

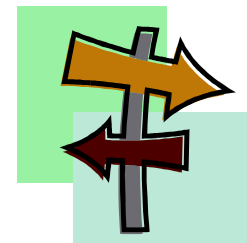


Topic 5

Accounting for Material

Session Objectives

- Describe the different procedures and documents necessary for the ordering, receiving and issuing of materials from inventory
- Describe the control procedures used to monitor physical and 'book' inventory and to minimise discrepancies and losses
- Interpret the entries and balances in the material inventory account



Session Objectives

- Identify and explain the costs of ordering and holding inventory.
- Calculate and interpret optimal reorder quantities.
- Calculate and interpret optimal reorder quantities when discounts apply.



Session Objectives

- Produce calculations to minimise inventory costs when stock is gradually replenished.
- Describe and apply appropriate methods for establishing reorder levels where demand in the lead time is constant.



Inventory - Manufacturing

- Finished goods inventory
- Work in process
- Raw materials

Accounting Procedures for Ordering and Issuing Inventory



Ordering, Purchasing and Receiving Inventory

- Purchase Requisition
- Purchase Order
- Goods Received Note (GRN)
- Purchase Invoices

Purchase Requisition

- A formal request for materials to be bought
- Might be :
 - prepared by member of stores staff or
 - produced automatically by a computer system or
 - Prepared by someone in the department using the material
- Must be authorised by an appropriate person such as stores manager

Purchase Order

- Specially relevant for large organisations with separate purchase departments.
- It is an order placed with a supplier for the purchase of goods
- A copy of the PO is sent to the chosen supplier and one retained by buying department
- A copy of the PO is sent to the goods receiving department as confirmation of expected delivery

Goods Received Note

- Records the details of materials received from a supplier
- Is the basis of entering receipts in the store record

Goods Received Note (GRN)

- The goods receiving department will:
 - Check what goods have been delivered, in terms of quantity, apparent quality, supplier and purchase order number to which they relate
 - Compare goods received against the delivery note accompanying the materials
 - Check the purchase order copy to see that the goods that have been delivered are as ordered
 - Prepare a goods received note

Goods Received Note

Supplier.....

Serial No.....

Carrier:.....

Date Issued:.....

Date of Delivery:

Purchase Order No.....

Description	Code	Quantity	Packages	Gross Weight

Inspection Report			Received by.....
Passed	Rejected	Remarks	Required by.....
			Accepted by:
Inspector..... Date:.....			

Purchase Invoices

- Invoice received from a supplier
- Purchase invoice along with a copy of GRN and a copy of the Purchase Order is sent to the purchasing department

Documents for Issuing Inventory

- **Material Requisition Notes:** These are requests for materials. This document performs two functions:
 - Allows the storekeeper to issue the goods
 - Provides a means for updating the stores ledger record and the bin card

Documents for Issuing Inventory

- **Material returned Notes:**
 - Provide record of unused material returned to stores
 - Are used to update stores
- **Material Transfer Notes:**
 - Document transfer of materials from one production department to another
 - Are used to update stores

