UNIT-6

Elements of Purchasing

Learning Outcomes

By the end of this unit the learner will be able to:

- ✓ Describe the Elements of Purchasing
- ✓ Understand the Material Purchasing System
- ✓ Discuss the Role of Warehouses or Stores in construction management.

Unit 6

Elements of Purchasing

Introduction

To maintain uninterrupted supply of materials of construction, organisations need to set up purchasing and procurement departments to manage the process efficiently. An essential component of such procurement and purchasing process is to have an efficient store management system for the effective management of materials and spare parts flow for producing the desired product at a relatively low cost. The main purpose of this unit is to familiarize the reader with the processes involved in material procurement and purchase and developing effective storage systems and procedure for managing materials at the stores.

Elements of Purchasing

The main objective of purchasing is to ensure the availability of all ingredients for a project from start to finish without interruption. Purchasing high quality items at a low price ensures that the final product will be of a high quality and cost less. The purchasing function must be carried out using prescribed procedures such that items are of the highest quality, sourced from the right source at the right price, obtained at the right time in the right quantity using the right mode of transport and delivered to the right place.

Below, figure 9.1 provides details of some of the important elements of purchasing.

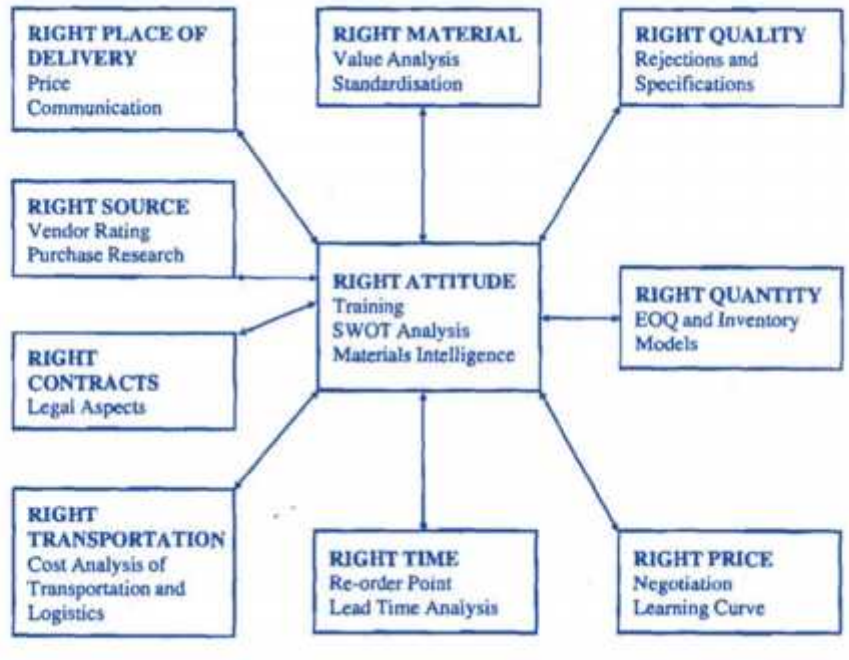


Fig: 9.1 Element of purchasing

Right Source

Firstly, value analysis techniques should be used to locate the right materials and the cost of transporting the items should also be considered in arriving at the right source. The source should be reliable and have the capacity to deliver uniform and high quality materials. Experience shows that the cost of transporting certain materials such as aggregates is usually higher than the cost of the material. Decisions must also be made on whether or not to obtain materials or items directly from the manufacturer or from a secondary source.

Right Price

Generally speaking, it is advisable used guidelines to determine the right price of the items using the cost structure of the item. Usually, the tender system can be used with emphasis on the lowest reliable bidder, to select from an array of competing bidders. In some other cases, the negotiation approach may be best.

Right Quality

Specification benchmark obtained from indents can be used to measure the quality of items. Indents come with drawings which are also useful in determining quality levels.

Right Time

The purchasing manager is responsible for reducing lead time for purchasing items. This is usually facilitated by having prior knowledge of lead time information for all items and taking practical steps to reduce the time it takes to place the order until it arrives and become ready to be used (i.e. the lead time). Provision should be made for emergency situations, such as an interruption in the delivery process due to floods or labour strikes. This implies making a rush purchase or buying more than what is needed but this must be considered carefully and only in emergency situations.

