RATIONALE OF MATERIALS MANAGEMENT
CHAPTER III
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PURCHASE PROCEDURE

Purchasing is the most important function of materials management. The moment a buyer places an order he commits a substantial portion of the finance of the corporation which affects the working capital and cash flow position. Proper sales cannot be made unless materials used for manufacture or for resale are bought at reasonable cost.

Purchasing has been defined by Westing and Fine as a "business activity directed to securing the Materials, supplies and equipment, required in the operation of an organisation". Purchasing means a policy well planned properly co-ordinated and covering a wide range of control in the selection of materials, sources of supply, ensure timely deliveries, a complete inspection for quality and quantity and development of up-to-date methods and technique of higher standard to reveal efficiency and economy.

The basic objectives of purchasing are

1. To support company operations with an uninterrupted flow of materials and services.

2. To buy materials competitively and wisely. To buy competitively involves keeping abreast of the forces of demand and supply that
regulate prices and availability of materials. Wise buying involves a constant search for better values, that yield the best combination of price, quality and service.

3. To keep inventory investment losses at the lowest possible.

4. To develop reliable alternative sources of supply.

5. To develop good, continuing vendor relationships. Good vendor relationships are invaluable. Under such relationships, the myriad problems that inevitably arise between buyer and seller are readily solved. Vendors naturally direct their research, give advance information on new products and prices and give better service to their permanent customers.

6. To achieve maximum integration with the other departments, of the firm. This requires understanding the needs of the other departments.

7. To train and develop highly competent personnel who are motivated to make the firm succeed along with their personal progress and

8. To develop policies and procedures so as to accomplish the preceding seven objectives at the lowest reasonable operating cost.
Therefore, the basic objective of the purchasing function is to ensure continuity of supply of raw materials, spare parts and other items and at the same time reduce the ultimate cost of the finished goods. The objective is not so much to procure the raw materials at the lowest price but to reduce the cost of the final product. For ensuring this the necessary parameters are Right quality, Right price, Right time, Right sources and Right quantity.

RIGHT QUALITY

The Oxford dictionary defines 'quality' as 'fitness, merit, excellence'. In industrial purchasing, quality has an entirely different meaning. Here quality is related to suitability and cost, rather than to natural excellence. The best quality is that which can be purchased at the lowest cost to fulfil the need or satisfy the intended function for which the material is purchased.

There is nothing wrong with seeking lower prices. All experienced buyers rightly do this. However, it is wrong to put price out of its proper sequence. For the personal needs buying considerations start with price. First they decide the amount to be allocated for the purchase, after that they seek the highest quality within the amount. In industrial purchasing the sequence is reversed. Quality comes first and price comes second. In other words in industrial purchasing quality determines the price.
1. Quality is determined by balancing two major considerations:

   a) The technical consideration of suitability and

   b) The economic consideration of price and availability.

   The design engineering department has the basic responsibility for determining the technical quality of materials to be used in production. Engineering departments work closely with production and sales in this determination. The using department is normally responsible for determining the suitability of materials not used in production. For example, the office manager is responsible for determining the quality of typewriters, calculators and other office machines.

   The purchasing department is responsible for the second major consideration in quality determination i.e., the economic consideration of quality. After the technical decision of quality has been made, purchasing must determine whether the materials selected can actually be purchased on a continuing and competitive basis.

   After the right quality has been determined it must be described in such a way that the seller can easily understand and supply it. This is a complicated one, since a buyer has to describe in writing all the characteristics and the seller should know about the items desired. In industrial purchasing, purchases are regularly made from suppliers situated thousands of miles away. These distant suppliers must determine
buyer's wishes from a piece of paper—the purchase order. The description must be precisely understandable to all competing sellers, not just to one seller. Under these circumstances quality description becomes more difficult.

Quality description performs three main purposes (1) they make it possible to describe items on purchase orders, (2) they let the vendor know exactly what the buyer wants and (3) they permit inspection by specified measurement or test which can verify that the material received is the material described on the purchase order.

Quality is usually described on purchase order by the following methods:

(1) Market grades (2) Brand or trade names (3) Commercial standards (4) Chemical or physical specifications (5) Performance specifications (6) Material and method-of-manufacture specification (7) Blueprints (8) Samples and (9) Qualified products list.

Many products cannot adequately be described by a single method of description. In such cases, a combination of two or more methods can be used.

