Module 3: Materials Management

3.1 Material Management

Definition:
Materials management involves planning, organizing, and controlling the flow of materials to ensure the right quality and quantity of materials are available at the right time, place, and cost.

Functions:

1. **Material Planning:** Forecasting and planning material requirements.
2. **Procurement:** Sourcing, purchasing, and supplier management.
3. **Inventory Control:** Maintaining optimal inventory levels to minimize costs.
4. **Storage:** Proper storage of materials to prevent loss, theft, or damage.
5. **Distribution:** Timely supply of materials to departments.
6. **Waste Management:** Minimizing wastage of materials.

Importance:

- Reduces costs by minimizing wastage and overstocking.
- Ensures uninterrupted production flow.
- Enhances coordination between departments.
- Improves customer satisfaction by meeting deadlines.

Relationship with Other Departments:

- **Production:** Ensures timely availability of raw materials.

- **Finance:** Aligns material purchases with budgets.
- **Sales and Marketing:** Aligns material procurement with demand forecasts.
- **Quality Control:** Ensures materials meet quality standards.

3.2 Purchase

Objectives:

1. Procuring the right quality and quantity of materials.
2. Ensuring timely delivery.
3. Minimizing procurement costs.
4. Developing strong vendor relationships.

Purchasing Systems:

1. **Centralized Purchasing:** All purchases made by a single department.
2. **Decentralized Purchasing:** Individual departments handle their own purchases.

Purchase Procedure:

1. Identifying the need for materials.
2. Requesting a purchase requisition.
3. Identifying suppliers and inviting quotations.
4. Evaluating quotations and selecting a supplier.
5. Issuing a purchase order.
6. Receiving and inspecting materials.

7. Payment and record-keeping.

Terms and Forms Used:

- **RFQ (Request for Quotation):** Inviting supplier bids.
- **Purchase Order (PO):** Official document for material procurement.
- **Invoice:** Bill issued by the supplier.

3.3 Storekeeping

Functions of Storekeeping:

1. Receipt of materials.
2. Inspection and quality control.
3. Issuing materials to departments.
4. Maintaining stock records.
5. Disposal of obsolete materials.

Classification of Stores:

1.

   Centralized Store:

   - All materials stored in one location.
   - **Advantages:** Better control, reduced duplication, lower costs.

- **Disadvantages:** Delay in material delivery to departments.

2.

Decentralized Store:

- Materials stored near the point of use.
- **Advantages:** Faster material delivery, less dependency on transport.
- **Disadvantages:** Higher costs, risk of duplication.

Types of Records Maintained by Stores:

1. Bin cards.
2. Stock registers.
3. Issue slips.
4. Purchase order records.

Storage Equipment:

- **Types:** Shelves, racks, bins, pallets, and automated systems.
- **Applications:** Ensure proper organization, reduce space usage, and prevent damage.

Codification of Stores:

- **Need:** Simplifies identification, reduces errors, and ensures uniformity.
- **Methods:** Alphabetical, numerical, or alphanumeric codes.

3.4 Inventory Control

Definition:
Inventory control ensures optimal inventory levels to minimize costs while meeting production needs.

Objectives:

1. Minimize inventory costs.
2. Avoid overstocking and understocking.
3. Ensure smooth production flow.

Economic Order Quantity (EOQ):

- **Definition:** EOQ is the optimal order quantity that minimizes total inventory costs (ordering + holding costs).
- **Formula:**

    $EOQ = \sqrt{\frac{2DS}{H}}$
    Where:
    - D: Annual demand.
    - S: Ordering cost per order.
    - H: Holding cost per unit per year.

Example:
If annual demand (D) = 1000 units, ordering cost (S) = ₹50, and holding cost (H) = ₹2/unit/year:

$$EOQ = \sqrt{\frac{2 \times 1000 \times 50}{2}} = 224 \, \text{units (approx.)}$$

ABC Analysis:

- **Definition:**
  Categorizes inventory based on value and consumption.
  - **A Items:** High value, low quantity.
  - **B Items:** Moderate value and quantity.
  - **C Items:** Low value, high quantity.

Modern Methods:

1. **Just-in-Time (JIT):** Materials arrive only when needed.
2. **VED Analysis:** Categorizes inventory as Vital, Essential, or Desirable.

Inventory Models:

1. **Wilson's Inventory Model:** Determines EOQ using demand, ordering, and holding costs.
2. **Replenishment Model:** Ensures stock levels are replenished before they run out.
3. **Two-Bin Model:** One bin for current use and another for backup stock.

3.5 Material Requirement Planning (MRP)

Concept:

MRP ensures materials are available for production and delivery by aligning inventory with production schedules.

Applications:

- Reduces inventory costs.
- Enhances production efficiency.
- Minimizes material shortages.

Software Packages:

1. **SAP ERP:** Comprehensive enterprise resource planning software.
2. **Oracle NetSuite:** Cloud-based solution for inventory and MRP.
3. **Tally ERP:** Popular for small and medium-sized enterprises.

Let me know if you'd like additional numeric examples, diagrams, or elaborations!