Chapter-VI

Summary of Findings, Suggestions and Conclusion
Inventory Management

The term ‘inventory’ is nothing but a stock of goods that is maintained to facilitate the continuous production of goods and services. S.E. Bolten observes, “The term ‘inventory’ refers to the stockpile of the product a firm is offering for sale and the components that make up the products.” In other words, it can be said that inventory is composed of assets that will be sold in future in the normal course of the business operations.

The assets which firms store as inventory in anticipation of need are (1) raw materials, (2) work-in-process (semi-finished goods), and (3) finished goods. The raw material inventory contains in terms that are purchased by the firms from others and are converted into finished goods through the manufacturing process. The work-in-process inventory consists of items currently being used in the production process. Finished goods represent final or completed products that are available for sale. The inventory of such goods consists of items that have been produced but are yet to be sold. To expand the definitions of inventory to fit manufacturing companies, it can be said that inventory means, “The aggregate of those items of tangible personal property which (1) are held for the ordinary course of business; (2) are in process of production for such sales; and (3) they are to be currently
consumed in the production of goods or services to be available for sale.”

Inventory is called the “Graveyard of business” because it has been a basic cause of the failure of many organizations. Inventories constitute the most significant part of current assets of a large majority of companies. Because of the large size of inventories maintained by the firms, a considerable amount of funds is required to be allowed to them. It is, therefore, absolutely imperative to manage inventories effectively and efficiently in order to avoid unnecessary investment. A firm neglecting the management of inventories will be jeopardizing its long run profitability and may fail ultimately. So, in order to manage the inventory properly, a need for inventory management arises.

Inventory management is concerned with the determination of the optimal level of investment for each component for each component of inventory and the inventory as a whole, the efficient use of the components and the operation of an effective control and review mechanism. The management of inventory requires careful planning so that both the excess and the scarcity of inventory in relation to the operational requirement of an undertaking may be avoided. Therefore, it is essential to have a sufficient level of investment in inventories.

Inventory management helps to manage stock in such a manner that there are no excessive and inadequate levels of inventories and a sufficient inventory is maintained for the smooth
production and sales operation. Thus, the objective of inventory management is to determine the optimum level of inventory.

Inventory control refers to a system, which ensures the supply of required quantity and quality of inventory at the required time and at the same time prevents unnecessary investment in inventories. According to P.K. Ghosh and G.S. Gupta, “Inventory control is concerned with the acquisition, storage, handling and use of inventories so as to ensure the availability of inventory whenever needed, providing adequate cushion for the contingencies, deriving maximum economy and minimizing wastage and losses.”

Inventory control is concerned with keeping the desired inventory level and maintaining it. Its basic objective is to keep an adequate inventory level and maintaining it at the minimum inventory carrying cost. The aim of inventory management, thus, should be to avoid excessive and inadequate levels of inventories. Efforts should be made to place an order at the right time with the right source to acquire the right quantity at the right price and quality.

The norms of inventories could be set by either the top management, or by the materials department. The top management usually sets monetary limits for investment in inventories. The materials department then has to allocate this investment to the various items and ensure the smooth operations of the concern. It would be worthwhile if norms of inventories were set by the ‘Management by Objectives’ concept. This concept
expects the top management to set the inventory norms in consultation with the materials department.

Carrying too much or too little of the inventory is detrimental to the company. If too little inventories are maintained, the company will have to face frequent stock-outs and incur heavy ordering costs. Very large inventories subject the company to heavy inventory carrying costs in addition to unnecessary tie-up of capital. An efficient inventory management, therefore, requires the company to maintain inventories at an optimum level where inventory costs are minimum and at the same time there is no stock-out that may result in loss of sale or stoppage of production. This necessitates the determination of the minimum and the maximum level of inventories.

As we have now approached the twenty-first century, inventory management will assume increasing importance in the industrial world. To date, only the most progressive manufacturing firms realize that materials availability, engineering, purchasing, specifications and fabrication costs are all factors which ultimately contribute to total material cost. Progressive firms also realize that all factors which affect material cost should be coordinated and controlled by a system-oriented inventory management approach, if the total materials cost is to be minimized. The factors just mentioned, coupled with the fast increasing use of computer-based information systems, increasing international business activity and growing materials shortages
highlight the importance and opportunities for sophisticated management in this area.