Accounting for Inventory

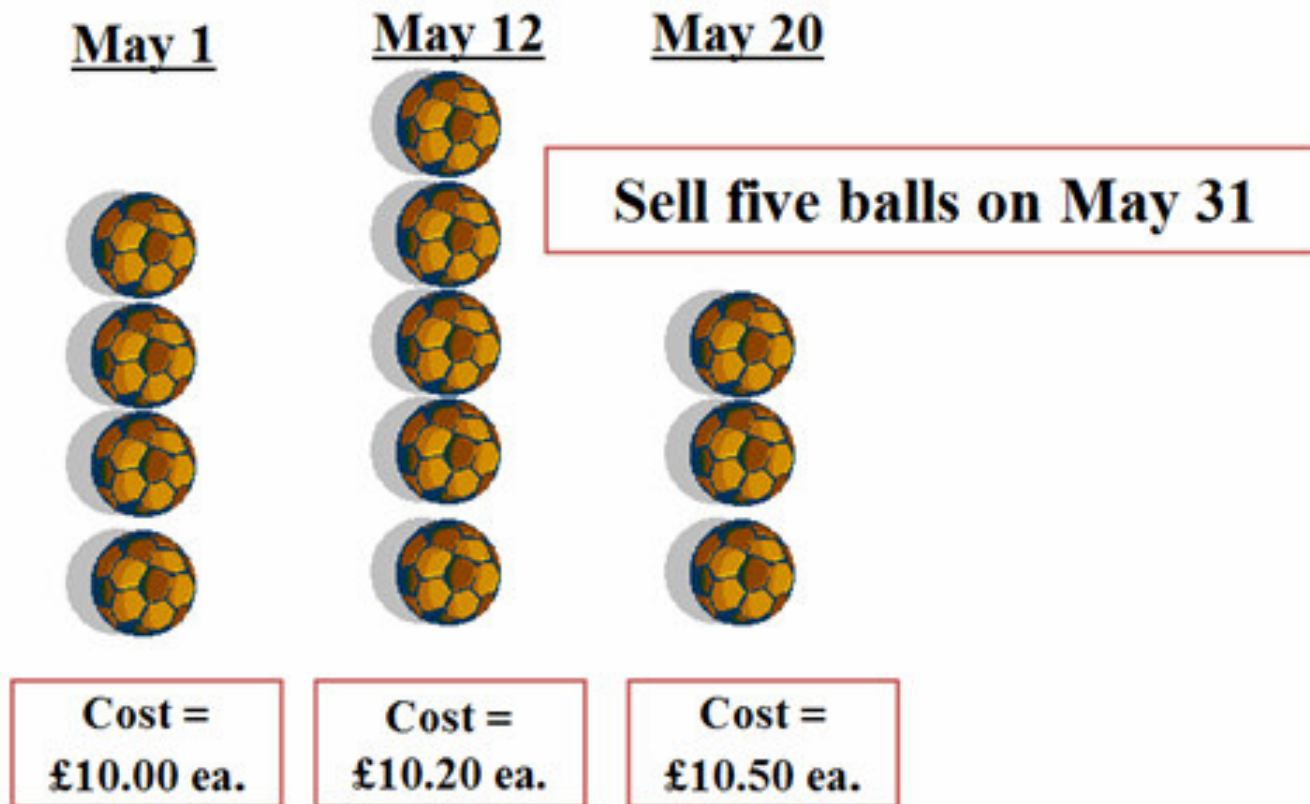
- Materials-in-store is an asset and are recorded in the balance sheet of a company.
- Accounting transactions relating to materials are recorded in the material inventory account.

Inventory Valuing Methods

Three costing methods available:

- First –in- First-out or FIFO
- Last-in-First-Out or LIFO
- Average Cost or AVCO

Illustration



First –in- First-out or FIFO

- Cost of balls sold = $£10 \times 4 + £10.20 = £50.20$
- Value of Closing Stock = $£10.20 \times 4 + £10.50 \times 3 = £72.30$

Last –in- First-out or LIFO

- Cost of balls sold = $£10.5 \times 3 + £10.20 \times 2 = £51.90$
- Value of Closing Stock = $£10.20 \times 3 + £10 \times 4 = £70.6$

Average Cost or AVCO

- Average cost can be:
 - Periodic Simple Average Method
 - Weighted average

Periodic Simple Average Method

- Average Cost of the balls = $[\text{£}10 + \text{£}10.20 + \text{£}10.50] / 3 = \text{£}10.23/\text{ball}$
- Cost of Goods Sold = 5 cameras @ $\text{£}10.23$ (rounded) = $\text{£}51.15$
- Value of Closing Stock = $\text{£}10.23 \times 7 = \text{£}71.61$

Weighted Average Method

- Weighted Average Cost = $[(4 @ £10) + (5 @ £10.20) + (3 @ £10.50)] / 12$
= £10.21/ball
- Cost of Goods Sold = 5 balls @ £10.21
(rounded) =

Methods of Stock Taking

- Continuous stock taking
- Period-end stock taking

Continuous stock taking

- Also known as perpetual stocktaking.
- Carried out throughout the year in accordance with a pre-determined programme.
- The advantages of this method are:
 - There is better information for stock control
 - Excessive build-up of certain lines of stock and having insufficient stock of other lines are avoided
 - Less work is needed to calculate stock at the end of accounting period