Right Quantity

Guidelines provided by techniques such as economic order quantity, fixed period or fixed quantity option could be used to procure the right quantity of items. Equally important is the experience and knowledge of the purchasing manager. In making the purchase, the buyer should consider discounts, the price structure, the relationship with the supplier, and the quality of items.

Right Place

This refers to the correct place to receive delivery. Terms and conditions of purchasing should clearly state the delivery address and the mode of delivery with other extra specified. Conditions such as FOB (Free on Board), CIF (Cost, Insurance and Freight) and FOR (Free on Rail) are usually offered by the suppliers as part of the terms and conditions of service.

Fundamental Objectives of Purchasing

i. Maintaining
ii. Minimizing
iii. Prevent duplication
iv. Maintaining proper quality standards
v. Obtain valued for money in terms of obtaining lowest price items at the highest quality and functionality
vi. Helps to maintain organisation's competitiveness by purchasing materials at reduced prices.

Materials Purchasing System

The costs of purchasing material may range from a few thousand to millions of pounds, depending on the nature of operations. To ensure ease of operation and accountability formalised systems and procedures are made available to handle such vast complexity of procuring and purchasing of items. Procedures normally involve starting the purchase process, choosing suppliers, placing orders, following up on the orders, and receiving the materials. The subsequent section will elaborate on the "material procurement cycle," from indenting to dealing with issues.

Indenting

Typing mistakes should be avoided when preparing purchase orders. All terms and conditions must be included in the purchase order and copies forwarded to the user, the store and the accounts departments. The process for preparing purchase order can be lengthy but an indent could be prepared and will usually consist of the following:

- Name of the item
- Description of the item
- Item code (if it is a standard item)
- Quantity of the item
- Specifications
- Date/time by which the item is desired
- End user department's name and location where the item is desired or is to be delivered
- Indent originator's name (for coordinating delivery or for clarifications)
- Other related information, if the item is budgeted
- Signature of the authority for normal procurement, and/or signature of senior management personnel, if it is not budgeted

Enquiry Stage

During this stage, the buyer's request or preliminary order is sent to vendor for prices to be quoted for each item and returned to the buyer. The process consists of:

- Name of the item
- Description of the item
- Quantity of the items
- Time till which the offer is to be valid
- Specifications
- Date/time by which the item is desired
- End user department's name and location where the item is desired or is to be delivered
- Standard terms and conditions which the company follows and desires for its vendors to accept these conditions regarding insurance, warranty and guarantee expected, payment details, mode of transportation, point of transfer of goods from vendor to company etc.

Offer Processing Stage

Incoming offers are compared with the buyer's own ideal benchmark listings, the expected terms and conditions and the pricing, on and fair and objective basis. The ideal offer may be transmitted to the vendor during the early stage with details of the buyer's expectations.

Determining the best offer may be difficult because:

i. Someone may have agreed to all terms and conditions but the price could be too high
ii. A vendor's price may appear quite low because he may have excluded some extras such as cost of transportation and/or insurance
iii. Other vendors may quote low prices but may have imported the materials from a company or country which does not have a service centre in UK or at the location of final delivery

Since this stage is primarily for comparison purposes, the buyer may have to request for re-quote or he has to recalculate the implications of the results of the cost factors until satisfactory results are obtained. Negotiating with vendors is another option to consider.

Ordering Systems

The Purchase Order (PO) is immediately drafted when the right supplier has been chosen. Given the legal nature of this document which is binding on both parties, it is critical to renegotiate and clarify issues until the terms and conditions are completely accepted by all parties entering into the agreement. Typing mistakes should be avoided and all terms and conditions included. The relevant departments, such as the user, stores, and accounts departments should be sent copies of the final agreement. To optimize purchase orders due to the complexities involved, certain criteria, frequently used and minimum value items may be excluded.

