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Accounting for Materials

AAT Level II

AFC - Advanced Financial Accounting & Costing

Chandima Prabhath
B.Sc (Accounting) Sp. (USJ), CA Finalist, CMA Finalist, AAT Finalist (Prize Winner), Dip. in English

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JMC Jayasekera Management Centre (Pvt) Ltd
Pioneers in Professional Education
65/2A, Chittampalam Gardiner Mawatha, Colombo 02 | T: +94 112 430451 | E: info@jmc.lk | F: +94 115 377917

Chapter 03

AAT 02
Advanced Financial Accounting and Costing

Accounting for Materials

Chandima Prabhath
B.Sc. Accounting (special) USJ (UG)
AAT Passed Finalist (Prize Winner)
CMA Finalist (Prize Winner)
CASL (Finalist)

OVERVIEW

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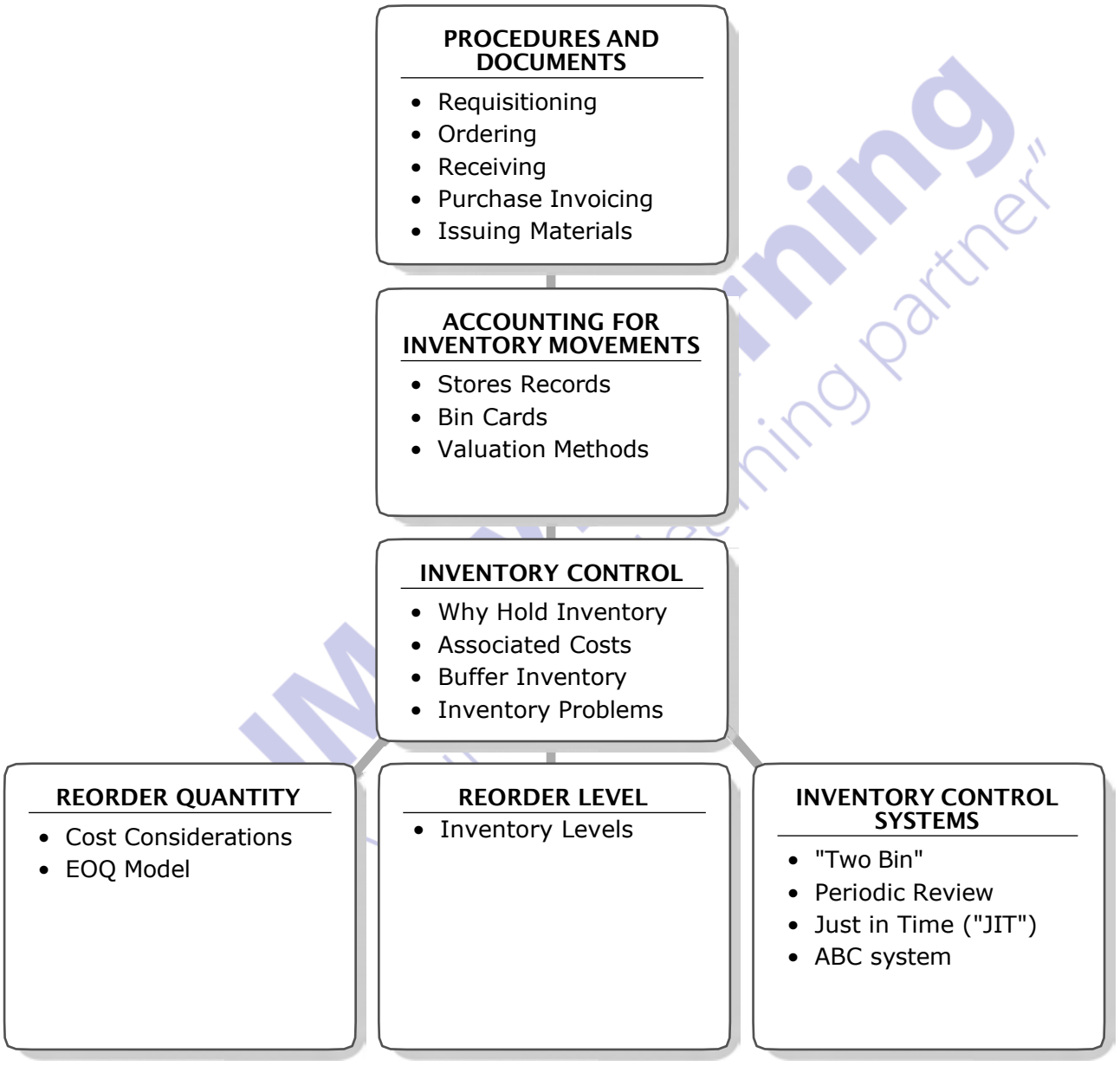
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1. Purchasing Process

For inventory purchases the process starts with the requistion of materials.