Period-end stock taking

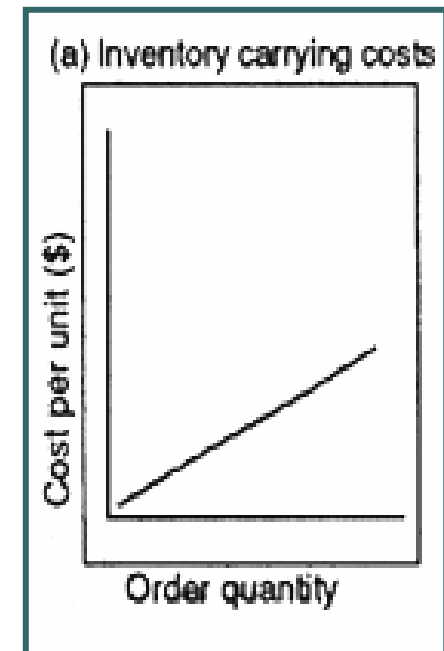
- Kind of stock taking is done once a year.
- The stores are closed during the period of stock taking.
- The advantages of this type of stocktaking are:
 - Cheaper option
 - Is inevitable to a certain extent even when there is continuous stock taking

Total Cost of Stock

- Purchase cost
- Holding cost
- Ordering cost
- Stock-out cost

Examples of Holding cost

- Interest on capital
- Cost of storage space
- Administration cost
- Losses from deterioration
- Pilferage and obsolescence



Can be reduced by keeping stock levels at minimum levels

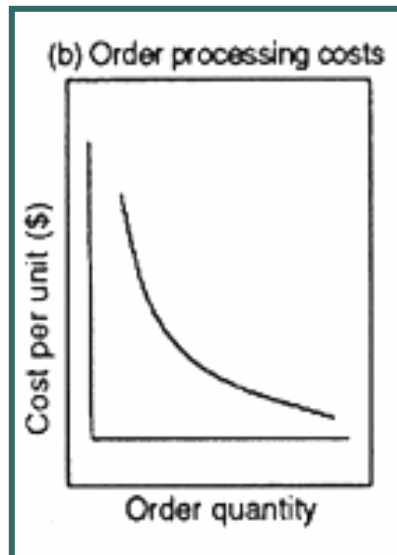
Reasons for Holding Stock

- Increase sales and profits
- Offer wide variety
- Meet customer demand
- Prevent delays in production

Examples of Ordering Cost

Primarily the labor costs associated with processing the order:

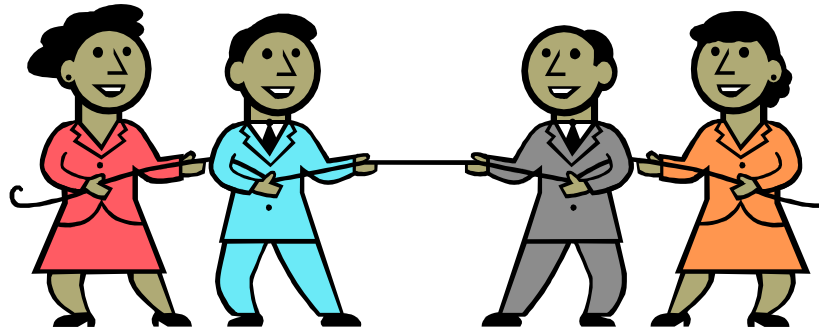
- Ordering and requisition
- Receiving, inspecting, stocking
- Invoice processing



Can be reduced by placing orders only at infrequent intervals

Conflict between Holding and Ordering Costs

There is a conflict between the desire to minimise holding costs and minimising the order cost



What is Economic Order Quantity (EOQ)

- Order quantity for a stock item that will minimise the combined cost of stock ordering and stock holding over a given period of time say an year

