

Paper

Q. 1) NXE Manufacturing Concern furnishes the following information:

Standard:	Material for 70 kg finished products	100 kg
	Price of material	₹1 per kg
Actual:	Output	2,10,000 kg
	Material used	2,80,000 kg
	Cost of Materials	₹2,52,000

CALCULATE: (a) Material usage variance, (b) Material price variance, (c) Material cost variance.

SOLUTION

$$\text{Standard Quantity of input for actual output (SQ)} = 2,10,000 \text{ kg} \times \frac{100 \text{ kg}}{70 \text{ kg}}$$

$$= 3,00,000 \text{ kg.}$$

$$\text{Actual Price (AP)} = (₹2,52,000 \div 2,80,000 \text{ kg}) = ₹0.90 \text{ per kg.}$$

$$(a) \text{ Material Usage Variance} = (\text{SQ} - \text{AQ}) \times \text{SP}$$

$$= (3,00,000 - 2,80,000) \times 1 = ₹20,000 \text{ (F)}$$

$$(b) \text{ Material Price Variance} = (\text{SP} - \text{AP}) \times \text{AQ}$$

$$= (1 - 0.90) \times 2,80,000 = ₹28,000 \text{ (F)}$$

$$(c) \text{ Material Cost Variance} = (\text{SQ} \times \text{SP}) - (\text{AQ} \times \text{AP})$$

$$= (3,00,000 \times 1) - (2,80,000 \times 0.90)$$

$$= ₹48,000 \text{ (F)}$$

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

$$₹48,000 \text{ (F)} = ₹28,000 \text{ (F)} + ₹20,000 \text{ (F)}$$

Q. 2) ABC Ltd. produces an article by lending two basic raw materials. It operates a standard costing system and the following standards have been set for raw materials:

Material	Standard mix	Standard price (₹per kg)
A	40%	4
B	60%	3

The standard loss in processing is 15%. During April, the company produced 1,700 kgs. of finished output.

The position of stock and purchases for the month of April are as under:

Material	Stock on 01.04.2021	Stock on 30.04.2021	Purchased during April 2021	
	(Kg.)	(Kg.)	(Kg.)	(₹)
A	35	5	800	3,400
B	40	50	1,200	3,000

Opening stock of material is valued at standard price. CALCULATE the following variances:

- (i) Material price variance
- (ii) Material usage variance
- (iii) Material yield variance

Material mix variance Total Material cost

variance

Solution:

Types of material	Standard			Actual		
	Qty. (Kg.)	Rate (₹)	Amount (₹)	Qty. (Kg.)	Rate (₹)	Amount (₹)
A	800	4	3,200	35	4	140.00
				795	4.25	3,378.75
B	1200	3	3,600	40	3	120.00
				1,150	2.50	2,875.00
Total	2,000		6,800	2,020		6,513.75

- (i) Material price variance

= Actual qty. (Std. price – Actual price)

Material A: Since the actual price and standard price in respect of 35 kg. of raw materials A are same i.e. ₹4, there will be no price variance in respect of this quantity. Price variance will be in respect of only 795 kg. as given below:

= 795 kg. (₹4 – ₹4.25) = ₹198.75 (A)

Material B: For Material B also, price variance will only be in respect of 1,150 kg. as given below:

$$= 1,150 \text{ kg. } (\text{₹}3 - \text{₹}2.50) = \text{₹}575 \text{ (F)}$$

$$\text{Total} = \text{₹}198.75 \text{ (A)} + 575 \text{ (F)} = \text{₹}376.25 \text{ (F)}$$

(ii) Material usage variance

$$= (\text{Std. qty. for actual output} - \text{Actual qty.}) \times \text{Std. price}$$

Material A	$= (800 - 830) \times 4$	$= 120 \text{ (A)}$
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Material B	$= (1,200 - 1,190) \times 3$	$= 30 \text{ (F)}$
		₹90 (A)

