KARNATAKA STATE OPEN UNIVERSITY

MBA PROGRAMME

II YEAR – III SEMESTER

SPECIALIZATION: OPERATIONS

MATERIAL AND PURCHASE MANAGEMENT

COURSE: MBA 118D/SC D3.2 BLOCKS: 1-4

DEPARTMENT OF STUDIES AND RESEARCH IN MANAGEMENT

KARNATAKA STATE OPEN UNIVERSITY

MUKTHAGANGOTHRI, MYSURU- 570 006.

DEPARTMENT OF STUDIES AND RESEARCH IN MANAGEMENT

M.B.A III SEMESTER

COURSE - MBSC - 3.3 D

MATERIAL AND PURCHASE MANAGEMENT

BLOCK - 1:

BLOCK-2: STORE MANAGEMENT

BLOCK-3: PURCHASING MANAGEMENT

BLOCK-4: VENDOR DEVELOPMENT AND INVENTORY MANAGEMENT

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Programme Name : MBA **Year/Semester : 2nd Year, 3rd Semester** **Block No: 1 to 4**

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UNIT 1: INTRODUCTION TO MATERIALS MANAGEMENT

Structure:

1.1 OBJECTIVES

After studying this unit, you should be able to;

- Define basics of materials in an organization;
- Explain the very purpose of materials in an organization;
- Find out the extent to which materials management is done in an organization;
- Evaluate the significance of materials management and
- Examine the issues in materials management

1.2 INTRODUCTION

Today we are living in a materialistic world. Life style of an individual depends on number of products being used by a person. Products are inevitable part of life; it is not possible to forgo even a single product by individuals. This dependence of mankind on products shows the need for industrial activity. As long as man needs products, production needs to go on. This determines the scope for managing materials in an organization for the smoother and effective functioning of production activities in an organization.

Materials management is one of the essential business functions. Material is one of the five M's in factors of production. Materials means physical raw materials and intermediate products (Semi finished) which are used in production to convert them in to finished or further work in process to finish further. It is concerned with managing materials. Much earlier Materials management was concerned with purchasing of raw materials or semi-finished products. But today due to the nature of business and globalization, production is diversified to take the advantage of cost. Hence materials and components are purchased from various places of the world; where they are produced cheaply and assembled at best of the best places where skills are found, needs good materials management techniques. Management of materials in an organization gives a cutting edge to the organization because superior value products can be produced cost effectively in time.

1.3 DEFINITION OF MATERIALS MANAGEMENT

Materials management is connected with maintaining adequate supply of raw material, spares, components, operating supplies (utilities) to meet anticipated demands economically.

The function of Materials Management is to ensure supply of materials at right time, right place, in right quantity, of right quality, from right sources and at right price.

Materials management is concerned with the management of material flow into, through and out of the system.

Materials Management is combination of traditional material activities bounded by common idea-the idea of an integrated management approach to planning, acquisitions, conversion, flow and distribution of production materials from raw material state to the finished product state.

Materials Management is 'decision making with respect to design procurement, storage, issue, packing and handling, accounting of materials to get most out of every amount invested in materials.

Materials management is one of the essential business functions. It deals with planning, acquiring and supply of materials within the supply chain of an organization. It is one of the basic resources with the help of which production of products is done. For a very long time it was treated with less importance as it was a routine function. But over a period of time due to its role in the complex business it has become more important; and a more professionally approached method.

Indian institute of materials management defines "Materials management means planning, directing, coordinating & controlling of activities related to acquisition, storage, & maintenance of materials needed for the purpose of production with an objective of minimizing the cost & increasing the profitability"

According Toe L.J. De Rose, "Material management is the planning, directing, controlling and co-ordination of all those activities concerned with material and inventory requirements, from the point of their inception to their introduction into manufacturing process."

N. K. Nair quotes "Material management is the integrated functioning of the various sections of an organization dealing with the supply of materials and allied activities in order to achieve maximum co-ordination."

1.4 OBJECTIVES OF MATERIALS MANAGEMENT

Objectives help in measuring how much successful any function is, in an organization. The primary objectives of materials management are as follows-

1. **Low prices:** The materials department reduces the price of the items it buys.
2. **High inventory turnover:** When inventories are low in relation to sales, less capital is tied up in inventory. This in turn increases the efficiency with which the company's capital is utilized, so that return on investment is higher. Also storage and carrying costs of inventories are lower, when turnover is high.

3. **Low cost of acquisition and processing:** If materials are handled and stored efficiently their real cost is lower. Acquisition and possession costs are low when the receiving and stores department operate efficiently.
4. **Continuity of supply:** When there are disruptions in the continuity of supply excess costs are inevitable and production costs go up, excess expediting and transportation costs are likely and continuity of supply is particularly important for highly automated process; where costs are rigid and must be incurred even when production stops because of lack of materials.
5. **Consistency of quality:** To maintain consistency of quality of materials at the lowest possible overall cost is another important objective of materials department.
6. **Low payroll costs:** the lower the pay roll costs of material department being other factors equal, the higher will be profits.
7. **Favorable suppliers' relations:** A company's standing in the business is to a considerable degree, determined by the manner in which it deals with its suppliers. A company with good reputation in supplier relations is more likely to attract customers than with bad name. Suppliers also can make a direct contribution to a company's success. Their product development and research efforts can be of tremendous assistance to their customers.

The secondary objectives of materials management are not so limited in scope and variety as the primary objectives. Since they present the materials departments they can vary widely from industry to industry. Broader secondary objectives of materials management are as stated below.

1. **Maintaining continuity of supply:** During the early time procurement of raw material was maintained through many sources of supply and by keeping high levels of stock. Management of materials is done based on the requirement of production by adopting many materials management models; Today due to Information technology revolution and Enterprise resource planning, backward integration of suppliers in to the value chain is happening through Internet of things (IOT).
2. **Contribution to cost reduction:** Modern methods of materials management have a major advantage in reducing cost. It uses many equipment's to handle and to keep a count on materials. Materials are handled in bulk with the help of machineries and equipment's. This has considerably reduced human intervention and has increased accuracy with which

the work is done. The time taken in this process has drastically reduced. As a reason modern materials management has drastically reduced cost of production.

3. **Innovation in product/process:** Today handling materials is made easy due to Mechanical revolution. Many different materials handling equipment are introduced like-
    - Bulk material handling equipment's like hoppers, recliners, conveyor belt, stackers bucket and grain elevators.
    - Engineered systems like automated storage and retrieval systems, automated guided vehicles, Robotic delivery systems, conveyor systems,
    - Industrial trucks like Hand trucks, side loaders, pallet trucks an and order pickers
    - Storage and handling equipment's like drawers, bins and shelves, mezzanines, racks, stacking frames

    Above materials handling equipment's are only few of the examples, there are many more products which have made manufacturing easy, less time consuming, more quality oriented and less cost process.

1.5 FUNCTIONS OF MATERIALS MANAGEMENT

Broadly speaking functions of materials management can be categorized in to two-

Primary functions: Consisting of functions like, materials requirement planning, purchasing, inventory planning and control, ascertaining and maintaining the flow and supply of materials, quality control of materials, departmental efficiency.

Secondary functions: Consisting of functions like design and development of the product, make and buy decisions, coding and classification of materials, forecasting and planning.

There are many different functions of materials management. The important ones amongst them are as stated below-

1. **Material Planning and Control:** Meticulous planning is needed every day in the production department with respect to parts and materials. It is determined as per production schedules and production schedules are prepared based on the order received, or on anticipated demand for the product. It needs to ensure every type or part of material is made available for carrying out the smoother production process. To do so, today a large number of inventory maintaining models are available, with the help of which cost and associated uncertainty can be reduced. Suitable model can be selected depending up on the organizations needs or situations.
2. **Purchasing:** Materials are purchased in the purchasing departments based on the requisitions of production department. Based on the production schedules, requirement

of materials and parts are determined which will be subsequently procured by keeping a contract with suppliers and by collecting quotations etc., at regular intervals. Purchasing of materials involves activities like planning and policy making. Mainly purchases can be broadly classified in to two categories- they are cash purchase and purchase by tender. Purchasing process has many phases like purchase requisition, selection of suppliers, ordering, follow-up, receipt and inspection, maintaining records and suppler management.

3. **Logistics-Transportation and warehousing:** Logistics is an overall process of managing resources: means acquiring, storing and transporting resources to the final destinations. It is concerned with management of warehousing and flow of materials, service and information in a supply chain with a view to enhance the product's value. Selection of modes of transportation amongst the four modes of transportation like motor, rail, air, water and pipelines is a complex decision making process. The complexities of decision making are conflicting objectives, information non-availability, presence of a large number of alternatives etc.

   Maintaining the materials at a place in the condition involves activities like receipt of materials, physical identification of materials, physical control of stored materials, physical verification of inventory, valuation of stock and issue.

4. **Stores Management:** It involves physical control of materials, preservation of stores, minimization of damage through timely disposal and obsolescence. Efficient handling, maintenance of store records, proper recording and stock keeping. Responsibilities of the store also includes verification of stocks and reconciling them with book figures. A store plays vital role in the operation of a company.

5. **Inventory control or management:** From the point of view of materials management inventory is generally referred as materials in stock. This resource of an enterprise is called idle resource. Inventories are either stocked for sale, or they will be in the process of manufacturing, or they will be in the form of materials to be utilized. The cycle time taken for manufacturing depends up on the interval between receiving raw materials or semi-finished products like parts and transforming them in to finished good. As a reason it is necessary to hold the raw material or semi-finished products in the inventory for the efficient operation of the production process with less interruptions.

CHECK YOUR PROGRESS

1. 5 Ms of the factors of Production includes

A. Money B. Material c. machine D. All the above

2. An integrated material management approach includes planning, acquisitions, conversion, _____ of production materials from raw material state to the finished product state.

a. Flow d. Distribution c. Both d. Sales

3. One of the objectives of material management is to _____ inventory turnover:

a. Increase b. Decrease c. Stabilize d. Maintain uniformity

4. Physical objects that are embedded with sensors, processing ability, software, and other technologies are called

a. Internet of things b. Technology oriented material management c. RFID d. ERP

5. The time taken for manufacturing, interval between receiving raw materials or semi-finished products like parts and transforming them in to finished good is called

a. Cycle time b. Production time c. Idle time d. Just in Time

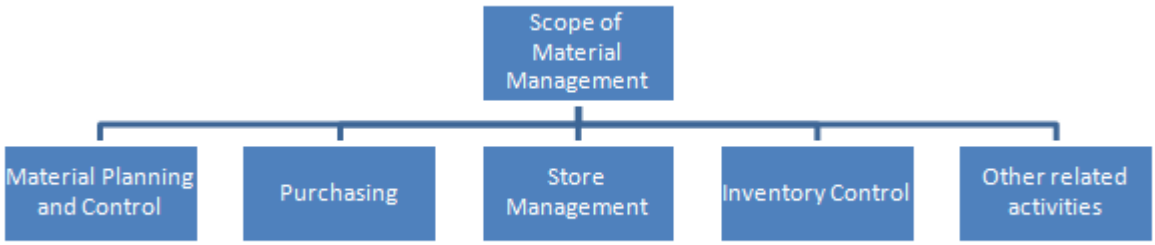
1.6 SCOPE OF MATERIALS MANAGEMENT

Since time immemorial the concept of materials management is known. Artha Shastra written by Koutilya describes the scope of materials management. It is as follows:

Praveno Vakpatu Dheeman Swami Bhaktscha Nischayaha!

Pralubhaha Satyavadi Cha Bhandgari Sa Ishyate!!

The meaning of the Sloka suggests that materials management should be truthful, adaptable communicable and be intelligent as well as loyal to the organization and should suppress personal greed and obviously serve the user.



Materials management has very vast scope. Materials planning and control, purchasing and inventory management are its sub functions. Broadly the scope of materials management are as follows.

1. **Materials Planning and control:** Materials planning and control is done based on the sales forecast and production plan like: estimating the individual requirements of parts, preparing materials budget preparation, forecasting the levels of inventories, scheduling the orders and monitoring the performance in relation to production.
2. **Purchasing of materials:** Purchasing of right quality and quantity of materials in proper time at appropriate price from right place and source. It emphasizes on acquisition aspects.
3. **Stores Management**: It involves activities like physical control of materials, preservation of stores, minimization of obsolescence and damage through timely disposal and efficient handling, maintenance of stores records, proper location and stocking. A Store has vital role in a company's operation; it has to do physical verification of stocks and reconcile with the book figures regularly.
4. **Inventory Management/Control:** Since there is a time interval between receiving the purchased inventory and semi-finished goods or materials and transforming them in to finished product maintaining the inventory at the store is a necessity. Hence inventories need to be stocked and effectively controlled for the smoother and efficient functioning of the production cycle with minimum interruption.

Other related functions/activities: includes activities like

1. **Standardization of materials:** It means from minimum variety of materials, parts, tools and process maximum variety of products are produced. It is the process of establishing standards or units of measure by which extent quality, quantity, value, performance etc. may be compared and measured.
2. **Simplification:** Reduction process of variety of products manufactured is called as simplification. It is concerned with the reduction of product range, assemblies, parts materials and design.
3. **Specifications:** It is related to a product or a process or a service also. It refers to a precise statement that formulizes the requirements of the customer.
4. **Value analysis:** Sometimes while producing unnecessary specifications or features are added. Value analysis helps in identifying cost added due to inefficient and unnecessary specification and features. Value analysis helps in the last stage of production called maturity stage by its contribution.
5. **Ergonomics (Human Engineering):** It is concerned with man machine system. It is also called as the human factors or human engineering.

1.7 IMPORTANCE OF MATERIALS MANAGEMENT

1. Materials constitute the biggest single element of cost. Generally, more than half the cost of any production system is due to materials alone. Therefore, reduced materials cost is vital for improved productivity. Cost content of the product can be managed well if materials management is done well. Scientific purchasing helps in acquiring materials at reasonable prices. Proper storing of materials also helps in reducing their wastages. These factors help in controlling cost content of products.
2. The cost of indirect materials is kept under check. Sometimes cost of indirect materials also increases total cost of production because there is no proper control over such materials.
3. If some of the work in progress materials are not supplied during the line assembly type of production, it affects the equipment. Continues supply of materials helps in properly utilizing the equipment, because there will not be break downs due to late supply of materials.
4. Sometimes when raw materials or work in progress does not reach the production department there will be a loss of a day to the labourers because production will be stopped due to non-availability of materials. Such loss of direct labour can be avoided if materials are managed or handled well.
5. Materials management helps in avoiding the wastages of materials at the stage of storage as well as during their movement. Wastage can be kept under control with the help of materials management.
6. Materials management does the prompt supply of materials in an organization. Late delivery can be avoided if the supply of materials is prompt. When supply of material is done well i.e., at the time when it is required, production of product to meet the demand can happen otherwise and late delivery instances are going to increase which creates a bad perception abut the company in the mind of consumers.
7. Materials lock up the working capital of an organization, if material planning is not done well at the time of purchase, wrong decisions lock up the capital. The investment on materials can be kept under control with the help of materials management over stocking is avoided and lock up of capital can be avoided.
8. Movement of materials in the company and also in stores creates congestion. If materials management is done effectively congestion can be avoided.

9. Non-availability of materials/resource input leads to production shut down, project delays etc. Hence timely availability of materials is vital for production efficiency.

1.8 CHALLENGES OF MATERIALS MANAGEMENT

Execution of materials management is not so easy, because various raw material, semi-finished goods or components have to be purchased by an organization for the smoother functioning of production activities every day. For example, in producing a car around 30,000 components are needed. Where as to build an aircraft A380 a superjumbo size plane it requires over four million parts, which are produced by 1,500 companies spread over 30 countries across the globe, the production requires a workforce of thousand, spread across different facilities. As a result selection of materials for purchasing, identifying a right supplier and storing at the place of production or construction are considered are going to be the real challenges in today's scenario.

1. **Selection of Materials:** During the buying process purchasing method involve negotiating specifications and cost directly with the manufacturers of raw materials or components or from suppliers and distributors. While selecting the good from the provider it is vital to know the guaranteeing part like quality and quantity of materials agreed to supply and their ability to deliver in time at the date required. In today's global scenario selection of appropriate materials from various producers and suppliers available across the globe in the free trade environment, to take the advantage of cost and quality is a daunting task.
2. **Material procurement:** After choosing provider, the company needs to follow up the material ordered till it arrives at the duty site within the quantities and dates fixed. Materials procurement starts with the generation of a material requisition schedule (e.g. release forms), specifying material varieties, quantities required and dates once the material ought to be delivered. On large jobs, the site workers typically prepare schedule, then it will be sent to purchase department to request the material from the suppliers or distributors. Some of the company's request for 80% of the planned material remaining material will be purchased when the production is closely about to complete.
3. **Job site storage and handling:** Most of the material management issues happen at the duty site, material tracking, storage problems, material distribution and re-handling. One of the important challenges to the manufacturers is tracking materials. Tracking helps in identifying undelivered material as ordered is being delivered or not. Additionally,

tracking helps in tracing material accessibility so that they can avoid theft or loss, and also can locate its placement in store or on-site.

1.9 NOTES

1.10 SUMMARY

In this unit we have discussed about Materials management concerned with the management of material flow into, through and out of system in an organization. It is decision making with respect to design procurement, storage, issue, packing and handling and accounting of materials to get most out of every amount invested in materials.

Objectives of the materials management are: Low prices, High inventory turnover, Low cost acquisition and processing, Continuity of supply, Consistency of quality, Favorable suppliers' relations, maintaining continuity of supply, Contribution to cost reduction, Innovation in product/process.

Functions of materials management are:

1. **Primary functions:** Consisting of functions like, materials requirement planning, purchasing, inventory planning and control, ascertaining and maintaining the flow and supply of materials, quality control of materials, departmental efficiency
2. **Secondary functions:** Consisting of functions like design and development of the product, make and buy decisions, coding and classification of materials, forecasting and planning.

Scope of materials management are: Materials Planning and control, purchasing of materials, Stores Management, Standardization of materials, Simplification, Specifications, Value analysis, Ergonomics (Human Engineering).

Importance of materials management are: it keeps inventory accurate, enables JIT (Just In Time) inventory management, freight costs are optimization, quality control goes up

Challenges of materials management are: selection of materials to purchase, identifying a right supplier and storing at the place of production or construction.

1.11 KEY WORDS

- Materials – Raw material, Work in Process , Finished goods and spare parts
- WIP- Work in Process – The material under process, semi-finished goods
- Finished Goods- Items that are ready to be dispatched
- Inventory- Stock of material in a firm
- Make or Buy- Deciding whether to buy a part or manufacture it on own
- IOT- Internet of Things- Physical objects that are embedded with sensors, processing ability, software, and other technologies.

1.12 ANSWER TO CHECK YOUR PROGRESS

1. All the above
2. Flow and Distribution
3. Increase
4. Internet of Things
5. Cycle Time

1.13 SELF ASSESSMENT QUESTIONS

1. What is materials management?
2. Define materials management
3. Explain the objectives of materials management.
4. Managing materials in an organization is challenging. Do you agree? If yes, why?
5. It is important to manage materials well in an organization to reduce the cost of an organization. Comment on this.
6. Material management is vast in its scope. Evaluate this statement with the activities of Materials management.

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UNIT-2: MATERIALS MANAGEMENT ORGANIZATION

Structure:

2.1 OBJECTIVES

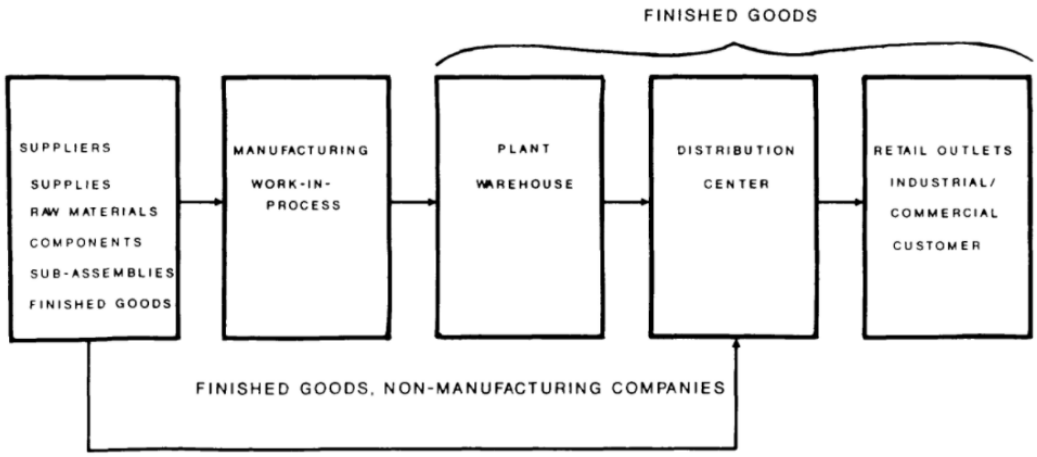
After studying this unit, you should be able to;

- Explain about Materials in an organization;
- Gain an Idea about Materials and
- Examine Integrated systems approach

2.2 INTRODUCTION

Materials management is an organizational philosophy that has evolved through application of the systems approach to management, an approach that provides for integration of all management functions. A primary objective of this philosophy is to coordinate all business activities that are part of the materials cycle, from supplier through company operations and on the critical materials-related sub functions, and as such, is a major company function, among such others as engineering, finance, and manufacturing.

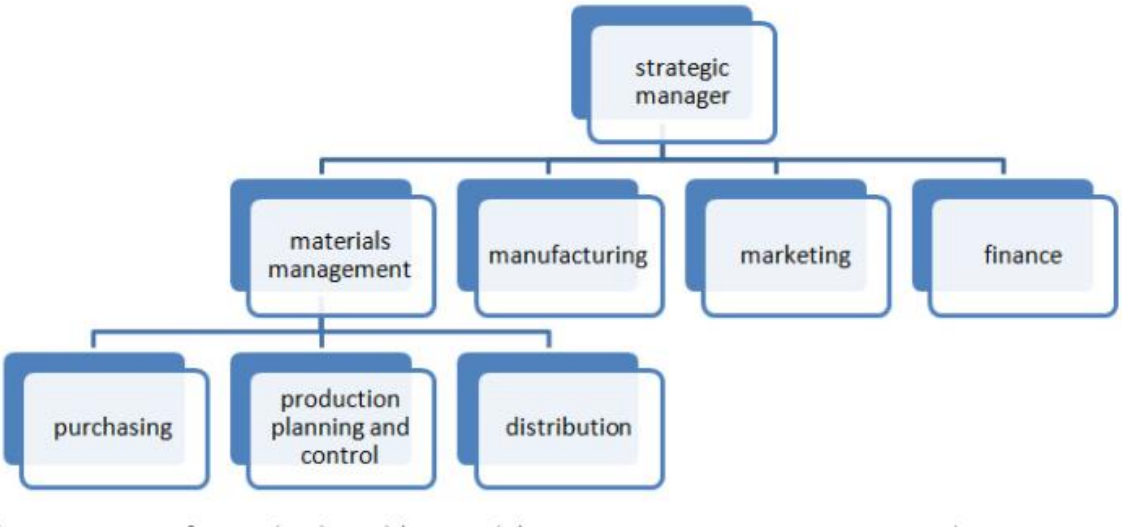
According to Colton and Rohrs, materials management is “a wide spectrum of varied activities and is totally committed to providing a smooth flow from suppliers to production to customers.” Figure 2. represents a typical flow of materials from supplier to customer.



Total materials management can be defined as an organizational concept that fosters a total systems approach to plan, acquire, store move, and control materials, in order to optimize all company resources and provide customer service consistent with company policy. The materials referred to in this definition are all materials that a company may control, including raw materials, supplies, work-in-process, and finished goods. Company resources include materials, people, money, and facilities.

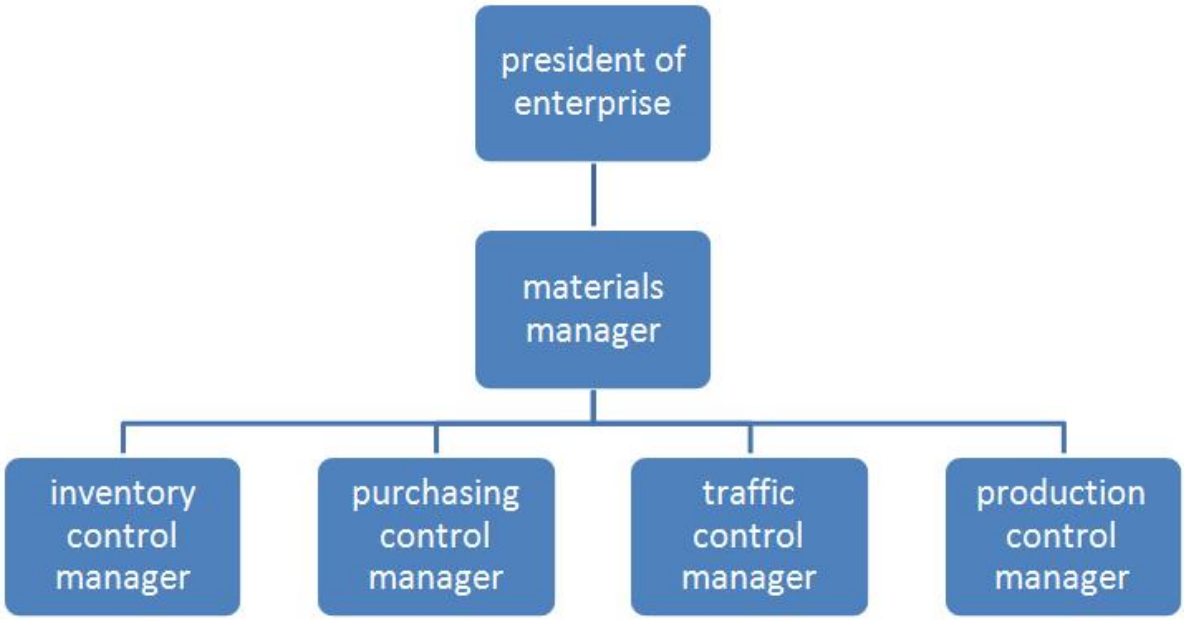
2.3 MATERIALS MANAGEMENT ORGANIZATION

Materials management is one of the sub functions of strategic management, it possesses sub functions like purchasing, production, control and distribution. The below diagram explains structure of the organization with materials management as a separate function.



Large organization where numerous raw materials and semi-finished goods are to be procured and issued will have sub departments in it. The sub departments will be like

inventory control department, purchasing control department, traffic control department and production control department.



2.4 MATERIALS MANAGEMENT CONCEPTS

Today materials manager has to equip himself with all the qualities and attributes that a general manager should have because the concept of materials management has matured so much. Blending of managerial functions are happening today in a prudent way so that an organization can arrive at economy in materials and can avoid wastage in materials and it in turn creates a strong foundation to an organization to face competition.

The basic concept of materials management lies in identifying a system that can help to reduce cost and delay at work place. It helps in knowing poor performance done by management with respect to handling different materials at the right quantity, source and time. Materials management is not mere materials management or managing or observing materials when they arrive or when it is issued for production. It is a vast area of activity including planning of materials, their procurement in right quantity and quality, their proper dispatch on proper time and disposing obsolete or excess materials.

Materials management is not inward-looking static concept rather it is a pragmatic forward looking concept which proceeds still further. This concept is dynamic, with the changing industrial environment it is keeping itself abreast, moving with time.

When it comes for production cost, at one hand there is a raising cost of wages to workers, through hostile trade union pressing for increase in pay and on another hand severe competition through horizontal combination has created a situation demanding more attention towards better materials management.

This is making management personnel to be increasingly alert while testing new application of latest materials management techniques. As a reason materials management is very challenging with modern techniques of production.

Amongst the different areas of management in an organization, when it comes for production unit, materials management constitutes very critical area of management.

CHECK YOUR PROGRESS

1. An _____ approach provides for coordinating all business activities that are part of the materials cycle, from supplier through company operations and on the critical materials-related sub functions.
2. The materials refers to all the materials that a company may control, including raw materials, _____ and finished goods.
3. The sub departments in materials department include inventory control department, _____, traffic control department and production control department
4. Materials' Management is a vast area of activity including planning of materials, procurement in _____, their proper dispatch on proper time and disposing obsolete or excess materials.
5. Materials management is not inward-looking static concept rather it is a _____.

2.5 INTEGRATED SYSTEMS APPROACH TO MATERIALS MANAGEMENT

Integrated systems approach to materials management is one of the main reasons of good materials productivity. This happens through coordination of its flow into the production or service system, looking at the total system relevant costs; both visible and hidden to get most value out of every rupee invested in materials, components, and parts. This will mean addressing the following major areas for the coordinated action as represented in the following schematic diagram. These problem areas are also interdependent and will impact or influence each other represented by the interacting information flow as depicted through the directed arrows. The effect of demand and supply environment as environmental supra system is shown.

Fig. 1.1 Proposed framework for integrated systems approach to materials management (MM)

Through the circle encompassing the materials management system. The major problem areas requiring coordinated actions are as follows-

1. Inventory management
2. Materials handling and transportation
3. Storage and warehousing
4. Waste management or SOS (Surplus, obsolete, and scrap management)
5. Make or buy decisions and outsourcing
6. Incoming materials quality assurance
7. Vendor selection, evaluation and development
8. Value analysis for cost reduction or cost avoidance.
9. Lead time compression, value stream mapping, and process simplifications
10. Standardization, codification and variety reduction
11. IT-enabled systems and process
12. Purchasing systems to ensure right price
13. Supply chain management and system integration
14. Organization structure for effective materials management
15. Materials management performance monitoring, reporting system.

2.6 NOTES

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2.7 SUMMARY

In this unit you have learnt that materials management is the process of planning and controlling material flows. It includes planning and procuring materials, supplier evaluation and selection, purchasing, materials, supplier evaluation, and selection, purchasing, expenditure, shipping, receipt process for materials (Including quality control), warehousing and inventory and materials distribution.

Materials management is not mere managing materials in the stores of an organization and observing their utilization. It covers vast area of activities like planning of materials, procurement of quality and quantity, dispatch and identifying obsolete or excess materials in a store and dealing with that.

Today Materials management concept is very much matured: a materials manager has to equip himself with all the qualities and attributes that a general manager should have. The managerial functions are blended in a prudent way to secure economy in materials, to avoid wastage in materials and thus to create a solid foundation for an organization to face competition

Integrated systems approach to materials management is one of the main reasons of low materials productivity. This happens through coordination of its flow into the production or service system, looking at the total system relevant costs; both visible and hidden to get most value out of every dollar invested in materials, components, and parts.

2.8 KEY WORDS

- **Suprasystems:** Macro Level system composed of number of subsystems
- **Integrated system:** many subsystems combined to form one system which are strongly dependent of each other.
- **Just in Time:** A Japanese concept of production which do not advocate keeping of inventory.

2.9 ANSWER TO CHECK YOUR PROGRESS

1. Integrated
2. Work in Process
3. Purchase Control
4. Procurement in right quantity and quality
5. Pragmatic forward looking concept

2.10 SELF ASSESSMENT QUESTIONS

1. Do you agree materials management is an integration of all management concepts? If Yes Why? If No What are the reasons?
2. Explain how does materials management helps an organization to foster systems approach.
3. Describe the structure of an organization with materials management as a separate function.
4. Substantiate the statement "Materials manager has to equip himself with al the qualities and attributes that general manager should have" with examples.
5. How does system's approach of materials management is one of the main reasons of low materials productivity? Explain in detail.

2.11 REFERENCES

1. J. R. Tony Amold, Stephon N. Chapman, (2001), "Introduction to materials management" Printice hall.
2. P. Gopala Krishnan, (2006), "Purchasing and materials Management", McGrawhill.
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UNIT 3: MATERIALS PLANNING AND BUDGETING

Structure:

3.1 OBJECTIVES

After studying this unit, you should be able to:

- Define materials planning Find out the Importance and gain of materials planning;
- Analyze the factors affecting materials planning;
- Identify the problems experienced in materials management;
- Recommend effective and authentic materials planning ;
- Prepare material budget;
- prepare materials budgeting and
- Evaluate the benefits of materials budgeting.

3.2 INTRODUCTION

Production of Product everyday determines the planning of items or materials required. The quality of sub-assemblies, parts and raw materials needed are planned to buy. Today a large number of inventory models are available, which are helpful in minimizing the total cost comprising all relevant costs and associated uncertainty. A suitable mode can be selected, depending upon organization's need or situation.

The basic calculation used by the materials budget is as follows-

Raw materials required for production + Planned ending inventory balance = Total raw materials required - Beginning raw materials inventory = Raw materials to be purchased.

3.3 MATERIAL PLANNING

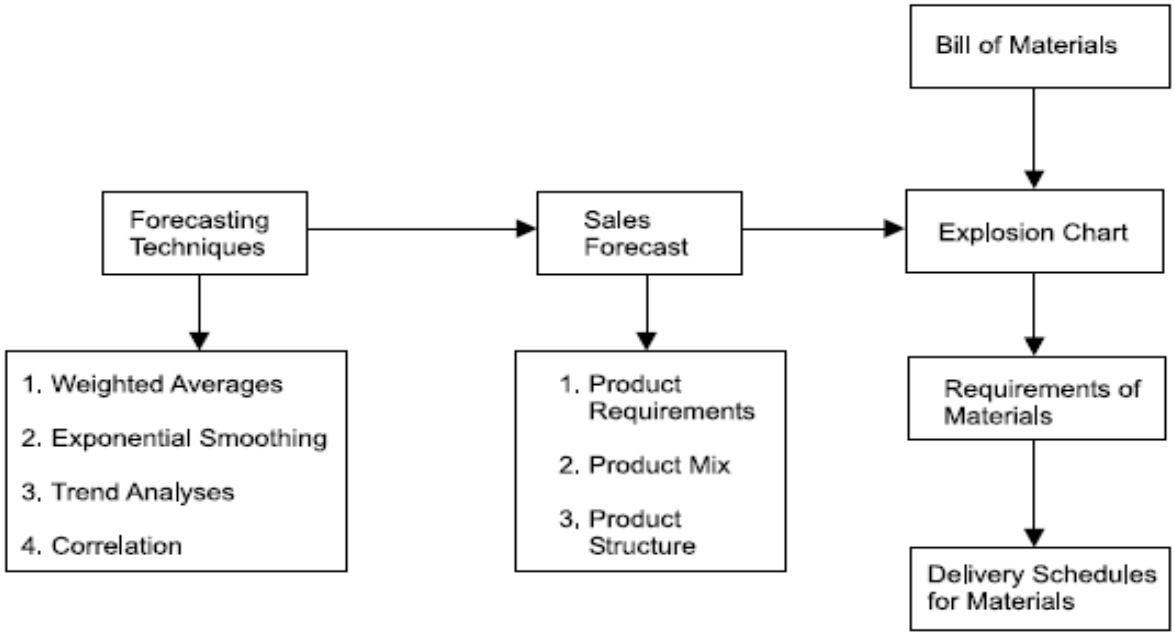
Material planning is done on the basis of forecast of end product demand. Forecasting techniques such as weight average method, exponential smoothening and time series models are used for planning. Bill of materials is a document which shows list of materials required,

until a given product is made ready and transported. An exclusive chart is a series of bill of material grouped in a matrix form so that combined requirements for different components can be done. requirements of various materials arrive at from the demand forecast, using bill of materials, through exclusive charts. Thus material requirement plan will lead to be the development of delivery schedule of the materials and purchasing of those material requirements.

It is a scientific way of determining the requirements of raw materials or components needed in a company for production. The items needed for production are identified within economic investment policies. It is one of the sub system in the overall planning activity. Material planning is influenced by many factors. These factors can be classified as macro and microsystems.

a) **Macro factors:** Price trends, business cycles, government's import policy are some of the micro factors which are affecting material planning.
b) **Micro factor:** Plant capacity utilization, rejection rates, and communication are some of the micro factors that affect material planning. Essentially the factors existing within an organization like production plan, corporate policy on inventory holding, investment etc. are also included. For any organization, factors such as lead time of procurement, acceptable inventory levels, working capital, seasonality, delegation of power are micro factors.

Material planning



3.4 BENEFITS OF MATERIALS PLANNING

Benefits of materials planning are -

1. It avoids the practice of crisis management.
2. Helps to perform effectively and efficiently due to proper forecasts.
3. Helps in materials budgeting.
4. Helps in purchase planning.

3.5 MATERIALS BUDGETING

Examples of the direct materials budget

ABC Company plans to produce a variety of plastic goods, and 98 percent of its raw materials involve plastic resin. Thus, there is only one key commodity to be concerned with. Its production needs are outlined as follows:

ABC Company

Direct Materials Budget

For the Year Ended December 31, 20XX

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Product A (units) to be produced*	5,000	6,000	7,000	8,000
x Resin/unit (kg)	2	2	2	2
Total resin needed	10,000	12,000	14,000	16,000
+ Planned ending inventory *	2,000	2,400	2,800	3,200
= Total resin required	12,000	14,400	16,800	19,200
-Beginning inventory +	1,600	2,000	2,400	2,800
= Resin to be purchased	10,400	12,400	14,400	16,400
Resin cost per kg	$0.50	$0.50	$0.55	$0.55
Total resin cost to purchase	$5,200	$6,200	$7,920	$9,020

* - Given

+ - Calculated @ 20 Per cent

The inventory at the end of each quarter or beginning inventory of next quarter is planned to be 20 percent of the amount of resin used during that quarted, so the ending inventory varies over time, gradually increasing as production requirements increase. The reason for the planned increase is that ABC has some difficulty receiving resin in a timely manner from its supplier, so it maintains a safety stock of inventory on hand.

3.6 BENEFITS OF MATERIALS BUDGETS

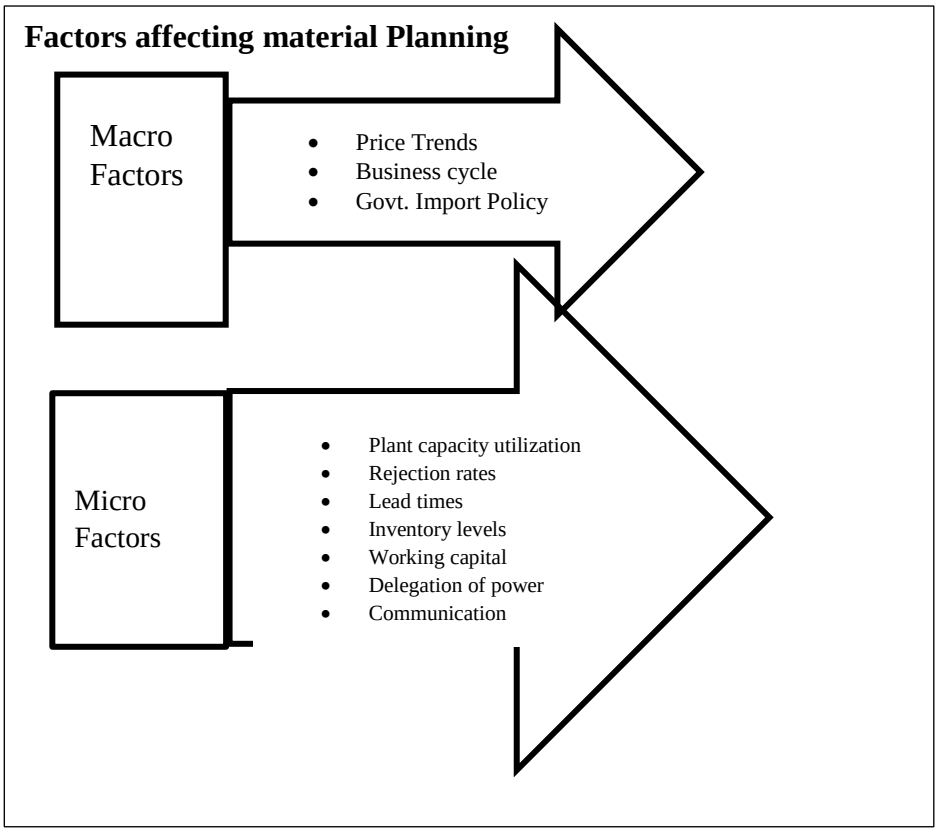
Benefits of materials budgets are as follows-

- The budget keeps the inventory always in check so that there cannot be sudden scarcity or abundance of raw materials.
- No excess inventory cost will be incurred if materials budget is maintained well.
- Cash flow can be maintained well in a better way. With the help of budget organization can notify the exact amount and time of the expected cash flow required in the future can be known.
- As Materials budget is prepared for every month or quarter, organization can identify any errors or flaws before the financial year-end.

3.7 FACTORS INFLUENCING MATERIALS PLANNING

There are two major factors influencing the material planning, they are-

1. **Macro Factors:** These include factors such as business cycles, import and export policies, price, trends, credit policy and other global factors.
2. **Micro factors:** These factors include the internal organization factors such as production plan, investments, corporate policies, inventory holding. Other essential factors such as the time of procurement, working capital, acceptable inventory levels, delegation of power seasonality also influence the material planning.



The key factors influencing material planning can be shown as inputs from:

1. Based on the forecasting and project management type
2. Total manufacturing order and service order
3. Capacity which needs to be produced as well as distribution metrics
4. Finally, depending upon the purchase order and customer order

Material Planning can be carried out by

1. Requirement based on past consumption.
2. Material Resource Planning (MRP): MRP starts with the production plan of the concerned manufacturing. Once the annual production plan is determined, the material requirement is calculated by detailed analysis of materials required, the ones not available and, lead time of procurement etc.

3.8 PROBLEMS ENCOUNTERED IN MATERIALS PLANNING

As per major activity groups involved in materials management in any manufacturing organization, 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.

Problems relating to Materials Planning

1. **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 equipment needed in the process and manufacture of end products. It provides information with respect of 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 the alternatives for suitability to the design from functional point of view from processing point of view i.e., where it will help in easier / faster changes in the products process of the organization. For example colour codes or item tags are used to paint different colours on different items to differentiate them based on customer, grade, specification as applicable.
2. **Standardization:** Basic purpose of standardization is to achieve inter-changeability of parts.

   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 standardization this number of different types can be brought down to 20-30 without compromising on functional quality and requirement of the product.
3. **Make or buy:** Large organizations, (even small organizations) usually are not in a position to manufacture all parts or components required to be used in product manufactured by them.

   This is because:

   a) It may not be the economical to manufacture industry.

   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 manufactures-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 be brought from outside. Materials management activity helps the organization in taking this decision from time to time. Engineering and design, production, finance departments etc also join together to helping 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. This we will discuss in detail in unit number 11.

4. 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 organization. You can recall example of Dabbawalas of Mumbai here.

The following factors need to be considered for devising a classification or codification system:

a) The basis of classification and codification should be same and consistently applicable to all items.
b) It should cover all items presently in use and should be capable to take up a new item 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 items should have same code.
d) The code should be uniformly used and understood throughout the organization by concerned persons. It should be simple to understand and apply. It should normally be self-explanatory.

