

A Bharti Associate Company



**IT IS TIME
TO CHANGE
THE WAY
INDIA STUDIES...**



Presenting...

VARIANCE ANALYSIS

Definition

The Institute of Cost & Management Accountants defines variance as the difference between a standard cost and the comparable actual cost incurred during a period

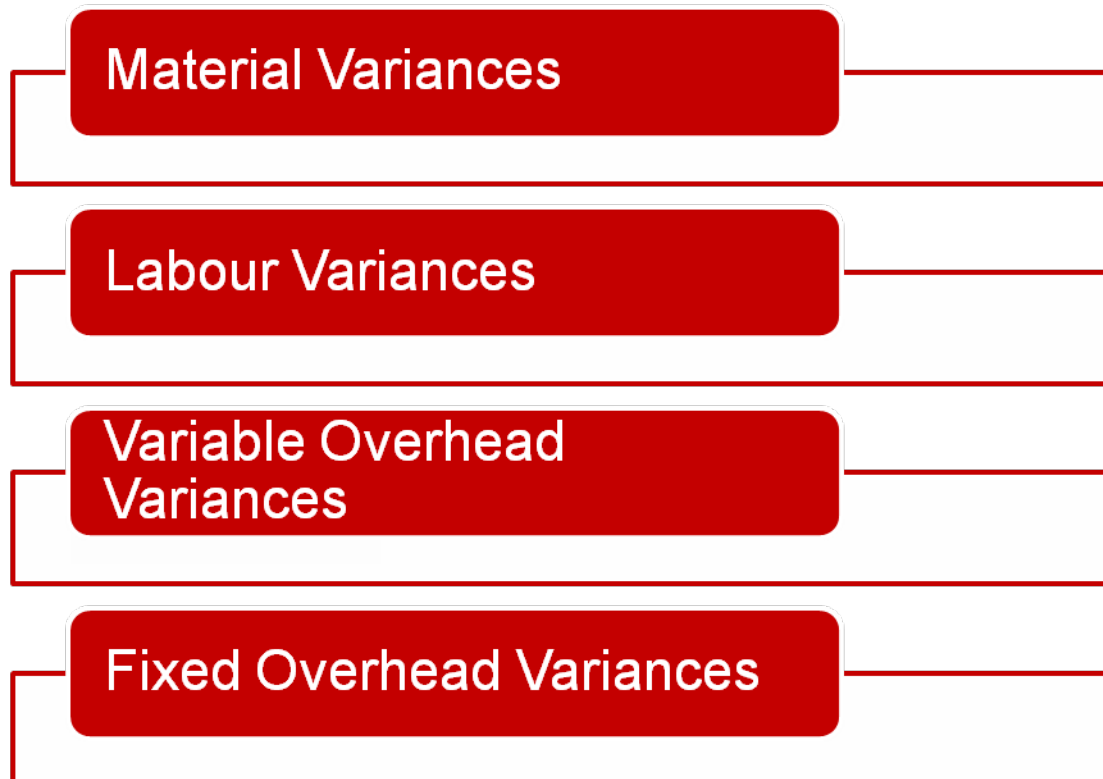
Variance Analysis can be defined as the process of computing the amount of and isolating the cause of variances between actual costs and standard costs. It involves two phases:

- 1.Computation of individual variances**
- 2.Determination of the cause(s) of each variance**

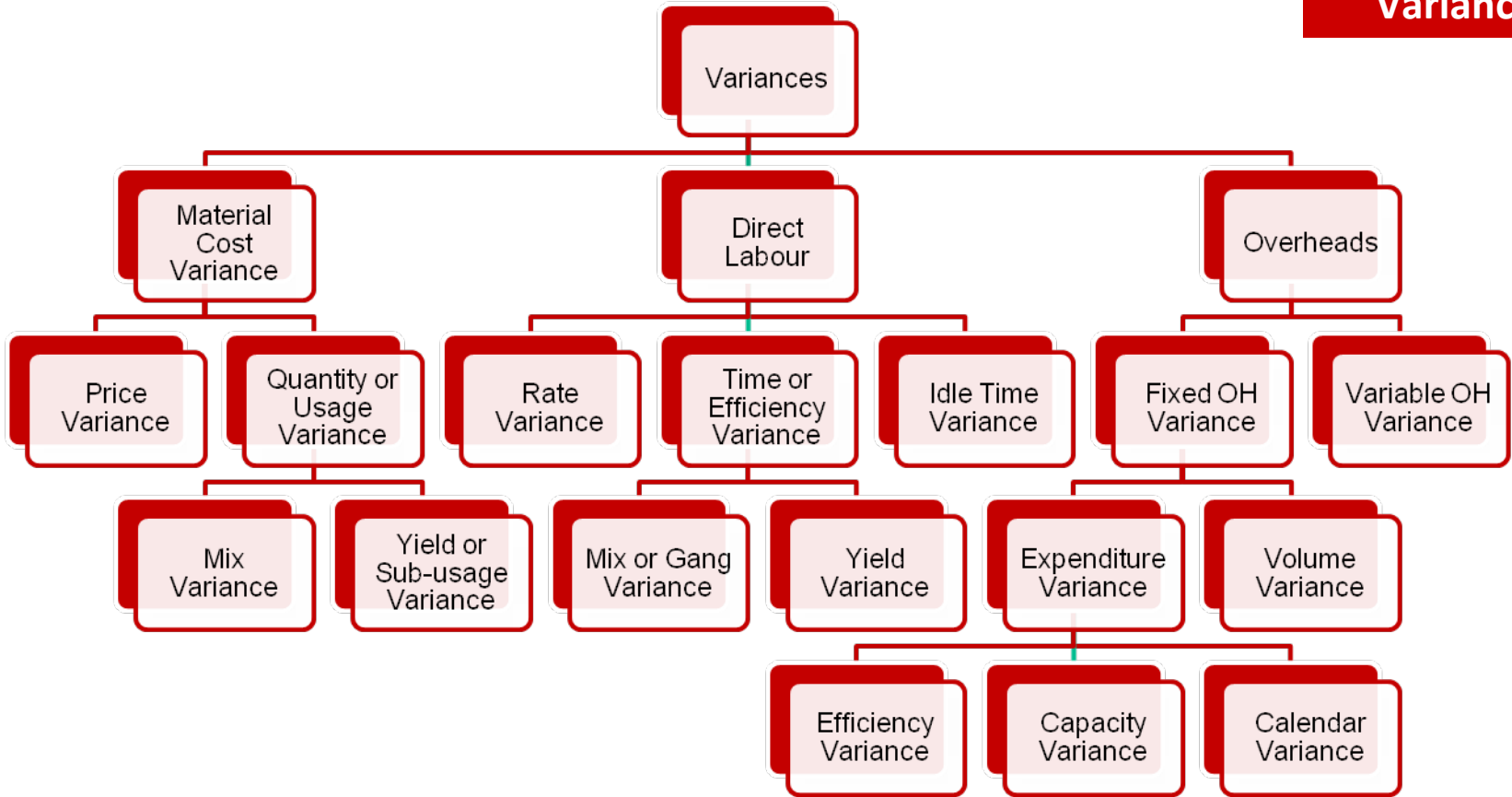
Care to be taken while comparing actual and standard cost