Typical purchase order contains the following:

- The order number, serial number and date of order
- The name and address of the ordering company
- Consignee's name and address
- General terms and conditions of order
- Description of goods, its specifications and quantities
- Supplier's quotation reference and any other correspondence or MOM (Minutes of Meeting)
- Pricing terms and its billing terms
- Payment terms
- Delivery date and schedule
- Packing instructions
- Transport instructions
- Freight payment terms
- Insurance terms
- Warranty and guarantee term,
- Cancellation provisions and damage relating to liquidity clauses
- Incoming inspection details and removal of rejections
- Bonus for early despatch or zero rejections etc.
- Other special terms and conditions

Ordering system may vary depending on the methods used to arrive at the final document. When creating purchase orders, the following methods are usually considered:

Cash Purchase

The usual method of preparing purchase orders are not followed because it is too time-consuming or overly expensive. Instead, a senior executive makes available emergency cash to purchase items critical to the progress of the project from suppliers in the marketplace.

Tender System

This method of procurement is prevalent in the private sector. The objective of this tender system is mainly to encourage fair and competitive pricing and to discourage favouritism or nepotism in procuring items. Nepotism usually occurs when the terms and conditions or the specifications seem to favour one particular vendor. Loading is done to eliminate nepotism by comparing all advantages and disadvantages of purchasing a specific item from vendors in terms of cost and productivity. For instance, a machine which is more expensive may be many times productive that a less costly one. Detailed specifications would ensure objectivity and eliminate suspicion of nepotism.

There are 3 methods of tendering to choose from:

i. Open tender
ii. Limited tender
iii. Single tender

Open Tender

The process begins with the publishing of Notice Inviting Tenders (NITS) in major newspapers and Trade Journals. The tenderers are expected to purchases the tender documents which contain the terms and conditions, as well as the specifications of the project. There is also an option to submit a technical or commercial bid during the process. Tenderers are expected to provide quotes and meet all contractual obligations or a certain minimum technical specification with regards to the terms and conditions. If any deviations occur in the quantity of supply or with the terms and conditions, then this would have to be discussed to arrive at an agreeable solution.

Costly items with high technological content which require global tenders are financed by international financial institutions like the IMF (International Monetary Fund). To ensure a smooth tender process, clear and simple language must be used for this type of tendering. Also, a comprehensive checklist should be prepared before embarking on this global order.

The main problem present by the open tender method is that of the 'rogue bidder' who quotes very low prices to win the contract only for him to attempt to renegotiate terms for an increase in payment once the buyers have committed a lot of investment to the project.

Limited Tender

This type of tender is designed to solve the 'rogue bidder' problem. It requires having a limited number of bidders who meet certain pre-defined specifications. Precautions must be put in place so that genuine bidders are not disqualified or the criteria for qualification do not favour one particular bidder. Limited tender produces reduce lead times.

Simple Tender

This type of tender is ideal for proprietary items but should be avoided to prevent unfair pricing or blackmail. It may, however, be useful when frequent repeat orders are required in order to reduce lead time during contract negotiations.

Rate and Running Contract

This type of contract is used by centralised procurement agencies or stores to buy items from one or more contracted sources. Items are normally procured for a fixed period at a fixed rate. Running contract is a type of rate contract which has flexible period of validity of about ± 25%.

Having more than one source of supply ensures competitive pricing and prevents disappointment of shortage of supplies. Other branches of a particular company may benefit from the fixed rate contracts by

purchasing at the fixed rate when the company uses centralised purchasing approach. This saves lead time and results in reduced pricing due to large orders across the organisation.

Subcontracting

Here contracts are awarded at fixed rates to a few selected sources to a few selected sources to supply items to the buyer. This method ensures that suppliers reserve capacity for the order and produce high quality items at short notice.

System Contract

With this type of contract, the buyer allows the supplier to plan for the materials so that the supplier immediately suppliers more items when the re-ordering period approaches. This frees up time for the buyer to concentrate more on expensive and vital items. The buyer normally provides consumption specifications to the systems contractor.

The main disadvantage includes third parties being privy to company information which could have serious security implications. Another disadvantage is that since the buyer does not have control, it becomes difficult to regain control when the need arises. Defects in product quality may creep in and become unnoticeable after a long time.