Result of proper codification system are-

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. Locational planning of materials in the store can be done

CHECK YOUR PROGRESS

1. _____ is a document which shows list of materials required, until a given product is made ready and transported

2. Acceptable inventory levels is _____ Factor influencing material planning (Micro/ Macro)
3. _____ helps in materials budgeting.
4. The detailed analysis of material requirement materials required the ones not available and lead time of procurement etc. is called _____
5. _____ is a decision of whether certain items may be more advantageously manufactured in-house or be brought from outside.

3.9 NOTES

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3.10 SUMMARY

- **Materials Planning:** Production of Product everyday determines the planning of items or materials required. Many manufacturing companies have adopted computerized systems to control the flow of resources and inventory. Materials requirement planning is one such system. MRP uses a master schedule to ensure that the materials, labor, and equipment needed for production are at the right places in the right amounts at the right times.
- **Material planning**: Material planning is influenced by many factors. These factors can be classified as macro and microsystems.

Benefits of materials planning

1. It avoids the practice of crisis management
2. It Helps to perform effectively and efficiently due to proper forecasts
3. It Helps in materials budgeting
4. It Helps in purchase planning

Problems encountered in materials planning

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.

Materials budget: is used to identify the requirement in production budget. Materials that must be purchased within a time period is calculated in this. In an annual budget it is presented in either a monthly or quarterly format.

Benefits of materials planning are

- Inventory levels
- Purchasing planning
- Production planning
- Work scheduling
- Customer service improved
- Saves times.

3.11 ANSWER TO CHECK YOUR PROGRESS

1. Bill of materials
2. Micro factors
3. Material Planning
4. Material Requirement Planning
5. Make or Buy

3.12 KEY WORDS

- **Bill of Materials** is a document which shows list of materials required, until a given product is made ready and transported Planning
- **MRP: Material Requirement Planning** The detailed analysis of material requirement materials required the ones not available and lead time of procurement etc. is called
- **Make or Buy** is a decision of whether certain items may be more advantageously manufactured in-house or be brought from outside.

3.13 SELF-ASSESSMENT QUESTIONS

1. What is Materials planning? Why is it necessary to an organization?
2. What are the benefits of materials planning?
3. Describe the factors determining materials planning.
4. Do you agree that 'materials controlling can be achieved by controlling over materials of an organization'? Substantiate this with your answer.
5. What are the problems encountered in materials planning? Explain in detail.

3.15 REFERENCES

1. J. R. Tony Amold, Stephon N. Chapman, (2001), "Introduction to materials management" Printice hall.
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3. Eugene L. Magad & John M. Amos, (1995), “Total materials management”, Chapman & Hall.
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UNIT-4: MATERIALS CONTROL

Structure:

4.1 OBJECTIVES

After studying this unit, you should be able to:

- Define material control;
- Explain the basis for material control and
- Find out the procedure of recording materials control.

4.2 INTRODUCTION

Materials control an uninterrupted functioning of an organization. It can be achieved by controlling over materials of an organization. It is a system which ensures availability of the required quantity and proper quality at the proper time and at the same time avoidance of unnecessarily blocking up of capital in stores. The system of material control should be so comprehensive that it covers the whole procedure from the point when order is placed with the suppliers up to the stage until the materials are consumed in production.

4.3 MATERIALS CONTROL

Material control is the systematically controlling process of materials over many pages of production like controlling materials over stages of procurement, storage and usage to help and maintain the regular and uninterrupted flow of the materials in the production pipeline.

"Material control is a management activity that administers how the inventory employed in the production process is procured, acquired, handled and utilized. It is a process that requires planning, organizing and auditing of all the elements employed in certain productive activity".

The main objectives of material control are: to maintain an uninterrupted supply of all elements required for the production process to run smoothly, to reduce thefts and wastage through proper storing procedures and to manage efficient handling, dispensation and consumption of available materials. This is a crucial function for companies to reduce their costs, since it deals with one of the highest cost centers of any business organization, which is its productive process

Materials are all the commodities consumed in the production department to produce items either directly or indirectly. Inventory is a common term used for raw materials, components, work-in-progress, and finished goods stocked in the store.

Calculating material cost is also vital for calculating the cost of production. Materials in some cases account for more than 65% cost of product. Hence proper control over material cost is vital.

Production cost can be limited with the help of efficient material cost system by substantially reducing the cost of materials.

Maintaining production schedules, meeting market demand and avoiding excessive investment in inventories is possible if systematic and effective control over material is obtained.

Material control is the main component of the process of material management. Materials control may be defined as a system which ensures availability of the required quantity of material of proper quality at the proper time and at the same time avoidance of unnecessarily blocking up of capital in stores. The system of material control should be so comprehensive that it covers the whole procedure from the point when order is placed with the suppliers up to the stage until the materials are consumed in production.

According to True Tamplin Material control is the process of systematically controlling materials over the stages of procurement, storage, and usage so as to help maintain the regular and uninterrupted flow of the materials in the production pipeline.

According to Smriti Chand "Material control is a systematic control over purchasing, storing and consumption of materials, so as to maintain a regular and timely supply of materials, at the same time, avoiding overstocking."

Material control refers to the "management function concerned with acquisition, storage, handling and use of materials so as to minimize wastage and losses, derive maximum economy and establish responsibility for various operations through physical checks, record keeping, accounting and other devices."

No system of costing is complete without an effective material control system. Material control is a system that ensures the provision of the required quantity of materials of the required quality at the required time with the minimum capital investment.

4.4 ESTABLISHING THE BASE FOR MATERIALS CONTROL

Sound material control can be established with the following Basis of materials control.

- ***Proper Co-ordination:*** Amongst different materials control department like material purchasing, receiving, testing, storing, production planning and accounting, there should be a proper co-operation and co-ordination.
- ***Centralization of Purchasing:*** The important requirement of a successful inventory control system is the appointment of intelligent and experienced personnel in purchase department; these personnel should be expert in their field and negotiating

the deals. It is important to determine purchase procedure to see that purchases are made, after making suitable enquiries, at the most favorable terms to the firm.

- ***Proper Scheduling:*** All the requisitions made by production department should be scheduled, so that material could be issued from time to time which avoids hampering of production.
- ***Proper Classification:*** *Materials should be properly classified and codified based on some proper methods*. Proper code numbering of each item and groups helps the department in prompt recording and dealing.
- ***Use of Standard Forms:*** Any information can be sent to all the departments within no time if standard forms for requisitions, order, issue, return and transfer of materials are followed.
- ***Internal Check System:*** To know the effectiveness of inventory control audit should be done by an independent party.
- ***Proper Storing System:*** Loss from damage, evaporation, pilferage, theft and deterioration can be avoided if all the materials and supplies are stored in a well designated location with proper safeguards. This can be achieved by developing store location between purchase department and production department, it also helps in minimizing internal transportation cost.
- ***Proper Store Accounting:*** An efficient inventory control necessitates maintenance of proper inventory records. This helps in obtaining in identifying any typical information regarding any particular item of inventory from such records.
- ***Proper Issuing System:*** Adopting an operation system for controlling stores and operation system helps in delivering materials upon requisition. This helps in the delivery of materials in the right amount**.**
- ***Perpetual Inventory System:*** The amount and value of each kind of material in stock can possibly be determined by Operating perpetual inventory together with continuous stock checking. The real time data is taken here,
- ***Fixing of Various Stock Levels****: Under or over stocking can be avoided if* Stock of different levels are maintained and should be should be pre-determined to ensure the continuity of smooth production. The various levels of maintaining stock can be like minimum stock level, maximum stock level, reorder point, safety level etc,
- ***Determination of Economic Order Quantity:*** Cost of inventory can be minimized by maintaining Economic order quantity.

- ***Regular Reporting System:*** The management should take regular information regarding stock position, materials quantity etc.

4.5 RECORD AND PROCEDURES OF MATERIALS CONTROL

- Project stores shall be identified for receiving material, plant or equipment and have to be stored in a defined area.
- Before receiving materials, the storekeeper has to check the incoming document in accordance with material supplied and the original purchase order. Purchase requisition.
- Without the correct documentation no material shall be accepted in the project stores called as material control procedure.
- The storekeeper shall have to inform quality inspector to do the inspection of materials after the receipt of materials.
- Whether the material, plant or equipment is fit for the purpose or is it confirming to the specification can be ascertained after the inspection of store keeper and quality inspector.
- After the inspection from store keeper and quality inspector, a satisfactory report has to be prepared. Further quality inspector shall forward the report to materials inspection if the report is found satisfactory. Based on which request for final inspection of the material, plant or equipment can be done.
- When the delivered material, plant, or equipment is accepted, significant documents shall be acquired by the storekeeper and shall be forwarded to the QA/QC Manager / Procurement Manager for safekeeping. Such documents are not as limited as follows:
    - Delivery Note
    - Material Testing Certificate / Factory Test Certificate
    - Bill of Lading
    - Country of Origin
    - Operation & Maintenance Manual
    - Installation Manual
    - Warranty Certificates
    - Other related testing records from the manufacturer's vicinity as applicable.
- Site Procurement Manager has to furnish copies of the documents to the senior site Engineer for their information and use. (Original copies shall be well maintained for final handing over of the project which shall be handed to Employer / PMT finally)

- Storekeeper shall raise a sequentially numbered site stores receiving voucher. (Material control procedure)
- The Storekeeper shall ensure that the site stores receiving voucher is signed by
    - Himself, confirming the correct quantities of the material, and correct incoming
    - Himself, confirming that all material has been entered into stock records.
    - The Storekeeper and/or Site discipline and authorized material inspector who inspected the material for conformance
    - The Project manager to approve the receipt of the material
- Copies of the Receiving Voucher shall be distributed as follows
    - White copy to purchasing department
    - Yellow copy to central stores
    - Pink copy to accounts department
    - Green copy to site stores files
- Material deliveries shall be handled in accordance with the handling and storage process.
    - All the Copies of incoming documentation has to be maintained in the files of store's.
    - Controlling of all non-conforming material deliveries has to be controlled in accordance with handling of non-conformance procedure.
    - Materials can be received from the project stores after producing sequentially numbered issue or return voucher signed by the store keeper and/or material quality inspector
    - Store keeper and site procurement manager generates material status and makes it available if requested by QA/QC Manager.

CHECK YOUR PROGRESS

1. Material control is systematically control over purchasing, _____ and Consumption of materials
2. Companies order materials in right quantity in the form of _____considering both purchase cost and storage cost
3. The continuous accounting practice that records inventory changes in real time is called _____
4. The stock maintained to meet emergency conditions are called _____

5. The level at which the stocks are depleted that triggers purchasing is called _____

4.6 GUIDELINES FOR EFFECTIVE AND RELIABLE MATERIALS CONTROL

Proper guideline to be used for effective and reliable materials control are as follows-

1. Proper coordination is needed for all departments involved in material purchasing, receiving, testing, approving, storage, accounting and distributing of funds.
2. Use of materials, supplies and equipment budgets so that economy in purchasing and use of materials can be realized.
3. Operation of system of internal check is to be done, so that all transactions involving materials, supplies and equipment purchases are checked and approved by a number of properly authorized persons.
4. Centralization of purchasing is advisable. Economy in purchasing and use of materials may be achieved through use of materials, supplies and equipment budgets.
5. Standard forms upon which instructions regarding purchases and uses of materials are properly written should be accepted.
6. Storage of all materials and supplies in a designated location, properly safeguarded under effective supervision.
7. A system of perpetual inventory should be adopted so that it is possible to determine at every time the amount and value of each kind of material in stock.
8. Determination of a minimum quantity to each item of material below which point the inventory is not allowed to drop and also a maximum quantity above which stock should not be carried.
9. A proper and effective system of stock control and issue should be adopted so that there will be delivery of materials upon requisition to departments in the right time and right amount at the time they are needed.
10. Development of a system of controlling accounts and subsidiary records which exhibit summary and detailed material cost at each stage of material receipt and consumption from the stock room to finished goods.
11. Regular reports of materials purchased, issued from stock, inventory balances, obsolete stock, goods returned to vendors and spoiled or defective items to be maintained.

4.7 NOTES

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4.8 SUMMARY

Materials Control: It is a system which ensures availability of the required quantity and of the proper quality at the proper time and at the same time and avoidance of unnecessarily blocking up of capital in stores.

Establishing the Base for Materials Control: Sound material control can be established with the following Basis of materials control

- Proper Co-ordination
- Centralization of Purchasing
- Proper Scheduling
- Proper Classification
- Use of Standard Forms
- Internal Check System
- Proper Storing System
- Proper Store Accounting
- Proper Issuing System
- Perpetual Inventory System
- Fixing of Various Stock Levels
- Determination of Economic Order Quantity
- Regular Reporting System

4.9 KEY WORDS

- **Material control** is a systematic control over purchasing, storing and consumption of materials, so as to maintain a regular and timely supply of materials, at the same time, avoiding overstocking.
- **Economic Order Quantity:** Ordering an optimum size of lot considering both purchase cost and storing cost
    - planning
    - Production
    - Budget
    - Control
    - Record
    - Procedures
    -

4.10 ANSWER TO CHECK YOUR PROGRESS

1. Storing
2. Economic Order Quantity
3. Perpetual Inventory
4. Safety Stock
5. Re order level

4.11 SELF- ASSESSMENT QUESTIONS

1. Comment on 'Materials budget is used to identify the requirement in production budget'
2. Explain the benefits of materials budget.
3. 'No system of costing is complete without an effective material control system'. Do you agree to this statement? Why? or why not?
4. What are the basis for material control? Explain in detail?
5. Explain the record and procedure of material control in an organization.

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BLOCK 2: STORE MANAGEMENT

Any organization invests substantially in the material hence they need to be preserved with utmost care. Receiving, storing, issuing the material are the three important functions that are carried out by the store. Warehousing the material is not an easy job but a package of activities rather a service the production, the next internal customer in the production cycle, to ensure smooth production. The materials are usually numbered, tagged and stored at predefined place or bins. They may also be colour coded to showcase their identity. An organization may house raw material such as coal, metals like steel, copper, iron, aluminum, silver, gold, non-metals like plastic rubber, glass. It may also store chemicals, fuels, lubrication oils, The materials have to used or consumed periodically. The materials are classified for better maintenance and control. Such classification may be on the basis of price, size, criticality and the way of maintaining them.

In this block, you will study in detail about store management through below units

Unit -5 : Organizing For Materials Management

Unit -6: Store Management

Unit-7: Spare Parts Management

Unit-8: Integrated Management Information System

UNIT-5: ORGANIZING FOR MATERIALS MANAGEMENT

Structure:

5.0 OBJECTIVES

After studying this unit, you would be able to:

- Explain organizing materials management, steps in organizing materials and need for organizing materials;
- Discuss organizational variation within materials management
- Describe scope of materials management organization
- Explain limitations of materials management

5.1 INTRODUCTION

Materials Management is an organizational concept whose primary objective is to integrate and manage the sourcing, flow, and control of materials using a total systems perspective across multiple function reports to a different executive, which can result in each function or activity pursuing conflicting organizational goals and objectives. Of the 7 prime resources needed to run an organization, namely management, materials, methods, manpower, machines, money and matrix (facilities), the materials are the major resource to be managed effectively. The organization of materials management is aimed at planning the materials requirements for the production of goods and services. The organization structure should be such that the materials can be managed efficiently and its flow, storage and use can be controlled effectively. Materials management organization ensures that the materials are used economically and wisely. The finished products should be manufactured using the existing materials purchased at economic costs and be brought under a single organizational section, with equal sharing of responsibilities of their flow, maintenance, storage, utility, quality and cost of materials. Materials management is not just limited to organizing materials, but also managing the inventory and purchase activity, assessing the value, conservation and protection of inventories in hand and in process.

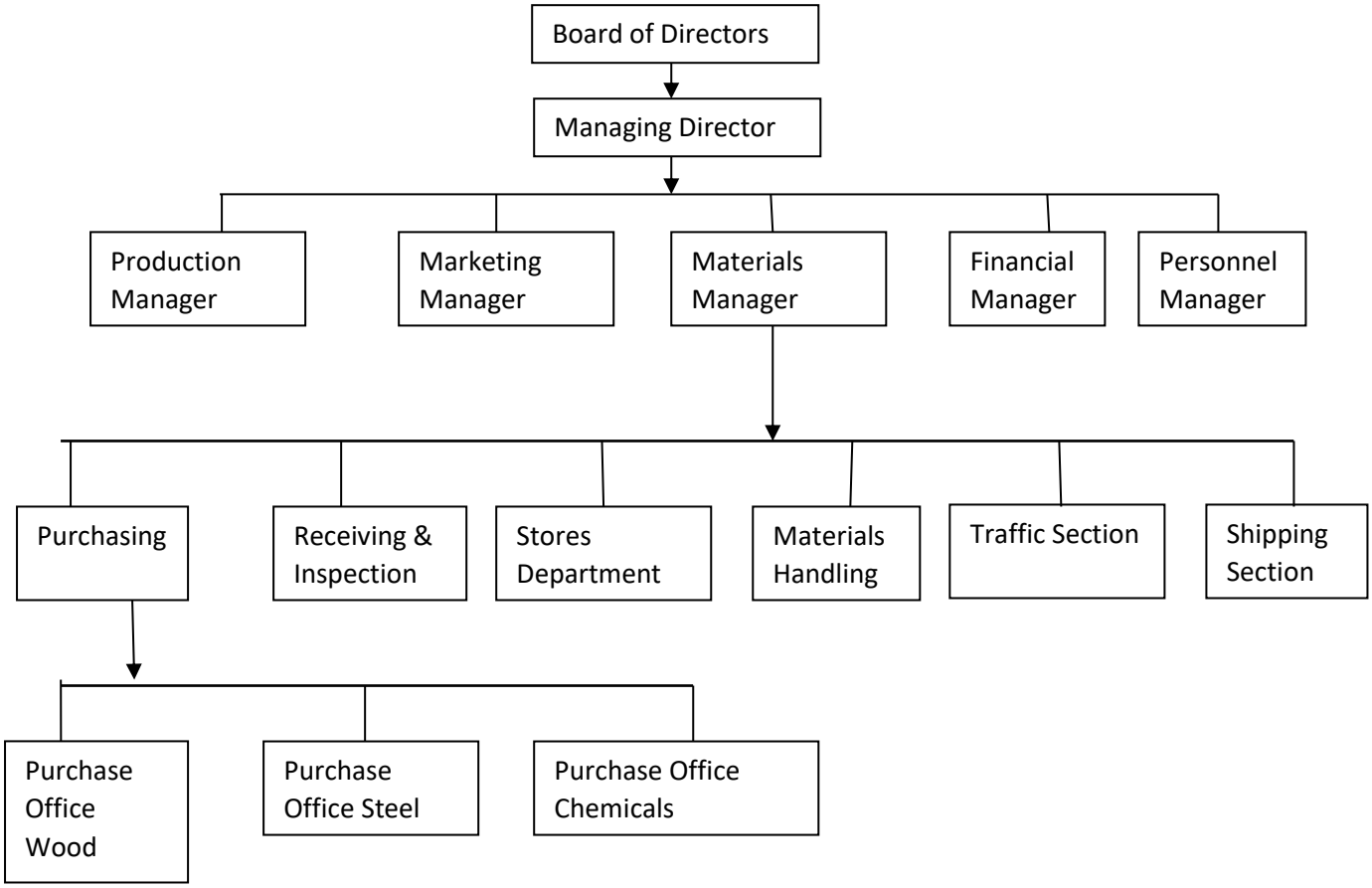
5.2 MATERIALS MANAGEMENT IN THE COMPANY ORGANIZATION

The organization of materials management ensures efficient integration of activities related to materials and the regulation of their use as per the production requirements to maintain stability in the department. There should be harmonious structural growth and authority within the organization's hierarchical system and integrative decision-making. This helps in **achieving the goals of the organization by way of proper information supply system.**

Like all other management areas viz., manufacturing, marketing, finance and personnel, materials management should have an independent existence and should be put under the

direct control of top management. Due to the manufacturing characteristics, the organization structure would differ from industry to industry. Even within the same industry, it would differ from company to company due to the size of the unit, dispersion of plants, diversification of activities and above all philosophy of management.

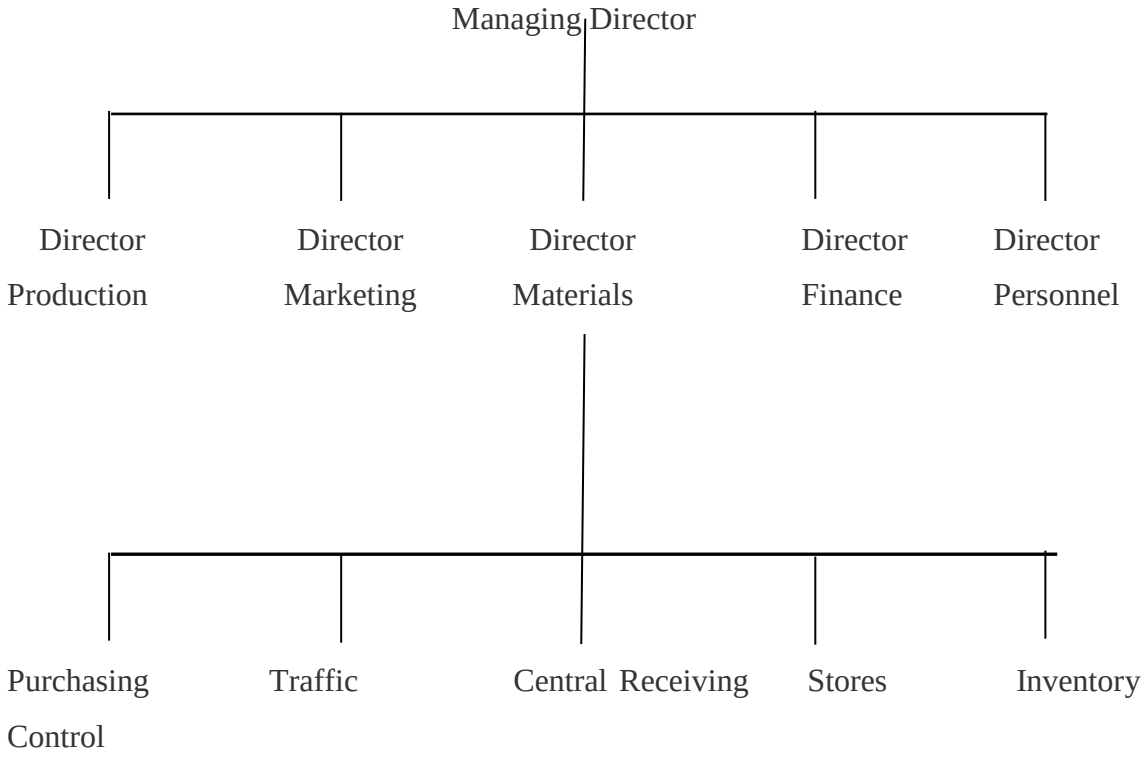
The internal organization of the materials management in large-sized company is shown here



We have seen the need for integrated materials management and the advantages that go with it. It was also recognized that materials management is a top management functions. Some organizations in India have a director in the board exclusively in charge of materials and even small organizations are no exception to the order. A typical organization chart is shown in Exhibit 5.2

EXHIBIT 5.2

TOTAL ORGANIZATIONAL PLAN



Depending upon the company's operations and its environment, many variations of the organization plan are feasible

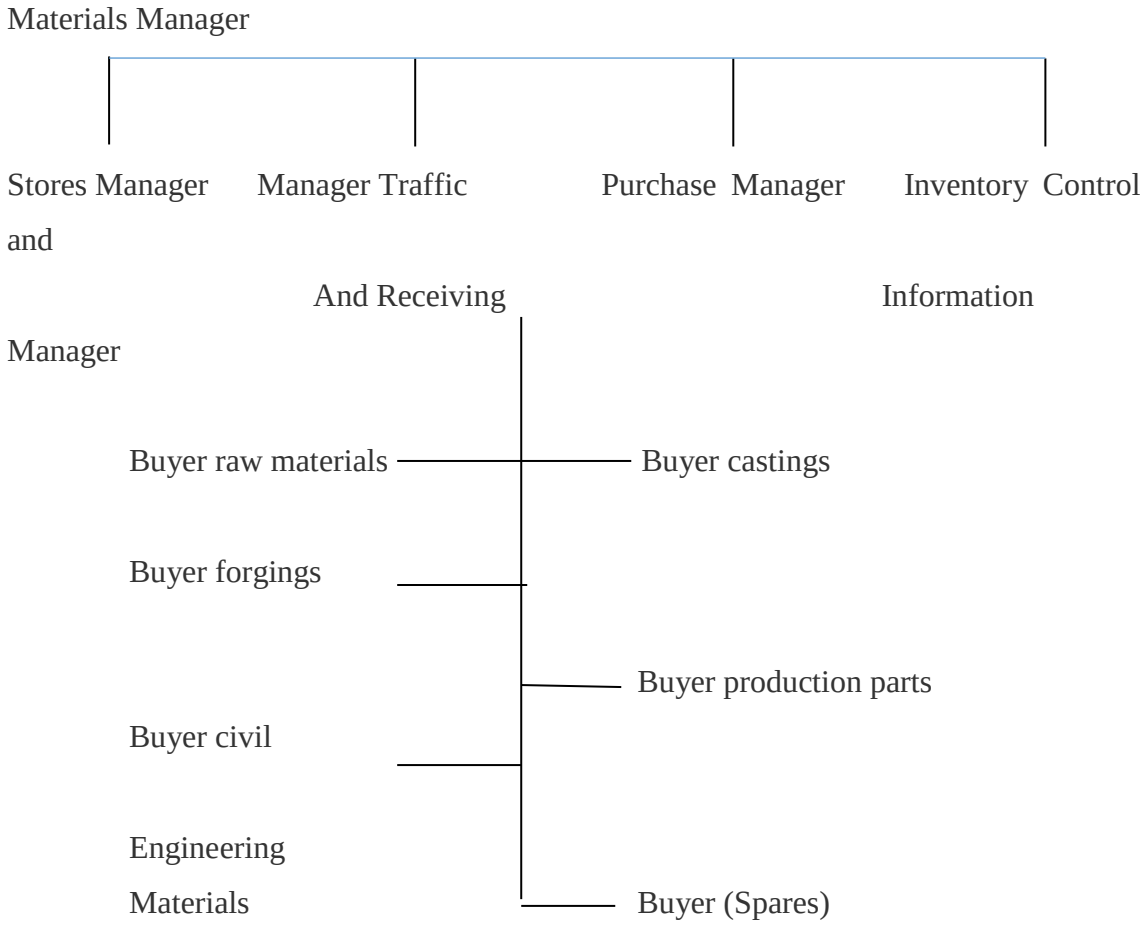
5.3 ORGANIZING MATERIALS MANAGEMENT

Once the relationship of materials management with regard to other departments in the overall organizational plan is finalized, the next step is to finalize the internal structuring of the department. The following alternatives are available.

Organization Based on Commodities

Under this system of organization, items are classified according to their nature such as raw materials, bought out components, spares, imported items, finished goods and so on, and they are assigned to individuals. Depending upon the importance of the commodity group in respect of the operations of the company, workload will vary between the groups and this forms the basis for determining the staff in each commodity group. For example an automobile manufacturing firm may have commodity groups for forgings, castings, pressed parts, raw materials, finished bought out items, and civil engineering materials. This arrangement is shown in Exhibit 5.3

EXHIBIT 5.3



Material Organization Based on Location

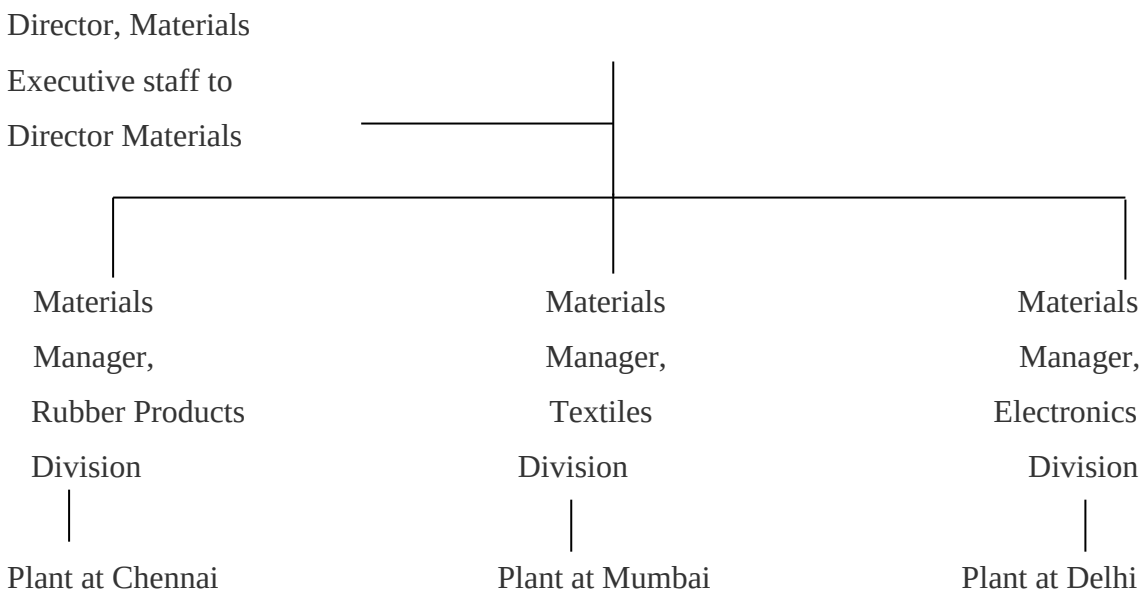
When an organization has several plants located in different parts of the country there are two alternatives. One is to have a centralized management located at the headquarters. The other is to have a decentralized materials management set up in each location. There are several reasons favoring the latter alternative. Firstly, when distances between the plants are significant, the materials management function is impaired when controlled from headquarters, both in terms of cost and time. Secondly, the plant's product lines play an important role. Each plant may require many unique materials and a materials management department located at the plant will be in a much better coordination with the plant's production, finance and marketing departments.

We can likewise list the advantages of a centralized materials management department for multi-plant operations. The most important benefit is that combining the requirements of plants and buying in bulk leads to substantial reduction in cost. In a centralized set-up, inter-plant transfer of materials in an emergency is possible. Also surplus materials in one plant can we utilized in meeting the requirements of another plant. Since

there is only one department dealing with various sources of supply a high order of skill can be expected. An example of decentralized set-up is shown in Exhibit 5.4.

Exhibit 5.4

MULTIPLANT OPERATIONS



We can, however, develop systems combining the advantages of centralization and decentralization. Under this system, control is exercised at policy level by a central materials management staff located at the headquarters. Continuous feedback is maintained on the operations of the decentralized departments. For example, the headquarters may lay down common policies, procedures and systems for all the plants. A periodic reporting system may be established between the plants and the headquarter. A system of delegation of powers could be installed whereby beyond a specific financial limit the plant's materials management department will have no authority and only the headquarters can make the decision. Common usage items where bulk buying could mean a lot of saving may be exclusively handled by the headquarters. Organization having multi-plant operations would benefit by adopting a judicious blend of decentralized set-up with centralized control.

Organization Based on Function

Here the materials management department is structured on the basis of functions such as stores, transport, receiving, purchase and so on. Thus, stores of different manufacturing divisions will be under one individual who will report to the materials manager. All purchasing activities will be again under one individual who will report to the

materials manager. This system which permits specialization in each function is now followed by many organizations in India.

Organization Based on Special Requirements

For organizations undertaking turn-key projects certain special aspects need to be considered. Erection of steel plants, commissioning of refineries, laying pipelines are some of the examples in this category. The important aspects which must be considered are:

1. The project schedule will require timely procurement of materials
2. Storage at site where conventional stores management aspects are not relevant
3. Flexibility of the set-up to spot interchangeable materials and equipment between projects to avoid delay and idling of equipment.
4. Ability to obtain or forecast costs which will assist in costing the entire project.

This has become one of the major activities; following each five year plan more and more projects are being commissioned. Sometimes a division-wise materials management function is organized in multi-divisional organizations. This has one advantage in that the materials management department is quick to grapple with the problems and needs and this facilitates better coordination.

5.4 INTER-DEPARTMENTAL RELATIONSHIPS

Broadly, the materials management will have to work in close coordination with production, marketing, and finance departments. Only an atmosphere of mutual trust will ensure that these departments will work towards the total organizational objectives. For instance, production will have to keep the materials management department informed about its plans and schedules also the materials requirements can be planned in advance. Even the adjustments in sales forecasting, or the changes in schedules must be duly conveyed to materials management. In the same way, the materials management department must keep the production department informed about the list of suppliers, availability of new materials and anticipated delays so that re-scheduling of production could be done and costly stock-outs avoided. The expertise of the materials departments could be profitably used by the production department in purchasing capital equipments.

The finance department also has to work in close coordination with materials in anticipating funds requirements, payment of bills to suppliers, insurance and so on. Such close coordination will ensure prompt payment of bills and improve relationship with the suppliers.

Marketing department will have to give advance information on forecasts and special requirements so that planning can be done effectively. Materials management through efficient operations can keep the prices at competitive level and thus help the marketing department in its operations.

In many organizations formal committees consisting of executives drawn from marketing, production, finance and materials management departments are formed to finalise annual sales targets, production programmes, total budgets, materials budget etc, Formal organizational arrangements help in furthering inter-departmental relationships.

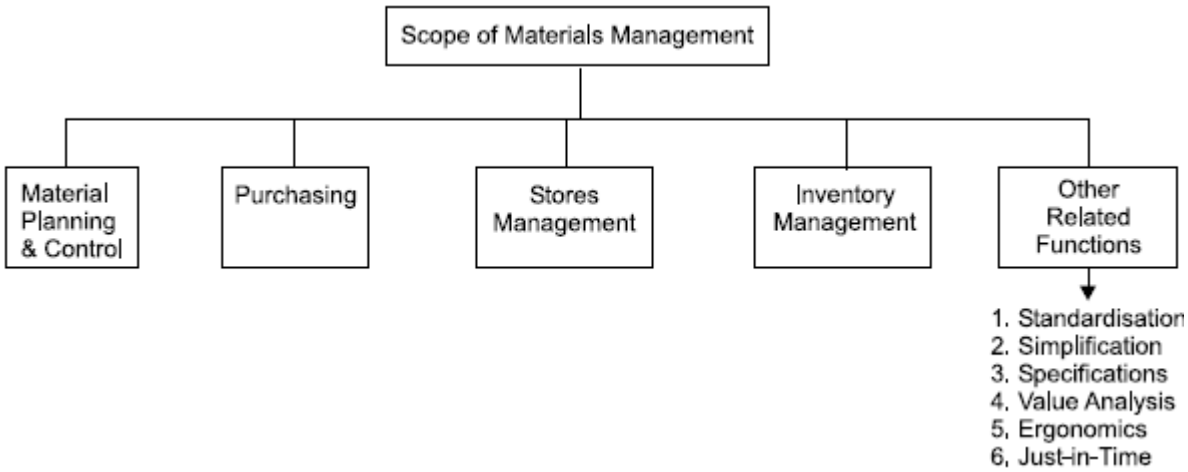
Span of Control and Delegation

Principles of sound organization should be followed in establishing span of control and delegation of powers. Generally speaking, executives at the top of an organization will have fewer persons reporting to them than a materials engineer who at his level may have many persons reporting to him. Powers, especially those of expenditures, should be clearly defined so that smooth working is possible.

CHECK YOUR PROGRESS

1. The 7 prime resources needed to run an organization are management, _____, methods, manpower, machines, money and matrix (facilities).
2. The material Management Department can be organized based _____
3. Materials Department works closely with _____ and _____ Department
4. Span of Control refers to
5. Marketing department will have to give advance information on _____

5.5 SCOPE OF MATERIALS MANAGEMENT ORGANIZATIONS



1. ***Materials planning and control:***

   Based on the sales forecast and production plans, the materials planning and control is done. This involves estimating the individual requirements of parts, preparing materials budget, forecasting the levels of inventories, scheduling the orders and monitoring the performance in relation to production and sales.

2. ***Purchasing:***

   This includes selection of sources of supply finalization in terms of purchase, placement of purchase orders, follow-up, maintenance of smooth relations with suppliers, approval of payments to suppliers, evaluating and rating suppliers.

3. ***Stores management or management:***

   This involves physical control of materials, preservation of stores, minimization of obsolescence and damage through timely disposal and efficient handling, maintenance of stores records, proper location and stocking. A store is also responsible for the physical verification of stocks and reconciling them with book figures. A store plays a vital role in the operations of a company.

4. ***Inventory control or management:***

   Inventory generally refers to the materials in stock. It is also called the idle resource of an enterprise. Inventories represent those items, which are either stocked for sale or they are in the process of manufacturing or they are in the form of materials, which are yet to be utilized. The interval between receiving the purchased parts and transforming them into final products varies from industries to industries depending upon the cycle time of manufacture. It is, therefore, necessary to hold inventories of various kinds to act as a buffer between supply and demand for efficient operation of the system. Thus, an effective control on inventory is a must for smooth and efficient running of the production cycle with least interruptions.

5. ***Other related activities***

a. ***3S***

   i. ***Standardization:*** Standardization means producing maximum variety of products from the minimum variety of materials, parts, tools and processes. It is the process of establishing standards or units of measure by which extent, quality, quantity, value, performance etc. may be compared and measured.

   ii. ***Simplification:*** The concept of simplification is closely related to standardization. Simplification is the process of reducing the variety of products

manufactured. Simplification is concerned with the reduction of product range, assemblies, parts, materials and design.

iii. ***Specifications:*** It refers to a precise statement that formulizes the requirements of the customer. It may relate to a product, process or a service.

Example:

Specifications of an axle block are Inside Dia. = 2 ± 0.1 cm, Outside Dia. = 4 ± 0.2 cm and Length = 10 ± 0.5 cm.

b. ***Value analysis****:* Value analysis is concerned with the costs added due to inefficient or unnecessary specifications and features. It makes its contribution in the last stage of product cycle, namely, the maturity stage. At this stage research and development no longer make positive contributions in terms of improving the efficiency of the functions of the product or adding new functions to it.

c. ***Ergonomics*** *(Human Engineering):* The human factors or human engineering is concerned with man-machine system. Ergonomics is "the design of human tasks, man-machine system, and effective accomplishment of the job, including displays for presenting information to human sensors, controls for human operations and complex man-machine systems." Each of the above functions is dealt in detail.

5.7 NOTES

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5.8 SUMMARY

Someone in every organization must make materials management decisions and since materials objectives are inter-related, it is desirable to give one-person authority overall activities concerned with materials management. There are some organizations where materials authority is dispersed in a number of departments in the organization, which means duplication of efforts and is considered a wasteful exercise. A materials manager is needed, since Inventory management is a key process and requires tough decisions and as such must understand the inventory process. Purchasing managers of manufacturing companies also work frequently as materials managers, particularly if there are no major materials management problems. In majority of organizations, the purchasing manager makes an excellent and effective materials manager provided he has the skills and authority. There are number of problems being faced in such a situation. One quite common

arrangement is to group together all materials management activities under a materials manager who in turn report to manufacturing manager. There are various arguments such as expediency, indivisibility and span of control which can be advanced for the role of materials manager as junior partner to manufacturing manager.

5.9 KEYWORDS

- **Organizing:** It is the second key management function, after planning, which coordinates human efforts, arranges resources and incorporates the two in such a way which helps in the achievement of objectives. It involves deciding the ways and means with which the plans can be implemented.
- **Multiplant Operations:** Comprising or involving more than one plant. to be anything but a small supplier of a local market requires a multiplant operation in many locations.
- **Organizational Plan:** Organizational planning is the process of defining a company's reason for existing, setting goals aimed at realizing full potential, and creating increasingly discrete tasks to meet those goals.

5.10 ANSWER TO CHECK YOUR PROGRESS

1. Materials
2. Commodities, Location, Function and Special Requirement
3. Production and Finance
4. How many people report to one person
5. forecasts and special requirements

5.11 SELF ASSESSMENT QUESTIONS

1. What do you understand by materials management?
2. Discuss the organizational variations within in materials management
3. Explain the scope of materials management
4. What are the limitations of materials management?

5.12 REFERENCE

- Materials Management by A K Datta
- Materials Management by M. Sundaresan, P. Gopalakrishnan
- Operations Management by K.ShridharaBhat

UNIT -6: STORE MANAGEMENT

Structure:

6.0 OBJECTIVES

After studying this unit, you would be able to:

- Envisage role of stores in an organization
- Appreciate the problems and benefits of centralization/decentralization of stores
- Explain the systems and procedures for stores management
- Differentiate between the types of stacking arrangements and layouts employed in stores and their impact on efficient retrieval
- Identify different kinds of equipment used in storing and handling of materials
- Trae out latest developments in terms of automated storage and retrieval systems.

6.1 INTRODUCTION

As all the activities in any organization cannot be carried out at one point of time, storage is an inevitable process. It safeguards the material by simply carrying it overtime; no transformation of any characteristics is desired. Thus stores in any company have a vital role to play. All other activities involving materials are related to the stores. In majority of manufacturing organizations material constitutes the major fraction of cost, i.e. 60 to 80% of total cost. The cost of capital blocked in inventories is substantial. If this part of working capital is not properly managed the subsequent losses may be enormous. The success of the business, besides other factors, depends to a large extent on the efficient storage and material control. Material pilferage, deterioration and careless handling may lead to reduced profits. Stores management is concerned with carrying the right kind of Materials in right quantity, neither in excess nor in short supply, providing it quickly as and when required, keeping it safe against any kind of deterioration, pilferage or theft, and to carry out the efficient performance of all these functions at lowest possible cost.

6.2 STORES

The term ‘stores’ refers to the place, where the materials are kept. They need to be preserved at different temperatures and humidity. The store warehouses raw materials, spare parts, tools, consumables, components and stationery items.

Objectives of Store Management

An efficient stores management has normally the following main objectives.

- To ensure uninterrupted supply of materials without delay to various users of the organization.
- To prevent overstocking and under stocking of the materials
- To ensure safe handling of materials and prevent their damage.

- To protect materials from pilferage, theft, fire and other risks
- To minimize the cost of storage
- To ensure proper and continuous control over the materials.
- To ensure most effective utilization of available storage space
- To optimize the efficiency of the personnel engaged in the store

6.3 FUNCTIONS OF STORE KEEPING

The main functions of storekeeping are performed in an organization's Stores Department. They include:

1. Issuing purchase requisitions when material is required.
2. Receiving purchased items from the Receiving Department and verifying that every lot of items is supported by an indent, a purchase order, and an inspection note. (GRN- Goods Received Note)
3. Preparing Goods Received Note in accordance with the different stores lots received.
4. Ensuring that all the Goods Received Notes are regularly posted to the Bin Card.
5. Placing and arranging items received in suitable places and adhering to the golden principle of storekeeping: "A place for everything and everything in its place."
6. Minimizing storage, handling, and maintaining costs by preserving and handling materials in the most economical and efficient manner.
7. Issuing items to various business departments and ensuring that all issues are properly authenticated and accounted for.
8. Ensuring adherence to issuing procedures and organizational systems and guidelines.
9. Periodically reviewing the inventory by initiating inventory control systems (e.g., perpetual inventory control system and ABC system of inventory control).
10. Disclosing fullest and up-to-date information about the availability of stores whenever required. This depends on maintaining proper stores records with the help of Bin Cards and a Stores Ledger.

