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## **E- CONTENT FOR M.COM (SEMESTER- 2)**

**SUBJECT: MANAGEMENT ACCOUNTING**

**PAPER CODE: COMCC-9**

**UNIT- III: STANDARD COSTING AND VARIANCE ANALYSIS (Part III)**

**TOPIC: MATERIAL COST VARIANCE (PRACTICAL QUESTIONS)**

***NOTE: Refer previous pdfs content for theoretical part and formulae of this unit.***

### **PRACTICAL QUESTIONS:**

**Ques.1** The following particulars are regarding the standard and actual production of product X.

Standard quantity of material per unit	5kg
Standard price per kg	Rs.5
Actual Number of units produced	400 units
Actual quantity of materials used	2200 kg
Price of materials	Rs. 4.80 per kg

Calculate material price variance and material usage variance.

### Solution.

Standard			Actual output 400		
Qty.	Rate	Amt.	Qty.	Rate	Amt.
400X5	5	10,000	2200	4.8	10,560
=2000					

Above, we have to create table on the basis of actual output.

Standard Quantity = Standard quantity required for production of actual output

Standard quantity is quantity of materials used and calculated on the basis of actual output.

- i) Calculation of Material Cost Variance (MCV)

**Standard cost- Actual cost**

$$= 10000 - 10560$$

= Rs. 560 ( Adverse or A)

- ii) Calculation of Material Price Variance (MPV)

**(Standard Price- Actual Price) X Actual Quantity**

$$= (5 - 4.8) \times 2200$$

= Rs. 440 (Favourable or F)

- iii) Calculation of Material Usage Variance (MUV)

**(Standard Quantity- Actual Quantity) X Standard Price**

$$= (2000 - 2200) \times 5$$

= Rs. 1000 (Adverse or A )

To Check:

$$\text{MCV} = \text{MPV} + \text{MUV}$$

$$= 440 (F) + 1000 (A)$$

$$= 560 (A)$$

**Ques. 2.** In a factory, standard estimates for material for the manufacture of 1000 units of product Z is 400 kg at 2.5 per kg. When 2000 units of product Z are produced it is found that 825 kg of materials are consumed at Rs. 2.70 per kg.

Calculate material cost variance.

**Solution.**

Standard			Actual Output= 2000		
Qty. of Material	Rate	Amt.	Qty. of Material	Rate	Amt.
800* kg	2.5	2000	825 kg	2.70	2227.5

\*1000 u ----- 400kg

Std. qty. required for 1 unit = 400/1000 kg

Std. qty. for actual output = 400/1000 X 2000 = 800 kg

- i) Material Cost Variance ( MCV)  
= **Std. Cost – Actual Cost** = 2000-2227.5 = 227.5 (A)
- ii) Material Price Variance (MPV)  
= **(Std. Price - Actual price) X Actual Qty.**  
= (2.5- 2.7) X 825 = 165 (A)
- iii) Material Usage Variance (MUV)  
= **(Std. Qty. - Actual Qty.) X Std. Price**  
= (800 – 825) X 2.5 = 62.50 (A)

To Check:

$$\begin{aligned}
 \text{MCV} &= \text{MPV} + \text{MUV} \\
 &= 165 (A) + 62.5 (A) \\
 &= 227.5 (A)
 \end{aligned}$$

**Ques.3.** Calculate various variances on the basis of following information:

Qty. of material purchased

3000 unit

Value of material purchased	Rs. 9000
Standard quantity of material required for 1 tonne of finished product.	25 units
Standard rate of material	Rs. 2 per unit
Opening stock of material	100 unit
Closing stock of material	600 units
Finished product during the period	80 tonnes

**Solution:**

Output= 80 Tonnes

Standard Cost			Actual Cost		
Qty.	Rate	Amt.	Qty.	Rate	Amt.
2000	2	4000	2500	3	75500
(1)	(2)		(3)	(4)	

Working Note:

- (1) 1 ton = 25 units of materials  
80 tonnes = 25 X 80 = 2000 units
- (2) Standard Rate of Material is Rs. 2 p.u.
- (3) Material Consumed for production  
= opening stock + Purchase – Closing Stock  
= 100 + 3000 – 600  
= 2500 units
- (4) Actual Rate of Material Purchased  
9000 / 3000 = Rs. 3 p.u.

