
UNIT 14 ISSUES IN MATERIALS MANAGEMENT

Objectives

After studying this unit, you should be able to:

- understand the concept of material;
- appreciate the importance of materials in manufacturing industries;
- understand why proper management of materials is required; and
- know the various issues in materials management.

Structure

- 14.1 Introduction
- 14.2 The Concept of Materials
- 14.3 Importance of Materials
- 14.4 Need for Materials, Management
- 14.5 Issues in Materials Management
- 14.6 Summary
- 14.7 Self-Assessment Exercises
- 14.8 Further Readings

14.1 INTRODUCTION

Historically, factors of production as considered by early classical economists were: Land, Labour and Capital. These three factors of production were not adequate later on in the context of manufacturing organisations during and after the industrial revolution. At this stage the five M's were considered as the main factors of production in the modern manufacturing organisation. The 5M's are Men, Money, Machines, Materials and Methods. The relative internal importance of these five factors varies according to type of manufacturing organisation and also over a period of time.

For example, during the early periods labour was comparatively more important among land, capital and labour. Later on with the advent of machines; men, machines and capital became equally important; because machines still needed to be operated by men. Still later, when emphasis shifted towards automation, labour(men) became comparatively less important.

From another view point; for example in labour intensive manufacturing organisations labour is comparatively more important. In capital intensive industries because mechanization and automation levels are high, capital and machine become relatively more important.

In many manufacturing organisations, depending upon the type and size of product one or more type of material is used in manufacture of that product. If the product is simple, say- glass bottles; large amount of silicon (basic component of glass) is consumed. where as in a complicated product for example; a passenger car-large number of different

materials and varying quantities are used up in its manufacture. In such cases material becomes equally if not relatively more important factor among the five Ms. In almost all modern manufacturing organisations materials are an important factor.

14.2 THE CONCEPT OF MATERIALS

In the context of manufacturing, the final output is product. Mostly manufacturing processes convert input materials into useful products. Thus, that which physically becomes a part or whole of the final product can be termed as Material.

Example: In the manufacture of Leather Shoes.

- Leather is input Material

This may be of several types, depending upon the types of shoes being produced i.e. leather for soles if 'type' uses leather soles There may be other types of material for soles.

- Shoe laces may be another input material
- The thread used in sewing is another input material
- Glues, adhesives etc, used are another input material. These are the type of materials which directly go into the manufacture of leather shoes and form integral part of the final product leather shoes. These are called RAW MATERIALS.

In some other manufacturing situations, apart from raw materials other forms of input materials such as parts / component etc. (manufactured by others - end product from their point of view) may also be required. These are also for the purpose termed material - because these also go into the manufactured product.

From manufacturing organisation's point of view there are many other materials required and used in the organisation but may not become part of the final product viz. tools - screw drivers, needles, hammers, tongs etc. required by workers and operators to be used in doing their work. Machines require spare parts. Attachments, lubricants etc. which do not form part of the final product but are needed in the manufacturing process.

We may, understand materials as something which becomes part of the final product or is required as part of the process required to manufacture the product. Thus, any physical thing that is required directly or indirectly for the manufacture of a product can be termed material from the organisational point of view.

14.3 IMPORTANCE OF MATERIALS

For any manufacturing organisation materials, supplies, equipments are of primary importance. The reasons are

- 1) Nothing can be produced without materials, supplies or equipment
- 2) Materials constitute major part of total cost of products. This varies depending upon type of product. Following Table should make it clear.

Table 14.1

Material cost as per cent of Total cost

Percentage of total cost	Manufacturing Groups
Above 75	Fabrication, Construction, Electrodes, Tea etc.
65-75	Wool, Sugar Jute, Cotton, Yarn, Commercial vehicles, Earth Moving equipments, Scooters, Furniture etc.
55-65	Cotton Textile, Bread, ship building, cables, electricity generator's, Refrigeration. Heavy machinery etc.
45-55	Chemicals, Cement, Pharmaceuticals. Electronics. Paper. Engineering, Non-Ferrous type. Machine tools. Explosives etc.
35-45	Fertilizer, steel, cigarettes, Transportation, Asbestos, News print, News paper, Ferrous Alloys, Aircraft manufacturing etc.