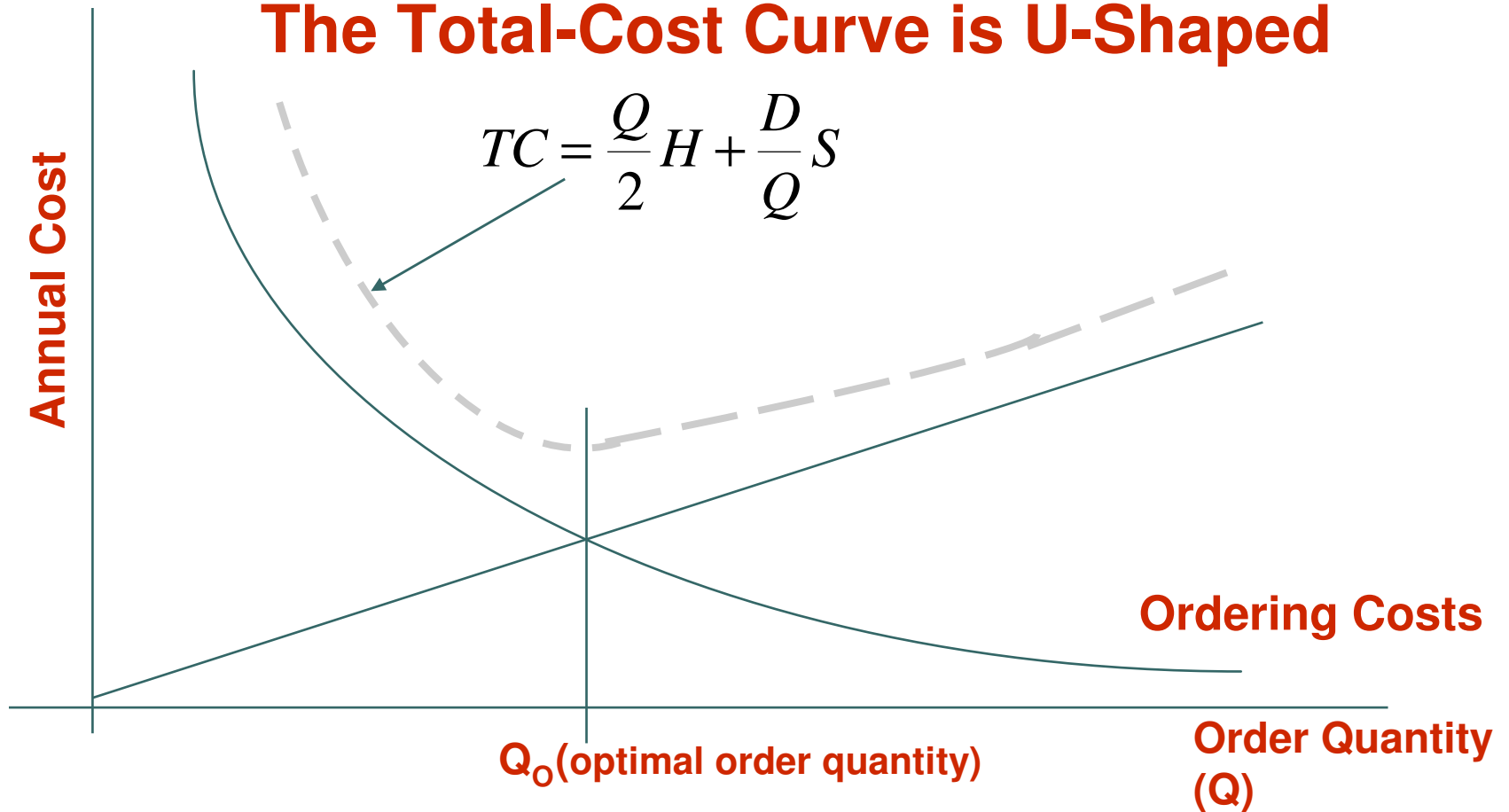
Total Cost

Total cost = Annual carrying cost + Annual ordering cost

$$TC = \frac{Q}{2} H + \frac{D}{Q} S$$

Cost Minimization Goal

The Total-Cost Curve is U-Shaped



Economic Order Quantity

The total cost curve reaches its minimum where the carrying and ordering costs are equal.

$$Q_{OPT} = \sqrt{\frac{2DS}{H}} = \sqrt{\frac{2(\text{Annual Demand})(\text{Order or Setup Cost})}{\text{Annual Holding Cost}}}$$

Important Calculations

- Average inventory held = $EOQ / 2$
- Number of orders in a year = $\text{Expected Annual Demand} / EOQ$
- Total annual holding cost = Average inventory ($EOQ / 2$) x Holding cost per unit of inventory
- Total annual ordering cost = Number of orders x Cost of placing an order

Question

- ABC plc is a retailer selling spades. The company has an annual demand of 22,050 spades. Each spade costs £10. Fresh supplies can be obtained immediately but ordering cost is £120 per order. Annual cost of holding one spade is estimated to be £1
- Find the EOQ

Question

- EOQ
= Square Root $[(2 \times 120 \times 22,050) / 1]$
= 2300 units (approx)

Question

- ABC plc is a retailer selling spades. The company has an annual demand of 22,050 spades. Each spade costs £10. Fresh supplies can be obtained immediately but ordering cost is £120 per order. Annual cost of holding one spade is estimated to be £1.
- What is the total annual cost?

