UNIT 17 RETRIEVAL AND TRANSACTION PROCESSING SYSTEM

Objectives

After completion of this unit, you should be able to

- be familiar with the store records system;
- be acquainted to the system of storage in stores;
- understand the physical controls in stores;
- be familiar with the various methods of storing different items;
- understand the cost aspects and productivity of storage system;
- be familiar with the problems and the recent developments in storage systems; and
- be acquainted to the stores equipments and material handling equipments.

Structure

17.1 INTRODUCTION

Warehousing system has been divided into three important sub-systems (i) Receiving and inspection sub-system (ii) Storage sub-system (iii) Issuing distribution sub-system. After completing the receiving and inspection procedures stocking follows. Although this is the most underrated function in warehousing management, it involves routine activities liking sorting out materials coming at the end of inspection process, maintaining the record of each and every item, with proper codification and location either by manual method or using computerized technique. Stocking is very important for easy location, proper identification and speedy issue to the consuming departments. This process is very crucial in warehouses where thousands of items are stocked for meeting the requirement of plant or for outside consumers. A good system of storekeeping is important in any system of warehouse management.

It is assumed that inventory records agree with the physical stocks of materials in the stores. If however it is found that they do not agree, they must be

adjusted after periodical physical verification of stores. Needless to say that no amount of inventory control will work successfully if accurate records are not maintained and much of its value will be lost if stores are badly maintained.

17.2   STORE RECORDS SYSTEM

Development of appropriate recording system for stores is important to provide right information regarding the physical inventory and accounting of the organization. Two records are usually kept of materials and other goods received issued or transferred, namely, Bin (or stock) card and the store ledger.

a)   **Bin Card:** For each kind of material, a separate record is kept on Bin Card which shows details of quantities of each type of materials received, issued and on hand each day. A storekeeper maintains Bin Cards up-to-date and usually in duplicate. One card is attached to each bin on shelf containing the material and the other record remains with the storekeeper for reference. (Exhibit. 17.2.1)

b)   **Stores Ledger:** This is similar to bin card except that there 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 material requisitions respectively. (Exhibit. 17.2.2)

Today most of the stores are maintaining the data of Bin-Card and Stores Ledger with the help of computer, which has made the retrieval process much simpler and economical.

EXHIBIT 17.2.1
BIN CARD

Bill No. ……………..   Maximum Quantity …………….

Material …………….   Ordering level …………………

Code No. …………   Minimum Quantity ……………..

Stores Ledger Folio……….

Date	Quantity Received	Quantity Issued	Balance	Remarks

EXHIBIT 17.2.2
STORES LEDGER ACCOUNT

Material …………..   Code……………   Maximum Quantity …………

Bill No……………..   Folio …………   Minimum Quantity ………….

S.No.	Ordered			Received				Issued					Balanced		
	Date	P.O. No.	Q.D.E	Date	P.O. No.	Unit Cost	Total Cost	Date	R No.	Dept	Q	Unit Cist	Total Cist	Q	Unit Cost	Total Cost

P.O.No.:   Purchase Order No.

Q   :   Quantity

D.E.   :   Date Excepted

R No.   :   Requisition No.

17.3 THE STORAGE SYSTEM

Selecting the most suitable storage system means dealing with a number of interacting, and often conflicting factors. The degree of mechanization affects layout, while scarcity of space affects height. The need for rapid over-picking means on easy accessibility to stock, it weighs against space economy. Any storage system is therefore, a compromise between the use of space and use of time.

The storage and retrieval are matched processes. The quick location of any item in the stores is required to minimize the retrieval delays. It is possible only where there is definite place for keeping each item and it is kept there. Moreover, the address of that place is conveniently defined.

Every item carried have a specific store location address in the form of a code which may be written in the inventory catalogue, or a separate store location index may be prepared. The location code should not be confused with material identification code.

Three basis ways of storing:

a) Fixed location

b) Random location

c) Zoned location

The first means that while stock can be found immediately without a complex system of recording there can be a considerable waste of space.

The second system means space is better utilized, but good and elaborate records have to be kept about where the materials are:

Zonal location means that goods of a particular product group are stored in a given area. They may be randomly stored in a zoned location or stored according to fixed location.

Particularly in a large highly mechanized or automated store-house fast-moving or high turnover goods and sometimes, medium and slow-movers are also grouped together. The purpose is to assign most suitable types of storage and materials handling equipment to different kinds of stock movement. Fast-moving lines are usually positioned near the input and output end of a stores with the object of reducing the travel time.