Source: Gopala Krishna P. and M.S. Sandilya. Purchasing Strategy-Text and Oases. starting . p-6. As reproduced in Aswathappa K., production Management. Himalaya, P-394.

- 3) Because materials form major part of total cost. these offer a very good scope for reduction of total cost. A small per cent in material cost can result in large per cent increase in profitability.

Example: Suppose a small company has total sales of rupee 1000. Total cost is Rs.900/- . Thus profit is Rs.100/- Which amount to 10 per cent of the sales. Suppose out total cost of Rs. 9001-, material cost is Rs.600/-.



If one per cent saving in material cost can be achieved, then resultant saving is Rs.6/- (1 per cent of 600) which directly adds to the profit, thus profit becomes Rs.106/-

Therefore, in this case, 1 per cent saving in material cost results into 6 per cent increase in profit.

4. End product quality apart from other factors, largely depends on quality of input materials.
5. Any interruption or shortage in supply of materials when needed by the production department, in many situations can result in complete stoppage of production.
6. Because of growing concern for pollution, some contribution has to be materials manager by finding substitutes which are less polluting or less damaging.
7. In the long term welfare and interest of the mankind, the natural resources (most of the materials ultimately come from one or the other natural resource) need to be conserved and regenerated along with planned usage.

14.4 NEED FOR MATERIALS MANAGEMENT

In manufacturing organisations hundreds of items, materials, components spare parts etc., of varying dimensions and quality are daily needed. To keep track of these items, to identify sources of their supply, to negotiate purchase, to coordinate between manufacturing operations needs, engineering and drawing department, finance department and suppliers, stores etc. there is a need to have a separate department / division, which can manage all these efficiently. In large organisations where the number of such items may run into thousands and the value of these items may run into hundreds of crores: the need for proper management is all the more important.

Also, because about fifty percent of total revenue, usually is consumed in materials, its efficient management can directly contribute to the profitability of the organisation. Since, every manufacturing organisation has production management for production activity, financial management for finance of the organisation, personnel management of human resource management or development as is now being termed, it is but natural to have materials management for efficient management of materials which account for a major part of a company's total budget.

Materials Management Defined

Lee and Dobler define material management as, "A confederacy of traditional materials activities bound by a common idea. -- the idea of an integrated management approach to planning, acquisition, conversion, flow and distribution of production materials from the raw material state to the finished product state".

Bailey and Fanner define materials management as, "The management of the flow of materials into an organisation to the point where those materials are converted into the firm's end product(s)".

The process of planning, procuring, storing, handling and distribution of required materials within the firm, is termed as materials management.

The scope of materials management is wide. It has impact directly or indirectly on the activities of many related departments in the organisation.

Its scope spans from the identification and specification of materials, identifying, the sources and suppliers, negotiating prices, purchasing, arranging for in bound transportation, receiving, and inspection for quantity and quality, efficient storage, issuing to respective manufacturing departments, maintaining proper records, and in some cases disposal of scrap and surplus/obsolete materials and components. Thus its scope spans from the suppliers to the production shops of the organisation, till the end product.

Objectives

The main objective of materials management is to make available the right materials, in right quantity, of right quality, at the right time and right prices. Thus some of the objectives can be:

Right Material : Identification and specification of materials required to be decided in consultation with engineering and production. Making efforts to locate suppliers who are capable to supply exactly what is required. Make available that which is required and specified.

Right Quality: For every item, supply to be made according to quality specification, neither of very high quality than specified (depends on pricing also) nor below, so that end product quality and process operations are not unduly affected. The quality of incoming materials be consistently maintained.

Right Quantity: Based on annual or periodic estimates of consumption, the purchases be made in right quantity i.e. neither too high (storage and handling cost may increase) nor too low (sometimes material may not *be* available when needed in production department).