- 1. Conditions might have changed, thus rendering the standard costs unrealistic – for instance the quality of available materials may be low.**
- 2. Standards fixed upon on too idealistic a basis will remain unattainable.**
- 3. The service rendered by a service departments may not be upto the mark so that, for example time is lost due to a machine working slow.**
- 4. In certain activities, fixation of standard is either not possible or not desirable. Goods requiring artistic work of high quality cannot be and should not be subject to quantitative standards. In certain cases work cannot be properly measured. Standards in these cases will be useless.**

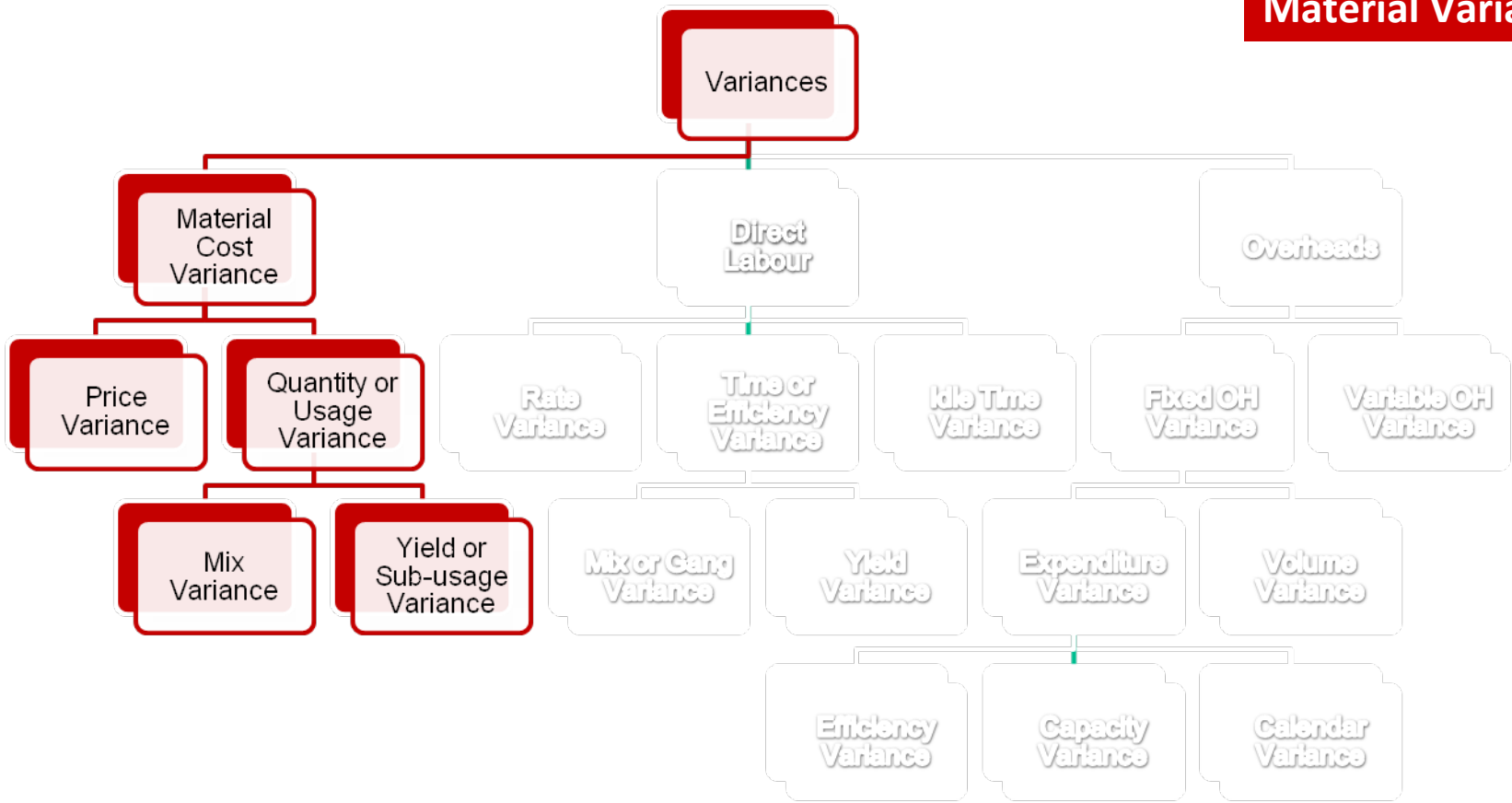
Variations are broadly classified into the following:



Variations



Material Variances



Material Cost Variance

Material Cost Variance is the difference between the actual cost of direct materials used and standard cost of direct materials specified for the output achieved.