17.4 PHYSICAL CONTROL OF STORES

The commonly followed systems for physically controlling stores materials are :

a) Closed stores system

b) Open stores system

c) Random access stores system

Some of the firms 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 exist of

material from the store is permissible only with the accomplishment of authorizing document. Maximum physical security and tight accounting control of inventory material are ensured by such a storage method.

b) **Open stores system:** In this system no separate store room exists. The material is stored as closed to the point of use as is physically possible. Such a system find applicability in the highly repetitive mass production type of system, such as automobile assembly plant. The storage facilities are arranged at each work station as per requirement and availability of space.

c) **Random Access Stores System :** This is a typical kind of closed stores system in which no materials has a fixed location. All materials are stored at random locations throughout the storeroom. When an item enters the stores. It is stocked at first available storage location or that particular group, and when it leaved the storage, location becomes empty for any other item of the same group.

The storage facilities are open and worker has direct access to it. The open type of storage system expedites the activities and cut down the retrieval time. Due to rapid use of material, it is not subject to high-rate of deterioration or obsolescence. The system places little emphasis on the security of materials. The materials used in open system should not be easily damaged or pilfreged.

The responsibility, of stores in this system is to deliver the material to production areas and to device satisfactory physical storage arrangements with production supervisors. The further responsibility is to store material in production areas with the production supervisors.

The paper work is also considerably less to open system: It places less emphasis on accounting control. No perpetual inventory records are kept. The actual usage can be determined by finding the difference between the number of items in the beginning and end of the period.

Usually a paper-work control system using electronic data processing equipment is employed when the material entered into the store, is loaded into the store, and loaded into the computer giving details of code number description of material, location in the stores etc. This system is very popular in modern store.

The most significant advantages of this system is that it utilizes the space more efficiently than a fixed location system. Further, it provides greater flexibility by accommodating different materials

This type of storage system has got certain disadvantage too. It is feasible for large scale operating and requires a costly control system using electronic data processing equipment. The preservation of record is very important. The physical stock verification without this is very cumbersome.

17.5 AUTOMATED STORAGE/RETRIEVAL

Significant developments have taken place in the area of stores management in the past few decades. The concept of a totally automated storage and retrieval system has been inviting the attention of professionals to match the storage system with the rapid development in the technology. High rise storage systems have been commonly used in advanced countries. Automated material handling systems are used for the unit load type storage retrieval system. But for the systems in which different quantities of different item are to be retrieved the semi automatic kind of material handling with manual operator are used.

Some of the system to improve the efficiency of automated storage/retrieved systems are as follows:

i) Sequencing in a optimal way by picking stocks in a signal picking tour.

ii) Allowing a single operator to perform all storage and order picking operations in an aisle.

iii) Make a picking list based on a single customer's order.

iv) Stores items in pairs such as nuts, bolts, washers etc.

v) Locating items from the rack as per the structure and importance of orders.

vi) Allocating all items related to a specific facility to a single aisle.

17.6 METHOD OF STORING VARIOUS ITEMS

a) All small items of stores and parts should be kept in bins. An identification level showing location, part number/material code no. and description of the item would be affixed to one piece of the item in the bin. Another lable indicating the same information should also be affixed to the front of the bin. Also, the same information may be loaded in the coupular. The location has to be designated in row-way bin system. For example, if the item is kept in the row 3, way 4 and bin 2 the location would be designated as 03-04-02.

b) Where heavy items are stored on the ground in a shed, identification boards showing the class, art no. material code no. and description of the material should be kept in the vicinity of the items. The materials should be arranged in such a way that the oldest materials can be selected first for issue, where large quantities of bulky item are involved. It will be preferable to store them as pallets. This will permit more compact and efficient storage for the quick handling by forklight trucks.

c) Similarly iron and steel, timber etc. should have identification boards attached to the stocks.

d) Items of special steel like tool steel, carbon steel etc. will be marked by a colour code. Both the ends of the items should be colour painted so that even if an item is issued from one end, it should be possible to identify the cut piece from the colour code at the other end. It is referable to mark the specification of the special steel through out the lengths of rod, bars etc.