6.4 PLANNING FOR STORE KEEPING

Store management requires you to develop relationships with customers, workers, store suppliers and other parties key to store operations. In managing a store, the core of job is to ensure that employees serve their purpose, that store merchandise meets standards and that customer leave satisfied. To do so, need a plan and the means to achieve the goals of that plan.

In-Store Management

Managing a store requires high-level organizational skills and the ability to strategize. It needs a plan in place not only to maintain order at the store location but also to optimize the way the store operates. In-store management requires to monitor the floor, perform data research, communicate with others and resolve issues quickly. An effective manager is always on the lookout for ways to improve the store and boost the company's profits.

Input from Others

One key to planning for a store is to get input from relevant parties. For instance, the workers at the store can provide with advice regarding day-to-day issues, such as frequent moving raw material items and customer feedback. As another example, upper management provides with instructions regarding the goals of the store so that manager can plan effectively.

Inventory Software

An inventory software system is also key to planning in a store. A store inventory system uses barcoding technology and computer software to monitor activity throughout the store. It tracks data regarding the movement of inventory, from incoming shipments in the storeroom, to the store floor and finally to the production. It allows the store manager to run reports to analyze trends and make decisions regarding the short- and long-term strategy for the store.

Task Management

Employees must take action to keep the wheels turning every day. More specifically, must prioritize task management. Creating and maintaining daily task schedule is key to planning for store managers. The task schedule should include routine activities, such as opening and closing the store, and activities required to stay compliant with quality standards or regulations. It also should include a process for how employees can handle unexpected occurrences at the store.

6.5 LOCATION OF STORES

Here, location refers to the site for a particular store. The location of stores should be carefully planned.

An important factor to consider when establishing a store setup is the question of where to locate it for an optimal effect.

It is crucial to set up stores in a convenient and safe place near to the Receiving Department. It should also be accessible from all parts of the factory and be free from the risk of fire, theft, and other hazards.

The general principle used to determine the location of a Stores Department is to minimize the total cost (i.e., in terms of kg/km) of transporting materials.

Determinants of the Location of Stores

The main factors that determine the location of stores in a manufacturing operation are outlined as follows:

1. Minimization of Material Handling Efforts: The raw material store should be near the production shops, and the finished goods and packing materials stores should be near the assembly shop. The stores should be easily accessible by transport.

2. Nature of the Materials: The nature of the materials to be stored influences location. Weather-resistant materials can be stored outdoors, while materials such as cement and plastic must not only be protected from the weather but also be stored in a dry place.

3. Quantity, Weight, etc., of Materials: The quantity of each of the goods to be stored must be considered to choose the location. When the quantities are known, adequate provision may be made for immediate and future storage needs.

4. Flow of Materials: The location of stores should be convenient, enabling the steady and regular flow of store items without obstruction.

5. Free from Risk of Loss: Stores must be set up in a safe location that is free from the risk of loss due to fire, theft, moisture, and other hazards.

6. Flexibility: The location of stores must leave open the potential for future expansion.

6.6 LAYOUT OF STORES

The layout of stores refers to the physical arrangement of storage facilities or the internal arrangement or placement of materials inside the stores.

Layout of stores aims at the effective utilization of available space for storage of materials. It seeks to make the receipt and issue of stores convenient, improve the appearance of the stores, and minimize the chance of damage, wastage, pilferage, and accidents.

When designing the layout of stores, another important aim is to reduce the operating cost of storage. The layout of stores should be chosen based on the class and quantity of the materials to be stored, as well as the general nature of the business.

Different materials should be separately stored, paying due attention to the viewpoints of space economy, effective supervision, minimum wastage, and convenience. The materials should be kept in bins, racks, shelves, drawers, drums, packages, pallets and containers.

Factors to Consider to Decide Stores Layout

1. Similarity: Items of a similar nature should be stored in one place for the sake of convenience and easy identification.

2. Popularity: The turnover of each item should be considered to enable fast-moving items to be stored near the point of issue/usage.

3. Size of Item: Items that are large or bulky in nature should be stored near the point of use.

4. Nature of Materials: The nature of the materials to be stored is important in determining the layout of stores. Hazardous, sensitive, and perishable goods should be stored separately in safe places.

5. Physical Movement of Materials: Strictly adhere to the principle of 'first in, first out' in the matter of physical movement of materials.

6. Physical Facilities: To create an efficient layout, it is important to consider physical facilities such as lighting arrangements, ventilation, wall paint, availability of cranes, and other handling equipment.

6.7 STORAGE SYSTEM

Physical Systems: The design of proper shortage system is very important for easy location, proper identification, and speedy issue to the consuming department. The commonly followed systems for physically controlling stores materials are: closed stores system, open stores system and random access stores system. A single firm can follow a combination of these systems depending upon the nature of production operation and the use of materials.

a) Closed Stores System: In such a system all materials are physically stored in a closed or controlled area, usually kept in physical control by locking. Only stores personnel are permitted to enter the stores area. Entry and exit of the material from the area is permissible only with the accompaniment of authorizing document. Maximum physical security and tight accounting control of inventory material are ensured by such a storage system. Such systems are usually used for precious, high value, rare, hazardous and delicate materials

b) Open Stores System: In this system no separate store room exists. The material is stored as close to the point of use as is physically possible. Such a system finds applicability in the highly repetitive, mass production type of systems exhibiting a continuous and predictable demand, e.g. automobile assembly plant. The storage facilities are arranged at each work

station as per requirement and availability of space. The storage facilities are open and worker has direct access to it; no authorization document is needed. Sand is kept in open space in a foundry.

c) Random Access Stores System: This is a typical kind of closed stores system in which no material has a fixed location, All materials are stored at random locations throughout the store room. However, similar types and sizes of storage equipment are grouped together. When an item enters the stores, it is stocked at the first available storage location for that particular group, and when it leaves the storage, location becomes empty for any other item of the same group. This type of arrangement is one in small firm or job shops.

Store Records System: Development of appropriate recording system for stores is important to provide right information regarding the physical inventory and accounting of the transaction. Two records are usually kept of materials and other goods received, issued or transferred, namely, on Bin (or Stock) Cards and in the Store Ledger.

a) Bin Cards: For each kind of material, a separate record is kept on Bin Card which shows details of quantities of each type of material received, issued each day. A typical Bin Card is shown below. The Storekeeper maintains the Bin Cards up-to-date and usually in duplicate. One card is attached to each bin on shelf containing the material and record remains with the storekeeper for reference. Some firms use the KARDEX System in which a Kardex is prepared and updated. Bin cards are also used as a check on the stock ledger accounts in the material accounting division.

Company Name
Bin Card

Material Nam:	Maximum Stock level
Material Code:	Minimum Stock Level
Location	Reorder Level

Date	Receipt		Issue		Balance	Name
	GRN #	Qty	Request #	Qty		

b) Stores Ledger: It is identical with bin card except that here money values are shown. The store ledger may be maintained by a separate material accounting department. The entries regarding the materials ordered, received and issued are made from the purchase order, receiving section report and the material requisitions respectively.

Issue System

This is the last stage in the stores system. Issues can be of two kinds, i.e., issues to consuming departments, and issues to outside supplies for processing. In both the cases there are certain common requirements. The control of issues is regulated by production programmes. Based on the programme and the bill of materials work orders are prepared, Listing for each material quantity to be issued and the corresponding quantity of the component to be manufactured. Any material requirement over and above indicated in the work order quantity means excessive wastage and scrapping.

CHECK YOUR PROGRESS

1. In _____ system no separate store room exists.
2. Storekeeping refers to the art of _____ raw materials,
3. _____ implies a long-term commitment between two or more organizations to achieve specific goals.
4. _____ is prepared when materials are received in store
5. The _____ refers to the physical arrangement of storage facilities or the internal arrangement or placement of materials inside the stores.

6.8 STORE FUNCTIONS

The major functions of the stores are as follows:

a) Receipt: Receiving and accounting of raw-materials, bought out parts, spares, tools, equipment and other items.

b) Storage: Provision of right and adequate storage and preservations to ensure that the stocks do not suffer from damage, pilferage or deterioration.

c) Retrieval: Facilitating easy location and retrieval of materials keeping optimum space utilization

d) Issue: Fulfilling the demand of consumer departments by proper issue of items on the receipt of authorized purchase requisitions, which are called as indent.

e) Records: To maintain proper records and update receipt and issue of materials.

f) Housekeeping: Keeping the stores clean and in good order so that the handling, preservation, stocking, receipt and issue can be done satisfactorily.

g) Control: Keeping a vigil on the discrepancies, abnormal consumptions, accumulation of stocks etc., and enforcing control measures.

h) Surplus Management: Minimization of scrap, surplus and obsolescence through proper inventory control, and effective disposal of surplus and obsolete items.

i) Verification: Verifying the bin card balances with the physical quantities in the bins and initiating the purchasing cycle at appropriate time so as to avoid the out of stock situations.

j) Coordination and cooperation: To coordinate and cooperate with the interfacing departments such as purchasing, manufacturing, production planning and control, inspection, etc.

6.9 SUPPLIER PARTNERSHIPS

If good schedules are to be maintained and the company is to develop a just-in-time environment, it is vital to have good, reliable suppliers. They establish the flow of materials into the factory.

Partnering: Partnering implies a long-term commitment between two or more organizations to achieve specific goals. Just-in-time philosophy places much emphasis not only on supplier performance but also on supplier relations. Suppliers are looked on as co-producers, not as adversaries. The relationship with them should be one of mutual trust and cooperation.

There are three key factors in partnering.

1. Long-term commitment. This is necessary to achieve the benefits of partnering. It takes time to solve problems, improve processes, and build the relationship need.

2. Trust. Trust is needed to eliminate an adversarial relationship. Both partners must be willing to share information and form a strong working relationship. Open and frequent communications are necessary. In many cases the parties have access to each other's business plans and technical information.

3. Shared vision. All partners must understand the need to satisfy the customer. Goals and objectives should be shared so that there is a common direction.

If properly done, partnering should be a win–win situation. The benefits to the buyer include the following:

• The ability to supply the quality needed all the time so there will be no need for inbound inspection. This implies that the supplier will have, or develop, an excellent process quality improvement program.

• The ability to make frequent deliveries on a just-in-time basis. This implies that the supplier will become a just-in-time manufacturer.

• The ability to work with the buyer to improve performance, quality, and cost. For a supplier to become a just-in-time supplier, a long-term relationship must be established. Suppliers need to have that assurance so they can plan their capacity and make the necessary commitment to a single customer.

In return, the supplier has the following benefits.

- A greater share of the business with long-term security.
- Ability to plan more effectively
- More competitive as a just-in-time supplier.

Supplier selection: The factors to be considered when selecting suppliers were technical ability, manufacturing capability, reliability, after sales service, and supplier location. In a partnership there are other considerations based on the partnership relationship.

They include the following:

1. The supplier has a stable management system and is sincere in implementing the partnership agreement.
2. There is no danger of the supplier breaching the organization's secrets.
3. The supplier has an effective quality system.
4. The supplier shares the vision of customer satisfaction and delighting the customer.

Supplier certification: Once the supplier is selected, the next step is a certification process that begins after the supplier has started to ship the product. Organizations can set up their own criteria for supplier certification or can use one such as what has been developed by the American Society for Quality. This emphasizes the absence of defects both in product and non product categories (e.g., billing errors) and use of a good documentation system, such as the ISO 9000 system.

6.10 NOTES

6.11 SUMMARY

In this unit we have identified the basic functions of stores in an organization. Effective Storage of goods is vital to the success of any organization and efficient management of stores leads to higher productivity, fewer delays and lower overall costs. The need of a proper identification, receipt and storage system has been highlighted. This is followed by a discussion of stores accounting and verification systems. Systematic procedures to identify the location of an item in stores go a long way to reduce retrieval time. Some stores address systems 'have been presented in this regard. The location and layout of the stores deserve careful consideration as do the various storing equipment like bins, racks and other material handling devices. Finally the basic concepts of automated storage and retrieval have been presented.

6.12 KEYWORDS

STORE KEEPING: Store keeping is the task of maintaining safe custody of all items of supplies, raw materials, finished parts, purchased parts, and other items. ... In short, storekeeping refers to the art of preserving raw materials, work-in-progress, and finished parts in the stores in the best possible manner.

SUPPLIER: A supplier is an entity that supplies goods and services to another organization. This entity is part of the supply chain of a business, which may provide the bulk of the value contained within its products. Some suppliers may even engage in drop shipping, where they ship goods directly to the customers of the buyer.

6.13 ANSWER TO CHECK YOUR PROGRESS

1. Open Stores System
2. Preserving
3. Partenering
4. (GRN- Goods Received Note)
5. Store Layout

6.14 SELF-ASSESSMENT EXERCISES

1. Explain the function of store keeping
2. What are the determinants of the location of stores?
3. Discuss the layout of stores
4. Explain the storage system in store management
5. Discuss the major function `stores in an organization.
6. Discuss supplier partnerships in store management

6.15 REFERENCE

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UNIT-7: SPARE PARTS MANAGEMENT

Structure:

7.0 OBJECTIVES

After Studying this unit you should be able to:

- Identify different types of spare parts
- Forecast spare parts requirement
- Formulate of selective control policies for various categories

7.1 INTRODUCTION

Spare Parts Management mission is to provide "the right parts, in the right quantity, to the right place, at the right time, with the right level of quality, and at the least total cost to the organization".

Effective management of maintenance spare parts is a critical contributor to equipment operating performance and to the cost of the maintenance investment.

The scope of Spare Parts Management therefore includes all functions from the supplier through to the point of use. – Identification and coding, criticality classification, procurement, quality inspection, stocking policies, links to work planning (kitting, staging), supplier management and internal performance.

Need for Spare Parts Management

Asset maintenance results inevitably in Spare parts consumption. The unavailability of the right parts may have a serious, negative impact on equipment availability, increased downtime, and resource efficiency, scheduled interruptions. Also, it can increase the risk of reducing the quality of goods produced, cause environmentally hazardous emissions and create hazards to staff.

Incorrect spare part management leads to the accumulation of an excessive amount of spare parts, which often leads to large amounts of capital expenditure.

To avoid this in reality, it is important to have a good spare parts inventory system in place. Positive impacts on business performance due to effective Spare Parts Management include:

- Reduced downtime
- Reduced inventory costs
- Increased availability of working capital
- Improved safety

Spare parts management is a form of Risk Control; its purpose is to control the risk to business operations caused by equipment downtime by ensuring the availability of spares at optimum cost.

7.2 SPARE PARTS MANAGEMENT BEST PRACTICES

An accurate Spare Parts Management system allows the area responsible to be proactive and responsive to the plant. Also, they can save from 5 to 15% on spare parts inventory costs. Here are spare parts management best practices, for managing parts inventory more effectively:

1. **Identify all spare parts** - Make sure that all parts required for maintaining the asset are properly identified. If, for example, a part is required for a major overhaul, there may be several items that are purchased for a one-time use. Once the machinery overhaul is completed, there may be unused parts which may have future use and should be inventoried. Other equipments in the plant may be able to use the same parts. So, rather than maintenance storing these parts without any correlation with the asset, the items should be added to the inventory control system.

2. **Classify all spare parts** - Classify the spare parts as per criticality. This classification will support the process to define an effective safety stock: have the right parts, at the right time, with the lowest possible cost at the minimum inventory value.

3. **Utilize and Manage the Bill of Materials (BOM)** - Having accurate BOMs will support the scheduled preventive maintenance (PM) that is needed on a given piece of equipment. This process will allow the generation of a work order within the scheduled date of the PM. BOMs will make ordering parts and placing work orders simpler. Additionally, one has to make sure that BOMs are kept up to date, considering the asset status and modifications.

4. **Use the work order** - All spare parts that have been used have to be linked to a work order. For PM, work orders requested in advance can be pulled and staged for pickup or delivered to the requesting department. This will reduce the maintenance department's wait time at the parts warehouse for their work order to be fulfilled. Work orders need to be created for all parts issuance so that inventory remains accurate. In case of emergency, it would be possible to understand the historical information related to breakdowns to improve the parts in stock, when this is reasonable.

5. **Limited access to the parts warehouse inventory** - Limiting access to the parts warehouse inventory is mandatory to maintain inventory accuracy. Adopt a policy that parts inventories are "off limits" and only parts department employees have access, utilizing badge access to entry and exit points. Allowing everyone to have access can quickly make parts inventories inaccurate.

6. **Optimize the warehouse** - Centralize and consolidate parts - Having all parts centralized (in one or satellite warehouses) and consolidated can make security easier but also makes this potentially large asset easier to control and maintain inventory accuracy.

7. **Use an Inventory control system** - By utilizing ERP's warehouse functionality or a warehouse management system (WMS) to manage parts inventory will ensure accuracy and ease of managing parts warehouse. This should be linked to the EAMS/CMMS. Using barcodes and scanning functionality in conjunction with the system will improve the efficiency of the management processes in the parts warehouse and inventory accuracy.

8. **Define a stock location for every part -** Ensure that stock locations are created at the lowest detail, typically a bin and slot location for each SKU, allowed by systems.

9. **Implement cycle counting for inventory control** - Cycle Counting is a Periodic inventory system audit-practice in which different portions of an inventory are counted or physically checked on a continuous schedule, related with inventory ABC classification. The usual class breakpoints applied are:

A = 10% of line items, gives 65% of turnover

B = 20% of line items, gives 25% of turnover

C = 70% of line items, gives 10% of turnover

Each portion is counted at a definite, preset frequency to ensure counting of each item at least once in an accounting period. Some variation about these figures is usual, but significant differences can indicate problems with stock holding policy.

10. **Standardize Spare Parts** - Standardizing for spare parts management, usually means agreeing that a certain type/model of equipment will be used and with that the spare parts required for each installation will be the same. This is different to industry-wide standardization. This can contribute to improve the Mean Time to Restore (MTTR), the negotiations with the Spare Parts Suppliers and the stocks.

11. **Develop Spare Parts Management Processes** - Make sure that Spare Parts Management Processes are developed as per best practices to ensure sustainability and a base for training.

12. **Decide based on accurate data** - Use quality data for decision making: one has to develop reports and KPI´s considering the Spare Parts Management Processes, to support the improvement and base for Spare parts maintenance budget.

Need for Scientific Management of Spare Parts

Need for necessitate scientific spare parts management are:

- Random and unpredictable pattern of failure of machines and equipments
- Long lead time required for procurement of spareparts from original equipment manufacturers
- Difficulty in manufacturing of spare parts becauseof non-availability of special materials
- High tendency for obsolescence of machines and equipments

7.3 FACTORS INFLUENCING SPARE PARTS INVENTORIES

The factors influencing spare parts inventory are

- **The costs involved in spare parts management**

Costs are classified as direct and indirect. Such classification is made considering if a cost is easily allocated or not to cost objects. Traditionally, indirect costs are allocated to cost objects using cost drivers related to the volume of production, such as labor or the amount of raw material used. Nevertheless, when the production volume is used as a cost driver, some costs cannot be easily allocated to the costs object. The correct allocation of indirect costs is crucial because the proportion of such costs has dramatically increased over the last few years. By applying a correct cost allocation method, managers will have useful information to lead actions such as cost management and optimization. Traditionally, logistics costs have been considered as indirect. Therefore, such costs are generally allocated using one of the two following techniques:

The allocation process is based on simple criteria of allocation. They are attached to a pool of costs; therefore, they are considered as overhead costs. When an indirect cost is improperly allocated, a particular cost object could get a larger proportion of the indirect costs. Correspondingly, a smaller fraction of the indirect costs will be allocated to other(s) cost object(s). Such situation may lead to inequities, which can affect the correct decision-making process. In the field of spare parts logistics, such an imbalance can affect the correct decisions about, for instance, the stock or no stock decisions, lot sizing definition, inventory policy implementation. In many cases, such a situation could affect the long-term profitability of the organization. Regarding the uncertainty in cost assessments, the American Institute of Chemical Engineers (AIChE) proposed the following five costs categories:

• Direct (capital and other investment costs)

• Indirect (operating expenditures and maintenance costs)

• Contingencies (unexpected situations)

• Intangible (client retention, employee motivation and performance), and costs to society (external costs).

- **The quantity of spare parts to be procured**

Spare part demand could significantly vary over a time. Even though there are periods without demand. Commonly used lot sizing policies like Economic-Order-Quantity, Lot-For-Lot and Period Order Quantity do not take these effects into account.

7.4 MAJOR FACTORS INVOLVED IN THE SPARE PARTS INVENTORY PROBLEMS

The major factors involved in the spare parts inventory problems include

- **Location of the Plant:** Plant location is the choice of region and the selection of a particular site for setting up a plant. Consequently, location often plays a significant role in a company's profit and overall success.
- **Import Policy:** Applications seeking authorization for import of "restricted" goods, for claiming benefits under the schemes in FTP or for seeking clarifications and for other purposes may be made to the Regional Authority. The Nature of the Plant and Machinery.
- **Availability and Lead Time for Procurement:** Usually lead time in procurement is measured in months. Purchasing lead time starts when the goods or services are ordered and ends when they are received. This lead time includes availability confirmation, ordering, order acknowledgement, shipping notice, receipt of goods or service, invoice recording and payment
- **Age of Machines**: The **Machine Age** is an era that includes the early-to-mid 20th century, sometimes also including the late 19th century. An approximate dating would be about 1880 to 1945.
- **Reliability of the Parts:** Stochastic models for spare parts forecasting have not been widely researched in scientific literature from the aspect of their reliability. By analyzing system reliability and failure rate, we estimate the required number of spare parts in the moment of expected failure or when reliability falls below the predefined level.

7.5 CLASSIFICATION OF SPARE PARTS

Since spare parts and maintenance materials also include all kinds of suppliers necessary to keep production equipment operating satisfactory and turn out production to the desired quantity and quality at the desired time, they can be grouped as under,

- **Regularly used spare parts:** These are parts identical to certain parts in a machine, but having a lifetime which is less than the machine as a whole, and requiring replacement at

least once, perhaps several times, during the period the machine is in operation. Examples are different types of gears, bearings, electric motors, electric controls V-belts, filters, etc.,

- **Irregularly used spare parts:** These are also parts manufactured to be identical with one or more parts in a machine, but they are supposed to have a lifetime, which in most cases, is the same or longer than the lifetime of the machine. When a machine is scrapped, some parts in the machine may still be in a satisfactory condition. Examples are propellers, axles, castings, etc., these parts might be used during the lifetime of the machine, but usually when the machine is finally scraped, there may be a considerable stock of such parts in the store-room.
- **Regularly used materials:** These include lubricating oils, greases, lamp fuses, washers, bolts and nuts, besides steel and metal plates, bars, pipes, fittings, under special corrosive atmosphere. For all practical purposes, their consumption can be considered as regular.

- Irregularly used materials: There are instances when some materials are needed suddenly because of unforeseen events. This would be due to faults in the original materials, accidents, etc., their consumption pattern is impossible to forecast and is highly irregular in nature.

Salient Features of Spare Parts

- About 10 % of value of a machine is investedis spare parts at any point of time
- About 40 percent of the total working capitalis tied up in spare parts inventory
- About one third of spare parts inventory isnon-moving or obsolete
- The lead time is long and prices exorbitant
- The inventory carrying charges are about 30 percent of the value of inventory

Methods of Planning Spare Parts Inventory

1. Choose a method for labeling critical components
2. Balance inventory volume with saw-tooth diagrams
3. Keep your bill of materials up to date
4. Calculate optimal economic order quantity
5. Develop a standard work order process
6. Focus on inventory control during employee training
7. Perform cycle counts on a regular basis
8. Make spare parts easily accessible
9. Invest in a quality cmms

Planning for Spares Required for Overhauling

Overhauling Spares are those which are used when a machine or equipment is completely stopped from working, periodically and the same is reconditioned by replacing worn-out or defective parts to give a new lease of life to the machine or equipment.

Considerations in Overhauling

Replace some spare parts even if they are serviceable or can be repaired Replace items such as 'O' rings, oil seals, fan belts, entirely even if some of them appear to be in good condition Replace the repair kit wherever provided earlier

CHECK YOUR PROGRESS

Fill in the blanks

1. Incorrect spare part management leads to the accumulation of an _____- of spare parts, which often leads to large amounts of capital expenditure.
2. _____ is a Periodic inventory system audit-practice in which different portions of an inventory are counted
3. According to American Institute of Chemical Engineers (AIChE) costs have been categories in to _____ groups.
4. MTTR stands for _____
5. _____ to manage parts inventory will ensure accuracy and ease of managing parts warehouse

7.6 OBSOLETE SPARES

Obsolete materials are those which are not useful to the company for various reasons, such as, changes in design or model, changes in the production processes, or changes in the product-line etc., This may also be due to a change in the use of materials. These materials have economic worth or value for which the need no longer exits. These materials, no longer useful for current needs or anticipated production requirements, or usable elsewhere in the organization, find a place in the stores making demands on valuable storage space and adding to costs. Sometimes, because of the high value of the materials, managers are unwilling to authorize their disposal. But their disposal is necessary when it is established as a fact that their holding cost is a real loss to the concern. If for example, it is accepted as a principle that is equal to or more than the scrap value, then the materials department will have to spur action. Frequent reports should be prepared and forwarded, with recommendations for disposals, to those managers who can authorize such disposals. A Follow-up procedure

should also be established so that materials department can negotiate and expedite disposals and removal of the materials from stocks, either by selling, junking or otherwise. Because this entails disposal assets of the company, management must approve of the disposal within the guidelines framed for such purpose.

Obsolete spares are those which are in good working condition but which are no longer useful for the company's operations because of replacement of machines and equipments by machines and equipments of different designs or technology or modification in the design of equipments or machines manufactured by the supplier and also because of changes in the manufacturing processes or materials used or changes in the products manufactured.

Previously, purchasing for the most part was concerned with such activities, although materials control is increasingly assuming this responsibility. However, there is certain logic for the purchasing to maintain such activities, because purchasing is aware of the markets and market conditions. In order to get the best value for the materials to be disposed, they will in all probability continue to do so in future.

Reasons for Obsolescence of Spare Parts

- Insufficient attention to initial provisioning of spares
- Inflated list of recommended spare parts given by original equipment manufacturers
- Ordering parts even though the equipment or machine is being phased out due to service life or change in technology
- Wrong indenting or error in forecasting the demanded for spare parts
- Wrong codification leading to duplication

7.7 NOTES

7.8 SUMMARY

Interchangeable parts have revolutionized modern manufacturing. However, the idea of interchangeable parts was originally a maintenance innovation. Equipment that represents a significant financial investment (e.g. aircraft, rolling stock and MRI scanners) is usually maintained by replacing parts in need of maintenance with ready for-use parts. In this manner, downtime of equipment due to maintenance can be kept to a minimum. To make this system work, it is crucial to have the right amount of spare parts available. Spare Parts

Management purpose is to provide the right parts, in the right quantity, to the right place, at the right time, with the right level of quality, and at the least total cost to the organization. Effective management of maintenance spare parts is a critical contributor to equipment operating performance and to the cost of the maintenance investment. The scope of Spare Parts Management therefore includes all functions from the supplier through to the point of use; this easily leads to the accumulation of an excessive amount of spare parts, which often leads to large amounts of capital expenditure.

7.9 KEY WORDS

- **Spare Parts:** are parts that you can buy separately to replace old or broken parts in a piece of equipment.
- **Inventories:** The term inventory refers to the raw materials used in production as well as the goods produced that are available for sale.
- **Reliability:** The quality or state of being reliable, the extent to which an experiment, test, or measuring procedure yields the same results on repeated trials.

7.10 ANSWER TO CHECK YOUR PROGRESS

1. Excessive Amount
2. Cycle Counting
3. Five
4. Mean Time to Restore
5. Warehouse management system (WMS)

7.11 SELF-ASSESSMENT QUESTIONS

1. What do you mean by spare part management
2. Explain the need for scientific management of spare parts
3. Discuss the factors influencing spare parts inventories
4. Describe the classification of spare parts
5. What are the salient features of spare parts
6. Explain the Factors that influence spareparts planning

7.12 REFERENCE

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UNIT-8: INTEGRATED MANAGEMENT INFORMATION SYSTEM

Structure:

8.1 OBJECTIVES

After studying this unit you should be able to:

- Explain the fundamental management concepts
- Apply core knowledge in Information Systems
- Identify and analyze requirements for information systems
- Apply design principles in Information Systems.
- Identify the basic components of Management Information Systems.

8.2 INTRODUCTION

Management Information System is an accumulation of 3 different terms as explained below. Management: We can define management in many ways like, "Manage Man Tactfully" or Management is an art of getting things done by others. However, for the purpose of Management Information System, management comprises the process and activity that a manager does in the operation of their organization, i.e., to plan, organize, direct and control operations.

Information: Information simply means processed data or in the layman language, data which can be converted into meaningful and useful form for a specific user.

System: The system can be explained in a following ways:

System can be defined as a set of elements joined together for a common objective.

A group of interrelated or interacting elements forming a unified whole

e.g., business organization as systems.

A group of interrelated components working together towards a common goal by accepting input and producing output in an organized transformation process

Integrated MIS (Management Information System)

An organization is primarily a system of people, methods and means to attain some predetermined objective. The final objective sought to be achieved by planned organizational change is a new store of equilibrium for the proper functioning of the organizational system. In simple language, all the significant components in the organizational system (Socio-technical) are in a state of adjustment. Built into the changed state (if it did not exist previously), is a tendency towards movement (change), development and growth. A change may be brought about by many means, including natural organizational or evolutionary change, that is to say, a change that is not the result of deliberate organizational effort. But in

the context of planned organizational change, the concept of integrated MIS is sure to act as a change agent, being both structural and operational.

However, the efficient functioning of any organizational system largely depends upon a continuous process of information flow, in which information are received, stored, processed and exchanged. Such an information system is again the combined effort of the people, equipment used (hardware as it is called in the computer language), processing facilities (software) and the procedures, which are aimed at meeting the information requirements of the organization.

Many managements live in a make-believe world that an integrated MIS can be developed without developing an adequate management system. A management system is the organizational arrangement, structure and procedure for adequate planning and control with clear- cut and established objectives. Only within the management structure and framework, can a good MIS be designed and developed. Only then the MIS can provide a manager the needed information in the right form, at right time and right place.

Outlined above is the information pyramid where there are at least three levels in which information are needed for decision-making. The first level may be said to be at the top-level, management where a summarized report is sufficient. At the second level, that is to-say, at the middle management level, the information requirements are of control level in nature, which may be described as exception reports. At the third level, which needs day-to-day information, where formal reporting at fixed intervals are in the nature of routine procedure of the system, the information requirements are numerous, At this level, information requirements are operational in character and, therefore, they are needed largely for the purpose of operational control. Therefore, this level needs a continuous information-flow. Here, in reality, continuous information flow with quick feedback is the objectivity test

for MM. The frequency and the number of information handled are the test criteria for efficient flow of materials for operational purposes at the third level, whereas ‘management by exception and ‘information by summary’ are the governing principle at the second and the first levels respectively, of the information pyramid.

8.3 INFORMATION FLOW VS MATERIALS FLOW

General information flowchart is designed indicating the general structure of the integrated information system. This information flow system can then reflect the design efforts for

1. Setting objectives
2. Establishing constraints, and
3. Determining the information needs and sources.

However, it may be noted that specific steps which have gone into processing the data and the nature of equipment and people involved, are also extremely important because they provide the foundation upon which detailed specifications will follow.

It must be mentioned, however, that before an MIS is designed and developed, it should be validated by cost-benefit analysis covering all aspects in their entirely. Integrated MM-MIS cannot be, however, developed in isolation and implemented all at once. Important as it is, its successful development and implementation necessitated elaboration of the total process of information-flow and total integral concept of MIS, along with the total organizational need. This can only be developed step by step. In order to step-up the process, the total information system of stock registration, control, movement and flow of materials must first be analyzed by splitting up the information in such areas as

1. Materials, suppliers, components and/or parts list information,
2. Capacity planning and manufacturing instructions,
3. Materials requirements planning and materials bill explosion
4. Production scheduling and planning, and
5. Procurement and purchase planning

The traditional way of handling such information is through interflow of information between related departments. But with the use of computerized information systems, this has become increasingly data based, which permits the physical separation and retrieval of information from programmes that are used to process the information data. To sum up, an integrated approach to MIS is intended to ensure that data processing gives due recognition

and consideration to the whole information requirements of the company, operating, as it does, as an integral part of the organization.

8.4 COMPUTER SYSTEM FOR MIS AND MM

Computerized integrated MIS has opened up vast possibilities for the MM. As the objective of MM is efficient flow of materials at economic cost. MIS can be directed for use by the different sectors of MM organization for controlling the materials flow and planning for efficient use of materials for manufacture. No doubt, MM is a part of the total MIS organization. Structure and information needs are inextricably interlaced and interwoven. An analogy between the human body and the central nervous system is appropriate. This system takes into view the integrative concept of information flow, where each organizational entity is seen as a system for information requirements with the components of input, processing storage and output. Each again is connected with each other through the information and communication channels and each organizational entity becomes a decision-making point.

The computer system for MIS has as its basic cycle: hardware, software, personnel and operations. This basic cycle can be broken down into many parts. However, it is not thought necessary here to dilate more elaborately on the schematic representation of the computer system nor is it necessary in order to comprehend the rudiments of the computer system for MM. Suffice it to say that in broad terms the concurrent activities in hardware, software and personnel acquisition are all pointed towards the operational phase of the system. As the operation commences, certain cybernetic feedback occurs, and various phases are repeated, through mostly at a higher level of accomplishment.

Management information service is for management. The whole information system is a management tool, but too often, this is forgotten thus, the neglected facet of MIS is that without management it is useless management must be bent on utilizing the information which it obtains. MIS is, therefore, a means to an end and not an end in itself. Management is often plagued with lack of useful information at the propitious time. Faced with such shortcomings, a many managers substitute a more easily attainable goal for the intuitively correct ones. However, as MIS is oriented towards the needs of management. MIS enhances the ability of management by delivering the decision- supporting information to a cognizant management.

8.5 IN-PROCESS MATERIALS AND MOVEMENT CONTROL

The problem of material location and order status control

Modern materials management systems based on computer usage provide for a reporting system on material location and order status. There is a false feeling that once a computer system is designed and introduced, the job has been accomplished. But the fact is that in most of the systems, the level of accuracy of the material location for the period during which the report is made, is far below the expected level. Many reasons can be adduced to this, First there are supervisory problems and the problems associated with the obtaining of cooperation of the personnel who put the input data. Data checks can be built into the system, but if initially accurate information is not put into the data, usefulness of such checking system is invariably lost. The problems are, therefore, too often related to human activity. If one expects to have useful and accurate input data, information sources must be carefully investigated and exploited. There is also the problem of human error. Any follow up with corrective steps are somewhat ineffective once errors have crept in. Thus, in designing a material locational control and order status system the first and foremost point to remember is that any system designer should feel assured about the susceptibility of the total system to human failure.

An effective material location and order status system will then first require that tthe the implementation of any system should concern itself with all material and order information necessary from the viewpoint of procurement down to final distribution. However, in practice, it is only rarely that a system design will attempt to cover all the problems in totality. Generally, some segment of the problem is tackled and designed into a systems approach, rather than a total approach. Almost all systems tend to be concerned with inventory levels, unworked, in-process, semi-finished and/or finished goods inventories. The modern trend, however, is to design systems that go well beyond the in-plant material status and are concerned more with and, less frequently, with distributional systems that go well beyond the in-plant material status and are concerned more with information that are related to procurement and in-transit order status and, less frequently, with distributional system data. To be sure, when the distributional data is brought within the scope of the system and added to the in-plant and procurement data, the problem of material location and movement control, as well as order status control, will have been resolved.

It must be remembered at the same time that having resolved the question of material location and order status control, it is all the more necessary to devise control systems for

actual movement of personnel and material to maximize the system's effectiveness. Data based on accurate information is only useful when actions are taken lased upon its analysis at the most desirable location and at the most appropriate time. Although, data and information are synonymously used, they are not one and the same thing. To have an adequate material order status control, a firm must have accurate information. From the information collected, if these are reasonably correct, data will follow. Thus, in order to have accurate information, any system must know:

1. materials location points,
2. state of the materials,
3. succeeding requirements, and
4. the availability of equipment as well as personnel required to take actions on materials, as and when they may be required.

One of the major problems industries facing today is the high rate of material movement and distribution costs. These are dependent more on accountability data collected from accounting and book-keeping functions, rather than on operational data. As such, a large portion of the data supplied to management are only marginally useful, since these rely more on accountability rather than operational effectiveness.

In summary, the requirements of any material status, material location and order status control system can be partly covered by the following bits information.

1. The system must have the information relating to
   (a) event
   (b) location
   (c) time
   (d) quantity
2. The data must be such as to be of value and can be converted into information for decision-making
3. The recorded data must be accurate and timely.
4. The data conversion and processing for decision-making information must be efficient.
5. The related information must represent the problem accurately in order to be of maximum use.
6. Consideration must also be given to human factors involved in input information.

The above factors must be borne in mind in order to build maximum cost-effectiveness as well as operational efficiency in any system. Information as to the condition of the material and timely location has to be included. Knowing the condition and location of

materials, effective production-distribution decisions can be reached. Since the latter two are constrained by the effectiveness of materials flow, total materials control system requires accurate and timely information in proper sequence and at the optimum time.

CHECK YOUR PROGRESS

1. The Information requirement may be classfied into _____ Levels
2. _____ is a set of elements joined together for a common objective
3. The major objectives of MIS is to help _____
   (Mangement, workers, Job, All)
4. Effective material location is possible thorugh MIS provided _____
5. MIS must consider _____ factors involved in input information

8.6 RFID TECHNOLOGY IN MATERIALS MANAGEMENT

RFID technology has grown dramatically in usage by industries such as manufacturing, retail, distribution and etc. Nevertheless the RFID application has a short history in the construction industry. However, the construction sector in the UK has shown interest in how a number of applications such as tags can be incorporated into boilers and doors, also which can be used by most housing associations and facilities management (FM) for asset management systems. Past experienced in the UK construction industry, work has been carried out into the use of RFID in quality control, logistics tracking, system or component build, waste reduction, and asset management. RFID technology is becoming cheaper and should offer construction new opportunities to improve maintenance of assets. It can provide potential savings(money and efficiency) through:

- productivity improvements;
- availability of 'real time' data capture;
- job tracking;
- better quality control;
- better stock control;
- reduction in paper work;
- reducing the incidents and associated cost of sending in correct products to site;
- improvement in customer information;
- web-enabled customer information system;
- improved health and safety;

RFID applications in materials management are as follow:

- ***Inventory tracking*:** RFID systems can enable automatic, real-time, error free tracking and inventory of unique materials through the supply chain from fabrication, transport, receipt, site storage, and issue to installation. For example, a pipes pool can be automatically identified as they are shipped and received and reduces error of current manual identification method. It updates and immediately downloads electronically materials management systems without manual data entry.
- Streamlined materials tracking and expediting: an RFID-enabled process can deliver material status information earlier than the current manual processes, provide field planners with reliable advance information, and be able to optimize planning on schedule critical tasks or quickly find available work for crafts that might otherwise be temporarily under-utilized
- Accurate material status and inventories: Provide accurate information about shipping, receiving, and inventory to avoid items missing, misplaces, or not received which can cause schedule disruption. This situation can easily be supported by using a hand-held reader, for example, to confirm possession of material that may have been placed or moved to an incorrect location within a yard.

8.7 NOTES

8.8 SUMMARY

In this unit we have, have discussed some basic concepts relevant to management information system such as the fundamental concepts of management, levels of management, systems concepts, types of systems, components, information and types of information systems and examples of information systems. Management Information System is seen as a way of evaluating, analyzing and processing an organization data to produce meaningful and useful information from which the management can take decision to ensure future growth and development of the organization.

8.9 KEYWORDS

Management Information System: Management Information Systems (MIS) is the study of people, technology, organizations, and the relationships among them. MIS professionals help

firms realize maximum benefit from investment in personnel, equipment, and business processes. MIS is a people-oriented field with an emphasis on service through technology.

Information Flow: Information flow is the movement of information between people and systems. Efficient and secure information flows are a central factor in the performance of decision making, processes and communications.

RFID systems: It is the systems that simplify the identification and management of valuable tools or equipment substantially.

8.10 ANSWER TO CHECK YOUR PROGRESS

1. Three
2. System
3. Management
4. Materials are physically kept in designated places
5. Human

8.11 SELF ASSESSMENT QUESTIONS

1. What is an Information system? Why information systems are needed
2. Discuss Information Flow Vs Materials Flow
3. Explain Computer System for MIS and MM
4. Discuss RFID technology in materials management

8.12 REFERENCE

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BLOCK 3: PURCHASING MANAGEMENT

Dear Learner

Purchasing is an important activity in any organization. Since it involves a major chunk of investment, it is handled with utmost care and diligence. Any organization tends to decrease the cost of buying. There are two terms which are used in the context of buying namely Purchasing and Procurement. You may think both refer to same set of activity, but there is a difference. **Procurement** is the process of identifying, shortlisting, selecting, and acquiring suitable goods or services or works from a third-party vendor through a direct purchase, competitive bidding, or tendering process while ensuring timely delivery of the right quality and quantity whereas purchasing refers to a set of functions associated with acquiring the goods and services that an organization requires. Purchasing is a small subset of the broader procurement function. This process includes activities like ordering, expediting, receiving, and fulfilling payment.

Purchasing has to be dealt professionally. Usually there will be exclusive department in any manufacturing organization to deal with purchasing. A proper system must be established and procedure needs to be laid down. In government organization and public sector organizations purchasing is done by inviting quotations for goods up to one lakh. If the value is above one lakh they have to go for e-procurement or e-tendering.

In this block you will be studying various aspects of purchasing through below units

Unit 9: Purchase Management

Unit 10: Purchase Policy and Procedure

Unit 11: Purchasing methods

Units 12: Forms of Purchasing Organizations

UNIT-9: PURCHASING MANAGEMENT

Structure:

9.0 OBJECTIVES

After studying this unit, you will be able to:

- Give the definitions of Purchasing and highlight the meaning there of
- Discuss the term purchasing with its objectives
- Draw the features of Purchasing and explain the importance of Purchasing
- State how purchasing is important to a company
- Discuss the principles to be considered in order to make purchasing highly effective
- Sketch-out features of Purchase Management keeping in view of its definitions

9.1 INTRODUCTION

As you know an organisation is expected to understand the requirement of production department and maintenance department so as to enable the right goods or services to be produced. Purchase of material is of great importance for any organization; otherwise one cannot make either semi-finished goods or finished goods. Purchase is vital in supply chain management. As a learner, by now you have acquainted yourself with the various concepts of supply chain management. While supply chain is a very broad career field, it has 7 primary functional areas: Purchasing, Manufacturing, Inventory Management, Demand Planning, Warehousing, Transportation, and Customer Service. These areas may appear to be independent functions, but in an efficient supply chain, they must interact to a great degree and are very dependent upon one another. The purchasing function is core to any company, as it provides the materials and resources needed to create a product. As the economy becomes more global, the opportunities become even more exciting. The roles that exist within this function are numerous, and here are just a few: coordinator or analyst, materials manager, corporate purchasing manager. These roles can exist at a field location such as a plant or at a corporate location. Depending on the company, individuals could be involved in purchasing anything from office supplies to parts for the construction of airplane engines.