Solution

$$\begin{aligned}\text{Total Annual Cost} &= \text{Holding Cost} + \\ &\quad \text{Ordering Cost} \\ &= \text{Average stock} \times \text{holding cost} + \text{No. of} \\ &\quad \text{orders per annum} \times \text{Ordering cost} \\ &= [(2300/2) \times 1] + [(22,050) / 2300] \times 120 \\ &= \text{£}2,300 \text{ (approx)}\end{aligned}$$

The EOQ with Discounts

- If quantity discounts are accepted this will have the following effects:
 - Annual purchase price will decrease
 - Annual holding cost will increase
 - Annual ordering cost will decrease

Question

- ABC plc is a retailer selling spades. The company has an annual demand of 22,050 spades. Each spade costs £10. Fresh supplies can be obtained immediately but ordering cost is £120 per order. Annual cost of holding one spade is estimated to be £1. EOQ is 2300 units.
- A 2% discount is available on orders of at least 3000 spades and that 2.5% discount is available if the order quantity is 4500 spades or above. Would the least cost order still be 2300?

Solution

Order Qty = EOQ of 2300 spades

Purchase cost = $22050 \times 10 = \text{£}220,500$

Stock holding cost = $\text{£}1,150$

Ordering cost = $\text{£}1,150$

Total cost = $\text{£}222,800$

Order Qty = 3000 spades

Purchase cost = $22050 \times 10 \times 98\% = \text{£}216,090$

Stock holding cost = $1 \times 3000 / 2 = \text{£}1,500$

Ordering cost = $120 \times 22050 / 3000 = \text{£}882$

Total cost = $\text{£}218,472$

Solution

Order Qty = 4500 spades

Purchase cost = $22,050 \times 10 \times 97.5\% = \text{£}214,987.5$

Stock holding cost = $1 \times 4500 / 2 = \text{£}2,250$

Ordering cost = $120 \times 22050 / 4500 = \text{£}588$

Total cost = $\text{£}217,825.5$

Costs are minimised with order size 4500 spades

Question

- ABC plc is a retailer selling spades. The company has an annual demand of 22,050 spades. Each spade costs £10. Fresh supplies can be obtained immediately but ordering cost is £120 per order. Annual cost of holding one spade is estimated to be £1. EOQ is 2300 units.
- Assume that the company adopts EOQ of 2300 spades as its order quantity and that it now takes 2 weeks for an order to be delivered. How frequently will the company place an order?

Solution

- Annual demand = 22050
- EOQ = 2300
- The company will place an order $22050 / 2300$ times = 9.58 times every year
which is $(2300 / 22050) \times 365$ days = 38 days (approx)

Question

- ABC plc is a retailer selling spades. The company has an annual demand of 22,050 spades. Each spade costs £10. Fresh supplies can be obtained immediately but ordering cost is £120 per order. Annual cost of holding one spade is estimated to be £1. EOQ is 2300 units.
- How much stock will it have on hand when the order is placed?

Solution

The company must make sure that there is sufficient stock to last the two weeks lead time. It must therefore place an order when there is 2 weeks worth of demand in stock

$$(2 / 52) \times 22050 = 848 \text{ units}$$

Economic Batch Quantity (EBQ) Model

- **Relevance:** Used by organisations that manufactures and stores their own products
- **Decision:** Whether to produce large batches at long intervals or produce small batches at short intervals

Economic Batch Quantity (EBQ) Model

- It is also called Optimal Batch Quantity.
- It is a measure used to determine the quantity of units that can be produced at minimum average costs in a given batch or production run.
- EBQ is an amended EOQ.

EBQ

- Ordering cost is replaced by Machine Setup Cost.
- In EOQ inventory is replenished instantaneously whereas in EBQ it is replenished over a period of time
- Depending on demand rate, part of batch will be sold while the remainder is still being produced
- For the same size of batch (Q), average inventory held under EOQ is greater than under EBQ