1.1 Requisitioning

- Storekeeper requests purchasing department to obtain reorder quantity from appropriate supplier.
  - Documentation is a ***purchase requisition***, which is authorised to raise a purchase order.
- Production department requests transfer of raw materials from stores to the factory.
  - Documentation is a *materials requisition* (s.2), where items are dispatched to production and inventory records updated.

1.2 Ordering

- Purchasing officer (or buyer) requests supply of materials listed. A copy is sent to goods inwards/warehouse.
  - Documentation is a *purchase order* (PO), which specifies quantity, price, delivery date and terms.

1.3 Receiving

- Goods are inspected and checked to the supplier's *delivery note* and copy purchase order before being recorded.
  - Documentation is a *goods received note* (GRN), which creates a common format.

1.4 Purchase Invoicing

- When a supplier's invoice is received it is checked to a GRN before being authorized for payment.
  - Documentation is a *purchase invoice*.

Illustration 1 Purchase Requisition Note (PRN)

PURCHASE REQUISITION		**Serial No.** 17293 **Date** 8/12/2022
Quantity	**Description**	**Code or reference**
10 boxes	5 star office lever arch file 70mm A4 Cloudy Grey (Pack of 10)	8792
Date required:		**REQUISITIONED BY:**
CHARGE ACCOUNT: Department: Job: Stock account:		Dept: Signature:

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Illustration 2 Purchase Order (PO)

ABC Ltd	Order No	
	Date	8/12/2023
	PR No	12293

PURCHASE ORDER

To: XYZ Ltd.

DESCRIPTION	QUANTITY	CODE	PRICE
5 star office lever arch file 70mm A4 Cloudy Grey	10 boxes	8792M	$13.58 per box

REQUIRED BY: 15/12/2011 DELIVER BY: 14/12/2011

Please supply the above goods.

BA Dowling
Purchasing Officer

Illustration 3 Goods Received Note (GRN)

GOODS RECEIVED NOTE

Received from: Lyreco **GR number:** 00356
Delivery note number: 2641 **Date:** 13/12/2011

DESCRIPTION	QUANTITY	ORDER NO
5 star office lever arch file 70mm A4 Cloudy Grey	10 boxes	5483
Inspector's report: Good condition		**Received by:** David South

1.5 Issuing Materials

- The materials requisition form details the materials that are wanted for the production process.*
- It is used by the storekeeper as:
  - an authorization to issue stated materials (i.e. transfer to the factory);
  - a source document to record material usage.

*Commentary

*Materials requisition forms are a key source of materials data and are used for updating raw materials inventory ("stores") records.

Illustration 4 Materials Requisition note (MRN)

Materials (or Stores) Requisition **Number:** 02344

Originated by Dept: **Date:** 14/12/2023

CHARGE TO: (Job or Department)

			For Cost Office use	
Code	**Description**	**Quantity**	**Price**	**Amount**
8792M	5 star office lever arch file 70mm A4 Cloudy Grey	1 box		

Authorized by: _____

Issued by:

Date of issue:

2 Accounting

2.1 Stores Record Cards/Inventory Cards

Prepared for *each item* of material. These show:

- the identification information and location in stores;
- the quantities on order/received/issued and a running balance of quantity in inventory;
- the prices and values of all receipts and issues; and
- the control quantities (e.g. maximum or minimum reorder levels and reorder quantity).

2.2 Bin Cards

Prepared for each *bin* or storage location, the data on these is usually limited to:*

- the location code of bin;
- the identification of material; and
- the receipts, issues and remaining balance of material held in that location.

2.3 Inventory Valuation Methods

2.3.1 Need For

- The cost of materials purchased normally will be derived from suppliers' invoices.
- Where identical purchases have been made at differing prices and it would be impractical to identify individual items, a valuation method will be needed. For example:
  - First in, first out (FIFO);
  - Last in, first out (LIFO);
  - Periodic (simple) average cost;
  - Weighted average cost;
  - Standard cost.

Exam Advice

In periods of rising prices (which is the norm), FIFO shows higher inventory values and higher profits than LIFO.

2.3.2 FIFO

- For raw materials, the units *purchased first* are deemed to be the *first issued* to be used in production.*
- The unit cost for the first batch received (i.e. "first in") is the issue price until the whole batch has been issued—then the unit cost of the next batch in becomes the issue price.