Inventory management has a significant role in the Indian economy. In several industries more than 50 per cent of the total cost of the product or the job is generally the cost of materials alone. Unfortunately, the importance of proper materials management has not been fully realized in India and very little attention has so far been paid to the task of controlling investment in materials through the application of various scientific techniques. In contrast, advanced countries of the West and Asian countries like Japan have made gain strides in the successful use of inventory management techniques.

In view of the above reasons, it has become all the more important to study inventory management of the Shipyard Industry of India.

The shipbuilding industry in India has a chequered history throughout centuries. It declined almost to the point of extinction during foreign rule and revived after the establishment of national government in India (Sahai. IM, 1971). In India, ships building and shipping industries have had an unbroken tradition exceeding over 6,000 years dating back to Mohonjodara and Harappan period. It takes us to distant past when art of building ships had reached high degree of development, centuries before it had a beginning in other parts of the then known world. The oldest evidence is supplied by the Rigveda (1500 B.C.) that contains several references about the construction of ships in India in those
age-old centuries (V.C.S. Sastry, 1962). The Maurya period, which roughly coincides with the Indian campaign of Alexander the great (327 B.C.) saw considerable development in this industry. The industry was flourishing, its output and employment potential also was very high. According to Strabo (60 B.C. to 19 A.D.) for example, Alexander constructed fleet with the help of Indian artisans, from pine cedar and other trees obtained from the forest in the territory of King Poras.

There were a number of shipbuilding yards, the most important being at Hoogly, Balasur, Murgangi, Chilmiri, Jessori, and Karibari. Abul Fazal said that in the province of Sindh, the Sarkar thatta alone could provide 40,000 vessels ready for hire. Under Shivaji, the Marathas built a formidable fleets. He established shipbuilding yards first at Kolava, Suvarna Durg, and Vijaya Durg, and later at Bombay in 1735. In addition to these, there were six other managed by Parsi forms, ships built at these yards weighed from 600 tonnes to 1,300 tonnes.

Ship building in India is not a new industry but has long history. Long before the European powers came to India, Indian mariners had carried India’s trade with South-east Asia and established a thriving trade partnership with east and west. The East India Company recognizing the excellence and durability of ships built in India established several shipbuilding yards in India. Between 1800 A.D. and 1840 A.D. a large number of naval crafts and merchants were built in the shipyards. However, the increase of power and entrenched authority of the British rule in India
brought about accelerated decline in Indian ship-building and shipping industry to serve the interest of their own relevant industries.

Shipbuilding is a unique industry, which is both capital and labour intensive. Huge amounts of investments are necessary to setup facilities of shipbuilding. Unlike process industries, shipbuilding involves deployment of sizeable labour force and managerial personnel. The government has invested significant amount of money in this priority sector. In the Indian shipbuilding scenario, public sector occupies a predominate role. The shipbuilding industry has been reserved for the public sector in terms of Industrial Policy Resolutions of 1948 and 1956. However, the private sector is allowed to construct “mechanized sailing vessels” up to 10,000 dwt. The role of private sector is to supplement the efforts of the state in this activity. At the end of 31st March, 1997, there were seven public sector shipbuilding units in the country engaged in manufacturing, selling, repairing of warships, repairing of cargo ships, passenger ships, tugs, barges, trawlers, assault boats, floating docks and dredges etc.

Of these seven shipyards, GRSE Limited, Kolkata, MDL Mumbai, GSL, Goa are under the administrative control of department of defence production, ministry of defence. These shipyards are mainly intended to cater the requirements of the Indian navy, but a part of their capacity is also available for construction of other types of vessels. The remaining four shipyards CSL, Cochin, CIWTC Limited, Kolkata, HDPE Limited,
Kolkata, HSL Visakhapatnam are under the administrative control of ministry of surface transport.

Among the number of managerial problems one of the most important problems bothering the executives is the problem of inventory management. In a developing economy like ours, capital resources are limited. Hence with the limited capital resources, every company has to increase their production. In this effective inventory management assumes great importance. Reckless management of inventory has wrecked many otherwise prosperous units in any economy. The problem to be investigated in this study comprises grave consequences such as colossal waste of inventory, erosion of profitability and liquidity, decreasing production, problems in the storage, identification and distribution uncertainty about the time when materials are needed and quantity required problems in converting requirement estimates into provisioning quantities, problem in procurement, inferior quality of materials etc.

