

Topic 2:

Direct material costs

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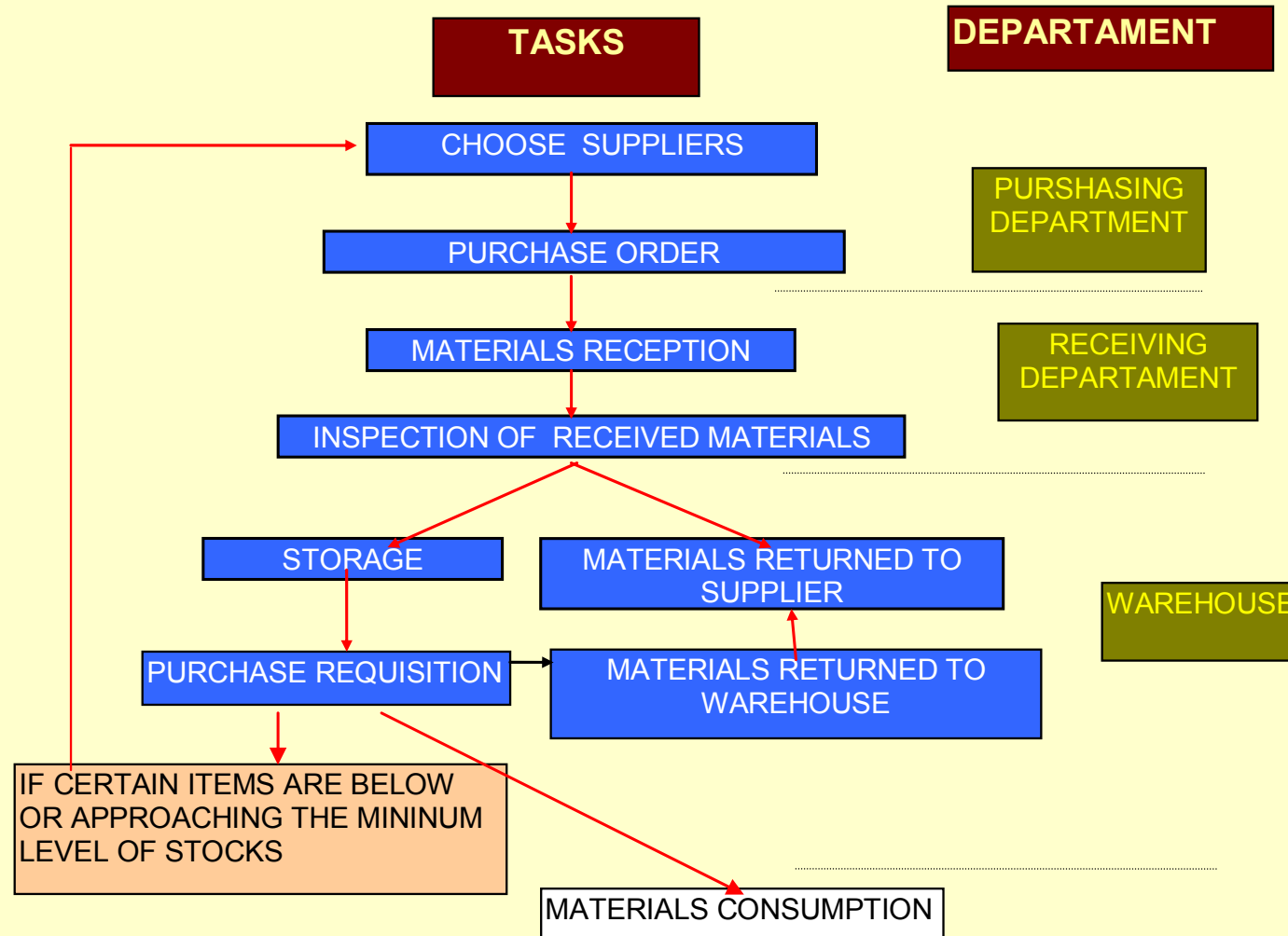
School of Business Administration
Course: Cost Accounting and Management Control
Bachelor's Degree in Management and Business Administration

- 2.1. Introduction.
- 2.2. Perpetual inventory.
- 2.3. Determining direct material costs.
- 2.4. Quantitative methods in stock control systems.

2.1: INTRODUCTION.

Direct material cost refers to the cost of materials which are conveniently and economically traceable to specific units of output.

2.2: PERPETUAL INVENTORY.



The following are the objectives of a good system to control materials:

1. Materials of the desired quality will be available for efficient and uninterrupted production.
2. The investment in materials will be maintained at the lowest level consistent with operating requirements.
3. Purchase of materials will be made at the most favourable prices under the best possible terms.
4. Materials will be stored in such a way that a minimum of handling time and costs is achieved.

2.3: DETERMINING DIRECT MATERIAL COSTS.

