9. MATERIALS MANAGEMENT

It deals with purchasing and controlling the materials used in the production process.

1. Materials (goods) planning and control

Decisions to be taken in this are:

a) Amount of materials needed for output desired
b) Amount of inventory and its storage and recording
c) Vendor relations
d) Quality materials and price per unit
e) Quantity and time of order
f) Methods of receiving and transporting
g) Handling of defective materials and stock

Policies and procedures should be established so that most of these decisions become routine in nature. When exceptions occur, the concerned authority should correct them.

Materials are a form of investment and until they are sold and produce revenue, the money cannot be used for other income producing purposes. Consequently, the manager wants to buy (the materials) in small quantities and sell the output rapidly in order to obtain income. But, if quantities are too small, the income producing opportunities may be lost and customers may be missed. Also, purchasing in small quantities usually results in higher prices. The losses due to theft should be kept minimum. While increasing controls may reduce cost from losses, it also increases, the controlling cost. The problem is to find the balance between these two costs.

2. Inventory control of raw materials.

The use of inventory is to take care of seasonal variations in demand. The inventory of materials, parts, goods and supplies represent a high investment in all business. Many companies failed because their inventories locked up too much money or the items in inventory become obsolete, impaired or lost. The purpose of inventory is to disconnect one segment of a process from another, so that each segment can operate at its optimum level of performance.

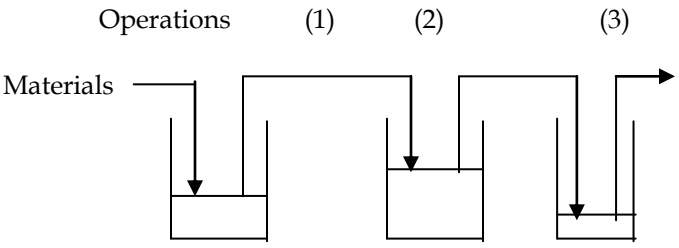

Fig.9.1 Inventory between different operations

Types of Inventories

a) Purchased materials, parts, products
b) Goods in process or between operations
c) Finished goods at the factory, warehouse or store
d) Repair parts for machines
e) Supplies for the office, shop or factory
f) Tools

Each of these types of inventory is performing basically the same function and can be studied in the same way. Some of the inventories represent a much greater investment, cause more serious trouble if the items are not in stock and are more costly to restock than others.

Determining Economic Inventory Level

The detailed analysis made to determine economical inventory level must consider total inventory should not be so great that it make it difficult to pay current bills in cash. The Fig 8.2 shows how the number of units of a purchased item varies over a period of time. When a purchased item is received the inventory increases instantly. The units are removed from inventory, as they are demanded. At certain levels or when inventory falls to a specific level, a purchase order is sent to the vendor. The order will be received sometime later. In the meantime, more units may be drawn from inventory. This cycle is repeated for each item purchased.

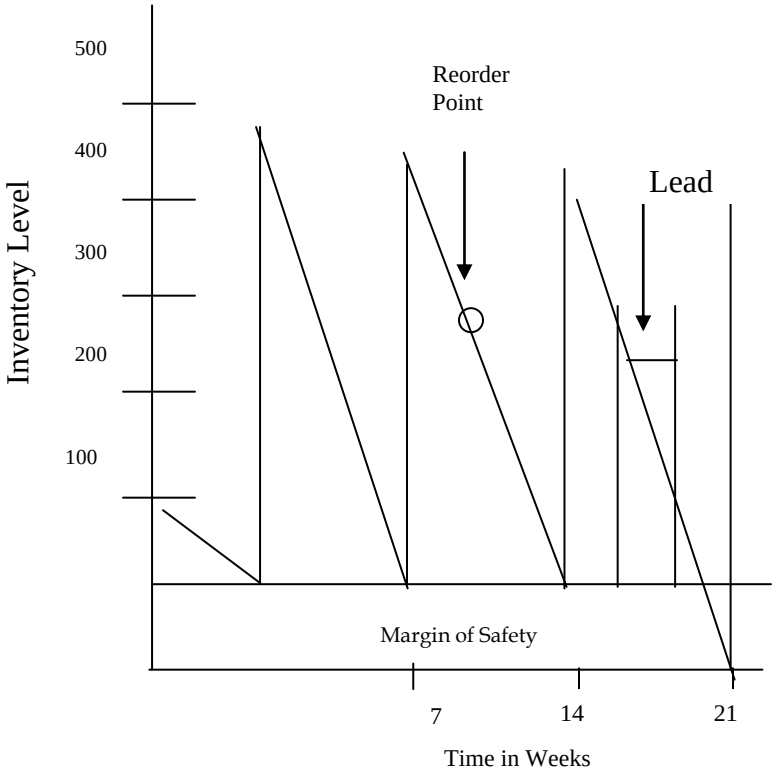

Fig 9.2 Graph of Changing Level of Inventory of an

For items in process and in finished goods, the inventory builds up over a period of time as goods are produced so that the vertical line in the figure will be sloping upwards to the right. The inventory builds up because production is greater than demand. Too little inventory may cause stock- -outs (shortage of the material or product when it is required for production or sale). The problem is to strike the optimum inventory to carry converted in terms of Economic Order Quantity (EOQ) for consumption materials and economic lot size for batch production.

