In the ***continuous inventory approach***, at the beginning of each year some firms divide their inventory into 52 equal groups and assign one of them to be physically counted each week. Thus, the physical inventory operation goes on without interrupting production operation or upsetting store room activities. This approach has three advantages. It can be planned and worked into scheduled activities without a shutdown. It can be conducted in an orderly and relaxed manner; these conditions are also conducive to accurate work. Secondly, there is the possibility of detecting and eliminating causes for discrepancies without allowing them to continue throughout the year. Finally, this approach facilitates efficient utilisation of stores personnel. In many store-rooms, withdrawals are heavy early in the day and are much lighter later on. Thus, when the issue clerk's busy work slacks off, he will have backlog of inventory work to do.

In some companies separate staff are appointed for the purpose of continuous stock taking. This approach involves extra cost and only very large companies can afford it.

Periodic stock verification is taken once in a year.

In the ***fixed*** or ***periodic inventory***, inventory is taken once a year, generally coinciding with the financial year. This necessitates shutting down the production operation and organising a special crew for the inventory job. This approach is ideal for seasonal businesses. It is troublesome because it is a major task which must be accomplished in a short time, interrupting production operation.

I CLASSIFICATION AND CODIFICATION

Classification and codification enables reduction in sizes, and varieties.

Good store-keeping requires proper classification and codification of various items stored in stock. Proper classification and codification offer several advantages such as:

1. Systematic grouping of similar items for correct identification of each and every item.
2. The usage of long descriptions is simplified and possible confusion avoided.
3. Avoids duplicate stocks of same item being held under different names, descriptions, brand names, part number, and different stores.
4. Enables reduction in sizes and varieties.
5. Helps in standardisation of materials and helps in finding substitutes.
6. Can be used as a basic for setting up different stores.
7. To arrange bin cards and records in stores, accounts and inventory control sections in the same uniform manner.
8. Ensures accuracy in correspondence, records and posting of receipts and issues in appropriate records.

Principles of Classification and Codification

Consistency, coverage of entire range of items, mutually exclusive code and easily understandable are the principles of classification and codification.

The following principles should be observed while establishing an effective classification and codification system:

1. There must be a consistency in the point of view so that the basis of classification should remain unchanged for all items.
2. The system of classification must cover the entire range of items for which it is devised and at the same time allow reasonable scope for extension. This principle is that of comprehensiveness.
3. The third principle is that of mutual exclusiveness which means that there must be only one code number possible for any item.
4. The system developed should be simple enough to be understood and easily adopted by non-specialist personnel. This also means that the codification basis when once understood, the code numbers should be self-explanatory to a certain possible extent.

Methods of Classification and Codification

Stores are generally classified on the basis of their nature or usage, the former being the most common method used. Based on nature, stores are classified into specific groups as shown below:

- Raw materials
- Consumable stores
- Tools
- Work-in-process
- Hardware
- Gearbox
- Components
- Spare parts
- Packing materials
- Finished goods
- Motors
- CKD - Completely knocked down items.

Stores can be grouped into 12 groups on the basis of nature or usage.

(II) MATERIALS HANDLING

Many types of materials, *viz.*, raw materials, purchased components, materials-in-process (i.e., semifinished goods), finished goods, packaging materials, maintenance and repair supplies, scrap and waste and rejects or rework are used and handled in manufacturing organizations. These materials are of various size, shape and specific features. The characteristics of the materials to be used in production are determined by *product design decisions*. The layout of facilities is directly affected by the nature of these materials. *For example*, large and bulky materials, heavy materials, fluids, solids, flexible and inflexible materials and materials requiring special handling to protect them from conditions such as heat, cold, humidity, light, dust, flame and vibration affect the layout of facilities for handling, storing and processing these materials.

Definition of Materials Handling

Materials handling is defined as the art and science of moving, packaging and storing of substances in any form. Other definitions include:

Materials handling is the art and science of moving, packing and storing of substances in any form.

(a) Creation of time and place utility.

(b) Movement and storage of material at the lowest possible cost through the use of proper methods and equipments.

(c) Lifting, shifting and placing of material which effect saving in money, time and place.

(d) Art and science of conveying, elevating, positioning, transporting, packaging and storing of materials.

Scope of Materials Handling

The scope of materials handling activity within an organization depends on the type of the product manufactured, the size of the organization, the value of the product and the value of the activity being performed and the relative importance of materials handling to the enterprise.

There are three perspectives about materials handling, *viz.*,

(a) The traditional point of view.

(b) Plant-wide concern for overall flow of materials.

(c) The systems point of view.

In the *traditional point of view* of materials handling, the emphasis is on the movement of materials from one location to another within the confines of the individual plant. The

concern is to find the best way to move the materials from one place to another within the plant.

Plant wide concern focuses the attention on the overall flow of material in the plant. The main concern is the inter-relationships between all handling problems and the possibility of establishing an overall materials handling plan.

The systems point of view of material handling requires visualization of materials handling problems, the physical distribution activities and all closely related functions as one, an all-encompassing system. This point of view involves a much broader consideration of all materials handling activities involving the movement of materials from all sources of supply (vendors), all handling activities within and around the plant and the handling activities involved in the distribution of finished goods to all customers of the firm.

The subject of materials handling as discussed in this chapter is concerned only with handling of materials within the plant.

Importance of Materials Handling

1. Efficient materials handling is important to manufacturing operations. Materials sent by vendors must be unloaded, moved through inspections and production operations to stores and finally to the shipping department. These movements do not add value to the product but they do add to the cost.
2. Materials handling analysis is a subset of plant layout. Method study, plant layout and materials handling are all part of the design of a production facility and can hardly be treated as separate. Materials handling system and plant layout enhance effectiveness of each other. A good plant layout enables an operation to use the most efficient handling method. Efficient operation of appropriate materials handling methods reduces costs and enables maximum capabilities to be derived from a given production facility.