Right Time: Adherence to timing (as and when required) by the production can be achieved through storage. But making purchases too much advance so that the items will remain in the stores for longer period (increasing the cost of storage and chances of obsolescence / damage etc.) or just in the nick of the time increasing the risk of stock out, would not amount to the right time. Proper timing of purchase and requirement be balanced.

Right Prices: Negotiation of purchase price should be competitive without sacrificing on quality and the reliability of supply. Bulk purchase or long term purchase contract can also be used effectively in negotiation of prices. Major savings in overall cost of materials can be effected at this stage thus directly contribution to the organisation.

Low Payroll Costs: This not only refers to the total payroll of the materials management department but overall total expenditure of the materials department. If the department's overall annual expenditure is more than the savings it can achieve in the total material cost, than the department is not operating efficiently and rather helping the organisation in savings in overall material costs it would actually be a burden on the organisation. But the expenditure need not be unduly curtailed at the cost of undermining the functioning of the department itself.

Proper Records: Maintenance of meticulous records is necessary from company point of view, because materials management function is responsible for approximately fifty per cent of the companies budget. Proper record and administrative control supplemented by rigorous audit can contain temptations of corruption. Also proper records should constitute part of companies overall data base, which can be used in future for related planning and management decisions.

Activity A

Kindly evaluate the quantity, quality, delivery schedule and record keeping of the purchase section of your organisation and prepare a report on discrepancy if any.

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14.5 ISSUES IN MATERIALS MANAGEMENT

As per major activity groups involved in materials management in any manufacturing organisation, several issues emerge, which need to be considered while discharging its functions: some of these are

- a) Issues related to materials planning,
- b) Issues related to purchase,
- c) Issues related to stores or inventory,
- d) Issues related to material handling and disposal.

These are being discussed in greater detail.



Issues Relating to Materials Planning

i) Materials Identification: Materials management department closely and continuously coordinates with the engineering and design, production and process to help identify the materials, sub-assembly, spare parts, tool and equipments needed in the process and manufacture of end products. It provides information with respect to various options, alternative materials available /or could be made available to meet the needs of production. The engineering and design, production and process departments assess these alternatives for suitability to the design from functional point of view, from processing point of view, i.e. whether it will help in easier / faster / more efficient performance of process operations? Through meticulous assessment each of the material, component etc is identified. This assessment is a continuous process depending on new materials, substitutes, supply conditions or internal changes in the products, process methods, designs or schedules.

ii) Standardisation: Basic purpose of standardisation is to achieve interchangeability of parts /components internally in the organisation or even across industry. Second purpose is to reduce the number of varieties of parts / components used in the production process of the organisation.

For example: in manufacture of motor car a large number of nuts and bolts of different dimensions, different specifications may be in use, suitable for various applications in the product. Suppose there are 100 different types of nuts and bolts being used. Through proper standardisation this number of different types can be brought down to 20 or 30 without compromising on functional quality and requirement of the product.

iii) Make or buy: Large organisations, (even small organisations) usually are not in a position to manufacture all parts or components required to be used in the product manufactured by them.

This is because :

- a) It may not be economical to manufacture internally.
- b) In house, expertise / technical skill may not be available.
- c) Additional capital required to set up facilities for the manufacture of the component may not be available.
- d) Specialized manufacturers-suppliers of the specialized components may be operating in the market, the components of the right quality may be available at competitive rates.

From time to time it needs to be reviewed whether certain items may be more advantageously manufactured in house or to be brought from outside. Materials management activity helps the organisation in taking this decision from time to time. Engineering and design, production, finance departments etc also join together to help take this decision. A decision to make an item in house has long term implications because the company's funds are to be invested into fixed assets to create the manufacturing facilities. Such a decision is very difficult to reverse later on.

iv) Coding & Classification: A system of classification and codification for all items/ parts/components, needs to be devised and implemented. So that detailed descriptions need not be referred to every time. The code assigned to an item is uniquely identified. It should be uniformly understood by all concerned in the organisation.