The objectives of the system contract include:

- Simplification of ordering procedures
- Improving stocking of repetitively used materials
- Reducing administrative expenses
- To maintain adequately controlled service levels
- To improve profitability of both buyer and seller, and, at the same time, inspires more confident relationship between them.

Stockless Purchase

The buyer informs the vendor about quantities of items to purchase and the supplier constructs a supply facility on the site to provide the consumer with as much items as he wants based on agreed rates which is slightly high due to vendor installing stock facility on-site. The main advantage is having zero load time with minor or no paperwork by the buyer. The disadvantage of this system is the tendency for monopolising business by the vendor which could lead to hikes in prices.

Blanket Order

Blanket Orders are used to purchase low priced items or MRO (Maintenance, Repair, Operations) items. The order is usually time dependent and requires the order to cover periods of up to a year for a fixed price or using other pricing mechanisms. The advantage of such a system is that it avoids increasing prices associated with repeated ordering. It places servicing responsibility on the supplier and frees up time for the buyer to undertake more critical work.

Seasonal Buying

Some items are produced only seasonally and have to be purchased ahead of time or due to shortage of storage space, the buyer is currently unable to keep stocks of some of these items. This approach is also adopted when prices are expected to become unstable at the time the buyer may be ready to purchase them to use.

Receipt of Materials, Transportation and Inspection

Where planning and commitment of delivering items are not strictly adhered to, it becomes critically important to chase or follow up the orders. Tax and insurance forms have to be obtained and completed while the goods are in transit. This also calls for regular coordination between all concerned parties to ensure orders are delivered in the right conditions and on time.

Inspection of incoming items is done for quality verification. The quality of an item is defined in terms of:

- Dimensions and/or weight,
- Physical and/or chemical properties,
- Design and/or performance characteristics,
- Surface textures,
- Aesthetic values,
- Packaging characteristics,
- Defectives allowable, and
- Service and/or operating characteristics.

Quality can be measurable or immeasurable. Agreed universal standards should be used in determining the quality of an item and there should be no ambiguity in the item specification. Items could be unambiguously described using:

i. Colour
ii. Surface finishes
iii. Lacquer or vanish
iv. Thickness or size

To ensure quality procurement, organisations should:

i. Set quality standard
ii. Compare performance of products with standards
iii. Take action to correct defects
iv. Provide plan for continuous improvement

