TECHNO MAIN CAMPUS TMSL MATERIAL INDUSTRIAL MANAGEMENT (LECTURE NOTES)

BY PROF SPC

1. Materials Management

Definition:

Materials management is the planning, organizing, and controlling of all activities related to the flow of materials, from their procurement to their movement and storage, to ensure efficient production and delivery of products.

Functions:

1. **Procurement**: Sourcing and acquiring materials needed for production.
2. **Storage**: Safe and efficient storing of materials.
3. **Inventory Control**: Maintaining optimum inventory levels.
4. **Distribution**: Ensuring materials are available where needed.
5. **Quality Control**: Ensuring that materials meet quality standards.

Importance:

- Ensures smooth production flow by providing necessary materials.
- Reduces costs by optimizing inventory levels and procurement practices.
- Enhances coordination between various departments.
- Reduces delays in production and delivery processes.

Relationship with Other Departments:

- **Production**: Ensures timely availability of raw materials.
- **Finance**: Works on budget control, cost reduction, and payments for materials.
- **Sales**: Coordinates to ensure finished products are available for delivery.
- **Engineering/Design**: Ensures correct materials are sourced as per design specifications.

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2. Purchase

Objectives:

1. Ensuring continuous availability of materials.
2. Obtaining materials at the right price and quality.
3. Maintaining a good relationship with suppliers.
4. Reducing procurement costs.

Purchasing Systems:

1. **Centralized Purchasing**: One department handles all purchases.

2. **Decentralized Purchasing**: Each department manages its own purchases.
3. **Just-in-Time (JIT) Purchasing**: Materials are ordered to arrive exactly when needed.

Purchase Procedure:

1. **Need Identification**: Determining what materials are required.
2. **Supplier Selection**: Identifying and negotiating with suppliers.
3. **Purchase Order (PO)**: Issuing a formal request to purchase materials.
4. **Receiving and Inspection**: Ensuring materials meet required standards.
5. **Payment and Record Keeping**: Making payments and maintaining records.

Terms and Forms Used in Purchase Department:

- **Purchase Requisition**: Internal request to procure materials.
- **Request for Quotation (RFQ)**: Sent to suppliers to get quotes for materials.
- **Invoice**: Document showing payment owed for materials purchased.

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3. Storekeeping

Functions:

1. Receiving, storing, and issuing materials to departments.
2. Maintaining records of inventory levels.
3. Safeguarding materials from damage and theft.
4. Ensuring proper material handling and storage conditions.

Classification of Stores:

1. **Centralized Stores**:
    - **Advantages**:
        - Easier control and management of inventory.
        - Reduced duplication of items.
    - **Disadvantages**:
        - Delay in delivering materials to distant departments.
        - Higher transportation costs.
    - **Application**: Suitable for smaller organizations or companies with fewer departments.
2. **Decentralized Stores**:
    - **Advantages**:
        - Quick availability of materials.
        - Reduced transportation costs.
    - **Disadvantages**:
        - More inventory needed at multiple locations.

    - Difficult to control and monitor.
  - **Application**: Large organizations with geographically spread departments.

Functions of Store:

- Receiving materials.
- Storing and handling materials properly.
- Issuing materials to departments.
- Maintaining accurate records.

Types of Records Maintained by Store:

1. **Bin Cards**: Physical records attached to bins for tracking inventory levels.
2. **Stock Ledger**: Records of materials issued and received.
3. **Material Requisition Slip**: Document used for requesting materials.

Storage Equipment:

1. **Shelving**: For light materials.
2. **Racking**: For heavy or bulky materials.
3. **Pallets**: Used for stacking and transporting materials.

Codification of Stores:

- **Need**: Simplifies the identification and management of materials.
- **Methods**:
  - **Alphabetical**: Materials are assigned codes based on their names.
  - **Numerical**: Materials are assigned numbers for easy tracking.

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4. Inventory Control

i. Definition:

Inventory control refers to the process of managing and optimizing the amount of stock to ensure availability while minimizing costs.

ii. Objectives:

1. Minimizing the cost of holding inventory.
2. Ensuring uninterrupted production by having materials readily available.
3. Avoiding excess inventory and stockouts.
4. Enhancing inventory turnover.

iii. Economic Order Quantity (EOQ):

- **EOQ Formula**: EOQ=2DSHEOQ = \sqrt{\frac{2DS}{H}}EOQ=H2DS Where:
  - DDD = Demand rate (units per period).
  - SSS = Setup or ordering cost per order.
  - HHH = Holding or carrying cost per unit per period.
- **Example**: Let's assume a company has an annual demand (DDD) of 10,000 units, ordering cost (SSS) is $50 per order, and holding cost (HHH) is $2 per unit per year. The EOQ can be calculated as: EOQ=2×10000×502=500 units.EOQ = \sqrt{\frac{2 \times 10000 \times 50}{2}} = 500 \, \text{units}.EOQ=22×10000×50=500units. This is the most cost-effective order size.

iv. ABC Analysis:

- **A**: High-value items with low volume (70-80% of total value).
- **B**: Medium-value items (15-20% of total value).
- **C**: Low-value items with high volume (5-10% of total value).
- **Other Modern Methods**:
  - **VED Analysis**: Classifies inventory based on its criticality (Vital, Essential, Desirable).
  - **FSN Analysis**: Based on the usage rate (Fast-moving, Slow-moving, Non-moving).

v. Types of Inventory Models:

1. **Wilson's Inventory Model**: Emphasizes balancing ordering and holding costs.
2. **Replenishment Model**: Inventory is replenished after depletion to a certain level.
3. **Two-bin Model**: Two bins are used, with the first bin in use, and the second for reordering.

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5. Material Requirement Planning (MRP)

Concept:

MRP is a production planning and inventory control system that determines the quantity and timing of material requirements based on the production schedule.

Applications:

- Ensures materials are available for production.
- Reduces excess inventory.
- Helps in scheduling production activities.

Software Packages Available:

1. **SAP MRP**: Enterprise resource planning software with robust MRP features.

2. **Oracle MRP**: Integrated with other ERP functions, allowing material planning.
3. **Microsoft Dynamics**: Offers MRP capabilities along with supply chain management.

MRP helps organizations improve production efficiency by managing material availability and aligning it with the production schedule.