The following factors need to be considered while devising a classification and codification system:

- a) The basis of classification and codification should be the same and consistently applicable to all items.
- b) It should cover all items presently in use and should be capable to take up any new items in future.
- c) Every item should have a unique code / or number such that there is one-to-one correspondence between code and the item. No two codes should refer to the item, and no two or more items should have same code.
- d) The code should be uniformly used and understood throughout the organisation by the concerned persons. It should be simple to understand and apply. It should normally be self explanatory.

Several accrue if proper codification system is used in the Organisation:

- 1) There is no need of long description. Each item can be described by using the codes.
- 2) Correct identification of each and every item possible.
- 3) Duplication of storage, purchase, etc. avoided since each item is uniquely identified.
- 4) Uniformity is achieved in maintaining accurate records in all sectors i.e. stores, purchase, finance, production etc.
- 5) Can be used for locational planning of materials in the stores,

Activity B

Visit an organisation which has already computerised its materials management department. Study the system design for materials management, classification & coding system and find out any correction or modification required.

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Quality Specification: Materials department, engineering and design department, production department, collectively decide on required quality standards for every items; so as to achieve the desired quality of the end product at the same time meeting the cost target of the end product. Agreed upon quality is precisely specified and becomes part of the item description and also integral part of the code used to identify the item. Usually it is in the form of physical, chemical or performance specifications. Where Engineering Drawing or Blue prints are provided for the part, the quality specifications become integral part of such Drawing or Blue print. Other ways of specifying quality, (which may be used single or in combination) are:

- 1) By providing samples or prototype.
- 2) By providing manufacturing operation specification.
- 3) By Brand or Trade name.
- 4) By specifying well accepted market grades.
- 5) By specifying testing procedures and relevant standards.
- 6) By specifying / providing engineering drawing / blue prints. Proper quality specification are of greate help to the purchase department, the suppliers, and the inspection and testing sections.

Issues Relating to Purchasing

This issue is comparatively more important and relevant to large corporations operating multiple plants may or may not be located at different places. For a single place organisation decentralization might be feasible on a very limited scale. There are advantages relevant to both the policies. At times, better results can be achieved through combining the two and specifically demarking the items or volumes for which central or local purchasing is responsible.

Some of the possible advantages of centralization are:

- a) Favourable price mid terms can be negotiated because of large volume purchases.
- b) Specialised vendors/ancillaries can be encouraged to take up manufacture and supply of items/components of requited and specified quality.
- c) Administration and control is comparatively more easy and efficient.
- d) Number of personnel required is comparatively less resulting into reduced overhead costs of purchasing.
- e) Paper work, record keeping is consolidated. Possible to develop uniform procedures and policies.
- f) Easier to maintain the quality of purchased parts items: through centralized testing and inspection. It is also possible to conduct testing and inspection at die vendors



- g) It is beneficial to the vendor also, in case, the size of order constitutes major proportion of his total production capacity.

Advantage of decentralization:

- a) Coordination between purchaser department and the user departments in the plant is quicker and simple.
- b) It is possible to develop local suppliers, which can result into lower transportation costs and also lower levels of holding inventor's.
- c) Availability of local suppliers facilities, quicker readjustment of the internal requirements is feasible.
- d) Better quality coordination between local supplier and the plant can be maintained.
- e) Local control local coordination, and local rescheduling become easy and quicker.

Normally, a well balanced combination of centralization and decentralisation can be used more advantageously.

ii) Single Source vs Multiple Source

The purchase department can decide to choose and depend on a single source for each of some selected items. In the extreme case, the department can decide to use single source for each of the item. On the other extreme, the policy may be to have multiple sources for each of the item. Each policy- single source or multiple source has its own advantages and disadvantages.

