Chapter 9

Inventory Management
CHAPTER 9

INVENTORY MANAGEMENT

9.0 INVENTORY MANAGEMENT:

Every enterprise needs inventory for smooth running of its activities. It serves as a link between production and distribution process. There is, generally, a time lag between the recognition of a need and its fulfillment. The greater the time-lag, the higher the requirements for inventory. The unforeseen fluctuations in demand and supply of goods also necessitate the need for inventory. It also provides a cushion for future price fluctuations.

The investment in inventories constitutes the most significant part of current assets/working capital in most of the undertakings. Thus, it is very essential to have proper control and management of inventories. The purpose of inventory management is to ensure availability of materials in sufficient quantity as and when required and also to minimize investment in inventories.

9.1 MEANING:

The investment in inventory is very high in most of the undertakings engaged in manufacturing, whole sale and retail trade. The amount of
investment is sometimes more in inventory than in other assets. It is necessary for every management to give proper attention to inventory management. A proper planning of purchasing, handling, storing and accounting should form a part of inventory management. An efficient system of inventory management will determine (a) what to purchase (b) how much to purchase (c) from where to purchase (d) where to store, etc.

The purpose of inventory management is to keep the stocks in such a way that neither there is over-stocking. The over-stocking will mean a reduction of liquidity and starving of other production processes; under-stocking, on the other hand, will result in stoppage of work. The investments in inventory should be kept in reasonable limits.

9.2 OBJECTIVES:

➢ To ensure continuous supply of materials, spares and finished goods as that production should not suffer at any time and the customers demand should also be met.
➢ To avoid both over-stocking and under-stocking of inventory.
➢ To maintain investments in inventories at the optimum level as required by the operational and sales.
➢ To keep material cost under control so that they contribute in reducing cost of production and overall costs.
➢ To eliminate duplication in ordering or replenishing stocks. This is possible with the help of centralizing purchases.
➢ To minimize losses through deterioration, pilferage, wastages and damages.
➢ To design proper organization for inventory management. Clear cut accountability should be fixed at various levels of the organization.

➢ To ensure perpetual inventory control so that materials shown in stock ledgers should be actually lying in the stores.

➢ To ensue right quality goods at reasonable prices. Suitable quality standards will ensure proper quality of stocks. The price-analysis, the cost-analysis and value-analysis will ensure payment of proper prices.

➢ To facilitate furnishing of data for short-term and long-term planning and control of inventory

9.3 TECHNIQUES OF INVENTORY MANAGEMENT:

9.3-1 Economic Order Quantity:

The prime objective of inventory management is to find out and maintain optimum level of investment in inventory to minimize the total costs associated with it. The EOQ is the optimum size of the order for a particular item of inventory calculated at a point where the total inventory costs are at a minimum for that particular stock item. The economic order quantity (EOQ) is an optimum quantity of materials to be ordered after consideration of the following three categories of costs:

Ordering Costs:- The costs of ordering inventory include the following:

- Preparation of purchase order
- Costs of receiving goods
- Documentation processing costs
• Transport costs
• Intermittent costs of chasing orders, rejecting faulty goods
• Additional costs of frequent or small quantity orders
• Where goods are manufactured internally, the set-up and tooling costs associated with each production run.

**Carrying Costs:** - The carrying costs of inventory include the following:

• Storage costs (rent, lighting, heating, refrigeration, air conditioning etc.)
• Stores staffing, equipment maintenance and running costs
• Handling costs
• Audit, stock taking or perpetual inventory costs
• Required rate of return on investment in current assets
• Obsolescence and deterioration costs
• Insurance and security costs
• Costs of money tied up in inventory

**Stock-out Costs:** - The stock-out costs are associated with running out of stock which include the following:

• Lost contribution through the lost sales caused by the stock-out
• Loss of future sales because customers go elsewhere
• Loss of customer goodwill
• Cost of production stoppages caused by stock-outs of WIP or raw material
• Labour frustration
• Over stoppages
• Extra costs associated with urgent replenishment purchases of small quantities.

Assumptions of EOQ: To be able to calculate a basic EOQ certain assumptions are necessary
• That there is a known, constant stockholding cost.
• That there is a known, constant ordering cost.
• That rates of demand are known and constant.
• That there is a known, constant price per unit, i.e., there are no price discounts.
• That replenishment is made instantaneously, i.e., the whole batch delivered at once.
The following formula is used in calculation of EOQ:

$$EOQ = \sqrt{\frac{2AB}{CS}}$$

where,

A = Annual consumption
B = Cost of Placing an order
C = Cost per unit
S = Storage and other inventory carrying cost

9.3-2 VED Analysis:

VED analysis divides items into three categories in the descending order of their critically as follows:

- 'V' stands for vital items and their stock analysis requires more attention, because out of stock situation will result in stoppage of production. Thus, 'V' items must be stored adequately to ensure smooth operation of the plant.

- 'E' means essential items. Such items are considered essential for efficient running be: without these items the system would not fail. Care must be taken to see that they are always in stock.

- 'D' stands for desirable items which do not affect the production immediately but availability of such items will lead to more efficiency and less fatigue.
VED analysis can be very useful to capital intensive process industries. As it analyses items based on their critically, it can be used for those special raw materials which are difficult to procure.