9.2 MEANING AND DEFINITIONS OF PURCHASING

You may please know the fact that Purchasing is the first phase of Materials Management. The term Purchasing means procurement of goods and services from some external agencies. The objective of purchase department is to make arrangement for the supply of materials, spare parts and services or semi-finished goods, required by the organization. This is to produce the desired product, from some agency or source outside the organisation. The purchased items should be of specified quality in desired quantity available

at the prescribed time at a competitive price. After having this aim, let us quickly understand some of the definitions of purchasing.

In the words of Alford and Beatty, “Purchasing is the procuring of materials, supplies, machines, tools and services required for equipment, maintenance, and operation of a manufacturing plant”. According to Walters, purchasing function is defined as ‘the procurement by purchase of the proper materials, machinery, equipment and supplies for stores used in the manufacture of a product adopted to marketing in the proper quality and quantity at the proper time and at the lowest price, consistent with quality desired.”

Westing, Fine and Zenz defined “Purchasing is a managerial activity that goes beyond the simple act of buying. It includes research and development for the proper selection of materials and sources, follow up to ensure timely delivery; inspection to ensure both quantity and quality; to control traffic, receiving, storekeeping and accounting operations related to purchases.” The modern thinking is that Purchasing is a strategic managerial function and any negligence will ultimately result into decrease in profits.

From the above definitions, its clear that purchasing is an operation of market exploration to procure goods and services of desired quality, quantity at lowest price and at the desired time. Suppliers who can provide standard items at the competitive price are selected by the companies which are in need. . Purchasing in an enterprise has now become a specialised function, as the cost, quality and time determine the sustainability.. It was experienced that by giving the purchase responsibility to a specialist, the firm can obtain greater economies in purchasing. Moreover purchasing involves more than 50% of capital expenditure budgeted by the firm.

Purchasing is an important function of materials management. In any industry purchase means buying of equipments, materials, tools, parts etc. required for industry. The importance of the purchase function varies with nature and size of industry. In small industry, this function is performed by works manager and in large manufacturing concern; this function is done by a separate department led by the specialized person and the team meant for the purpose. The moment a buyer places an order he commits a substantial portion of the finance of the corporation which affects the working capital and cash flow position. He is a highly responsible person who meets various salesmen and thus can be considered to have been contributing to the public relations efforts of the company. Thus, the buyer can make or mar the company‘s image by his excellent or poor relations with the vendors, as the case may be.

9.3 CONCEPTS OF PURCHASING

As far as purchasing is concerned it is very essential to understand some of the pertinent concepts and they are; Purchase Management, Purchasing Strategy, Purchasing Cycle, Purchase Order System, Procurement and so on.

Purchase management; it is a business discipline that helps the companies to manage the activities and relationships which make up the purchasing functions necessary to do business. It saves money, increasing profits. It is an important function for any wholesale, distribution or manufacturing business. Efficient purchase management prime opportunity for wholesalers to clear bigger profits by controlling costs of the inventory stock needed to run their business

Purchasing strategy ensures an entrepreneur to end up with the most cost-effective outcomes. It generally means selecting vendors that will deliver quality products within set timelines at affordable prices, with negotiated discounts or other value-added services

Purchasing cycle involves starting with a purchase requisition that is then approved by the appropriate staff, such as a department head before an official purchase order is created. Once the purchase order is in the system, it needs to be approved by multiple people, depending on a variety of factors such as cost.

Purchase order system allows an organization to digitize records there by eliminate the usage of tons of paper. It is more of automation in which purchasing activities are tracked in real-time to keep everyone on budget. The system obviously helps saving the cost. The system also allows for improved inventory management and better supplier relationships because everything is tracked from a centralized location. Procurement is the process of sourcing and purchasing goods and services from an external source, like a third-party vendor or supplier. Oftentimes, procurement managers will procure goods and services with limited resources and reduced capabilities. This means they have to Purchasing Organization

Procurement is the process of sourcing and acquiring the goods and services a company needs to fulfill its business objectives.. An effective procurement strategy can do many things. For instance, it can save company money by negotiating favorable terms and pricing. It can also ensure supplier quality, efficiency, and timeliness.

Principles of Purchasing The success of any manufacturing activity is largely dependent on the procurement of materials of right quality, in the right quantities, from the right source, at right time and at right price – popularly known as five ‘R’s of the art of efficient purchasing, and they are called as Principles of Purchasing

Marketing Intelligence; it is a process of collecting, gathering, and analyzing information, and segregating the data based on whether it's relevant or irrelevant to the company's market. This type of data is super valuable to decision makers in a business. This data can provide a vast outlook on the real-time prices of commodities or intelligence to overcome sourcing challenges that will help reducing the procurement risks. Even for small businesses it's important to run an analysis on procurement and market intelligence.

Economic Order Quantity; The economic order quantity is the order quantity that helps minimize holding costs and order costs for your business.

9.4 OBJECTIVES OF PURCHASING

The objective of purchasing in narrow sense is buying materials of the right quality, in the right quantity, at the right time, at the right price, from the right source with right terms and conditions. In broad sense, it is indicating the scope of purchasing function that involves policy decisions and analysis of various alternative possibilities prior to their act of purchase. Let us proceed to see how specific objectives of purchasing and they are;

- To pay reasonably low prices for the best values obtainable, negotiating and executing all company commitments.
- To keep inventories as low as consistent with maintaining production.
- To develop satisfactory sources of supply and maintain good relations with them.
- To secure good vendor performance including prompt deliveries and acceptable quality.
- To locate new materials or products as required
- To develop good procedures, together with adequate controls and purchasing policy.
- To implement such programmes as value analysis, cost analysis, and make-or-buy to reduce cost of purchases.
- To secure high caliber personnel and allow each to develop to his maximum ability.
- To maintain as economical a department as is possible, which is commensurate with good performance.
- To keep top management informed of material development that could affect company profit or performance.
- To develop and maintain good relations with suppliers. Suppliers provide better service to their regular customers and also lend them useful information regarding availability of possible substitutes and price trends.
- To develop adequate purchase policies and rational procedures from time to time

- To train and develop purchasing personnel working under the purchasing executive as per the bench mark.
- To conduct business in such an open manner that potential vendors will be impressed by the fairness of the system and encouraged to furnish competition. This will help ensure that the customers in a place secure the best product at the lowest price at all times.
- To encourage competitive purchasing.
- To develop and maintain an adequate inventory of supplies and equipment as required.

9.4.1 Main Objectives of Purchasing Function

After having understood of the specific objectives of purchasing, it is very essential for us to know about main objectives of purchasing function and they are as follows;

Purchase of right quality: You know quality is one of the mantra of success in all walks of life, so also in purchasing. Quality is the main objective of the purchase. You are fully aware of the fact that at one time, the highest grade material might be the suitable but at some other time; medium grade material might be suitable quality. Determination of required quality of material and components is the basic responsibility of engineering-production department. Therefore, a few engineers of the production department associate with the purchasing department and enable to purchasing in charge personnel in purchasing right quality of materials. It is also relevant to state that purchasing objective of right quality is the problem of standardization and the purchasing. Therefore, the staff must know standard specifications to be used in the purchase of materials, parts and components.

Purchase of right quantity: The purchasing objective of right quantity is utmost important which determine amount of inventories to be carried. The quantity of purchased goods must be based on the requirement of the production. Purchase of more or less quantities than the requirement will lead to huge inventories and lock-up of finances which affect the liquidity. On the other hand, if purchased quantity is less than the requirement lead to sudden disruption of work. It may cause machinery to remain idle, under utilisation and thereby loss in production. From the above situation it is very clear that both situations are harmful for any organization. The right quantity of different materials will be determined by management policy relating to control of inventories and the manner in which conflicting situations of inventories at too high or too low level are reconciled.

Purchase at right price: This is also a very important objective of purchasing function. It may be noted that required material at the right price is a deciding factor of company's

profitability; as such right price is of vital. Right price indicates a fair and reasonable price. To assure purchasing at right price, the purchasing manager should have full knowledge of materials or parts to be procured. The buyer or the purchasing manager, who fails to procure materials at fair and reasonable price, remains unfit to operate.

Purchase at right time: Procurement of material at the right time is also very important objective of purchasing. If orders are submitted late, it involves costly expediting and may even interrupt continuous flow of production process causing material shortage. Availability of working capital, material requirements based on sales and production forecasts and market situations are the important factors that buyer should bear in mind while doing his purchases.

Purchase from right source: The most suitable sources from which material requirements needs to be procured play an important role in determining the success of an organization. While selecting a right source, the purchase manager must see the reliability of the vendor, quick and reliable source; accessibility of the vendor, cooperation expected of the suppliers, past performance with other buyers, goodwill etc. Before final selection of the source, purchaser should carefully analyze the possibility of buying directly from the manufacturer or from the distributor. He should see supplier's goodwill as well, without which it is very difficult to assess the worthiness of the suppliers.

9.5 IMPORTANCE OF PROCUREMENT

Procurement is important in business because it directly impacts a company's profit margin. For an organization to be profitable, the cost of procuring goods needs to be less than the amount it sells those goods for, minus whatever costs are associated with processing and selling them. Enacting the best procurement procedures will ensure that the buyer (i.e. the company) is acquiring goods and services at the best possible price at all times. In addition, procurement is linked to several core business functions within an organization.

1. Directly affects bottom line of company;

Purchasing often takes up a significant portion of a firm's total annual budget. The cost of goods and services bought has a direct impact on the profit margin and the bottom line of the company. These costs are unavoidable, of course, but through the implementation of an effective procurement strategy, it is possible to make significant savings in expenditure of the company.. Such savings – even minor ones – can have a huge impact on company's finances, with a reduction in input cost meaning an increase in profit margin as well.

2. Reduces risk in Supply Chain

A smooth and constant flow of goods is the hallmark of a healthy supply chain. Disruptions in supply can have serious consequences for the entire organisation, no matter short term and the long term. It leads to a slowdown in production, delay in the delivery of goods, a loss of reputation, or other severe consequences and increased costs. It may be noted that one of the cornerstones of effective procurement is supplier management. It involves identifying reliable and credible suppliers and nurturing long-term relationships with them. This has multiple benefits, such as rebates and other cost reductions, along with improved communications, resulting in less chance of critical disruption in the delivery of goods.

3. Drive long-term strategy of business

Businesses, particularly small and medium enterprises, are always seeking growth. But as technology enables fast-paced expansion, supply chains are also strained. A lack of insight into existing supplier capabilities can result in a critical shortage of materials at times when the company can least afford it. This is where the inputs from a procurement team become vital. It can help the business avoid problems of scaling that are commonly associated with rapid expansion. For a successful growth strategy, procurement teams can contribute by identifying new or alternative suppliers who can step in to ensure constant access to essential goods in future.

4. Impact on the reputation

The scale and complexity of supply chains have grown in recent decades, especially in the wake of globalized world. In the last few years, even smaller firms have gained access to international suppliers and, supported by technology and advances in communications. As such, procurement has also assumed increased significance, particularly in regard to identifying and dealing with far-off suppliers. Enforcing and maintaining quality standards can be a major challenge when the source of goods is located thousands of miles away. This can't be ignored, either. Modern consumers particularly among younger generations are often extremely concerned about issues such as ecological conservation, sustainable pricing, and labor standards and all factors can affect procurement. Therefore, it should always be considered a critical part of any organization’s corporate strategy. Procurement Managers deal with things like, four pillars of Corporate Strategy and they are;

- Sourcing activities and tactical sourcing
- Negotiation and vendor management
- Strategically selecting goods and services

- Approving organizational purchase request

9.5.1 Procurement;

It is the process of sourcing and acquiring the goods and services a company needs to fulfill its business objectives. The word procurement always makes us think that it is the process of purchasing, but, these words – 'Purchasing' and 'Procurement' are not synonyms. A few people might think that they are the same, in reality they are not. Procurement is a much broader term that includes the process of purchasing also. The sourcing and purchasing of goods and services from external sources is known as procurement to meet the needs of the organization. It will lead the company to profitability and efficiency. An effective procurement strategy can do many things. For instance, it can save company money by negotiating favorable terms and pricing. It can also ensure supplier quality, efficiency, and timeliness.

Steps in the procurement process

Procurement involves much more than just handing over the company credit card and paying for a purchase. For example, an effective procurement strategy includes everything involved in the procuring process, from identifying which goods and services an organization requires for growth, through to maintaining the right documentation and records.

1. Identify which goods and services the company needs.
2. Submit a purchase request.
3. Assess and select vendors.
4. Negotiate price and terms.
5. Create a purchase order.
6. Receive and inspect the delivered goods.
7. Conduct three-way matching.
8. Approve the invoice and arrange payment.
9. Conduct record keeping.

9.6 PURCHASING MANAGEMENT

Purchasing is an important function of materials management. In any industry purchase means buying of equipments, materials, tools, parts etc. required for industry. The importance of the purchase function varies with nature and size of industry. In small industry, this function is performed by works manager and in large manufacturing concern; this function is done by a separate department. The moment a buyer places an order he commits a substantial portion of the finance of the corporation which affects the working capital and

cash flow position. He is a highly responsible person who meets various salesmen and thus can be considered to have been contributing to the public relations efforts of the company. Thus, the buyer can make or mar the company‘s image by his excellent or poor relations with the vendors.

9.6.1 Definition of Purchasing Management;

The purchasing is defined as the process of buying and procuring the materials, parts, components, equipments, spare parts, tools and supporting items required by industries or any organization to deliver its products as per customer requirements at the competitive rates and of good quality.

9.6.2 Objectives of Purchasing Management

Purchasing professionals have a number of objectives including cost control, developing and managing supplier relationship, encouraging innovation and diversification of the supply chain. The important objectives of Purchasing Management are as under;

- **Reducing Costs**

Getting the lowest price for a particular product or service may not be necessary, but purchasers strive hard to save money for their businesses by getting the best prices and terms overall. The company concerned focuses on incentives and discounts that supplier’s offer. Apparently, both seller and purchaser evinces in negotiating favourable contract terms that improve cash flow by prolonging payment and reducing long-term costs by cutting waste and avoiding defective products.

- **Diversifying Supply**

It may be noted that no company hinges on a particular supplies for its materials, as spending too much with one supplier is risky. In case supplier trouble fulfilling their obligations or raise their prices significantly, the company that depends solely on them may have problems- delay delivery of goods to their customers or raise their prices, would cost their business heavily. In order to ensure smooth supply the companies intend to purchase expand the supplier base.

- **Fulfilling Business Requirements**

You may note down this point that companies doing business with the right suppliers provide for pricing and supplying. Companies ensure support small businesses by allocating a certain percentage of their purchasing budgets based on need and objectivity. They also avoid suppliers with bad reputations or business unethical practices. Purchasing management help achieving such objectives.

- **Sparking Innovation**

Purchasing professionals can support growth of their company by obtaining innovative solutions to business problems and opportunities. For this purpose, they work closely with vendors, share their company's needs and exploring the way suppliers can help. They develop better technologies and products for customers, and refine processes and thereby allow them to deliver goods and services more efficiently.

- **Managing Relationships**

Purchasing professionals can work with many people either in intra or inter companies or agencies. They may deal with representatives from marketing, finance, logistics, legal, insurance, warehousing, and such other departments as may be deemed fit. Given the broad range of goods and services that they buy and the impact that their decisions have on their company as a whole.

- **Spending Wisely**

Generally companies spend **more** than half its budget on Purchasing. Judicious spending on purchase help a company to expand their market share and increase its sales. This will lead quality products to market first. Purchasing management improve profitability by efficiently developing those products and services For this purpose they go for collaboration with suppliers who are similarly invested in the company's success. The decisions taken up by the professional of purchasing and supply management reflect upon cost, quality and scheduling. These decisions can affect whether or not someone will buy a company's product, and also make a big impact on the company's revenue and sales.

- **Reducing Costs and Improving Savings**

The effective management of Purchasing has a direct impact on two of the most important factors viz cost and sales. Through initiating process improvements, product improvements and supplier relationship development, purchasing professionals are responsible for garnering cost savings for their organizations without trading off quality. On an average, the cost of materials is two and a half times the value of all labor and payroll costs. As a result, companies see great value in purchasing and supply management professionals who are able to increase their savings and improve their costs.

- **Negotiating Successful Contracts**

The professionals of purchasing in a company will be pressed in to action in negotiating terms with suppliers that benefit both parties. These tasks of negotiating determine procuring cost savings, purchasing and supply management. This important aspect

not only affects revenue and sales, but also the relationship between the organization and the supplier. Strong negotiation skills and ability of successful purchasing and supply management professionals foresee long-term business relationships. In addition to managing costs, fruitful contracts focus on the quality of the materials in addition to how and when they will be delivered. Time is a key factor of successful deals as the materials need to be available based on schedule.

- **Developing Long-Lasting Supplier Relationships**

Purchase as one time affair is unusual and costly. Companies typically require supplies on an on going basis, so that production is uninterrupted. It's important to develop enduring relationships with suppliers. This aspect of purchasing and supply management can add tremendous value to a business. By working with the supplier on a long-term basis, purchasing and supply management professionals can garner higher cost savings, increase competitive advantage and fine-tune schedules. A long-term relationship benefit both the purchaser and supplier and builds a level of trust and thereby enabling both parties to succeed.

- **Mitigating Risk**

One has to Understand the potential risks and develop innovative strategies to manage them is an important aspect of purchasing and supply management. Potential risks include fraud and transparency, intellectual property and counterfeit materials. In addition, purchasing and supply management professionals need to have a plan in place if supplies are delayed or the schedule changes. A company having a strong risk mitigation strategy can greatly affect an organization's bottom line.

The purchasing department is responsible for buying the goods and services a company needs to run its business at a price that supports the company's bottom line. It's a critical role, since delays in purchasing could stop the production process and result in empty shelves for customers.

9.6.3 Functions of Purchasing Management

It directs the flow of goods and services in a company and handles all data relating to contact with suppliers. To be effective, it requires knowledge of the supply chain, business and tax laws, invoice and inventory procedures, and transportation and logistics issues. Although a strong knowledge of the products and services to be purchased is essential, professionals in this field must also be able to plan, execute, and oversee purchasing

strategies that help their company be more profitable. The functions of the purchasing department are as under;

- The most obvious function of the purchasing department in every business or organization is being in charge of buying all items needed by the business or organization.
- The purchasing department interacts with suppliers, receives quotations from them and places orders from them.
- The department is responsible for testing every item bought in order to make sure that they are in good condition.
- Materials bought by the purchasing department are stored by them until they are needed by the various departments and offices of the organization.
- The purchasing department makes sure that the right commodities or items are bought.
- It also makes sure that the right quantity of goods is purchased.
- Having bought the commodities or items, the purchasing department supplies these items to other departments of the company or organization. Simply put, it is in charge of distributing the items within the company.
- After placing orders for the goods from suppliers, the purchasing department checks the deliveries to make sure that they tally with quotation and orders.

These are some of the basic functions of the purchasing department in every company or organization. The purchasing department is normally headed by a purchasing manager. The purchasing manager is sometimes also referred to as the chief buyer. It all depends upon the size of the organisation.

CHECK YOUR PROGRESS

1. Define Purchase Management
2. What is Purchasing Cycle?
3. Define Procurement
4. Who is a Procurement manager?
5. What is the use of Procurement Policy and Procedure ?

9.7 NOTES

9.8 SUMMARY

We can make effort to sum up the content of the unit as adduced. Purchasing is part of materials management as such all activities involved in this needs to be as per the standard set in the organization concerned. True that purchasing though appear to similar, yet we find some differences. Every company manage purchasing and procurement of material through an efficient purchase manager who has to perform the function under the supervision of the concerned authority concerned depending upon the forma d magnitude of the business.

9.9 KEY WORDS

- **Purchasing Department** is also termed as the procurement department or the buying departments make the smartest possible choices to ensure they purchase the best goods and services
- **Materials Management Strategy** is a process adopted by companies to strategize, systematically arrange and monitor activities related with the flow of materials. Procurement of raw materials, its quantity, quality, supporting smaller products etc., all fall under materials management.
- **Purchase Order System** is more of automation in which purchasing activities are tracked in real-time to keep everyone on budget
- **Purchasing officers** find source and buy materials, goods, and services on behalf of the employer to be resold or used in daily operations. Purchasing officers maintain stock levels, and may also conduct research, negotiate with vendors, and interview prospective suppliers
- **Procurement manager;** A procurement manager is responsible for sourcing products and services for the company in which he/ or she is working
- **Procurement Policy and Procedure** provide fundamental guidance to the business on best practice in conducting procurement for goods and services

9.10 ANSWER TO CHECK YOUR PROGRESS

1. **Purchase Management** It is an important function for any wholesale, distribution or manufacturing business. Efficient purchase management prime opportunity for wholesalers to clear bigger profits by controlling costs of the inventory stock needed to run their business
2. **Purchasing Cycle** also called the procurement cycle or procure-to-pay (P2P)—is the process by which one can order, obtain, and pay for the goods and services your business needs

3. **Procurement** is the process of finding and agreeing to terms, and acquiring goods, services, or works from an external source, often via a tendering or competitive bidding process
4. **Procurement manager;** A procurement manager is responsible for sourcing products and services for the company in which he/ or she is working.
5. **Procurement Policy and Procedure** provide fundamental guidance to the business on best practice in conducting procurement for goods and services.

9.11 SELF ASSESSMENT QUESTIONS

1 Explain the role of a procurement officer in manufacturing organization of your choice
2 Can you differentiate between procurement and purchasing?
3 Sketch out Steps in the purchasing process of an Automobile company
4 Discuss the why purchase management is matter of essence in any organization irrespective of the scale of operation
5 State the objectives of purchase management and its important in a company
6 As a purchasing manager what Principles you should borne your mind while Purchasing material
7 Give an appraisal of Functions of Purchasing department in Indian Railways
8 State the Procurement Policy and Procedure to be adopted by a professional in purchasing materials
9 Describe Responsibilities of Procurement Manager in an company
10 Explain the Objectives of Purchasing in a company?
11 Highlight the roles and responsibilities of purchasing department

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UNIT -10: PURCHASING SYSTEM

Structure:

10.1 OBJECTIVES

After studying this unit, you will be able to:

- Give the meaning of Purchasing Cycle and state its objectives
- Explain the importance of Procurement Planning in the Procurement Cycle
- Sketch out various stages in which Purchasing Cycle undergo
- Discuss the various Process of Purchasing Cycle in a company
- Examine the Purchasing Methods and Techniques followed by a company
- Critically evaluate the pros and cons of Centralized - Decentralized Purchasing in company

10.2 INTRODUCTION

As you know a good purchaser of goods and services will not step in to purchasing abruptly, instead he has to get in to it through various processes. All such process will enable buyer to be on safer side, so that the company concerned function uninterruptedly. This process is purchase cycle also known as buying cycle/purchase cycle. It is the process a customer goes through when purchasing a product or service. Customers move through a series of purchasing stages in the cycle and each stage as they educate themselves and move close so that they take a final purchasing decision. Awareness, consideration, intent, purchase and repurchase/continuous purchase are the basis of purchasing cycle.

When a company identifies the need for a product, the procurement cycle of an organisation starts, with collecting information. Obviously, it covers needs analysis; needs clarification, purchase requisition and/or purchase order, purchasing cycle, authorization step by step are the stages of purchasing cycle. The procurement cycle is a series of steps involved in the process of acquiring goods for sale or use by a company or agency. It starts with identifying the need for a given product, moves through the process of purchase and delivery, and winds up at renewal, where people decide if they need more of the product. Often, an entire department oversees this process. This department must find the best products at the best prices, considering limitations like refusing to do business with certain companies or countries in the process of deciding what to procure and from where.

10.3 PURCHASING CYCLE

As already stated purchasing cycle is very important for every buyer, otherwise the task will remain incomplete. Before we step in to the process of purchasing cycle, let us see the definition and meaning of it. The procurement cycle also called as purchasing cycle, is a series of steps involved in the process of acquiring goods for sale or use by a company or agency. The cycle starts with ascertaining the need for a given product, and moves through

the process of purchase and delivery, and winds up at renewal, where people decide if they need more of the product. The department must find the best products at the best prices and fair terms and conditions.

During this part of the procurement cycle, people on both sides work to obtain the best deal. The supplier will consider factors like the size of the order and probability of repeat orders, where as the buyer company thinks about issues like how quickly it needs the product. The buyer demand samples, so that it can assess quality and compare offers from different suppliers. This task will help the buyer to will finalize a deal with a sales contract, and await delivery.

After delivery, people use or sell the product, bringing the procurement cycle to a close as they face both a new need for the product, or completion of a project and no further need for a given product. They can discard unused product, return rentals, get rid of damaged and used-up products, and decide whether they need to order more. At this point in the procurement cycle, people may ask for feedback from employees and others so that they can find out how the products meet their needs. There are usually specific procurement procedures in place at a company. People must follow these if they want to order new products, from filing the correct requisition form to making sure that someone is available to sign for the product at time of delivery. This can be complicated in workplaces with issues like security concerns, where protecting the security of the workplace may require some additional steps, like running background checks on suppliers, during the procurement cycle.

For companies of all sizes, from local small businesses to global megacorps, the purchasing cycle begins with needs analysis and ends with payment and record keeping. In between, they may generate a purchase order, pay for goods directly, or invite tenders (also known as bids) to encourage more aggressive and price-effective competition between suppliers wishing to fulfil a specific need. Most companies have a quirk or two, but in general the process follows a fairly straightforward series of events.

A purchasing cycle (or process) often describes the steps that the consumer or business undergoes before making a purchase. For example, in a company setting, a purchasing cycle is established by purchasing department and may include steps like obtaining approval from a purchase, completing purchase requisition, paperwork, and so on.

10.3.1 Procurement Planning in the Procurement Cycle

It is needless to say that procurement planning is the process of determining what to purchase, at session and from what source. During the process of procurement planning, the procurement method is assigned and the expectation for fulfillment of procurement

requirements is decided by the purchasing manager of the company concerned. Procurement Planning is so important due to the following reasons,

- It helps company to decide material to buy, when and from which type of vendor/s
- It allows planners to determine the material to be bought based on need
- It is an opportunity for all stakeholders involved in the processes to meet and to discuss particular procurement requirements. As you know stakeholders include entity, end users, procurement department, technical experts, and even vendors to give relevant inputs on specific requirements.
- It permits the creation of a procurement strategy for procuring each requirement included in the procurement plan. For this purpose a market survey is highly relied upon.
- Planners can estimate the time required to complete the procurement process and award contract for each requirement
- The need for technical expertise to develop technical specifications and/or scope of work for certain requirements can be assessed, especially where in-house technical capacity is not available.
- Planners can assess feasibility of combining or dividing procurement requirements into different contract packages.

10.3.2 Procurement Plan: It is the product of the procurement planning process. It can be developed for a particular requirement, a specific project, or for a number of requirements for one or many entities in the public or private sectors. The Procurement Plan is important because:

- It enlists all requirements to be procured over a period of time.
- From it the procurement schedule is developed. This establishes the timelines for carrying out each step in the procurement process up to contract award and the fulfillment of the requirement.
- It allows for the consolidation of similar requirements under one contract or the division of a requirement into several contract packages for economies of scale.
- From the number of requirements on the procurement plan, the procuring entity can determine beforehand any need for additional staffing, including external assistance for the purpose of completing all procurement requirements listed on the procurement plan.

- It allows for the monitoring of the procuring process to determine how actual performance compares with planned activities, and thus to alert the pertinent departments and adjust the procurement plan accordingly.
- It enhances transparency and predictability of procurement process.

10.3.3 Steps in Purchasing Cycle.

In any company, the purchasing manager or person in charge of purchasing need to understand various steps in purchasing cycle. The following are the step-by-step techniques of purchasing cycle:

1. **Need Recognition:** The business must know it needs a new product, and find out whether from its available internally or external.
2. **Specific Need:** The right product is critical for the company. Therefore, the company must indicate necessary product by identifiers such as colour, weight, stability, durability, etc.
3. **Source Selection:** The Company needs to decide where to obtain the product. That means it may decide to obtain the product from a supplier or its own approved vendor. At this stage, the purchaser chooses the supplier who'll be filling the order, either from the pre-vetted list in their software catalogue or through other means.

   Centralized contract and document management and information sharing means previously-negotiated contract terms and best price are already available for each vendor on the approved list. New vendors being added to the system will have this information added as legal team completes and certifies the company's agreement(s) with the vendor. If your company doesn't use automation, then your team will need to sit down with the vendor to negotiate payment terms and conditions.
4. **Contract Agreement:** If the source is finalized, then the contract agreement should be prepared. The contract agreement usually consists of the term and conditions of payment for the supply product.
5. **Purchase Order:** The purchase order is used to buy materials between a buyer and a seller. It specifically defines the prices, specifications and other additional obligations. The purchase order (generated from a purchase requisition or not) must also be approved. The purchase order process benefits from automation and artificial intelligence, usually through the use of purchase order software that's part of a comprehensive procurement software package. At this point, the buyer officially places

the order and creates a binding purchase agreement between your business and the vendor.

6. **Delivery:** The product order by the company must be delivered in the method specified in the purchasing documents.
7. **Expedition:** Expedition is required for the delivery of purchase order if there is any delay. The function of an expediter is to make sure that the required goods or components arrive at the appointed date, in the agreed quality, at the agreed location.
8. **Inspection of Purchase Order**: Once the company product is delivered, it may be accepted (if in order) or rejected (in case the item is of a defective product). Acceptance of the item obligates the company to pay for it. For material goods, arriving shipments are inspected for completeness and integrity, with any shortages and broken goods marked to be credited back to the buyer. The invoice is either included with the goods or sent separately by the vendor. Inventory management is either manually updated or handled automatically by the procurement software, which links the shipping documentation to the original purchase order, invoice, related correspondence, and other documents for data analysis and auditing purposes.
9. **Payment Approval:** If the product is accepted by the company, then the top officers approved the necessary funds for the product payment. The invoice is reviewed for accuracy against the purchase order, invoice, and other documentation. Depending on the terms established for the supplier and the approval of the reviewing party, payment is made (usually within 30, 60, or 90 days). The payment may be in the form of cash, cheque, bank transfers, credit letters, or other types of electronic payments.
10. **Records Management** Businesses still using manual systems follow up by updating their inventory totals and purchasing ledger. Purchasing software automates this step, as documents are cross-connected and update automatically across all departments.

10.4 IMPORTANCE OF PROCUREMENT PLANNING

The importance of Procurement Planning in the Procurement Cycle are as follows;

1. It helps the company to decide what to buy, when and from where to buy.
2. It allows determining and checking if expectations are realistic in nature.
3. It is an opportunity for all stakeholders of the company involved in the process to meet in order to discuss particular procurement requirements. These stakeholders can be the vendors, end users, the procurement department, and technical experts to provide their inputs on the specific requirements.

4. It allows the company to create the procurement strategy for procuring each requirement that will be included in the entire procurement plan.
5. The company can assess the feasibility of combining or dividing the various procurement requirements into different packages as per the merit of the situation.
6. Planners can estimate the time required to complete the procurement process and award contract for each requirement
7. It allows planners to decide and to procure material so that they meet the requirement on short notice;
8. It is an opportunity for all stakeholders involved in the processes to meet so that they discuss particular procurement requirements. These stakeholders may be the requesting entity, end users, procurement department, technical experts, and vendors to give relevant inputs on specific requirements.
9. It permits to evolve procurement strategy for procuring each requirement that will be included in the procurement plan.

10.5 PUBLIC PROCUREMENT METHOD

Public procurement methods are procedures used by procuring entities to procure goods, services and construction works. There are various methods Public procurement and they are detailed as below;

- **Open Tendering** It is the preferred competitive public procurement method used for acquiring goods, services and infrastructure works. It is executed in accordance with established procedures set out in the procurement guidelines and detailed in the standard bidding documents. Open tendering is also known as open competitive bidding, open competition or open solicitation, and the procurement notices used to call for bids for these requirements are identified as: In the process of Open tendering the company needs to adhere to the following aspects:
    - advertise locally in the market
    - have a list of unbiased and coherent technical specifications
    - have objective evaluation means and measures
    - be open to all qualified bidders maintaining the transparency
    - be granted to the least cost provider without contract negotiations
- This method actually encourages effective competition to obtain products required with an emphasis on the value for money. However, considering that it is a procedure based method quite many experts feel that this method is not very suitable for large or complex

acquisitions owing to its intense focus on the output process instead of rigid compliance to the standards. Disadvantages of Open Tendering:complex requirements are not very suited for this method, extended timelines and complications in defining the exact needs and requirements by the procuring company

- **Restricted Tendering**

Unlike the open tendering method of the Procurement Cycle, restricted tendering only places a limit on the amount of request for tenders that can be sent by the various suppliers in the market. And because of the selective nature of this process, restricted tendering is also known as selective tendering. Restricted tendering is considered a competitive procurement method but the competition is limited to agencies that are invited by the procuring team. The procuring company should establish a set of guidelines when selecting the suppliers as randomized selections will not be very apt for the entire process. This method is selective to find the best-suited and qualified suppliers to procure goods from plus it also saves a lot of time and resources of the company.

- **Request for Quotations**

This procurement method is used for small-valued products or a service required by the company and is the easiest and simple methods of procurement without any sort of complexities involved. This method ensures the fast and quick procurement process without much of the paperwork. There is no formal proposal drafted from either of the parties involved in this method. The procurement entity selects a minimum of three suppliers for the quotes. After the comparison of quotes and the services provided by the suppliers, the best one is selected.

- **Single-Source**

Single source procurement method is the non-competitive method that should be used under specific circumstances in the organization. Single source procurement occurs when the company intends to acquire products and goods from a single supplier. This method has to undergo a strict approval process from the company management. The various internal and external circumstances that call to cycle this method are mentioned below:

- Emergencies in the organization
- If only one supplier is available and qualified to fulfill the requirements in an efficient manner
- If the advantages of using a certain supplier are quite clear
- If the company requires a certain product that is only available from that one specific supplier

- For the continuation of work processes that cannot be reproduced by another supplier in the market

Benefits of a well-designed Procurement Cycle process;

- Saves a lot of time ensuring the right solutions to meet your business needs and requirements.
- Right price and cost efficiency
- Avoids overlooking the vital steps that may cause problems in the future.
- The selected supplier is well familiarized with the business operations
- Transparent accounting systems.

10. 6 METHODS OF PURCHASING MATERIALS

Some of the methods of purchasing are discussed as follows:

Purchasing by Requirement: This method refers to those goods which are purchased only when needed and in required quantity. The goods which are not regularly required are purchased in this way. On the other hand it refers to the purchase of emergency goods. These goods are not kept in store. Purchasing department must be in knowledge of the suppliers of such goods so that these are purchased without loss of time.

Market Purchasing: Market purchasing refers to buying goods for taking advantages of favorable market situations. Purchases are not made to meet immediate needs but are acquired as per the future requirements. This method will be useful if future needs are estimated accurately and purchases are made whenever favourable market situations arise. The market situation is constantly studied for forecasting price trends.

The advantages of this method are: lower purchase prices, more margins on finished products due to lower material cost and saving in purchase expenses. This method suffers from some limitations: losses in case of wrong judgment fear of obsolescence, higher storing expenses due to more purchases.

Speculative Purchasing: Speculative purchasing refers to purchases at lower prices with a view to sell them at higher prices in future. The attention in this method is to earn profits out of price rises later on. The purchases are not made as per the production needs of the plant rather these are far in excess of such requirements. A cloth mill may purchase cotton in the market when prices are low with the attention of earning profits out of its sales when prices go up.

Speculative purchasing should not be confused with market purchasing. The former is done to earn profits out of future price rises whereas the latter is concerned with purchasing

for own needs when favourable market situations exist. Though speculative purchasing may result in profits but there are chances of prices going down in future, fear of obsolescence and incurring higher storage costs.

Purchasing for Specific Future Period: This method is used for the purchase of those goods which are regularly required. These goods are needed in small quantity and chances of price fluctuations are negligible. The needs for specific period are assessed and purchases made accordingly. The requirements for such purchases may be assessed on the basis of past experience, period for which supplies are needed, carrying cost of inventory etc.

- **Contract Purchasing;** in the words of Spriegel it is "the purchasing under contract, usually formal, of needed materials, delivery of which is frequently spread over a period of time." Under this method a specific quantity of materials is contracted to be purchased and delivery is taken in future. Even though the goods are procured in future but the price and other terms and conditions are fixed at the time of contract. This method may be useful when price rises in future may be expected and material requirements for future may be accurately estimated.
- **Scheduled Purchasing**: Under this method the suppliers are supplied a probable time schedule for material requirements so that they are in a position to arrange these in time. An accurate production schedule is prepared for estimating future material needs. The suppliers are informed of probable needs and orders are sent accordingly. The schedule provided by the purchaser to the vendor is not a contract. This is only a gentleman's agreement for terms and conditions of purchases. The main objectives of this method are: minimum inventory, prompt service, low prices, quality goods etc.
- **Group Purchasing of Small Items**; sometimes a number of small items are required to be purchased. The prices of these items are so small that costs of placing orders may be more than prices. In such situations the buyer places order with a vendor for all these items. The purchase price is agreed to be by adding some percentage of profit in the dealer's cost. This method will be used only when dealer's records are open to inspection for determining his cost. This type of purchasing reduces the cost of the buyer by eliminating much clerical work.
- **Co-operative Purchasing**: Small industrial units may join to pool their requirements and then place bulk orders with dealers. This will help them in availing rebates on large quantity purchases, cash discounts and savings in transportation costs. After receiving

the materials these are divided among the member units. Co-operative purchasing helps small units in availing the benefits of bulk purchasing.

In addition to the above methods**,** companies may ponder over some more methods that may be utilized to request items or services which are as follows;

- **Blanket Orders:** An open order for a specified period which authorizes the vendor to allow items/services to be charged by one of the authorized persons listed on the order. A blanket order is for items/services usually less than $5,000, including freight.
- **Check Requests**: A form used to request payment for certain items. Items which are normally paid on a check request are: conference/seminar registration fees; fellowships and honorariums; inter-library loan; lodging deposits; lodging expenses for non-employees; memberships; postage; refunds/overpayments; royalty payments; agency fund expenditures (student organizations/payroll deductions) and petty cash replenishment requests.
- **Petty Cash**: A petty cash fund is established in a department to improve the efficiency of departmental operations. These funds are available to purchase minor items when it would be otherwise impractical to purchase items through the usual purchasing methods. Petty cash is for items less than $200.00 and not on the prohibited list.
- **Purchasing Credit Card:** A credit card to provide departments and requisitioners with a widely accepted method of ordering small dollar, petty cash type items. The credit card is the preferred method for purchasing items less than $5,000 and not on the prohibited list.
- **Purchase Requisitions and Orders**: A form used to request purchase of supplies, equipment, and services.

10.6.1 Types of Purchases:

Organizations buy many different goods and services from various sources. As previously indicated, the challenge for purchasing is deciding on the supplier that offers the best opportunity for items an organization must purchase externally. Purchasing department is responsible for buying items for the company. Services are a special category of spend and the involvement of purchasing depends on the organization.

- Raw materials; Items with a lack of processing by the supplier into a newly formed product. Often these raw materials are not of equal quality and are purchased by grade. Examples Petroleum, coal, lumber, copper, zinc, gold, and silver

- Finished products; Products for internal use or products that require no major processing before resale to the end customer. Example, Furniture, computers, cars, and carts
- Maintenance, repair, and operating items (MRO) Items that do not go directly into an organization's product but are required to run the business. Example, Spare parts, office and cleaning supplies
- Production support items Materials required for packaging and shipping, example Tape, bags, inserts, and shrink-wrap
- Service required supporting the facility or the business. Customer support, temporary labor, facilities, and legal
- Capital equipment Assets intended to be used for more than one year. Machinery, computer systems, and material-handling equipment
- Transportation and third-party purchasing A specialized type of service buying to manage inbound and outbound material flows. Rail, truck, ocean, 3PL, and multimodal.

10.7 PURCHASING SYSTEM

As a business owner, companies need an efficient way to monitor their inventory which help determine when a specific quantity of material to be purchased. For this purpose, they can rely upon purchasing system. A purchasing system is a component of inventory management that can help businesses monitor and manage inventory. With a purchasing system, a company can track the goods and services it purchase and its overall inventory levels. A purchasing system is a set of processes a business can use to acquire goods and services. Purchasing system software can help streamline the following:

- Placing purchase orders
- Managing orders and invoices
- Keeping a list of suppliers
- Forecasting future spending
- Finding purchase information (e.g., date of purchase and cost)
- Updating inventory stock levels
- Maintaining accurate records of purchases
- More complex purchasing systems may even have the capability of automatically ordering needed inventory, managing supplier contracts, and integrating with basic accounting software to record transactions.

10.7.1 Types of purchasing systems

The type of purchasing system one can come across for business depends on the data needed to record and track. An effort has been made to highlight some types of purchasing systems for a company:

- **Stockless purchase system**: Supplier holds items ordered by a customer until the customer needs
- **Blanket order**: Company places small orders on a day-to-day basis.
- **E-purchasing**: Purchasing used for the purchase and sale of supplies, goods, and services through the internet.
- **Rate contract method**: System that helps a business establishes parameters for purchasing goods and services.
- **Capital equipment purchase**: Purchasing system that requires high capital.

Again, a business may need to get a specific type of purchasing system depending on how business handles inventory and industry. For example, a business manager may need to use a blanket order if the business needs to purchase items on a day-to-day basis.

10.7.2 Purpose of purchasing system

There are many perks of purchasing systems that small businesses can take advantage of. For starters, purchasing systems can make the purchasing process much easier and more efficient for businesses. An online purchasing system can cut down costs, shorten the length of the purchase cycle, and help reduce human errors. Additionally, purchasing system reports can make it easier to manage inventory budget and forecast supplies needed for the future.

Overall, purchasing systems can play a stupendous role in controlling what business spends on goods and services. Purchasing systems can help:

- For quick and necessary purchases
- Pay reasonable prices on goods and services
- Better budget for goods and services

10.7.3 Purchasing System vs. Purchase Order System

A purchase order is a document buyers use to place an order with a seller or supplier. It is a part of a purchasing system. One of the processes a business manages with a purchasing system is placing and tracking purchase orders.

While a purchasing system handles a variety of inventory management tasks, a purchase order system focuses mainly on the process of purchase orders. With a purchase

order system, one can track a number of things, including purchase order information (e.g., date, amount of purchase, etc.), when the order is received, and processed invoices.

10.8 CENTRALIZED PURCHASING

Centralized purchasing means buying and managing purchases from one location for benefits of all different locations within an organization. Centralized purchasing can also be run by a central location buying in to a distribution warehouse, which in turn feeds smaller warehouses. This is called a hub and spoke system. The responsibility and authority to purchase, lease, or rent materials, supplies, goods, equipment, or services are placed with the Division of Finance and Operations, Purchasing and Stores Department in the company concerned. Most organizational leads would definitely agree that choosing the right control scheme is always a challenge.

