

ME376

MATERIALS MANAGEMENT

Course Outcomes (COs):

At the end of the course the students will be able to:

- CO1 Describe the role and scope of materials management in organization.
- CO2 Apply the concepts of classification, codification, specification, standardization and variety reduction for proper store management.
- CO3 Apply deterministic and probabilistic inventory control models and selective inventory control to insure a steady supply of materials to meet the needs of the organization.
- CO4 Evaluate the budget and material requirement plan to insure a steady supply of materials to meet the needs of the organization.
- CO5 Explain the key characteristics of fundamental and specialized purchasing aspects, store keeping, the public and international purchase.

Syllabus:-

- **MATERIALS MANAGEMENT (04 Hours)** Functions, Objectives, Activities, Cost, advantages, Desirable qualities of purchasing and materials manager
- **CLASSIFICATION, CODIFICATION & SPECIFICATION (05 Hours)** Need for classification and identifications of materials, Classification of Materials, Codification: Nature, process, merits and demerits, Codification Systems, Stores Vocabulary, Marking of Stores, Objective of specifications, Specification Categories and development
- **STANDARDISATION AND VARIETY REDUCTION (05 Hours)** Standard, Dimensions, Different levels of standards, Scope, Various foreign standards used in India, Procedure for evolving Indian standards, Benefits, Standardization and variety reduction in products, Techniques of variety reduction, Three S's- Standardization, Simplification and Specialization
- **INVENTORY CONTROL AND MANAGEMENT (07 Hours)** Classification, Inventory Models (Deterministic and Probabilistic), P and Q Systems in Practice, Selective Inventory Control, Two dimensional Classification, Music 3-D Model, A-B-C analysis for always better control.
- **BUDGETING AND MATERIAL RESOURCE PLANNING (07 Hours)** Budgetary control, Types, advantages, Material Requirement Planning (MRP) structures, Management, Lot sizing techniques
- **STORE AND STORE KEEPING (04 Hours)** Objectives, Functions of storekeeper, Benefits of store keeping, Features of successful store keeping, Stores Organization, Location and layout of stores, Types of stores, Stock taking.
- **PURCHASING (10 Hours)** Purchasing Process, purchasing terms and conditions, Principles, Objectives, Methods, Vendor/Supplier rating, e-Procurement, Vendor/Supplier performance evaluation, negotiation, make or buy, outsourcing, and buy commodities, capital goods, Director general of Supplies and Disposals (DGSS&D), Supplier registration, Government e-Market place (GeM), tendering, Central Public Procurement Portal (CPPP), Director general of foreign trade (DGFT), Importers, Criteria of Licencing, Negative list, Import procedure.

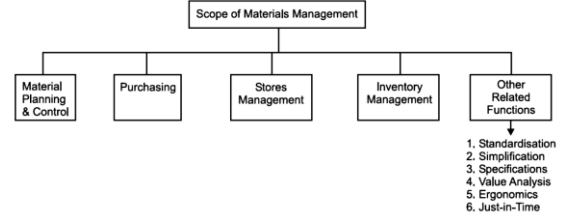
3. Books Recommended:

1. J. R. T. Arnold, S. N. Chapman and L. M. Clive, Introduction to Materials Management, 7th Edition, Pearson Education, 2010.
2. A. K. Chitale and R. C. Gupta, Materials Management: A Supply Chain Perspective, 3rd Edition, PHI learning Private Limited, 2014.
3. J. Heizer, B. Render, C. Munson and A. Sachan, Operations Management, 12th Edition, Pearson Education, 2017.
4. P. Gopalakrishnan and A. Haleem, Handbook of Materials Management, 2nd Edition, Prentice Hall India Learning Private Limited, 2015.
5. P. Gopalakrishnan and M. Sundaresan, Materials Management: An Integrated Approach by Gopalakrishnan, 1st Edition, Prentice Hall India Learning Private Limited, 1977.

