INDUSTRIAL MANAGEMENT

INVENTORY CONTROL

UNIT - 3

Content:

- Inventory
- Cost
- Deterministic models
- Perpetuary inventory control
- Stock taking
- Introduction to supply chain management
- Eoq and Epq

What does inventory means ?

- **Inventory –** A physical resource that a firm holds in stock with the intent of selling it or transforming it into more valuable state.

- **Inventory System –** A set of policies and controls that monitors levels of inventory and determines what levels should be maintained, when stock should be replenished, and how large order should be placed.

Types of Inventory	Reasons for holding the inventory
1) Raw materials	To reap the price advantage available on seasonal raw materials.
2) Work in progress	To balance the production flow.
3) Ready made components	When the components are bought rather than made.
4) Scraps	When the components are bought rather than made.
5) Finished Goods	Lying in stock rooms and waiting dispatches.

What does Inventory cost means ?

1.Inventory costs are the **costs related to storing and maintaining its inventory over a certain period of time.**

2.The cost of holding goods in stock. Expressed usually as a percentage of the inventory value, it includes capital, warehousing, depreciation, insurance, taxation, obsolescence, and shrinkage costs.

COST ASSOCIATED WITH INVENTORY

- PURCHASE COST
- CAPITAL COST
- ORDERING COST
- INVENTORY CARRYING COSTS
- SHORTAGE COST

PURCHASE COST

- The cost that an investor pays for a security.
- Purchase price can also refer to the price that a company pays for an item, such as another company.

CAPITAL COST

- These are fixed, one-time expenses incurred on the purchase of land, buildings, construction, and equipment used in the production of goods or in the rendering of services

ORDERING COST

These are costs of ordering a new batch of raw materials. These include cost of placing a purchase order, costs of inspection of received batches, documentation costs, etc.

INVENTORY CARRYING COST

The cost of holding goods in stock. Expressed usually as a percentage of the inventory value and includes cost of capital, warehousing, depreciation, insurance, taxation, obsolescence, and shrinkage.

SHORTAGE COST

Costs that fall with increases in the level of investment in current assets.

SUPPLY CHAIN MANAGEMENT

Supply Chain Management (**SCM**) is the management of the flow of goods and services. It includes the movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption. Interconnected or interlinked networks, channels and node businesses are involved in the provision of products and services required by end customers in a supply chain.

FUNCTIONS

Supply chain management is a cross-functional approach that includes managing the movement of raw materials into an organization, certain aspects of the internal processing of materials into finished goods, and the movement of finished goods out of the organization and toward the end consumer.

The purpose of supply chain management is to improve trust and collaboration among supply chain partners, thus improving inventory visibility and the velocity of inventory movement.


Supply Chain Management
Vertically Integrated Partnerships
Procurement
Inventory Control
Logistics
Product Lifecycle Management
Preferential Pricing & Lead-Times
Demand Management

Definition of **Inventory Control**...

In General Sense,

"Inventory control is a method where all stocks of goods are properly and promptly issued, accounted, and preserved in the best interest of an entity that handles its inventory."

In terms of Business,

"Inventory control is a method designed by the top level of management of a company. It requires a strategic decision to be taken for its effective implementation. Its proper implementation is the responsibility of the store manager."

In an Academic perspective,

"Inventory control is a method to identify those stocks of goods, which can be used for the production of finished goods. It shall be supported by a schedule which gives details regarding; opening stock, receipt of raw-materials, issue of materials, closing stock, and scrap generated."

OBJECTIVES OF INVENTORY CONTROL

- Protection against fluctuations in demand.
- Better use of men, machines and materials.
- Protection against fluctuations in output.
- Control of stock volume.
- Control of stock distribution.

BENEFITS OF INVENTORY CONTROL

- Aims at keeping track of inventories.
- Inventories of good quality and right quantities should be made available to different departments as and when they needed.

Process of inventory control

- All Capital Equipment purchases are delivered to the Central Receiving dock (Storeroom).
- Receiving Clerk notifies the Inventory Control Office, informing the Inventory Coordinator of an equipment delivery.
- The information included in the database will be used to track individual items and their placement on Campus.