RIGHT PRICE

Right price need not be the lowest price. The price can be kept low by proper planning and not by rush buying. There are three
basic methods by which a buyer can seek the right price.

1. Published Price Lists.

2. Competitive bidding and

3. Negotiation.

PUBLISHED PRICE LISTS

Published price lists in the form of daily quotation exist for standard commodities traded on the various commodity exchanges throughout the world. Usually price lists show different prices for varying quantities. Quite often a seller having particular commodity in inventory will sell at a price lower than the price quoted for the commodity on the exchange. The prices shown on a seller's price list are asking prices. They may or may not be the actual selling prices.

COMPETITIVE BIDDING

Competitive bidding is a widely used form of purchasing. Mostly industrial buyers place the order with the lowest bidder. By law government buyers are usually required to give the order to the lowest bidder, provided the lowest bidder is not otherwise disqualified to perform the contract.

Competitive bidding properly used is an excellent method of obtaining a fair price. This method of pricing is most applicable to
highly standardized products and services that are widely used and produced abundantly for store by many manufacturers.

NEGOTIATION

Negotiation should be used in all situations where the competitive bidding cannot be used. When the time is too short, the money value of the order, is too low and the number of bidders is inadequate their willingness to compete is lacking or the specifications are vague, the buyer has no choice but to negotiate.

Use of the negotiation technique does not preclude competition or competitive bidding. In fact, negotiation as a method of price determination seeks and exploits competition just as vigorous as does competitive bidding. However in negotiation competition is sought on a less formal basis and generally includes the areas of quality, quantity and service, as well as the area of price. When adequate price does not exist, a price should be determined by first analysing costs, profit and price and then by negotiating.

Negotiation is particularly useful in dealing with sellers who are a sole source of supply, or with sellers controlling multiple sources that behave in a monopolistic manner. In cases where cost, are not reliably determinable in advance, as in most research contracts and many contracts for items that have never been made before, there is no alternative to negotiation.
RIGHT SOURCES OF SUPPLY

Purchasing department is responsible for investigating all potential suppliers and for placing the order with the supplier which will in the long run, provide a satisfactory product at the lowest cost to the company. Every industrial enterprise has two primary sources of supply. I the firm itself may produce, the components and II purchase from outside suppliers. The first decision to be made in selecting a source of supply is whether the source should be the company itself or an outside supplier.

Deciding whether a part should be purchased or manufactured is known in industry as the make or buy problem. Two factors stand out above all others, when considering the make-or-buy question. The paramount consideration are cost and availability of production capacity. In addition to the two basic factors the following factors should be considered which favour making the part, rather than buying from outside.

i. Cost consideration is less expensive to make the part.

ii. Productive use of excess plant capacity to absorb fixed overheads.

iii. Need to exert direct control over production and quality.

iv. Design Secrecy required for the product.

v. Unreliable suppliers and

vi. desire to maintain a stable work force in periods of declining sales.
These are purely internal problems of the industry and it is in a position to get the reliable information, needed for ensuring smooth production.

The second decision concerns external sources of supply. Selecting capable suppliers, is one of the most important functions of purchasing department. If the right supplier is selected, then competitive pricing, reliable quality, on-time delivery, good technical service and other goals of good purchasing can be automatically achieved.

A buyer must consider many factors in selecting sources of supply. They are,

ASSURANCE OF SUPPLY

Reliability of supply is important to both buyers and suppliers, who suffer shortages themselves must be used with great care even though they are having desirable capabilities. Suppliers assuring long-term sources for their raw materials and component parts should be favoured and continued.

SIZE OF SUPPLIER

Size of an order should correlate with the size of the supplier receiving the order. If a company's annual usage of a particular item is small, the order should be placed with the smaller supplier. For him
the same order would be much more important and he will ensure better service for the buying company. On the other hand, if the annual usage were a very large quantity, a small supplier would not be able to service properly such a large account.

NUMBER OF SUPPLIERS

Placing the entire firm's business with one supplier in times of shortage is known as placing all the buyer's eggs in one basket. This supplier will take better care of his special customer and can provide the best pricing because of an assured and continuous sales volume. If a company uses two or three suppliers, it will be protected in times of shortage by having alternate sources of supply.²

DEVELOPING SOURCES OF SUPPLY

In some cases, a buyer is not able to select but must create a satisfactory supplier. If existing suppliers cannot satisfy a company's needs, a logical alternative is to create a supplier that can satisfy the company's needs. If necessary the buyer may even provide the prospective new supplier with the financial, technical and managerial help needed to enable the new source to achieve efficient production.
Maximum purchasing efficiency results only when buyer and seller integrate their total materials management efforts, including the interflow of data and communications.