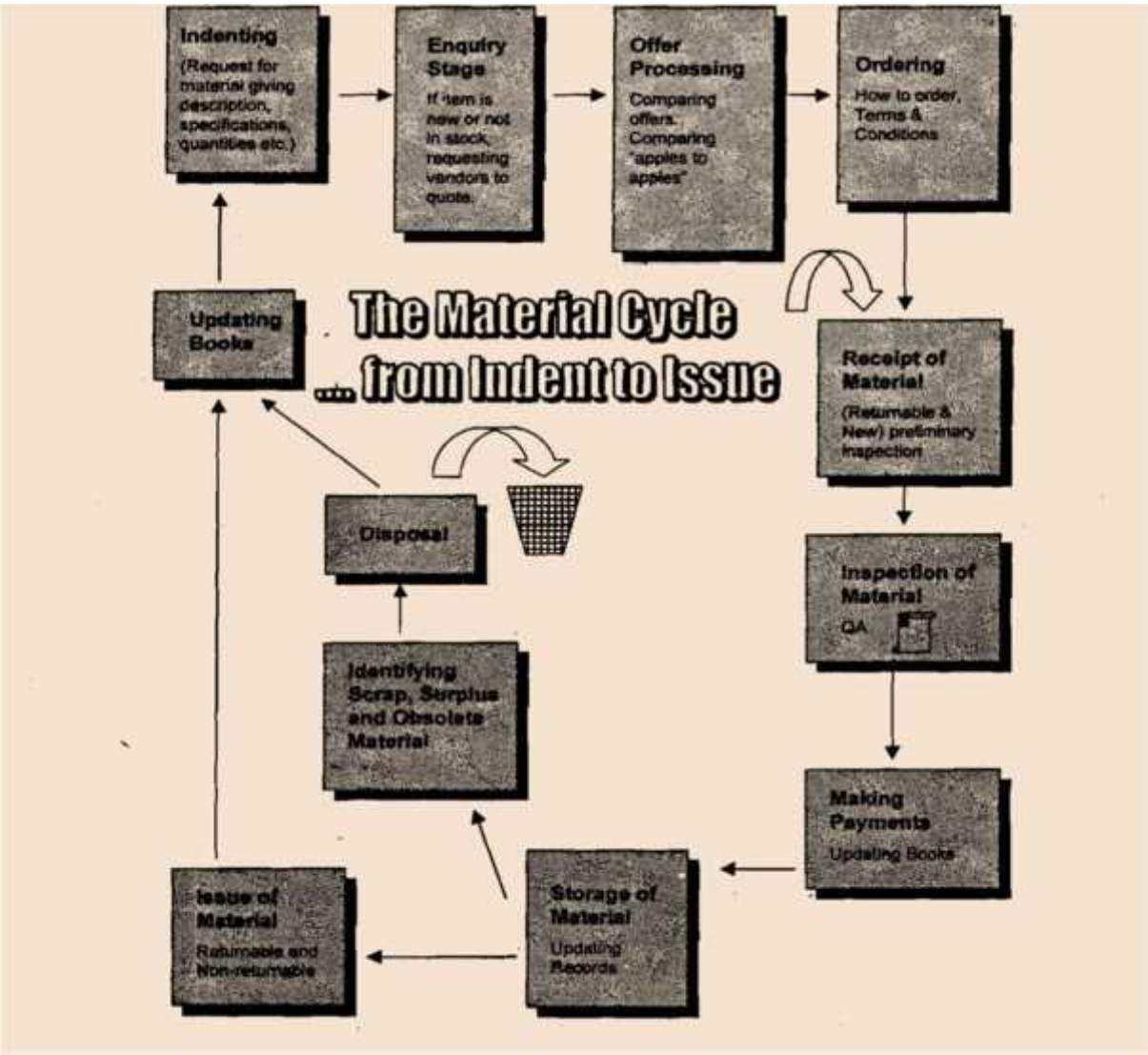
Communication channels to concerned parties can be improved through regular quality inspection.

Material Procurement Circle

When items pass quality checks, they are dispatched to the warehouses or stores for storage. The end-use department may request for the item following store system procedures. All stages in the material purchasing system can be classified as a " Material Procurement Cycle" as shown in figure 9.2.

Figure 9.2 shows this Material Procurement Cycle initiating from indenting materials to issues with the items.

Fig 9.2



Material procurement cycle

Warehouses or Stores

Stores and warehouses are critical components of the whole construction project. The use department interacts with the stores on daily basis to request for materials. Having a store or warehouse prevents undue interruption to the flow of work on the site. Since items stocked at the stores cost lots of money, they are often regarded as capital asset or money.

Function and Objectives of Stores

The general definition of as store is simply where materials are kept to be used later during the course of construction. A store can be defined as a place for:

- Receiving raw materials, components, tools, equipment and other items and account for them
- Providing adequate and proper storage and preservation to the various items
- Meeting the demands of the user departments by proper issues and account for the consumption
- Minimizing obsolescence, surplus and scrap through proper codification, preservation and handling
- Highlighting stock accumulation, discrepancies and abnormal consumption and evolve effective control measures
- Ensuring good housekeeping so that material handling, material preservation, stocking, receipt and issue can be done adequately
- Assisting in verification and provide supporting information for effective purchase action

Location and Layout of Stores

The option available to choose from include centralised, decentralised or a mixture of the two depending on a range of factors. Centralised stores are used when there are several projects occurring in different places. Decentralised stores are normally sited close to the project site. There may also be more than one decentralised store specialising in providing different types of components (e.g., items having electrical or mechanical aspects). Sometimes a mixed concept of centralised and decentralised type may be employed depending on the nature of the project and site location.