Introduction

- **Materials management** is a function, which aims for integrated approach towards the management of materials in an industrial undertaking.
- Its main objective is **cost reduction** and **efficient handling of materials** at **all stages and in all sections** of the undertaking. Its function includes several important aspects connected with material, such as, **purchasing, storage, inventory control, material handling, standardisation** etc.
- **Materials management** is defined as *"the function responsible for the coordination of planning, sourcing, purchasing, moving, storing and controlling materials in an optimum manner so as to provide a pre-decided service to the customer at a minimum cost"*.

Functions of Materials Management



Functions of Materials Management

1. **Materials planning and control:** Based on the sales forecast and production plans, the materials planning and control is done.

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.

Functions of Materials Management

2. Purchasing:

Includes

- selection of sources of supply and 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.

Functions of Materials Management

3. Stores management: A store plays a vital role in the operations of a company.

Store management 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,
- Physical verification of stocks and reconciling them with book figures.

Functions of Materials Management (2)

4. Inventory control or management:

Inventory generally refers to the **materials in stock** (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.

Functions of Materials Management (3)

5. Other related activities

(a) 35

(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.

Functions of Materials Management (3)

(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 formulates the requirements of the customer. It may relate to a product, process or a service.

Functions of Materials Management (4)

(b) Value analysis:

Value analysis

is concerned with the costs added due to inefficient or unnecessary specifications and features.

makes its contribution in the last stage of product cycle, namely, the maturity stage.

At the stage of Value analysis - 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.

Functions of Materials Management (4)

(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."

Aim of Materials Management

To get

1. The **Right quality**
2. **Right quantity** of supplies
3. At the **Right time**
4. At the **Right place**
5. For the **Right cost**

Purpose of Material Management

- To gain **economy in purchasing**
- To satisfy **the demand** during period of replenishment
- To carry **reserve stock** to avoid stock out
- To **stabilize fluctuations** in consumption
- To provide **reasonable level of client services**

Objectives of Material Management

Primary

- Right price
- High turnover
- Low procurement & storage cost
- Continuity of supply
- Consistency in quality
- Good supplier relations
- Development of personnel
- Good information system

Secondary

- Forecasting
- Inter-departmental harmony
- Product improvement
- Standardization
- Make or buy decision
- New materials & products
- Favorable reciprocal relationships

Economy in material management

- Containing the costs
- Instilling efficiency in all activities

Four basic needs of Material Management

1. To have **adequate materials on hand when needed**
2. To pay **the lowest possible prices, consistent with quality and value requirement for purchases materials**
3. To **minimize the inventory investment**
4. To **operate efficiently**

Basic principles of material management

1. Effective management & supervision
depends on
 - Planning
 - Organizing
 - Staffing
 - Directing
 - Controlling
 - Reporting
 - Budgeting
2. Sound purchasing methods
3. Skillful & hard poised negotiations
4. Effective purchase system
5. Should be simple
6. Must not increase other costs
7. Simple inventory control programme

Elements of material management

1. Demand estimation
2. Identify the needed items
3. Calculate from the trends in Consumption during last 2 years.
4. Review with resource constraints

Materials Management in Other Areas of Management Functions

- Materials Management and Design/Development
- Materials Management and Production
- Materials Management and Sales
- Materials Management and Finance & Accounting

Materials Management AND Design Development

- Good cooperation is absolutely necessary between **Materials Management** and **design development** in the interest of **advantageous materials costs** and **low level of capital** being tied up in inventories. Measures taken by **design and development** determine the structure of a company's materials and parts requirements and hence **materials and parts requirements** and hence **material costs**.

Materials Management AND Design Development

Cooperation between **materials management** and **design/development** is necessary in several respects:

- To coordinate **product development** and **supply**;
- In alteration service;
- In **buying new assembly** parts;
- In carrying out **value analysis**;
- In the **setting of norms, standardization** and **analysis of the materials and part purchases**;
- In **quality control**;
- In **determining component parts to be used**;
- In **formulating enquiries to suppliers**;
- In **making or buying decisions**; and
- In **updating the bills of materials**.