RIGHT TIME

For determining the right time the purchase manager should have lead time information for all products and analyse its components for reducing the same. Lead time is the total time elapsed between the recognition of the need of an item till the item is procured for use. This covers the entire duration of the materials cycle and consists of pre-contractual administrative lead time, manufacturing and transporting lead time and inspection lead time. While determining the purchases, the buyer has to consider emergency situations like floods, strikes etc., Rush purchase should be made only in exceptional cases.

RIGHT QUANTITY

The right quantity is the most important parameter in buying. Concepts such as economic order quantity, fixed period and fixed quantity systems will serve as broad guidelines for determining the right quantity. But the buyer has to use his knowledge, experience and commonsense to determine the quantity after considering factors such as price structure existing in the market, price discounts allowed by the suppliers, availability of item, seasonal fluctuations, standard ordering quantities and make or buy consideration.
The buyer has to adopt separate policies and procedures for capital and consumer items. He should be able to distinguish between indigenous and international purchasing procedures.

**INVENTORY CONTROL TECHNIQUES**

Inventory is the physical stock of items that a business or production organisation keeps in hand for efficient production. Inventories consist of raw material, component parts, supplies and finished assemblies which an organisation purchases from an outside source and parts and finished products which the company manufactures itself.

It is very essential that material of the correct quantity and quality is made available as and when required, with due regard to economy in storage and ordering costs, purchase price and working capital.

**IMPORTANCE OF INVENTORY CONTROL**

Inventory is excess of receipt over issue or sale. Where receipt is equal to issue inventory is nil which is an ideal condition, but this ideal stage is never attained. Actuals vary with the anticipation thus, causing inventory.

Inventory is not a sign of wealth. Working capital is tied up with the excess inventories, interest has to be paid on capital. This
increases the cost of production. They occupy valuable space and may require added storage space for which rent has to be paid. There will be an increased cost of handling stores and maintaining their record. Inventories are subject to damage, deterioration and spoilage with passage of time. With change in design or availability of better type of material, long lying inventories will become obsolete. There is also more possibility of pilferage and misplacement of material parts. Therefore, it is important to have strict control over the inventory.

Inventory turnover ratio is the health of materials management. In India this ratio is 2.7:1 in public sector and 4:1 in the private sector. In developed countries it is 6:1. Inventory should be controlled with the object of minimising the total variable cost. Tandon committee appointed by the R.B.I., interalia dealt with prescribing inventory norms for industries for smooth running with no stock out. The inventory level is fixed at the point where the marginal cost of added inventory is equal to the marginal benefits obtained. Any further investment in inventory will not bring a great return. Inventory control plans for physical control of materials, proper storage and handling as well as numerical control of accounting techniques.
OBJECTIVES OF INVENTORY CONTROL

Two primary objectives of inventory control are

a) To minimise idling of men and machines which may arise due to shortage of raw materials, supplies and spare parts and to provide efficient and smooth service to the customers and

b) To keep minimum investment on inventories and inventory carrying cost.

The first objective requires holding large inventories, whereas the second objective requires holding only sufficient inventories. Both these objectives are in conflict with each other.

The challenge of inventory control is to balance these two conflicting objectives. Inventory control tries to solve this problem by striking an optimum inventory holding cost for each organisation. The materials department is accused of both stock outs as well as large investment in inventories and the solution lies in exercising a selective inventory control and application of inventory control techniques.

There are two methods of control, one by quantity and the second by value. The quantity control system is designed to supervise the input and output of each individual stock item. The purpose of the value control is to provide a means of verifying that the detailed quantity
control is operating effectively and also to produce information about the value of stock for financial purposes.

The main point about the control of stock by quantity is that by the very nature of operation every item of stores receives individual attention. Detailed information about each item is required and this is taken from the stock records.

Stock control in quantity is only bound to give the correct overall result if every item is kept at the proper level. This is never achieved in practice and a few expensive items out of balance can upset the whole situation. Therefore, value control is necessary to show the overall position.

The following are the important inventory control techniques.