Objectives of Materials Handling

Higher productivity or lower manufacturing cost is the prime objective of materials handling.

Even though the best solution to the materials handling problem, is *no handling*, it is hardly practicable in a manufacturing process. Hence, the *main objective* of materials handling is to reduce the number of handlings as well as the overall cost of material handling equipments and reducing the distances through which the materials are handled.

The following may be considered as other objectives of materials handling:

1. Lower unit materials handling costs.
2. Reduction in manufacturing cycle time through faster movement of materials and by reducing the distance through which the materials are moved. Reduction in manufacturing cycle time results in reduced work-in-progress inventory costs.
3. Contribution towards a better control of the flow of materials through the manufacturing facility.
4. Improved working conditions and greater safety in the movement of materials.
5. Contribute to better quality by avoiding damage to products by inefficient handling.
6. Increased storage capacity through better utilization of storage areas.
7. Higher productivity at lower manufacturing cost.

Materials Handling Principles

Certain principles have evolved to guide facility layout to ensure efficient handling of materials. Although there are no hard and fast rules, they do provide effective guidelines for the efficient movement of materials in most facility layouts.

Materials handling principles help the efficient movement of materials in most facility layouts.

Table 22.1 lists the materials handling principles which provide a frame-work for selecting specific materials handling devices/equipments which are the core of the materials handling system.

The seven principles can be summarized in the form of the following guidelines :

1. ***Eliminate Handling :*** If not, make the handling distance as short as possible.
2. ***Keep Moving :*** If not, reduce the time spent at the terminal points of a route as short as possible.
3. ***Use Simple Patterns of Material Flow*** (the simplest path is a straight line path of flow which minimizes the handling distance between two points). If not, reduce backtracking, crossovers and other congestion producing patterns as much as possible.
4. ***Carry Pay Loads Both Ways :*** If not, minimize the time spent in 'transport empty' by speed changes and route relocations.
5. ***Carry Full Loads :*** If not, consider increasing the size of unit loads, decreasing carrying capacity, lowering speed, or acquiring more versatile equipment.
6. ***Use Gravity :*** If not, try to find another source of power that is reliable and inexpensive.

In addition to the above guidelines, there are certain other very important aspects of materials handling such as the following :

(a) Materials handling consideration should include the movement of men, machine, tools and information.

(b) The flow system must support the objectives of receiving, sorting, inspecting, inventorying, accounting, packaging and assembling.

Since the considerations and objectives do conflict, it is essential to take a system decision followed by delicate diplomacy to establish a material movement plan that meets service requirement without sub-ordinating safety and economy.

Table 22.1 : Materials Handling Principles

Sl. No.	Principles
1.	Materials should move through the facility in direct flow patterns, minimizing zig-zagging or backtracking.
2.	Related production processes should be arranged to provide for direct material flows.
3.	Mechanized materials handling devices should be designed and located so that human effort is minimized.
4.	Heavy and bulk materials should be moved to the shortest distance during processing.
5.	The number of times each material is handled should be minimised.
6.	Systems flexibility should allow for unexpected breakdowns of materials handling equipments, changes in production system technology, etc.
7.	Mobile equipments should carry full loads all the times.

Every effort should be made to reduce materials handling costs, particularly because they do not add any value to a product. The product will not be worth any more to the consumer simply because it was moved, but it will cost the customer more.

How to reduce handling costs? There are three fundamental ways of minimising the costs.

(a) Eliminating the handling itself whenever and wherever possible.

(b) Mechanising, largely by conveyors and power driven trucks, whatever handling still remains.

(c) Making the necessary handling more efficient.

Primary requisite for any action to be taken towards minimising handling costs is to have a record maintained for them. It is here that majority of the companies are not doing the right thing.

I ORGANISATION FOR MATERIALS HANDLING

Organisation of materials handling vary with the industry, manufacturing process, product manufactured, its bulk and its value.

Materials handling is a job that directly affects each area in a plant, and as such requires a carefully planned organisational structure. The structure varies with the industry, the type of manufacturing process, the product manufactured, its bulk, and its value. Emphasis depends on the amount of handling required in the manufacturing process. In small firms, *for example*, the materials handling function may be one of several duties assigned to the plant engineer, the purchasing manager, or the production manager. As firms grow in size, however, an increase in specialisation is usually manifest in this area until a stage is reached where a separate department is developed to study procedures and devise better materials handling techniques. When thus organised, materials handling is a function and is often a part of the industrial engineering section. In some organisations, however, materials handling is subordinated to materials management, production, purchasing, storing or maintenance. Irrespective of which department it is subordinated to, materials handling should be centralised under one head so that an overall co-ordinated approach is possible.

Unit Load Concept

Unit load refers to the number of items so arranged that the mass can be picked up and moved as a single object.

One of the basic requirements of efficient materials handling is observance of the Unit Load Principle, which implies that the larger the load handled, the lower the cost per unit handled.

A *unit* load is understood as a number of items, or bulk material, so arranged that the mass can be picked up and moved as a single object, too large for manual handling. It is implied that any single object too large for manual handling is a unit load.

Simply stated, the unit load principle means that it is quicker to move a lot of items as a unit than it is to move each one of them individually. With machines at our disposal, these units can be made for machine size rather than man size.

Unit load concept helps reduce or lower the cost per unit handled.

In grouping materials into units many companies use skids, or pallets so that mechanical trucks can be employed to lift and move the unit. Not only do skids and pallets save time in handling materials, but goods so handled are more compact and require less floor space because they can be stacked.

The use of the principle of unit load has been so effective that many firms today are insisting that materials which they buy be supplied on a unit load basis (palletised, *for example*) rather than in individual units or packages.

Despite the obvious advantages, unit load has specific disadvantages which should not be ignored.