Materials Management and Production

- The task of **materials management** and **production** are closely related.
- Derived from marketing, it is in **production** where **materials requirements** originate and it is up to **materials management** to cover the requirements.
- The **two functions overlap** within the **spheres of scheduling, production program planning** and **production control** i.e. in those **sub-functions** which are also assigned in different ways.

Materials Management and Production

Close cooperation is required above all in:

- **Planning production and materials requirements;**
- **Coordinating production control and materials scheduling;**
- **Solving bottleneck problems** by subcontracting measures;
- Deciding about **call-off inventories** to be held by **suppliers** and **consignment inventories** kept in-house.
- By means of **effective cooperation between materials management and production**, one can succeed in **reducing the level of capital tied up in inventories** as well as reducing materials costs.
- This sort of cooperation is an **imperative prerequisite** for **total control of the flow of materials** from the **suppliers to the user within the company** and via the **processing points in production** to the **users within allocation for marketing** and thus for **fast order processing**.

Materials Management and Sales

- **Integrated materials management** is not **just of all a supply system for sales**.
- It is **oriented towards fulfilling the customer orders** obtained by the **sales department**, at the **lowest possible cost**. If one regards materials management in this light, then it in fact exhibits **manifold connections** with sales which necessitate **close cooperation** here as well, indeed in several respects:
 - In **deciding on customer service** towards the market;
 - In **formulating the sales plan** and **pursuing fulfillment** of the plan;
 - In **deciding about transport facilities** and also **transport and traffic processing**;
 - In the **administration of customer orders** which must be linked with materials management;
 - In **deciding about commissioning, packaging and dispatching** to the customers.
- Effective cooperation between materials management and sales is a prerequisite
 - on the one hand for the lowest possible level of capital tied up in stock, and on
 - the other hand, for high customer services.
 - close cooperation between **sales and materials management** and the latter being geared towards the **company's marketing strategy** can provide a company with **important competitive advantages**.

Materials Management and Finance & Accounting

- Materials management is **mostly responsible** for the **greatest bulk of costs** within a company and has a **considerable influence** on the level of its **current assets**.
- Thus, **materials management** influences to the **company profitability and liquidity** and hence to the **key factors of finance and accounting**, comes the **necessity for coordination** with both departments.
- This involves:
 - **Planning justifiable levels of inventory investments** for the **purpose of annual budgeting**;
 - **Controlling inventory status** during the **course of the years**;
 - **Implementing inventory reduction** projects;
 - **Carrying out analysis for make or buy decisions**;
 - **Deciding on investments in transport and storage facilities**;
 - **Implementing plans** for the **reduction of overhead expenses**;
- **Routine coordination** between **invoice checking and credit control**; and
- **Exchanging information** and data for the **purpose of planning and control**

Advantages of Materials Management

- 1) A proper material management system ensures that there is enough buffer stock so as to prevent any stoppage in production (*saves TIME*).
- 2) A proper Materials Management system helps in determining the number of materials to be ordered to reduce cost without any obstructions in production (*reduces COST*).
- 3) The material management system can be used to ensure that available resources are in accordance with the specification, as per required quantity and functional to get a satisfactory quality in production (*improves QUALITY*).
- 4) The efficient material management system improves productivity of the organization by ensuring efficient material flow within organization and motivating workers by availability of equipment and materials (*improves PRODUCTIVITY*).
- 5) Material management system minimizes waste implementing strategies for waste minimization such as - the stock control for minimization of over or duplicate ordering, good practices of material handling, systematic inventory process and proper material storage (*minimize WASTE*).

Desirable qualities of purchasing and materials manager

1) Organization: Excellent organizational and planning skills.

This professional needs planning to be able to delegate tasks, keep the company's documentation in order, create a productive work routine and be able to follow up with its partners. Without organization, no professional is able to complete their tasks with satisfaction; therefore, this item is the first skill that the purchasing manager must conquer.