(i) Material yield variance

$$= (\text{Std. qty.} - \text{Revised Std. qty.})$$

$$\times \text{Std. Price Material A} = (800$$

$$- 808) \times 4 = 32 \text{ (A)}$$

$$\text{Material B} = (1,200 - 1,212) \times 3 = 36 \text{ (A)}$$

$$\underline{\text{₹ } 68 \text{ (A)}}$$

(ii) Material mix variance

$$= (\text{Revised std. qty.} - \text{Actual qty.})$$

$$\times \text{Std. Price Material A} = (808 -$$

$$830) \times 4 = 88 \text{ (A)}$$

$$\text{Material B} = (1,212 - 1,190) \times 3 = 66 \text{ (F)}$$

$$\underline{\text{₹ } 22 \text{ (A)}}$$

Check

$$\text{MUV} =$$

$$\text{MMV} +$$

$$\text{MYV } 90 \text{ (A)}$$

$$= 22 \text{ (A)} + 68$$

(A)

(iii) Total material cost variance

= Std. cost for actual output – Actual cost = 6,800 – 6,513.75 =

286.25 (F) Check

MCV = MPV + MUV

286.25 (F) = 376.25 (F) + 90 (A)

Q. 3) From the following information, compute material variances.

	Quantity (Kg.)		
Standard:			
Material A	10	2	20
Material B	20	3	60
Material C	20	6	120
	50		200
Actual:			
Material A	5	3	15
Material B	10	6	60
Material C	15	5	75
	30		150

Solution:

It is assumed that the data given here is for the production of one unit of output. SQ – Standard Quantity for Actual Output

Material A = 10 kg

Material B = 20 kg

Material C = 20 kg SP –Standard Price per

Material A = ₹ 2
unit

Material B = ₹ 3

Material C = ₹ 6

AQ – Actual Quantity used for Production

Material A = 5 kg

Material B = 10 kg

Material C = 15 kg AP – Actual Price per

Material A = ₹ 3

Material B = ₹ 6

Material C = ₹ 5

unit

RSQ – Revised Standard Quantity for Actual Input

$$\text{Material A} = \frac{10}{50} \times 30 = 6 \text{ kg}$$

$$\text{Material B} = \frac{20}{50} \times 30 = 12 \text{ kg}$$

$$\text{Material C} = \frac{20}{50} \times 30 = 12 \text{ kg}$$

i. Material Cost Variance = SQ × SP –

$$\text{AQ} \times \text{AP} \text{ Material A} = (10 \times ₹ 2) - (5 \times ₹ 3) = 20 - 15 = ₹ 5 \text{ (F)}$$

$$= ₹ 5 \text{ (F)}$$

$$\text{Material B} = (20 \times ₹ 3) - (10 \times ₹ 6) = 60 - 60 = \text{Nil}$$

$$\text{Material C} = (20 \times ₹ 6) - (15 \times ₹ 5) = 120 - 75 = ₹ 45 \text{ (F)}$$

$$= ₹ 50 \text{ (F)}$$

ii. Material Price Variance = (SP

$$- \text{AP}) \times \text{AQ} \text{ Material A} = (2 - 3) \times \frac{10}{5} = ₹ 2 \text{ (A)}$$

$$= ₹ 2 \text{ (A)}$$

$$\text{Material B} = (3 - 6) \times 10 = ₹ 30 \text{ (A)}$$

$$\text{Material C} = (6 - 5) \times 15 = ₹ 15 \text{ (F)}$$

$$= ₹ 20 \text{ (A)}$$

iii. Material Usage Variance = (SQ

$$- \text{AQ}) \times \text{SP} \text{ Material A} = (10 - 10) \times ₹ 2 = ₹ 0 \text{ (F)}$$

$$= ₹ 0 \text{ (F)}$$

$$\text{Material B} = (20 - 10) \times ₹ 3 = ₹ 30 \text{ (F)}$$

$$\text{Material C} = (20 - 15) \times ₹ 6 = ₹ 30 \text{ (F)}$$

$$= ₹ 70 \text{ (F)}$$

iv. Material Mix Variance = (RSQ

$$- \text{AQ}) \times \text{SP} \text{ Material A} = (6 - 10) \times ₹ 2 = ₹ 8 \text{ (F)}$$