Direct material costs include:

a) DIRECT COSTS:

- Invoice price.
- Other costs of bringing the materials to the factory (freight, insurance, etc.).
- Indirect costs: material handling charges (costs involved in receiving, storing and handling materials). They are usually treated as indirect costs, since it is difficult to apportion them to various materials.

b) FINANCIAL COSTS: associated with the money invested in materials.

Budgeted indirect material costs must be assigned to different products, so budgeted rates should be established, based on annual estimated costs in the various departments and their activities.

RATES FOR THE PURCHASING DEPARTMENT

If the different orders to be placed have a similar invoice price and there is a limited number of well-known suppliers:

$$\frac{\text{Budgeted annual Purchasing Department costs}}{\text{Estimated annual number of orders to be placed}}$$

On the other hand, if there is a significant difference in the value (€) of the different orders to be placed:

$$\frac{\text{Budgeted annual Purchasing Department costs}}{\text{Estimated annual value (€) of orders to be placed}}$$

RATES FOR THE RECEIVING DEPARTMENT

If the different materials' inspection time is likely to be similar:

$$\frac{\text{Budgeted annual Receiving Department costs}}{\text{Estimated annual number of units to be received}}$$

On the other hand, if the most expensive materials should require a more detailed inspection:

$$\frac{\text{Budgeted annual Receiving Department costs}}{\text{Estimated annual value (€) of units to be received}}$$

RATES FOR WAREHOUSE

There are different cost concepts:

- Labour costs (employees).
- Renting/Depreciation of the premises.

Thus, different rates should be used.

LABOUR COSTS:

If there are no significant differences in control activities:

$$\frac{\text{Budgeted annual Warehouse Department labour costs}}{\text{Estimated annual number of units to be stored}}$$

If there are significant differences in control activities:

$$\frac{\text{Budgeted annual Warehouse Department labour costs}}{\text{Estimated annual value (€) of units to be stored}}$$

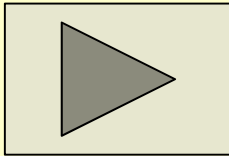
RENTING/DEPRECIATION COSTS:

If the different materials are stored for a similar period of time, costs are to be allocated depending on surface or volume:

$$\frac{\text{Budgeted annual Warehouse Department renting/depreciation costs}}{\text{Estimated m}^2 / \text{m}^3}$$

On the contrary, if storage time differs significantly:

$$\frac{\text{Budgeted annual Warehouse Department renting/depreciation costs}}{\text{Estimated storage time}}$$



Task: try to solve problem 2.1.

2.4: QUANTITATIVE METHODS IN STOCK CONTROL SYSTEMS.

The **economic order quantity (EOQ)** is based on a model that takes the estimated demand for a product over a period and divides this up into a number of equal-sized batches for which purchase orders should be placed. Since each order is of equal size, the frequency of placing orders during the period is also established.

The EOQ model finds a balance between two opposing costs:

- The cost of placing orders (salaries, stationery, telephone, etc.).
- The cost of holding stocks (cost of capital invested in stock, insurance, handling, etc.).

If only one order is placed, ordering costs can be reduced to almost zero, but this implies a high cost of holding stock. On the contrary, if frequent small orders are placed, the cost of holding stock will be reduced but there will be a significant increase in the cost of placing orders.

The EOQ model is based on a given set of assumptions:

- 1) Demand is known with certainty.
- 2) Purchasing cost per unit is unaffected by the order quantity (there are no bulk discounts): this makes purchasing costs irrelevant to determining EOQ because purchasing price is the same, whatever the size of the orders.
- 3) Ordering costs vary according to the number of orders placed.
- 4) Stock holding costs are constant per unit.

We use the following concepts:

D – Demand in units over a specified period.

p – Purchasing price per unit.

r – Cost of holding one unit in stock over the time period used in D.

k – Relevant ordering cost per order.

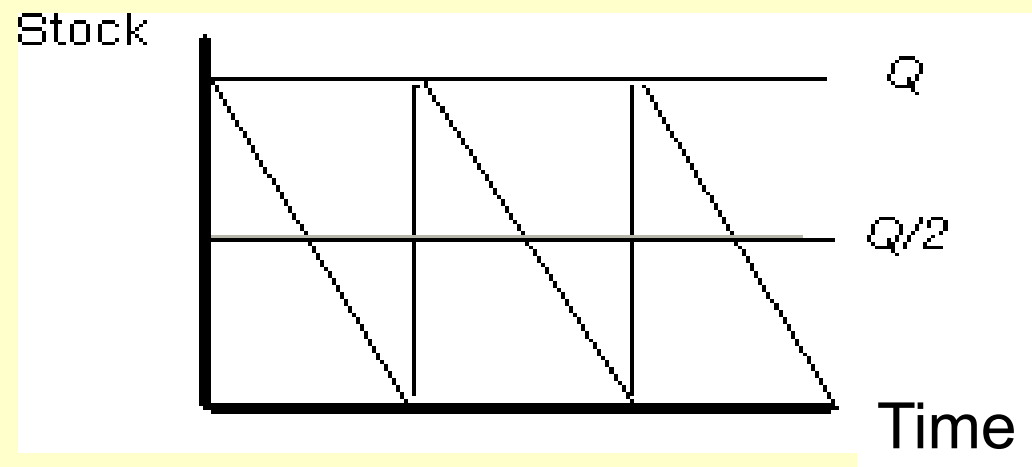
Q – Size of each order (order quantity).

