nature of the product. One of the major reason is ships are unit products, they are never a case of large series or mass production. The evaluation of exact manhour for a given ship is also very difficult, because of various overlapping and complex nature of activities that are involved in shipbuilding.

Wide variety of materials

The ocean going ships apart from having all the engineering requirements also need to have all the luxurious boarding and lodging facilities for ship's crew along with all the computerised navigational and communication equipment. Thus it calls for a very wide variety of materials to be used in ship construction.

Skills of various trades

As a very wide variety of materials are used it also calls for personnel with skills of various trades involving fitter, welder, piping, electrical equipment and fittings, main and auxiliary engine installation, electronic and navigational equipment installation, joinery work, air conditioning and ventilation, etc.

Unit production

It is not a mass production item, neither a show case item. It is a case of unit production. In shipbuilding, it is customer driven market, i.e. the customer tells what he wants and the builder is supposed to deliver satisfying the customer requirement. Thus in general each individual ship becomes more or less different from the other, hence the question of mass production never arises, making it a pure item of unit production. Whereas in case of say automobile industry, it is the manufacturer, who decides what he is going produce through his own market

survey. The customer cannot put his specific requirement. It is a pure situation of show case product. In such cases, once the design is made, tested and frozen, it goes for production. The production volume can be in millions. Hence one derives all the benefits of mass production, but in shipbuilding it being a unit product, the benefit of mass production is never achieved. Another distinct feature in ship building is there is no provision for prototyping.

Series production

One step above unit production is series production. There are situations where a customer, a shipping company may order for more than one vessel having identical specifications. These series of vessels are often referred to as sister ships. For medium sized to big vessels this series may be of the order of 5–10 vessels, whereas for smaller vessels, say fishing trawlers, it may be in the order of 50–60 vessels. At the same time if the number of ships required is on the higher side, it is very likely that the order for manufacturing them may also be spread over more than one shipbuilder. Hence again it becomes more or less a situation of unit production. Even if some vessels of identical specification is there, the second vessel in line is started after the 1st one has progressed, subsequently the third one and so on. By the time the 1st one is completed, delivered and put in service, the 2nd in line is in advanced stage of completion. Once the 1st one goes in service, often feed back from it may lead to some changes or modification in the internal fittings and other items. Also at the same time, the time lag between two identical operations of two sister ships are spaced so widely apart in time scale, that it loses all the benefits of series production, i.e. the fixtures and set up for identical component fabrication can not be kept waiting for such long periods.

Delivery schedule

The ship builder gets only four inputs from the customer, i.e. the type of cargo, volume or weight of cargo to be carried, ship's route of operation and ship's cruising speed. Based on these four information the builder needs to work out the entire design, build strategy, delivery schedule and cost of the ship. The builder signs a contract with the ship's owner mentioning among other things, the delivery date, the ship's cost and guarantees the speed requirement failing which the builder will be liable to pay heavy demurrage to the ship owner. The delivery schedule, ship's cost and speed guarantee all these are stated at the time of signing the contract when not even any design work has started. Hence to satisfy all these customer requirements becomes a challenging task for the shipbuilder.

Ship's speed

The cruising speed is one of the very important criterion for the ship owner. The sailing schedule and number of round trips that a ship can make over a period of time depends very much on its cruising speed. A ship with higher speed can make more number of trips, thus it can generate more revenue. However at the same time higher speed means higher power requirement resulting into higher fuel consumption causing escalation in operating cost. Thus the extra revenue generated by higher speed may get offset by the additional expenditure due to higher fuel

consumption. Hence the ships' owners are very careful about deciding on the ship's speed of operation. In the contract between the ship owner and the ship builder, the speed is one of the very important aspect which is mentioned with necessary demurrage clause. The ship builder needs to guarantee that the vessel will deliver the required speed at the given loading condition. Therefore determination of exact power requirement and selection of appropriate engine and propeller become very vital in ship construction.

All these various aspects give a very specific character to the shipbuilding industry as compared to any other manufacturing industry. Coordination of activities of huge workforce, materials all together pose a serious and difficult organisational problem to be handled in a shipyard.



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