This variance results from differences between quantities consumed and quantities of materials allowed for production and from differences between prices paid and prices predetermined.

Can be computed using the formula:

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

where,

- AQ = Actual Quantity**
- AP = Actual Price**
- SQ = Standard Quantity for the actual output**
- SP = Standard Price**

Example 1

Product A requires 10 kgs of material at the rate of Rs. 4 per kg. The actual consumption of material for the manufacturing of Product A came to 12 kgs of Material at the rate of Rs. 4.50 per kg. Calculate Material Cost Variance.

Solution:

$$\begin{aligned}\text{Material Cost Variance} &= \text{Standard Cost for Actual Output} - \text{Actual Cost} \\ &= (\text{SP} \times \text{SQ}) - (\text{AP} \times \text{AQ}) \\ &= (4 \times 10) - (4.50 \times 12) \\ &= 40 - 54 \\ &= \text{Rs. 14 (Unfavourable or Adverse)}\end{aligned}$$

Example 2

The standard material and standard cost per kg of material required for the production of one unit of Product A is: Material 5kg @ Rs. 5 per kg.

The actual production and related data are:
400 units of Product A, Material used 2200 kgs @ Rs. 4.80 per kg.

Calculate Material Cost Variance

Solution:

$$\begin{aligned}
 \text{SQ for actual output} &= 400 \text{ units} \times 5 \text{ kg} = 2000 \text{ kg} \\
 \text{Material Cost Variance} &= \text{Standard Cost for Actual Output} - \text{Actual Cost} \\
 &= (\text{SP} \times \text{SQ for actual output}) - (\text{AP} \times \text{AQ}) \\
 &= (5 \times 2000) - (4.80 \times 2200) \\
 &= 10,000 - 10,560 \\
 &= \text{Rs. 56 (Unfavourable or Adverse)}
 \end{aligned}$$

Material Price Variance

A Materials Price Variance occurs when raw materials are purchased at a price different from standard price.

It is that portion of the direct materials which is due to the difference between actual price paid and standard price specified

Can be computed using the formula:

$$\text{Material Price Variance} = (\text{Standard Price} - \text{Actual Price}) \times \text{Actual Quantity}$$

This variance is unfavourable when the actual price paid exceeds the predetermined standard price.

It is advisable that materials price variance should be calculated at the time of materials purchase rather than when materials are used. This is quite beneficial from the viewpoint of performance measurement and corrective action.

Example 3

Compute the Material Price Variance from the following data:

Standard Material cost per unit

Material A 2 pieces @ Re.1.00 = 2.00

Material B 3 pieces @ Rs. 2.00 = 6.00

Materials Issued

Material A 2050 pieces

Material B 2980 pieces

Assume Material A was purchased at the rate of Re. 1.00 and Material B at the rate of Rs. 2.10

Solution:

Material Price Variance = (Standard Price – Actual Price) x Actual qty.

Material A = (1.00 – 1.00) x 2,050 = Zero

Material B = (2.00 – 2.10) x 2,980

= Rs. 298 (Unfavourable)

Materials Usage Variance

The material quantity or usage variance results when actual quantities of raw materials used in production differ from standard quantities that should have been used to produce the output achieved.

It is that portion of the direct materials cost variance which is due to the difference between the actual quantity used and standard quantity specified.

Can be computed using the formula:

$$\text{Material Qty. variance} = (\text{SQ for actual output} - \text{AQ}) \times \text{Standard Price}$$

This variance is favourable when the total actual quantity of direct materials used is less than the total standard quantity allowed for the actual output.

Also,

$$\text{Material Cost Variance} = \text{Material Price Variance} + \text{Material Usage Variance}$$

Example 4

The standard cost of material for manufacturing a unit of a particular product PEE is estimated as follows: 16 kg of raw material @ Re. 1 per kg.
On completion of the unit, it was found that 20 kg. of raw material costing Rs. 1.50 per kg has been consumed. Compute Material Variances

Solution:

$$\begin{aligned} \text{Material Price Variance (MPV)} &= (\text{Standard Price} - \text{Actual Price}) \times \text{Actual qty.} \\ &= (1.00 - 1.50) \times 20 = \text{Rs. 10 (Adverse)} \end{aligned}$$

$$\begin{aligned} \text{Material Usage Variance (MUV)} &= (\text{SQ for actual output} - \text{AQ}) \times \text{Standard price} \\ &= (16 - 20) \times 1 = \text{Rs.4 (Adverse)} \end{aligned}$$

$$\begin{aligned} \text{Material Cost Variance (MCV)} &= \text{Standard cost for actual output} - \text{Actual cost} \\ &= (16 \times 1) - (20 \times 1.50) = 16 - 30 = \text{Rs. 14 (Adverse)} \end{aligned}$$

$$\begin{aligned} \text{Also, MCV} &= \text{MPV} + \text{MUV} \\ &= 10 \text{ (A)} + 14 \text{ (A)} = 14 \text{ (Adverse)} \end{aligned}$$

Material Mix Variance

The material mix variance results when materials are not actually placed into production in the same ratio as the standard formula.

It is that portion of the materials quantity variance which is due to the difference between the actual composition of a mixture and the standard mixture.

Can be computed using the formula:

Material Mix variance = (Revised Standard Qty. – AQ) x Standard Price

Revised Standard Quantity = $\frac{\text{Total weight or quantity of actual mix}}{\text{Total weight or quantity of standard mix}} \times \text{SQ}$

Example 5

Calculate the Materials Mix Variance from the following:

Material	Standard	Actual
A	90 units @ Rs. 12	100 units @ Rs. 12
B	60 units @ Rs. 15	50 units @ Rs. 16
	150	150

Solution:

Material	Standard			Actual		
	Quantity	Rate	Amount (Rs.)	Quantity	Rate	Amount (Rs.)
A	90	12	1,080	100	12	1,200
B	60	15	900	50	16	800
	150		1,980	150		2,000

Continued....