DETERMINISTIC MODELS

Deterministic models are of two types :

1)ECONOMIC ORDER QUANTITY (EOQ)

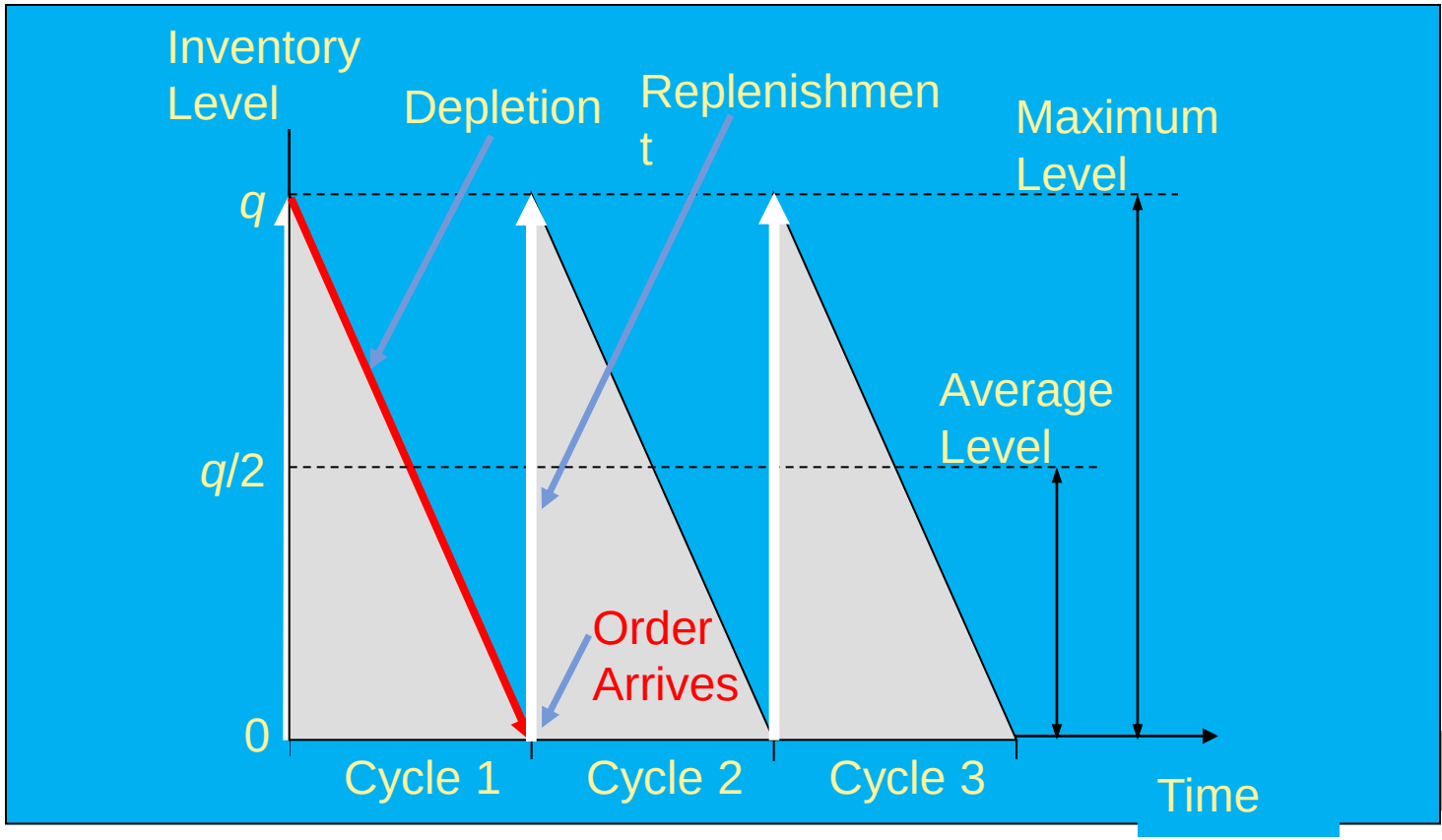
2) ECONOMIC PRODUCTION QUANTITY (EPQ)

ECONOMIC ORDER QUANTITY (EOQ)

This is the basic model in achieving an optimal ordering quantity which minimises the total inventory costs. However there are some assumptions to be upheld:

(a) Demand is known and constant.
(b) The lead time, the time between the placement of order and the receipt of the order, is known and constant.
(c) The receipt of inventory is instantaneous.
(d) Quantity discounts are not possible.
(e) The only variable costs are the ordering cost and the holding
or carrying cost.
(f) Orders are placed so that stock outs or shortages are avoided completely.