Advantages due to single source:

- a) For small total annual requirement of an item multiple sources tend to increase clerical and other expenses.
- b) Due to bulk purchases from single source, it becomes possible to avail of discounts of prices or freights or other services.
- c) Supplier tries to cooperate, update-and improve his services because of long term relations.
- d) Scheduling of deliveries or long term contract is feasible.
- e) If supplier is the only producer or owns the patent or his quality far superior other suppliers or prices are highly competitive, one has to depend on single supplier.

Sometimes by judicious development of single suppliers on long term basis overall material cost can be reduced significantly.

Advantages of multiple source :

- a) Dependency on single supplier is reduced.
- b) Break down, strike, stoppage of work with one supplier does not unduly affect the working of the company.
- c) Competition among suppliers, keep them alert.
- d) It provides flexibility in the choice of placing an order.

iii.) Vendor/Ancillary Development

This is somewhat similar to single/multiple supplier decision and also an outcome of make/buy decision. When total annual requirement is large and item is to be bought from the market, then it is worth it to encourage ancillaries to take up the production and supply of the item to a parent company. The ancillary supplies a major portion of its production to parent company and remaining production is off loaded in the market. Parent company can also decide to help develop more than one ancillary for the same item if requirements of item is very large.

Vendor/ancillary development can be encouraged by parent company through tiny one or combination of the following:

- Providing item design / drawings
- Providing technology for production
- Helping in arrangement of finance
- Helping by loaning of its technical persons



- Extending credit facilities
- Extending quality control/testing facilities
- Indirectly/directly helping in getting raw materials

It is the general policy of all public sector undertakings to encourage development of ancillaries, where ever required and to the extent feasible.

iv) **Vendor Rating:** Poor vendor performance, can result into creating uncertainties with respect to delivery schedules, quantity and quality. This may often interrupt the production schedules, quantity performance of the producing company. The company may have to resort to emergency purchasing- thus resulting into the increased cost of production. It becomes an important issue for the purchasing company to develop proper / objective vendor performance evaluation procedures which should act as an instrument to help both the parties. Continuous and close vendor performance evaluation helps in improving the performance of the materials management and also that of the production department at the company.

Several vendor rating techniques are prevalent. Vendors are assessed on a specified set of factors. Selection of factors depends on the item, production process, production schedules etc.

Some of the factors are :

- Adherence to delivery schedules
- Adherence to quantity schedules
- Adherence to quality specifications
- Price competitiveness
- Flexibility and cooperativeness
- Technical potential and capability
- Long term Financial Strength
- Service attitude
- Packaging, freight and delivery capability and costs.
- In-house testing facilities and reliability of test certificates. Some of the rating methods are briefly discussed as follows :

Informal: No meticulous records are maintained. All the concerned departments from time to time inform the purchasing about difficulties / complaints about items used by them. Purchasing department by identifying the vendor from the item about which complaints are received- takes appropriate action.

Activity C

Sonepat suppliers is one of the vendors. This firm has made 17 deliveries on time out of 20 orders placed on them, has given an average of 5 per cent rejects and has delivered items at the performance index of Rs. 110 when the average price performance index is Rs. 100.

What is the overall evaluations rating for Sonepat suppliers?

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Weighted Point Method

Under this method, purchasing company assigns relative weights to some important factors identified in respect of an item. Then performance of vendors is evaluated on each of the factors and overall rating arrived at by combining these evaluation in proportion to weights.

For example: With respect to an item and the vendor(s), the company may decide that price, quality and delivery schedules are the three important factors for performance



evaluation. The company may decide the weights 40:40:20 respectively. The overall rating may be arrived at,

$$\begin{aligned} \text{Overall Rating} = & \frac{\text{Lowest Price Available in the Mkt.}}{\text{Price quoted by the vendor}} \times .40 \\ & + \frac{\text{Number of lots accepted}}{\text{Number of lots supplied}} \times .40 \\ & + \frac{\text{Delivery time allowed in days}}{\text{Actual time taken for delivery}} \times .20 \end{aligned}$$

Accordingly the company can compare, performance of vendors and decide – which should be preferred and which should be dropped?