Solution:

Material ^S	Standard			Actual		
	Quantity	Rate	Amount (Rs.)	Quantity	Rate	Amount (Rs.)
A	90	12	1,080	100	12	1,200
B	60	15	900	50	16	800
	150		1,980	150		2,000

Material Mix variance = (Revised Standard Qty. – AQ) x Standard Price

Since Standard Mix and Actual Mix are same i.e., 150 units, hence Revised Standard Quantity and Standard Quantity will be same:

$$\begin{aligned} \text{A} &= \text{Rs. } 12 \times (90 - 100) \\ &= \text{Rs. } 12 \times 10 = \text{Rs. } 120 \text{ (Adverse)} \end{aligned}$$

$$\begin{aligned} \text{B} &= \text{Rs. } 15 \times (60 - 50) \\ &= \text{Rs. } 15 \times 10 = \text{Rs. } 150 \text{ (Favourable)} \end{aligned}$$

$$\text{Total} = \text{Rs. } 30 \text{ (Favourable)}$$

Example 6

The standard material cost to produce a tonne of Chemical X is:

300 kg of Material A @ Rs. 10 per kg

400 kg of Material B @ Rs. 5 per kg

500 kg of Material C @ Rs. 6 per kg

During a period, 100 tonnes of Mixture X were produced from the usage of:

35 tonnes of Material A at a cost of Rs. 9,000 per tonne

42 tonnes of Material B at a cost of Rs. 6,000 per tonne

53 tonnes of Material C at a cost of Rs. 7,000 per tonne.

Calculate Material Price, usage and mix variances.

Solution 6

Materials	Standard			Actual		
	Quantity	Rate	Amount (Rs.)	Quantity	Rate	Amount (Rs.)
A	30,000	10	3,00,000	35,000	9	3,15,000
B	40,000	5	2,00,000	42,000	6	2,52,000
C	50,000	6	3,00,000	53,000	7	3,71,000
	1,20,000		8,00,000	1,30,000		9,38,000

Material Cost Variance (MCV) = Standard cost for actual output – Actual cost
 = Rs. 8,00,000 – Rs. 9,38,000
 = Rs. 1,38,000 (Adverse)

Material Price Variance (MPV) = (Standard Price – Actual Price) x Actual qty.

A = (10 – 9) x 35,000 = Rs. 35,000 (F)

B = (5 – 6) x 42,000 = Rs. 42,000 (A)

C = (6 – 7) x 53,000 = Rs. 53,000 (A)

Total Rs. 60,000 (A)

Continued....

Solution 6

Material Usage Variance (MUV) = (SQ for actual output – AQ) x Standard price

$$A = (30,000 - 35,000) \times 10 = \text{Rs. } 50,000 \text{ (A)}$$

$$B = (40,000 - 42,000) \times 5 = \text{Rs. } 10,000 \text{ (A)}$$

$$C = (50,000 - 53,000) \times 6 = \text{Rs. } 18,000 \text{ (A)}$$

$$\text{Total} \qquad \qquad \qquad \text{Rs. } 78,000 \text{ (A)}$$

Material Mix Variance (MMV) = (Revised SQ – AQ) x Standard Price

Working:

$$1. \text{ Revised Standard Quantity} = \left(\frac{\text{Total actual weight of mix}}{\text{Total standard weight of mix}} \times \text{Standard Qty.} \right)$$

$$A = \left(\frac{1,30,000}{1,20,000} \times 30,000 \right) = 32,500 \text{ kg}$$

$$B = \left(\frac{1,30,000}{1,20,000} \times 40,000 \right) = \frac{1,30,000}{3} \text{ kg}$$

$$C = \left(\frac{1,30,000}{1,20,000} \times 50,000 \right) = \frac{1,62,500}{3} \text{ kg}$$

Continued....

Solution 6

$$\begin{aligned}
 \text{Material Mix Variance (MMV)} &= (\text{Revised SQ} - \text{AQ}) \times \text{Standard Price} \\
 \text{A} &= (32,500 - 35,000) \times \text{Rs. } 10 \\
 &= 2,500 \times 10 &&= \text{Rs. } 25,000 \text{ (A)} \\
 \\
 \text{B} &= 5 \times \left(\frac{1,30,000}{3} - 42,000 \right) &&= \text{Rs. } 6,667 \text{ (F)} \\
 \\
 \text{C} &= 6 \times \left(\frac{1,62,500}{3} - 53,000 \right) &&= \text{Rs } 7,000 \text{ (F)} \\
 \text{Total} &&&= \text{Rs. } 11,333 \text{ (A)}
 \end{aligned}$$

Materials Yield Variance

The material yield variance explains the remaining portion of the total materials quantity variance. It occurs when output of the final product does not correspond with the output that could have been obtained by using the actual inputs. It is that portion of the materials usage variance which is due to the difference between the actual yield obtained and the standard yield specified (in terms of actual inputs).

Can be computed using the formula:

Material Yield variance = Standard Cost per unit x (Standard yield or output for actual input – Actual yield or output)

Standard yield is the production which should result in by the input of actual quantity of materials.

