

INVENTORY MANAGEMENT SYSTEM

Nayan Suryawanshi¹, Sachin Gore², Prasad Lawand³, Prof. Shital Patel⁴

^{1,2,3}Student, Dept. of Mechanical Engineering, Bharati Vidyapeeth College of Engineering, Navi Mumbai

⁴Professor, Dept. of Mechanical Engineering, Bharati Vidyapeeth College of Engineering, Navi Mumbai

Abstract:- Inventory management is key factor in success of any organization. Inventory means any idle resource of an enterprise it also means stock on hand at a given time. So, the function of inventory management is to find sufficient amount of stocks that will fulfil the demand without causing over stocks. This research paper is focused on various aspects of inventory management as well as the benefits of implementing inventory management in organization.

Key words: Need of inventory, Cost associated with Inventory, Influence of demand on inventory, Purpose of inventory control.

1. INTRODUCTION

Inventory is commonly used to indicate materials like raw materials, finished, semi-finished, packing, spares and others stocked in order to meet an expected demand or distribution. The basic purpose of inventory analysis, whether in manufacturing, distribution, retail or services, is to specify when items should be ordered and how last the order should be. In distribution, inventory is classified as in transit meaning that it is being moved in the system and warehouse which is inventory in a warehouse or distribution center retail sites carry inventory for immediate sale to customer. In services inventory generally refers to the tangible goods to be sold and the supplies necessary.

2. PUPOSE OF HOLDING INVENTORY

The general purposes for holding inventory may include one or more of the following reasons.

To maintain independence of operations. center flexibility in operations can be achieved by a supply of materials at work Centre continuously. let's take example, big amount of cost is involved for making each new production setup, but inventory management allows organization to reduce number of setups. Assembly lines can be more effective by making independence workstations. difference work units will take different time which can vary naturally according to process. [4] therefore, it is desirable to have extra amount of inventory in hand. so that performance of all department can be increased. and from this management average output can be make stable.

To meet variation in product demand. when the demand of the product is known, then it may possible to produce the product to perfectly meet the Demand.

To allow flexibility in production scheduling. An inventory stock in hand relieves the pressure on production department to get the products out. longer lead times permit process management for continuous and quick flow and less - cost production through large lot size production. [9]

To provide a safeguard for variation in raw material is ordered delivery time. When material is from a vendor, delays can occur for a variety of reasons: a normal variation in shipping time, a shortage of material at the vendor's plant causing backlogs, an unexpected strike at the vendor's plant or at one of the shipping companies, a lost order, or a shipment of incorrect or defective material.

Purchase order calculated amount can give various advantages in economic way. Many costs are associated with placing order, conversation calls, typing or writing, posting extra. Also, shipping costs favor larger orders—the larger the shipment, the lower per-unit cost. [7]

Many other domain-specific reasons. Inventory should be managed according to the situation. for example, in transit inventory material is passed from the dealers to consumers and depends on quantity of required products.

3. TYPE OF INVENTORY

(1) Raw materials: Basic unfabricated materials which have not undergone for any operation as they are supplied from vendor directly e.g. Round bars, angles, channels, pipes, etc.

(2) Brought-out parts: These parts refer to those finished parts, subassemblies with are purchased from outside as per specification.

(3) Work-In-Progress (WIP): It is the items, or materials in partially completed condition of manufacturing e.g. subassemblies.

(4) Finished goods inventories: Completed products ready for dispatch or waiting for sales.

(5) Maintenance, repairs and operating stores: These are not the items which actually do not form the part of final product but are consumed in production process e.g. oil, grease, etc.

(6) Tools inventory: It includes market procured tools as well as special tools manufactured for the purpose of manufacturing a single product also.

(7) Miscellaneous inventories: Office stationeries, consumable stores.

Another way of classification of inventories is:

(1) Lost size inventory: Inventories procured for particular lot size.

(2) Transportation Inventory: If material is in transportation for longer time, that also indicates inventory.

(3) Anticipation inventories: These are built up for a particular season when demand is high and is remainable only for shorter duration.

(4) Fluctuation inventories: These are the inventories as a result of non-accurate sales forecast and so as to satisfy variations in demand.

4. TYPES OF INVENTORY COSTS

The inventory costs represent cost associated with functions of inventory system. Optimal policy will be one which minimizes total cost.

(1) Ordering Cost (Co):

This represents expenses involved in placing an order with outside supplier. This is predominant where inventory is replenished. This includes costs involved in processing and ordering for purchase, expediting over-due orders, receiving consignment and inspection. This is cost in rupees per orders.

(2) Set-up Cost (Co):

When items are produced within organization, it is set-up cost. It is the internal product cost in changing over existing production run to produce the ordered items. This includes costs involved in requisition, preparing shop order, scheduling work, pre-production set-up, tools and die preparations, expending and lot inspection. [3] It is cost in Rs. /order.

(3) Carrying Cost (Co):

It is the cost of holding and storage of inventory. It is proportional to amount of inventory and time over which it is held.

It consists of:

- i) Storage and handling.
- ii) Interests of funds raised for inventory.
- iii) Insurance.
- iv) Obsolescence and deterioration.
- v) Stock and record keeping. It considers effect of increased clerical and other costs in maintaining stock, record keeping and stock checking. Carrying cost is expressed as cost per unit time.

This is also represented as 'Percentage of average annual investment in inventory (I)'.

Then, $C_u = C_u \cdot I$

where, C_u is unit cost and I is in decimal fraction.

(4) Shortage Cost (Cs):

It is loss to firm due to non-availability of item, when it is required.

(5) Unit Cost (Cu):

It refers to nominal cost of inventory item per unit. It is the purchase price of item if it is bought from outside.