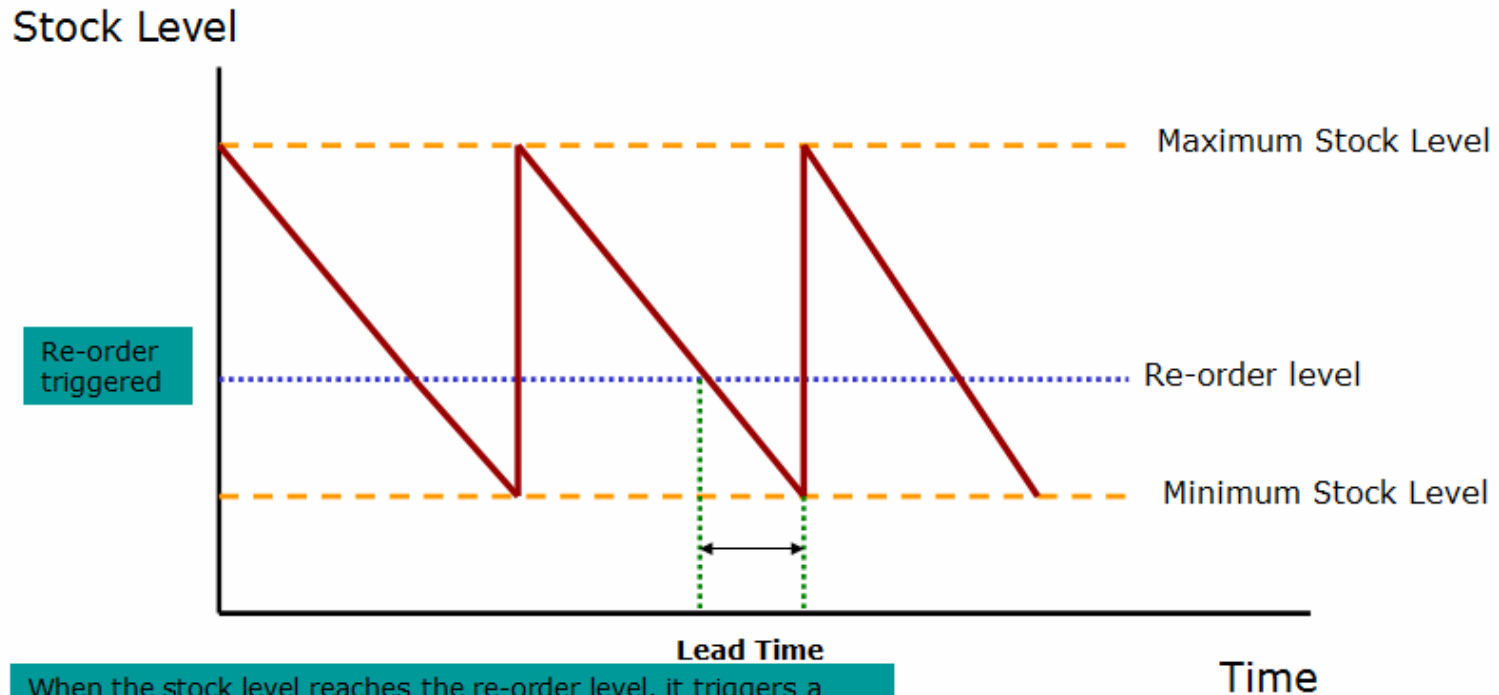
EBQ

- Economic Batch Quantity

$$= \sqrt{\frac{(2 \times \text{Cost of setting up a batch} \times \text{Demand per annum})}{(\text{Holding cost per unit}) \times (1 - \text{Demand per annum} / \text{Annual Replenishment Rate})}}$$

Where demand per annum / Annual Replenishment Rate indicates the rate at which stock increases.

Reorder Levels



When the stock level reaches the re-order level, it triggers a new order. The difference between the time of re-order and delivery is the 'lead time'.

Reorder Level

- Level of stockholding at which a fresh order is placed with a supplier
- Re-order level
 - = Maximum demand for the stock item during the lead time
 - = Maximum supply lead time (in days or weeks) x Maximum daily or weekly demand for the item

Question

- A company operates a fixed re-order level of stock control and sets the re-order level so as to avoid the risk of stock-outs. It is trying to establish a re-order level for its stock item X5
- The daily demand of X5 is expected to be between 60 -100 tonnes. The lead time is between 1 and 3 days
- What should be the reorder level for X5?

Solution

- Reorder level = Maximum supply lead time (in days or weeks) x Maximum daily or weekly demand for the item
= 3 x 100 = 300 tonnes

Control Levels of Stock

- **Minimum level**

= Re-order level – (Average demand of the item x average length of lead time)

- **Maximum Level**

= Re-order level + Re-order quantity – (Minimum usage per day x minimum lead time per order)

Question

- ABC plc places an order of 500 units, to replenish its stock of a Material K whenever the stock balance is reduced to 300 units. The order takes at least 4 days to be delivered and ABC plc uses at least 50 components each day. What is the maximum stock level?

Solution

- Maximum level = $300 + 500 - (50 \times 4) = 600$ units