Standard Yield (SY) = $\frac{\text{Standard production} \times \text{Total Actual Quantity of input}}{\text{Total Standard Quantity of Input}}$

Standard Cost per unit = $\frac{\text{Total cost of standard mix of material}}{\text{Net standard output quantity}}$

Example 7

Standard Input = 100 kg, standard yield = 90 kg, standard cost per kg of output = Rs. 20. Actual input = 200 kg, actual yield = 182 kg. Compute the yield variance

$$\text{Standard yield for the actual input} = \frac{90}{100} \times 200 = 180 \text{ kg}$$

$$\begin{aligned} \text{Yield Variance} &= (\text{Actual yield} - \text{Standard yield for actual input}) \times \text{standard cost per unit} \\ &= (182 - 180) \times \text{Rs. } 20 \\ &= 2 \times 20 = 40 \text{ (Favourable)} \end{aligned}$$

Example 8

Materials	Standard			Actual		
	Quantity	Rate	Amount (Rs.)	Quantity	Rate	Amount (Rs.)
A	10	2	20	5	3	15
B	20	3	60	10	6	60
C	20	6	120	15	5	75
Total	50	4	200	30	5	150

Compute (a) Mix Variance (b) Price Variance (c) Usage Variance (d) Cost Variance

Solution 8
Solution:

Material Cost Variance (MCV) = Standard cost for actual output – Actual cost
= 200 – 150 = Rs. 50 (Favourable)

Material Price Variance (MPV) = (Standard Price – Actual Price) x Actual qty.

Material A = (2 – 3) x 5 = 5 (Adverse)

B = (3 – 6) x 10 = 30 (Adverse)

C = (6 – 5) x 15 = 15 (Favourable)

20 (Adverse)

Material Usage Variance (MUV) = (SQ for actual output – AQ) x Standard price

Material A = (10 – 5) x 2 = 10 (Favourable)

B = (20 – 10) x 3 = 30 (Favourable)

C = (20 – 15) x 6 = 30 (Favourable)

Total 70 (Favourable)

Continued....

Solution 8

Material Mix Variance (MMV) = (Revised SQ – AQ) x Standard Price

Working:

$$1. \text{ Revised Standard Quantity} = \left(\frac{\text{Total actual weight of mix}}{\text{Total standard weight of mix}} \times \text{Standard Qty.} \right)$$

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

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

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

Material A = (6 – 5) x 2 = Rs. 2 (Favourable)

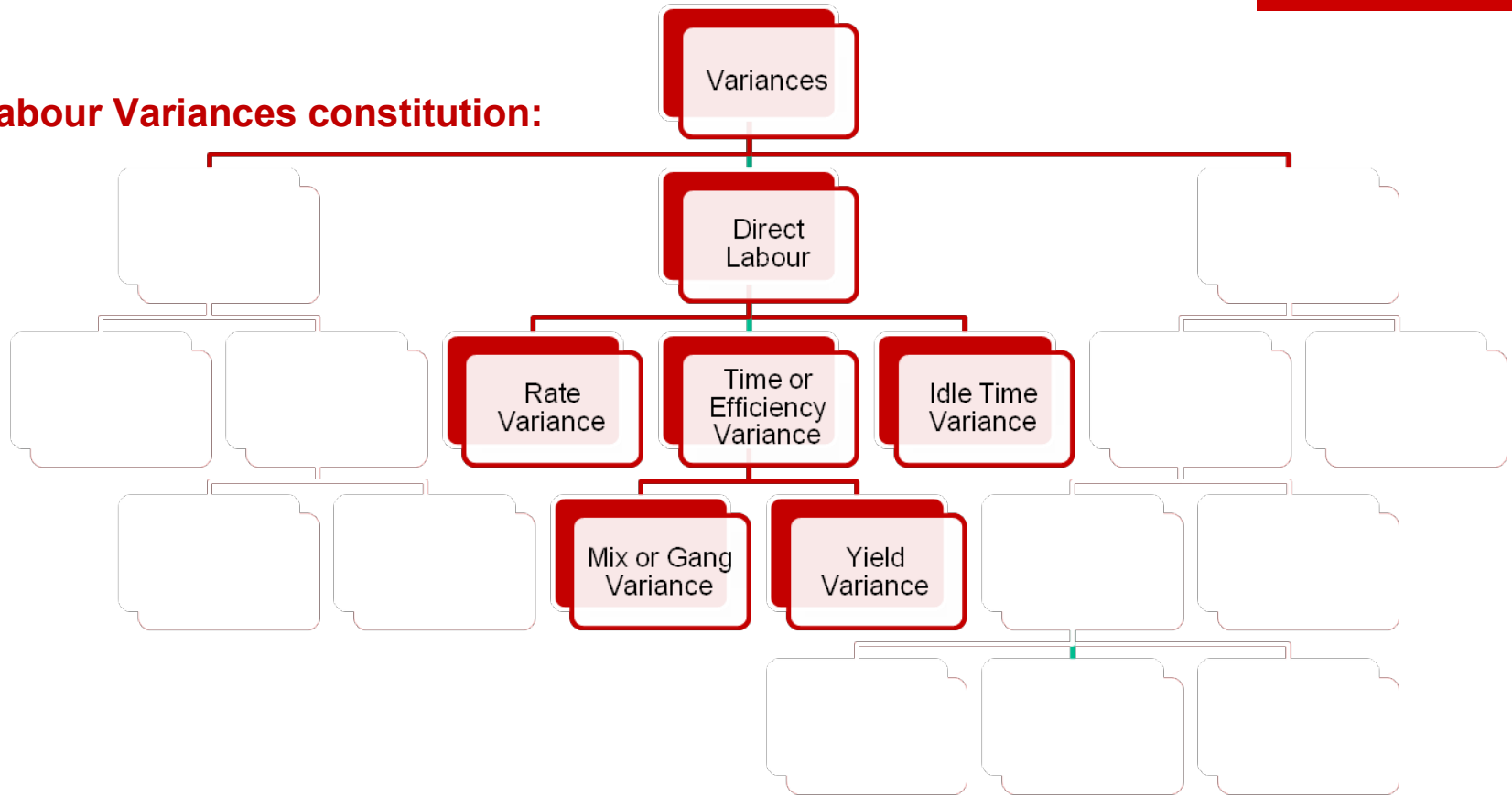
Material B = (12 – 10) x 3 = Rs. 6 (Favourable)

Material C = (12 – 15) x 6 = Rs. 18 (Adverse)

Total = 10 (Adverse)

Labour Variances

Labour Variances constitution:



Labour Cost Variance

Labour Cost Variance denotes the difference between the actual direct wages paid and standard direct wages specified for the output achieved.