$$5) \times ₹ 2 =$$

$$\text{Material B} = (12 - 10) \times ₹ 3 = ₹ 6 \text{ (F)}$$

$$\text{Material C} = (12 - 15) \times ₹ 6 = ₹ 18 \text{ (A)}$$

$$= ₹ 10 \text{ (A)}$$

$$\text{v. Material Yield Variance} = (\text{SQ} - \text{RSQ}) \times \text{SP}$$

$$\text{vi. Material A} = (10 - 6) \times ₹ 2 = ₹ 8 \text{ (F)}$$

$$\text{vii. Material B} = (20 - 12) \times ₹ 3 = ₹ 24 \text{ (F)}$$

$$\text{viii. Material C} = (20 - 12) \times ₹ 6 = ₹ 48 \text{ (F)}$$

$$= ₹ 80 \text{ (F)}$$

Q. 4) The standard cost of a certain chemical mixture is as under:

40% of Material A at ₹ 20 per kg. 60% of Material B at ₹ 30 per kg. A standard loss of 10% is expected in production. The following actual cost data is given for the period:

180 kg material A at a cost of ₹ 18 per kg 220 kg material B at a cost of ₹ 34 per kg The weight produced is

360 kg.

Calculate

and present:

- i. Material Cost Variance
- ii. Material Price Variance
- iii. Material Usage Variance
- iv. Material Mix Variance
- v. Material Yield Variance

Solution:

Assume 100 kg of Standard Input is used in the ratio of 40% and 60% for Material A and Material B respectively. So, the information can be presented as follows:

Standard		Actual	
Quantity	Rate	Quantity	Rate
	Kg		Kg

		(₹)		(₹)
Material A	40	20	180	18
Material B	60	30	220	34
Total	100		400	
Less: Loss	10		40 (Bal. fig.)	
Output	90		360	

When there are more than one input then five parameters are to be calculated as follows:

1. SQ – Standard Quantity for Actual Output

$$\text{Material A} = \frac{40}{90} \times 360 = 160 \text{ kg}$$

$$\text{Material B} = \frac{60}{90} \times 360 = 240 \text{ kg}$$

2. SP – Standard Price per unit

$$\text{Material A} = ₹ 20, \quad \text{Material B} = ₹ 30$$

3. AQ – Actual Quantity

$$\text{Material A} = 180 \text{ kg}, \quad \text{Material B} = 220 \text{ kg}$$

4. AP – Actual Price per unit

$$\text{Material A} = ₹ 18, \quad \text{Material B} = ₹ 34$$

5. RSQ – Revised Standard Quantity for Actual Input

$$\text{Material A} = \frac{40}{100} \times 400 = 160 \text{ kg}$$

$$\frac{60}{100} \times 400 = 240 \text{ kg}$$

6. Material Cost Variance = SQ × SP – AQ × AP

$$\text{Material A} = 160 \times 20 - 180 \times 18 = 3,200 - 3,240 = ₹ 40 (A)$$

$$\text{Material B} = 240 \times 30 - 220 \times 34 = 7,200 - 7,480 = ₹ 280 (A)$$

$$= ₹ 320 (A)$$

$$7. \text{ Material Price Variance} = (SP - AP) \times AQ$$

$$\text{Material A} = (20 - 18) \times 180$$

$$= ₹ 360 (F)$$

$$\text{Material B} = (30 - 34) \times 220$$

$$= ₹ 880 (A)$$

$$= ₹ 520 (A)$$

$$8. \text{ Material Usage Variance} = (SQ - AQ) \times SP$$

$$\text{Material A} = (160 - 180) \times 20$$

$$= ₹ 400 (A)$$

$$\text{Material B} = (240 - 220) \times 30$$

$$= ₹ 600 (F)$$

$$= ₹ 200 (F)$$

$$9. \text{ Material Mix Variance} = (RSQ - AQ) \times SP$$

$$\text{Material A} = (160 - 180) \times 20$$

$$= ₹ 400 (A)$$

$$\text{Material B} = (240 - 220) \times 30$$

$$= ₹ 600 (F)$$

$$= ₹ 200 (F)$$

$$10. \text{ Material Yield Variance} = (SQ - RSQ) \times SP$$

$$\text{Material A} = (160 - 160) \times 20$$

$$= \text{Nil}$$

$$\text{Material B} = (240 - 240) \times 30$$

$$= \text{Nil}$$

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