***Commentary**

*Similar to raw materials, for finished goods, the units manufactured first are deemed to be the first sold (e.g. cars finished on a production line).

2.3.3 LIFO

- For raw materials, the units purchased most recently (i.e. last) are deemed to be the first issued to be used in production.*
- If a new batch is received before the previous batch is fully issued, the new cost becomes the "last in" price until:
  - the new batch is fully issued (when the previous last in price will apply); or
  - a new delivery received (when the cost of the new batch will apply).

***Commentary**

*It is possible for the last units purchased to be first used when a "bin" system is used and the items first removed from the top were the last to be put in.

2.3.4 Weighted Average

- A weighted average price is calculated by *weighting* according to the number of units purchased at each price.*
- The average price at any time is the total inventory value divided by the number of units on hand.

$$\text{Weighted Average Price} = \frac{\text{Total Cost of the inventory at the issue date}}{\text{Total Number of units at the issue date}}$$

Example 1 Inventory Valuation Methods

The following data relate to the receipts and issues of an item in January. There was no opening inventory.

5 January	Receive 100 items @ Rs.5.00 each
16 January	Receive 50 items @ Rs. 5.50 each
17 January	Issue 40 items
20 January	Issue 70 items
23 January	Receive 50 items @ Rs.6.00 each
30 January	Issue 70 items

Required:

Calculate the value of closing raw materials inventory using the following methods to price issues:

(a) FIFO **(b) LIFO** **(c) Weighted average**

2.3.5 Comparison of Methods

	Advantages	Disadvantages
FIFO	• Provides an up- to-date closing inventory value (i.e. fair and commercial). • A realistic reflection of physical movement of materials (e.g. on a "conveyor belt").	• Out-of-date cost of issues (if prices are increasing or inventory held is old). • Tedious record keeping. • Identical jobs may have different costs.
LIFO	• Provides an up-to- date cost of issues to production (i.e. reflects current economic values).	• Out-of-date closing inventory valuation (if purchased some time ago). • Often unrealistic as oldest materials, etc should be issued first. • Tedious record keeping.
Weighted average	• Provides a compromise between inventory valuation and pricing of material issues. • Realistic for identical items to have the same value. • Simplifies record keeping.	• Tedious calculations of weighted average (on every receipt). • Issue price may be fictional (i.e. not an actual price).

3 Inventory Control

3.1 Reasons for Holding Inventory

- To satisfy customer demand or avoid production stoppages (raw materials).
- To provide a "buffer" if there are shortages in supplies, high demand for inputs or a long "lead time" *(i.e. waiting on receipt of goods)*.
- To take advantage of quantity discounts.
- To buy in ahead of a shortage or price rise.
- For technical reasons

3.2 Inventory Related Costs

Purchase price +/- conversion costs	■ after quantity discounts (trade discounts) ■ labour, overheads, etc
Holding costs	■ cost of capital tied up (often largest component) ■ insurance ■ obsolescence (deterioration/perishing), pilferage (i.e. theft) ■ warehousing (and other "space" costs) ■ stores administration
Procurement/ ordering costs	■ transport (goods inwards) ■ clerical and administration ■ batch set-up costs
Shortage costs*	■ production stoppages (caused by lack of raw materials) ■ "stock-out" costs for finished goods (lost sales/goodwill) ■ emergency costs of remedial action

*Commentary

***Assuming no discounts and no shortages, the only costs which vary with the level of inventory are variable holding costs and the fixed costs of placing an order.

3.3 Buffer Inventory

Buffer inventory is inventory held as a reserve principally against short-term shortages (of raw materials).

- Buffer inventory also may be held to provide a cushion against excessive fluctuations in purchase prices of supplies. The buffer may be used to avoid having to pay premium prices during a shortage or "out of season".
- Where buffer inventory is held:*
  - there will be an associated cost of holding it (depending on the level);
  - if the level does not change the cost of holding it will be fixed for a period.
  - One of the assumptions of the "economic order quantity (EOQ) model", which follows, is that there is no requirement for such "safety" or buffer inventory.