Can be computed using the formula:

$$\text{Labour Cost Variance} = (\text{SH} \times \text{SR}) - (\text{AH} \times \text{AR})$$

where, AH = Actual hours
 AR = Actual Rate
 SH = Standard hours for actual output
 SR = Standard Rate

$$\text{Standard time for actual output} = \frac{\text{Standard Time}}{\text{Standard Output}} \times \text{Actual Output}$$

When the actual labour cost is more than standard cost, there will be adverse variance.

Labour Rate Variance

A Labour Rate Variance is the difference between the standard labour rate specified and the actual labour rate paid.

It is that portion of the direct Labour (wages) variance which is due to the difference between actual Rate of pay paid and standard Rate specified

Can be computed using the formula:

$$\text{Labour Rate Variance} = (\text{Standard Wage Rate} - \text{Actual Rate}) \times \text{Actual Time}$$

This variance is adverse when the actual wage rate paid exceeds the predetermined standard wage rate.

Example 9

The standard time and rate for unit component A are given below:

Standard hours 15; Standard rate Rs. 4 per hour

The actual data and related information are as under:

Actual production 1000 units; actual hours 15,300 hours, actual rate Rs. 3.90 per hour. Calculate Labour Rate Variance.

Solution:

$$\begin{aligned}\text{Labour Rate Variance} &= (\text{Standard wage rate} - \text{Actual wage rate}) \times \text{Actual hours} \\ &= 15,300 \times (4 - 3.90) &= \text{Rs. 1,530 (Favourable)}\end{aligned}$$

Labour Efficiency Variance

The Labour time or efficiency variance is the result of taking more or less time than the standard time specified for the performance of a work. It is that portion of the Labour cost variance which is due to the difference between the actual labour hour expended and standard labour hours specified.

Can be computed using the formula:

$$\text{Labour Efficiency variance} = (\text{SH for actual output} - \text{AH}) \times \text{Standard Rate}$$

This variance is favourable when the total actual hours are less than the standard hours allowed.

Also,

$$\text{Labour Cost Variance} = \text{Labour Rate Variance} + \text{Labour Efficiency Variance}$$

Example 10

The standard time and rate for unit component A are given below:

Standard hours 15; Standard rate Rs. 4 per hour

The actual data and related information are as under:

Actual production 1000 units; actual hours 15,300 hours, actual rate Rs. 3.90 per hour. Calculate Labour Efficiency Variance.

Solution:

$$\begin{aligned}
 \text{Labour Efficiency Variance} &= \text{Standard wage rate} \times (\text{Standard hours} - \text{Actual hours}) \\
 &= 4 \times (15,300 - 15,000) = 12,000 \text{ (Adverse)}
 \end{aligned}$$

Idle Time Variance

It is a sub-variance of Wage Efficiency or Time Variance.

The standard cost of actual hours of any employee may remain idle due to abnormal circumstances like strikes, lock outs, power failure etc. Standard cost of such idle time is called Idle Time Variance. It is always adverse or unfavourable.

Can be computed using the formula:

$$\text{Idle Time variance} = \text{Idle Hours} \times \text{Standard Rate per hour}$$

If there are idle hours, actual hours used in mixed variance and yield variance will be reduced by idle hours. Revised standard hours will also be calculated on adjusted actual hours. But in the calculation of Efficiency and rate variance, total actual hours will be taken.

Labour Mix Variance

The composition of actual gang of labour may differ from composition of standard gang due to shortage of a particular grade of workers or some other reason. It is that portion of the wages variance which is due to the difference between the actual labour grades utilized and the standard labour grades specified.

Can be computed using the formula:

Labour Mix variance = (Revised Standard labour hours – AH) x Standard Wage rate

Revised Standard hours = $\frac{\textit{Total hours of actual mix or gang}}{\textit{Total hours of standard mix or gang}}$ x SH

Labours Yield Variance

The Labour yield variance occurs when there is a difference between standard output and actual output.

It is that portion of the Labour Efficiency variance which is due to the difference between the actual yield obtained and the standard yield specified.

Can be computed using the formula:

Labour Yield variance = Standard labour Cost per unit x (Standard yield or output for actual mix– Actual yield or output)

Standard yield is the output which should result on input of actual hours mix.

Standard labour Cost per unit = $\frac{\text{Total cost of standard mix of Labour}}{\text{Net standard output}}$

Example 11

A gang of workers usually consists of 10 men, 5 women and 5 boys in a factory. They are paid at standard hourly rates of Rs. 1.25, Rs. 0.80 and Rs. 0.70 respectively. In a normal week of 40 hours the gang is expected to produce 1000 units of output.

In certain week, the gang consisted of 13 men, 4 women and 3 boys. Actual wages were paid at the rates of Rs. 1.20, Rs. 0.85 and Rs. 0.65 respectively. Two hours were lost due to abnormal idle time and 960 units of output were produced.

Calculate various labour variances.

Solution 11

Workers	Standard			Actual		
	Hours (Workers x week)	Rate (Rs.)	Amount (Rs.)	Hours (Workers x week)	Rate (Rs.)	Amount (Rs.)
Men	400	1.25	500	520	1.20	624
Women	200	0.80	160	160	0.85	136
Boys	200	0.70	140	120	0.65	78
Total	800		800	800		838

Solution:

Direct Labour Cost Variance = Standard cost for actual output – actual cost

Standard cost for actual output = Standard cost per unit x actual output

= Rs. 800/1000 units x 960 units = Rs. 768

DLCV = 768 – 838 = Rs. 70 (A)

Continued...