1. Stock levels
2. Economic order quantity system
3. M R P system
4. A B C Analysis

1. STOCK LEVELS

The basic method of controlling stock by quantity is by means of fixing stock levels for each commodity. These levels are noted on the stock records.
The various kinds of stock levels are

1. Minimum level
2. Order level
3. Maximum level

MINIMUM STOCK LEVEL

It is the minimum quantity of materials kept in stock below which the stock of any given commodity should not be allowed to fall. It is also called minimum inventory, buffer stock, "Reserve stock" or safety stock. It is expressed in units of issue. When this level is reached urgent action should be taken to forward the next order.

A zero level of safety stock is never planned by any organisation, some cushion called safety stock is always maintained. If items stored are used with constant foreseeable rate and lead time for a purchase order is fixed and definite, an undertaking need not keep even minimum inventory. Under these conditions replenishment stock would be received just when the existing inventory is finished. These are only ideal conditions. In reality these conditions namely consumption rate and lead time keep on changing and the company has to accept the fact that the rate of consumption and lead time will be greater on occasions. If both, the lead time and rate of use are increased, it will create a serious stock out situation which will be very embarrassing.
COMPUTATION OF MINIMUM STOCK

The usage of inventory cannot be perfectly forecast, it fluctuates over a period of time. Two costs are involved in determining the minimum inventory:

1. Opportunity cost and
2. Carrying cost.

Opportunity cost is the cost of stock-outs if no quantity of safety stock is maintained. The raw materials stock-outs cause production disruptions and result in higher cost of production. If the finished goods inventory is out of stock, proper customer service cannot be provided and they may be lost to the competitors.

Inventory carrying cost is the cost incurred to carry the stock over a period of time. This includes,

(a) Interest on capital invested in the stock.

(b) Insurance and tax charges payable on the stock holding.

(c) Storage cost

(d) Allowance for deterioration or spoilage of stock

(e) Salaries of stores personnel and

(f) Obsolescence.
The larger the quantity of safety stock, the larger the carrying cost and lower the opportunity costs of the stockouts. On the other hand, if a very low level of safety stock is maintained, frequently stock out will occur which will result in the larger opportunity cost, but the carrying costs will be low. Thus, the optimum level of safety stock involves a trade off between the costs of stock-outs and the carrying costs of safety stock, or the safety stock will be optimum when the total of carrying and stock-outs cost is minimum.

The following factors should be taken into account for fixing minimum stock.

1. **INVESTMENTS**

   In order to keep the investments on inventory at a low level the high value 'A' items should have very low quantity and if possible nil minimum stock and the stock-out possibilities will be avoided by close follow-up of orders weekly, fortnightly or monthly for review of the stock position. The medium value 'B' items will have a slightly higher minimum stock and low value 'C' items a fairly good minimum stock.

2. **LEAD TIME**

   Lead time is the time required to obtain the supply after the need is determined or it is the interval between the time an item reaches the order level and the actual receipt of the materials at the
stores. If the lead time is short, minimum stock should be small and if the lead time is long, minimum stock should be kept at higher level.

3. CYCLE TIME

Cycle time is the interval between two deliveries when bulk orders are placed. If the cycle time is long a fair minimum inventory should be maintained.

4. SPECIALLY MANUFACTURED ITEMS

If an item is not a standard product of the supplier and is specially manufactured for the buying firm, delay in delivery is likely. Therefore, it is advisable to keep a slightly higher minimum stock in such cases.

5. COUNTRY OF SUPPLY

If the supply has to come from a foreign country there can be no certainty that materials will arrive on time. The reasons can be import licence problem, manufacturing delay, in arrival of steamer, delay in clearance of goods etc. Therefore, a higher minimum stock has to be kept when materials are imported from another country than if they are to be received from buyer's own country.
6. SHELF LIFE

If the shelf life of an item is only a few hours or one or two days as in the case of Liquid, Nitrogen, Dry-ice etc, it is not possible to keep any minimum stock and delivery should take place to suit shelf life.

Fixing of minimum stock is an intricate work. The best way to proceed is to decide the category from the investment point of view i.e., A, B and C and thereafter apply the various rules.

The formula used to calculate the minimum stock which is given by Wheldon

Minimum stock level = Re-ordering level - (normal consumption x normal re-order period)

MAXIMUM STOCK LEVEL

Maximum stock is equivalent to minimum stock plus rate of delivery. It is the limit beyond which the stock of an item should not be allowed to raise in the normal course.