Staff Strength of the Purchasing Department

Generally speaking, the volume of work , the number and types of items to be purchased, frequency of purchase, etc., determine the staff strength of the purchasing department. In government owned enterprises, social responsibility of providing jobs influence the staff strength. More often, an individual is appointed in a government organisation not because his/her services are needed by the organisation, but because he/she needs the job.

Titles used for Purchasing Managers

Like the titles used to designation the heads of materials management, different titles are used to designate the head of the purchasing department. The most common titles used are: Purchase Manager, Deputy Manager, Purchase Chief, Purchase Officer, Commercial Manager, Divisional Manager – Planning and Production, and Asst. General Manager – Purchase.

FUNCTIONS OF PURCHASING DEPARTMENT

The definition given for purchasing at the beginning of this chapter should give us an idea about the functions of purchasing department. For greater clarity we list the functions below. It may be emphasised that some of the functions are the sole responsibility of the purchasing department, some are shared with other departments, and the remaining are the responsibilities in which the purchasing department has considerable interest.

1. Responsibilities often fully delegated to the purchasing function:
   - *(a)* Obtaining prices.
   - *(b)* Selecting vendors.
   - *(c)* Awarding purchase orders.
   - *(d)* Following up on delivery promises.
   - *(e)* Adjusting and settling complaints.
   - *(f)* Selecting and training of purchasing personnel.
   - *(g)* Vendor relations.
2. Responsibilities often shared with functions other than purchasing function:
   - *(a)* Obtaining technical information and advice.
   - *(b)* Receiving sales presentations and arranging for sales opportunities with interested personnel.
   - *(c)* Establishing specifications.
   - *(d)* Scheduling orders and deliveries.
   - *(e)* Inspecting.
   - *(f)* Specifying delivery method and routing.
   - *(g)* Expediting.
   - *(h)* Accounting.
   - *(i)* Purchasing and market research.
   - *(j)* Inventory and warehousing policy and/or control.
   - *(k)* Forward buying and hedging policies and procedures.
   - *(l)* Construction contracting.
   - *(m)* Service contracts and agreements.
   - *(n)* Sale of scrap, salvage and surplus.
   - *(o)* Purchasing for employees.

(p) Contracting for machines and equipment.
(q) Development of specifications.
(r) General considerations of quantities or timing on planning deliveries.
(s) Transportation and traffic.
(t) Determination of whether to make or buy.
(u) Customs.
(v) Other functions.

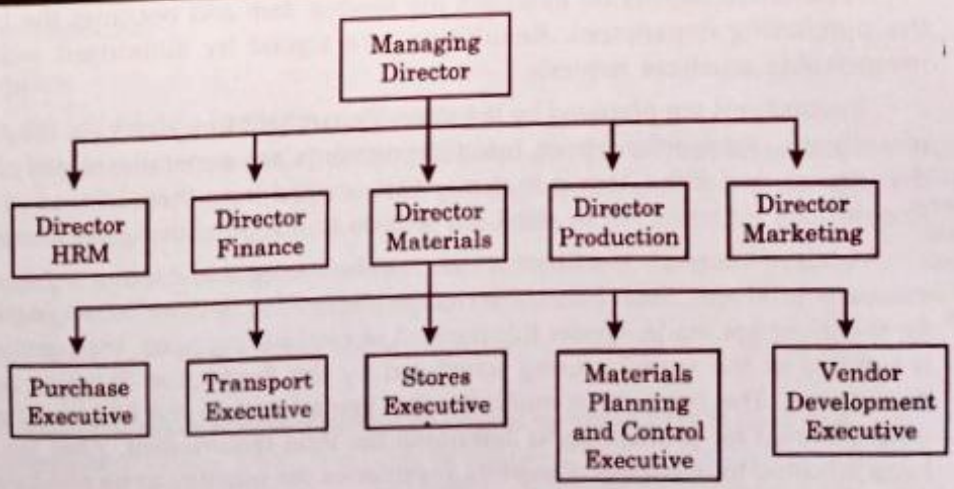
3. Responsibilities often divorced from purchasing but of particular interest to purchasing:
   (a) Receiving and warehousing.
   (b) Payment of invoices.
   (c) Other functions.[12]

The above listing is exemplary, but not exhaustive. Company policy varies in the division of these responsibilities. Purchasing responsibilities in any company should be well defined to encourage effectiveness in operations.

PURCHASE ORGANISATION

In a large industrial establishment, a separate department, namely the purchase department, is generally maintained. In small concerns, the owner/manager himself makes all the purchases, and dispenses with the need for a purchasing department. Composition of purchase department may vary from company to company. It may be noted that, in most industrial establishment, all the departments dealing with materials are placed under the control of one executive. This practice is referred to as materials management—a concept, which was discussed in the preceeding chapter. As we have read in the previous chapter, material constitutes a major component in manufacturing cost of a product. Due to this majority of large and public sector companies have created a separate independent post for material function known as "Director for Materials". Exhibit 21.2 shows the structure at materials organisation.

Exhibit 21.2 : Structure of Materials Organisation



with the help of GM materials of different units located at Bangalore (2 units), Vizag, Haridwar and Bhopal.

Purchase executives discharges his/her duties with the assistance of Asst. purchasing, purchase service assistant and records and correspondence assistance.

There are three main sections, namely purchasing, purchasing service and records.

Purchase section places order with the selected vendors for raw materials and different components. Purchase service section follows the orders placed, its shipment by the vendor and its final receipt in the company. Finally, record section maintains all records of quotations, costs, purchases etc.

PURCHASING CYCLE

Purchasing cycle comprising of eight steps.