Factors that determine the choice of centralised or decentralised stores are as follows:

i. Fast-moving items: these items require a decentralised store since the items are fast-moving
ii. Cost of item: centralised store are most suitable for storing very expensive items provided they are not fast-moving
iii. Special storage facilities: centralised store is also suitable for items requiring special storage facilities to avoid high cost of storage
iv. Commonality of requirement of item: when many projects are underway and required the same type of item, it is best to keep the items in a centralised store
v. Transport cost: decentralised store close to the site is ideal for receiving items which cost a lot to transport
vi. Cost aspects: all associated cost of purchasing materials should be duly considered before determining the type of storage to use
vii. Life of the item: ideally store on site (decentralised store) to prevent likely delays in transit

Location Determinants of Stores

i. Nearness to work site with the central store keeping high valued items
ii. Environmental consideration so that storage of certain items which may pollute the surroundings are located away from residential communities
iii. Ready availability of transport infrastructure
iv. Facility should be flexible enough to expand and provide good working environment

v. Cost of transport, storage an actual store at the selected location must be carefully evaluated
vi. Frequently used items are best stored close to the site to reduce travel distance to procure items
vii. For projects involving deadly substances, there must be health facilities close by

General Criteria for Layout of Stores

i. The design should make for easy identification of items
ii. Stored items should be easy to retrieve from the facility
iii. Design of layout should allow free movement of people and equipment
iv. Layout should facilitate preservation of materials from dust, moisture, chemicals etc.
v. Excellent lighting system
vi. Layout must make provision for effective fire-fighting
vii. Space should be available for toilet, maintenance and repair areas, safe wiring systems etc.
viii. The most economic layout should be arrived at after extensive analysis of alternative designs
Height of store must provide sufficient space to aid vertical movement:
ix. All major functional areas should be properly marked out and labelled. Areas for bulk storage, inspection section, receiving bay should all be clearly identified.
x. Racks, pigeon holes, bins are suitable for individual items
xi. It is best to fix the racks to the walls. Alternatively you may use revolving racks with castors
xii. Secure locking systems should be provided for expensive items
xiii. Ideally, trucks and lorries should be packed against the wall of the receiving bay to allow for easy loading and unloading of items using suitable ramps
xiv. Large doors and sufficiently-spaced columns are best
xv. High security measures should be in place
xvi. Security personnel should be present to prevent theft and store facility should be close to a police station
xvii. Excellent communication between departments concerned with storage issues should be encouraged for seamless operations
xviii. Training should be provided to personnel on how to use fire-fighting equipment effectively

Preservation of Stores Material

Preservation to improve profit involves the following procedures:

i. Economic aspects: if cost of preserving material is close to the cost of purchasing of the materials, it would be best to discard that particular method of preservation. The cost of preserving or not preserving should be adequately weighted.
ii. Period of idleness of the part: short and long term methods exist for determining idleness of parts

iii. Condition of the spare part or material: effort should not be wasted to preserve materials which will not last long or may have deteriorated beyond repair and would cost more to preserve
iv. Effectiveness of preserving method: when method only gives a marginal improvement in the life of the material it would not be economical to preserve the material.

Some preservation techniques

i. Greasing bearings and pacing in grease proof paper
ii. Keeping expensive instrument in their boxes with moisture absorbing silica
iii. Keep electronic equipments and cards in static bags to prevent damage from electric shock charges. Also used anti-charge belts when handling electronic components
iv. Use French chalk to dust rubber materials
v. Dip sintered bush bearing in warm oil for 24 hours per year
vi. Keep all valves open to prevent corrosion due to metal-to-metal contact
vii. Electrodes should not be removed
viii. Stock grinding wheels vertical and keep them apart with separators
ix. Protect machined faces of components with grease
x. Protect carbon steel exchangers by filling them with oil, water or gas
xi. Place switch gear components in plastic bags
xii. Cleaning, oiling and greasing should be performed on bearings and bearing stored at suitable places
xiii. Double coat Ensis fluids should be used to clean and protect steel wire
xiv. Provision should be made for the protection of highly corrosive copper and its alloys
xv. Use fresh water to clean silver and Lead parts
xvi. Label corrosive chemicals and keep incompatible chemicals stored away separately
xvii. Keep cylinders containing hydrogen, oxygen and other gases on shock absorbing coil pads an aware from heat
xviii. Protect vegetable oils and paints from light, moisture and air
xix. Protect wood from termites by coating them with anti-termite varnish
xx. Separate glass sheets from one another with plastic or paper and vertically stack them
xxi. Warm batteries before use and do not store them in warm or humid temperature
xxii. Protect cloth and paper from being eaten up by termites, rodents, ants or by moisture
xxiii. Protect rubber products from the harsh elements of the weather such as heat, sunlight etc., and also from oil, dust and water