Maximum level is used for controlling investments. For fixing the maximum stock level the main consideration is financial and other points affecting this level are the possibility of items becoming obsolete as a result of operational changes and the danger of deterioration.
in perishable commodities, availability of storage space, etc., It is the signal to defer or cancel outstanding deliveries if any.

Stock control will make regular review and send to purchase section a list of the items which have exceeded the maximum to reschedule deliveries.

The formula for the calculation of maximum stock level given by Whelden is

\[ \text{Maximum stock level} + (\text{Reorder level} + \text{Reordering quantity}) - (\text{Minimum consumption} \times \text{minimum re-ordering level}). \]

**THE ORDERING STOCK LEVEL**

Order level or order point is the level of the availability at which recoupment of an items is to be initiated. When availability reaches the order level, a fresh recoupment purchase requisition is to be raised so that supplies against the purchase requisition will arrive when the stock reaches the minimum level. Order level is equivalent to minimum stock plus requirements during lead time. For example, if the minimum stock is equivalent to one month's requirements and if the lead time is six month, the order level will be equivalent to seven months requirements.
The formula to calculate the order point is

\[(\text{lead time} \times \text{average usage}) + \text{safety stock}\]

It can be operated in two ways.

1. Ordering Point System
2. Periodic Review System

ORDERING POINT SYSTEM

In this system the order for replenishment is placed when the stock level reaches a particular point. The control is achieved by maintaining the inventory cardex in which maximum, minimum level, order level are specified, while making any issues the entries are made into cardex, it will indicate when the stock levels are reaching the ordering point. The ordering point depends upon the average use of the item and lead time for obtaining the fresh supplies. This system is devised for use based upon the consumption at a stable rate.

PERIODICAL REVIEW ORDERING

In this system the stock position is reviewed in the interval of a particular period, when the stock position is not sufficient to sustain the uses until the next schedule review, an order placed. The frequency of review time varies depending upon the type of organisation, importance of material and the end-use. However, for the sake of convenience the orders for a fixed period of 8 to 10 weeks requirement are released.
against one order. This system is well suited for the items where the requirement can be planned well in advance.

The following diagram explains the various stock levels.

**D.1: DIAGRAM SHOWING VARYING INVENTORY LEVELS**

From this diagram it can be observed that the maximum inventory is safety stock plus the order quantity. The minimum inventory at any time will be the safety stock, when the inventory level reached the ordering point fresh stock quantities are ordered. During the lead time the inventory level reaches the safety stock level. When the new stock arrives, the inventory again reaches to the maximum inventory level.
ECONOMIC ORDER QUANTITY

Order quantity is that quantity which is ordered at a time. To a great extent the prices depend upon the order quantity. When the order quantity is small the order frequency and the clerical work get increased.

Economic order quantity is the most economical purchase order quantity or lot size. It is that quantity at which the cost of ordering the annual requirements of an item and the inventory maintenance cost are equal i.e., when the total of the two costs is the lowest.

ORDERING COST

Ordering cost is the cost of placing order, which is increased on procurement process with items of low unit value. It is a significant factor, that small items should be ordered in significantly large quantities to avoid unreasonable expense in preparing large numbers of small orders.

Ordering cost include all the annual expenditure of the purchase section. It covers all the costs of acquisition. This should take into account the cost of calling quotation, processing tenders, preparation of orders, follow-up receiving and inspection of materials, payment of bills, entertainment and refreshment and legal expenses in case of purchase disputes.
Ordering costs are expressed as cost per order which is obtained by dividing the total ordering costs by the number of orders placed. More the number of orders to be placed, more will be the ordering expenditure. If the level of purchasing increases, the extra load will be tackled by paying over-time to existing staff or by recruiting new personnel. This additional cost is viewed as the marginal cost of orders. The ordering cost in a typical Indian firm is around Rs.100 per order. This cost varies considerably depending upon the purchase department.

INVENTORY CARRYING COST

Inventory carrying cost is the cost of possession. It is measured as a percentage of the unit cost of the item. This cost includes, interest on capital, insurance and tax charges storage costs, handling and distribution cost, obsolescence and allowance for deterioration or spoilage.