**Objectives of the Study**

The objectives of the study are:

1. to find reasons for low capacity utilization and to give practical solutions to overcome this problem.
2. to suggest ways and means to increase the return on investment.
3. to suggest certain techniques to increase the overall efficiency.
4. to suggest scientific inventory management tools and techniques to overcome the present problems in inventory management.

5. to suggest certain techniques to reduce material cost and cost of production.

Scope

The study has been covered the major units like Goa Shipyard Limited, Central Inland Water Transport Corporation, Cochin Shipyard Limited, Garden Reach Shipbuilders and Engineers Ltd., Hindustan Shipyard Ltd. and Mazgaon Dock Limited.

A comparative study of the above units has been made to suggest corrective measures.

The study has been mainly concentrated on inventory management. The functioning of stores and purchase departments has also been covered by this study. Wherever necessary, the information was obtained by other functional heads like factory accountant, planning engineer, production manager etc. The study has also been focused on production and finance department at appropriate places.

Hypothesis

Mismanagement of inventories and the irregular supply of the critical parts when they are needed is being mainly responsible for the unsmooth and irregular production by the various
shipyard companies in India. Therefore, proper and efficient management of inventories is of utmost importance. Unfortunately, there are several weaknesses in the existing practices of inventory management which until recently had been left entirely unbridled. The rationale for norms and the need to link inventory management requirements is, thus, clear. Eventually, the entire system of material planning is to be dovetailed, to create better management of inventories.

**Research Design and Methodology**

Methodology includes use of statistical techniques, inventory control techniques included various analysis.

**Tools to be Used in the Collection Data**

**Primary Data** – A questionnaire to be issued to the units covered to elicit relevant data from personal interviewing of executives, Planning commission and other concerning government officers of the related departments, academicians and financial analysis in real life setting.

**Secondary Data** – Annual reports and financial statements of the selected companies, inventory and financial statistics from various journals, periodicals, newspapers and reports, Economic Survey, Journal of Accounting and Finance, margin, productivity, the Material Management journals. *The Economic Times* and *Financial Express* etc., books and various publications of financial
institutions and Reserve Bank of India, published and unpublished works of research scholars and available studies.

The present study is expected to reveal the latest facts regarding the inventory management practices prevailing in units under the study. To highlight the malpractices which are responsible for the mismanagement of inventories and spare units. To expose the problems confronted in the context of prevent inflation shortage of funds and credit squeeze policies of Reserve Bank of India. To develop feasible solutions to alleviate genuine difficulties experienced by the Inventory Managers in all the plants in the management of inventories, such as uncertainty about the time when spare-parts are needed and quantity required, problem converting requirement estimates into provisioning quantities, problem in procurement, storage identification and distribution. The study aims to find out the solutions of the basic problems arising in the management of inventories. For example, what should be the level of inventory for a particular item that a unit should carry or how much should one procure in a lot. Replacement time is not constant but fluctuates, resulting in stock-out situation. Every company/plant must minimize such a situation. If the spare parts and other items of inventory are to be purchased, when to order and how much to order. Finally, the study aims to develop some new models of inventory management and to try to improve the existing practices in the management of inventories.
Review of Literature

The purpose of this chapter is to present a review of literature relating to inventory management. Inventory, is most of the industries, accounts for the largest proportion of growth working capital. A number of studies, therefore, have been conducted to find the determinants of investment in inventories.

A good number of studies have been carried out in this area. However, as far as the shipyards industry in India is concerned, the literature on this subject is inadequate. But in recent years the mounting accumulation of inventories in public sector and private sector made them to realize the importance of the inventory management. Very few number of researches of studies have been conducted at various institutions and in universities which projected some problems faced by the public sector units and managed by both the central and various state governments.