As per Business Dictionary centralized purchasing is a purchasing system in which all the departments of a company with a wide geographical distribution can go for purchases through a common purchasing organization. In other words, centralized procurement is a purchase of all required goods and services made by a single department for all the branches of the entire company no matter the territorial boundary. Purchasing manager is the head of the department and assisted by other human resources.

Centralized procurement is beneficial in finding the best deals with local vendors for the corresponding location of the company department. It not only helps in avoiding duplicity of orders, but also promotes advantages such as high volume bulk discounts, lower transportation and inventory management costs. Centralized purchasing is a viable solution for those who feel difficulties in managing long-running transitions and mending fences. Centralised procurement system is not apt in case plants are located in far off places.

10.8.1 Benefits of centralized procurement:

After understanding the concept of centralized procurement, let us proceed further as to how centralized procurement bring in various benefits and they are as follows;

- Reduction of Overhead expenses:
- Better Relationships within the organization:
- Advanced control:
- Team cohesion:
- Cost-saving features:
- Volume purchasing
- Warehouse

- Save time in searching products:
- No duplication:
- No diversion:
- Good relations:.
- Standardized procedure:
- Reduction in carrying inventory cost:
- Cost of order processing:
- No scope for wrong decision:
- Adjustments of material among inter section:

10.8. 2 Disadvantages of Centralized procurement:

When the system has benefits, it also has drawbacks, and they are;

- Inordinate delay:
- High initial cost:
- Local Purchase could be faster:
- Emergency Purchase is difficult:

CHECK YOUR PROGRESS

1. Differentiate between Centralized purchasing and Decentralized purchasing
2. What is Blanket order?
3. Where Open tendering is used?.
4. What is Stockless purchase system?
5. Define Contract Purchasing

10.9 DECENTRALIZED PURCHASING

Decentralized purchasing refers to purchasing of materials by all departments and branches independently to fulfil their requirements. In this case, each plant or office buys their actually required materials. Decentralization of purchasing signifies the existence of purchasing power entrusted to each branch or department of any enterprise. In this process, each branch or department decides its own requirements of goods from time to time and makes its purchases accordingly. As such all the defects of centralized purchasing can be overcome by decentralized purchasing system. Decentralized purchasing will enable to purchase the materials immediately in case of an urgent situation.

10.9.1 Advantages of Decentralized Purchasing:

Some of the advantages of decentralized purchasing are;

- Benefit of time:

- Better coordination:
- Fosters correlation between input and output:
- Benefit of choice:
- Effective Control:
- Materials are purchased in right quantity of right quality for each department easily.
- No heavy investment is required initially.
- Purchase orders can be placed quickly.
- The replacement of defective materials takes little time.

10.9.2 Disadvantages of Decentralized Purchasing

The decentralised purchasing has few demerits and they are as follows

- Organization losses the benefit of a bulk purchases.
- Specialized knowledge may be lacking in purchasing staff.
- There is a chance of over and under-purchasing of materials.
- Fewer chances of effective control of materials.
- Lack of proper co-operation and co-ordination among various departments.

Thus, it is observed that centralization and decentralization of purchasing have their own merits and demerits. The decision should be taken by the management properly keeping all factors in mind.

It is difficult to change from decentralized purchasing to centralize purchasing. Employees feel their privileges are being taken away. They feel they are losing control of their site. Some will refuse to really cooperate in the changes in hopes to making the program look unsuccessful.

10.10 NOTES

10.11 SUMMARY

To sum up that companies under the leadership of purchasing manager make efforts to complete purchasing process only when planning, procedures and process of purchasing logically reaches its objectives. The purchasing need to undergo procurement cycle, which

is a series of steps involved in the process of acquiring goods for sale or use by a company or agency. The effective purchasing of product need to encompass procurement planning processes, which determine what to purchase, at time and from what source. It can be developed for a particular requirement, a specific project. There are various methods of purchasing, and it is the responsibility of the company concerned to rely upon the method/s based upon the need. The government agencies have to rely upon Public Procurement method, where in open tendering, restrictive tendering, single source, and inviting quotation etc; would take their own course. The companies can opt either centralized purchasing or decentralized purchasing or both. Centralized purchasing can also be run by a central location buying in to a distribution warehouse, which in turn feeds smaller warehouses. Under decentralization of purchasing, purchasing power is entrusted to each branch or department of any enterprise. As such each branch or department determine its own requirements of goods from time to time and makes its purchases accordingly, however the unit concerned has obligations to report to the central system of the action taken as per the directives. Purchasing system handles a variety of inventory management tasks, and a purchase order system focuses mainly on the process of purchase orders. It is needless to say that purchasing managers is put in place to perform various functions in ensuring that quality products are procured at highly competitive prices. The major tasks, duties, and responsibilities of this role are highlighted in the job description as approved by the competent authority; of course standard of job description is followed scrupulously.

10.12 KEY WORDS

- Procurement cycle; The procurement cycle also called as purchasing cycle, is a series of steps involved in the process of acquiring goods for sale or use by a company or agency
- Procurement planning; It is the process of determining what to purchase, at session and from what source.
- Purchasing Manager; Purchasing Manager will be responsible for sourcing equipment, goods and services and managing vendors.
- Job Description;
- Purchasing systems; It handles a variety of inventory management tasks, a purchase order system focuses mainly on the process of purchase orders
- Speculative Purchasing; Speculative purchasing refers to purchases at lower prices with a view to sell them at higher prices in future.

- Purchasing for Specific Future Period: This method is used for the purchase of those goods which are regularly required.
- Procurement Plan: It is the product of the procurement planning process
- Cross company purchasing; here, a purchase order on a vendor is opened assigning cost center of another entity in the account assignment segment.
- Purchase order; A purchase order is a document buyers use to place an order with a seller or supplier
- Plant specific; Plant specific purchase organization is assigned specific plants, as such, it will procure material only for those plants
- E-purchasing: Purchasing used for the purchase and sale of supplies, goods, and services through the internet.
- Rate contract method: System that helps a business establishes parameters for purchasing goods and services.
- Capital equipment purchase: Purchasing system that requires high capital.
- Purchasing organization; it is an independent physical organizational entity of material management that responsible to procure materials or services with negotiation terms and conditions from vendors or internal plant.

10.13 ANSWERS TO CHECK YOUR PROGRESS

1. Centralized purchasing means buying and managing purchases from one location for all different locations within an organization. Decentralized purchasing refers to purchasing of materials by all departments and branches independently to fulfil their requirements.
2. Blanket order: Company places small orders on a day-to-day basis.
3. Open tendering; it is the preferred competitive public procurement method used for acquiring goods, services and infrastructure works.
4. Stockless purchase system: Supplier holds items ordered by a customer until the customer needs
5. Contract Purchasing; under this method a specific quantity of materials is contracted to be purchased and delivery is taken in future.

10.14 SELF ASSESSMENT QUESTIONS

1. Explain various Methods of Purchasing Materials

2. ‘Organizations buy many different goods and services from various sources’ Elucidate
3. Explain the Procurement cycle with a series of steps involved in the process of acquiring goods for sale or use by a company or agency
4. Give a note on Purchasing System vs. Purchase Order System
5. “Business purchases vary considerably in size and scope, and a purchasing method that may be appropriate for one type of expenditure may not be suitable for another”. Comment
6. Examine the implications of Public Procurement method

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UNIT-11: PURCHASING POLICY AND PROCEDURE

Structure:

11.1 OBJECTIVES

After studying this unit, you will be able to;

- Explain the objectives and importance of Purchase Policy and Procedure in an organization
- Critically evaluate how " an organization can formulate Purchase Policy and Procedure for its effective purchasing"
- Discuss purchase policy and the system and types of purchasing systems
- Give an note on centralized purchasing v/s decentralized Purchasing
- Describe General Principles of Purchasing Policy for a company

11.2 INTRODUCTION

The purchase policy and procedure is one of the most important activities of materials management in an organisation. There are various systems available to the purchase, which depends on a number of factors, namely; demand, supply, price, vendor, type of material, consumption pattern, organisational set up, past precedents, procedures, decision making, spares and seasonal commodities, and so on. In the primitive stage barter system is prevalent in making purchases i.e. goods exchanging the goods. In the modern world, barter system is discarded and money is playing predominant role for goods and services. Many organizations including MSMEs prefer to purchase goods and services on credit purchase, although many have preferred cash basis. In the wake of Digital India, purchases are made cash less. Purchase policy needs to be formulated so that a company purchases the required material in the right quantity from right source at the right time and price. Telephonic orders, tender system of purchases, rate and running contract, sub contracts etc, are some of the important methods adopted by an organization. Purchasing Systems depends upon the size of the organization, its nature, area of operation etc. Centralized purchasing and decentralized purchasing fetch their own benefits to the organizations concerned. It is the responsibility of a company to creating a Purchasing policy – step by step process and obtain nod by the competent authority.

11.3 PURCHASE POLICY AND PROCEDURE

11.3.1 Purchase policy

As you know a company willing to purchase materials need to follow its own purchasing policy. A purchasing policy is a collection of rules that control the requisition process. Purchasing policies help procurement administrators implement their procurement strategy by creating a policy structure that is aligned with the organization's strategic purchasing

requirements. A purchasing policy consists of a set of policy rules, which define a policy rule then create a rule by defining the settings, start date, and end date for rule. When a company look at various factors, its purchasing policy will find four primary areas to form base of purchasing policy:

- Guidance for Employees: Employees need to know standards when it comes to requesting and making purchases. That includes preferred vendors, price points and how to handle and work with vendors not yet approved.
- Acceptable Behaviour: Purchasing policies should also have clear examples of what is acceptable for company. This includes how to handle conflicts of interest, vendor interaction and defined communication parameters.
- Purchasing Engagement: Without a good purchasing policy, a manager won't have defined purchasing engagement policies. Engagement is about how the company works internally and how the company deals with outside interests.
- Universal External Engagement Policies: Acceptability for employees to do when they are working with those outside interests. Purchasing department stance to handle when dealing with a new vendor or new project.

11.3.2 Purchase Policy and Procedure

A policy is a statement of intent, which is implemented as a procedure or protocol. Whereas, policies are generally adopted by a governing body within the organization. Policies can assist in both subjective. A procedure is an established method of accomplishing a task, usually with steps that are performed in a prescribed order. As already stated that all the organization no matter whether small, medium and big, purchase the required one effectively provided they have put in place the objective purchase policy and procedure. It is needless to say that purchase may be made on cash basis or credit basis or both. In wake of digital process the transaction can be effected online/ digital without giving scope for contact between the parties.

A well laid out purchasing procedure can be followed by any organisation in making purchases. Every purchase system and procedure has its own benefits and limits. The system should be such, which suits to the requirements of an organisation. The main motto of the purchase policy is to purchase the required material in the right quantity from right place at the right time and price. This in turn helps obtaining the maximum advantage from the amount invested on the purchases. As already stated that different sizes of companies adopted their own purchase policy and procedures, which may be either customary or written as

approved by the competent authorities. The system of audit ensures the purchasing is made systematically by following established rules in force.

11.3.3 Objectives of purchase policy and Procedure;

The objectives of purchase policy and Procedure are to;

- Make purchase commitments for materials, equipment and services at the lowest possible price, consistent with quality and delivery requirements.
- Ensure deliveries of purchase materials are available to meet training, operational and maintenance requirements and that equipment is delivered and services are performed as required and agreed to by user, buyer and supplier.
- Explore and capitalize on all legally permissible opportunities for cost reduction on purchase of materials.
- Ensure suppliers adhere strictly to brand or make and test specifications and those materials and equipment received meet specified quality standards and all stated performance criteria.
- Develop local suppliers.
- Establish and maintain good relations with suppliers.
- Implement buyer rotation plan.

11.4. PURCHASING PROCESS | PURCHASE MANAGEMENT

You are well aware that some organization hastily procures goods and services without approval from the competent authority nor have they followed any formality as laid down in the purchasing procedure. In such cases, both the suppliers and purchasing in charge will be facing the problems. It is the responsibility of the in charge of purchasing to obtain approval, besides following purchasing procedure.

Purchasing is the overarching process of obtaining necessary goods and services on behalf of an organization, while, procurement involved activities in obtaining them. The procurement process in an organization is unique to its context and operations. Regardless of the uniqueness, every procurement management process consists of 3 Ps', namely Process, People, and Paperwork;

1. Process is the list of rules needed to be followed while reviewing, ordering, obtaining, and paying for goods/services.
2. People are stakeholders and their specific responsibility which one can find in the procurement cycle. They take care of initiating or authorizing every stage of the

process tactfully. The number of stakeholders involved is directly proportional to the risk and value of the purchase, and

3. Paper refers to the paperwork and documentation involved in every stage of the procurement process flow and are collected and stored for reference and auditing purpose.

Procurement automation is definitely more than saving time and money. In order to keep the procurement management process fair, transparent, and efficient, a good understanding of the procurement process flow is key. Although the procurement process of organizations differs from each other, the flowchart below sums up the important steps in a procurement process. Procurement refers to techniques, structured methods, and means used to streamline an organization's procurement process and achieve desired results while saving cost, reducing time, and building win-win supplier relationships. Procurement can be direct, indirect, reactive, or proactive in nature.

As far as procurement process is concerned it is all the steps an organization must take to acquire the products and services it needs to do business. Typically a procurement process starts from the minute purchase requests is placed, and involve steps like identifying suppliers, negotiating price, invoice approval, right through to receiving the goods. It's important to note that there's no "one size fits all" format for the procurement process flow. The steps in a company's procurement process depends on several factors like: business model, company size, location of business, company structure, handling budget and spending, human resources (e.g. procurement manager)

11.5 EFFICIENT PROCUREMENT AUTOMATION SOFTWARE

It minimizes the chaos made by paperwork, shortens the procurement lifecycle, reduces human dependency intervention and errors, lessens the workload of all stakeholders, keeps the process accurate and consistent, injects transparency into the process flow, sticks to the predefined procurement cycle. It may be noted that an automated procurement management software rather than depending on emails and excel sheets ensure speed up the procurement process, ensure accuracy, enhance efficiency, and save time and resources.

11.5.1 Supply and purchase contract

For small companies, the purchasing department is responsible to acquire production assets, business equipment, facilities and other major items. Larger organizations often employ other people or outsource the process of the purchasing department. The purchasing process does not end with the supplier receiving the contract. It continues until the products

actually reach the company and in some cases it can be based on a long term relationship, therefore implying the need of a purchase order system which allows business owners to have a written historical record of various purchases.

11.5.2 Best Practice for Purchasing:

As far as best practice of purchasing is concerned, we have understood automation, as part of digital India.

Automation: In the wake of digital India and digital transformation and artificial intelligence (AI) tools standard components of many top-shelf software solutions, purchasing process needs to be automated, Medium and large scale companies embrace automation of purchase process. It is very clear that the purchasing process done manually, on paper experienced a production shutdown due to delay of critical raw materials. Further, discovered a double payment for a major purchase, or simply chasing down the purchase order number for a particular item to match it to the shipping documents and invoice. Manual workflows and paper-based record-keeping are no longer sufficient for companies that want optimal return on their purchasing investment or a healthy, strategic supply chain.

11.6 PURCHASING PROCEDURE

The policy statements are the guidelines to be followed. Lengthy and too many policies have to be avoided. The purchasing policy throws light upon guidelines and direction to attain the objectives.. It defines - rules of purchasing, conduct of purchasing personnel, social and minority business objectives and operational issues. The procedure describes the sequence of steps leading to the completion of an identified specific task.

- **Recognition of the need:** The initiation of procedure starts with the recognition of the need by the needy section. The demand is lodged with the purchase department in the prescribed Purchase Requisition Form forwarded by the authorised person either directly or through the Stores Department. The purchase requisition clearly specifies the details, such as, specification of materials, quality and quantity, suggested supplier, etc. Generally, the low value sundries and items of common use are purchased for stock while costlier and special items are purchased according the production programmes. Generally, the corporate level executives are authorized signatories to such demands. Such purchases are approved by the Board of Directors. The reference of the approval is made on requisition and a copy of the requisition is sent to the secretary for the purpose of overall planning and budgeting.

- **Selection of the supplier**: The process of selection of supplier involves two basic aspects: searching for all possible sources and short listing out of the identified sources. The complete information about the supplier is available from various sources, such as, trade directories, advertisement in trade journals, direct mailing by the suppliers, interview with suppliers, salesmen, suggestions from business associates, visit to trade fair, participation in industries convention, etc. Identification of more and more sources helps in selecting better and economical supplier. It should be noted that the low bidder is not always the best bidder. When everything except price is equal, the low bidder will be selected. The important considerations in the selection are the price, ability to supply the required quantity, maintenance of quality standards, financial standing etc. It should be noted that it is not necessary to go for this process for all types of purchases. For the repetitive orders and for the purchases of low-value, small lot items, generally the previous suppliers with good records are preferred.
- **Placing the order**: Once the supplier is selected the next step is to place the purchase order. Purchase order is a letter sent to the supplier asking to supply the said material. At least six copies of purchase order are prepared by the purchase section and each copy is separately signed by the purchase officer. Out these copies, one copy each is sent to store-keeper, supplier, accounts section, inspection department and to the department placing the requisition and one copy is retained by the purchase department for record
- **Follow-up of the order**: Follow-up procedure should be employed wherever the costs and risks resulting from the delayed deliveries of materials are greater than the cost of follow-up procedure, the follow-up procedure tries to see that the purchase order is confirmed by the supplier and the delivery is promised. It is also necessary to review the outstanding orders at regular intervals and to communicate with the supplier in case of need. Generally, a routine urge is made to the supplier by sending a printed post card or a circular letter asking him to confirm that the delivery is on the way or will be made as per agreement. In absence of any reply or unsatisfactory reply, the supplier may be contact through personal letter, phone, telegram and/or even personal visit.
- **Receiving and inspection of the materials**: The receiving department receives the materials supplied by the vendor. The quantity are verified and tallied with the purchase order. The receipt of the materials is recorded on the specially designed receiving slips or forms which also specify the name of the vendor and the purchase order number. It also records any discrepancy, damaged condition of the consignment or inferiority of the

materials. The purchase department is informed immediately about the receipt of the materials. Usually a copy of the receiving slip is sent to the purchase department.

- **Payment of the invoice**: When the goods are received in satisfactory condition, the invoice is checked before it is approved for the payment. The invoice is checked to see that the goods were duly authorised to purchase, they were properly ordered, they are priced as per the agreed terms, the quantity and quality confirm to the order, the calculations are arithmetically correct etc.
- **Maintenance of the records**: Maintenance of the records is an important part and parcel of the efficient purchase function. In the industrial firms, most of the purchases are repeat orders and hence the past records serve as a good guide for the future action. They are very useful for deciding the timings of the purchases and in selecting the best source of the supply.
- **Maintenance of vendor relations**: The quantum and frequency of the transactions with the same key suppliers provide a platform for the purchase department to establish and maintain good relations with them. Good relations develop mutual trust and confidence in the course of the time which is beneficial to both the parties. The efficiency of the purchase department can be measured by the amount of the goodwill it has with its suppliers.
- **Cost-benefit evaluation and cost-effectiveness evaluation method**: As you know that businesses of all sizes have limited resources for their daily operations – employees, raw material, production equipment i facilities, and money all are limited. The cost-benefit evaluation method and cost-effectiveness evaluation method are techniques that companies use to help them make particular business decisions.

11.7 COST-BENEFIT ANALYSIS

When performing a cost-benefit analysis on a project, it is important to analyse a comprehensive list of expenses and positive outcomes the project will create. Costs or expenses that the project creates include:

Direct costs are purchases that a business makes that directly relate to the creation of its goods and services. These costs can include material purchases, employee salaries and equipment or tool rentals.

Indirect costs are other expenses that help keep the business or company operating, including insurance, facility rentals and utility costs.

Intangible costs are costs that companies can't easily quantify. These costs can include customer satisfaction, employee morale or overall productivity.

Potential risks are any challenges or issues that a company might face during a project or after the project's completion. These can include other direct or indirect costs, such as spending more than the company expected, and intangible costs, such as loss of business or profit.

Opportunity costs are the loss of potential benefits or profit from making one decision over another. This can be cleared with an example in case a company decides to sell some property; they might be missing out on potential profit from renting the property on a monthly basis.

Once a company realises major costs of a project or decision, it can compare those expenses to project's benefits. A project's benefits are often similar to the costs and can include direct benefits, such as an increase in profit, and intangible benefits, which covers increased customer or employee satisfaction. After comparing the benefits and the costs, company can choose whether the benefits outweigh the costs and if the project or decision will be positive for the business overall.

Factoring Opportunity Cost

Generally companies implements a plan or make a purchase, in which case businesses consider both initial money needed and the opportunity cost. To get a true cost of a particular plan or purchase, company management needs to factor in the opportunity cost of the decision, which usually involves having the business acumen to think long-term about choices. Decision-makers weigh the benefits of alternative opportunities or actions with an open mind.

Calculating Costs Involved

In order to ascertain the cost-benefits analysis process, a company should first list all the associated costs and perceived benefits of the plan or purchase. The costs can be direct, like the purchase of raw materials, inventory storage, manufacturing and labor, or they can be indirect costs such as rent, electricity, internet, advertising and taxes.

The real strategy comes into play when the money is available but other types of costs must be taken into consideration. Looking at the constraints, a company can decide either to take on a project or make a purchase

Businesses must also account for intangible costs which are often hard to identify and quantify when brainstorming the costs of a decision. If a decision has the ability to affect a company's brand, impact employee morale, decrease customer loyalty or lower productivity,

that also needs to be accounted for. Once the intangible costs are noted, list the opportunity costs – costs that would take effect now and ones liable to occur in the future.

11.8 COST-EFFECTIVENESS EVALUATION METHOD

The cost-effectiveness evaluation method is an alternative to a cost-benefit analysis. This method is more complex as multiple components are involved in to it. This method analyzes multiple outcomes and courses of action in order to take a decision about the subject. The fundamental difference between the cost-effectiveness evaluation and cost-benefit evaluation is that in the case of former monetary value is not assigned to the benefits of a particular decision. This is a major benefit when dealing with intangible costs and benefits that may be nearly impossible to assign a monetary value too accurately.

One can find a similarity in these methods. Healthcare decision-makers like doctors, hospitals, patients and health systems as a whole face many decisions on how to allocate limited resources. It is extremely difficult to put a monetary value on an outcome that involves a person's health, so using this method to compare options would not serve a purpose. These choices are ultimately made based on the prominence of the problem, the health benefits involved and available funding.

11.8.1 Measuring Cost-Effectiveness

The example quoted here in under helps to understand the cost effectiveness of cost of purchases.

- The first step someone should take when performing a cost-effectiveness analysis is to decide on which outcome will be used as a means of comparison between multiple events. For example, if one pharmaceutical company uses television advertisements to promote its new vitamin and another company uses only social-media like Twitter advertisements, you can compare the relative cost of acquiring a new patient.
- The second step is to measure the potential outcomes for each possible scenario so you can have comparison points to use between them. This involves having a group of people who did not come into contact with either advertisement, a group of those who only saw the television advertisements and a group that only saw social media advertisements.
- Once these figures are arrived, we have to proceed further to calculate the cost of each activity, including time spent on designing and implementing the plan.
- In this case, one can calculate the cost of buying each type of advertisement and the time spent creating the different campaigns. Whereas cost-benefit analysis expresses

value in monetary figures, whereas cost-effectiveness express value in terms of physical units, ie is the number of people opted to buy vitamins.

- Once the cost of each option is determined, the cost-effectiveness can be calculated by Total costs / number of extra units.
- If the television advertisements cost $100,000 and acquired 20,000 new customers, the cost-effectiveness would be $5 per additional customer. If the social media advertisements cost $90,000 and acquired 15,000 new customers, the cost-effectiveness would be $6 per additional customer.

11.9 CREATING A PURCHASING POLICY

In this section, step by step process of purchasing policy is explained as under;

- Objective of the purchasing policy
- Role of purchasing.
- Vendor setup and on boarding process.
- Contract signing authority
- Purchasing authority levels.
- Delegation of authority.
- Purchasing process and accepted norms
- Invoices and accepted norms
- Competitive Bidding
- Ethical purchasing and conflict of Interest
- Supplier diversity
- Record retention

11.10 MAKE OR BUY DECISION

All companies can't focus on manufacturing products throughout. There are various factor s to be considered while deciding production of goods. In case, cost of production exceeds market price, manager can ponder over buying from the market and vice versa. Therefore it is the responsibility of the manager to take a call on Make or buy, which is apt strategy of management to achieve efficiency in operation. In fact it is a valid consideration in any cost reduction or product improvement programme. Make or buy would help such company to decide based on conditions.

11. 10. 1 Meaning of Make or Buy

A make-or-buy decision refers to choosing between manufacturing a product in-house or purchasing it from an external supplier. This is like outsourcing decisions, on comparison of costs and advantages of producing in-house versus buying from outside. This is taken up generally, when company has produced a product or part there of or considerably changed a product, or weaken capacity of manufacturing within or fluctuations demand. In an aggressive competitive business environment, all the manufacturing and services companies need to reassess their existing processes, technologies, products and services.

There are **four stages** for successful make-or-buy decision:

- Building incentive for outsourcing,
- Exploring strategic implications,
- Analysing costs/performance,
- Selecting providers.

11.10. 2 Criteria for Make or Buy Decision

Companies having own manufacturing prefer buying only raw material or semi-finished parts. Such decision is made in the following cases:

- Finished product can be kept ready at cheaper rate by the firm than that of the outside suppliers
- Such finished products are manufactured by limited number of outside firms, which are unable to meet the demand.
- The part of the product is an important for the firm, and requires extremely close quality control.
- With the firm's existing facilities, the part can be readily manufactured
- Requires high investment on facilities, which are not available at supplier's plant
- Stable demand

Companies usually buy a finished part of product from an outside supplier when:

- They do not have facilities of their own to produce it and there are other profitable opportunities for investing company capital.
- Existing facilities can be used more economically to produce other parts.
- Skilled human resources is not readily available to manufacture the part of the product
- Patent or other legal barriers prevent the company for making the part thereof.

- Demand for the part of the product is either temporary or seasonal.

11. 10. 3 Analysis for Make or Buy Decision:

A make or buy cost analysis involves a determination and comparison of the cost of making the part of the product and the cost of buying it. The company take final make or buy decision based on a careful weighing of the cost considerations and various quantitative considerations.

The most difficult make-buy factors to assess the feasibility are those that will significantly be affected by change in economic conditions, technological advancement, growth of the firm, or changes in the labour management relations in future. Studies show that more mistakes have happened in making what could be more profitable to bought than in buying what could more profitable to be made.

To get a clear picture, analyst must carefully evaluate these costs considering the effects of time and capacity utilisation. Cost figures must include all relevant costs, direct and indirect, and they must reflect the effect of anticipated cost changes. Since it is difficult to predict future cost levels, estimated average cost figures for the total time period in question are generally used.

Suppose a supplier has the following unit cost of a part: Buy Decision

Example 1

If the company likes to make this item rather than buy it could reduce the cost of part from Re. 1.20 to Re. 0.80. The company has idle equipment that can be used to make the part and have maximum overhead expense of Re. 0.24 per unit. Further, the company invests on additional facilities to manufacture the part with the normal overhead, in that case the cost of unit is equal to Re. 1.28, and then it is worthwhile to make the part of the product, than that of buying.

Example 2:

A simple cost analysis is as follows:

Buy Decision with Example 2

On the basis of above cost analysis it is quite clear that the decision must be in favour of buying the part.

CHECK YOUR PROGRESS

1. What is the application of Purchasing policy?
2. What are four stages for successful make-or-buy decision:
3. Define Make or Buy Decision

4. Differentiate between Direct costs and Indirect costs are other expenses that help keep the business or company operating, including insurance, facility rentals and utility costs.
5. What are the objectives of purchase policy and Procedure?

11.11 NOTES

11.12 SUMMARY

From the above its very clear that Purchases being the part of the supply chain management play a vital role in determining the cost of production, so also selling price. Organisation makes purchase commitments for materials, equipment and services at the lowest possible price, consistent with quality and delivery requirements. Purchase depends on a number of factors, namely; demand, supply, price, vendor, type of material, consumption pattern, organisational set up, past precedents, procedures, decision making, spares and seasonal commodities. Purchase is very transparent only when there is purchase policy and procedure. The policy and procedure relating to purchase is the result of transparent, objective, time and cost-effective decision making. There is hardly any standard purchasing policy and procedure which can be applied to all industries. These policies may vary from company to company depending on the size, type of business, products and services produced and various other factors. Further effective purchase is the result of risk management as well.

11. 13 KEY WORDS

- Purchase-to-Pay is an integrated system which fully automates goods and services purchasing process for a business
- Factoring Opportunity Cost. Decision-makers weigh the benefits of alternative opportunities or actions with an open mind.
- Potential risks are any challenges or issues that a company might face during a project or after the project's completion
- Rate contract method it is an agreement between the Purchaser and Supplier to supply items at specified prices during the period covered by the contract. The contractor is bound to execute any supply order which may be placed upon him during the period of the contract at the rates specified.

11.13 ANSWER TO CHECK YOUR PROGRESS

1. Purchasing policy throws light upon guidelines and direction to attain the objectives of purchase

2. There are **four stages** for successful make-or-buy decision:

    11.14Building incentive for outsourcing,

    11.15Exploring strategic implications,

    11.16Analysing costs/performance,

    11.17Selecting providers.

3. Make or Buy Decision refers to choosing between manufacturing a product in-house or purchasing it from an external supplier.

4**. Direct costs** are purchases that a business makes that directly relate to the creation of its goods and services. These costs can include material purchases, employee salaries and equipment or tool rentals and **Indirect costs** are other expenses that help keep the business or company operating, including insurance, facility rentals and utility costs.

5. The objectives of purchase policy and Procedure are to Make purchase commitments for materials, equipment and services at the lowest possible price, consistent with quality and delivery requirements.

11. 15 SELF-ASSESSMENT QUESTIONS

1. Explain the objectives of Purchase Policy and Procedure in an organization
2. What are the benefits of Purchase Policy and Procedure in an organization?
3. Discuss the basis to be considered to evolve Purchasing Policies in a company
4. Give a note on Purchase policy and system and explain the different types of purchase system
5. Sketch out the steps involved in Purchasing Process for a manufacturing company
6. Highlight the best practices you have observed in a centrally owned government organization of your own choice

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UNIT-12: PURCHASING ORGANIZATIONS

Structure:

12.1 OBJECTIVES

After studying this unit, you will be able to:

- Explain the functions of Purchasing Department in any a service rendering organisation
- Elucidate the parameters to be considered for making effective purchasing for an organisation
- Critically evaluate purchasing process steps and best practices in an organization
- Sketch out methods of evaluation of costs of purchase in an organization
- Explain the usefulness of make or buy decision and explain the advantages of make or buy decision
- Draw the factors influencing make or buy decision in an organisation
- State the volatile nature of the make or buy situations
- Give a note on forms of purchasing organization
- Explain the duties and responsibilities of Purchasing manager

12.2 INTRODUCTION

The purchase department led by an efficient manager needs to be strategic. It is needless to say that Purchasing is the process a business or organization uses to acquire goods or services to accomplish its goals. Principles of purchasing needs to be followed in the process, otherwise objectives of purchasing cannot be achieved. There are several organizations engage in manufacturing of goods to meet the demands of the consumers; as such they attempt to set standards in the purchasing process. It may be noted that processes vary greatly between organizations. Purchasing is part of the wider procurement process, which typically also includes expediting, supplier quality, transportation, and logistics. Essentially the purchasing in an organization is revolving around right quality, right quantity, right time, right source, and right price and right place. The purchased items should be of specified quality in desired quantity available at the prescribed time at a competitive price. The purchased items should be of specified quality in desired quantity available at the prescribed time at a competitive price.

- Purchasing cycle involves starting with a purchase requisition as approved by the appropriate head which leads to official purchase order. Purchase order system allows an organization to digitize records there by eliminate the usage of tons of paper. It is more of automation in which purchasing activities are tracked in real-time to keep everyone on budget.

In this competitive arena, many organizations embrace best practices of company which have adopted transparent purchase policy. This is important for such companies to reap maximum benefits. The make-or-buy decision is vital process in management field. It is basically action of making a tactical choice between producing an item internally and purchasing from an outside supplier. The organization concerned takes decision about the feasibility of going for manufacturing or procure from other sources.

12.3 PURCHASING DEPARTMENT

The purchasing Department is an organizational unit taking care of purchase. Almost all business transactions related to procurement are carried out in a purchasing organization. The purchasing organization represents the procuring unit in a legal sense.

The purchasing department is in charge of company's procurement process. It is responsible for buying all the goods, equipment, materials and services the company needs to manufacture items and offer goods for sale and to do so in a timely and organized manner so production doesn't falter. Negotiating prices and delivery terms, coordinating deliveries with the warehouse and logistics team extracting the best value from supplier contracts. While it's tempting to think of purchasing as a purely operational role, the department is in fact responsible for setting the company's strategy regarding procurement. This is a high-level function. It involves assessing the company's long-term needs for goods, services and materials, and setting budgets by department or location based on the company's current needs and projected future growth.

Cost efficiency is a key objective of the purchasing team. With its strategic hat on, the department will check out all the suppliers in the market and weigh them up against each other in terms of quality, reputation, service delivery, capacity and cost. Risk is another consideration

Within the context of risk mitigation, the purchasing department might analyze the pros and cons of using domestic versus foreign suppliers, for example, and make decisions about whether the company should manufacture goods itself or buy them from external suppliers.

12.3.1 Operational Objectives of Purchasing Department

From an operational perspective, the purchasing department is responsible for ordering goods and services, receiving inventory, administering supplier contracts and dealing with quality control issues, such as managing complaints and returns. The goal here is to keep supplies flowing through the business so there are always enough resources for

people to perform their jobs, and always enough products on the shelves when customers want to buy them. The department will also keep on top of supplier contracts to ensure they are delivering the best value.

12.3.2 Measurable Quality Objectives for Purchase Department

An essential role of the purchasing department is to buy good-quality products at the right price. That is not necessarily the best price – there are plenty of reasons why a company might choose a more expensive supplier if his product is better quality, or if he has shorter lead times or a lower defect rate. Nonetheless, the purchasing department will always be conscious of maximizing profitability. For small businesses, this can be challenging. Many suppliers set minimum order quantities for their products which mean that a smaller business may have to buy more than it actually needs at a given point in time. Choosing the smallest order quantity also means the business cannot access the bulk discounts that a larger company might negotiate.

This means that purchasing department teams often have to work much harder for smaller businesses. They invariably have to balance quantity and supply-risk concerns against pricing and quality concerns to ensure the company has a continuous cash flow. Often, their role comes down to an economic decision, where low prices can result in higher risks, or vice-versa. The basic objective of the purchasing function is to ensure continuity of supply of raw materials, sub-contracted items and spare parts and to reduce the ultimate cost of the finished goods. In other words, the objective is not only to procure the raw materials at the lowest price but to reduce the cost of the final product.

12.3.3 Objectives of the Purchasing Department

The purchasing department will play an important role in procuring quality of material in proper quantity from most reliable source at best possible price, and at right time. Realising this crucial aspect, one has to remember the following objectives of purchasing department.

- To avail the materials, supplies and equipments at the competitive costs. These are the inputs in the manufacturing operations. As such minimization of the input cost increases productivity and profitability of the operations.
- To ensure the uninterrupted flow of production through continuous supply of raw materials, components, tools etc. with repair and maintenance service.
- To increase the asset turnover. The investment in the inventories should be kept as minimum to the volume of sales. This will increase the turnover of the assets which in turn profitability of the company.

- To develop an alternative source of supply, exploration of alternative sources of supply of materials increases the bargaining ability of the buyer. Further, minimisation of cost of materials increases the ability to meet the emergencies.
- To establish and maintain the good relations with the suppliers. Maintenance of good relations with the supplier helps in evolving a favourable image in the business circles. Such relations are beneficial to the buyer in terms of changing the reasonable price, preferential allocation of material in case of material shortages, etc.
- To achieve maximum integration with other departments of the company. The purchase function relates to production department for specifications and flow of material; engineering department for the purchase of tools, equipments and machines; marketing department for the forecasts of sales and its impact on procurement of materials; financial department for the purpose of maintaining levels of materials and estimating the working capital required; personnel department for the purpose of planning and developing the personnel of purchase department and maintaining good vendor relationship.
- To train and develop the human resources. Purchasing department is handled efficiently with varied types of human resources. The company should build the qualitative employee force through training and development and such other strategies deemed fit
- To efficient record keeping and management reporting. Paper processing is inherent in the purchase function, otherwise the department will crumble. Such processing should be standardised so that record keeping can be facilitated. Periodic reporting to the management obviously helps management to strike decisions easily.

12.3.4 Functions of Purchasing Department

It will be much easier to achieve better results and save on purchases. With a little attention to each point, if the department is clear about all its functions and they are optimizing them. If the human resources department is the heart of a company, the purchasing department is its brain. Both are essential for the company to function and the entire business body depends on its proper functioning. Primary purchasing department functions include; planning with suppliers, inventory control, supplier evaluation, accounting, commercial management, review and preparation of contracts, compliance with purchasing policies

- **Planning with Suppliers**

The planning with suppliers is essential for the proper functioning of the company. The purchasing department is in charge of always keeping in mind what the company's needs for materials or services will be. Likewise, they will have to agree with the suppliers on delivery times and responses on special dates. For example, some companies have peaks of activity at certain times of the year, and the purchasing department has to make sure that their supplier can provide the necessary stock on those dates. All the planning that is carried out must be reflected in the contracts. Another option is to do it through a purchasing and service centre. In this case, the baking will be done with the purchasing centre, and, in turn, this will be in charge of the management with the suppliers.

- **Inventory Control**

The control stock or inventory can be crucial in preventing a crisis. Therefore, the purchasing department must know what is in the company and what is not. What is missing and what is leftover. Selling surplus is one of the spending control tricks in an SME that we can follow. Only with inventory control will we be able to know what surpluses we have. It also helps to buy only what is needed. Although surpluses can be sold, they are generally sold for a lower price than what was purchased. Therefore, the most advisable thing is always to adjust purchases to the real needs of the company. In this sense, purchasing software can be fundamental allies to keep inventory control up to date without requiring a very high effort.

- **Supplier Evaluation**

The supplier evaluation allows us to know if we have the best possible suppliers. This is another of the functions of the purchasing department that can be most useful in the medium or long term. It is about systematizing a method that objectively scores the suppliers that work with the company. This same method can also be used with potential vendors that we have not yet used. In this way, we will know if we have the best option or room for improvement. It is a score by price or quantitative criteria and qualitative such as the quality of the product, compliance with the agreed deadlines, the possibility of responding to possible unforeseen events, etc. In working with a purchasing centre, the purchasing canter will be in charge of this process.

- **Accounting**

The accounting is one of the aspects most tired, but more important of the functions of the purchasing department. It is the responsibility of the department to have clear accounts at all times, taking care of all the accounting management in smaller SMEs. This is so because in smaller companies the purchasing, sales and accounting department is usually unified. The

largest must be aligned with the accounting department, providing all the necessary information and being clear about the expenses arising from purchases. After human resources, purchases are usually the largest item of expenditure in a company, so having clear accounts is a legal obligation. Still, the company needs to function in the short, medium and long term.

- **Commercial Management**

In addition to accounting, you have to add the whole business management aspect. These two sections usually account for most of the working time within the department. Commercial management includes managing administrative processes, the accounting that we have already mentioned, the fiscal and financial ones. Of course, all this work must be in line with the company's direction and the advisors in case they are hired.

- **Review and Preparation of Contracts**

The contracts with suppliers also require special attention. Sometimes, the purchasing department handles dealer contracts, especially when dealing with the purchasing and sales departments. It is advisable not to use model contracts but to personalize them according to the company's needs. Model contracts can serve as a starting point but ideally, tailor it.

Likewise, you have to be careful with each point when providers offer a standard contract. In all matters relating to contracts, it is important to be legally advised. Everything we put in the contract has to be following current legislation. Otherwise, it will not be valid. .Therefore, this function is quite important. Fortunately, this is a one-off action, which only needs to be done once with each type of contract. Of course, we must be aware of possible legislative developments in this regard.

- **Compliance with Purchasing Policies**

You have to take care of the contracts with the suppliers and make sure that they are fulfilled. It is useless to make very exhaustive contracts that regulate the entire relationship with them if we do not consider if the different parties are being fulfilled as indicated. In this sense, negotiation techniques must be controlled when demanding certain aspects of the contract. It is important that any contractual relationship with a supplier is seen as a win-win and does not appear that we are taking advantage.

In the same way, it is also important to be tough when it comes to being. The policies of the contract are to comply and must demand when they are not met. For that reason, they were signed in the first place. If we have a purchasing centre, the same will happen with the contracts with the purchasing centre. In this case, the contract is usually the same for all

associated companies, and we will not have the opportunity to customize them in a general way.

12.4 PURCHASING MANAGER

The purchasing manager for a department store must track emerging trends in order to match supply with demand. The purchasing manager for a department store must track emerging trends in order to match supply with demand. Sourcing reliable suppliers is a crucial part of purchasing management. Managers, agents, and buyers usually learn about new products and services from Internet searches, trade shows, and conferences. They meet with potential suppliers in their plants whenever possible. Skills in foreign languages may be helpful for sourcing suppliers in other countries. Individuals who work in this area must always assess potential suppliers in terms of the supplier's ability to deliver quality merchandise at a suitable price and on time.

Purchasing management professionals must be good negotiators, understand technical product information, have good mathematical ability, understand spread sheet software, understand marketing methodology, and be outstanding decision makers. To get ahead in this field requires good leadership skills, and higher positions often require a master's degree in a business related subject. Entry level positions, such as junior buyers, assistant buyers, and purchasing clerks, often require a college degree and some product knowledge.

Purchasing managers, buyers, and materials managers control budgets, manage staff, and may analyse procurement methods as well as negotiate supplier contracts. These professionals must understand tax laws, purchasing trends, ethics, and global outsourcing issues. Buyers and purchasing agents usually deal specifically with purchasing tasks, while managers usually supervise others, including purchasing agents. Titles and duties vary greatly between industries and employers, however. Buyers need the ability to select products that consumers will want to buy, so they need to understand trends as well as economic conditions that affect consumer buying decisions. Those employed in small stores may be responsible for purchasing the store's entire inventory, while people working for larger operations may focus on a few product lines.

Individuals who opt for a career as purchasing managers acquire all the goods and services that a company needs to carry out its daily activities. Purchasing products involves negotiating with sellers, checking the quality standards, running tenders, maintaining files, so on and so forth.

12.4.1 Purchasing Manager Job Description

Purchasing Managers' responsibilities include: Purchasing Manager will be responsible for sourcing equipment, goods and services and managing vendors. The successful candidate will be able to perform strategic procurement activities across multiple categories of spend, search for better deals and find more profitable suppliers.