The purchasing functions listed above will be performed in tandem to complete a transaction from its completion. Certain steps can be noticed in the process of initiating and completing the transaction. The steps are:

1. Recognition of need.
2. Description of need.
3. A suitable source is selected for the purchase. Often a source has to be developed.
4. Price and availability are determined.
5. Purchase order is prepared and sent out to the supplier.
6. Acceptance of the purchase order is obtained from the supplier.
7. Follow up is done by the purchasing department to ensure timely delivery of the material.
8. Checking the invoice and approving it for making payment to the supplier.

1. Recognition of Need

Recognition of need : Identifying an item that is officially brought to the attention of purchasing department.

The recognition of need refers to the means by which a needed item is officially brought to the attention of the purchasing department. Two procedures are followed. One involves the issuance of requisitions or demand notes by the user department or the stores department, the other involves the issuance of a bill of materials.

A *purchase requisition* describes the needed item and becomes the basis for action by the purchasing department. Requisitions are signed by authorised individuals to avoid irresponsible purchase requests.

Requisitions are prepared by the stores department in which case they are called *routine* requisitions. Requisitions from using departments are generally routed through the stores department, and if the item is in stock, it is supplied from there instead of being purchased. Requisitions for items not in stock are sent on to the purchasing department for action.

A *bill of materials* is a list of all items to be incorporated into a finished product that the company produces. Such bills are generally prepared at the time when engineering blueprints for the items are made. Under this method of establishing need, the purchasing departments is notified of the manufacturing scheduled by the Production Planning and Control (PPC) department. The buyer then multiplies the items listed in the bill of materials by the total units planned for production to determine the total requirement. After the total needs have been adjusted to make use of existing inventories the quantity to be purchased is known. The bills of materials procedure is primarily applicable to the purchase of standard parts and small expendable tools. Supplies and similar needs are usually handled by the requisition procedure.

2. Description of Requirement

The purchase requisition described the required item. In order to assure complete and accurate information for ordering, the requisition must include all necessary information in a form that can be readily checked and verified.

Purchase requisition should give accurate information for ordering recognised product.

The buyer must check a requisition on the basis of his/her own knowledge of the item, records of past purchases and vendor catalogues. He/she should not change an inadequate requisition, interpret sketchy descriptions, or in any way make judgements about a questionable requisition. He/she should refer it back to the originating department seeking clarifications. Even what appear to be obvious errors should be checked with the using department because production can be delayed if the user wanted an item for some purpose different from that assumed by the buyer and such avoidable delays can be very costly.

3. Selection of Source

After a need has been recognised and described, the purchasing department proceeds to select the source of supply. In most cases the purchasing department would know from where the material could be bought. A regular list of approved suppliers, called Register of Suppliers, is maintained by the purchasing department. Often it becomes necessary to advertise in the press inviting tenders from suppliers.

Registered suppliers who are approved by the company.

Whatever the method, it is essential that a right source must be selected. A right supplier is one who delivers materials of the correct specifications on the stipulated delivery dates. He/she is ethical in his/her behaviour, stands by the promises and has a high regard for cordial buyer-seller relationship. He is progressive in his business and seeks technological advancement in improving the quality of his products. His price is reasonable. In short, he can be wholly relied upon. Further, he is at all times honest and fair in his dealings with the customers, his own employees, and himself, who has adequate plant facilities and know-how, so as to be able to provide material which meets the purchaser's specifications in the quantities required and who realises that, in the last analysis his own interests are best served when he serves his customers.

Single vs Multiple Sources

Before selecting a right source, a relevant issue that needs solution is whether to have a single source or multiple sources. The issue is often decided after a careful consideration of arguments for both the possibilities.

Arguments for Single Source

A *single source* has the following arguments in its favour :

Buying from single supplier helps develop long-term relationship and reduces the risk and interruption in the supply.

(i) The supplier may be the exclusive owner of certain essential patents or processes, and therefore, be the only possible source. Under such circumstances, the purchaser has no choice, provided that no satisfactory substitute item is available.

(ii) A given supplier may be so outstanding in the quality of his product or in the source provided as to preclude serious consideration of buying elsewhere.

(iii) The order may be so small as to make it just not worthwhile, if only because of added clerical expenses, to divide it.

(iv) Concentrating purchases may make possible certain discounts or lower freight rates that could not be had otherwise.

The supplier is more co-operative, mere interested and more willing to please if he knows all the buyer's business. This argument, of course, loses much of its weight even if the total order amounts to, but little or although fairly large, represents but a very small proportion of the seller's total sales.

(vi) A special case arises when the purchase of an item involves a die, tool, or mold charge. The expenses of duplicating this equipment is likely to be substantial. Under such circumstances, probably most buyers confine their business to the possessor of the die, tool or mold.

(vii) When all orders are placed with one supplier, deliveries may be more easily scheduled.

(viii) The cost of the purchasing department are lowered because of dealing with small number of suppliers.

(ix) Long-term relationship with suppliers encourages loyalty and reduces the risk and interruption in the supply.

Several well known companies are said to have single source policy. *For example*, Ford Motors, Austin, Rover and Volvo follow single source policy. Nearer at home, in a CMM seminar held in Bangalore, Mr. M. L. Kapoor, the then president of the international body of Materials Management, International Federation of Purchasing and Materials Management, had cited an interesting example of how his company, Dunlop, had successfully brought down costs by encouraging a single source of supply which had benefited both the sides.

It does not mean that policy of multiple sources is not followed. Several companies follow multiple sourcing because of certain benefits.

Arguments for Multi-sources

Buying from multiple suppliers may not help in maintaining quality and helps get material at competitive prices.

(i) It is the most common practice among the majority of buyers to use more than one source, especially on the important items.

(ii) Knowing that competitors are getting some of the business tends to keep the supplier more alert to the need of giving good prices and services.

(iii) Assurance of supply is increased, since should fire, breakdowns or similar accidents occur to any one supplier, deliveries can still be obtained from the others.

(iv) Should floods, railway strikes, or other wide spread occurrences develop which may affect all suppliers to some extent, the chances of securing at least a part of the goods are increased.