2) Good relationship: Excellent interpersonal skills and the proven ability to work well with all levels of management and staff.

The famous item "to know how to work in a team" today is a requirement made to every type of professional. For the purchasing manager, this skill is even more necessary, because his area has interface with several other areas of the corporation: finance, product quality, engineering, etc. The purchasing professional often needs the support of the team from the other areas of the company, and this makes it essential that he knows how to dialogue with everyone around him. Again, the ability to organize proves its necessity: when the rest of the team needs the help of the manager, he needs to be organized enough to be able to help the other team members.

3) Knowledge of company strategies:

In order to be able to properly perform its function, the purchasing manager needs to be thoroughly familiar with the strategies of the company for which he works, and can align his trading methods to achieve corporate goals. For example, the purchasing professional cannot negotiate a lower price for the purchase of a large batch of products if the company's objective is to renew inventories to generate space for new production lines. Therefore, knowing the goals of the company is necessary to make the best decisions.

Desirable qualities of purchasing and materials manager

4) Trading: Negotiating is necessary at all times in the purchasing profession. The good purchasing manager is the one who is prepared to negotiate with confidence and with knowledge about suppliers, competition and company's trading objectives.

5) Constant updating:

The purchasing professional must constantly update himself on what happens in the market in which his company is inserted and also on what happens outside of him. For this, it is interesting that he participates in fairs and events, working as a kind of bridge between the corporation and the external market and thus bringing the news into the work environment.

6) Ethics:

The respectable purchasing manager should always maintain ethics in the dealings. To do so, it is your duty to inform clearly and objectively the stages of your quotation process, your expectations regarding suppliers, give feedback to companies and keep the rules predetermined during the negotiation process.

7) Excellent verbal and written communication skills.

8) Proficiency in latest techniques and soft skills (for example - Microsoft Office Suite or similar software, Proficient with inventory reporting systems).

Example – Advertisement for Job Responsibilities of Materials Manager

Job Summary: The Materials Manager will oversee the planning, procurement, storage, control, and distribution of materials and products according to company needs and customer requirements.

• **Supervisory Responsibilities:**

- ✓ Manages and trains supervisors in the manufacturing department.
- ✓ Conducts performance evaluations that are timely and constructive.
- ✓ Handles discipline and termination of employees as needed and in accordance with company policy.

Duties/Responsibilities:

- ✓ Directs production and inventory control, shipping and receiving, and materials storage.
- ✓ Directs production planning and scheduling based on sales forecasts.
- ✓ Maintains inventory levels to ensure deliveries occur within customer timelines.
- ✓ Maintains and ensures accuracy of the perpetual inventory system.
- ✓ Works with purchasing department to schedule delivery of materials, supplies, and equipment.
- ✓ Oversees shipping and receiving functions related to purchased parts and finished goods.
- ✓ Identifies opportunities to reduce transportation costs and charges.
- ✓ Manages and monitors storage of purchased parts and finished goods.
- ✓ Performs write-offs on damaged or obsolete inventory to reflect accurate value of inventory.
- ✓ Establishes procedures for conducting and valuing year-end physical inventory.

✓ Performs other related duties as assigned.

Example – Advertisement for Job Responsibilities of Materials Manager (2)**• Required Skills/Abilities:**

- ✓ Excellent **organizational and planning skills**.
- ✓ Excellent **verbal and written communication skills**.
- ✓ Excellent **interpersonal skills** and the proven **ability to work well with all levels of management and staff**.
- ✓ **Proficient with inventory reporting systems**.
- ✓ Proficient with Microsoft Office Suite or similar software.

• Education and Experience:

- ✓ Bachelor's degree in Business Administration or related field required.
- ✓ Five years of experience in materials control field required.

• Physical Requirements:

- ✓ **Prolonged periods sitting at a desk and working on a computer**.
- ✓ Must be able to lift up to 15 pounds at a time.