Responsibilities of purchasing manager are as follows;

- Develop, lead and execute purchasing strategies
- Track and report key functional metrics to reduce expenses and improve effectiveness
- Craft negotiation strategies and close deals with optimal terms
- Partner with stakeholders to ensure clear requirements documentation
- Forecast price and market trends to identify changes of balance in buyer-supplier power
- Perform cost and scenario analysis, and benchmarking
- Assess, manage and mitigate risks
- Seek and partner with reliable vendors and suppliers
- Determine quantity and timing of deliveries
- Monitor and forecast upcoming levels of demand

12.4.2 Requirements of Purchasing Manager;

- Proven working experience as Purchasing Manager, Agent or Officer
- Familiarity with sourcing and vendor management
- Interest in market dynamics along with business sense
- A knack for negotiation and networking
- Working experience of vendor management software
- Ability to gather and analyse data and to work with figures
- Solid judgement along with decision making skills
- Strong leadership capabilities

12.4.3 Purchasing Manager Job Responsibilities:

- Developing and implementing purchasing strategies.
- Managing daily purchasing activities, supervising staff, and allocating tasks.
- Managing supplier relations and negotiating contracts, prices, timelines, etc.
- Maintaining the supplier database, purchase records, and related documentation.
- Coordinating with inventory control to determine and manage inventory needs.

- Managing the maintenance of office/manufacturing equipment and machinery.
- Ensuring that all procured items meet the required quality standards and specifications.
- Preparing cost estimates and managing budgets.
- Working to improve purchasing systems and processes.
- Training new employees in the purchasing process and how to use the purchasing system.
- Deep knowledge of inventory and supply chain management.
- Supervisory and management experience.
- Proficiency in Microsoft Office and purchasing software.
- Excellent communication skills, both written and verbal.
- Strong critical thinking and negotiation skills.
- Strong planning and organizational skills.
- Ability to work independently.

12.4.4 Purchasing Manager Job Description Example/Template

- Purchasing managers perform various functions in ensuring that quality products are procured for their companies at great prices. The major tasks, duties, and responsibilities of this role are highlighted in the job description example shown below:
- Ensure suppliers comply with internal quality standards and external laws
- Conduct assessments to identify new and reliable suppliers/vendors
- Build and maintain positive trust relationships with key suppliers and vendors
- Develop and implement best practices, procedures, and policies for procurement
- Expedite purchase orders and ensure suppliers deliver requested items within set time constraint
- Create and maintain an up-to-date supplier/vendor database
- Evaluate business contracts to ensure compliance with legal requirements
- Oversee the management of supplier/vendor product cost, quality and delivery performance
- Direct and supervise the activities of purchasing agents to ensure effective performance of job duties
- Seek and gain approval of executives to secure purchasing contracts with new suppliers or vendors

- Continuously compare product prices and service quality to ensure a company gets the best deals on purchased products/services
- Maintain accurate record of relevant purchase document for reference purposes
- Oversee the processing of payment and preparation of invoices
- Prepare and manage budget for the purchase department
- Carry out market analysis to determine future product/material availability.

  If anyone is seeking the job of a purchasing manager, the requirements most employers may want to fulfil include the following:
- Education and Training: To become a purchasing manager, you require a Bachelor's degree in business, accounting, materials management, or in other similar field. Several years of experience as procurement or purchase agent may also be required. Having a working knowledge of project management principles and supply chain systems is also useful for the purchasing manager job position
- Negotiation Skill: Purchasing managers are adept at conducting negotiations with suppliers to determine contract terms and product price
- Networking Skill: They are skilled in building and maintaining professional contacts in order to discover new opportunities for better procurement deals
- Analytical Skill: They are able to conduct research to discover profitable purchasing deals and suppliers offering such deals

12.5 PROCUREMENT MANAGER

You are perhaps fully aware of the fact that procurement manager play a strategic role in the task assigned. A procurement manager is responsible for sourcing products and services for the company in which he/ or she is working. The role is sometimes also called a purchasing manager.

In large businesses, the procurement manager leads a team of procurement agents and specialists. And work under the supervision of a chief procurement officer (CPO). Whereas ,in small and medium-sized businesses, procurement manager is solely responsible. In this case, procurement manager report to the chief operations officer (COO) or chief finance officer (CFO). It is needless to say that regardless of size, procurement teams must work closely in collaboration with the finance, operations and legal departments.

12.5.1 Role and Responsibilities of Procurement Manager

A procurement manager is responsible for ensuring that their business purchases the goods and services to the objectives fulfilled. This will help business to achieve their goals

which is apparently known. Generally finding supplier partners strike a balance between quality and cost. Procurement manager responsibilities include reviewing past purchases made by the company. This evaluation determines vendor effectiveness, compliance and ultimately, the business's return on investment. In the last few years, the role of procurement department has been changing and expanding, as follows;

- Traditionally, the role of procurement manager focused merely obtaining goods to meet internal needs. Of late, an increasing number of companies recognize insight and value procurement managers hold.
- Their ability is indeed very essential to reduce costs, improve outcomes and identify strategic partnerships.
- Procurement managers are more specialized and conversant with new technology.
- They are more empowered to analyse business operations, identify potential problems and recommend solutions to any type of problem which they may encounter.

12.5.2 Responsibilities of Procurement Manager

- Supplier Evaluation: Before the company to sign a contract with a particular supplier, procurement manager has to evaluate the supplier to make sure see it is worth collaborating with it. Obviously the managers look at the price quality, and delivery of the provided items
- Interviewing Vendors: The manager is to discuss face to face, with vendors, to find out more about their products and services, so that he will make sure that evaluation is correct and comprehensive.
- Visiting Supplier Plants and Distribution Centers: The procurement manager Visit the supplier's plant and distribution center can and make out the real position of a particular supplier. Further he can make supplier's ability to meet the standards. Furthermore, he will see center working efficiency to meet the demand company and also examine the appropriateness of manufacturing, storing, and shipping conditions appropriate.
- Attending Trade Shows, Conferences, and Meetings: A purchasing/procurement manager always keeps himself/ herself in a constant learning process. It may be noted that there are lot emerging trends in latest products and supplier, conditions of the market, as such it is mandatory for such managers to keep themselves in abreast with latest.

- Unrolling Analysis of Price Proposals and Financial Reports of Company: Every company strives hard to obtain material at the best price. Therefore, it is the duty procuring officers to analyze the price proposals of suppliers and the financial reports of the company, before negotiating the best price.
- Negotiation of Various Contracts: As already state that, procurement manager's responsibilities are to close complete the deals on behalf of the company. The responsibility is that the managers remain as good negotiator which is definitely an advantage.
- Collaboration with Suppliers for Agreeing upon Policies: Procurement managers have to collaborate with the suppliers/ vendors mainly to come up with convenient a policy that determines the details regarding shipment of products and other details that will keep the workflow steady.
- Training of Staff Members for Meeting Standards: The staff members should be imparted trained to enrich themselves with the acceptable quality of the received goods, besides determining defective or unacceptable goods. As these actions are urgently wanted, the procurement manager should organize training programs periodically.
- Monitoring and Evaluation of Unrolling Contracts: Once a contract is signed, procurement managers have to keep an eye on the adhering to the terms and conditions of such contract by the vendors. As professional manager in procurement, when needed, he will have to make the required adjustments, based on need and objectivity.
- Maintaining and Reviewing Records of delivered Items: Procurement manager will constantly have to be aware of the items that have been purchased as per the terms and conditions envisaged in the contract. Therefore the manager should up-to-date inventories with detailed information about a product's price, performance, and delivery in the books maintained for the purpose.

12.6 FORMS OF PURCHASING ORGANIZATION

Purchasing Organization is an independent physical organizational entity of material management that responsible to procure materials or services with negotiation terms and conditions from vendors or internal plant. If the company want to purchase material for multiple plants, than the cross plant purchase organization will be involved. Purchase organization is also responsible for purchasing price agreements with the external vendors.

One purchase organization can be assigned to only one company code. One company code can have one or more purchase organizations as per requirements of client. It helps to perform the task for purchasing process Purchase organization is the top level organizational element in SAP MM.

The purchase organizations can be established at different levels. Business purchasing is the process of procuring the supplies and materials that are necessary for the operation of company. Business purchases vary considerably in size and scope, and a purchasing method that may be appropriate for one type of expenditure may not be suitable for another. Most businesses use a variety of strategies. And various types of purchase organisation are explained as under,

- **Plant specific**; Plant specific purchase organization is assigned specific plants, as such, it will procure material only for those plants. This purchase organization do not acquire the material for all the plant attached to the company code, as the duty is highly specific.
- **Company code specific:** This purchase organization procures procure material and service for all the plants which are assigned to the company code. Ex if ten plants assigned to company code then this purchase organization go for purchase of the material for all the plants attached to the company code.
- **Reference purchase organization**. It acts as the head office. The reference purchase organization will do all the contract and negotiation activity with the vendor. Whenever the normal purchase organisation procuring material, it will always refer the Reference purchase organization.
- **Cross company purchasing;** here, a purchase order on a vendor is opened assigning cost center of another entity in the account assignment segment.
- **Cross company code purchase organization**: This cross company code purchase organization is useful for better negotiations at corporate level purchasing company get header level discounts across multiple company codes. The header level discount is set on the pricing for the whole sales order and affects every single within that sales order. They can find the price components on the Pricing and Invoicing Tab in the sales order. On the top side company can see item level price components and at the bottom are the header level price components. If the company use cross company code purchase organization, it cannot manually enter company code at header level in the PO

- **Standard purchase organization**: where standard purchase organization involves in procurement of special stocks such as consignments, subcontracting, stock transfers, etc It is mainly used for special procurement process.
- **Central purchase organization** is a business unit that makes all procurement for an organization, often better suited for large corporations with various locations. Some advantages include reducing redundant work, lowering costs associated with training and supporting additional staff, and better control

CHECK YOUR PROGRESS

1. What is Purchasing?
2. What is Business purchasing?
3. Name any two job Requirements for a Purchasing Manager;
4. What are the skills required for a successful purchase manager
5. What is Reference purchase organization?

12.7 NOTES

12.8 SUMMARY

Purchasing department led by purchase manager swing in to action based on Procurement Policy and Procedure besides the principles of purchasing. The companies concerned give absolute authority to procure material keeping in view the liquidity, the level of inventory and cost of purchasing. It may be noted that the organization lures customers based on pricing which determine the profit margin as well. Purchasing manager needs to be strategic to achieve the generalized as well as specific objectives of the purchasing

The purchase organizations can be established at different levels such as plant level, company code specific, reference purchase organization cross company purchasing cross company code purchase organization and standard purchase organization. These purchase organisations address the requirement of materials and act accordingly.

12.9 KEY WORDS

- **Central purchase organization** is a business unit that makes all procurement for an organization, often better suited for large corporations with various locations. Some advantages include reducing redundant work, lowering costs associated with training and supporting additional staff, and better control
- **Purchasing Department:** The purchasing Department is an organizational unit taking care of purchase.
- **Procurement Manager:** A procurement manager is responsible for sourcing products and services for the company in which he/ or she is working. The role is sometimes also called a purchasing manager.
- **Vendor Rating:** It is a score by price or quantitative criteria and qualitative such as the quality of the product, compliance with the agreed deadlines, the possibility of responding to possible unforeseen events, etc.

12.10 ANSWER TO CHECK YOUR PROGRESS

1. Purchasing is part of the wider procurement process, which typically also includes expediting, supplier quality, transportation, and logistics.
2. Business purchasing is the process of procuring the supplies and materials that are necessary for the operation of company
3. Requirements of Purchasing Manager;
    - Proven working experience as Purchasing Manager, Agent or Officer
    - Familiarity with sourcing and vendor management
4. Negotiation skill, networking skill and analytical skill
5. Reference purchase organization acts as the head office. The reference purchase organization will do all the contract and negotiation activity with the vendor. Whenever the normal purchase organization procuring material, it will always refer the Reference purchase organization.

12.11 SELF ASSESSMENT QUESTIONS

1 Explain the role of a procurement officer in manufacturing organization of your choice

2 Can you differentiate between procurement and purchasing?

3 Sketch out Steps in the purchasing process of an Automobile company

4 Discuss the why purchase management is matter of essence in i any organization irrespective of the scale of operation

5 State the objectives of purchase management and its important in a company

6 As a purchasing manager what Principles you should borne your mind while Purchasing material

7 Give an appraisal of Functions of Purchasing department in Indian Railways

8 State the Procurement Policy and Procedure to be adopted by a professional in purchasing materials

9 Describe Responsibilities of Procurement Manager in an company

10 Explain the Objectives of Purchasing in a company?

11 Highlight the roles and responsibilities of purchasing department

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Block-IV VENDOR DEVELOPMENT AND INVENTORY MANAGEMENT

Dear Learners,

Professional management of any organization calls for proper vendor management. You might have heard about a common parlance about saying Garbage In Garbage Out (GIGO) which means if input is bad the output will be bad. This is true in case of manufacturing firms also. You may have sophisticated machineries, well trained workers. But if the quality of raw material is not good you can produce quality products. A well maintained purchase department gets right quality and right quantity of material in right time which is backed by good vendor relations.

Dear Learner, in the previous blocks you have studied about purchasing. In this last block let us discuss about the vendor development and various aspects of vendor relation. The other equal important task of purchase department in general and stores department in particular is to maintain stock.

In this final of the paper Materials Management, you will have to study four units. Namely

Unit – 13 Vendor Development
Unit – 14 International Purchasing
Unit - 15 Inventory Management
Unit – 16 Inventory Control Systems

UNIT-13: VENDOR DEVELOPMENT

Structure;

13.0 OBJECTIVES

After studying this unit, you will be able to:

- ❖ Learn the meaning and scope of Vendors
- ❖ Examine the process of Vendor Development
- ❖ Explain the Concept of Vendor Selection
- ❖ Discuss Vendor Rating and Its Techniques
- ❖ Analyze the importance of Vendors' Relationship
- ❖ Examine the need for vendor motivation.

13.1 INTRODUCTION

In the previous block, we have dealt with the concept of purchasing management. This block also discusses about the implementation of purchasing management principles within a company. This unit will help you to explain vendor rating and selection of suppliers. The various section and sub section of this unit will also summarize the various techniques used for vendor rating. Picking up a vendor is perhaps one of the most nerve wracking but critical activities a business should embark on. Your vendors will be delivering your direct purchases to produce the products you sell and your indirect purchases that keep your business effective.

When you are selecting a budding vendor, you are selecting a partner in your business and you will trust them to work with you in a professional and profitable manner. It is important that you chose a company that can supply your requirements now and for the near future.

A manufacturer might decide to purchase certain parts rather making them. Sometimes all parts are purchased and the manufacturer simply performs assembly operations to produce the finished goods. In some cases, a firm might choose to perform part of the work itself and subcontract part of the operations to outside suppliers or vendors. Whatever may be the extent of purchasing, like, some parts or components or subunits from outside suppliers (outsourcing) or subcontracting some operations to vendors, good supply management is crucial for the survival and growth of any organisation. The vendors are considered as the best intangible assets of any organisation. Good suppliers are vital link in the supply chain. Supplier inefficiencies such as delayed delivery of parts or materials or missing or defective materials can affect the production schedules, increase inventory carrying costs al It can also cause late deliveries of end products. To review vendor’s plant capacities, financial conditions, performance, etc, the materials manager must formulate a

selective policy for vendor selection and choose only those suppliers who are suitable to the firm's needs. One of the objectives of purchasing is to develop at least two suppliers who are suitable to the firm's needs for each item being purchased.

13.2 VENDOR – MEANING AND DEFINITION

A vendor means a person or company offering something for sale. A vendor is one who is capable of providing the necessary supplies to an organization for the smooth functioning of manufacturing and services. In general, vendor is also a trader in a street.

The definition of a vendor is ‘a person selling something’. An example of a vendor is, a man with a stall at a farmer's market who is selling tomatoes, a person selling property, a person or company that supplies goods or services to a business for carrying out the operations in the concerned organization.

Also, the Vendor name refers to a name used to describe a company or individual offering a product or a service for reselling to the next link in the supply chain.

Types of vendors and their roles include:

- Manufacturers
- Wholesalers
- Retailers
- Service and maintenance providers
- Independent vendors

Vendors are an integral part of any organization whether manufacturing or service, who enable the operations by supplying the necessary materials. Vendors are the pillars of materials management as they play a crucial role in the supply of materials.

13.3 VENDOR DEVELOPMENT

Vender development is creating new vendors and improving established vendors. This is a continual and important activity of the purchasing manager. Traditionally, one of the reasons for developing new vendors is to build more competition in the supply market eliminating monopoly or oligopoly. The company can then buy material from several sources. Another traditional reason for such multiple source buying (and therefore also for vendor development) is to spread the risk of non-availability or shortage of input materials over many suppliers. In case, one of the supplier's employees go on strike (or if there is an explosion or fire in the supplying company) the other suppliers can be relied upon to compensate for the shortage. Therefore, in traditional organizations, risk minimization is the

main motive behind vendor Development. However, few organizations have a thinking that single source buying provides some advantages which multiple source buying. One of the obvious advantages of single source buying is that of close rapport between the two companies and the loyalty established with the supplier. This goodwill might yield benefits in several ways at the time of difficulties or crisis for the buying company. Also, the supplying company might even do some information gathering work for the buying company and therefore, keep it appraised of the recent market trends (what may be termed as "intelligence information"). Reliability, lack of uncertainty, quick and faithful response to the needs, and, therefore, a general improvement in quality and reduction in inventory and purchase related costs are the long-term benefits for both organizations practising single source supply.

However, the present Indian situation is still in infant stage in such world class thinking. In the present socio-economic milieu prevailing in our country where trust and concern are found somewhat wanting, the Indian companies seem to find more advantages in multiple-source buying. But still, the choice between single source and multiple source buying is quite situational. Vendor development can be seen as an attempt to get the advantages of spreading risks, building competition and at the same time establishing a good rapport. Vendor development involves helping or building up the vendors by various means such as:

- Lending money for part of his capital equipment working capital requirement, etc.
- Lending technical help by making company engineers and technicians available to the vendor to help him over the initial technical problems.
- Help in R&D, by again lending technical help to not only to establish the company, but also to help improve its products and services continuously.
- Guaranteeing him a certain amount of business (This is particularly needed during initial stages of setting up the vendor).

13.4 VENDOR EVALUATION

Recognizing that there is a need for having a good and reliable vendor, one has to obtain supplier evaluating supplier's capabilities. The buyer who has to do the evaluation, faces two different situations:

(i) Evaluating the performance before the vendor has delivered anything (pre purchase assessment).

(ii) Evaluating the performance of the vendor after the deliveries have been made by the vendor. (continuous process)

The former is known as **Vendor Evaluation** and the latter **Vendor Monitoring** or **Vendor Rating**. In the case of Vendor Evaluation, the buyer lacks evidence on the results achieved by the vendor. Hence, the buyers must get the information through the general reputation of the vendor and data from other buyer's surveys.

Factors to be Considered in Vendor Evaluation

An organization searches for prospective vendors, may be through call for quotations, and then use a **qualitative** evaluation and elimination process. The process of evaluation compares vendors in terms of their ability to provide the desired quality, quantity, price and service.

In the context of purchasing, **quality** refers to the reliability of an item for its **intended purpose**. Therefore, the best quality need not necessarily be of the highest quality, but must be evaluated in consideration of the intended use to which the product will be put. In purchasing parlance, **quantity** means not only the total amount required but also the time schedule according to which the goods have to be supplied to meet the buyer's requirements. The supplier must be able to supply the desired quantity within the time period specified by the buyer. The factor "**price**" is considered concerning **desired quality** and **quantity** and also when accompanied by other useful services along with the goods supplied.

Service is an intangible factor in vendor evaluation and includes such issues as, reserve capacity, technical capabilities, quality-control procedures, production assurance and labour and financial stability.

Apart from the above factors the below factors also play a significant role in selecting a vendor or in **Vendor Analysis** as it in generally called

(i) **Delivery:** shorter lead times and on-time delivery help the buying firm to maintain acceptable customer service with less inventory. The benefits of fast, on-time deliveries apply to both the service and manufacturing sectors. Many manufacturers demand quick, dependable deliveries from their suppliers to minimise inventory levels.

(ii) **Location:** location of a supplier can have an impact on shipping time, transportation costs and response time for rush orders or emergency service. Local buying can create goodwill in the community by helping the local company.

(iii) **Inventory Policy of the Supplier:** if a supplier maintains an inventory policy of keeping spare parts on hand, this could be helpful in case of an emergency equipment break-down.

(iv) **Flexibility:** The willingness and ability of a supplier to respond to changes in demand and to accept design changes could be an important consideration.

Vendor evaluation Criteria

The following steps may be used to evaluate a vendor

1. A set of key factors is chosen.
2. Weight is assigned to each factor.
3. A nominal scale (say 1-5) is chosen. Here 1 indicates lowest rating and 5 highest rating. Each supplier is rated under each factor using this scale.
4. Net rating of a supplier under a factor is the product of rating under a factor and weight assigned to the factor.
5. Sum total of net rating under each factor for a supplier gives the total rating. In a similar manner, the total net rating of other suppliers is calculated. The highest net rating denotes the best supplier.

13.6 VENDOR RATING

Vendors has always been evaluated for product quality and it is used as a factor in fluencing purchasing decisions. These ratings are primarily meant to provide an overall quality rating of a vendor for use in reviewing. comparing and selecting vendors.

Objectives of Vendor Rating

(i) To establish a procedure by which quality control, purchasing and user departments can fulfill the corporate objective of obtaining quality product at minimum cost.

(ii) To develop an effective tool for rectification of defects, improving the vendor's ability to serve more satisfactorily and as a basis for making future purchase decisions.

(iii) To periodically evaluate the written evaluation aspects relating to quality, quantity, price and service of the vendor.

Advantages of Vendor Rating

(i) An efficient vendor rating system obtains the best vendor for the buyer organisation which saves both time and money and also achieves the best value for money spent on purchases.

(ii) Provides a scientific vendor rating system, which if used improves the image of the purchasing executive.

(iii)Provide the buyer additional information on the capabilities of the vendor concerning know-how, testing, transport, contractual willingness etc.

(iv) Compares the performance of vendors and improves the relationship with better performers (vendors)

(v) Ratings can be used to provide feedback to the vendors to improve their performance.

(vi) Helps making decisions to disqualify, blacklist or discriminate the existing vendors

(vii) Inculcates a competitive spirit among vendors.

(viii) Vendor rating can be used as an important mechanism to allocate the share of business amongst a large member of suppliers.

(ix) Vendor rating not only enables the buyer organisation to know the performance of their suppliers, but also gives an idea as to how much they out-perform their competitors regarding price, quality, lead-time, split shipment, service, technical assistance, meeting in emergency, ad-hoc requirements of buyers etc.

Vendor Rating- Parameters

A large number of factors usually grouped under technical, financial, managerial and service factors are considered for the purpose of an elaborate vendor rating scheme. The technical factors include past performance in quality, warranty, inspection plans, tool-room facilities, laboratory testing types of equipment, skill mix of supervisors of various departments, support document availability, testing types of equipment, design facilities, knowledge of cost reduction technique such as value analysis, quality consciousness at all levels, plant capacity, plant layout, maintenance policies, manufacturing experience and so on.

The financial parameters include volume discounts, credit terms, cash discounts, product price, real profit margin, return on total assets, current ratio, quick ratio, funds flow analysis, cash flow analysis follow-up procedure for payment, a guarantee of price protection against inflation and the like.

The management aspect includes employees and executives, the ability of management, adaptability to change, the reputation of board members, corporate image, integrity, length of time in business, industrial relations, staff morale, dynamism, nature of company, honesty, strength, weakness, opportunity, threat, strategies, structure, system, staff, skills and the like.

The service parameters based on experience include the delivery lead-time, reliability in delivery, willingness to accept small orders, the width of production levels, depth of production line, management information system, guarantee, after-sales-services, the ready availability of spare parts, ability to meet emergency requirements of buyer organisation and the like.

Usually, vendors are rated on factors such as quality, delivery, price and response, which are discussed in various rating methods in the following paragraphs. Three popular techniques (methods) or plans used for vendor rating are:

(i) The Categorical Plan

(ii) The weighted-point plan

(iii) The Cost-ratio plan.

The three vendor rating plans or methods mentioned above are discussed in the following paragraphs.

***The Categorical Plan*:** This plan is the simplest and the least precise of the evaluation techniques. It relies heavily on the experience and judgment of the individual buyer. Essentially, it consists of a procedure whereby the buyer keeps a record of all vendors and their products. After establishing a list of factors for evaluation purpose, the buyer assigns a grade indicating performance in each area. A marking system of plus, minus or neutral is usually used. In addition, evaluation check lists are given to all departments involved with the supplier's mechanisms, such as quality control, production and receiving departments. At periodic evaluation meetings, the buyer discusses ratings with representatives of these departments. Later, those suppliers with composite high or low rating may be notified and future business allocated accordingly. A list of factors can be established on the supplier's performance in each area based on the experience with the supplier over a period of time and each factor is given a grading as "never", "seldom", "usual", "always" etc. This system, though non-quantitative, provides a means of systematic record keeping on performance criteria. It is also inexpensive and required a minimum of performance data. However, it relies heavily on the memory and judgment of individuals doing the rating and the possibility exists that ratings will become a routine chore performed with a minimum of critical thought.

The Weighted Point Plan: This plan provides for quantifying the evaluation criteria. Specific number of evaluation factors can be included in the evaluation plan and their relative weights can be expressed in numerical terms so that a composite performance index can be determined and supplier comparisons are made.

For ex, the buyer decides to use the evaluation criteria which include quality of shipments, the accuracy of delivery promises, frequency of cost-reduction suggestions and price. Assuming that quality and delivery are the most significant, a point rating system such as the following might be used: Quality = 40 points, delivery = 30 points, cost-reduction

suggestion = 20 points and price = 10 points (note that the total of all factors is equal to 100 points)

Box13.1 shows the composite rating schedule

Box 13.1: Composite Rating Schedule

(a) Quality Rating	**Total Shipments received**	**Percentage with normal rejects**	**Weighted Quality Rating**
Vendor A	100	90%	$\frac{90}{100} \text{x} 40 = 36$
Vendor B	60	80%	$\frac{80}{100} \text{x} 40 = 32$
Vendor C	50	70%	$\frac{70}{100} \text{x} 40 = 28$
(b) Delivery Rating	**Percentage on Schedule**	**Weighted Delivery Rating**	
Vendor A	80	$\frac{80}{100} \text{x} 30 = 24$	
Vendor B	90	$\frac{90}{100} \text{x} 30 = 27$	
Vendor C	100	$\frac{100}{100} \text{x} 30 = 30$	
(c) Cost Reduction Rating			
Reduction	**Number of Cost-Total suggestions**	**Percentage of Cost**	**Weighted Reduction Rating**
Vendor A	1	20%	$\frac{20}{100} \text{x} 20 = 4$
Vendor B	1	20%	$\frac{20}{100} \text{x} 20 = 4$
Vendor C	3	60%	$\frac{60}{100} \text{x} 20 = 12$
(d) Price Rating			
	Average Price/Unit	**Lowest Price /Actual Price**	**Price Rating**
Vendor A	Rs. 40/-	$\frac{40}{40} = 1$	1 x 10 = 10

Vendor B	Rs. 50/-	$\frac{40}{50}=0.8$	0.8 x 10 = 8
Vendor C	Rs. 60/-	$\frac{40}{60}=0.67$	0.67 x 10 = 6.7 ≈ 7

(e) Composite Rating

	Quality (Max 40 Points)	**Delivery** (Max. 30 Points)	**Cost Reduction** (Max. 20 Points)	**Price** (Max 10 points)	**Composite Rating**
Vendor A	36	24	4	10	74
Vendor B	32	27	4	8	71
Vendor C	28	30	12	7	77

Vendor C is better than Vendor A and Vendor B

The Cost-Ratio Plan: This Plan relates all identifiable purchasing costs to the value of shipments received from respective suppliers. The higher the ratio of costs to shipments, the lower rating applied to that supplier.

The choice of the costs to be allocated depends somewhat on the product involved. However, quality, delivery, service and price are the usual categories. Costs associated with quality usually include costs of visits to vendor's plants and sample approval, inspection cost of incoming shipments and costs associated with defective products.

Box **13.2** shows an example of the various elements of quality cost.

Box: 13.2: Quality Costs

Vendor _____Month _____Year_____

	Rupees
(i) Visits to vendor Plant	200/-
(ii) Sample Approval	300/-
(iii)Incoming Inspection	75/-
(iv)Manufacturing Losses	Nil
(v) Reworking Costs	Nil

(vi) Value of Rejected Parts	425/-
(vii) Other Costs	Nil
Total Costs =	Rs. 1000/-
Total Value of Purchases =	Rs. 1,00,000/-
Quality/Cost Ratio = $\frac{1000}{100000}$ =1%	

The usual costs associated with delivery include expediting, telephone and communication charges, emergency transportation (e.g., air shipments) etc.

The delivery cost ratio is calculated as the ratio of total delivery costs to the total value of purchases expressed as a percentage. Another costs-ratio used in service-cost ratio. The quality and delivery and service cost ratios are combined with the vendor's quoted prices to determine the net cost. Here, the vendor performance is reviewed periodically by an evaluation committee comprising representatives from all departments involved with purchasing.

***Supplier Audits**:* Buyers need to keep up to-date information regarding supplier's production capabilities, quality and delivery problems and resolutions as well as supplier's performances on other buyers criteria. This is facilitated using periodic audits of suppliers. If an audit reveals problem areas, a buyer can address them and prevent the problems from becoming serious. Suppliers audit covers factors such as management style, quality assurance, materials management, the design process used for product design, process improvement policies and procedures for corrective actions and follow up.

***Supplier Certification**:* supplier certification is a detailed examination of the policies and capabilities of a supplier. The supplier certification verifies that a supplier meets or exceeds the requirements of a buyer. Supplier certification is important in supply relationships and facilitates the establishment of long-term relationships with suppliers. Certified suppliers are sometimes referred to as world class suppliers. One advantage of using certified suppliers is that the buyer can eliminate much or all of the inspection and testing of delivered goods. Buying from certified suppliers has much less risk than with non-certified suppliers. The most widely used industry certification is ISO 9000 certification.

***Supplier Partnerships**:* Of late the buying firms have realized the importance of building good relations with their suppliers instead of treating them as adversaries and dealing with them on that basis. Japanese are pioneers in applying the concept of supplier partnerships and deriving benefits of good supplier relations. These benefits include supplier

flexibility in terms of accepting changes in delivery schedules, quality and quantities. Also, suppliers can help buyers to identify problems and offer suggestions for solving them. Hence, simply choosing and switching suppliers based on price alone is not a good practice for buyers.

CHECK YOUR PROGRESS

1. Categorical plan is _____ type of Plan (Qualitative/Quantitative)
2. The factors influencing vendor evaluation are
   a) Price b) Delivery c) Quality d) All
3. Define vendor.
4. What is Vendor Evaluation?
5. Vendor rating is a tool to control vendors (True/ False)

13.6 CHALLENGES OF DEVELOPING VENDOR RELATIONSHIP

Another important objective in purchasing management is that of maintaining a good relationship with vendors. A good vendor is an asset to the company; and, therefore, it is considered as important just as customer goodwill. A vender who supplies the proper quality material in proper amounts in proper time is not very easy to find. Moreover, there are many situations where materials are required on urgent basis. There are situations where materials are in shortage in the supply market. In all such situations, good relationships with the vendors pay dividends, Hence many a times buyer organization gives importance to this personal relationship than professional relationship:

The modern management theory and world-class manufacturing call for a long-term, almost a lifetime, association with the vendor. This also means that there will be fewer vendors but these will be dedicated venders—almost as a part of the organizational family.

Until the present and even now, the Indian Industry has not given/is not giving much attention and importance to vendor relations. The emphasis, if any, is on vendor selection and on monitoring the performance of the vendors through a vendor rating system. A vendor is an entity that is, generally, taken for granted. In any case, a continuous programme of developing vendors and of selecting new vendors, if and where necessary, should be in existence in any organization

13.7 NOTES

13.8 SUMMARY

Many Japanese firms rely on one or a few suppliers whereas many US firms deal with numerous suppliers to remain flexible and have the advantage of playing one against the others. In India we find mix of the above two depending on the nature of the industry.

Few Problems in Developing Supplier Relationships persist in the organizations, Because many of the benefits go to the buyer, suppliers may hesitate to enter into such relationships. Also, Suppliers may have to increase their investment in equipment which may put a strain on their cash flows. Differences in the cultures of the buyer and supplier which may become a barrier to good supplier buyer relationship between them.

13.9 KEYWORDS

- **Attributes:** Feature regarded something as being caused by quality or characteristic of something
- **Competitive Edge:** A factor that gives a person or a company an advantage over rivals or competitors to produce or provide service.
- **Lifecycle Costs:** Costs incurred in the process of the life of a product or service.
- **Vendor:** A person or company offering something for sale especially a trader in the street/ market.
- **Vendor Development:** Any activity that a buying firm undertakes to improve supplier's performance and capabilities to meet the needs of buying firms'
- **Vendor Evaluation:** Process of evaluating and approving potential suppliers by quantitative assessment.
- **Vendor Rating:** Evaluating the performance of suppliers based on certain criteria or some combination of variables.

13.10 ANSWER TO CHECK YOUR PROGRESS

1. Qualitative
2. d) All
3. A person or company offering something for sale
4. Process of evaluating and approving potential suppliers by quantitative assessment.
5. False

13.11 SELF ASSESSMENT QUESTIONS

1. Give the meaning of vendor with a few examples.
2. Explain the need and importance of vendor development.
3. What is vendor evaluation?
4. Discuss the factors to be considered for vendor evaluation.
5. What is vendor rating?
6. Bring out the attributes that need to be considered while rating vendors.
7. Distinguish between vendor evaluation and vendor rating.
8. Discuss a few methods of vendor rating.
9. Write a note on a) The categorical Plan b) The weighted point method c) The cost-ratio plan.
10. Bring out the advantages of vendor rating
11. Examine the challenges of vendor relationships.
12. Why do companies develop new vendors?
13. Discuss the significance of vendor motivation.
14. Give a brief account of the importance of vendor development considering all the aspects

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UNIT-14: INTERNATIONAL PURCHASING

Structure;

14.0 OBJECTIVES

After studying this unit, you will be able to:

- Identify the need for International Purchasing
- Discuss Importance of International Purchasing
- Examine the role of International Purchasing in Supply Chain Management
- Explain the Process and documentation for International Purchasing
- Discuss the Government Policy for International Purchasing
- Elaborate few trends in International Purchasing

14.1 INTRODUCTION

For a growing economy like India's achieving self-sufficiency should be the goal but not at the cost of imports. Importing is an essential economic function which cannot be completely eliminated. Ricardo's principle of comparative advantage states that is would be beneficial for an economy to concentrate on the production of items in which is specializes, export these items and import its requirement of other items. The principle, though not totally practical, cannot be dismissed. International trade is undoubtedly governed by political motives and as such as a country cannot totally rely on another country for its requirements of specific items. It would be equally fruitless to undertake import substitution at any cost. The government of India from time to time reviews the import policies considering various aspects such as trade balance, raw materials position, etc. Recently the import policy has been liberalised, as shortage of raw materials has led to under utilisation of capacity. In some cases, automatic licenses will be issued to cut down procedural delays. Import policies as such are not static and changes in policies and procedures are very important to industries which depend on imports for their production.

14.2 NEED FOR INTERNATIONAL PURCHASING

No country in this world is completely self-sufficient with regard to its material needs. Import means purchasing from on outside source beyond the territorial jurisdiction of the country and an industrial organisation requires certain materials, plant and equipment, which are either not available within the country or are available from a foreign source at a cheaper price. In order to meet the material needs, many organisations resort to import and therefore purchases from foreign sources items like raw materials, spares, tools and plant or equipment or capital machinery are required by the importing organisations. Through imports, business relations develop and this helps in promoting mutual understanding and friendliness between importing and exporting countries. Usually, it is the duty of the purchase department to make

all arrangements with regard to import of all items and to procure them in time. For many organisations, there may be a number of items of regular use which have to be imported from abroad, while for others, only a few items may have to be imported.

14.3 INTERNATIONAL PURCHASING –DOCUMENTATION

If a company is importing for the first time, the first and foremost step for it would be to check whether the item is allowed to be imported. This information will be available in the Red (Blue) book. If the item is banned for imports (on the ground that it is indigenously available), the starting point is to get a list of all local manufacturers and ask for quotations. If the manufacturers are not a position to supply, then a written statement to that effect should be obtained from them. These statements should be presented the Government to get the clearance for imports. The government, on its part, might give names of some more possible suppliers or could write to the suppliers, themselves and then possibly clear the import of the items. Companies can get import entitlements on the exports even if they be indirect.

In case the import clearance is obtained or the item is not banned for imports, a company has to go through the following stages to accomplish the purchase:

1. **Locating the foreign source of supply**. This has to be done by contacting the Ministry of Trade, Foreign consulates and Embassies, Indian Consulates in foreign countries, etc. A foreign consulate or embassy has a commercial attaché who is well versed with the list of suppliers in his country.
2. **Procurement of the item**. At this stage the importer will be involved with foreign source of supply, manufacturing unit of this company, engineering department and governmental institutions like DGTD, MMTC and STC.
3. **Documentation**. Special documents, not used for indigenous purchases, are required. The commonly used documents are: (a) Bill of lading, (b) Invoices (c) Certificate of origin (d) weight certificate (e) insurance policy (f) markings of packages.

NATURE OF DOCUMENTS

Bill of Lading

The bill of lading is the most important document which accompanies bills of exchange drawn under letters of credit. It is evidence of the fact that goods have been dispatched by the exporter and gives the importer title to the goods and enables him to claim them on arrival at the destination.

A bill of lading is a document signed by the master of a ship or by the ship owners or their agents acknowledging the receipt of certain specified goods for carriage and embodying

an undertaking that the goods will be delivered to the consignee, or to his order or assignee, or merely to order. The bill specified the port of shipment, the destination and the condition under which the goods are received for carriage. It is at the same time, (i) a receipt for goods delivered to carrier for transportation, (ii) a contract between the shipper and the carrier for transportation of the goods and then delivery to the consignee or his order, and (iii) a document of title to the goods, giving the holder title to the goods mentioned.

Bills of lading are prepared by the shipper on forms supplied by the shipping company. Normally a bill of lading shows the date and place of shipment, the name of the carrying vessel, the name of the consigner and the consignee, the post of destination, the number, contents and identification mark of the goods shipped, and the amount of freight 'paid' or to pay. The detailed particulars of the number of packages, the mark they bear, their contents and the amount of the freight on them are entered in the space provided for them.

Certificate of origin

The laws of some countries require a certificate of origin of imported goods to be produced before clearance of goods by customs and assessment of duty. An importer, therefore, may request the exporter to send a certificate of this kind along with other documents. The certificate is usually required where goods from certain countries receive preferential treatment or the import of goods from certain countries receive preferential treatment or the import of goods from some countries is partially or wholly prohibited. The country where the goods are produced should, therefore, be known to the customs authorities. Sometimes, the certificate of origin is endorsed on the back of the relative invoice, in which case the whole document is known as a "Certified Invoice".

Packing List

A packing list serves to indicate the exact nature, quantity, and quality of the contents of each package in a shipment. The list helps the importer to identify the goods and check them against his own order. Banks may require such a list when they have financial interest in the merchandise. Clearance of goods through customs is also facilitated by packing lists.

Nature of insurance policy

Marine insurance policy is a contract between the insurer and the insured whereby the former, in consideration of the payment of a premium by the latter, agrees to indemnify the latter against loss incurred by him in respect of goods exposed to "perils of the sea" or to the particular perils insured against. For a policy to be valid, the insured must have an insurable interest in the goods subject to insurance, i,e., he benefits from the existence of the goods and

suffers a loss if the goods are damaged or lost. The insured need not have this interest at the time of insuring, but must have acquired it at the time of putting a claim under the policy for damage or loss of the goods.

The insurer, known in marine insurance parlance as the underwriter, is the party providing insurance cover, and it may be an insurance company transacting marine business or some firm of underwriters. A proposal for marine insurance is made through a marine insurance broker, who writes the particulars of the proposed insurance on a ship, which he submits to some underwriter. If the latter accepts the risk he signs the slip, and the insurance is in force form the time though the actual policy is delivered later. Further details of reference may be made to the chapter of insurance buying.

Marking of packages

A pacing list serves to indicate the exact nature, quantity and quality of the contents of each package in a shipment. The list helps the importer to identify the goods and check them against his own order. Banks may require such a list when they have a financial interest in the merchandise. Clearance of goods through customs is also facilitated by packing lists. The packages should be suitably marked with address, dimensions, weight and other particulars. The packings should be sewn correctly and in conformity with instructions in the order.

Payments

The importer is involved with banks, Ministry of Finance, and the Reserve Bank. The documents involved are (1) Letter of Credit/drafts (2) Terms of payment (3) Rate of Exchange (4) Payments under various credits and trade agreements.

Letter of Credit

A letter of credit is an arrangement whereby the obligation to pay an exporter is undertaken by a bank. The bank's credit is available to an importer who is not known outside and who otherwise would not be trusted with goods by a trader in another country. If a letter of credit is received from a bank the credit standing of the importer is of little consequence. What becomes important to the exporter is the credit standing of the bank issuing the letter of credit.

The importer requests a bank in his country to issue a letter of credit in favour of the exporter. The bank cables or writes to a correspondent or some other bank in the exporter's country that a credit has been opened in favour of the exporter, and the latter bank informs the exporter about it. The advising bank informs the exporter that it will honor drafts drawn

by the latter under terms and conditions laid down in the letter of credit. The liability for payment is really that of the bank issuing the letter of credit and the bank that honors' the drafts drawn by the exporter, gets reimbursed by the issuing bank.

Essential functions of LoC.

1. The name of the bank issuing the letter of credit is stated on the top of the instrument. The exporter receiving the letter should see whether the bank is acceptable to him or not.
2. The instrument mentions the name and full address of the beneficiary, i,e the seller in whose favour it is issued.
3. The amount for which the credit is issued is clearly stated. This amount is sometimes calculated exactly on the basis of the quantity of merchandise to be shipped. Banks are then not willing to accept and honour drafts for a smaller or larger amount. To avoid this difficulty some flexibility mentioned in the amount is introduced by using the word "about" with the sum.
4. The name of the importer for whose account the credit is opened is mentioned in the letter of credit. The credit standing of the importer is of little consequence to the seller if he is satisfied with the issuing bank. In fact the importer may not be known to the exporter at all.
5. Another important point to be clearly stated in the letter of credit is the tenor of the draft or drafts to be drawn under it. The draft may be a sight draft. This depends on the initial contract regarding the transaction between the exporter and the importer.
6. The letter of credit lists the documents to be attached to the draft drawn under it. The list is made out by the importer and given to the bank of issue. The documents are such as clearly indicate the discharge of contractual obligation by the exporter. Any discrepancy between the documents that accompany the draft and as those specified in the letters may result in a refusal by the advising bank to honour the draft.

The documents specified make clear the type of bill of lading, the conditions of marine insurance, if ocean freight is to be prepaid, the other details which do not have any misunderstanding in the mind of the exporter. It is possible that the documents demanded may not be in accordance with the custom and usage regarding them. In such a case, the exporter may object and should communicate with the advising bank. To speed up matters, direct communication with the importer is often resorted to.

7. The letter of credit has an expiry date, i,e., a date up to which the instrument is valid. A time of an exact date is mentioned by which the whole operation should be completed.