(v) Some companies diversify their purchases because they do not want to become the sole support of one company, with the responsibility that such a position entails.

(vi) Assigning orders to several suppliers gives a company a greater degree of flexibility, because it can call on the unused capacity of all the suppliers instead of only one.

Factors in Source Selection

The selection of particular source(s) must be based on such factors as reliability, technical abilities, after sale service availability, buying convenience, past experience, location, financial position, labour relations, reciprocal relations and the like.

These and other related factors must be carefully considered and time and money should be spent on selecting a right supplier. Once a good choice has been made, succeeding orders can be placed economically and with confidence. Satisfactory experience with a chosen supplier is the best possible basis for repeat orders.

4. Determination of Price and Availability

The next step in the purchasing cycle is to secure the price for the items to be purchased. This may be accomplished in three ways. For standard items, *vendor's catalogues* and price lists are available and for such items the buyer need only check current listings to obtain the price. *Negotiation* is the second method of establishing price. Negotiation implies bargaining

between buyer and seller. *Inviting tenders* or quotations is the third method. Inviting tenders is a must in government undertakings.

5. Placing the Order

The legal order is placed with the supplier on a form known as a purchase order: Most companies insist that every purchase be placed in this manner. When an order is placed by telephone or telegraph, it is the practice to confirm the order by sending the supplier a regular purchase order. Such an order should be clearly marked "confirming" to avoid the possibility of the supplier taking it as a second order.

6. Order Acknowledgement

Some companies insist on order acknowledgement from the supplier, acknowledging the receipt of purchase orders and agreeing to supply the items stated in the order.

Acknowledgement is to get a definite commitment from the supplier about the supply of items on time.

7. Follow Up and Expediting

Follow up is done to ensure that the items ordered are delivered by the supplier on time. Theoretically, no special expediting procedure should be needed. If good production planning is made by the buyer, if engineering changes are rare and kept to a minimum, if an adequate system of inventory control is operative, if the purchase order was properly prepared, if a reliable supplier has been selected, and if reasonable tolerance and mutual helpness exists on the part of both, then no particular follow up device would have to be resorted to. These conditions have too many "ifs" and to assume that all these "ifs" will become "yes" is to take things for granted.

It is necessary, therefore, that follow-up should be done. Though a general policy should be established for the entire purchasing department, the immediate responsibility for expediting is likely to rest on the buyer who placed the order. Thus, the purchase manual of one of the Bangalore based organisation says:

Extension of Delivery Period

If the supplies are not effected within two weeks after the delivery date or if the suppliers ask for extension of time, the attention of the authority who signed the order shall be drawn. If financial implications are involved, approval of the next higher authority shall be taken. While granting extension of delivery time, financial implications shall be examined and financial concurrence obtained where it involves financial implications.

Cancellation of Orders and Penalty

For cancellation of the order the approval of the next higher authority shall be obtained. Before imposing any penalty less than what has been laid down in the terms and conditions of the supply the approval of the General Manager shall be obtained.

The actual methods differ, of course, varying from writing series of letters, telephone calls, personal visits, to the use of resident urgers or expediters whose work it is to see that shipments are made at the time specified in the order.

8. Checking The Invoice and Approval

The last step in the purchasing cycle is to check the invoice and approve it for payment. Since the bill constitutes a definite claim against the buyer, it needs to be handled with great care.

The bill sent by the supplier is compared with the Order and the Good Received Note that is made out when the material is received. If the bill is correct in all respects, it is approved and given to accounting department for payment.

Blanket Order: Buyer issues an order covering the requirement of a small item for one year.

Blanket Orders : Blanket order is a method wherein the buyer issues an order covering the requirement of a small item for one year. The order is relevant for one year. Whenever the stock of the item reaches low, the buyer simply telephones the supplier and requests him to supply the item against the outstanding blanket order. Blanket orders are useful in more than one way (1) paper work is reduced (2) time of buyers is saved, (3) facilitate price negotiation because one order covering a year's requirement is placed once, and (4) facilitate inventory contract of small items.

In stockless buying stock of items is kept in buyer's plant, ownership of the stock being with the supplier.

Stockless Buying : Also called `systems contracting', stockless buying, is a special type of blanket order. It operates on the following lines:

(a) The buyer places a blanket order for a family of items, such as fasteners, at firm prices.

(b) On a telephone call from the buyer, supplier will deliver the items to the inventory area set aside in the buyer's plant. The items are still owned by the vendor.

(c) Vendor submits a single invoice monthly for all items supplied.

(d) Buyer makes a single payment for all items used.

(e) Computer prepares a summary report, at regular predetermined intervals, showing the items and quantity used, for both the buyer's and vendor's analysis, planning and re-stocking.

Stockless buying differs from *blanket ordering* in one respect in the former the stock of items is kept in buyer's plant, ownerhship of the stock being with the supplier. This is not the case in blanket order buying.

Stockless buying offers the advantages of centralised purchasing (with professional negotiation of a basic agreement covering the organisation's total needs) without incurring the disadvantage of excessive paper work on relatively minor transactions. The technique should be limited to relatively minor purchases that are made as and when the need arises. It should not be used for major purchases.

The purchasing function is influenced by certain policies. The policies refer to *(a)* ancillarisation, *(b)* make or buy decision, *(c)* speculative buying, *(d)* vendor rating, *(e)* ethics in purchasing, *(f)* reciprocity, *(g)* purchasing for employees, *(h)* gifts, *(i)* and value analysis.

I PURCHASING POLICIES

Ancillary Development

contracting is tuation where n buyer a part le

When a company decides to buy a part from outside suppliers, it is usually sub-contracted. In most cases, the sub-contractor is an ancillary unit. Sub-contracting is the work of obtaining the prime manufacturer's requirements, mostly of fabricated parts and components, from outside sources in order to manufacture a certain product in the prime manufacturer's plant. Sub-contracting is being practised to a much greater degree now than in the past. One of the reasons is the policy of the Central Government to encourage ancillary industries in our country.