Check List Method

In this method, with respect to factors identified a check list is circulated amongst concerned departments. The concerned departments have to give their evaluation in respect to each question in the check list. Based on the compilation on overall rating/score can be arrived at.

Critical Incidents Method

A record of significant events occurred in the past with respect to dealings with each of the vendor are maintained and overall assessment arrived at. For example : a particular lot may contain extremely high percentage of rejects, a particular delivery might have been unduly delayed affecting the production schedules.

Vendor performance is required to be reviewed from time to time, because performance may not remain uniform, and also because of dynamic changes in external as well internal environment. For example, new suppliers may enter the market, new substitutes may come into existence, the law may restrict/ban/or favour some materials, internal product mix/line may change, schedule may change, design of products may change.

v) Size and Timing of Purchase Orders

This is an integrated issue. Stores and inventory, production schedules, suppliers capability, time lag reliability, cost of holding inventory, and cost of placing orders etc. all have an important bearing on how much to order and when to order.

Relative importance of material or an item to the organ is on is also an important issue, since all items need not be considered equally for inventory management and control. Some of the techniques used to classify items with respect, to their relative importance are:

ABC - Analysis

All items in use, are classified in respect to importance to their total value of annual consumption. A complete list in descending order of consumption value of items is created. It has been observed, in general, about 10-15 per cent of the items account for 60-80 per cent of total annual consumption value of all items, - these are termed as 'A' class items. About 15-20 per cent of items account for 15-20 percent of the total annual consumption value of all items - these are termed as 'B' class items. The remaining approximately 10 per cent of the items are classified as 'C' items.

'A' Class items are subjected to highest level of control supervision and management.

'B' Class items are subjected to medium level of control, supervision and management.

'C' class items usually are not subjected to elaborate control/management. Since, the cost of effort is not worth it.

For 'A' & 'B' class items precise mathematical models for determination of E O Q - economic order quantity, frequency of purchase; safety stock/buffer stock level etc. can be used.

The models applicable in these situations and related issues are discussed in detail in the next unit 15. Also Block-6 of MS 5, will be helpful in this regard.



HML - Classification

High, Medium and Low classification is done on the basis of importance of price/unit - unlike ABC where total consumption value was considered. It is for the management to decide beyond which level of price/unit, the items would be classified as 'H' 'M' and 'L'. Accordingly 'H' classified items are required to be subjected to highest level of control, Supervision and management. The general guidelines are accordingly devised by the management in respect to each of the classification.

VED - Classification

The classification i.e. VITAL, ESSENTIAL and DESIRABLE; is done on the basis of importance of an item to the production process. Those which are highly important, and whose non-availability may render the stoppage of production are classified as 'V', where as those because of which, if not available' the production may be affected or hampered are classified as 'E' and others classified as 'D'. In this classification, the opinion of technical people in the production process plays very important role. One can formulate a matrix considering ABC and VED analysis.

SDE - Classification

Scarce, Difficult and Easy classification is with respect to their availability in the market. Scarce items are those which are scarce, either imported, or restricted or rationed items, usually in short supply and not available uniformly throughout the year. 'D' items are those which are available in the local market. 'E' items are those which are easily available in the local market as and when needed.

FSN - Classification

The FAST, SLOW AND NON MOVING, classification is based on rate of movement of items from the store, The time lapsed since last issue from the stores becomes one of the indicators to be used for this classification. The fast moving items (F) need to be reviewed frequently for placing the purchase order where as non moving (N) items need to be reviewed for disposal consideration.

All these classifications help in identifying more important items to be taken up for close supervision and management by materials management on SELECTIVE basis. An organisation may require and use thousands of different items, therefore it usually is not feasible to monitor all of them equally closely.

vi) Quality Assurance of Incoming Materials

Purchase function major responsibility, in consultation with production and engineering function to assure the quality of purchased material. Proper sped final ions have to be decided and finally conveyed as part of purchase orders. The characteristics/ standards need to be put down in purchase orders in unambiguous items. The technical terms should uniquely be understood by the supplier. The testing and inspection methods/ procedures, the type of tests that are required to be conducted; all need to be specified accurately.

