Chapter 2

MATERIAL ACCOUNTS - 1

Introduction

- In a manufacturing organization, the cost of raw-materials forms a major factor in the cost of production. The percentage is on average 35 to 40%. As Wheldon has put it: "In the majority of industries, more than 50% of the total production cost of a product is represented by direct materials. Large amount of capital invested is locked up in stock of materials and the cost of maintaining these stocks can amount to about 25% of the value of stocks."
- This is an adequate proof of the importance of materials in industries. Lack of control over materials would lead to wastage and even pilferage. On the contrary, a substantial saving would be effected in the cost of production if only proper check over materials is maintained and that would be directly reflected in the profits. Materials are no less important than cash and as much care of materials is required as that of cash in any manufacturing company.

Definition

- In the words of Wheldon, "Direct material is all material that becomes a part of the product, the costs of which are directly charged as part of the prime cost. In other words, it is the material which can be measured and charged directly to the cost of the product."
- This definition brings out the following features:
  - Cost of direct material is a direct expense.
  - Hence, it becomes a part of the Prime Cost.
  - It can be separately measured and costed.
  - It becomes a part of the finished product.

Types of Materials

- Materials can be classified on the basis of two factors, viz. (1) the use of materials and (2) their characteristics.
- On the basis of the use, materials have been grouped into (a) Direct materials and (b) Indirect materials.
  - We have seen that the material that becomes part of the product is treated as **direct material**. Wood used in the manufacture of tables, yarn used in weaving cloth are few examples of direct materials.
  - **Indirect material** is that which cannot be traced as part of the product. Items used in maintenance of plant and machinery i.e., consumable stores are indirect materials. Sometimes, materials of small value are also treated as indirect, as it would be expensive to analyze the cost such materials and allocate it to each unit of product.

Types of Materials

- On the basis of characteristics of materials, the classification may be given as under:
  - **Raw materials:** The materials which are generally purchased from outside and consumed in the process of manufacture are termed as raw materials. Ordinarily, it becomes a part of the product and is known as Direct Material.
  - **Component Parts:** When a finished product is made up of two or more parts assembled, the parts may be purchased from outside sources or may be manufactured in the factory. No further processing is required on such part in the course of manufacturing. Such parts, of which the final article is made, are known as Component Parts.
  - **Semi-finished Goods:** Goods which are not in saleable state, on which some processes have been performed, and which require further processing before being transferred into finished stock are known as semi-finished goods.

- **Finished Stock:** They are those goods which are in saleable state and on which no more manufacturing operation is necessary.
- **Consumable Stores:** Materials like oil, grease, cotton waste, etc. which are generally required for operating and maintaining the machinery and equipment are termed as consumable stores. They are auxiliary items of store, not becoming a part of the product but simply assisting production.
- **Scrap:** Waste of materials arising in the course of manufacturing as well as spoiled or defective materials are called scrap.
- **Work-in-progress:** The goods still in the process of being manufactured, on which some process is partly done are work-in-progress.
- **Defective Work:** Defective work is that product which contains a manufacturing defect and cannot be sold without correcting such defect. If products cannot be corrected, then they are sold as second.

Objectives of Material Control

- Adequate Stock
- Minimize Inventories
- Maintaining Continuity of Production
- Minimize Cost of Purchasing and Storage
- Reduce Wastage and Losses
- Minimize Risk of Obsolescence
- Effective Use of Funds
- Assisting Purchase of Material
- Giving Maximum Satisfaction to Customers
- Reducing Loss Due to Fall in Prices
- Maximum Use of Space
- Proper Storage
- Helps Financial Planning and Preparations of Budgets

Setting Stock Levels

- In order to reduce the cost of materials to minimum, there should not be over investment in materials. Likewise the production should not be held up for want of materials. Hence, the stores control demands that the minimum level of stock should be fixed below which stock should not fall; the maximum level should be fixed beyond which the stock should not rise and ordering level should also be fixed when the steps should be taken to place the order for fresh supplies.

- **Maximum Level:** Maximum level is the quantity of stock on hand at any time, beyond which it should not be allowed to rise. Otherwise it would result into over-investment in materials resulting into loss of interest on capital unnecessarily locked up. Deterioration of goods and risk of obsolescence are the two dangers of overstocking. Hence, maximum level of stock should be fixed for each type of materials.