All public sector undertakings of the Government of India have been given a directive whereby they are required *"to identify and earmark particular lines of production and items of manufacture"* which could be off- loaded to ancillary industries. In fact, the directive goes to say that entrepreneurs should be given all facilities for setting up such ancillary units and

other facilities including land, electric power, water and other services, and the necessary know-how and managerial guidance. The following extracts from the policy circular will give an idea of what is involved in such ancillary development. The public sector enterprises must take the responsibility for providing technical know-how and managerial guidance on –

(i) Production process/method, equipment selection and layout.

(ii) Production aids like design, detailed manufacturing drawing, tooling, jigs and quality control procedures and equipment.

(iii) Manpower planning.

(iv) Organisation and procedure for production planning, progressing and control.

(v) Management aids like cost-accounting, industrial engineering, product diversification and marketing.

(vi) Sources of financing and procedure for obtaining them.

In addition, the public sector enterprises should assume responsibility for providing:

(i) Imported raw material and components, scarce/critical indigenous raw material and drawings.

(ii) Tooling, jigs and fixtures to the extent that these are outside the capability of ancillary unit.

(iii) Process quality control equipment and training facilities for the development of supervisory and artisan skills.

Ancillarisation results in spread of entrepreneurial base.

Ancillarisation has advantages. It results in spread of entrepreneurial base. It promotes industrial development. And for the prime or parent company regular supply of right quality items is assured.

There are problems associated with ancillarisation. Ancillary units are best fit when the parent company continues with existing products. If the primary company embarks on major modification of the existing product(s), ancillary units probably will not be able to meet the requirements of new products. Again the benefit, the parent company otherwise would gain by buying from an outside supplier, in the form of sharing his superior quality and vast experience is lost (to the parent company). Providing technical and managerial guidance and offering other facilities for the development of ancillaries add to the operational problems of the parent company.

The obligation to develop ancillaries is often stretched to absurdity. An union leader of one of the Central Government undertakings told us that in his company, work is unnecessarily off-loaded to ancillary units rendering workers in the parent company idle. The workers and the unions are helpless because, when questioned the management has typical answer saying, that is the directive from Bureau of Public Enterprises that work should be given to ancillaries. It is no secret that some of the ancillary units are owned by those who are close to the people in the higher echelons of the company management.

Undue favours are shown to the owners of ancillaries in the form of relaxing specification time of inspection and making payments for orders executed.

MAKE-OR-BUY

Another purchasing policy relates to the decision involving whether to buy a part or component from outside or manufacture in own plant. In some cases a company may be able to make a required component more economically than it can buy it. On the other hand, historical production policy decisions may at times require a company to maker certain parts that it could buy more effectively from outside suppliers. Deciding whether a part should be purchased (outsourced) or manufactured is known in industry as the *make-or-buy* problem.

Mak-or-Buy decision is deciding whether a part should be purchased or manufactured.

There seem to be mainly two alternatives to the problem of make or buy. Actually the case is not as simple as this. There are in between stages wherein a company may buy, but takes over some function that is normally performed by the vendor or a company may make, but allow outside suppliers to perform some of the functions involved. Examples vary all the way from control of quality by a purchaser who puts inspectors in a supplier's plant to the control of a supplying company through financial investment through management affiliations.

Assuming that only two extremes are available – make-or-buy, there are three types of make or buy, there are three types of make or buy problems:

(a) making or buying something which it never before procured,

(b) making something which it is now buying; or

(c) buying something which it is now making.

Whatever the type, the problem of make-or-buy arises in one of several ways. The development of a new product or substantial modification of an old one are typical situations requiring make-or-buy investigations. Secondly, unsatisfactory supplier performance for parts originally purchased is a second situation that gives rise to make or buy investigations. Unsatisfactory vendor performance may show itself in poor service or unreasonable price hike. Thirdly, periods of significant sales growth or sales decline also generate situations that initiate make-or-buy analysis. Reduced sales may result in reduced production activity rendering production capacity and workers idle. When this happens management may think of bringing to own shop, work which was previously performed by outside suppliers. During periods of rising sales, management seeks external assistance in satisfying the production demands made on its limited facilities.

Types of Make-or-Buy Investigations

Make-or-buy problems when viewed from a broad sense can be grouped into two general categories. The *first* category includes parts for which the using firm currently possesses the necessary major production potential. With only a small capital outlay for tooling and minor equipment, the firm can make each of these parts. The *second* category includes parts which the using firm cannot produce in its existing operations, without making a sizeable additional investment in tooling and facilities.

Investigation of problems in the second category extends far beyond the traditional make-or-buy analysis. Any 'make' alternative requiring a significant capital investment becomes a major problem needing a long time plan and which should involve top management.

The make or buy problem requiring only a nominal expenditure of funds in the event of 'make' decision is the type most commonly encountered by materials and production managers. A decision of this type is important insofar as effective allocation of the firm's resources is concerned. However, its effect on the firm's future is less far reaching, than in the case of a decision requiring a major capital investment. Although, the decision requiring a nominal expenditure of funds does not require direct top management participation, it does require co-ordinated study by several operating departments. Top management's responsibility is to develop an operating procedure which provides for the pooling of information from all departments affected by the decision. In other words, the management should ensure that the decision is made after a careful consideration of all relevant factors.

ROLE OF PURCHASING MANAGER

Who makes the decision to make or buy depends to a large degree on the amount involved. It may be made by one person but most often it is made by several individuals. Whatever the amount involved, it should be emphasised that no simple rule can be applied

to all cases of make or buy. Each case must be decided on its own merits with sufficient attention to all relevant considerations.