The inventory carrying cost in a typical Indian industry works out 30 percent normally. A major portion of this is accounted for by the interest on capital which in turn depends on the fiscal policies of the government. A few firms differentiate the costs as fixed and variable. In the analysis of mathematical formula, only the variable costs of ordering is considered as the fixed cost is constant irrespective of the number of orders placed or inventory carried.
If the annual requirements of an item are purchased in one lot, the ordering cost is low but the inventory carrying cost is high on account of the high average working stock. On the other hand, if they are purchased in several lots, the ordering cost is high but the inventory carrying cost is low on account of maintaining smaller stock. The economic order quantity is obtained when the total of the two costs is the lowest or equal. This is proved graphically by the following figure.

From this diagram it is observed that the lowest total cost is at the point where the line of ordering cost intersects the line of carrying cost and the EOQ is obtained at the point of the lowest total
cost. The total cost curve is obtained by adding the ordinates of inventory carrying costs and ordering cost.

Formula for calculating EOQ mathematically is

\[ Q = \frac{2\sqrt{AI}}{S} \]

Where
'\( A \)' is the annual consumption of an item in rupee.
'S' ordering cost per order.
'I' inventory carrying cost as a percentage of inventory cost.
'Q' Economic order quantity expressed in rupees,

Total ordering cost = No.of orders x ordering cost per order
No. of orders = \( \frac{\text{Annual consumption (A)}}{\text{Economic ordering quantity (Q)}} \)
Total ordering cost = \( \frac{A}{Q} \times S \)
Total Inventory carrying costs = Average inventory x inventory carrying costs.
= \( \frac{Q}{2} \times I \)

For EOQ these two costs are equal

\[ \frac{AS}{Q} = \frac{QI}{2} \]
\[ Q = \sqrt{\frac{2AS}{I}} \]

This is also called square root law. EOQ method has certain limitations as given below
1. Materials purchased must have regular turnover.

2. Annual consumption must be forecast accurately.

3. Sufficient data should be available to estimate carrying cost and buying cost accurately.

It is of little use in dealing with materials whose price or usage fluctuates radically, or with materials whose usage cannot be predicted with a reasonable degree of accuracy. Under such conditions a figure which represents the correct order quantity today may not be valid tomorrow. Therefore, if the material in question is carried in inventory for a period of time which excess the period of stability of its economic order quantity, the formula cannot achieve its objectives.

ABC ANALYSIS

ABC analysis is an American terminology for selective control or selective or split inventory management or proportional value analysis. It is a basic analytical management tool which enables top management to place the effort where the results will be greatest. This technique popularly known as Always Better Control or the Alphabetical approach. This technique tries to analyse the distribution of any characteristic by money value of importance in order to determine its priority. In materials management, this technique has been applied in areas needing selective control, such as inventory, criticality of items, obsolete stocks, purchasing
orders, receipt of materials, inspection, storekeeping and verification of bills.

ADVANTAGE OF ABC ANALYSIS

This approach helps the materials manager to exercise selective control and focus his attention only on a few items when he has to face lakhs of stores items. By concentrating on 'A' class items, the manager is able to control inventories and show 'visible' results in a short span of time. By controlling the 'A' items and doing a proper inventory analysis, obsolete stocks are automatically pinpointed. ABC analysis has helped in reducing the clerical costs and resulted in better planning and improved inventory turnover. Equal attention to 'A', 'B' and 'C' items will not be worthwhile and should be very expensive.

MECHANISM OF ABC ANALYSIS

ABC analysis is made on the basis of either the average inventory investment in each item or the annual rupee usage of each item (unit cost x No. of units is used in a year). The analysis is easy to conduct if the inventory has been properly identified and usage records have been maintained for a complete operating cycle. All items are simply ranked in order of their average inventory investment (on rupee usage). The total of these values for all inventory items is then computed. The value of each individual item is next expressed as a percentage
of the total. By going down the list and successively aggregating individual percentage, for each item, one can determine which items make up the first 75 percent of inventory investment, the first 90 percent and so on.

The normal items in most organisation show the following pattern.

1. 5 percent to 10 percent of the top number of items account for about 70 percent of the total consumption value. These items called 'A' items.

2. 15 percent to 20 percent of the number of items account for 20 percent of the total consumption value. These items are called 'B' items.

3. The remaining number of (75 to 80 percent) items account for the balance 10 percent of the total issue value. These items are called 'C' items.

A graph on cumulative value against cumulative percent of items is prepared to visually see the ABC categories.
Instead of doing ABC analysis many firms classify 'A' items as accounting for consumption value of above Rs.10,000. 'B' items between Rs.1,000 and Rs.10,000 and 'C' items less than Rs.1,000 of annual consumption. These limits vary depending upon the size of the firm.