The purchase department can achieve required quality of incoming material by :

- a) Conveying correct specifications.
- b) Assessing quality capability of supplier before placement of purchase order.
- c) Frequent testing and inspection at the suppliers production facilities, if considered necessary.
- d) Insisting on proper certification of dispatched material from the supplier's facility.
- e) Proper packaging and transportation to avoid deterioration/damage/breakage during transition.
- f) Testing and inspection at the receiving end. Insisting on approved quantity and quality certificate by receiving point so as to release the payment.
- g) Proper storage in the warehouse/store so as to avoid deterioration/damage during storage.
- h) Revising and conveying the quality specification as and when needed well in advance. So as to avoid stockpiling and or getting mixed up of 'old' quality items with 'new' quality items.



All these steps, used appropriately, help in insuring the right quality of the incoming materials; which ultimately reflects in the final product of the company.

Activity D

Does ABC/VED classification help in managing inventories? Explain.

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Activity E

Inventory of materials provides operational flexibility. But, many flexible operational systems need little inventory. Explain this seeming contradiction.

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Activity F

Discuss the role of inventory in the organisation's strategic management.

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Activity G

Conduct a survey in a library registers and analyse the inventory (books) on the basis of ABC and FSN analysis.

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Issues Relating to Storage and Material Handling

i) Optimum Level of Inventory

How much inventory of each item is to be maintained? This is the result of trade off between keeping very high inventory resulting into high inventory holding costs vs keeping very low inventory with high risk of stockout. A related question is When to order and how much to order? What should be the level of reorder point and safety stock? The models relating to these issues are discussed in great detail in the next units i.e. UNIT-15 and UNIT-16.

ii) Location and Layout of Store

Location of store should be convenient from point of view of receipt and inspection of material and also from the point of view of easy accessibility to internal users. It also depends on the type of items handled e.g. heavy material requiring rail head etc.

Layout depends on:

- Safety from theft and pilferage
- Damage etc.
- Easy and safe storage
- Minimizing unnecessary handling within the stores
- Efficient use of space
- Easy physical verification

iii) Storage System

A good storage system keeps in mind easy location and withdrawal of items when required; easy to physical counting/verification; easy to readjust to allow storage of new arrival/receipt of materials, minimizing use of specialized material handling equipment etc.

There are usually three material location system prevalent :

Fixed Location

Items of particular type have pre specified location and space. When this space is vacant other items usually are not placed here. Codification system earlier discussed, can be used by extending the code of an item to include its location in the stores.

Random Location

The items be stored where ever space is available, as and when the item arrives in the stores. It creates difficulties in terms of locating the item when needed, same item may be placed at more than one place, physical verification to assess the present stock position etc.

Zoned Location

Items of a particular group type are stored in an area earmarked for that group. Individual items of the group may be stored w.r.t. fixed or random location. Group codes can be used effectively.

Additionally, depending upon the type of item; stacking tray, shelf, slotted angles shelves, aisles can be effectively, utilized.

Different types of containers, which are compatible with the type of storage and material can also be effectively used to achieve safety, convenience, withdrawal and inspection.

iv) Receiving Inspection and Record Keeping

All the material received at the store should be inspected as per the procedure specified with respect to quantity as well quality. It should tally with the specifications contained in the purchase order issued by the purchase department, and also with the document received along with the material received.

Agreed upon sampling techniques and testing procedures can be effectively used. Bad, damaged, items not meeting the quality specification should be segregated from the good ones.

Proper and correct records for all receipts and issues need to be maintained for stores accounting, for checking present stock position, help the accounts and cost accounting functions in the organisation, to help compile and provide information for planning and decision making to all relevant levels and sections.

v) Material Handling and Equipment

The total system should be designed to minimize the unnecessary handling throughout the plant including the interior of stores specifically.