All the above research studies conducted at various universities in India and other published research studies and surveys in this area and text books brought out and research papers published in journals, newspapers etc., revealed that the various facets of materials management have not been fully developed and are not satisfactory. There is no common opinion on what functions have to be covered under the preview of materials management. Even the method, techniques, procedures and systems suggested by various authors to control the inventories varied widely. However, the materials management has been identified as the most potential area of prime importance.
to increase the productivity and efficiency of an organization. Even then, serious attempts of research have not been made in this area. The present study has been to some extent able to highlight the importance of the materials management as one of the important functional areas in an industry like shipbuilding.

**Stores Organization and Quality Control**

Actual procurement, storage and preservation activities form the last link in the material management process. Quality Control of raw materials, storage of materials, parts and supplies are an integral part of the process by which the supply department maintains a non-stop flow of the items maintained from the points of supply from outside the organization to their points of usage in the organization.

The stores management plays a crucial role in smooth running of an organization. The purpose of the stores is to provide uninterrupted material flow to the work-sights of the various departments in the organization. By this, one can understand that the stores are not just a dumping yard but an important element of the economy of the business organization.

The stores management assumes greater importance in the Indian context because of the stiff supply positions of various scarce materials. The blocking up of investments in huge amounts in inventories in the Indian industry attracted the Government of India and appointed Tandon Committee to recommend steps to reduce inventories in Indian industries.
The stores organization is responsible for receipt, standardization, identification, general inspection, and levels of stock of the incoming materials. Besides these responsibilities, preservation, storage, distribution and disposal of various materials are also held by it. The stores location and layout have a bearing on the organizational effectiveness. Locating the stores, proximity to user departments is a general practice to minimize transportation and other handling expenditure and to ensure timely supply of the necessary material.

The ship building industry is basically an assembling industry and which requires over 20,000 items to put in the construction of the ship. These items need to be procured, stored and maintained by the stores until the materials are issued to the various user departments at various time periods.

The stores organization of the selected shipyard companies along with the roles and positions is given in the chart 3.1 which tells about various sections and the roles of these sections along with the number of officers and assistants.

The stores organization in the selected shipyard companies is headed by officer-in-charge (stores) who is responsible directly to the General Manager (commercial). In turn, the General Manager (commercial) is responsible to Chairman-cum-Managing Director. Under officer-in-charge (stores), there are three different section-in-charges and are responsible for various functions of stores organization. The officer-in-charge (stores) is in the cadre of Deputy General Manager and the section-in-charges are in the
cadre of Senior Manager. Under these three section in-charges, there are five dealing officers, 58 storekeepers and equal number of stores attendants and mazdoors.

The procedures followed in respect of receipt of materials involves the physical inspection of the material received and to examine the quality and quantity against he specifications made in the purchase order and this is to ensure the suitability of the material for the requirements of the companies and to know whether the supplier fulfilled the terms and conditions laid down or not.

The stores section after careful inspection of the materials received, needs to make arrangements for the quality control check which is going to be done by quality assurance section of the selected shipyard companies. The selected shipyard companies have decentralized material receipt centres because it has four to five store yards located at a distance of two to five kilometers from the shipyard premises. These decentralized receiving centres ultimately necessitated to have more number of people to carry out the job of receiving materials.

If any deviation in the quality and quantity of the material ordered and received is found, it will be kept in abeyance till the supplier rectifies the discrepancy. In case of other materials, which satisfies the stores receipt centre, the items received are recorded in the ledger and the incoming material particulars are fed to the computers simultaneously. Afterwards, the receiving officer prepares a goods receipt note. In case of rejections, if any, the
shipyard companies have a practice of informing it to the supplier within 15 days from the date of receipt of it by the selected shipyard companies.

Due to decentralization of all the stores in the premises of the selected shipyard companies, they are forced to receive the materials at stores located at different places which are away from two to five kilometers. Eventually, the location of stores at different places gives rise to certain problems like higher transportation costs, poor delivery of materials, communication problems and other associated problems. To exercise control over the materials, it is necessary to locate all the stores at one place, as such, it is suggested that the selected shipyard companies should take necessary steps to locate all the stores in the premises of shipyard companies under review itself.

The materials used in ship construction are expected to work in a different climate on the seas and they need to withstand for the sea weather conditions. Marine equipment is different from the equipment used in other industries as their usage is on surface.