The basic principles in ABC analysis are

i. The analysis does not depend upon the unit cost of the items but only on its annual consumption value.

ii. It does not depend on the importance of the item.
iii. The limits for ABC categorisation are not uniform but depends upon the size of the undertaking, its inventory as well as the number of items controlled.

PURPOSE OF ABC ANALYSIS

The object of carrying out ABC analysis is to develop policy guideline for selective control. Management can use the information generated from such a study intuitively or formally. Some managers intuitively concentrate departmental efforts on the A and some on the B items. Others develop formal policies and procedures for handling A, B and C items. For example, one company has established the policy that all A items shall be reviewed and purchased every month, B items every one to six months and C items every six to twelve months. Details of formal policies are determined somewhat arbitrarily by management based on knowledge and judgement concerning the unique features of each company's operating situation. However, the employment of ABC analysis greatly reduces the possibility of error by clearly pointing out the specific items on which management can profitably concentrate its efforts.

LIMITATIONS OF ABC ANALYSIS

In practice a never-ending problem is that of adequately planning for handling the thousands of low-value 'C' items. Even with
good purchase planning, because of the large number of low value items in store is requires more time than what is allotted to them. Consequently, they reduce the amount of time available to purchasing personnel for value analysis, vendor investigation and other creative work involving high-value 'A' and 'B' items. The economic order quantity, provides an insight into a partial solution to this problem for some items. ABC analysis in its present form does not permit precise consideration of all relevant factors which should enter in the management's decision making process. Some consumable items like lubricants, etc though negligible in monetary value, may be vital for running the plant and constant attention is needed. If the inventory position is analysed according to the value, commonly known as XYZ analysis, then results will be different, depending upon the nature of items. The results of ABC analysis have to be reviewed periodically and updated. It is common experience that a 'C' item, like diesel oil in a firm, will become the most high value item during power crisis. However, ABC analysis is a powerful approach in the direction of cost reduction as it hopes to control items with a selective approach.

MATERIAL REQUIREMENTS PLANNING SYSTEM (MRP)

Widespread use of computer-based planning and control systems has greatly increased management's ability to analyse and manipulate large volumes of data to produce more timely and accurate information for decision-making purposes. In certain types of manufacturing
firms, this data-handling revolution has spawned the development of an inventory planning system or MRP.

The MRP concept provides a very basic and different way of looking at the management of production inventories in an intermittent manufacturing operation. Fundamentally, MRP challenges the traditional concept that any significant level of production inventory need be carried prior to the time, materials are actually required by the production operation. Once a firm's master schedule has been established and product bills of material have been finalized it is possible to calculate the production material needs for a given period of operation. The bill of material for a given finished product can be "exploded" and extended for a number of units to be produced to obtain that product's exact requirements for each component material or part. Since a given part is used in more than one finished product, requirements for that part in all products can be summed up to obtain the total requirements for that part during the operation period. Without a computer, this "explosion and aggregation" process is virtually impossible to do quickly and accurately in a firm producing multiple products.

In practice, the MRP approach calculates production material requirements weekly several operating periods in advance of the actual need. It then, generates requisitions for each material to be delivered in the required quantity several days prior to the start of the manufacturing operation. The MRP approach attempts to minimize most inventory
requirements and gear purchasing and production activities to the timing and quantity usage demands of the final product.

The technique of MRP system is designed for use in certain specialized operating situations. The system is used most advantageously under the following conditions.

1. When the demand of the material is highly unstable during a firm's normal operating cycle.

2. When demand for the material is directly dependent on the production of the specific inventory items or finished products.

3. When the purchasing department and its suppliers as well as the firm's own manufacturing units possess the flexibility to handle order placements or delivery releases on a weekly basis. Moreover, they must be able to respond effectively to sizeable weekly changes in material demand requirements. Without serious interference from such potential problems as unbalanced internal work loads or significant variation in the supplier's lead time requirements.

The basic responsibility for inventory control lies with top management. The effects of poor inventory management are not directly visible on the operating statement as a composite cost of inventory management. In most companies, these indirect costs, dispersed and hidden throughout the operating statement, can have a significant influence
on profit. Top management should carefully formulate and periodically review the basic policies, plans and forecasts which constitute the framework within which the daily inventory control operation functions.