9.3-3 FNSD Analysis:

FNSD analysis divide the items into four categories in the descending order of their usage rate as follows:

- 'F' stands for fast moving items and stocks of such items are consumed in a short span of time. Stocks of fast moving items must be observed constantly and replenishment orders be placed in time to avoid stock-out situations.

- 'N' means normal moving items and such items are exhausted over a period of a year or so. The order levels and quantities for such items should be on the basis of a new estimate of future demand, to minimize the risks of a surplus stock.

- 'S' indicates slow moving items, existing stock of which would last for two years or more at the current rate of usage but it is still expected to be used up. Slow moving stock must be reviewed very carefully before any replenishment orders are placed.

- 'D' stands for dead stock and for its existing stock no further demand can be foreseen. Dead stock figures in the inventory represents money spent that cannot be realized but it occupies useful space. Hence, once such items are identified, efforts must be made to find all alternative uses for it. Otherwise, it must be disposed off.
9.3-4 ABC Analysis:

In this technique, the items of inventory are classified according to value of usage. The higher value items have lower safety stocks, because the cost of production is very high in respect of higher value items. The lower value items carry higher safety stocks. ABC analysis divides the total inventory list into three classes A, B, and C using the rupee volume, as follows:

- Items in class 'A' constitute the most important class of inventories so far as the proportion in the total value of inventory. The 'A' items consist of approximately 15% of the total items, accounts for 80% of the total material usage.
- Items in class 'B' constitute an intermediate position, which constitute approximately 35% of the total items, accounts for approximately 15% of the total material consumption.
- Items in class 'C' are quite negligible. It consists remaining 50% items, accounting only 5% of the monetary value of total material usage.

9.3-5 Inventory Turnover Ratios:

Inventory turnover ratios are calculated to indicate whether inventories have been used efficiently or not. The purpose is to ensure the blocking of only required minimum funds in inventory. The inventory turnover ratio also known as stock velocity is normally calculated as sales/average inventory or
cost of goods sold/average inventory cost. Inventory conversion period may also calculated to find the average time taken for clearing the stocks.

Symbolically,

\[
\text{Inventory turnover ration} = \frac{\text{Cost of Goods Sold}}{\text{Average inventory at Cost}}
\]

Or

\[
\text{Net Sales} = \frac{\text{Net Sales}}{(\text{Average}) \text{Inventory}}
\]

9.3-6 **Just in Time (JIT):**

Just in time inventory control system involves the purchase of materials in such a way that delivery of purchased material is assured just before their use of demand. The philosophy of JIT control system implies that the firm should maintain a minimum(zero level) of inventory and rely of suppliers to provide materials just in time to meet the requirements.

9.3-7 **Lead Time:**

Lead time is the period that elapses between the recognition of a need and its fulfillment. There is a direct relationship between lead time and inventories. The level of inventory of an item depends upon the length of its lead time. Suppose, lead time is one month. Any action taken non will have an effect only one month later. So inventory for the current month must be in hand. During lead time there will be no delivery of material and consuming departments will have to be served from the inventories held.
9.4 ANALYSIS OF INVENTORY MANAGEMENT

Q. What is an average holding period of inventory in your company?

<table>
<thead>
<tr>
<th>Inventory</th>
<th>Average holding in days</th>
</tr>
</thead>
<tbody>
<tr>
<td>R.M.</td>
<td>38</td>
</tr>
<tr>
<td>W.I.P.</td>
<td>3</td>
</tr>
<tr>
<td>F.G.</td>
<td>28</td>
</tr>
<tr>
<td>Spare &amp; Tools</td>
<td>24</td>
</tr>
</tbody>
</table>

Inventory holding period for Raw Material, W.I.P., Finished Goods and Spares & Tools are 38, 3, 28 and 24 days respectively. (Calculated by taking average of all respondents' answers)
Q. Which method do you use to decide per order quantity?

<table>
<thead>
<tr>
<th>Methods</th>
<th>Percentage of companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.O.Q.</td>
<td>80</td>
</tr>
<tr>
<td>Any other</td>
<td>2</td>
</tr>
<tr>
<td>No specific method</td>
<td>18</td>
</tr>
</tbody>
</table>

Most of the respondents (80%) use EOQ model for deciding per order quantity while 18% respondents don’t use any method for this.
Q. Which method do you use for the classification of inventory?

<table>
<thead>
<tr>
<th>Methods</th>
<th>Percentage of Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.B.C.</td>
<td>68</td>
</tr>
<tr>
<td>V.E.D.</td>
<td>26</td>
</tr>
<tr>
<td>J.I.T.</td>
<td>4</td>
</tr>
<tr>
<td>F.N.S.D.</td>
<td>0</td>
</tr>
<tr>
<td>Any other</td>
<td>2</td>
</tr>
</tbody>
</table>
Q. Which method do you use for evaluation of inventory?

<table>
<thead>
<tr>
<th>Methods</th>
<th>Percentage of Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIFO</td>
<td>0</td>
</tr>
<tr>
<td>FIFO</td>
<td>70</td>
</tr>
<tr>
<td>Both</td>
<td>30</td>
</tr>
</tbody>
</table>

ABC system is widely used (68% respondents) for the classification and management of inventory followed by VED system (26%).

Similarly FIFO is most popular (70% of total respondents) inventory evaluation system. 30% respondents use both LIFO and FIFO system for evaluating inventories while no one use LIFO alone.