**Storage, Distribution and Disposal Management**

Since material stored is equivalent to cash and forms a major part of the total product cost, it is essential that the material should be properly accounted for and safe guarded in an efficiently and organized stores. With a judicious and proper control of management of stores, one can minimize the losses due to the obsolescence, pilferage, excess storing, etc.
Preservation of items in the space provided in the stores is of great importance because floor space accommodation is a costly affair. Keeping of items at various places in stores, particularly the slow moving and non-moving items is an important job. But often this is given least importance in Indian industry.

To have an effective storage programme, factors such as nature of the item, codification of the item, the expected idleness, economic value of the item and the need for protection should be taken care of. To identify the item in an easy way on the shelves and racks, it is necessary to have good lighting.

The stores section which is a part of commercial department in the selected shipyard companies has to maintain good relationship with branches of its own other departments in the organization. The stores and purchase sections’ functions are complimentary and close cooperation between these two sections will result in better standardization, codification, value analysis, variety reduction, inventory control, salvage, disposal of obsolete and scrap. Even in the absence of integrated materials management in the selected shipyard companies, the stores and purchase sections have close cooperation and co-ordination.

The stores section is responsible for the issue of materials to various departments and sections in the selected shipyard companies. Basing on the bill of materials, work order, material requisition notes, the stores personnel need to issue the material as prescribed in the authorized documents as mentioned above. While delivering the quantities of material, the personnel in stores
section, enter an entry in the books of stores and also an entry has to be made in EDP.

The two basic documents, which are supposed to be maintained by the stores section, are receipts and issues. They are being maintained in proper and pucca manner. However, it is noticed that there is a good number of discrepancies in stores section and this can be avoided by taking certain measures like tallying the material regularly and periodically from time to time. The store is expected to maintain documents like bincard, kordex, obsolete items, rejected items, suppliers index, indents and bills of materials.

Even after the computerization of the stores section, the selected shipyard companies are depending mostly on manual documents because of the poor reliance and inexperienced people working in the EDP section. For this, the selected shipyard companies should arrange for training in the area of material information system of EDP people and thereby minimize the expenses of maintaining both.

Surplus obsolete and scrap items management assumed tremendous importance in the materials management activities. Surplus originates from three sources namely scrap, obsolete materials and damaged equipment. Holding these items is costly to the organization. These costs include carrying charges, cost of maintaining the records, loss of the use of capital held up in inventories. In view of this, special efforts need to be made to avoid keeping them.
In Indian scenario, the first estimate was provided by the then Finance Minister, Mr. C. Subramaniam, who mentioned on December 10th, 1974 that the amount of money blocked in obsolete and surplus material was about Rs. 2,500 crore in India and it is expected to be Rs. 50,000 crore.

There are three methods of disposal of surplus, obsolete and scrap items. They are (a) annual rate contract, (b) inviting offers from time to time, and (c) public auctions.

Table 4.2 presents the percentage of disposal surplus and scrap of all items to the income generated by the sale of such items during 1998-99 to 2008-09. After observing the percentage of disposed surplus against the identified disposable surplus, it is suggested that the selected shipyard companies should establish a separate section under the overall control of General Manager (Commercial) to identify, locate, value, and initiate steps to dispose off the unwanted material and scrap at an early date so that the realization value may be put for some other productive purpose.

**Critical Evaluation of Inventory Practices**

Inventory management is an integral part of materials management and plays a key role in the smooth, economic and uninterrupted running of the industry. The rapid industrialization with the industrial resolution policies of Government of India brought enormous problems of management. Inventory management is one such problems. To have higher operational efficiency and profitability of an organization, reduction of the
capital locked up in inventories is very much essential. The same will help in improving the liquidity position of the enterprise. As inventories. Involve locking up of capital, proper care must be given in dealing with the problem of inventory management. The sum of the value of the raw materials, fuels and lubricants, consumable’s spare parts, processing material and finished goods are called as inventory.

The basic objectives of inventory management would be to keep down capital investment at a minimum level in inventories without endangering the process of manufacturing, to minimize the idle time of men, machinery and capital caused by shortage of various kinds of materials, to reduce the costs in maintaining the inventory and to minimize the losses of obsolescence. Inventories account for a major portion of working capital of an industrial unit. The predominant position in the total working capital, obviously warrants for their maximum efficiency. Thus, inventory management should aim at balancing between too much inventory and too less inventory. A firm cannot afford either excessive or shortage of inventory. To achieve higher degree of operational results, it is inevitable to maintain effective control and management of inventories.