**Calculation of material cost variance** = Standard cost - Actual Cost

$$= 4000 - 7500$$

$$= \text{Rs. } 3500 \text{ (A)}$$

**Calculation of Material Usage Variance** = (SQ – AQ) X Std. Price

$$= (2000 - 2500) \times 2$$

$$= \text{Rs. } 1000 \text{ (A)}$$

**Calculation of Material Price Variance** = (SP- AP) X Actual. Qty of Materials  
= (2-3) X 2500 = 2500 (A)

To check:

$$\begin{aligned}\text{MCV} &= \text{MQV} + \text{MPV} \\ &= 1000 \text{ (A)} + 2500 \text{ (A)} \\ &= 3500 \text{ (A)}\end{aligned}$$

**i) Material Mix Variance (MMV)-**

It is that portion of the material usage variance which is change in the composition of material mix.

It arises due to the difference between the standard and actual composition of mixture of material.

Formula:

$$\text{(Revised Quantity- Actual Quantity) X Standard Price}$$

**ii) Material Yield Variance (MYV)-**

The difference between actual yield of material in manufacture and the standard yield valued at standard output is called material yield variance.

Formula:

$$\text{(Standard Quantity- Revised Std. Quantity) X Std. Price}$$

The yield variance may be caused by the defective methods of operation, sub- standard quality of material purchased, lack of due care in handling, lack of proper supervision.

We can say,

$$\text{MQV} = \text{Material Yield Variance} + \text{Material Mix Variance}$$

**Ques.4** The standard mix to produce one unit of product is as follows:

Material A	60 units @ Rs. 15 p.u.	Rs. 900
Material B	80 units @ Rs. 20 p.u.	Rs. 1600
Material C	100 units @ Rs. 25 p.u.	Rs. 2500



**(SQ – AQ) X Standard Price**

$$A = ( 600 - 640 ) \times 15 = \text{Rs. } 600 \text{ (A)}$$

$$B = ( 800 - 950 ) \times 20 = \text{Rs. } 3000 \text{ (A)}$$

$$C = ( 1000 - 870 ) \times 25 = \text{Rs. } 3250 \text{ (F)}$$

$$\text{Total} = \text{Rs. } 350 \text{ (A)}$$

**To Check:**

$$\text{MCV} = \text{MPV} + \text{MUV}$$

$$= 1875 \text{ (A)} + 350 \text{ (A)}$$

$$= \text{Rs. } 2,225 \text{ (A)}$$

**Calculation of Material Mix Variance (MMV)**

**Revised Std. Quantity- Actual Quantity) X Standard Price**

Revised Value is total actual quantity in standard quantity ratio.

Calculation of Revised Standard Quantity:

Standard Quantity of A ----- 600 units

Standard Quantity of B ----- 800 units

Standard Quantity of C ----- 1000 units

Ratio:

600: 800: 1000

3: 4: 5

Now, We divide the total actual quantity i. e. 2460 units in the ratio of standard quantity i.e. 3: 4: 5, we get

A = 615 units

B = 820 units

C = 1025 units

**Material Mix Variance**

**( Revised Std. Qty. – Actual Qty.) X Std. Price**

$$A = ( 615 - 640 ) \times 15 = \text{Rs. } 375 \text{ (A)}$$

$$B = ( 820 - 950 ) \times 20 = \text{Rs. } 2600 \text{ (A)}$$

$$C = ( 1025 - 870 ) \times 25 = \text{Rs. } 3875 \text{ (F)}$$

$$\text{Total} = \text{Rs. } 900 \text{ (F)}$$

**Material Yield Variance (MYV)**

**(Std. Quantity- Revised Standard Quantity) X Std. Price**

$$A = (600 - 615) \times 15 = \text{Rs. } 625(\text{A})$$

$$B = (800 - 820) \times 20 = \text{Rs. } 400(\text{A})$$

$$C = (1000 - 1025) \times 25 = \text{Rs. } 625(\text{A})$$

$$\text{Total} = \text{Rs. } 1250(\text{A})$$

**To Check:**

$$\begin{aligned} \text{MQV} &= \text{MMV} + \text{MYV} \\ &= 900(\text{F}) + 1250(\text{A}) \\ &= \text{Rs. } 350(\text{A}) \end{aligned}$$

**Ques.5.** The standard material cost for normal mix of 1 metric tonne of chemical X is based on :

Chemicals per Kg	Usage ( kg)	Price
A	240	6
B	400	12
C	640	10

During a month, 6.25 metric tonnes of X were produced from:

Chemicals	Consumption metric tonnes	Costs (Rs.)
A	1.6	11,200
B	2.4	30,000
C	<u>4.5</u>	<u>47,250</u>
	8.5	88,450

Analyse the variances.

**Solution:**

Actual output produced = 6.25 metric tonnes



Note, 1 metric tonnes = 1000 kg

6.25 metric tonnes = 6.25 X 1000 kg = 6250 kg.