- **Maximum Level = Ordering level – (Minimum Consumption × Minimum delivery period) + Ordering Quantity**

- **Minimum Level:** The quantity of materials below which it should not be allowed to fall is the minimum level. If it falls below this level, the production may be held up for want of raw materials. Whereas the maximum level fixed the higher limit, the minimum level determines the lower limit. Two important factors should be taken into account while determining the minimum level, viz. (1) the time required to obtain the fresh supplies and (2) the average rate of consumption per unit of time.

- **Minimum Level =Ordering level – (Average Consumption × Average delivery period)**

- **Ordering Level (Re-Ordering Point):** It is the level of stock of which the store-keeper must ask the Purchase Department to place an order for supplies of materials. When the stock has reached a particular level, an order must be placed for fresh supplies; otherwise a shortage may arise and production is held up. It is a point between maximum and minimum level. Suppose an order must be placed when the stock is 4,000 units only, then the ordering level is 4,000 units.
- **Ordering Level = Maximum Consumption × Maximum Delivery Time**

- **Danger Level:** *It is the level of stock below the minimum level, when immediate steps must be taken to obtain the fresh supplies from whatever sources available, otherwise the production would stop. This level is determined taking into account the time required to obtain the materials by the quickest mode of transport.*
- **Danger Level = Average Consumption × Maximum Delivery Time for emergency purchase**

- **Safety Stock:** *Determining safety level is important from viewpoint of control over material. When it takes a long time to receive raw materials or parts from suppliers it would be desirable to keep safety stock so that production is not interrupted. It makes production process smooth and prevents production stoppage.*
- **Safety Stock = Maximum Consumption × (Maximum Delivery Time – Average Delivery Time)**

- **Ordering Quantity OR Economic Order Quantity (EOQ):** The quantity of materials for which order must be placed is also known as ordering quantity. It is used either to mean the most economical quantity for which an order may be placed at any one time or the quantity, bulk or packing in which the material is generally available in market. For example, if a particular chemical is available in packing of 100 kgs. or its multiples only, then an order for at least 100 kgs. must be placed. Here, the ordering quantity is 100 kgs.

- **EOQ =** $\sqrt{\frac{2AO}{C}}$

Where, A =Annual Consumption or Quantity consumed in a year

O = Ordering Cost or Cost of placing an order

C =Carrying Cost or Cost of carrying inventory per year

- **If the carrying cost is given in percentage, then (P) or the price per unit is put in the denominator in the above formula. In that case, the formula will be as follows:**

- **EOQ =** $\sqrt{\frac{2AO}{CP}}$

- **The Various levels of materials are determined by following formulas:**

- Maximum Level = Ordering level – (Minimum Consumption × Minimum delivery period) + Ordering Quantity
- Minimum Level = Ordering level – (Average Consumption × Average delivery period)
- Ordering Level = Maximum Consumption × Maximum Delivery Time
- Danger Level = Average Consumption × Maximum Delivery Time for emergency purchase
- Safety Stock = Maximum Consumption × (Maximum Delivery Time – Average Delivery Time)
- $EOQ = \sqrt{\frac{2AO}{C}}$ OR $EOQ = \sqrt{\frac{2AO}{CP}}$ (If carrying cost is in percentage)

Example - 3: From the following data obtained in respect of an item of store, calculate the economic ordering quantity for the item:

(1) Total annual consumption 10,000 kgs.

(2) Cost of carrying inventory: 10%

(3) Ordering cost ₹ 8

(4) Purchase price per kg 40 paise

Solution:

Here, A = 10,000; C = 10%; O = ₹ 8 and P = ₹ 0.40

To find out Economic Ordering Quantity we use following formula:

$$EOQ = \sqrt{\frac{2AO}{CP}}$$

$$= \sqrt{\frac{2 \times 10,000 \times 8}{0.40 \times 10\%}}$$

$$= \sqrt{\frac{1,60,000}{0.04}}$$

$$= \sqrt{40,00,000}$$

So, EOQ = **2,000 units**

Example - 4: About 50 items required daily for a machine.