Solution:**Solution 11**

Direct Labour Rate Variance = Actual hours (Standard wage rate – actual wage rate)

Men = 520 (1.25 – 1.20) = Rs. 26 (F)

Women = 160 (0.80 – 0.85) = 8 (A)

Boys = 120 (0.70 – 0.65) = 6 (F)

Total Rs. 24 (F)

Direct Labour efficiency variance = Standard wage rate (standard time for actual output – actual time paid for)

Continued....

Solution:**Solution 11**

Direct Labour efficiency variance = Standard wage rate (standard time for actual output – actual time paid for)

Standard time for actual output = Standard hours x $\frac{\text{actual output}}{\text{standard output}}$

Men = $400 \times 960/1000 = 384$ hours

Women = $200 \times 960/1000 = 192$ hours

Boys = $200 \times 960/1000 = 192$ hours

DLEV for Men = $1.25 \times (384 - 520) =$ Rs. 170 (A)

Women = $0.80 \times (192 - 160) =$ 25.60 (F)

Boys = $0.70 \times (192 - 120) =$ 50.40 (F)

Total 94.00 (A)

Continued....

Solution:

Solution 11

Idle Time variance	=	Idle hours x Standard Wage Rate	
	=	(Workers x hours) x Standard Wage Rate	
Men	=	(13 x 2) x 1.25	= Rs. 32.50 (A)
Women	=	(4 x 2) x 0.80	= 6.40 (A)
Boys	=	(3 x 2) x 0.70	= 4.20 (A)
		Total	43.10 (A)

Continued....

Solution:**Solution 11**

Direct Labour Mix variance = Standard Wage Rate (Revised Standard Time – Actual Time Taken)

Revised Standard Time = Standard Time x $\frac{\text{Total actual time}}{\text{Total standard time}}$

Total actual time = 800 – 40 Idle hours = 760

Men = 760 x 400/800 = 380

Women = 760 x 200/800 = 190

Boys = 760 x 200/800 = 190

DLMV for Men = 1.25 x (380 – 494) = 142.50 (A)

Women = 0.80 x (190 – 152) = 30.40 (F)

Boys = 0.70 x (190 – 114) = 53.20 (F)

Total 58.90 (A)

Continued....

Solution:

Solution 11

Direct Labour Yield variance = Standard Cost per unit (Standard output for actual time – Actual Output)

= Rs. 0.80 x (950 – 960) = Rs. 8 (F)

Standard output for actual time = 1000 units/800 hours x 760 hours = 950 units

Verification

Labour Cost Variance = Labour rate variance + Labour efficiency variance

= Rs. 24 (F) + 94 (A)

= Rs. 70 (A)

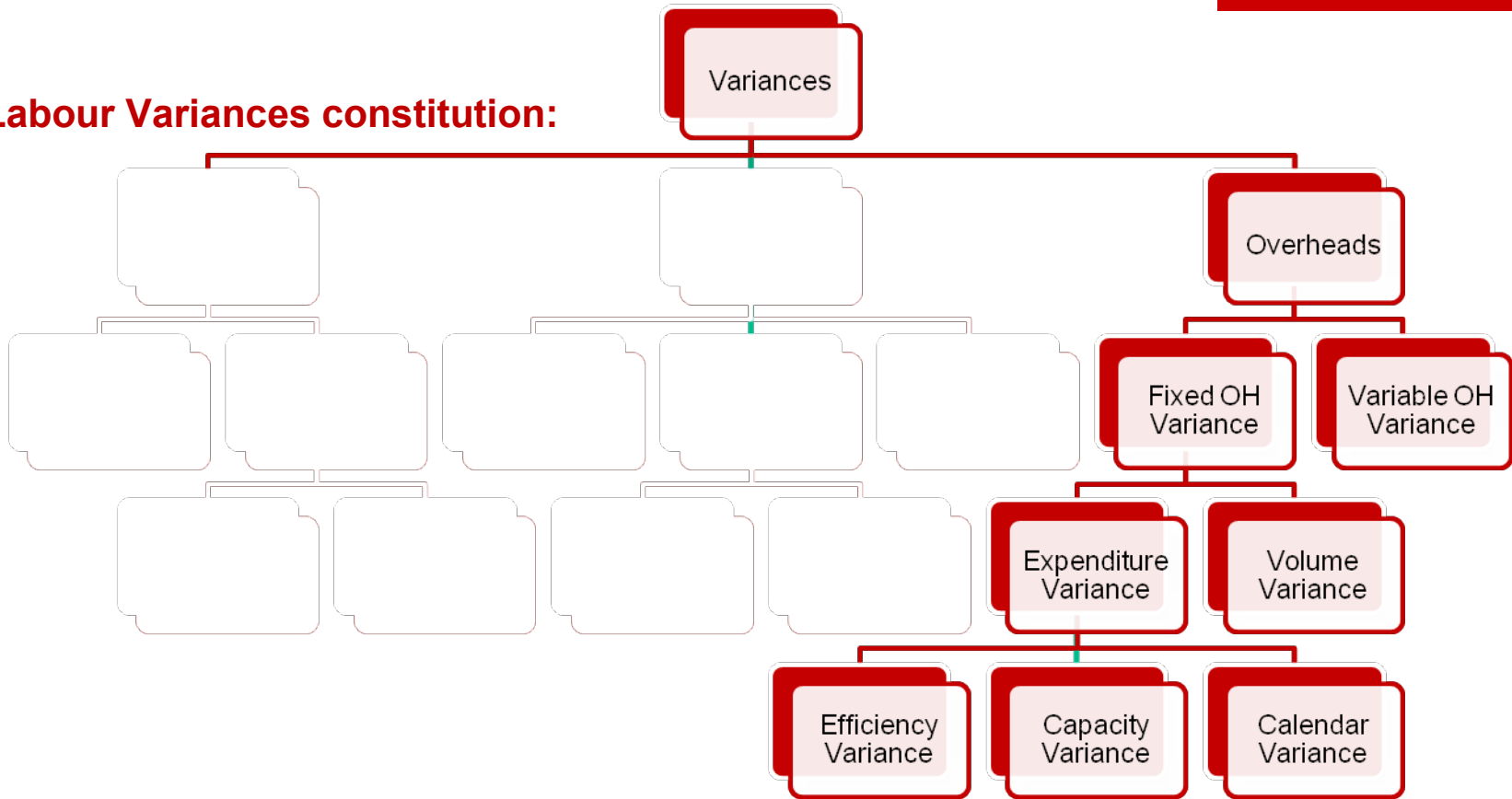
Labour Efficiency Variance = Direct Labour Mix Variance + Idle Time Variance + Direct Labour Yield Variance