3.4 Inventory Decisions

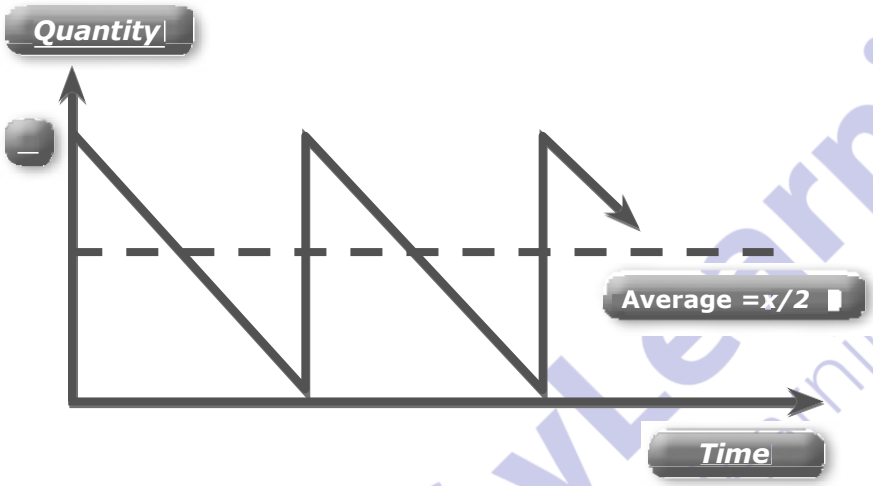
- *How much* to order at a time ➲ economic order *quantity* **(EOQ).**
- *When* to place an order ➲ *reorder level* **(ROL).**

4 Controlling Purchase of materials

4.1 Relevant Cost Considerations

4.1.1 Annual Holding Cost

- Holding costs that vary with inventory levels are relevant.*
  - For example, opportunity cost of capital invested in inventory.
  - As order quantity ↑, inventory holding ↑ therefore total annual holding cost (TC_h) ↑.
- If *x* is the reorder quantity and it is consumed at a constant rate, then:



- If holding a unit in inventory for one year costs Rs.Ch then the annual inventory holding cost (TCh) is **(x/2)*Ch**

*Commentary

*Holding costs that do not vary are irrelevant (e.g. fixed annual insurance premium, storekeepers' salaries, depreciation of warehouse, etc).

Acquisition costs of purchase/manufacture are also irrelevant.

4.1.2 Annual Order Cost

- There is an incremental cost to placing each order to buy more inventory.
  - For example, each order may have a fixed cost of placing it due to the cost of sending a fax.
  - As order quantity ↑, number of orders ↓. Therefore total annual ordering costs (TC_o) ↓.
- If C_o is the fixed cost of an order and D the demand per annum in units, then the annual order cost (TC) is **(D/ROQ)*Co**

4.1.3 Graphical Representation

Example 2 Annual Total Cost

D = 40,000, C_o = Rs.2 and C_h = Rs.1

Required:

Find the annual ordering cost, annual holding cost and annual total cost when orders of the following sizes are placed:

(a) 200

(b) 400

(c) 600

Solution

(a) Q = 200

Annual ordering cost =

Annual holding cost =

Total cost =

(b) Q = 400

Annual ordering cost =

Annual holding cost =

Total cost =

(c) Q = 600

Annual ordering cost =

Annual holding cost =

Total cost =

Summary

	(i) Order	(ii) Holding	(iii) Total
(a)			
(b)			
(c)			

4.2 Economic Order Quantity Model

4.2.1 Symbols Used

Co = Cost of placing order

Ch= Cost of holding one unit for a year

D = Annual demand

Q = Order quantity

Illustration Total Annual Costs

Annual demand for an inventory item (D) is steady at 120 units. The incremental cost of ordering the inventory (Co) is Rs.20 and the cost of holding a unit of inventory for a year (Ch) is Rs.3.

Solution

Order quantity Q	Average inventory Q/2	Annual holding cost $QC_h/2$	Numbers of orders p.a. D/Q	Annual reorder cost C_oD/Q	Total annual cost $QC_h/2 + C_oD/Q$
120	60	180	1	20	200
60	30	90	2	40	130
40	20	**60**	3	**60**	**120**
30	15	45	4	80	125
20	10	30	6	120	150
10	5	15	12	240	255

4.2.2 EOQ Formula

$$EOQ = \sqrt{\frac{2C_oD}{C_h}}$$

In the above illustration, $EOQ = \sqrt{\frac{2 \times \$20 \times 120}{\$3}} = 40$

Exam Advice

The EOQ formula is provided in the exam and the derivation of this formula is *not* examinable.

4.2.3 Assumptions (Limitations of the Basic Model)

These assumptions can be also considered limitations of the basic model.

- ✗ Constant unit purchase price (i.e. no discounts).
- ✗ Constant demand (or instantaneous resupply).
- ✗ Constant lead time.
- ✗ No shortage costs because "stock outs" will not arise (so no safety stock requirement).
- ✗ Reorder cost is independent of order size.
- ✗ Holding cost per unit (C_h) is constant (i.e. no stepped costs such as additional storekeepers).
- ✗ Average inventory holding is $\frac{X}{2}$ (i.e. constant rate of consumption).