Cost of placing an order	₹ 50.00
Carrying cost per day per item	₹ 0.02
Lead period	35 days

Calculate: (1) Economic Ordering Quantity

(2) Re-order level

Solution:

(1) Here, A = 50; C = ₹ 0.02; O = ₹ 50.00 and Lead period = 35 days

To find out Economic Ordering Quantity we use following formula:

$$EOQ = \sqrt{\frac{2AO}{C}}$$

$$= \sqrt{\frac{2 \times 50 \times 50}{0.02}}$$

$$= \sqrt{\frac{5,000}{0.02}} \qquad = \sqrt{2,50,000}$$

So, EOQ = **500 units**

Note: Here we use daily consumption instead of annual consumption because in this sum carrying cost per unit is given on daily basis.

(2) Re-order level = Daily consumption × Lead period

= 50 units × 35 days

= **1,750 units**

Example - 5:

EOQ 200 units

Cost of placing an order ₹ 100 Annual

carrying cost 10%

Price per unit ₹ 130

Compute:

(1) Weekly consumption of material

(2) Number of orders to be placed in a year

Solution:

(1) Here, A = (?); C = 10%; O = ₹ 100 and P = ₹ 130

To find out Weekly consumption we use following formula:

$$EOQ = \sqrt{\frac{2AO}{CP}}$$

$$200 = \sqrt{\frac{2 \times A \times 100}{130 \times 10\%}}$$

$$200 = \sqrt{\frac{200A}{13}}$$

$$(200)^2 = \frac{200\,A}{13}$$

$$40{,}000 = \frac{200\,A}{13}$$

$$\frac{40{,}000 \times 13}{200} = A$$

So, A = **2,600 units**

Here, we want to find Weekly consumption and for that we divide annual consumption by number of weeks in a year.

$$\text{Weekly consumption} = \frac{\text{Annual Consumption}}{\text{No.of weeks}}$$

$$= \frac{2,600}{52}$$

So, weekly consumption = **50 units**

(2) $$\text{Number of orders placed in a year} = \frac{\text{Annual Consumption}}{\text{EOQ}}$$

$$= \frac{2,600\ units}{200\ units}$$

= **13 times**

Example - 6: Following information is available as regards consumption of a certain material in a factory:

Ordering quantity	:	3,600 units
Reorder period	:	3 to 5 weeks
Maximum consumption	:	900 units per week
Minimum consumption	:	300 units per week
Normal consumption	:	600 units per week

Calculate Ordering Level, Minimum Level, Maximum Level and Safety Stock.

Solution:

(1) Ordering level = Maximum consumption × Maximum delivery time

= 900 units × 5 weeks

= **4,500 units**

(2) Maximum level = Ordering level – (Minimum Consumption × Minimum delivery time) + Ordering quantity

= 4,500 – (300 × 3) + 3,600

= 4,500 – 900 + 3,600

= **7,200 units**

(3) Minimum level = Ordering level – (Average consumption × Average delivery time)

= 4,500 – (600 × 4)

= 4,500 – 2,400

= **2,100 units**

Where, average delivery time = $\frac{Minimum\ time + Maximum\ time}{2} = \frac{3+5}{2}$ = 4 weeks

(4) Safety Stock = Maximum consumption × (Maximum delivery time – average delivery time)

= 900 × (5 – 4 weeks)

= 900 × 1 week

= **900 units**

Example - 7: From the following details, find out Minimum Level, Maximum Level and Re-ordering Point:

Average Consumption :	Daily 10 units
Minimum Consumption :	Daily 5 units
Maximum Consumption :	Daily 15 units
Re-ordering Quantity :	500 units
Ordering (delivery) Period:	20 days to 30 days

Solution:

(1) Ordering level = Maximum consumption × Maximum delivery time

= 15 units × 30 days

= **450 units**

(2) Maximum level = Ordering level – (Minimum Consumption × Minimum delivery time) + Ordering quantity

= 450 – (5 × 20) + 500

= 450 – 100 + 500

= **850 units**

(3) Minimum level = Ordering level – (Average consumption × Average delivery time)

= 450 – (10 × 25)

= 450 – 250

= 200 units

Where, average delivery time = $\frac{Minimum\ time + Maximum\ time}{2}$

$= \frac{20+30}{2}$

= 25 days

Example - 42: From the following information of Prerana Ltd. find out:

(1) EOQ, (2) Ordering level, (3) Maximum level, (4) Minimum level, (5) Danger level and (6) Safety stock.

