**Unit -3**

**Inventory Management**

Inventory is defined as the list of movable goods which helps directly or indirectly in the production of goods for sale. Inventory is a stock of item kept by an organization to meet internal or external customer demand. Virtually every type of organization maintains some form of inventory. Departmental stores carry inventories of all the retail items they sell; a nursery has inventories of different plants, trees and flowers and a rental car agency has inventories of cars.

***Types of Inventories***

1. ***Direct Inventories:-***

The inventories which play a direct role in the manufacture of a product and become an integral part of the finished product and become an integral part of the finished product are called direct inventories.

Direct inventories are classified as:

1. **Raw Materials**:- These are the materials which are machined or processed before they are ready to be used in assembly of the finished products. In other words, they are the basic materials from which components, parts and products are manufactured by the company.e.g. steel, copper, tin ,rubber, cotton, wood,etc.
2. **Inprocess Inventories (Work in progress):-**They are the semifinished goods at various stages of manufacture. The raw materials become work in progress at the end of first operation and remain in that classification until they become piece parts of finished goods. Work in progress can be found on conveyors, in and around the machines and in temporary storage awaiting for the next operation.
3. **Purchased Parts:-** These are some purchased items purchased from outside suppliers instead of manufacturing in the factory itself. For e.g. bell bearings, screw, nut, bolts, tyres.
4. **Finished Goods:-**They contain the output of the production process. These are the final products ready for dispatching to the customers.
5. ***Indirect Inventories:-***

They are those materials which help the raw material to get converted into the finished products, but do not become the integral part of the finished products.

They are classified as :-

1. Tools:-Various tools used for processing are classified as:-

* Standard tools used on machines such as drill, milling cutters, taps etc.
* Hand tools such as drill guns, hammers, punches etc.

1. Supplies:- It includes materials used in running the plant but do not go into the product. Supplies include :-

* Miscellaneous Consumable Stores such as brooms, cotton waste, and vim powder etc.
* Welding, soldering materials such as electrodes, welding rods, solder etc.
* Oils and greases such as kerosene, petrol, diesel etc.
* General office supplies such as candles, ink and ink pads, erasers, files, pins etc.
* Printed forms such as envelops, letterheads, enquiry forms, vouchers, etc.
* **Inventory Control**:-It means making the desired item of required quality and in required quantity available to various departments when needed.

**Objectives/Advantages of Inventory Control:-**

1. It ensures an adequate supply of materials, stores etc. There is no shortage of any item at any stage of production.
2. It reduces investment in inventories and inventory costs.
3. Materials are made available at the most economical rates.
4. Delays and interruptions in production due to non-availability of materials do not occur.
5. Production schedule and delivery dates are maintained.
6. The materials are protected from spoilage etc.
7. There is an increase in overall efficiency of the organization.

**Inventory Costs:-**

There are 3 basic costs associated with inventory :-

**Carrying Costs:-** They are those costs of holding the inventory. These costs vary with the level of inventory and occasionally with the length of time an item is held; that is, the greater the level of inventory over a period of time, the higher the carrying costs. Carrying costs can include the cost of losing the use of funds tied up in inventory; direct storage costs such as rents, heating , cooling ,lighting ,security refrigeration, record keeping and transportation; interest on loans used to purchase inventory; product deterioration and spoilage; breakage and taxes.

Carrying Costs are normally specified in two ways. The usual way is to calculate total carrying costs by summing up all individual costs mentioned above on per unit and per time basis. e.g. Rs 10/unit/year. The other way is to express as a percentage of the value of an item or as a percentage of average inventory value. e.g . 10% of the value.

**Ordering Costs:-** They are associated with replenishing the stock of inventory being held. These are normally expressed as a dollar amount per order and are dependent of the order size. Ordering costs vary with the number of orders made-as the number of order increases, the ordering costs increases.

Costs incurred each time an order is made can include requisition and purchase orders, transportation and shipping, receiving inspection, auditing and accounting reports. Ordering costs generally react inversely to carrying costs. As the size of orders increases, fewer orders are required reducing ordering costs. However, ordering larger amounts results in higher inventory levels and higher carrying costs. In general, as the order size increases, ordering costs decreases and carrying costs increases.

**Shortage Costs/ Stock out Costs: -** It occurs when customer demand cannot be met because of insufficient inventory. If these shortages result in a permanent loss of sales, shortage costs include the loss of profit. Shortages can also cause customer dissatisfaction and a loss of goodwill that can result in permanent loss of customer and future sales. In some instances, the inability to meet customer demand or lateness in meeting demand results in penalties in the form of price discounts or rebates. When demand is internal, a shortage can cause work stoppages in the production process and create delays, resulting in the cost of lost production.

Costs resulting from lost sales because demand cannot be met are more difficult to determine than carrying costs. Therefore shortage costs are frequently subjective estimates. Shortages occur because of carrying inventory is costly. As a result, shortage costs have an inverse relationship to carrying costs. As the amount of inventory on hand increases, the carrying costs increases whereas shortage cost decreases.

**Inventory Control Systems**

An Inventory control system controls the level of inventory by determining how much to order and when to order. There are two basic types of inventory systems:-

1. **Continuous (fixed order quantity system/Q Model)**:-

In a continuous inventory system (also referred as a perpetual system and a fixed order quantity), a continual record of the inventory level is maintained. Whenever the inventory on hand decreases to a predetermined level, referred to as Reorder Point, a new order is placed to replenish the stock of inventory. The order that is placed is for a fixed amount that minimizes the total inventory costs. This amount is called Economic Order Quantity.

A positive feature of a continuous system is that the inventory level is continuously monitored, so management always knows the inventory level/stock. This is advantageous for critical items such as replacement parts or raw materials and supplies. However, maintaining a continual record of the amount of inventory on hand can also be costly.

Example of Continuous Inventory system is the computerized checkout system with a laser scanner used by many supermarkets and retail stores. The laser scanners reads the bar code form the product packet; the transaction is instantly recorded, the inventory level updated. Such a system is not only quick and accurate; it also provides management with continuously updated information on the status of inventory levels.

1. **Periodic Inventory Systems:-**

In a periodic inventory system (also referred as fixed time period system or periodic review system), the inventory on hand is counted at specific time intervals; for example, every week or at the end of each month. After the inventory in stock is determined, an order is placed for an amount that will bring inventory back up to the desired level. In this system, the inventory level is not monitored at all during the time interval between orders so it has the advantage of little or not required record keeping. The disadvantage is less direct control. This typically results in larger inventory levels for a specific period and a system also requires that a new order quantity be determined each time, a periodic order is made.

An example of a periodic inventory system is a college or university bookstore. Textbooks are normally ordered according to a periodic system, wherein an account of text books in stock is made after session ends. An order for new textbooks for the next session is then made according to course enrollments for the next term demand and the amount remaining in stock.

**Difference Between Q Model and P Model**

**Feature Q Model P Model**

1. Order Quantity The same amount ordered each time The amount varies each time

order is placed

1. When to place order When inventory position drops to when the review period arrives

the reorder level

1. Record keeping Each time a withdrawal /addition is Counted only at review period

Made

4) Size of inventory less than P-Model Larger than Q Model

5) Time to maintain Higher due to perpetual recordkeeping Lesser than Q Model

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| **\*Flowcharts of q model and p model is attached with the mail.** |