The date is given is normally one which will allow the exporter to conveniently ship the merchandise under the contract and to get all the required documents within the period. Again, if the time given is not enough for the exporter he may communicate with the issuing bank or the importer and get the date changed.

8. The type of credit opened, whether revocable or irrevocable, confirmed or unconfirmed, is stated on the instrument.
9. The letter of credit mentions any other conditions that may be demanded by the importer and that may have been settled between the importer and the exporter.

Transportation of product to end user.

The buyer will be involved with the shipping company, forwarding agents, insurance company, custom and import authorities. As we have seen, the documents and insurance policy cover this area.

14.4 GOVERNMENT POLICY FOR INTERNATIONAL PURCHASING

IMPORT PROCEDURE AND DOCUMENTS

The following three documents are of vital importance:

1. Import Trade Control (ITC) Handbook of Rules and Procedures.
2. Import Trade Control Policy (popularly known as Red Book) Vol. 1 (It deals with the policy of the Government with regard to import of materials).
3. Import Trade Control Policy Vol. II (It deals with the policy with regard to registered exporters).

It is an usual practice that the Government of India publishes the Import Trade Control Handbook of Rules and Procedures simultaneously with the Red Book every year.

In addition, the following legislations are also relevant: (i) Import and Export Control Act and (ii) Import Control Order.

IMPORT APPLICATION

Application for import license has to be made on prescribed forms to be used by different categories of importers. These are given below:

1.	Established Importer	Form A
2.	Actual user not borne on the register of DGTD including small scale industries	Form B
3.	Actual user borne on the register of DGTD	Form C
4.	Capital goods and heavy electrical plant	Form D
5.	For establishment of revision of quotas	Form F

6.	Registered exporters	Form H
7.	For newspaper establishments	Form J
8.	Public sector projects / undertakings	Form K
9.	Emergency licenses	Form L
10.	For revalidation of licenses	Form M

An application for import license has to be submitted to the licensing authority accompanied by appropriate fee as prescribed by the Government. Educational and charitable institutions and hospitals are exempted from paying the fees.

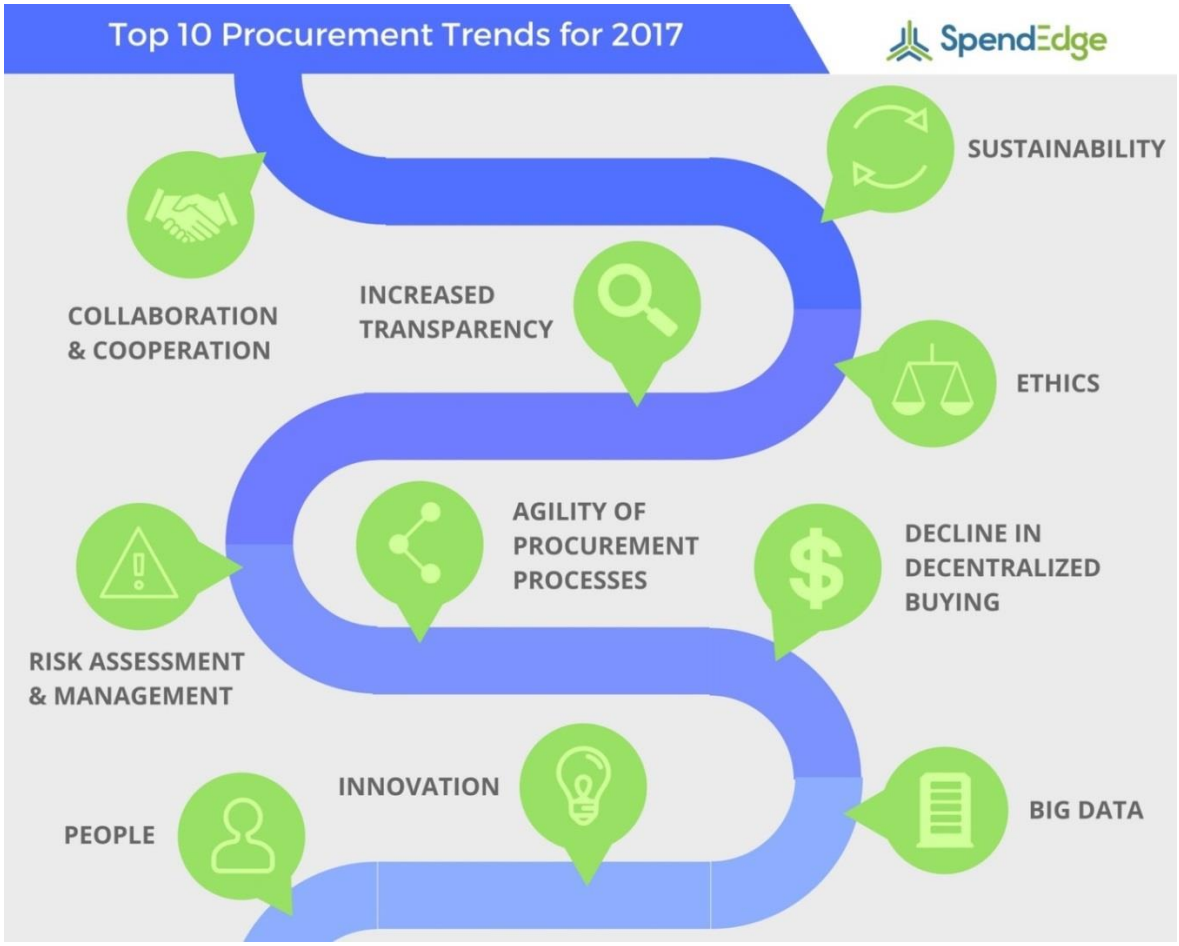
BASIS OF LICENSING

The license authority will then consider the application on the basis of the following factors:

1. Recommendation of the sponsoring authority, wherever necessary.
2. Availability of foreign exchange subject to the ceiling imposed.
3. Quantity of materials/goods/machinery etc. or its substitutes likely to be available from indigenous sources.
4. Consumption of the item in question by the importer through past imports.
5. Installed capacity, actual production during previous period and estimated planned production.
6. Import policy of the Government in respect of the item in question.

Issue of the license takes a few months for which the importing firm may be required to visit the authorities for expediting the case.

14.5 TRENDS IN INTERNATIONAL PURCHASING



Among the issues are in particular:

- Digitizing procurement, i.e. paperless processes, possibly with minimum human intervention, including automated RFQ process, payments, first line inquiry handling etc.
- Demand sensing, i.e. anticipating demand
- Consumer request transparency
- Carbon footprint and sustainable packaging
- Conflict minerals
- Visibility along the supply chain
- Certification process
- Supplier audits
- Effective risk management
- Dealing with smaller ticket items purchases
- International protocols, standards and data flows
- Management of small and big data
- Scouting and selecting software/digital tools and solutions.

Among the trends it is pointed out:

- Collaboration platforms (internal and external)
- Digital supply chain, trade, i.e. end-to-end paperless supply chains, including e-shipping documents, e-letter of credits, e-certificates, e-customs clearance
- Blockchain/Distributed ledger technology (DLT) based auditing of suppliers
- DLT, internet of things, artificial intelligence smart contract powered trade and supply chain financing
- Prove of provenance, based on DLT for unique or tagged items (DLT)
- AI-powered risk management tools
- Advances in material science and design will enable better remake and recycle opportunities
- Digital manufacturing, e.g. through robotics and 3D-printing
- Automated warehousing
- Digitized inventory and stock controls by drones.

CHECK YOUR PROGRESS

1. What is Forward Buying:
2. What is Inco terms?
3. What is International Purchasing Management
4. Define Invoice
5. What is Lead Time?

14.6 PROBLEMS IN INTERNATIONAL PURCHASING

The Government policy being one of protecting scarce foreign exchange, the procedure of clearance of imports is naturally very rigorous. It takes about 6-9 months to get the clearance from the authorities. For example, in the case of public sector undertakings there are about 10 different import procedures depending on the type of item imported (capital equipment, spare parts and raw materials) and the type of industry)priority, under the purview of ministry of steel and mines).

The imported quantity has to be one year's requirement and the renewal of import license is based on the previous year's consumption. The minimum average inventory a company has to hold is six month's requirements. However, in an attempt to play safe, companies carry heavy stock and one organization is reported to have more than four year's

requirement. The policy of conserving scarce foreign exchange has resulted in the locking up of the exchange in the form of inventory holdings.

Nowadays trade is not restricted within the boundaries of a nation but has spread throughout the world. Countries import those commodities which are not produced by them either because of cost disadvantages or because of physical difficulties, or even those which are not produced in sufficient quantities so as to meet the internal requirements. They export those goods which are produced in excess of internal requirements or in regard to which they have cost advantages. International purchasing is handled both by private as well as government agencies. However, the number of individuals or agencies engaged in International purchasing is much less as compared to those engaged in the home trade. This is primarily due to the difficulties which come in the way of International purchasing. These difficulties distract most of the traders from entering into the field of various formalities necessary for the purpose dare enter this field. The various difficulties which are faced by a trader engaged in foreign trade are enumerated below:

1. Distance
2. Diversity of Language
3. Difficulty in transportation and communication
4. Risk in transit
5. Lack of information about foreign merchants
6. Special feature of foreign markets
7. Custom duties
8. Remittance of price

1. **Distance:** Countries are spread across and the distance between them makes it difficult to establish quick and close trade contracts between the parties. Traders of different countries rarely meet each other and personal contact is rarely possible if not for any events. Even though trade directories have made it possible to obtain information regarding the markets for various products still procurement of information regarding individual products and their markets is a tedious task. There is a great time lag between placement of an indent and receipt of goods from foreign countries.
2. **Diversity of language:** different languages are spoken and written in different countries. This diversity of language poses another problem. The trader, wishing to establish trade relations with foreigners, must either know the language of that country or must utilise the services of somebody knowing that language. Price lists and catalogues are to be

prepared in foreign language, all correspondence is to be done in the foreign language, and even the advertisement is to be done in the language of that country. In western countries, therefore, everybody receiving training in foreign trade must study one or two foreign languages.

3. Difficulty in transportation and communication: correspondence with foreign traders takes a long time. Of course, e-mailing has facilitated communication these days a great deal. Receiving the goods or their supply takes even a longer time and also involves a large expense which increase the cost of goods for the customers. During the war, transportation of goods becomes even more difficult and sometimes the customers are denied the use of foreign goods or the factories stop working for want of imported raw materials.
4. **Risk in transit:** there is a greater risk in transit for the goods in the case of foreign trade than in the case of home trade. Goods are transported by ships which may sink due to hidden rocks or gales. Sea pirates also pose a problem. In the days of war, the ships and the goods can be captured by the enemies. Many of these risks are covered through marine insurance, but this increases the cost of goods.
5. Lack of information about foreign merchants: it is often difficult to obtain information regarding the financial position and business standing of the foreign merchants. Traders have to depend upon correspondence alone for successful operations. Transportations are done on the basis of samples and catalogues. This difficulty has been removed to some extent by the establishment of such business institution who provide confidential information about the merchants in their own countries.
6. Special features of foreign markets: every foreign market has certain characteristics of its own. Its problems, its requirements, its capacity and trade customs are peculiar to itself. Thus, extensive study of each foreign market is essential for success in foreign trade.
7. **Custom duties:** these days practically every county levies customs duties on its imports and exports. This is done with a view either to protecting its home industries or to earning revenue for the state. High tariff rates restrict the entry of goods in the country levying them and also limit its exports. Export duties are generally levied on raw materials so as to make them available for internal trade. Many countries enter into trade pacts to surmount the difficulties. For ex: GATT, ECAFE, EGM, etc are aimed at surmounting this difficulty.

8. Remittance of price: use of different currencies makes it difficult to obtain payment of the price of goods sold. Fluctuating exchange rates make it difficulties to calculate how much is to be recovered in one's own currency. Devaluation of a county's currency may mean a great loss to its importers. Again, the credit worthiness of the foreign party is difficult to ascertain. So long as the amount remains unpaid, there is always a danger of bad debts. The laws of many countries do not fully protect the interests of the foreign creditors. Existence of efficient banking system is essential for remitting the price quickly, easily and cheaply.

14.7 NOTES

14.8 SUMMARY

International Purchasing is one of the most significant areas of manufacturing and services as it facilitates the smooth flow of the operations. Any country is not complete with all the resources, which leads to purchase of materials from other countries surplus in resources and sometimes exchanging the abundant ones. International purchasing is monitored by the Government concerned to enable the various production and service activities in the country, so as to ensure transparency in the trade. Government has given guidelines in terms of procedures and process of International Purchase.

Brief input has been given about the role of SCM in international purchase highlighting the operations of supply chain management. A supply chain is a system of organizations, people, technologies, activities, information and resources involved in moving a product or service from supplier to customer. Today both manufacturing and service industry is dependent on various supplies across the world. It was evident that all the manufacturing industries suffered during the world wide lockdown because of the covid-19 pandemic, as they were dependent on China for the raw materials. The supply chain originates from the need identification of the customer and generates value in the process till the end product is delivered to the end user. The companies depend on an effective supply chain to compete in the market and for the optimal utilization of resources. The flows of the supply chain that occur within the individual organization are called the internal supply chain. The decisions, to purchase a product or service from external suppliers, are the basis for the

external supply chain. The organizations requires adherence to the **7** principles of supply chain for effective implementation and management of a robust supply chain.

Few trends in International purchasing have been discussed in this unit to give a clear picture about the trade happening between countries in the era of digital technology.

14.9 KEYWORDS

- **Capital Equipment:** Capital equipments are the assets such as vehicles that generally depreciate, or lose value over time.
- **Purchase Department:** The purchasing department is responsible for acquiring the inventory that a company sells.
- **Purchase Indents:** It is an internal company document used in the purchasing process to authorize the requisition of materials prior to initiating a purchase order.
- **Purchasing:** The acquisition of something for payment is known as purchasing.
- **Quality of Conformance:** It is the degree to which a product or service meets or exceeds its design specifications and is free of defects or other problems that mar its appearance or degrade its performance.
- **Red Book:** Ensures high standard of inspection, investigation, analysis, definitions, justification and presentation are maintained
- **Reorder Level:** The point at which the buying department places its order for replacement materials is known as reorder level.
- **Scientific Purchasing:** Scientific purchasing is the technique of purchasing goods of right quality, in the right quantities, at the right price, at the right time and from the right source.
- **Stock on Pipeline:** Goods that have left a firm's warehouse(s) but have not been bought by the ultimate consumers, customers, or users, and are therefore still within the firm's distribution chain are known as stock on pipeline or pipeline stock.
- **Two-bin System:** Two bin system is a replenishment system where parts are pulled from one bin.

14.10 ANSWER TO CHECK YOUR PROGRESS

- **Forward Buying:** The placement of an inventory purchase order earlier than required in order to take advantage of a special price offer, or similar is referred to as forward buying.
- **Inco terms:** INCO TERMS or international commerce terms are agreed rules which set out the delivery terms for goods which are traded internationally.

- **International Purchasing Management:** Purchasing management directs the flow of goods and services between the countries and handles all data relating to contact with suppliers and government agencies.
- **Invoice:** Invoice is an itemized statement of money owed for goods shipped or services rendered. Notes
- **Lead Time:** Lead time is the time interval between the initiation and the completion of a production process.

14.11 SELF ASSESSMENT QUESTIONS

1. Bring out the need for International Purchasing
2. Discuss briefly Importance of International Purchasing
3. Examine the role of International Purchasing in Supply Chain Management
4. Explain the Process and documentation for International Purchasing
5. Discuss the Government Policy for International Purchasing
6. Elaborate few trends in International Purchasing in detail.
7. Explain role of Global supply chain management and the various processes it is involved in.
8. Why do you think is there a need for global supply chain in today's scenario?

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UNIT-15: INVENTORY MANAGEMENT

Structure;

15.0 OBJECTIVES

After studying this unit, you will be able to:

- ❖ Learn the scope and nature of inventory control
- ❖ Describe the various components of inventory.
- ❖ Analyse the classification of inventory
- ❖ Explain the Process for inventory control costs
- ❖ Examine the importance of Inventory decision models.

15.1 INTRODUCTION

Inventory analysis is one of the most popular topics in production and material management. One reason is that almost all types of business organisation have inventory. For many firms inventory is the largest current asset. Inventory is usually thought in times of stock of materials or idle goods that are held by an organisation for use some time in the future. Inventory also includes partially finished products at different stages of a manufacturing process**, raw materials** and **components, resources, finished products, labour or cash**. The purpose inventory is to meet customer demand to avoid stock-out of materials which may cause stoppage of production or event to hedge against strikes and lock-out and to meet uncertainties in supply from vendors. Whatever form inventory takes or whatever its purpose, it often represents a significant cost to a business firm. If a firm carries excessive inventory, it is estimated that the average annual cost of carrying inventory would be approximately 30% of the total value of inventory held by the firm. Conversely, if the firm is a manufacturer, the stock-out could in extreme cases bring production to a halt and cause huge losses due to idling of machinery, equipments and labour. Hence if the amount of inventory could be reduced to an optimal level, both stock-out cost and inventory carrying cost can be reduced to the minimum possible level. Skillful inventory management can make a significant contribution to a firm's profit.

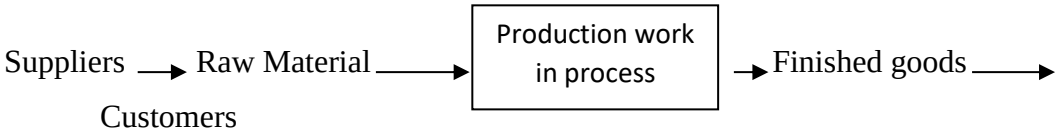
15.2 INVENTORY NATURE AND SCOPE

Inventories are stock of materials of any kind stored for future use, mainly in the production process. Thus, today's inventory is tomorrow's production material. However, semi-finished goods awaiting use in the next process or finished goods awaiting release for sale are also included in the broad category of inventories, which are nothing but idle resources. Inventories are materials or resources of any kind having some economic value, either in pipeline for conversion or for use in future.

Also, there are many indirect materials, such as, maintenance materials, fuels and lubricants, etc. which are used in a manufacturing organization they are also classified as inventories of materials for future use but they differ only in their use and classification from raw and other direct materials. All of them earn nothing, yet they are badly required to be stocked and to be used when the needs arise.

By definition, inventories facilitate production or satisfy customer demands. Inventory system is a set of policies and controls which monitors and determines the levels of inventory. Inventories conventionally include raw materials, work-in-process, component parts, supplies and finished goods. Operations is a transformation process in which the inputs are raw materials and the output is the finished goods.

The term inventory refers to any resource that has a certain value, which can be used at a future occasion when the demand arises. Alternatively inventory may be defined as "stock of items kept on hand by an organisation to be used to meet customer demand either in manufacturing or service".



Inventories here are equated with stock of materials. This is a narrow view. Broadly speaking, inventory is an idle resource that has potential economic value, thus taking in its ambit idle workers as inventory. But apart from materials other idle resources are considered as capacity. Inventory is a product at some point in conversion and distribution process, whereas capacity is the potential to produce.

In the service industry, inventory refers to the tangible goods to be sold and supplies necessary to administer the service.

In the production process, inventory stocks are located at various points. These are inter-connected through flows. A stock is replenished at a particular rate which is called the supply capacity. The rate of stock depletion is called demand. Inventory is a buffer between the difference demand and supply rates.

15.3 IMPORTANCE OF INVENTORY MANAGEMENT

Virtually every type of organisation maintains some form of inventory. A department stores or retail store carries inventories of all the retail items it sells, a family household maintains inventory of food, clothing, medical supplies, an automobile dealer maintains inventory of automobiles, a manufacturing firm maintains inventory of raw materials,

bought-out components, semi-finished goods or work-in-progress items, finished goods, spare parts for maintenance of equipments and machinery, inventory of skilled labour, liquid funds such as cash and also inventory of plant and equipment.

In an organisation, the importance of inventory can be recognised for the following reasons.

(a) Inventories represent resources acquired at a cost, thereby locking by substantial working capital.

(b) Inventories allow for smooth flow of production process by ensuring that adequate supply of raw materials, components and manufactured items are available to the production lines.

(c) Inventories serve as buffers against uncertain and fluctuating usage and reduce stock-out situations, thereby avoiding production hold-ups and loss of customer good will.

The inventory problem is common to all organisations and poses a challenge to management. The specific questions for which satisfactory answers have to be found by the managers are:

(i) What are the inventories that have to be acquires and maintained?

(ii) From what sources should they be acquired/

(iii) How much of the inventories should be acquires when inventory replenishment is needed?

(iv) When should the inventories be replenished?

15.4 CLASSIFICATION OF INVENTORY

Inventories are usually classified as (a) Raw Materials (b) Bought-out components or subassemblies, (c) Semi finished goods or work-in-progress or work-in-process. (d) consumable stores (e) Maintenance spare parts (f) finished goods stored or in transit to warehouses or customers.

Box 15.1 Lists various types of inventory

(A) Based on nature of materials

(i) Production Inventories: Raw Materials, Parts and Component which become part of the firm's finished product in the production process.

(ii) MRO Inventories: Maintenance, repair and operating supplies which are consumed in the production process. But which do not become part of the finished product (e.g. Lubricants, grease cotton waste, spare parts for machine repairs)

(iii) In-process Inventories: Also known as "work-in-process" or work – in- progress or semi-finished goods inventories – these are parts of sub assemblies found at various stages in the production process.

(iv) Finished goods inventories: completed products kept in stores ready for shipment.

(B) Classified by how it is created

(i) Cycle inventory: the position of total inventory which varies directly with lot size (i,e quantity ordered). For ex: if Q is the order quantity or the lot size and the supply is received exactly when the stock is nil, then the minimum inventory is nil, maximum inventory is Q and the average cycle inventory is half of quantity ordered.

(ii) Safety Stock Inventory: Safety Stock Inventories are held to avoid stock out conditions which cause production stoppages and to project against uncertainties in demand, lead time, supply and consumption rates.

(iii) Anticipation Inventory: Inventory of materials purchased in bulk quantities in anticipation of price rise and products having seasonal demand produced in quantities more than the demand during off-seasons and held in inventory to meet higher demand rate (more than production rate) during seasons of high demand.

(iv) Pipe-line inventory: inventory moving from point ot point in the materials flow system. Materials move from supplier to a plant, from one operation to the next in the plant and from the plant to the warehouse or distribution centre or to the customer. Pipe line inventories also include materials that have been ordered but not received.

(v) Fluctuation Inventory: inventory held as reserve stock to meet the unexpected fluctuating demand over a period which cannot be predicated accurately.

15.5 FUNCTIONS OF INVENTORY

One reason organisation maintain inventory is that it is rarely possible to predict sales levels, production levels, demand and usage patterns exactly. In such situations, inventory serves as a buffer against uncertain and fluctuating demand and keeps a supply of items available in case items are needed by the organisation or its customers.

The many functions that inventories perform can be summarised as follows;

(a) Smoothing out irregularities in supply: inventories provide a buffer to overcome the problems of uncertainties in supplies such as delayed deliveries and supply of short quantities by vendors as against the promised delivery schedules and quantities. Also, the customer demand for the goods may increase suddenly which affects the ability of the manufacturer to meet the customer demand. In such cases also, an inventory of finished goods held in the warehouse will act as a buffer against the uncertainties in demand. Thus, inventories fill the gap between supply and demand.

(b) Buying or producing in lots or batches: when the demand for an item does not justify its continued production through-out the year, it is produced in batches or lots on an intermittent basis. During the time when the item is not being produced, demands are met from the inventory which is accumulated by batch production.

(c) To meet seasonal or cyclical demand: companies will produce items at a constant production rate more than the demand rate in order to meet the seasonal demand occurring at a later period for which the production capacity is insufficient.

(d) To take advantage of price discounts while buying items; a company will often purchase large amounts of inventory to take advantage of price discounts, as a hedge against anticipated price increases in the future. In some cases large quantities are ordered because the cost of an order may be very high and it is more cost-effective to have higher inventories than to order small quantities several number of times in an year.

(e) To maintain continuity to operations in production processes: many companies find it necessary to maintain in-process inventories at different stages in an manufacturing process to provide independence between operations and to avoid work stoppages or delays and to continue production smoothly if there are temporary machine breakdowns or other work stoppages.

15.6 VARIOUS INVENTORY COSTS

There are two types of costs associated with inventory namely:

(a) Costs associated with the purchase of inventory items, i,e., cost of materials purchased.

(b) Costs on materials consisting of three basic costs namely

(i) Ordering costs or acquisition costs which are costs associated with the placement of an order for the acquisition or replenishment of the stock of inventory. Ordering costs are expressed as rupees per order and are independent of the order size. Ordering costs per year vary with the number of orders placed in an year. Costs incurred each time an order is made can include requisition costs, purchase orders, transportation

and shipping, receiving, inspection. Handling and placing in storage accounting, bills payment and auditing costs.

(ii) Carrying or holding costs are the costs of holding items in storage. These vary with the level of inventory and with the length of time an item is held i,e., the greater the level of inventory over time, the higher the carrying cost. Carrying costs include the direct storage costs such as rent lighting, security, refrigeration, record keeping, interest on capital tied up in holding the inventory (i,e, cost of capital) depreciation or equipments used for material handling, costs due to pilferage, spoilage, obsolescence, and taxes and also the cost of opportunity lost due to loss of funds tied up in inventory.

Carrying costs are expressed as rupees per unit of item held in inventory per time period such as a month or year. Alternately, carrying costs are sometimes expressed as a percentage of the value of an item or as a percentage of average inventory value per year.

(iii) Shortage costs also referred as stock-out costs, occur when customer demand cannot be met because of insufficient inventory on hand. Shortages may result in permanent loss of sales of items demanded but not provided, resulting in loss of profits. Shortages can also cause customer dissatisfaction and a loss of goodwill which may result in permanent loss of customers and future sales. In some instances delayed deliveries ot customers due ot shortages may result in specified penalties in the form of price discounts or rebates. When demand is internal, a shortage can cause work stoppages in the production process and create delays resulting in downtime costs and cost of lost production.

The three costs are related to each other in some way or the other. The ordering costs per year decreases as the order size (i,e the quantity ordered in each order) increases, thereby decreasing the number of orders per year. However, an attempt to place a few orders per year results in bigger order size which in turn increases the average inventory held and the carrying cost or holding cost. Shortage occurs because it is too costly to carry inventory in stock. As a result shortage costs are inversely related to carrying costs. As the amount of inventory on hand increases, the carrying cost increases while shortage costs decreases. The objective of inventory management is to employ an inventory control system that will include how much should be ordered and when orders should be placed in order to minimise the sum of the three costs, i,e ordering costs, carrying costs and shortage costs.

The costs generally associated with inventories are shown in Figure 15.3. The different components of cost are discussed below:

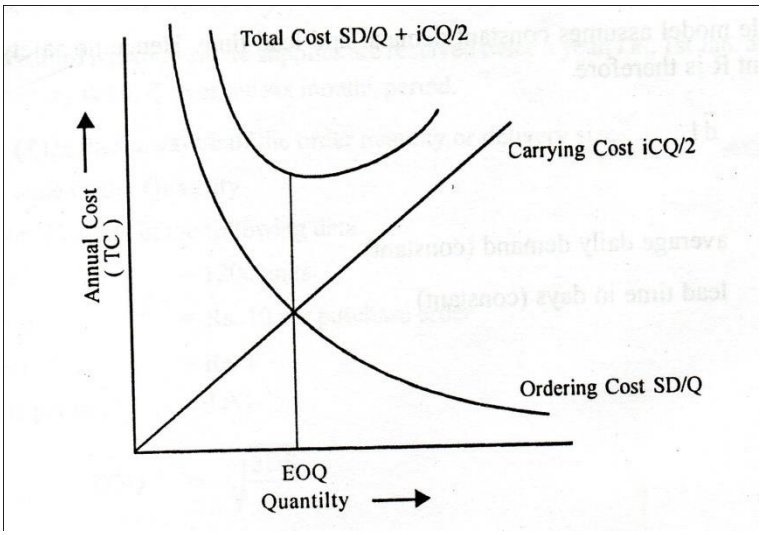


Fig 15.3

15.7 INVENTORY DECISIONS- MODELS

There are two basic inventory decisions managers must take in order to effectively manage inventories. They are

1. How much of an item should be ordered when the inventory is replenished?
2. When should the inventory be replenished?

Inventory Models

We will first consider deterministic inventory models in which we assume that the rate of demand for the item is constant or nearly constant. Later we will consider probabilistic inventory models in which the demand for the item fluctuates and can be described only in probabilistic terms.

Deterministic Inventory Models.

1. Economic Order Quantity (EOQ) Model

The EOQ model is applicable when the demand for an item has a constant or nearly constant rate and when the entire quantity ordered arrives in inventory at one point of time (instantaneously).

The EOQ model system is also known as fixed order quantity system (Q system) or a continuous or perpetual review system. In this system orders is placed for the same constant or fixed amount (known as economic order quantity) whenever the inventory on hand

reached a certain predetermined level known as re-order level or re-order point. Continual record of inventory level for every item is maintained. The order than is placed to replenish the stock of inventory is for a fixed quantity which minimises the total inventory carrying, ordering and shortage costs.

A positive feature of a continuous review system is that inventory level is closely and continuously monitored so that management always knows the inventory status. This is advantageous for critical items such as replacement parts of raw materials or supplies.

The function of the EOQ model, also referred to as the economic lot size model is to determine the optimal order size that minimises total inventory costs.

There are several variations of the EOQ model, depending on the assumptions made about the inventory system. Three such variations are (a) the basic EOQ model (b) the EOQ model with non-instantaneous receipt or gradual arrival or supplies and (c) the EOQ model with shortages.

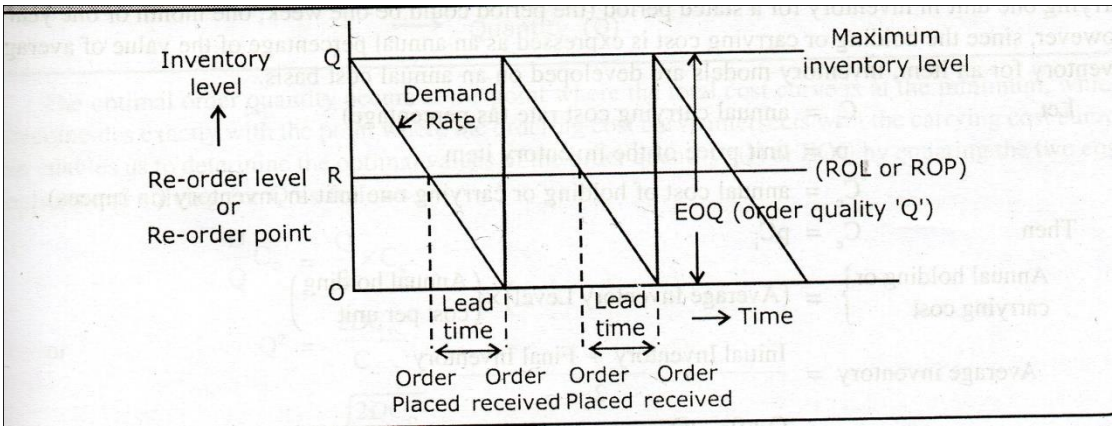
2. The Basic EOQ Model

The formula for EOQ and Re-order level are derived under asset of simplifying and restrictive assumptions, as follows:

- ¬ Demand is known with certainty and is relatively constant over time.
- ¬ No shortage are allowed.
- ¬ Lead time for the receipt of orders is constant.
- ¬ The order quantity is received all at once i,e instantaneously

The exhibit 15.4 illustrates the basic EOQ model lists the various assumptions used in the basic EOQ model.

FIGURE 15.4



The diagram above describes the continuous inventory order cycle inherent in the EOQ model. An order quantity 'Q' is received and is used up over time at a constant rate. When the inventory level decreases to the re-order point 'R', a new order is placed and a period of time referred to as the lead time, is required for delivery. The order is received all at once just at the moment when demand has used up the entire stock of inventory (i,e., the inventory level reaches zero), thus allowing no shortages. This cycle is continuously repeated for the same order quantity, re-order point and lead time.

Derivation of EOQ Formula

(a) The how-Much-to Order Decisions

Let 'D' be the annual demand for an item in units. If 'Q' is the order size (i,e., EOQ) to be determined then, the number of orders/year = $\frac{D}{Q}$

Let C_0 be the cost per order or ordering cost.

Then, annual ordering cost

$$= \left(\begin{matrix}\text{Number of Orders} \\ \text{per year}\end{matrix}\right) \text{x } (\text{Cost per order}) = \frac{D}{Q} C_0$$

The holding cost or carrying cost can be calculated using the average inventory level. Then we can calculate the holding cost for an item per year by multiplying the average inventory level by the cost of carrying one unit in inventory for a stated period (the period could be one week, one month or one year). However, since the holding or carrying cost is expressed as annual percentage of the value of average inventory for an item, inventory models are developed on an annual cost basis.

Let C_i = annual carrying cost rate (as percentage)

p = unit price of the inventory item

C_0 = annual cost of holding or carrying one unit in inventory (in rupees)

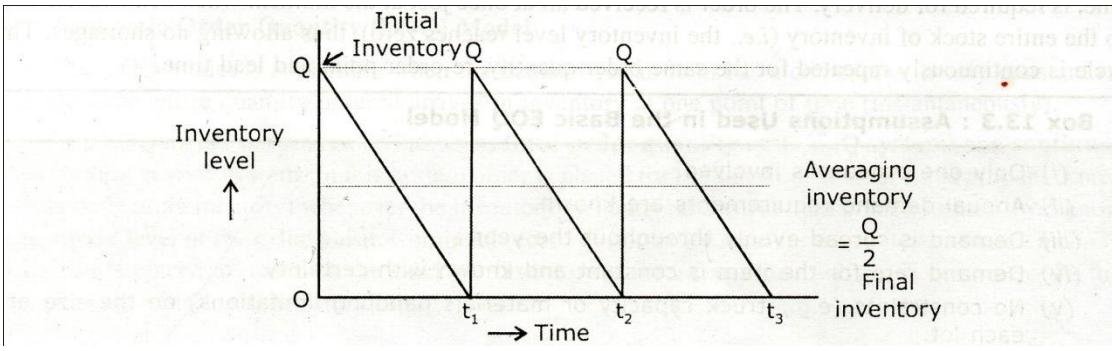
Then $C_e = pC_i$

$$\left.\begin{matrix}\text{Annual Holding of} \\ \text{Carrying Cost}\end{matrix}\right\} = (\text{Average Inventory Level}) \text{x} \left(\begin{matrix}\text{Annual Holding} \\ \text{Cost Per Unit}\end{matrix}\right)$$

$$\text{Average Inventory} = \frac{\text{Initial Inventory} + \text{Final Inventory}}{2}$$

$$= \frac{Q+0}{2} = \frac{Q}{2}$$

EXHIBIT 15.5



$$\left.\begin{matrix}\text{Annual Holding or} \\ \text{Carrying Cost}\end{matrix}\right\} = \left(\frac{Q}{2}\right) x\, C_c$$

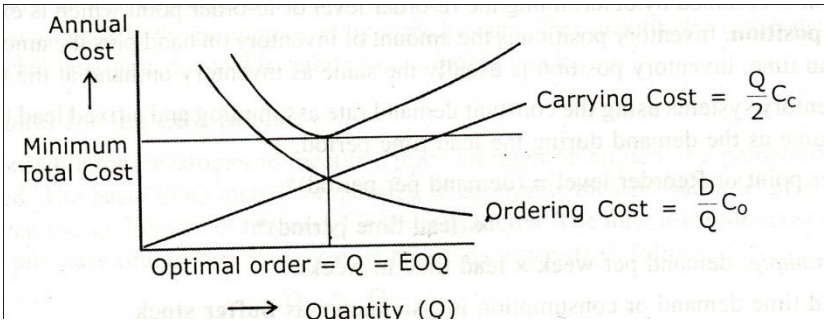
Total Annual = Annual Ordering Cost + Annual Holding Cost

Inventory Cost

$$TC = \frac{D}{Q} C_0 = \left(\frac{Q}{2}\right) x\, C_c$$

The cost function are illustrated in Exhibit 15.6

EXHIBIT 15.6



The optimal order quantity occurs at the point were the total cost curve is at the minimum, which also coincides exactly with the point where the ordering cost curve intersects with the carrying cost curve. This enables us to determine the optimal values of the order quantity (Q) or EOQ by equating the two cost functions and solving for Q as follows:

$$\frac{D}{Q}C_0 = \frac{Q}{2} x C_c$$

Or $$Q^2 = \frac{2DC_0}{C_c}$$

Or $$Q = \sqrt{\frac{2DC_0}{C_c}}, \text{ where } C_c = pC_i$$

Alternately, the optimal value of Q can be determined by differentiating the total cost equation with respect to Q and equating the resulting function to zero and then solving for Q as follows:

$$TC = \frac{D}{Q}C_0 + \left(\frac{Q}{2}\right) x C_c$$

$$\frac{dTC}{dQ} = \frac{DC_0}{Q^2} + \frac{C_c}{2}$$

$$0 = \frac{DC_0}{Q^2} + \frac{C_c}{2}$$

Or $$\frac{DC_0}{Q^2} = \frac{C_c}{2}$$

Or $$Q^2 = \frac{2DC_0}{C_c}$$

Or $$Q_{(EOQ)} = \sqrt{\frac{2DC_0}{C_c} = Q_{opt}}$$

Minimum total Cost, $TC_{minimum} = \frac{D}{Q_{opt}}C_0 + \frac{Q_{opt}}{2} x C_c$

(b) The When-To-Order Decision

Now that we know how much to order, we want to address the question of when to order. The answer to this question is obtained by determining the re-order level or re-order point which is expressed in terms of inventory position. Inventory position is the amount of inventory on hand plus the amount on order. But with short lead time, inventory position is usually the same as inventory on hand at the time of ordering.

For inventory systems using the constant demand rate assumption and a fixed lead time, the re-order point is the same as the demand during the lead time period.

Re-order point or Recorder level = (demand per period) x (lead time period)

For ex. Demand per week x lead time in weeks

This lead time demand or consumption is also known as buffer stock.

(c) Calculation of Cycle Time

The question of how frequently the order will be placed (or the time interval between two successive orders) can now be answered. The period between orders is referred to as the cycle time which is determined as follows:

Optimal number of orders per year = N

$$= \frac{D}{Q_{opt}} = \frac{D}{\sqrt{\frac{2DC_0}{C_c}}} = \sqrt{\frac{DC_c}{2C_0}}$$

The cycle time $T = \frac{\text{No. of days per year}}{N}$ days i, e., $\frac{365}{N}$ days

$$= \frac{\text{No. of weeks per year}}{N} \text{ weeks i, e., } \frac{52}{N} \text{ Weeks}$$

$$= \frac{\text{No. of Months per year}}{N} \text{ Months i, e., } \frac{12}{N} \text{ Months}$$

Just-in-time (JIT).

JIT is a form of inventory management that requires working closely with suppliers so that raw materials arrive as production is scheduled to begin, but no sooner. The goal is to have the minimum amount of inventory on hand to meet demand.

JIT is the key tool which is used to reduce the cost burden of high inventory. It helps to evaluate the actual stock level in supply chain and determine the optimum stock level. Major benefits of using JIT are: Low Inventory holding cost and warehouse cost.

The Just-In-Time (JIT) concept is a manufacturing workflow methodology aimed at reducing flow times and costs within production systems and the distribution of materials. ... The prime goal of JIT is for zero inventories across the organization and its supply chain.

Just-in-time, or JIT, is an inventory management method in which goods are received from suppliers only as they are needed. The main objective of this method is to reduce inventory holding costs and increase inventory turnover.

Elements of JIT include:

- Continuous improvement. ...
- Eliminating waste. ...
- Good housekeeping - workplace cleanliness and organisation.
- Set-up time reduction - increases flexibility and allows smaller batches. ...

- Leveled / mixed production - to smooth the flow of products through the factory.

Industries that practice JIT manufacturing often experience advantages and benefits such as:

- More cost efficient production.
- Continuous quality improvement.
- Waste Elimination.
- Improve productivity.
- Improve supplier relationships.
- Improve storage space used.
- Reduce costs associated with storage.
- Reduce manufacturing time.

CHECK YOUR PROGRESS

1. How Replenishment Level is calculated
2. What is Safety Stock?
3. What is Set-up Costs?
4. What is Shortage Costs?
5. What is Variable Costs?

15.8 SOLVED PROBLEMS

1. A company's books of accounts revealed the following.

Staff Salaries of purchase department	=	Rs. 2,50,000
Expenses incurred in ware-house personnel salaries	=	Rs. 2,75,000
Cost of Security for ware house	=	Rs. 80,000
Travelling and purchase follow up expenses	=	Rs. 80,000
Taxes and Insurance	=	1.0% p.a
Interest rate on inventory value	=	20% p.a
Cost of bills payment	=	Rs. 30,000
Cost of materials handling in store	=	Rs. 1,50,000

Obsolescence and pilferage = Rs. 20,000

Cost of inwards inspection = Rs.48,000

The company has an average inventory of Rs.60 lakhs and has placed 3400 orders in the year of review. Calculate the cost per order and inventory carrying the cost as percentage based on the above costs. What would be the EOQ if the annual demand of an item is 12,000 numbers and unit price is Rs. 60 per unit.

Solution:

In order to calculate the ordering cost/acquisition cost per order and the inventory carrying cost, as a percentage of the value of average inventory, it is necessary to bifurcate the various items of cost data under two heads, viz ordering cost and inventory carrying cost as follows:

Ordering Cost(Rupees)	Inventory Carrying Cost (Rupees)
(a) Staff Salaries of Purchase Department = 2,50,000	(a) Expenses incurred in Warehouse Personnel Salaries = 2,75,000
(b) Travelling & Purchase follow up expenses = 80,000	(b) Cost of Security for Warehouse = 80,000
(c) Cost of bills of payment = 30,000	(c) Taxes and insurance @1% = $\frac{1}{100}$ x 60,00,000
(d) Cost of Inward Inspection = 48,000	(d) Interest @ 20% of the value of average inventory = $\frac{20}{100}$ x 60,00,000
Total 4,08,000	
Ordering Cost per order (C_0) = $\frac{\text{Total Ordering Cost}}{\text{No. of orders per year}}$	(e) Cost of Material handling in store = 1,50,000
$= \frac{4,08,000}{3400} = \text{Rs.}120$	(f) Obsolescence and pilferage cost = 20,000

	Total Inventory Carrying cost $\}$ = 17,85,000 Inventory carrying Charges (C_i) $\}$ = $\frac{17,85,000}{60,00,000} \times 100 = 29.75\%$

Calculation of E.O.Q. :Annual Demand (D) = 12,000 Units

Unit Price (P) = Rs 60/-

$$E.O.Q = \sqrt{\frac{2 \times \left(\begin{matrix}\text{Annual Demand} \\ \text{(Units)}\end{matrix}\right) \times \left(\begin{matrix}\text{Ordering Cost} \\ \text{Per Order}\end{matrix}\right)}{\text{Unit Price} \times \left(\begin{matrix}\text{Inventory Carrying} \\ \text{Charges (as \%)}\end{matrix}\right)}}$$

$$= \sqrt{\frac{2DC_0}{PC_i}} = \sqrt{\frac{2 \times 12,000 \times 120}{60 \times 0.2975}}$$

= 401.67 = 402

2. An auto industry purchases spark plugs at the rate of Rs.25 per piece. The annual consumption of spark plug is 18,000 Nos., if the ordering cost is Rs. 250 per order and carrying cost is 25% p.a., what would be the EOQ? If the supplier of spark plugs offers a discount of 5% for order quantity of 3,000 Nos per order, do you accept the discount offer?