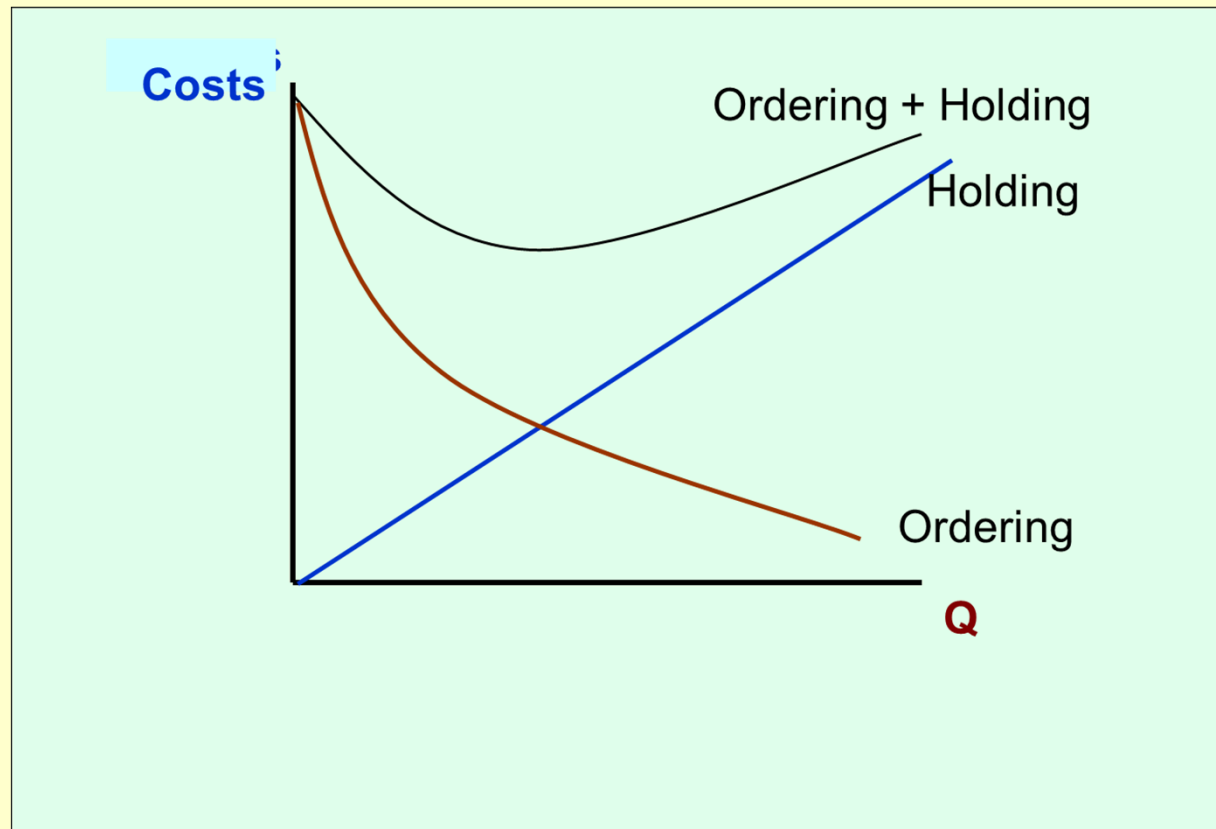
Our goal is to minimize total costs (**TC**):

TC= Purchasing cost + Holding costs + Ordering costs

$$TC = (D \times p) + \left(r \times \frac{Q}{2} \right) + \left(k \times \frac{D}{Q} \right)$$

Each time the inventory falls to 0, an order for Q units is placed. The inventory varies between Q and 0, so the average inventory is Q/2.





We take the first derivative of TC with respect to Q and set it at 0:

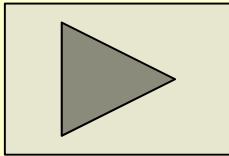
$$r/2 - (k \times D / Q^2) = 0$$

$$r \times Q/2 = k \times D / Q \quad (1)$$

$$Q = \sqrt{\frac{2 \times k \times D}{r}}$$

(1) Total costs are minimized when ordering costs equal holding costs.

The formula indicates that the EOQ increases with higher demand and/or higher ordering costs and decreases with higher holding costs.



Task: try to solve problem 2.2.