Actual output= 6250 Kg

Standard Cost			Actual Cost			
Qty.	Rate	Amt.	Qty.	Rate	Amt.	Revised
(3)			Quantity			
1500	6	9,000	(1)	(2)		
2500	12	30,000	1600	7	11,200	1593.75
4000	10	<u>40,000</u>	2400	12.5	30,000	2656.25
		<u>79,000</u>	<u>4500</u>	10.5	<u>47250</u>	<u>4250.00</u>
			<u>8500</u>		<u>88,450</u>	<u>8500</u>

Working Note:

(1) Conversion of actual quantity metric tonnes into kg

1 metric tonnes = 1000 kg

1.6 metric tonnes = 1.6 X 1000 = 1600 kg

2.4 metric tonnes = 2.4 X 1000 = 2400 kg

4.5 metric tonnes = 4.5 X 1000 = 4500 kg

(2) Calculation of rate of actual quantity where amount is given,

A= 11200/ 1600= Rs. 7

B= 30000/2400= Rs. 12.5

C= 47250/ 4500 =Rs. 10.5

(2) Calculation of standard quantity:

A –

1000 kg output = 240 kg material

6250 kg = 240/1000 X 6250 = 1500 Kg

B –

1000 kg output = 400 kg material

6250 kg = 400/1000 X 6250 = 1500 Kg

C –

1000 kg output = 640 kg material

6250 kg =  $640/1000 \times 6250 = 1500$  Kg

### **Calculation of Material Cost Variance**

**= ( MCV) = SC – AC**

= 79000 – 88450 = Rs.9450

### **Calculation of Material Quantity Variance (MQV)**

**= ( Std. Qty. – Actual Qty. ) X Std. Price**

A = (1500 – 1600 ) X 6

= Rs. 600 (A)

B= ( 2500 – 2400 ) X 12

= Rs. 1200 (F)

C= ( 4000 – 4500 ) X 10

= Rs. 5000 (A)

### **Calculation of Material Price Variance**

**= (Std. Price – Actual Price) X Actual Quantity**

A = (6 -7) X 1600 = Rs. 1600 (A)

B = (12- 12.5) X 2400 = Rs. 1200 (A)

C = ( 10 – 10.5) X 4500 = Rs. 2250 (A)

### **To check:**

MCV = MQV + MPV

MQV = 600 (A)+ 1200 (F)+ 5000(A)

=Rs. 4400(A)

MPV = 1600 (A) + 1200 (A)+ 2250 (A)

= Rs. 5050 (A)

MCV = 4400 (A) + 5050 (A)

=Rs. 9450 (A)

**Hence, LHS = RHS**

### **Calculation of Revised Quantity**

$$A : B : C = 1500 : 2500 : 4000 = 3 : 5 : 8$$

Allocate actual quantity i.e. 8500 Kg in the ratio of standard quantity, we get

$$A = 8500 \times \frac{3}{16} = 1593.75 \text{ kg}$$

$$B = 8500 \times \frac{5}{16} = 2656.25 \text{ kg}$$

$$C = 8500 \times \frac{8}{16} = 4250 \text{ kg}$$

### **Material Mix Variance (MMV)**

**(Revised Quantity – Actual Quantity) X Standard Price**

$$A = ( 1593.75 - 1600 ) \times 6 = \text{Rs. } 37.5 \text{ (A)}$$

$$B = ( 2656.25 - 2400 ) \times 12 = \text{Rs. } 3075 \text{ (F)}$$

$$C = ( 4250 - 4500 ) \times 10 = \text{Rs. } 2500 \text{ (A)}$$

$$\text{Total MMV} = \text{Rs. } 537.5 \text{ ( F)}$$

### **Material Yield Variance (MYV)**

**( Standard Quantity – Revised Quantity) X Standard Price**

$$A = ( 1500 - 1593.75 ) \times 6 = \text{Rs. } 562.5 \text{ (A)}$$

$$B = ( 2500 - 2656.25 ) \times 12 = \text{Rs. } 1875 \text{ (A)}$$

$$C = ( 4000 - 4250 ) \times 10 = \text{Rs. } 2500 \text{ (A)}$$

$$\text{Total MYV} = 4937.5 \text{ (A)}$$

**To check:**

$$\text{MQV} = \text{MMV} + \text{MYV}$$

$$= 537.5 \text{ (F)} + 4937.5 \text{ (A)}$$

$$= 4400 \text{ (A)}$$

The value of MQV is already calculated i.e. 4400 (A)

Hence, LHS = RHS

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