The variables are

a) Annual requirement of the item (c)
b) Ordering cost (s)
c) Inventory carrying cost per unit (I)

The model is given by the equation,

$$\text{EOQ} = \sqrt{\frac{2cs}{I}}$$

Uses of the model

The model is an excellent guide in scientific inventory management. This compels the manager to analyze the requirements and cost of inventory holding. It is useful in the inventory management by fixing.

1) Maximum and minimum level of stock holding.
2) Ordering level I (that is, the stock point when reordering is required, and
3) The most economic quantity to order.

The above is a simple and deterministic model, which assumes constant rate of consumption, constant cost of ordering and holding inventory and uniform lead – time (that is, the time lag between replenishment, action and actual supply or availability of the items)

3. Determining when to order

The level of inventory at which an order should be issued is based on:

1) The quantity to be used between times an order is issued and items are received.
2) A quantity needed to provide a margin of safety.

The time to be allowed in (1) is determined by the time taken for

a) Order to be processed by the firm
b) Order to be transported to the vendor
c) Vendor to make and pack the items
d) Items to be transported to the firm

Estimates of cost of carrying inventory ranges from 15% to over 100% of the average inventory investment for a year. Values of 20% to 25 % are often used. The recording point quantity can be estimated by computing various levels and reordering points and adding the cost of carrying the inventory and cost of running out of goods multiplied by the probability of running out. The lowest cost is the best order point.

4. Quantity Per Order

The quantity per order affects the level of inventory and the time between orders. Orders may be placed.
At certain intervals such as once in a week, a month or quarter, when the amount ordered can bring the level of inventory up to a predetermined standard mount.
When the inventory reaches a certain quantity.

5. Ordering Procedure

Many items can be ordered on a routine basis. The procedure starts with need as reflected by the reorder points and requires keeping a

a) Perpetual inventory which records when the inventory has reached the reorder point.
b) Quantities set aside that will not be used without making out a purchase order.

Items requiring special analysis

a) Expected changes in price, short delays in buying for expected decrease in price or increased quantities for expected increase in price result in savings. However, stock – outs or too heavy inventory costs should be guarded against.
b) Expected changes in demand. Seasonal products fall into this category.
c) Orders for a demand for special goods, quantity ordered is equal to amount demanded so that no material is left over.
d) Short supply of materials.

Speculative buying should be avoided unless the manager is in that business.

Placing responsibility of ordering

One person should have the responsibility for ordering all materials but that person should obtain the help of those knowledgeable people in the area where the goods are needed. By having a single person responsible, duplicate orders for the same material are avoided, the specialized kills needed for purchasing can be used and the responsibility for improvements in buying – process is established.

6. Sources of Supply

This is important because,

a) Price of purchased goods is a major cost in the production
b) Reliability in delivery and quality affects the operations
c) Vendor can be valuable source of information
d) Vendor can provide valuable service

Prices of materials

The prices of materials from different vendors are not the same. Higher prices may be charged for

a) Higher quality
b) More reliable and faster service
c) Better terms for returning goods
d) More services such as packaging and information
e) Better or delayed payment plan
    - The purchase manager can purchase an item at a lower price, but the total cost of processing the item may be higher.
    - Price and transport cost from a distance place may be less than from a local source but faster service from local source may allow the purchasing firm to have less inventory.
    - One source may supply a wide range of goods needed so that the expenses of ordering from many sources can be reduced.

The sources of supply may be brokers, wholesalers, manufacturer or others. Each of theses sources provides a valuable service. **Wholesaler** stocks many items, quick delivery of wide varieties of items. **Manufacturer** does not involve intermediate handler, but it is restricted to a product it can supply. Manufacturer may have sales representatives or agents who can help small business. Regional and National Trade Fairs and Trade Association provide valuable information on sources and their products and services.

Using few or many sources

Arguments for a single source

a) A closer and more individual relationship can be established
b) Better services during shortages
c) Discounts for large purchase

Multiple sources provide a greater variety of goods and often on better terms. Care should be exercised on ethics o supplier and should be guarded against including gifts, entertainment, misrepresentation and reciprocity. A small company should try to maintain a good image in its dealings with vendors in order to obtain good services.

7. Receiving Materials

The receipt and forwarding of materials to inventory constitute the last step in acquiring inputs.

- Checking whether the material is in conformity with order, proper condition and quality.
- Materials are checked for damage in transport, for specified characters such as colour, size and items specified and for proper quantity and price.
- Materials can be stored in the containers in which they are received, in separate containers or by individual item. The receiving agent prepares material for storing.