Advantages of Good Storage Method

A well laid out and organized store having good storage methods yield following benefits:

a) Accessibility to materials, permitting efficient service to users.

b) Minimization of material deterioration and pilferage.

c) Efficient utilization of space and height.

d) Easy physical counting

e) Quick location of items

f) Better control on stock

Materials Position in the Stores

Initial analysis of components, parts and materials should be made to store them in an organised manner. The following table gives the position of materials in the stores.

a) High usage items	Near the dispensing window
b) Heavy items difficult to transport	Near Broad Gangways near gate
c) Inflammable and dangerous items	Open isolated and stored in a fire proof place with sprinkle system.
d) Minsy items like oils, grease, paints etc.	Dry chamber in airtight container stored separately.

Activity 1

Discuss an ideal storage system for a modern industrial organisation.

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17.7 PRESERVATION OF MATERIALS

Cost of deterioration is one of the element constituting "inventory carrying cost and it is necessary that the same is kept to the minimum Dampness and humidity cause corrosion of metals and metallic stores and change their physical character. Common causes of deterioration of materials in storage are:

a) Corrosion of metals and metallic items and scaling.

b) Bacterial attack

c) Timber is therefore, on the items which is most suspectable to deterioration.

Preservation Methods

Although there are large number of example, of preservation methods, a few important examples are mentioned below.

- **Cement and lime** should be stocked in separate godown to obviate the lime dust from setting on cement.

- **Rubber Hoses :** To be stored in cool and dry places and kept away from direct sunlight and high temperature. Rubber hoses should never be hung on mails or hooks as such method are likely to cause damage due to bending strain and consequent cracking. They should be kept in coil on ground.

- **Conveyor Belting:** Always to be kept in upright position in factory packs under covered accommodation. To be stored in a cool dry room and should be stored in coils.

- **V- Belts :** They should never be hung up on nails to obviate strain and cracking.

- **Wire Ropes :** External surface should be greased to prevent seeping of moisture. They should also be stored under covered sheds.

- **Bearings :** Mineral jelly may be used as preservation .

- **Tyres :** These should be stored in vertical position. Tyres and other rubber goods will preferably be stored in rooms with controlled temperatures and air conditioned.

- **Batteries :** Charged batteries are liable to self discharge while in storage. These should be stored in very cool place away from hot air ducts and direct sunlight. If kept for long more than three months there should be discharged and charged periodically.

New developments have been made in the field of preservation of stores and prevention of pilferage, for example electrodes must be stocked in dry place. Bearings must be properly greased. Industries have taken several measures to cut down losses through pilferage. Large organizations have found it useful to maintain intelligence squads security personnel and electronic alarms. Scrap yards in the jet age scrap such as tungsten, copper etc. are dumped are even guarded by clog squads.

17.8 COST ASPECTS AND PRODUCTIVITY OF STORAGE SYSTEM

Every cubic meter of space must be utilized by stocks for high efficiency i.e. (L × W × H) where L represents length, W – width and H – height. Sometimes such stocking may drastically cut down the speed of material movement and create bottlenecks apart from affecting overall safety of people working in the warehouse. Therefore maneuvering needs for handling equipments and for minimizing the time required for receipt, stocking and issuing must be borne in mind at the planning stage in order to ensure real efficiency.

There are two types of costs involved in warehousing (i) Fixed costs (ii) Variable costs.

Fixed costs are to be incurred irrespective of the utilization of the space of the warehouse. They include money invested on land, buildings, rent, interest, maintenance, insurance etc.

Variable costs vary with the volume of handling costs, damages, deterioration, obsolescence etc. obviously when the volume of goods handled is high, the total cost per ton is low. This should be the aim of the stores manager in order to optimize the costs in stores.

17.9 PROBLEMS AND DEVELOPMENTS

Before the introduction of computer application in the warehousing the stores management has been always considered as a clerical job and the store manager was named as the custodian. In the views of materials management stores has been considered as the least glamorous and it never attracted the talent. It is forgotten that the stores manager is probably the custodian of the single largest group of current assets and plays a pivotal role in ensuring smooth production, besides assisting purchase activities through timely support. This is the major problem and challenge that faces the stores manager today. Many decisions in stores management, such as selection of racks, bins, handling equipment safety practices codification, training personnel and accounting call for considerable skill and an ability to coordinate with other departments as well as with outside agencies. Other areas in stores such as records keeping, movement analysis to reduce obsolescence surplus and damage are critical to the profitable operation of the firm. In many organizations the scrap yard also comes under the control of the stores manager. This is an entirely new responsibility calling for the ability to maximize returns on the disposal of scrap.