The inventory decisions are based on total inventory costs. The carrying cost is directly proportional to order quantity (Q). If the order quantity is increased, number of orders per unit time will be less and hence ordering cost will decrease. It is inversely proportional to order quantity (Q). The Total Inventory Cost = Carrying Cost + Ordering Cost. The following fig. shows inventory cost, known as Inventory Cost Curve. [8]

5. INFLUENCE OF DEMAND ON INVENTORY

Inventory means all movable items in store either ready for sale or for consumption in course of production with a view of converting them into finished stocks for sale.

Inventories form an integral part of working capital and require a considerable investment.

Hence, it is necessary to have a control over the inventories. Inventory control is a system that ensures provision of required quantity of inventories of required quality at the required time with minimum amount of

capital investment. Thus, function of inventory control is to obtain maximum inventory turnover with sufficient stock to meet all requirements. [8]

Inventory control ultimately balances the loss due to non-availability of an item and cost of carrying the stock of items. It aims at maintaining optimum level of stock of goods required by company at minimum cost to company

In case of inventory control, it is important to understand the trade-offs involved in using different types of inventory control logic(s), which varies with demand patterns. An important characteristic of demand relates to whether demand is derived from an end item or is related to the item itself. [5]

Generally, we use the terms independent demand and dependent demand to describe characteristic. Briefly, the distinction between independent and dependent demand is this: In describe this independent demand, the demands for various items are unrelated to each other. for example, many parts are produced by workstation which can be unrelated to fulfil extra requirement

In dependent demand, the need for any one item is a direct result of the need for some other item, usually a higher-level item of which it is part (please refer article no.13 also). These terms/entities can be are used to understand the impact of demand on inventory. Its explanation with example is discussed next.

In concept, dependent demand is a relatively straightforward computational problem. Needed quantities of a dependent-demand item are simply computed, based on the number needed in each higher-level item in which it is used. for example, if a motorbike company want to produced 600 bikes per day, the it will need 1200 wheel and Tyres (plus parts). the requirement of parts depends on production level. the demand for bikes is depend on sources. [3]

Company uses a variety of techniques, including customer surveys, forecasting techniques, and economic and sociological trends, etc.

This step is involved in deciding the process which need to be followed to complete the project based on the requirement of customer and convenience of the manufacturer. While deciding the process the manufacturer must evaluate the quality, cost and time required for the project.

6. PURPOSE OF INVENTORY CONTROL

1. To optimize (minimize) the financial investment in inventory.

2. Efficient purchasing storing, consumption, accounting for materials, etc.
3. Stock recording and timely action for replenishment.
4. To provide reserve stock for accommodating variations in lead times of delivery of materials.
5. Scientific short-term and long-term planning of materials.
6. To ensure timely delivery of goods and services for improvement in customer's relationship.
7. To minimize the risk of stock-out.
8. Efficient utilization of working capital.
9. To minimize loss due to deterioration, obsolescence damage and proliferate. Economy in purchasing and to minimize possibility of duplicating the orders.

7. ORDERING PROCEDURES AND CYCLES

Control can be a complicated balancing from the time a stock order is placed, received at your warehouse, counted, verified, labeled, put away, picked and shipped out or picked up.

One can control the stock of products by installing a system of inventory control procedures. It is important to involve appropriate number of members to be extra eyes and hands to keep your stock safe and organized.

Material planning plays very important role forecasting of materials. various forecasting techniques are used for analysis. after preparing demand forecasting we can prepare the material planning. bill of material is a data consist of various aspects like material list, quality.

Thus, material requirement plan will lead to be the development of delivery schedule of the materials and purchasing of those material requirements.

8. CONCLUSION

As we have seen in the Research Paper that Inventory Management is the most important factor in the success of any organization. Also, the analysis of Inventory Management highlighted that it improves Production Capacity as well as Time Management.

9. REFERENCES

- [1.] Benita M. Beamon, Measuring Supply chain Performance, University of Cincinnati, USA.
- [2.] Deepak Singh, Ajay Verma, Inventory Management, India.
- [3.] Yuzhuo Qiu, Jun Qiao, Panos Pardalos, Optimal Production, Replenishment, Delivery, Routing and Inventory Management Policies for Products with Perishable Inventory, University of Florida, USA.

- [4.] <https://www.scribd.com/presentation/258636121/Inventory-Lecture>
- [5.] http://www.academia.edu/7422739/Inventory_management_technique_in_pharmaceutical_industry
- [6.] <https://www.coursehero.com/file/p76q7s0/An-important-characteristic-of-demand-relates-to-whether-demand-is-derived-from/>
- [7.] PRODUCTION PLANNING AND CONTROL by L.C. Jhamb, Everest Publishing House.
- [8.] PRODUCTION SYSTEM PLANNING ANALYSIS AND CONTROL, James L., John Wiley and Sons.
- [9.] <https://www.investopedia.com/terms/i/inventory-management.asp>

BIOGRAPHIES:

Nayan V. Suryawanshi currently studying as a student in Bharati Vidyapeeth college of engineering, kharghar. His field of interest are Production Planning and Control, Material Technology, Metrology and Quality Control.



Sachin P. Gore currently studying as a student in Bharati Vidyapeeth college of engineering, kharghar. His field of interest are Production Planning and Control, Applied Mathematics and Quality Control.



Prasad S. Lawand currently studying as a student in Bharati Vidyapeeth college of engineering, kharghar. His field of interest are Production Planning and Control, Thermal Engineering and Production Process.



Prof. Shital V. Patel currently working as Assistant Professor in Bharati Vidyapeeth college of engineering, kharghar. She has 6 years of teaching experience. She has specialization in Production planning and control subject and guide for this research paper.