Annual Consumption	:	12,000 units
Cost per unit	:	₹ 1
Cost per order Inventory	:	₹ 12
carrying cost	:	20% p.a.

Lead time (maximum, average and minimum) (30-15-5 days)

Daily consumption (maximum, average and minimum) (45-33-15 units)

Maximum time of emergency procurement – 5 days

Solution:

(1) Here, A = 12,000 units; C = 20%; O = ₹ 12 and P = ₹ 1

To find out Economic Ordering Quantity we use following formula:

$$EOQ = \sqrt{\frac{2AO}{CP}}$$

$$= \sqrt{\frac{2 \times 12,000 \times 12}{1 \times 20\%}}$$

$$\sqrt{\frac{2,88,000}{0.20}}$$

$$= \sqrt{14,40,000}$$

So, EOQ = **1,200 units**

(2) Ordering level = Maximum consumption × Maximum delivery time

= 45 units × 30 days

= **1,350 units**

(3) Maximum level = Ordering level – (Minimum Consumption × Minimum delivery time) + Ordering quantity

= 1,350 – (15 × 5) + 1,200

= 1,350 – 75 + 1,200

= **2,475 units**

(4) Minimum level = Ordering level – (Average consumption × Average delivery time)

$= 1,350 - (33 \times 15)$

$= 1,350 - 495$

$= 855$ units

(5) Danger level = Average Consumption × Maximum time of emergency purchase

$= 33$ units $\times$ 5 days

$= 165$ units

(6) Safety Stock = Maximum consumption × (Maximum delivery time − average delivery time)

= 45 units × (30 − 15 days)

= 45 units × 15 days

= **675 units**

Example - 9: From the following information of Desai & Co. Ltd., find out:

(1) Re-Ordering level, (2) Minimum level, (3) Maximum level,
(4) Danger level and (5) Safety stock.

Maximum Procurement time	:	55 days
Maximum time of emergency procurement	:	5 days
Average Procurement time	:	50 days
Minimum daily consumption	:	1,200 units
Average daily consumption	:	1,500 units

Economic order quantity is 25% of Re-ordering level.

Solution: First we calculate minimum delivery time and maximum consumption.

$$\text{Average delivery time} = \frac{Minimum\ time + Maximum\ time}{2}$$

$$50\ \text{days} = \frac{Minimum\ time + 55}{2}$$

$$(50 \times 2) - 55 = \text{Minimum time}$$

$$\text{So, minimum time} = \boxed{45\ \text{days}}$$

$$\text{Average Consumption} = \frac{Minimum\ Consumption + Maximum\ Consumption}{2}$$

$$1{,}500\ \text{units} = \frac{1{,}200\ units + Maximum\ consumption}{2}$$

$$(1{,}500 \times 2) - 1{,}200 = \text{Maximum consumption}$$

$$\text{So, maximum consumption} = \boxed{1{,}800\ \text{units}}$$

(1) Re-Ordering level = Maximum consumption × Maximum delivery time

= 1,800 units × 55 days

= **99,000 units**

(2) Maximum level = Ordering level – (Minimum Consumption

× Minimum delivery time) + Ordering quantity

= 99,000 – (1,200 × 45) + 24,750

= 99,000 – 54,000 + 24,750

= **69,750 units**

Where, Ordering quantity = 25% of Re-ordering level

= 99,000 units × 25% = 24,750 units

(3) Minimum level = Ordering level – (Average consumption × Average delivery time)

= 99,000 – (1,500 × 50)

= 99,000 – 75,000

= **24,000 units**

(4) Danger level = Average Consumption × Maximum time of emergency purchase

= 1,500 units × 5 days

= **7,500 units**

(5) Safety Stock = Maximum consumption × (Maximum delivery time − average delivery time)

= 1,800 units × (55 − 50 days)

= 1,800 units × 5 days

= 9,000 units

8. (A) Vaspan Ltd. uses different types of materials A, B, C and D, in respect of which following information is available. Find out :