The structure of inventory of the public sector undertakings can be studied by classifying their total inventory into five categories: Raw materials, goods in process, finished goods, stores and spares and miscellaneous items. The structure of inventory can be analysed in two ways. First, the share of each component of
inventory is in relation to aggregate inventory. Secondly, appropriate indicators about adequacy or inadequacy of each type of inventory may be developed and applied to capital positions obtained in public sector enterprise.

The structure of inventory in Goa Shipyard Limited and other public sector ship building units is explained in two ways. (1) The share of each component of inventory to the total inventory. (2) A level of each inventory component in terms of number of month’s consumption, number of months cost of production and number of months sales. The former reflects the points where the inventory is concentrated most, while the later directs as to when and where the inventories are high and low when compared to the norms fixed for them.

The size of total inventory in Goa Shipyard Limited was of the tune of Rs.4425 lakh in the year 1998-99 and suddenly fell down to Rs. 2090 lakh in the year 1999-2000. Gradually, it increased year after year up to the end of 2008-09. In the last three years, it registered a total inventory of Rs. 29500 lakh in each year. The work in progress and finished goods in Goa Shipyard Limited in the year 1998-99 was of Rs.475 lakh and it reached the maximum of Rs.11135 lakh in the year 2006-07 and declined to Rs.6026 lakh in the year 2008-09. This reduction reflects the efficiency of policies and procedures of the commercial department and the purchase section of Goa Shipyard Limited.

The quantum of raw materials stores and spares inventory in terms of number of days consumption in the early part of the
period under study, witnessed below 500 days of consumption. This indicator oscillated between 142.6 days and 1200 days. In the year 2002-03, it had 1200 days raw material in terms of number of day’s consumption and gradually reduced to 299.4 days in the year 2008-09. The declining phenomenon is a welcoming feature and it speaks of the efficiency of the management of Goa Shipyard Limited. The norm fixed for this category of inventory is 180 days consumption. Still there is a scope to reduce the raw material, stores and spares inventory.

The Goa Shipyard Limited registered work-in-progress of Rs.3950 lakh in the year 1998-99 and this went up to Rs.10000 lakh in the year 2003-04 and finally it ended with Rs.23435 lakh. The phenomenal increase of this category of inventory speaks of huge amounts tied up in work-in-progress inventory. Therefore, the management should take stringent measures to reduce this inventory by expediting the jobs assigned to it by the customers and deliver the finished ship at a possible early date, which automatically increases the efficiency.

Work-in-progress of number of months cost of production was between 6.5 months and 22.7 months in Goa Shipyard Limited during 1998-99 to 2008-09. The year 1999-2000 had 6.5 months and raised to 22.7 months in the year 2005-06. It reduced to 19.2 months in the year 2006-07 and 21.2 months in the year 2007-08 and finally, it stopped at 20.3 months. The higher the number of months work-in-progress cost of production, the lower the efficiency of materials management in particular and the
overall management in general. Therefore, necessary steps should be initiated to reduce this index as far as possible to make the organization further viable for the cause of the development of the country.

The inventory turnover ratio is Goa Shipyard Limited in the year 1998-99 was 0.50 and in the immediate next year, it went up to 2.58 and it never touched an inventory turnover of ‘one’ during the remaining period of study. The norm fixed for it is six to eight times for this kind of industry. The higher the inventory turnover ratio, the higher will be the efficiency indicating effectiveness of techniques used for inventory control. The lower turnover in an organization results in over investment in inventories. Therefore, necessary measure are to be taken up by the management of Goa Shipyard Limited to improve the inventory turnover ratio.

The progressive growth rate of output and net sales when compared to the progressive growth rate of inventories, clearly indicates the inventory accumulation in Goa Shipyard limited. This is a deplorable state of matter and the management should respond to it properly and try to reduce the accumulation of inventories.