Although the final decision on a given make-or-buy question is usually with the top management of a company, many of the issues turn on purchasing possibilities and thus fall within the scope of the purchasing manager's job.

Make-or-buy decision is normally taken by a committee comprising representatives from different departments.

The decision to make or buy is normally taken by a committee comprising representatives from production, accounting, engineering, marketing and, of course, purchasing. Purchasing will advise on cost comparisons, production will specify needs and capacities, accounting will tabulate manufacturing cost data, engineering will check quality and suitability and sales may advise on trends and the likelihood that sales volume will be affected by the decision.

SPECULATIVE BUYING

Speculative buying is done with the hope of making profit out of price changes.

Speculative buying is conducted with the hope of making profit out of price changes. Two types of speculative buying may be distinguished. *One* is the usual type where the purchasing department buys certain items at low prices and sells the same when their prices shoot up, thus making profit in the bargain. A *second* type of speculative buying is conducted by some purchasing departments. This type of buying involves the purchases of material in excess of foreseeable requirements in anticipation that a need will arise for the material and that the firm will profit by making the purchase at the current price. Opportunities for purchases of this kind arise when a market drops temporarily and the buying firm has sufficient working capital to finance the speculative investment.

Distinction lies between forward buying and speculative buying. Forward buying is the practice of buying materials in a quantity exceeding current requirement, buy not beyond foreseeable requirements. The distinction between speculative buying and forwarding buying is that in the latter case, a definite production need for the material exists, while in the former case it does not.

Forward buying is the practice of buying materials in a quantity exceeding current requirement but not beyond foreseeable requirement.

Speculative buying, particularly of the type where profit is sought to be made by buying at low prices and selling at higher prices, has no place in industrial purchasing. If a firm wishes to engage in this type of speculation, it should be organised and administered from the normal purchasing activity.

VENDOR RATING

Vendor Rating: It is the process of rating a supplier based on some rating technique.

The ability to select reliable vendors is a mark of successful purchasing action. The familiar saying 'tell me who your friends are, and I will tell what you are' can be applied to purchasing. Rather it should be: 'tell me who your vendors are, and I will tell you what kind of purchasing department you have'. It is not always easy to identify good vendors; in many cases, purchasing department is unjustly criticised because of poor vendor performance. In this context there is no substitute for an objective means of vendor appraisal.

An objective and accurate vendor rating can become an asset and valuable tool in the hands of a buyer in making his purchase decisions as also providing feedback to suppliers with low rating to encourage improvement in their performance. In the absence of such an improvement over a reasonable time, black listing or grey listing the vendor may follow.

A drawback to vendor rating is that despite considerable effort to set up good system, the end results have too often been a group of antagonised suppliers and an impractical, meaningless mass of data which take too much effort to comply and is worthless to the purchasing department. Some companies make the error of adopting without changes, a rating plan which was developed for another company when, obviously, each system must

be lifted to the specific requirements of one particular organisation. Too often, also in attempting to ensure precision, the goal of improving quality and reliability of purchased item is lost. No system can be of any value unless it results in better vendor performance, nor can it work well unless the people involved understand it and are convinced that is worthwhile.

I RATING TECHNIQUES

There are several rating techniques now being used. Whatever the technique, the vendors are assessed on the basis of a wide variety of factors or criteria which might include but are not limited to the following:

- Price,
- Discounts received,
- Maintenance of specifications,
- Compliance with other specifications,
- Promptness of delivery,
- Freight and delivery charges,
- Installation costs,
- Service,
- Market information,
- Co-operation,
- Management competence,
- Credit terms,
- Disposition of rejects,
- Employee training,
- Adjustment policies,
- Cost reduction suggestions,
- Inventory plans,
- Financial position.

A few important techniques of vendor rating are described here.

Categorical Plan

Under this plan, personnel from various divisions maintain informal evaluation records. Individuals involved traditionally include personnel from purchasing, engineering, quality control, inspection and receiving. For each major supplier, each person prepares a list of performance factors which are important to him. At a monthly meeting, each major supplier is evaluated against each evaluator's list of factors. Each supplier is then assigned an overall group evaluation, usually expressed in simple categorical terms such as 'preferred', 'neutral', or 'unsatisfactory'.

The categorical plan is simple, easy to operate, and hence is most commonly used technique.

The Weighted Point Plan

Weighted point plan: The performance factors to be evaluated by giving weights.

Under this plan, the performance factors to be evaluated (quality delivery, price and services) are given "weights", for instance, quality might be weighted 25, delivery 20, price 30 and service 25. The weights selected in any specific situation represent buyer's judgement about the relative importance of the respective factors.

After the performance factors have been selected a specific procedure must be developed for measuring actual vendor performance on each individual factor. Supplier performance on each factor must be expressed in quantitative terms. To determine a supplier's overall rating, each factor weight is multiplied by the supplier's corresponding performance number; these products (for each factor) are then totalled to get the supplier's final rating for the period in question.

The responsibility of vendors rating shall rest with a committee comprising Chief/ Sr. Commercial Manager, Quality Control Manager, Accounts Manager, and Chief Production Engineer. This Committee shall meet every quarter to review each vendor's performance. Assistance of computers shall be obtained for the vendor rating as far as possible. Vendor's should be classified as class 'A', 'B' and 'C' based on their performance results. Future enquiries shall not be sent to class 'C' vendors. A price preference of 5% to class 'A' and 2% to class 'B' vendors shall be accorded over the prices quoted by class 'C' vendors."

Critical Incidents Method

Critical Incidents Method: It is based on buyer-vendor relationship.

Evaluating vendors by this method requires that a record of events and occurrences related to the buyer-vendor relationship is maintained in each vendor's file. The data and comments recorded should be significant, not trivial. They ought to reflect positive and negative aspects of actual performance. This kind of documentation can be used as a basis for discussing ways and means of overcoming difficulties, improving performance, acknowledging the existence of good business relationships, determining the competence of a vendor, and if necessary, considering termination. Because the critical incidents method is relatively easy to implement, it is particularly useful for small organisations.