(1) Minimum level of material 'A' (2) Maximum level of Materials 'B'
(3) Safety stock of Materials 'C' (4) Ordering level of Materials 'D'

Particulars	A	B	C	D
Delivery time (Weeks)	3 to 4	4 to 5	6 to 7	7 to 8
Average weekly Consumption (units)	?	40	70	250
Maximum weekly Consumption (units)	55	45	?	?
Minimum weekly Consumption (units)	45	?	40	200
Ordering level (units)	—	50	—	100

Solution: (1) Minimum level of material 'A' = Ordering level – (Average consumption × Average delivery time)

= 220 – (50 × 3.5)

= 220 – 175

= **45 units**

Where, Ordering level = Maximum consumption × Maximum delivery time

= 55 units × 4 weeks = 220 units

Average delivery time = $\frac{Minimum\ time + Maximum\ time}{2}$

$= \frac{3+4}{2}$ = 3.5 weeks

Average Consumption = $\frac{Minimum\ Consumption + Maximum\ Consumption}{2}$

$= \frac{45+55}{2}$ = 50 units

(2) Maximum level of material 'B' = Ordering level – (Minimum consumption × Minimum delivery time) + Ordering Quantity

= 225 – (35 × 4) + 50

= 225 – 140 + 50

= **135 units**

Where, Ordering level = Maximum consumption × Maximum delivery time

= 45 units × 5 weeks = 225 units

$$\text{Average Consumption} = \frac{Minimum\ Consumption + Maximum\ Consumption}{2}$$

$$40 \text{ units} = \frac{45 + Minimum\ Consuption}{2}$$

So, Minimum Consumption = (40 units × 2) – 45 = 35 units

(3) Safety stock of material 'C' = Maximum Consumption × (Maximum delivery time – Average delivery time)

= 100 × (7 – 6.5)

= 100 × 0.5

= **50 units**

Where, Average Consumption = $\frac{Minimum\ Consumption + Maximum\ Consumption}{2}$

70 units $= \frac{Maximum\ Consuption + 40}{2}$

So, Maximum Consumption = (70 units × 2) – 40 = 100 units

Average delivery time = $\frac{Minimum\ time + Maximum\ time}{2}$

$= \frac{6+7}{2}$ = 6.5 weeks

(4) Ordering level of material 'D' = Maximum Consumption × Maximum delivery time

= 300 × 8

= **2400 units**

Where, Average Consumption = $\frac{Minimum\ Consumption + Maximum\ Consumption}{2}$

250 units $= \frac{Maximum\ Consuption + 200}{2}$

So, Maximum Consumption = (250 units × 2) – 200

= 300 units

Example – 10 (A): Calculate:

(1) Re-Ordering level, (2) Minimum level, (3) Maximum level,
(4) Economic Ordering Quantity (EOQ) from the following:

(1) Annual Consumption	13,000 units
(2) Cost of placing an order	₹ 25
(3) Carriage exp. (yearly) per unit	₹ 65
(4) Re-ordering time	4 to 6 weeks
(5) Weekly average consumption	250 units
(6) Weekly minimum consumption	125 units

Solution:

(1) Here, A = 13,000 units; O = ₹ 25 and C = ₹ 65 To find out Economic Ordering Quantity we use following formula:

$$EOQ = \sqrt{\frac{2AO}{C}}$$

$$= \sqrt{\frac{2 \times 13,000 \times 25}{65}}$$

$$= \sqrt{\frac{6,50,000}{65}}$$

$$= \sqrt{10,000}$$

So, EOQ = **100 units**

(2) Ordering level = Maximum consumption × Maximum delivery time

= 375 units × 6 weeks

= **2,250 units**

Where, Average Consumption = $\frac{Minimum\ Consumption + Maximum\ Consumption}{2}$

250 units $= \frac{125 + Maximum\ Consuption}{2}$

So, Maximum Consumption = (250 units × 2) – 125 = 375 units

(3) Maximum level = Ordering level – (Minimum Consumption × Minimum delivery time) + Ordering quantity

= 2,250 – (125 × 4) + 100

= 2,250 – 500 + 100

= **1,850 units**

(4) Minimum level = Ordering level – (Average consumption × Average delivery time)