Basic Economic Order Quantity Model (EOQ Model)



FORMULAS USED IN EOQ

- Optimum reorder point

$$r^* = \frac{dq^*}{t^*} = dQ$$

- Total annual HOLDING cost

$$HC = c_h q_{\text{avg}} = c_h \frac{q}{2}$$

- Total annual ORDERING cost

$$OC = c_x n = c_x \frac{Q}{q}$$

- Total annual cost

$$TC(q) = c_h \frac{q}{2} + c_x \frac{Q}{q}$$

- Optimum order quantity

$$q^* = \sqrt{\frac{2Qc_x}{c_h}}$$

- Maximum inventory level = Q
- Average inventory level = Q/2

Assumptions in EOQ

- Constant or uniform demand
- Constant unit price
- Constant carrying costs
- Constant ordering cost
- Constant ordering cost
- Independent orders

ECONOMIC PRODUCTION QUANTITY (EPQ)

- **Economic production quantity (EPQ)** is the quantity of a product that should be manufactured in a single batch so as to minimize the total cost that includes setup costs for the machines and inventory holding costs.
- The **economic production quantity (EPQ)** model is used to determine the optimal order quantity that an organisation should place with a supplier to minimise inventory costs, while balancing inventory holding and average fixed order costs

VARIABLES USED

The following variables are used in developing mathematical expressions for the annual setup and carrying costs for a production run model:

Production Quantity = Q
EPQ = Q*
Annual Demand = D
Setup Cost per production run = Cs
Holding or carrying cost per unit per year = Ch
Daily production rate = p
Daily demand rate = d
Length of production run in days = t

FORMULAS USED IN EPQ

- Annual Setup Cost $\frac{D}{Q}C_x$
- Annual holding Cost $\frac{Q}{2}(1-\frac{d}{p})C_k$
- EPQ = Q* = $\sqrt{\frac{2DC_x}{(1-\frac{d}{p})C_k}}$
- Total Annual Inventory Cost $\frac{D}{Q}C_x + \frac{Q}{2}(1-\frac{d}{p})C_k + DC$
- Re Order Point, ROP $= d * L$

Perpetual inventory control

- This method requires a stock card or register or register for every item. Receipts are recorded from goods received notes disbursements from stores requisition.

- Perpetual inventory provides a highly detailed view of changes in inventory and allows real-time reporting of the amount of inventory in stock, hence, accurately reflecting the level of goods on hand.

- It eliminates the elaborate and costly periodical stock taking.
- There is no need of closing business for the purpose of stock taking.
- Bin cards and stores ledger give ready figures of stock position at any time.
- It facilitates the preparation of interim profit and loss account and the balance sheet.

Stock taking

- It requires an occasional count of stock to determine inventory balance on hand. The inventory count is recorded on inventory sheets .
- The usage of stores is determined by adding current reciepts to the old balance and substracting the new balance on hand.

MERITS

- Stock discrepancies are likely to be brought to the notice and corrected much earlier than under the annual stock-taking system.
- The system generally has a sobering influence on the stores staff because of the element of surprise present therein.
- The movement of stores items can be watched more closely by the stores auditor so that chances of obsolescence buying are reduced.
- Final Accounts can be ready quickly. Interim accounts are possible quite conveniently.

INVENTORY CONTROL MODELS

- JUST IN TIME INVENTORY MODELS
- INVENTORY CONTROL THROUGH ABC ANALYSIS
- VED ANALYSIS
- PERPETUAL INVENTORY SYSTEM

JUST IN TIME INVENTORY SYSTEM

- Just in time (JIT) inventory is a management system in which materials or products are produced or acquired only as demand requires.

- Just in time inventory is intended to avoid situations in which inventory exceeds demand and places increased burden on your business to manage the extra inventory..

INVENTORY THROUGH ABC ANALYSIS

- **ABC analysis** (or **Selective Inventory Control**) is an inventory categorization technique. ABC analysis divides an inventory into three categories- "A items" with very tight control and accurate records, "B items" with less tightly controlled and good records, and "C items" with the simplest controls possible and minimal records.

VED ANALYSIS

- V-VITAL
- E-ESSENTIAL
- D-DESIRABLE ANALYSIS
- In addition to the intrinsic or market value of materials ,which is invested in the materials there is sometimes a nuisance value to the materials.

PERPETUAL INVENTORY SYSTEM

- Under the perpetual inventory system, an entity continually updates its inventory records to account for additions to and subtractions from inventory for such activities as:
- Received inventory items
- Goods sold from stock
- Items moved from one location to another
- Items picked from inventory for use in the production process
- Items scrapped