Checklist System

Some companies use a simple check list to evaluate their vendors. Designed to facilitate vendor rating from the stand point of financial strength, size, product service, price, quality and the like, the check system is quite useful to evaluate suppliers. A typical check list is given below.

Buyer's Checklist for Evaluating Vendors

A. *Reliability*

1. Is supplier a reputable, stable, financially strong company?
2. Are the supplier's ability and integrity proved by past performance?
3. Is supplier giving me savings along with product improvements?

B. *Technical Capabilities*

1. Will supplier provide engineering assistance?
2. Will supplier's analytical engineering help improve the efficiency of my basic processes?
3. Will supplier provide design assistance?
4. Can supplier handle special needs and designs?
5. Does supplier contribute to general advancement through basic research?

C. *After-sale Service*

1. Does supplier have a service shop organisation available when and where I may need it?
2. Is emergency service available?
3. Will renewal parts be available when I need them?

D. *Availability*

1. Will supplier assure on-time delivery?
2. Are stocks available locally on short notices?
3. Is supplier's location an advantage to me?
4. Does supplier plan shipment to minimise my inventory?
5. Can supplier be depended upon to provide a steady flow of products or materials?

E. *Buying Convenience*

1. Does supplier offer a full line of related products?
2. Does supplier package his product conveniently for my use?
3. Does supplier have a local sales contact? Is he qualified to help me? Can he call upon specialists for my difficult problems?
4. Will supplier help me cut acquisition such as qualifying visits, telephone calls, lab tests, incoming inspections, spoilage and waste, rejects and complaints?

F. *Sales Assistance*

1. Does the supplier help develop mutual markets? Will he recommend our products?
2. Will the appearance of supplier's product enhance the appearance of my product?

All the above techniques, categorical plan, weighted plan, critical incidents, and the checklist system involve varying degrees of subjectivity and guesswork. The mathematical treatment of data in one plan often tends to obscure the fact that the results are no more accurate than the assumption on which the quantitative data are based. In the final analysis, therefore, supplier evaluation must represent a combined appraisal of facts, quantitative computations, and value judgements. It simply cannot be achieved effectively by formulas alone.

Besides, the vendor appraisal is concerned with the adequacy of the suppliers with whom the company is currently dealing. Decision taken many years ago may well have been correct at that time. However, since then things may have changed. *For example,* additional qualified suppliers may be available, new processes may have been developed, new markets have opened up and currency relationships may have changed. A most important part is that, in the key decision areas, both long and short-term effects are considered and subsequently renewed. With a new technology, and a "shrinking world" such reviews may well need to be carried out more frequently in future.

VALUE ANALYSIS

Value analysis is also known as value engineering.

Also called as value engineering, *value analysis* is an important activity that typically occurs jointly between purchasing and methods engineering. However, purchasing people have a very definite role to play, in value analysis, hence the topic is included as a part of purchasing function. This activity is aimed at modifying the specifications of materials, parts, and products to reduce their costs while reducing their original function. Focus is placed on the value of the product – what function is to be performed by the product – and how that value can be achieved at the lowest cost. Although value analysis is applied to all phases of the production process, primary attention is devoted to the materials and components going into the product.

Value engineering typically follows a rather close structured pattern of analysis. A value analysis team or committee takes a product, which has been designed or produced and attempts to define what function the product should fulfil. Once the function has been identified, the analysis committee examines the possible ways of performing the function at the lowest cost. The following questions are considered while examining the product :

(i) Is there a less expensive product which will perform the required function?
(ii) What does each component contribute?
(iii) Can a less expensive material be used?
(iv) Can parts be combined?
(v) Can it be designed for easier assembly?
(vi) Can it be fabricated by other parts?

Asking questions, on the lines as above, is probably the simplest and most effective approach for value analysis. Another approach is to make a comparative analysis. Value analysis may investigate all identical parts purchased by the company and this investigation can reveal opportunities to cut costs of some of these parts. One way is to plot the weight of similar parts purchased against their costs for a given amount of money. If most parts seem to fall on a smooth line, but a few parts fall away from the line, these few might present opportunities for special investigation.

Supplier contacts are yet another approach to value analysis. Smart purchasing personnel maintain close contact with suppliers who suggest improvement and cost-reduction ideas.

Value analysis has wide acceptance as it offers increased value of a product without increasing its cost or reducing the cost without reducing the usefulness of the product. It has been used by many companies and governmental agencies and lower costs.

Though value analysis is applicable to all aspects of manufacturing process, organisations have been focusing on finding alternative materials in the place of the present materials. This is because technological choses have been producing raw materials in different industris. Awareness applicability requires searching in places not normally accessed by designers and purchasing managers.

Value analysis is applicable to all aspects of manufacturing processes.

SOLVED PROBLEMS

1. *Calculate the vendor rating for the following. The item under consideration is the same from all suppliers.*

Supplier's Data	A	B	C
Quantity supplied	90	80	75
Quantity accepted	78	80	70
Price of each item (Rs.)	4	4.2	3.9
Delivery promised (in weeks)	6	6	6
Actual deliveries made in (weeks)	8	6.2	7

Weightage for quality = 70%, price = 2-%, delivery = 10%.

Solution : Total Vendor Rating = Quality Rating + Price Rate + Delivery Rate

	A	B	C
(a) Percentage accepted	$\frac{78}{90} \times 100$ = 86.66%	$\frac{80}{80} \times 100$ = 100%	$\frac{70}{75} \times 100$ = 93.3%
Quality rating (weightage of 70%)	86.66 × 0.7 = 60.66%	100 × 0.7 = 70%	93.3 × 0.7 = 65.33%