Solution:

(a) Calculation of EOQ :

Annual Demand (D) = 18,000 Nos

Unit Price (P) = Rs 25/-

Ordering Cost per Order (C_0) = Rs 250/-

Carrying Charges (as %) (C_i) = 25%

$$EOQ = \sqrt{\frac{2DC_0}{PC_i}}$$

$$= \sqrt{\frac{2 \times 18,000 \times 250}{25 \times 0.25}} = \sqrt{\frac{20 \times 18,000}{0.25}}$$

$$= \sqrt{80 \times 18{,}000} = \sqrt{10^4 \times 8 \times 18}$$

$$= 10^2 \times \sqrt{144} = 100 \times 12 = 1200 \text{ Nos}$$

(b) Decision regarding discount offer for Q = 3000.

(i) EOQ Option:

$$\left.\begin{matrix}\text{Total Cost of Materials Plus} \\ \text{Cost on Materials per annum}\end{matrix}\right\} = DP + \frac{D}{Q}C_0 + \frac{Q}{2}PC_i$$

$$= 18{,}000 \times 25 + \frac{18{,}000}{1200} \times 250 + \frac{1200}{2} \times 25 \times \frac{25}{100}$$

$$= 4{,}50{,}000 + 3750 + 3750$$

Total Cost $TC_{(EOQ)}$ = Rs. 4,57,500

(ii) Discount Option

Discount offered for order qty (Q_1) of 3,000 No.s = 5% of unit price

New Price after Discount.

$$P_1 = 0.95 \times 25 = 23.75$$

$$\left.\begin{matrix}\text{Total Cost of Materials Plus} \\ \text{Cost on Materials } TC_{(\text{Discount})}\end{matrix}\right\} = DP_1 + \frac{D}{Q_1}C_0 + \frac{Q_1}{2}P_1C_i$$

$$= 18{,}000 \times 23.75 + \frac{18{,}000}{3000} \times 250 + \frac{3000}{2} \times 23.75 \times 0.25$$

$$= 4{,}27{,}500 + 1500 + 8906.25$$

Total Cost $TC_{(Discount)}$ = Rs. 4,37,906.25

(iii) Decision Rule:

If TC (Discount) $\leq$ TC (EOQ) $\rightarrow$ Accept Discount

If TC (Discount) > TC (EOQ) $\rightarrow$ Reject Discount Offer

In this case, since $TC_{discount}$ (i,e, 4,37,906.25) is less than TC_{EOQ} (i,e., 4,57,500), discount offer of 5% on unit price for ordering 3000 Nos per order is acceptable.

3. The ABC Fun novelty company buys 80,000 shipping container per year. Price of each container is Rs. 0.40 Cost of purchase Rs 80 per order, cost of holding one container per year = Re.0.10. Bank rate of interest 15% including a charge for taxes and insurance. Find

(i) The economic order quality and time between orders based on 220 working days per year.

(ii) The minimum variable cost per year.

(iii)If the company had been following a policy or quarterly ordering. What would have been the increase in the variable cost?

Solution:

Annual Demand (D) = 80,000 Units

Unit Price (P) = Re. 0.40

Ordering cost per order (C_0) = Rs 80/-

Holding cost per item per year = Re. 0.10/-

$$\left.\begin{matrix}\text{Bank rate of interest including}\\ \text{charges for taxes and insurance}\end{matrix}\right\} = 15\% \text{ of unit price}$$

$$= \frac{15}{100} \text{x } 0.40 = \text{Re}.0.06$$

$$\left.\begin{matrix}\text{Inventory Carrying Cost}\\ \text{per item per year}\end{matrix}\right\} C_C = 0.10 + 0.06 = \text{Re}.0.16$$

Calculation of EOQ:

(i) $$\text{EOQ} = \sqrt{\frac{2DC_0}{C_C}} = \sqrt{\frac{2 \text{x} 80{,}000 \text{x} 80}{0.16}} = 8944.27 = 9000 \text{ Nos}$$

Calculation of time between orders based on 220 working days per year:

$$\left.\begin{matrix}\text{Time between orders}\\ \text{(in days)}\end{matrix}\right\} = \frac{\text{No. of working days per year}}{\text{No. of orders per year (N)}}$$

$$\left.\begin{matrix}\text{No. of Orders}\\ \text{per year (N)}\end{matrix}\right\} = \frac{\text{Annual Demand (D)}}{\text{EOQ}}$$

$$N = \frac{D}{Q} = \frac{80{,}000}{9000} = 8.88 \approx 9$$

Time between orders $= \frac{220}{9} =$ 24.44 days $\approx$ 24 days

(ii) Calculation of minimum variable cost per year:

Variable cost comprises ordering cost per year and inventory carrying cost per year and this would be minimum when the order qty, equals economic order qty. (i.e., EOQ)

$$\left.\begin{matrix}\text{Minimum Variable}\\ \text{Cost per year}\end{matrix}\right\} = \left(\begin{matrix}\text{Ordering Cost}\\ \text{Per Year}\end{matrix}\right) + \left(\begin{matrix}\text{Inventory Carrying}\\ \text{Cost per Year}\end{matrix}\right)$$

$$= \left\{ \begin{pmatrix} \text{No of} \\ \text{orders} \end{pmatrix} \text{x} \begin{pmatrix} \text{Ordering} \\ \text{Cost per order} \end{pmatrix} \right\} + \begin{pmatrix} \text{Average Inventory} & \text{x} & \text{Inventory Carrying} \\ \text{units} & & \text{Cost / unit / year} \end{pmatrix}$$

$$= (9 \text{ x } 80) + \left(\frac{9000}{2} \right) \text{x } 0.16$$

= 720 + 720 = Rs. 1440

(iii) Policy of quarterly ordering (ordering once in 3 months)

No of orders per year $= \frac{12}{3} = 4$

Order Qty per Order $= \frac{80{,}000}{4} = 20{,}000 \text{ units}$

Ordering cost per year = 4 x 80 = Rs. 320

Inventory carrying cost per year $= \frac{20{,}000}{2} \text{ x } 0.16 = \text{Rs.}1600$

Total Variable cost per year = 320 + 1600 = Rs. 1920/-

$$\left. \begin{array}{l} \text{Increase in the variable} \\ \text{Cost as compound with} \\ \text{that of EOQ ordering} \end{array} \right\} = 1920 - 1400 = \text{Rs. } 480/-$$

4. Determine safety stock, reserve stock and buffer stock for the data given below:

Normal Usage	=	100 per week
Lead time	=	4 to 6 weeks
Minimum usage	=	50 per week
Maximum usage	=	150 per week
Re-order quantity	=	600 No.s

Also, calculate the Re-order level, minimum and maximum levels of inventory and also average inventory level.

Solution:

$$\text{Buffer stock} = \begin{pmatrix}\text{Average}\\ \text{lead time}\end{pmatrix} x \begin{pmatrix}\text{Average}\\ \text{usage time}\end{pmatrix}$$

$$= 5 \times 100 = 500 \text{ No.s}$$

Safety stock is for usage at normal rate during the extension of lead time.

Max Extension of lead time = 6 – 5 = 1 week

Normal usage rate = 100 per week

Safety stock = (6-5) x 100 = 100 No.s

Reserve Stock is to meet the excess usage requirement during normal lead time.

Excess usage requirement = 150 – 100 = 50 per week

Reserve Stock = 5 x 50 = 250 No.s

Re-order level = Safety Stock + Reserve Stock + Buffer Stock

= 100 + 250 + 500 = 850 No.s

Minimum Inventory Level = S.S + R.S = 100 + 250 = 350 Nos

Maximum Inventory Level = $\begin{pmatrix}\text{Minimum}\\ \text{Level}\end{pmatrix} + \begin{pmatrix}\text{Order}\\ \text{Quantity}\end{pmatrix}$

= 350 + 600 = 950 No.s

Average Inventory Level = $\frac{\text{Min.Level} + \text{Max.Level}}{2}$

= $\frac{350 + 950}{2}$

= 650 No.s

15.9 NOTES

15.10 SUMMARY

The heart of inventory decisions lies in the identification of inventory costs and optimizing the costs relative to the operations of the organization. Therefore, an analysis of inventory is useful to determine the level of stocks.

Carrying costs includes the costs for storage facilities, handling, insurance, pilferage, breakage, obsolescence, depreciation, taxes, and the opportunity cost of capital.

In the case of subassemblies, or finished products that may be produced in-house, ordering cost is actually represented by the costs associated with changing over equipment from producing one item to producing another. This is usually referred to as setup costs.

The costs that are incurred as result of running out of stock are known as stock out or shortage costs.

15.11 KEYWORDS

- **EOQ:** EOQ is an inventory model that determines order quantity that meet customer service levels while minimizing total holding costs.
- **Fixed Cost:** Fixed Costs are expenses that don't change based on production or sales volumes.

  They include salaries, rent, insurance, etc.
- **Inventory Cost:** Cost recorded upon purchase of inventory is known as inventory cost; includes invoice price less cash discounts plus freight and transportation and applicable insurance, taxes and tariffs.
- **Inventory Holding Costs:** Inventory holding cost is the cost associated with acquiring and retaining inventory including cost of storage space, lost, stolen, or damaged merchandise, insurance, personnel and management costs, and interest.
- **Inventory Management:** Inventory management is the process of ensuring the availability of products through inventory administration.

15.12 ANSWER TO CHECK YOUR PROGRESS

- **Replenishment Level:** When the number of units drops below this specified amount, the inventory level is refilled. That is known as replenishment level.
- **Safety Stock:** The inventory a company holds above normal needs as a buffer against delays in receipt of supply or changes in customer demand is known as safety stock.
- **Set-up Costs:** Setup cost is the cost incurred to get equipment ready to process a different batch of goods.
- **Shortage Costs:** Shortage costs are the costs that fall with increases in the level of investment in current assets.
- **Variable Costs:** Costs that vary directly with the level of activity within a short time are referred to as variable costs. Examples include costs of moving cargo inland on trains or trucks, stevedoring in some ports, and short-term equipment leases.

15.13 SELF ASSESSMENT QUESTIONS

1. Define inventory.
2. Mention the different types of inventory costs. Explain them with a diagram.
3. Write a short note on stock out costs.
4. What are the primary functions of inventory management?
5. What is re-order level?
6. Explain EOQ with an example.
7. Briefly describe EOQ Model with Purchase Discount.
8. What are the Steps for calculating EOQ with purchase discount?
9. Explain fixed order period model with the help of a diagram.
10. What is safety stock and optimum level of safety stock*?*

15.14 REFERENCE

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UNIT-16: INVENTORY CONTROL SYSTEMS

Structure;

16.0 OBJECTIVES

After studying this unit, you will be able to:

- Explain Inventory Control
- Discuss various control systems
- Explain the Process for Inventory Control
- Discuss the latest trends in materials management
- Elaborate on Logistics Management and recent trends in inventory control

16.1 INTRODUCTION

Previous unit dealt with the concept of inventory management, the different costs of inventory and economic order quantity. It also discussed the various inventory models and safety stock. In this unit you will study about inventory control, the various elements of an effective inventory control and its advantages. This unit will also discuss the various analysis systems and give you an insight to the logistics management.

Inventory in common parlance is called stock of any item or resource used in an organisation. Since so much capital is committed to inventory and it affects the delivery of finished products to the consumers, inventory management is an important operation. Inventory management influences several other functions such as operations or production, marketing and finance.

16.2 INVENTORY CONTROL SYSTEMS

An inventory control system is a system that encompasses all aspects of managing a company's inventories; purchasing, shipping, receiving, tracking, warehousing and storage, turnover, and reordering.

An inventory control system is a manual or computerized solution that brings all aspects of inventory management into one cohesive system. Its purpose is to help control your stock in order to hold the least amount of inventory in your warehouses and ultimately improve cash flow and lower holding costs.

Independent v/s Dependent Demand

While studying inventory management, it is important to understand the distinction between independent and dependent demand. Demand can be attributed on the end item or can be attributed to the item itself. The predictions of inventory are based on how demand is attributed. Independent demand is influenced by market conditions outside the control of operations. The demand, in other words, is independent of operations. Finished goods

inventories are spare parts for replacement have usually independent demand. Dependent demand is related to the demand for another item. When a product is made up of parts and components, the demand for these is dependent upon the demand for the final product.

In an automobile company, the demand for cars is an independent demand decided by the market forces and the demand for tyres is a dependent demand decided by the production of the cars. Sales forecast is an essential input to decide the quantity of independent demand. The forecast is adjusted by certain extra quantity. In this chapter we will examine models to take care of the independent demand.

The approach to inventory is based on the demand pattern. Replenishment philosophy is appropriate for independent demand. As the stock depletes, it is replenished. When the inventory starts to run out, an order is placed for more material, and the inventory is replenished. On the other hand, requirements philosophy is employed for dependent demand items. The amount of stock ordered is based on requirements for higher level items. More material is ordered only when required by the need of the end product or higher-level items. Mere depletion would not lead to the order of raw material or work-in-process.

16.3 INVENTORY CONTROL SYSTEMS-TYPES

Two fundamental issues which underline all inventory planning and control systems are:

(i) How much to order or each material when orders are placed with either outside suppliers or production departments in-house.

(ii) When to place the orders (i,e., at what stock or inventory level).

Order quantities (called lot sizes which may be EOQ or otherwise) and when to place these orders, called order points or re-order levels, determine the amount of materials held inventory at any given time.

Selective Inventory Control

Because of the large number of materials used in production at many manufacturing plants, it is desirable to classify materials according to the amount of analysis that can be justified. Selective inventory control means that the method of inventory control varies from item to item and the differentiation should be on a selection basis.

The philosophy behind selective inventory control technique is “to put the efforts where results are worth putting the efforts”. The importance of materials can be due its costs, its consumption value, its criticality, its availability and consumption. A number of selective inventory control technique are used. Exhibit 13.6 lists the selective inventory control techniques, the criteria on which they are based and their main use or application.

The selective inventory techniques listed above are briefly discussed in the following paragraphs.

1. A-B-C Analysis (or Classification)

This is also referred to as "always better control" or Pareto Analysis. A-B-C analysis is a basic inventory control technique which is often the starting point. It can be applied to almost all aspects of materials management such as purchasing, receiving, inspection, storekeeping and issue of materials from stores, verification of bills, inventory control, value analysis etc.

Pareto's Law: Pareto, a German economist who worked out the distribution of income in East Prussia, found that 20% of the people owned 80% of the country's economy. Based on this finding, his law referred to as Pareto's Law states that "In any series of elements to be controlled, only a small fraction in terms of elements will usually account for a large fraction in terms of results". It is also usually, called 80/20 rule. The underlying principle of Pareto's Law is saying "the vital few and trivial many" which applied to many areas of selective inventory control. In inventory management, it may be noticed that usually nearly 20% of the items contribute to 80% of the annual consumption value or value of materials held in stores at any given time. Since the primary objective of inventory control is to reduce costs, 80/20 rule is useful in the sense that we need to focus on only 20% of the total items used or inventoried in order to effect reduction in 80% of the total annual consumption value or value of inventory held in stores (these 20% of the items are the vital few and the balance 80% are trivial many).

Exhibit : 00.0: Selective Inventory Control Techniques

Sl. No	Type of Control	Criteria	Application
1.	A-B-C Analysis (Always Better Control)	Annual Consumption Value of the item.	To Control Inventory of raw materials and W.I.P Inventory
2.	X-Y-Z Analysis	Inventory Value of items in Stores	To review the actual inventories, their uses etc, at scheduled intervals of stock checking

3.	V-E-D Analysis	Critically of the item	To determine the stocking level of spare parts for machines and equipments.
4.	F-S-N Analysis	Consumption Pattern of the item	To control obsolescence
5.	H-M-L Analysis	Unit price of the item	To control purchases and to develop vendors
6.	S-D-E Analysis (scarce, difficult to procure and easy to procure)	Purchasing problems in regard to availability	Lead time analysis and purchasing strategies.
7.	S-O-S analysis (Seasonal Off Seasonal)	Nature of supplies and seasonality	Procurement and holding strategies for seasonal items (agricultural products)
8.	G-O-L-F Analysis (Government, Open Market, Local and Foreign Source)	Source of supply of materials	Procurement strategies

ABC classification further refines 80/20 rule into a classification system using the annual consumption value (i.e., annual consumption quantity of an item multiplied by its unit price) have three classes of items namely A,B and C item. 'A' items generally consist of 10 to 15 percent of the total number of items and contribute for 65 to 70% of the total annual consumption value, 'B' items consist of about 20 percent of the total number and account for about 20 to 25 percent of total consumption value and the balance items categorized as 'C' items consist of the remaining 60 to 70 percent of the total number of items account for 5 to 15% of the total annual consumption value. The more common basis used for A-B-C classification is shown in Box. 00.0 below:

Box 00.0 : Basis for A-B-C Classification		
Class of Item	Percentage of total number of items	Percentage of total annual consumption value
A (Vital few) B (Moderate Importance)	10% 20%	70% 20%

C (Trivial Many)	70%	10%
	Total 100%	Total 100%

Mechanics of A-B-C Analysis

The steps involved in A-B-C Analysis are as follows:

Step 1. Calculate the annual consumption value (ACV) rupees for each item proposed to be used for manufacturing a product by multiplying the number of units used by the unit price of the item.

Step 2.Arrange all the items in the order of descending sequence of annual consumption value.

Step 3. Calculate the cumulative annual consumption value for each item, item-by-item.

Step 4. Compute the cumulative percentage of annual consumption value for each item.

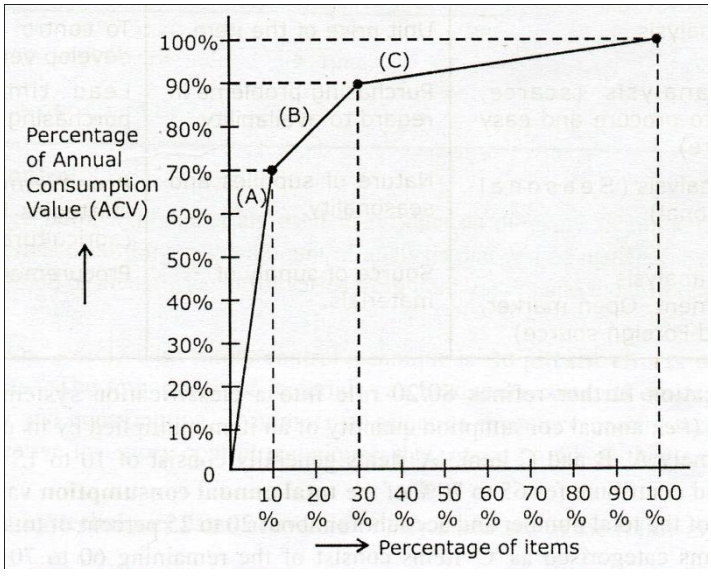
Step 5. Locate the item in the list for which the cumulative annual consumption value is 70% of near 70% of the total annual consumption value. Categories all the previously listed items upto this item as 'A' category items.

Step 6. Locate the item in the list for which the cumulative annual consumption (ACV) is 90% of the total ACV. Categories the items listed after 'A' category items and upto this item as 'B' category items.

Step 7. Categorise the remaining items as 'C' category items.

The ABC analysis graph is illustrated in Exhibit 13.7

EXHIBIT 13.7



2. X-Y-Z Analysis

This classification is based on the value of inventory of materials actually held in stores at a given time (usually during stock checking annually or half-yearly). X-Y-Z analysis helps to control average inventory value by focussing efforts to reduce the inventory of 'X' items which are usually 10% of the number of items stored, but accounting for 70% of the total inventory value. Similarly 'Y' items are 20% of the number of items stored and account for 20% of the total inventory value. The remaining 70% of the items accounting for 10% of the total inventory value are 'Z' items. The X-Y-Z classification is done in the same way as ABC analysis, the difference being the actual inventory value of items in stores instead of their estimated annual consumption value.

3. V-E-D Analysis

'V' stands for vital, 'E' for essential and 'D' for desirable. This classification is usually applied for spare parts to be stocked for maintenance of machines and equipments based on the critically of the spare parts. The stocking policy is based on the critically of the items. The vital spare parts are those which can cause stoppage of the plant if not available. Usually such spare parts are knows as capital or insurance spares. The inventory policy is to keep at least one number of the vital spare irrespective of its value. Also, spare parts to be supplied by foreign manufactures are treated as 'Vital spares because of the long lead time required for procurement. Essential spare parts are those whose non-availability may not adversely affect production. Such spare parts may be available from many sources within the country and the procurement lead time may not be long. Hence, a low inventory of essential spare parts is held. The desirable spare parts are those which if not available can be manufactures by the maintenance department or may be procured from local suppliers and hence no stock is held usually.

4. F-S-N Analysis

It stands for Fast Moving, Slow Moving and Non-Moving items. The classification is based on past consumption pattern. Items which are usually drawn from stores frequently are classified as fast moving items, items which are drawn only once or twice a year are classified as slow-moving and items not at all drawn for the past two years are classified as non-moving items. F-S-N analysis is useful to control obsolescence of raw materials, components, tools and spare parts.

5. H-M-L Analysis

This stands for High Value, Medium Value and Low Value items based on unit price of the item. For instance, a firm may decide to categorise items having unit price more

than Rs 5000 as 'H' items. From Rs 1000 to 5000 as 'M' items and below Rs 1000 as 'L' items. On this basis, materials management may delegate authority to various levels of purchase officers/managers to authorize and sign purchase orders. Also, for high value items, alternative sources of suppliers are developed.

6. S-D-E Analysis

This stands for Scarce Items, Difficult to procure items and Easy to Procure Items. A scarce items is one which is not easily available in the market and reliable source may have to be developed. For ex., imported items may have to be stocked because it is difficult to procure and takes long lead time.

7. S-OS Analysis

'S' stands for Seasonal items and 'OS' stands for Off-Seasonal items. It may be advantageous to buy seasonal items at low prices and keep inventory of buy at high price during off seasons. Based on the fluctuation in prices and availability, suitable decision has to be taken regarding how much to purchase and at what prices.

8. G-O-L-F Analysis

This stands for Government, Open Market, Local or Foreign source of supply. For many items, imports are canalised through government agencies such as State Trading Corporations, Mineral and Metals Trading Corporation, Indian Drugs and Pharmaceutical etc.

For such items the buying firms can not apply any inventory control techniques and have to accept the quota allotted by the Government. 'Open market' category are those who form bulk of suppliers and procurement is rather easy. 'L' category includes those local suppliers from whom items can be purchased off-the-shelf on cash purchase basis. 'F' category indicates foreign suppliers. Since an elaborate import procedure is involved, it is better to buy imported items in bigger lots usually covering the annual requirements.

16.4 INVENTORY CONTROL SYSTEMS FOR DEPENDENT DEMAND ITEMS

Dependent Demand Inventory: Materials Requirement planning (MRP)

In a manufacturing organization, inventory management is very complex in view of the numerous products, processes, parts and uncertainties. Priorities keep on changing. The demand is erratic. Still, managers do not give up. They use a computerized planning and control system called materials requirement planning (MRP). Even service organization such as restaurants, hospitals, power generating companies can also benefit from the use of

MRP.MRP is most valuable in companies employing assembly operations and least valuable in fabrication industries. MRP is moderately useful in process industries.

Basic Elements

MRP consists of four basic elements;

(1) The master production schedule which drives the MRP.

(2) The bill of materials (BOM) or product structure file.

(3) The inventory status file which carries the necessary data.

(4) The MRP software package that contains the necessary logic.

We shall examine all these four elements or files one by one.

Master Production Schedule

It deals with the end items or output of the production function. All future demand for work-in-process and raw materials are dependent on the master schedule. Past demand does not always get extension is future. And this is kept in main while planning for raw materials and work-in-process.

Master schedule allows management to control customer service, Inventory level and manufacturing costs. Master scheduling is delegated to a cross-functional team.

Aggregate plan indicates general operational range. Master schedule specifies exactly what is to be produced. Their decisions have interface with other functional areas of business. First trial master production schedules are run through an MRP programme. The planned order releases generated are the detailed production schedules. They are checked to ensure the availability of resources and reasonableness of completion time. Master schedule feasibility is thus checked. Sometimes it can be resource-hungry after product explosion. It then requires modification. MRP programme is then run again.

The parts explosion process assumes that master schedule is fusible with respect to capacity. Master schedule is an input for parts explosion to produce shop orders and purchase orders. The shop orders are put into a capacity planning routine and checked by materials planner to determine the availability of sufficient capacity. If it is not available, either capacity or master schedule is not feasible.

Master schedule should not be inflated and should reflect realistic capacity constraints. Inflationary schedules expect more output under pressure which makes order due dates invalid, thus breaking down the system.

The following diagram illustrates the aggregate plant and the master production schedule for bedsteads.

Month	1	2
Bedstead Production	800	850

	1	2	3	4	5	6	7	8
Type I	200			350		150	100	
Type II		100	75		125		100	
Type III			75			175		200

Fig. 16.1 The Aggregate plan and Master Production Schedule for Bedsteads

In the upper portion of the diagram, the aggregate production plan of bedsteads by weeks has been given. The lower portion shows a master production schedule classifying the bedsteads and the quantity planned by week. This will be followed by an MRP programme. Master production schedule is the starting point for the disaggregation process. It states how many and when each of the bedsteads are required.

Bill of Materials (BOM): It is already discussed in previous units

MRP Computer Programme

This programme work on the inventory file, the master production schedule and the BOM file. MPS provides a list of end item in specified time period. BOM describes the material and parts need to make each item. The stock position is shown by the inventory file. The MRP programme accesses the segments of the inventory file, and the same time redress to the BOM to compute the quantities of each item required. This figure is corrected by taking into consideration the on-hand amount. The net requirement is offset or setback in time is factor in the for acquisition of the material. The BOM and inventory files of the company may require modification to suit the MRP system.

The MRP programme may ignore the capacity constraints, in which case the capacity is balanced by the master schedule manually, the output is examined in terms of feasibility. The MPS is adjusted with correct imbalances. The programme is run again. This process is

reiterated till the output is acceptable.There can be multiple master schedules, for each major product line and they compete for resources. As a whole, they have to optimize resource utilization and due dates for the system as a whole.

Output Reports: MRP accesses the BOM, MPS and inventory file, and generates a wide variety of reports. These are classified as primary and secondary reports.

Primary Reports: these are the usual reports for production and inventory control such as planned orders to be released, order release notices to execute the planed orders, changes in due dates to accommodate rescheduling, cancellations or suspensions on MPS and inventory status data.

Secondary Reports: these could be planning reports for inventory forecasting performance reports to point out inactive items, and to determine lead times – actual and programmed and quantity usage and cost – actual and programmed and exception reports to point out discrepancies.

As MRP has expanded into MRP II, there are several additional reports.

Net change System: It is a form of MRP where charges can be made as they occur on a real time basis. Here constant updation of the system is called for. It is preferred to a regenerative MRP system. Net change systems however are 'nervous sometimes because of constant order changes. Suppose a customer cancels an order for week two, consequently leading to cancellation of all purchase orders (Pos) and shop orders. Suppose another customer enters the scene and places and exactly similar order for week tow. There is immediate addition of Pos and shop orders into the schedule. This is what is known as the nervous system.

Net change systems can be modified to respond to unplanned or exceptional occurrences.

Master production schedule (MPS) is at the top of the diagram. It is determined by the customer orders, aggregate production planning and forecasts of demand. The MRP programme is at the heart of the system. It is driven by three inputs- MPS, BOM and inventory records. There are two types of outputs – purchase orders going to the vendors and shop orders going to the factory. Before the execution of the shop orders, it is checked whether sufficient capacity is available. If so, the shop orders is placed under the control of the shop floor control system. If the capacity is not available, a change must be made in the capacity or the MPS through the feedback loop shown. The orders under shop floor are monitored to make sure they are completed on time.

The above diagram represents an MRP system to control inventories and capacity.

Through computerized inventory system were in use for years, they were independent of the scheduling system, MRP links them together. It creates specific schedules to identity the specific parts and materials acquired to produce the end items, the quantities needed and the dates when orders for these materials should be released or be received or completed within the production cycle.

16.5 TRENDS IN MATERIALS MANAGEMENT-ERP, SAP 4HANA etc.

ERP

Definition of enterprise resource planning (ERP)

Enterprise resource planning (ERP) is defined as the ability to deliver an integrated suite of business applications. ERP tools share a common process and data model, covering broad and deep operational end-to-end processes, such as those found in finance, HR, distribution, manufacturing, service and the supply chain.

ERP applications automate and support a range of administrative and operational business processes across multiple industries, including line of business, customer-facing, administrative and the asset management aspects of an enterprise. ERP deployments are complex and expensive endeavors, and some organizations struggle to define the business benefits.

The main purpose of an ERP system is to increase organizational efficiency of an organization by managing and improving how company resources are utilized. Improving and/or reducing the number of resources necessary without sacrificing quality and performance are keys to effectively improving business growth and profitability.

ERP systems typically cover all aspects of business operations and commonly provide:

- An integrated system
- Common database
- Real-time operation
- Support for all applications/components
- Common user interface across application/components
- On-premise, cloud hosted, or SaaS deployment

ERP software has the ability to collect and compare metrics across departments and provide a number of different reports based on roles or specific user preferences. The data collected makes finding and reporting on data faster and gives a complete view of business performance with complete insights on how resources are being spent.

ERP synchronizes reporting and automation by reducing the need to maintain separate databases and spreadsheets that would have to be manually merged to generate reports. This combined data collection and reporting offers valuable insight, such as where to cut costs and streamline processes, providing the information to make real-time business decisions.

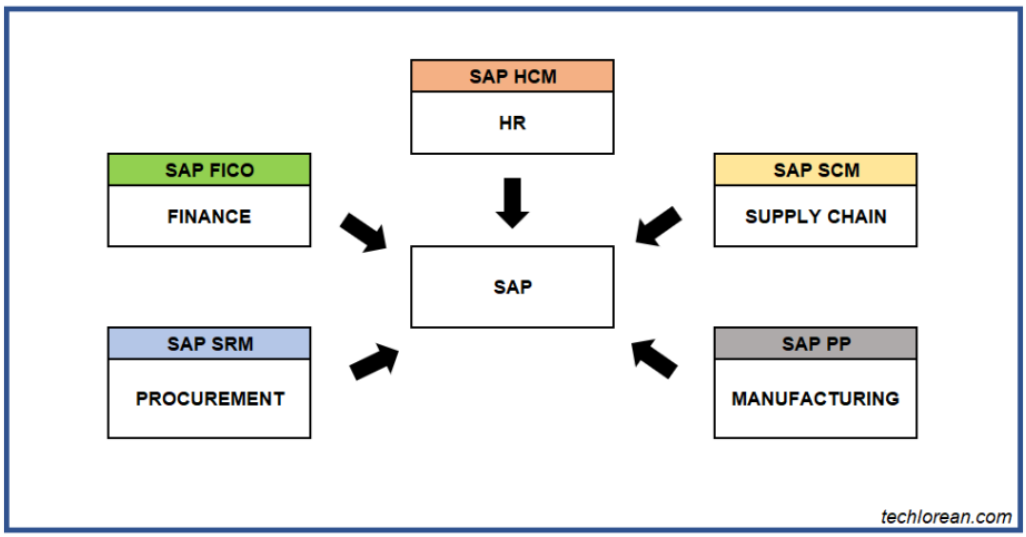
SAP

SAP is one of the world's leading producers of software for the management of business processes, developing solutions that facilitate effective data processing and information flow across organizations.

SAP means "Systems Applications and Products in data processing".

SAP ERP –Nature

SAP is considered as an ERP System but given the advancements in technology, it is no longer just a basic ERP system that integrates several processes into a single system. From research, it is evident that technologies such as machine learning, artificial intelligence, and even internet of things can be integrated or added to create a next generation ERP system. Today, there are cloud platforms, robotic process automation, predictive analytics for analysis, and more to enable even greater business efficiencies.



The SAP ERP system is often arranged in a three-tier, client-server architecture. This set up is recommended because it enables flexibility and increased scalability. The three tiers used by the SAP ERP software include: the presentation tier, the application tier and the database tier. The presentation tier provides the user with the SAP graphical user interface (SAP GUI). The SAP GUI can be installed on any computer that use Microsoft Windows OS

or Mac OS. The SAP GUI is the point of communication between the user and the SAP ERP system.

The application tier is the core of the SAP ERP system. This tier is responsible for processing client transactions, executing business logic, running reports, monitoring access to the database, printing jobs and communicating with other applications. The database tier is where both the business generated data and SAP application programs are stored. When working together, the application tier will receive the input and then send the information to the presentation tier. The presentation will display the output in the SAP GUI. This data is then stored in the database tier.

All processes that are started or stopped within the SAP ERP system are called SAP instances. Each instance possesses a dispatcher and various work processes. The dispatcher allocates tasks to one of the work processes. The SAP ERP system has different work processes to match with different tasks. These work processes include:

- dialogue work processes for managing online transaction requests from users;
- update work processes that perform updates in the database;
- spool work processes, which enable printing in the SAP system;
- batch work processes that process any background jobs scheduled in the system; and
- gateway work processes, which enable communication between applications, such as between SAP R/3 and SAP R/2.

While the SAP ERP system can contain several application instances, there must always be one special, central instance (CI). The CI has two components: the message process and the enqueue server. The message process establishes communication between the application instances in the SAP system. The enqueue server manages locks on the database tables.

Beyond this breakdown, there are several application modules that make up the SAP ERP system. Each module is designed to accommodate the SAP application programs and specific business data related to a particular area of business.

SAP HANA:

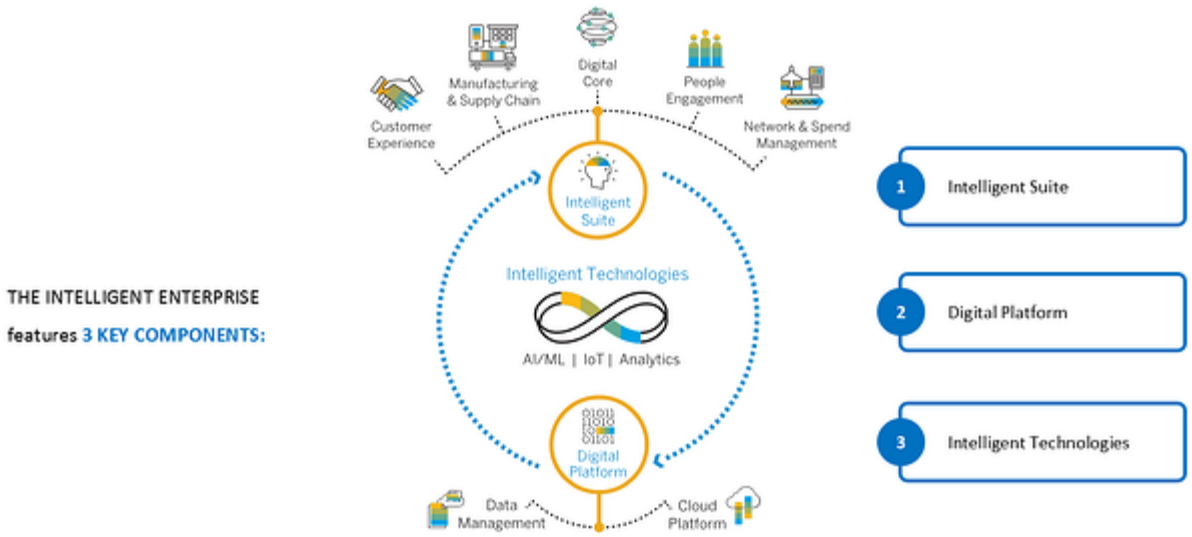
In the year 2010, SAP released its game-changer in-memory database, SAP HANA, designed to support high volume of data and allow real-time analytics. This SAP HANA database has become the foundation and technology platform for their cloud computing strategy with SAP Cloud Platform (SCP).

SAP HANA's new abilities also led SAP to redesign completely its ERP to provide their customers with the first ever Intelligent ERP:

SAP S/4HANA.

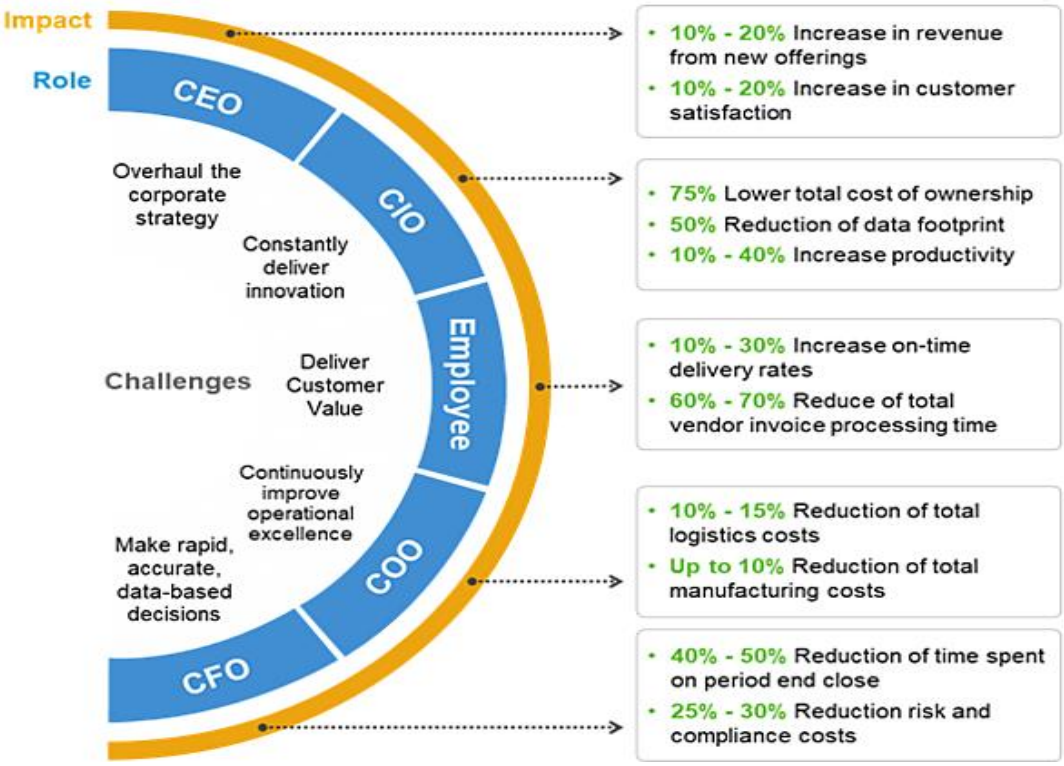
Intelligent Enterprise is about Business Strategy that allows rapid data transformation into Insight or predictive analytics. It's about nurturing the process automation, innovation, and optimal experiences.

There are several types of ERP Solutions. SAP S/4HANA is developed to answer and fit the industry specific needs it serves. Whether it's financial, purchasing, production or inventory management, S/4HANA will guide you in making informed decisions at any time. SAP S/4HANA is the leading technology built for innovation as it takes advantage of the many benefits of the industry 4.0.



To Improve productivity and profitability both through **process optimization** and **innovative solutions**. To have access to an Intelligent ERP (S/4HANA) and to the whole SAP products portfolio designed to fit business needs.

Some of the Key Business Benefits of SAP Intelligent ERP have been measured and summarized in the info graphic below:



CHECK YOUR PROGRESS

1. Define Logistics Management:
2. What is Point-of-Sale?
3. Define Reordering
4. What is RFID?
5. Differentiate between SDE Analysis and VED Analysis

16.6 NOTES

16.7 SUMMARY

Inventory management involves making decisions on the appropriate level of inventory to keep on hand. Too much inventory can increase storage costs and the chances of spoilage. Reordering is done by factoring in the demand and the lead time required to get the order filled. Businesses must maintain a minimum inventory level as a buffer to prevent shortages. Radio frequency identification tags, or RFIDs, can be used to track and protect valuable inventory.

VED–vital, essential and desirable is used primarily for control of spare parts. The spare parts can be divided in to three categories vital, essential, or desirable—keeping in view the criticality to production. The SDE analysis is based upon the availability of items and is very useful in the context of scarcity of supply. In this analysis, S refers to scarce items, D refers to difficult items which are available indigenously but are difficult items to procure, E refers to items which are easy to acquire and which are available in the local markets.

FSN analysis is based on movement of items in the store house. The items are classified as Fast moving (F) slow moving (S) and Non-moving (N). XYZ analysis is one of the basic supply chain techniques, often used to determine the inventory valuation inside a store. It is also strategic as it intends to enable the Inventory manager in exercising maximum control over the highest stocked item, in terms of stock value.

Logistics involves the coordination of the movement and storage of inputs and outputs in order to satisfy customer demand in the right place at the right time at the lowest cost.

16.8 KEYWORDS

- **ABC Analysis:** The classification of items in an inventory according to importance defined in terms of criteria such as sales volume and purchase volume is known as ABC analysis.
- **FSN Analysis:** FNS analysis divides the items of stores into three categories in the descending order of importance of their usage rate.
- **Inventory Control:** Supervision of the supply and storage and accessibility of items in order to insure an adequate supply without excessive oversupply is known as inventory control.
- **Inventory Receipt:** The receipt of products at a fulfillment center is known as an inventory receipt. Products are either expected and recorded in expected inventory records, or received ad hoc.

16.9 ANSWER TO CHECK YOUR PROGRESS

1. **Logistics Management:** The coordination of various organizations and functions to source, procure, and deliver goods to the client is known as logistics management.
2. **Point-of-Sale:** In an establishment that sells goods or services, the location at which payment for goods is made is known as point of sale.
3. **Reordering:** Rearranging the order of items in a compound document. Items in a compound document are typically numbered sequentially in ascending order is referred to as reordering.
4. **RFID:** Radio frequency identification systems that use transponders to transmit significant amounts of data to a receiver; often used as part of a real-time locator system.
5. **SDE Analysis** is based upon the availability of items and is very useful in the context of scarcity of supply and **VED Analysis** is the Analysis for monitoring and control of

stores and spares inventory by classifying them into 3 categories viz., Vital, Essential and Desirable.

16.10 SELF ASSESSMENT QUESTIONS

1. What do you understand by inventory control?
2. What are the Elements of an Effective Inventory Control?
3. Discuss the advantages of inventory control.
4. Explain the Procedure for Setting up an Effective Inventory Control.
5. Briefly discuss V.E.D. Analysis.
6. Explain the concept of S.D.E. Classification.
7. Explain F.S.N. Analysis.
8. Why is X.Y.Z. Analysis used?
9. Explain Logistics Management & its link with Inventory Control.
10. Write a note on inventory classification techniques.

16.11 REFERENCE

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