17.10 ISSUE SYSTEM

Issue can be further divided into issues of consuming departments and issues of outside suppliers for processing or conversion. In both cases there are certain common system requirements. The first aspect is the control of issues. Issues are based on production programmes. Based on this and the bill of material, work orders are printed for each material quality to be issued against each component requiring that material. This automatically control consumption because the work order gives details on quantity of material to be issued against each component requiring that material. This automatically controls consumption because the work order gives details on quantity of materials to be issued against each component requiring that material. This automatically controls consumption because the work order gives details on quantity of materials to be issued and the corresponding quantity of components to be manufactured. So any material requirement over and above that indicated in the work order quantity mean excessive wastage and scrapping. Normally, stores personnel at junior levels are not authorized to issue beyond work order quantity.

Direct material for which consumption norms can be established are controlled by work order. For direct materials such as fuel oil, electrodes, oxygen and tools it is obvious that control should be based on past experience and suitable delegation.

Adhoc material requisitions are sometimes made periodically consolidated statements of such items. Serial number controls are to be maintained and issues, as also receipts, must be posted in kardex so that stock balances are update. The need for updating the records cannot be over emphasized as the stores record is the starting point of inventory management in all organizations.

When issues are made to outside suppliers controls have to be more formal and adequate enough to take care of payments and claims.

Subcontracting often involves supply of raw materials by the subcontracting organization and here stricter controls through dispatch notes, consignment notes and purchase orders are exercises.

Goods stores systems can greatly assist the stores manager in accurate stock status reports, timely detection of discrepancies, prompt clearance of goods inward notes to expedite bill payment, reduction in demurrages and losses in claims.

Activity 2

How does issue take place in stores what should be the ideal system of store issues?

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Issues of Materials

Materials should be issued by the storekeeper to different departments, only upon receipt of a properly authorized withdraw form usually called a Material Issue Requisition form (shown in Exhibit 17.10.1).

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Exhibit 17.10.1
MATERIAL REQUISITION

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Material required for :……………… No. …………………………
<div align="center">(Job or process)</div>

Department ……………………….. Date: ………………………..

S.No.	Description	Code No.	Quantity Demand	Supp.	Rate	Amount	Entered on store register page No.

Requisitioned by	Approved by	Materials Issued by	Received by
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17.11 STORE EQUIPMENT AND MATERIAL HANDLING EQUIPMENTS

The different types of equipments which are used in store for easy retrieval can be broadly classified into two categories, viz., storing equipments and material handling equipments. A careful selection of different store equipment is a key to the successful operation of a store room.

Storing Equipments

The commonly used equipment in a store room are as follows:

i)   Platforms

ii)   Pallets and skids (wooden or metals)

iii)   Cabinets

iv)   Staking boxes

v)   Special storage racks

vi)   Gravity feed racks

vii)   Open and closed shelves

viii) Bins

ix)   Trays

x)   Drums

xi)   Barrels

xii)   Rotary Bins

The selection of the equipment shall be governed by the size, shape, other physical characteristic and the extent of preservation required. An open type of shelving should be preferred for easy accessibility unless the nature of the item needs a closed storage equipment. The selection of the material for racks etc., i.e., wood or steel should be carefully done. Steel equipment have advantages of strength, cleanliness and fire resistance.

Material Handling Equipment

The common type of material handling equipment used in stores are as follows :

i) Trolleys

ii) Fork-lift truck

iii) Hoists (manual and electric)

iv) Monorail

v) Belt conveyer, chain conveyer

vi) Roller convey

vii) Overhead bridge crane

Two wheeled truck

Four wheeled truck

Roller conveyor

17.12 SUMMARY

Effective storage of goods is vital to the success of any organization and efficient management of stores lead to higher productivity, fewer delays and lower overall costs.

Systematic procedure to identify location of an item, its perseverance and storage in proper and quick retrieval is necessary for providing useful service to the user departments. The automated storage and retrieval system is an answer to the ever increasing complexities involved in stores management due to the variety and volume of items particularly in large industrial organizations.

17.13 SELF ASSESSMENT EXERCISES

1) Explain the importance of proper storage in stores management.

2) How are records maintained in stores?

3) Discuss the various methods adopted in storing different materials.

4) What do you understand by the term "Automated Storage/Retrieval" What an its advantages?

5) Discuss the recent developments in storage system.

6) What are the different stores equipment and material handling equipments? Discuss its use.

7) Write notes on:

   a) BIN cards

   b) Closed/open stores system

   c) Reservation of material is stores

17.14   REFERENCES AND SUGGESTED READINGS

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