- To minimize the total material handling cost
- To maintain proper flow of material throughout the plant, through all sections.
- To ensure safety of material during movement and to minimize damage and to reduce accidents.
- To reduce inter-movement time.
- Compatible with material handling equipment. Various groups of equipment are
 - a) conveyors of various types
 - b) Elevators of various types
 - c) Cranes
 - d) Transporting and storing equipment
 - e) Pneumatic Fluidizing Equipment
 - f) Earth Moving Equipments, etc.

Activity H

Think of a material handling department. Out of your own experience, evaluate the department's location and layout of stores, storage system, and material indenting system.



14.6 SUMMARY

Materials constitute an important component of manufacturing industries. It also accounts for about 50 percent of total cost of manufactured products. This is an important sector providing opportunities for cost reduction, which directly contributes to profitability.

Materials are those which either directly go into the product or indirectly required for the manufacture of the product.

Material management discharges the function of planning, procuring, storing, handling and distribution of all required material in the organization. To provide right material, at the right price, of right quality at the right time and place and achieve overall minimum cost of material including the total cost of material management department.

Issues relating to materials management have been divided into groups and sub-issues as follows:

1) Issues Relating to Materials Planning

- Materials Identification
- Standardisation
- Make or Buy
- Coding and Classification
- Quality Specification

2) Issues Relating to Purchasing

- Centralised vs Decentralised Purchasing
- Single vs Multiple Source
- Vendor/Ancillary Development
- Vendor Rating
- Size and Timing of Purchase Orders
- Quality Assurance of incoming Material

3) Issues Relating to Stores and Material Handling

- Optimum Level of Inventory
- Location and layout of store
- Storage system
- Receiving Inspection and Record keeping
- Material Handling and Equipment

Materials management through resolution of those types of issues tries to meet materials requirements of a manufacturing organisation without affecting the production schedules and efficiency and at the same time trying to reduce the overall cost of material to the organisation.

14.7 SELF-ASSESSMENT EXERCISES

1. Consider an organisation in which you are working on are familiar with and critically evaluate the need of any or more of the issues discussed above. Are they being resolved adequately? What would you do?
2. Why selective inventory control and management are needed? What are the various techniques of classification for this purpose?

3. What is material for any manufacturing organisation? Give examples of direct and indirect material from your organisation.
4. Why materials management is needed? What advantages does manufacturing organisation derive by treating material management as a separate and important function?
5. Discuss various vendor rating techniques? Why an organisation should try to rate its vendors?
6. What is make or buy decision? What are the factors considered while resolving this issue? Why this issue be considered in the first place?
7. Identify the different types of inventories (raw-materials, work-in-progress, and finished-goods.) carried in the following organisations : gas stations, hamburgers stand, clothing store, and machine shop. What functions (purpose) do these inventories perform?
8. What is the difference between a requirements philosophy and a replenishment philosophy of inventory management? Why is the difference important?
9. Compare and contrast the management of finished goods inventory in a manufacturing company with that in a retail or wholesale firm.
10. Visit a department store, a local garage, or a fast-food outlet. Determine the type of inventory control system used, including forecast methods, decision needs, exception reporting, record keeping and management reports.

14.8 FURTHER READINGS

Ashwathappa, K., *Production Management*, Himalaya Publishing House.

Dean, S. Ammer, *Materials Management and Purchasing*, Taraporevala and Sons.

Evert E. Adam, Jr. Ronald J. Ebert, *Production and Operations Management*, Prentice Hall of India Private Limited.

Gopala Krishna, P. and Sudaresan M., *Materials Management - An Oral ed Approach*, Prentice Hall of India Private Limited.

Narasimhan, S.K., Meleavery, D.W. and Billington, P.J. *Production Planning and Inventory Control*, 2nd edition, P.H.I. N. Delhi

Gopal Krishna, P. and Sandilya, M.S. *Purchasing Strategy - Text and Cases*, Sterling, P-6.