Stores Systems and Procedures

Store systems consist of three main components; receipt, issue and documentation. Since an enormous volume of data is required to circulate during checking, controlling, and providing feedback, it is important to design the store management system in such a way that procedures make it easy for timely communication for effective decision-making.

Management of Receipt

Receipts or input into stores may originate from internal or external sources. Procedures for receipt are sometimes initiated long before materials from the vendor are received by the stores. Stores and purchase procedures may operate under two different departments but proper coordination between these two entities would ensure problems are averted.

Chronological record-keeping of details should be followed to ensure ease of transaction. The work involved in effective record-keeping includes:

(a) Determination of requirements
(b) Initiating purchase order
(c) Following up on purchase orders to expedite supplies
(d) Scheduling arrival of materials
(e) Receiving the materials physically and planning for their storage
(f) Performing quantity and quality inspection
(g) Checking input documents like invoice, lorry receipt, and other invoices etc.
(h) Keeping records of accepted or rejected materials
(i) Endorsing the suppliers bills and quantities and forwarding for payment
(j) Provisional goods inwards in case for later inspection
(k) Final goods inwards in case of final acceptance of goods
(l) Informing indenting departments of arrival of goods
(m) Sending paperwork to purchase/accounts for payment
(n) Updating insurance paperwork for latest goods arrival
(o) In case of demurrages, arrange for insurance company visit

All concerned parties must be informed of all procedures. Other functions include the following:

(a) Regularise miscellaneous items like samples and cash purchases by raising receipt notes
(b) Complete record keeping formalities for returnable items and items received from feeder shops for later internal or external consumption
(c) Keeping record of scrap received
(d) Keeping record of other bulk material supply items which may not be physically received or stored in the warehouse, like fuel oil etc.

Issue Control

Issues concern either the consuming departments or outsider suppliers. It usually involves making requests for an action to be taken. There are two types of issues available; control of issues based on scheduling of projects or issues relating to delegation of authority. In this unit, we will be dealing with issues relating to scheduling of projects. With regards to issue control, we are interested in the issue of the right material, the right quantity and the right personnel at the right place and time with an

authorised person taking charge of proceedings. Accurate records should be kept of all proceeding relating to issues.

The right quantities of materials are calculated on planned schedules of activities and issued to each phase of the project at the right time. The issues to be made are communicated to all concerned departments for them to be aware of the latest development. Consumption is automatically controlled as a result of specific details contained in an issue order with limits on the quantity of material store personnel are allowed to issue to the end-user department.

Emphasis should be placed on storekeeper's records of changes in inventory as work progresses to ensure work is not halted due to shortage of materials. Separate accounts should be created for one-time items. Bulk materials to be issued should be weighed or countered with the right instrument. To ensure accuracy of measurement, calibration of equipment should be done quite often. Emergency issues should be dealt with through provision of procedures to keep track of this type of issues.

Store Documentation

All documents should be labelled with systematic numbering and correctly categorised for easy retrieval. Other methods of documentation apart from the issue and receipt documentation include:

(a) Intra stores transfer voucher
(b) List of slow-moving, fast-moving or obsolete items
(c) Scrap disposal
(d) Rejection note
(e) Acceptance notes
(f) Delivery notes
(g) Travel requisitions
(h) Tour and expense reports
(i) Indents
(j) Codification methodology
(k) Material requirement planning

Due to the demanding nature and high value placed on proper management of information, there is the need to make use of specialised software on computerised systems to store updated document and reduce cost of processing these documents.

Further Reading:

- ✓ ***Keoki Sears, Glenn A. Sears, Richard H. Clough, (2008) Construction Project Management: A Practical Guide to Field Construction***
- ✓ ***Frank Harris, Ronald McCaffer, (2013), Modern Construction Management***