The excess value of inventory held by Goa Shipyard Limited is quite alarming when compared to the actual value of the inventories with that of the BPE norm of six months cost of production. The excess value of the inventory was of the tune of Rs.3916 lakh and reached a peak of Rs.23645 lakh. Understandably, this is the case for the extreme deviation of the
management from the norms prescribed for it. Necessary remedial steps should be initiated to keep down the excess value of the inventory in tune with the norms.

The practices of inventory management of other ship building units were studied in terms of inventory performances, which are the outcomes of the policies and procedures laid down and practiced by different managements of the public sector ship building units. The CIWTC carried a total inventory of Rs.796 lakh in the year 1998-99 and in the remaining years, these inventory figures fluctuated widely and varied between Rs.405 lakh and Rs.1274 lakh. In CSL, it started with Rs. 637 lakh in the year 1998-99 and reached a peak of Rs.7744 laks and decreased to Rs.1591 lakh during the period under study. In GRSE, the total inventory figured at Rs.10601 lakh and it gradually increased to Rs.98750 lakh by the end of 2008-09. In case of HSL, it had Rs.9782 lakh in the initial year of study and decreased to Rs.4044 lakh in the year 2000-2001 and varied among all the years. The HDPE started with Rs.1523 lakh in 1998-99 and it came down to a minimum of Rs.1461 lakhs in the year 200-01 and went up to a maximum of Rs.3806 lakhs. In all the remaining years, the total inventory of HDPE varied in between. The MDL with its lowest total inventory of Rs.42504 lakh in the year 1998-99 and recorded an enormous growth of Rs.111098 lakh in the year 2008-09. Therefore, it is understandable that the total inventory in all the ship building units varied between Rs.405 lakhs to Rs.111098 lakh during the period under study.
Size of raw materials, stores and spares inventory excluding work-in-progress and finished goods in other public sector ship building units varied between Rs.161 lakhs and Rs.31590 lakh. It is very low in CIWTC and this category of inventory ranged between Rs.184 lakh and Rs.358 lakh. The variation of this inventory is very high in GRSE and ranged between Rs.1935 lakh and Rs.31590 lakh. In CSL, it ranged between Rs.827 lakh and Rs.1585 lakhs and in HSL, the range of this category of inventory lied between Rs.2786 and Rs.7200 lakh. In HDPE, the range was in between Rs.161 lakh and Rs.1012 lakh. In MDL, it started with Rs.8844 lakh in the year 1998-99 and ended with Rs.22256 lakh in the year 2008-09.

The size of raw material, stores and spared inventory in terms of number of days consumption in other public sector ship buildings units ranged between 58.6 days to 1386.6 days. During the period under study, in very few years, the other shipyards maintained the level below the norm prescribed by BPE of this kind of inventory. The situation was very dark in light of the norm of 180 days inventory of raw material, stores and spares items in terms of number of days consumption. This has to be tackled properly to bring down the inventory to the level of norms.

The size of work-in-progress in other public sector ship building units varied between 0(zero) and Rs.88907 lakh during the period under study. HSL and HDPE maintained 0(zero) work-in-progress inventory in two different years. The work in progress inventory in GRSE and MDL is quite alarming with more than...
Rs.66326 lakh and Rs.8907 lakh respectively. This might be because for certain technical reasons that the customer preferred to take delivery of the ship in the immediate next financial year to claim the depreciation on the it in the next accounting year. That is why, the figures are not realistic. Whatever may be the reason for the non-delivery of the ship, it accounts for the addition for the work-in-progress inventory.

The work-in-progress in terms of number of months cost of production in other public sector ship building units revealed that the GRSE holds the highest number of months work-in-progress with it and it ranged between 13.1 and 43.9 months. In CSL it ranged between 0.1 and 20.5 months and in HSL, the range was between 0 (zero) and 1.6 months. The MDL carried work in progress of number of months cost of production of a range of 14.3 to 27.6 months. The higher the work-in-progress of number of months cost of production, the higher will be the inventory accumulation. The industry should consider this aspect and act accordingly to minimize the work-in-progress.

The inventory turnover, is an indication of the efficiency of the inventory management. But unfortunately, the inventory turnover never exceeded 7.72 times in the industry. The prescribed norm for it is six to eight times. The material management specialists and representatives of ship building units should take up this issue for improving the inventory turnover ratio in public sector ship building units. This ratio was very poor in GRSE CSL, HDPE and MDL in all the years under the period of study. They
never touched inventory turnover of ‘one’ This is definitely a distressing factor noticeable with the shipyard.