Example 3 EOQ

D = 40,000, Co = Rs.2 and Ch = Rs.1.

Required:

Calculate:

(a) the economic order quantity

(b) the number of orders to be placed each year

(c) the frequency of orders (assume 300 working days).

Solution

(a) EOQ =

(b) Number of orders =

(c) Frequency of orders =

5 Other Inventory Control Systems

Definition - Lead Time

Lead time is the time between placing an order and the actual delivery of goods.

5.1 Establishing Inventory Levels

5.1.1 Re-order Level (ROL)

Re-order Level	**=**	**Maximum Usage x Maximum Lead Time**

5.1.2 Maximum Inventory Level

Maximum Inventory Level	**=**	**ROL**	**+**	**ROQ or EOQ**	**-**	**(Minimum Usage x Minimum Lead Time)**

5.1.3 Minimum Inventory Level

Minimum Inventory Level	**=**	**ROL**	**-**	**(Average Usage x Average Lead Time)**

5.1.4 Average Inventory Level

Average Inventory Level	**=**	**(Maximum Inventory Level +Minimum Inventory Level)**	**/**	**2**

Average Inventory Level	**=**	**Minimum Inventory Level**	**+**	**(EOQ)/2**

Example 4 Inventory Levels

Monthly Maximum Usage = 200 KGs
Monthly Minimum Usage = 100 KGs
Lead time = From 02 months to 06 months
Reorder quantity (EOQ) = 750 KGs

Required:

Calculate:

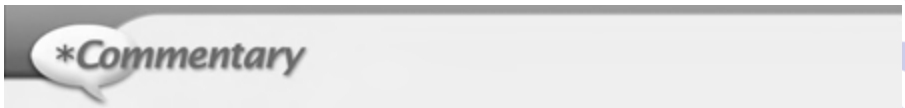
(a) **the Re-order Level**
(b) **the Maximum Inventory Level**
(c) **the Minimum Inventory Level**
(d) **the Average Inventory Level**

5.2 "Two Bin" System

- Determine optimum reorder levels and reorder quantities (e.g. as above).
- When inventory falls to reorder level ("reserve" bin), place an order for *fixed quantity* of inventory.
- On receipt of order, top up "reserve" bin and put balance into main bin.
- The reorder quantity which *minimises total inventory costs* is the EOQ.

5.3 Periodic Review System

- The periodic review system determines a review period (e.g. to fit in with production schedules) and maximum inventory levels. (Also called "cyclical review" or "P system"—P for period).
- At the end of each *fixed time interval* place an order to replenish inventory to maximum.*



*The time interval which minimises the annual cost of acquiring and holding inventory is called the "economic review period".

In a JIT purchasing system, material purchases are contracted so that receipt and usage coincide to the maximum possible extent.

5.4 Just in Time ("JIT")

JIT is a production planning technique that emphasizes acquiring materials and producing goods and services (both internally and externally) at the moment they are required.

- This "pull" system is driven by demand for finished products.
- Each component on a production line is produced only when needed for the next processing stage.

5.4.1 Necessary Conditions

■ Cooperation/flexibility of suppliers and internal workers. May need a core workforce and part-time/freelancers to change working hours from one period to the next.	■ To change output at short notice.
■ Guaranteed quality of raw materials.	■ Must be maintained in production.
■ Geographical proximity.	■ To make immediate deliveries.
■ Low inventory levels and short production runs.	■ Therefore need low set-up costs.

5.4.2 Advantages and Disadvantages

Advantages

- ✔ Inventories kept to absolute minimum (inventory holding costs ↓).
- ✔ Space saving.
- ✔ Less obsolescence when product specifications change.

Disadvantages

- ✗ Risk of "just too late".
- ✗ More frequent handling of smaller batches (reorder and set-up costs ↑).
- ✗ Higher cost of monitoring and control.
- ✗ Increased stress.

5.5 ABC Coding Systems

- ABC coding systems direct maximum inventory control effort to the most important (e.g. highest value) items. For example, this is useful for businesses with several thousand products.*
- The total purchase cost of each inventory item needs to be estimated for a period:
  - "A" items represent the top 10% in terms of annual purchase cost (require greatest control through quantitative techniques);
  - "B" items represent the next 20% (require less sophisticated control);
  - "C" items represent the remaining 70% (may be controlled subjectively).

*Alternative classifications to the highest value may be according to the level of difficulty of getting replacements or importance to the production process.

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