= 2,250 – (250 × 5)

= 2,250 – 1,250

= **1,000 units**

Where, Average delivery time = $\frac{Minimum\ time + Maximum\ time}{2}$

$= \frac{4+6}{2}$ = 5 weeks

Inventory (Material) Turnover Ratio

- In order to ascertain the speed of movement of a particular item of material, the inventory turnover rate is calculated. In a store department how much of a particular materials is received, how much of that material is issued and what is the rate of turnover of receipt and issue of material is ascertained which is known as material turnover ratio.
- A high inventory turnover ratio indicates that a particular item of material or store is moving fast and as much investment in such inventory is minimum, whereas a low inventory turnover ratio indicates that an item is not consumed quickly and it leads to overstocking.
- In case of non-moving or obsolete item, the rate of inventory turnover is extremely less or zero. Thus inventory turnover is the ratio which the value of material consumed during a particular period bears to the average stock held during that period.

- *It can be calculated as under:*

$$\textbf{Inventory (Material) Turnover Ratio} = \frac{\text{Material Consumed (COGS)}}{\text{Average Stock}}$$

For calculating the inventory turnover ratio it is necessary to calculate

(i) Value of Material Consumed (Cost of Goods Sold) and

(ii) Value of Average Stock

(i) Material Consumed = Opening Stock + Purchase – Closing Stock

$$\textbf{(ii) Average Stock} = \frac{\textit{Opening Stock} + \textit{Closing Stock}}{2}$$

- On the basis of inventory turnover rate, we can find out the number of days in which turnover of a particular item takes place. This will indicate the number of days in which average stock of an item is consumed.

$$\textbf{Material Turnover in Days} = \frac{\text{Days during the period}}{\text{Material Turnover Ratio}}$$

Example – 10 (B): Calculate Material Turnover Ratio and Turnover Period from the following:

Particulars	Material X ₹	Material Y ₹	Material Z ₹
(1)Opening stock	37,500	80,000	17,500
(2)Purchases	1,17,500	2,00,000	52,500
(3)Closing stock	17,500	40,000	7,500

Solution: (1) For, Material X:

$$\text{Material Turnover Ratio} = \frac{\textit{Material Consumed (COGS)}}{\textit{Average Stock}}$$

$$= \frac{1,37,500}{27,500} \qquad = \mathbf{5\ times}$$

Where, Material Consumed = Opening stock + Purchases – Closing stock

= 37,500 + 1,17,500 – 17,500 = ₹ 1,37,500

$$\text{Average Stock} = \frac{\textit{Opening Stock} + \textit{Closing Stock}}{2} = \frac{37,500 + 17,500}{2} = ₹\ 27,500$$

$$\text{Material Turnover Period} = \frac{\textit{Days during the period}}{\textit{Material Turnover Ratio}}$$

$$= \frac{365}{5} \qquad = \mathbf{73\ days}$$

(2) For, Material Y:

$$\text{Material Turnover Ratio} = \frac{\textit{Material Consumed (COGS)}}{\textit{Average Stock}}$$

$$= \frac{2,40,000}{60,000} = \boxed{4 \text{ times}}$$

Where, Material Consumed = Opening stock + Purchases – Closing stock

= 80,000 + 2,00,000 – 40,000 = ₹ 2,40,000

$$\text{Average Stock} = \frac{\textit{Opening Stock} + \textit{Closing Stock}}{2} = \frac{80,000 + 40,000}{2} = ₹\ 60,000$$

$$\text{Material Turnover Period} = \frac{\textit{Days during the period}}{\textit{Material Turnover Ratio}}$$

$$= \frac{365}{4} = \boxed{91.25 \text{ days}}$$

(3) For, Material Z:

$$\text{Material Turnover Ratio} = \frac{\textit{Material Consumed (COGS)}}{\textit{Average Stock}}$$

$$= \frac{62{,}500}{12{,}500} \quad = \boxed{5 \text{ times}}$$

Where, Material Consumed = Opening stock + Purchases – Closing stock

= 17,500 + 52,500 – 7,500 = ₹ 62,500

$$\text{Average Stock} = \frac{\textit{Opening Stock+Closing Stock}}{2} = \frac{17{,}500 + 7{,}500}{2} = ₹\ 12{,}500$$

$$\text{Material Turnover Period} = \frac{\textit{Days during the period}}{\textit{Material Turnover Ratio}}$$

$$= \frac{365}{5} \quad = \boxed{73 \text{ days}}$$

Example – 15 (C): From the following information, find out Stock turnover rate:

(1) Opening stock	₹ 1,20,000
(2) Closing stock	₹ 84,000
(3) Purchases	₹ 3,95,000

Generally stock are valued at cost price plus 20%.