The size of total inventory put together in all the public sector ship building units comes to Rs.75668 lakh in the year 1998-99 out of which GSK shared Rs. 4425 lakh inventory with 5.8 per cent of the total. In the same year, CIWTC had a minimum number of Rs.796 lakhs. MDLs inventory constituted 42504 lakh out of the total industry inventories. In the year 1999-2000, the industry’s total inventory was of the tune of Rs.98139 lakh and GSL shared Rs.2090 lakh with 2.1 per cent. This percentage of GSL went up to 17.8 per cent in the year 2004-05. This gradually declined and in the year 2008-09, it shared an amount of Rs.29461 lakh from out of the Rs.254321 lakh of the industry’s total inventory.

This needs to be brought down to the extent possible to improve the efficiency of Goa Shipyard Limited. Whereas, the MDL occupied a predominant place in all the years of study as far as the total inventory is concerned with more than Rs.67700 lakhs. Next to MDL, the GRSE stood second with a maximum total inventory of Rs.98750 lakh in the year 2008-09.

The size of raw materials, stores and spares inventory excluding work in progress and finished goods in the public sector shipbuilding industry was every increasing right from the beginning of the years of study to the year 2008-09. It was Rs.18051 lakh in the year 1998-99 and Goa Shipyard Limited was the third largest occupant with Rs.474 lakh out of the industry’s total
inventory of this kind. It shared 2.6 percent of the total inventory. While the industry total inventory was very increasing, the Goa Shipyard Limited share fluctuated widely from 2.1 per cent to 28.6 per cent. Percentage was increased to around three and half folds in a time span of 11 years from 1998-99 and had 8.7 per cent stake out of the total of Rs.69142 lakh in the year 2008-09. MDL and GRSE had a lion’s share with Rs.22256 lakh and Rs.31590 lakh respectively in the year 2008-09.

The industry’s total work in progress inventory is Rs.184196 lakh for the same period. However, in almost all the years during the period under study, the Goa Shipyard Limited occupied the same third position and it started with Rs.3950 lakh and experienced a low of Rs.1644 lakh in the immediate next year. From then onwards, is gradually increased year by year and finally it stood at Rs.23435 lakh in 2008-09. This has to be reduced to the extent possible to improve further liquidity position of the company. The CIWTC, CSL and HSL are at the lowest percentage of their contribution to the total work in progress inventory of the industry in the entire period under study.

The work-in-progress of number of months cost of production is very high in GSL, GRSE and MDL with that of the work in progress number of months cost of production of other shipyards in the industry. Though the operating results are good in all the above said three shipbuilding units, the should take steps to reduce this work in progress of number of months cost of production to six months as prescribed by BPE. In the remaining
shipyards, the work in progress is lower than the norms but still there are certain other reasons for the poor performance of the remaining shipyards owned and managed by Government of India.

The inventory turnover in all the shipyards is said to be poor as the inventory turnover is far away from the norm prescribed for it bys the BPE. GAO shipyard Limited is no exception for it. The Goa Shipyard Limited, GRSE and MDL are proclaimed as the efficient shipyards in the country by paying dividends continuously. Still they are lagging behind as far as the inventory turnover ratio is concerned. This has to be improved by adopting modern and scientific techniques of inventory management. Use of computers and computer packages available in this are is of great use in improving the inventory management performance by all the shipbuilding units in the country.

The present study highlighted the importance of inventory management function in public sector shipbuilding industry. An examination of the materials management practices followed by Goa Shipyard Limited suggested that there is an urgent need to review the existing policies, procedures and systems to achieve higher operational efficiency in this pivotal area. The problems encountered by Goa Shipyard Limited in the are of materials management are quite common in almost all the public sector ship building units in the country. The inventory accumulation as a whole in the industry is on the higher side. It is same in the case of Goa Shipyard Limited also. The suggestions made in the study
will hold good Shipyard industry which we are discussing about. It is hoped that the adoption of the suggestions made in this study would help in improving significantly the performance in the area of inventory management of Shipyard industry as a whole.