Solution: Here, first we have to find out cost price of stock.

As the stock is recorded 20% more than its cost price.

So, we assume cost price as ₹ 100, then book value is ₹ 120.

Here, Book value of opening stock is ₹ 1,20,000,

then cost price is $\frac{1,20,000}{120} \times 100$ = ₹ 1,00,000.

Same, cost price of closing stock = $\frac{84,000}{120} \times 100$ = ₹ 70,000.

Now, Opening stock = ₹ 1,00,000; Closing stock = ₹ 70,000 and Purchases = ₹ 3,95,000.

Material Turnover Ratio = $\frac{\textit{Material Consumed (COGS)}}{\textit{Average Stock}}$

$= \frac{4,25,000}{85,000}$ = **5 times**

Where, Material Consumed = Opening stock + Purchases – Closing stock

= 1,00,000 + 3,95,000 – 70,000 = ₹ 4,25,000

Average Stock = $\frac{\textit{Opening Stock} + \textit{Closing Stock}}{2} = \frac{1,00,000 + 70,000}{2}$ = ₹ 85,000

Material Turnover Period = $\frac{\textit{Days during the period}}{\textit{Material Turnover Ratio}}$

$= \frac{365}{5}$ = **73 days**

Example – 41 (B): The following have been extracted from the records of Karmali Co. Ltd. for the year 2019 and 2020:

Particulars	2019 (₹)	2020 (₹)
(1)Average Stock	(?)	80,000
(2)Opening Stock	80,000	(?)
(3)Purchases	4,14,000	(?)
(4)Adjusted Purchase	4,10,000	(?)
(5) Turnover Rate	(?)	9 times

From the above information find out:

For the year 2019:

(1) Material Turnover Rate

(2) Material Turnover Period

For the year 2020:

(1) Purchases

(2) Adjusted Purchases

Solution: (1) For, year 2019:

Here, closing stock is not given. So, we find it from Adjusted Purchase.

Adjusted Purchase (COGS) = Opening stock + Purchases – Closing stock

4,10,000 = 80,000 + 4,14,000 – Closing Stock

So, Closing stock = ₹ 84,000

$$\text{Average Stock} = \frac{Opening\ Stock + Closing\ Stock}{2}$$

$$= \frac{80,000 + 84,000}{2}$$

₹ 82,000

$$\text{Material Turnover Ratio} = \frac{Material\ Consumed\ (COGS)}{Average\ Stock}$$

$$= \frac{4,10,000}{82,000}$$

= 5 times

$$\text{Material Turnover Period} = \frac{Days\ during\ the\ period}{Material\ Turnover\ Ratio}$$

$$= \frac{365}{5}$$

= 73 days

(2) For, year 2020: Here Closing stock of 2019 becomes the opening stock of 2020.

Here, closing stock is not given. So, we find it from average stock.

$$\text{Average Stock} = \frac{Opening\ Stock + Closing\ Stock}{2}$$

$$80,000 = \frac{84,000 + Closing\ stock}{2}$$

So, Closing stock = (80,000 × 2) – 84,000 = ₹ 76,000

$$\text{Material Turnover Ratio} = \frac{\text{Adjusted Purchase } (COGS)}{Average\ Stock}$$

$$9 \text{ times} = \frac{\text{Adjusted Purchase}}{80,000}$$

So, COGS = 80,000 × 9 = **₹ 7,20,000**

Material Consumed (COGS) = Opening stock + Purchases – Closing stock

7,20,000 = 84,000 + Purchases – 76,000

So, Purchases = 7,20,000 – 84,000 + 76,000 = **₹ 7,12,000**