= Rs. 58.90 (A) + 43.10 (A) + 8 (F)

94 (A)

Overhead Variances

Labour Variances constitution:



Variable OH Variances

Variable Overhead Variance represents the difference between standard variable overhead (specified for actual units produced) and the actual variable overhead incurred.

Can be computed using the formula:

Variable OH Cost Variance = Standard Variable OH on actual production – Actual variable OH

OR

Variable OH Cost variance = (Actual time or standard hours for actual production x Standard variable OH Rate) – (Actual Variable OH)

Where, Standard variable OH Rate per unit or per hours = $\frac{\text{Budgeted OH}}{\text{Budgeted output or hours}}$

Example 12

Calculate variable OH Cost Variance from the following:

Budgeted production for the year	:	5000 units
Actual Production	:	4600 units
Budgeted Variable Overheads	:	Rs. 1,00,000
Actual Variable Overheads	:	Rs. 93,000

Solution:

$$\begin{aligned} \text{Variable Overhead Rate per unit} &= \frac{\text{Budgeted Overhead}}{\text{Budgeted Production}} \\ &= \frac{1,00,000}{5,000} = \text{Rs. 20.} \end{aligned}$$

$$\text{Solution Variable Overhead on actual Production} = \text{Actual Production} \times \text{Overhead Rate}$$

Continued....

Solution 12

Solution Variable Overhead on actual Production	=	Actual Production x Overhead Rate
or		
Recovered Variable Overhead	=	4,600 x 20 = Rs. 92,000
Variable Overhead Cost Variance	=	[Standard Variable Overhead on Actual Production – Actual Variable Overhead] or Recovered Variable Overheads – Actual Variable Overheads
	=	92,000 – 93,000
	=	Rs. 1,000 (unfavourable)

There may be two sub divisions of variable overhead variance.

(i) Variable Overhead Expenditure or Budget Variance

= Standard Variable Overheads for actual time – Actual variable overheads

Standard variable OH for actual time = standard variable OH rate per hour x actual hours

(ii) Variable OH Efficiency Variance

= Standard Variable Overheads on actual production – standard variable overheads for actual time

Standard or budgeted variable overhead for actual time

= Standard OH Rate per hour x Actual Hours

Standard variable OH on actual production

= standard variable OH per unit x Actual output

Example 13

Calculate (i) Variable Overhead Variance (ii) Variable Overhead Expenditure or Budget Variance and (iii) Variable Overhead Efficiency Variance from the following:

- 1. Standard hours per unit 3; Variable OH rate per hour Rs. 2**
- 2. Actual variable OH incurred Rs. 1,08,000**
- 3. Actual Output: 20,000 units**
- 4. Actual hours worked: 56,000 hours**

Solution:

- 1. Standard or Budgeted Variable OH on actual time**

$$= \text{Standard OH Rate} \times \text{Actual hours}$$

$$= 2 \times 56,000 = \text{Rs. } 1,12,000$$
- 2. Standard Variable OH for actual output**

$$= \text{Standard Variable OH rate per unit} \times \text{actual output}$$

$$= (3 \times 2) \times 20,000 = 1,20,000$$

Continued....

Solution 13

$$\begin{aligned} \text{Variable OH Variance} &= \text{Standard Variable OH} - \text{Actual Variable OH} \\ &= 1,20,000 - 1,08,000 = \text{Rs. } 12,000 \text{ (F)} \end{aligned}$$

$$\begin{aligned} \text{Variable OH Expenditure or Budget Variance} &= \text{Budgeted or Standard Variable OH for actual time} - \\ &\quad \text{Actual Variable OH} \\ &= 1,12,000 - 1,08,000 = \text{Rs. } 4,000 \text{ (F)} \end{aligned}$$

$$\begin{aligned} \text{Variable OH Efficiency Variance} &= \text{Standard Variable OH on actual production} - \text{Standard} \\ &\quad \text{Variable OH for actual time} \\ &= 1,20,000 - 1,12,000 = \text{Rs. } 8,000 \text{ (F)} \end{aligned}$$

Verification:

$$\begin{aligned} \text{Variable OH Variance} &= \text{Variable OH Expenditure} + \text{Variable OH Efficiency Variance} \\ &= 4000 \text{ (F)} + 8000 \text{ (F)} = \text{Rs. } 12,000 \text{ (F)} \end{aligned}$$

Fixed OH Variances

Terms to be understood before calculating OH Variances:

1. Standard OH Rate per unit or per hour or Budgeted OH Rate per unit

$$= \frac{\text{Budgeted Overheads}}{\text{Budgeted Output Units or Budgeted Hours}} \text{ or per hour}$$

2. Recovered or Absorbed Overheads

$$= \text{Standard OH Rate per unit} \times \text{Actual Output} \text{ or } \text{Standard OH Rate per hour} \times \text{Standard hours for actual output}$$

3. Budgeted Overheads (for budgeted hours or budgeted output):

$$= \text{Standard OH rate per unit} \times \text{Budgeted output units} \text{ or } \text{Standard overhead rate per hour} \times \text{budgeted hours.}$$

4. Standard Overheads (for actual time or budgeted output for actual time)

$$= \text{Standard OH Rate per unit} \times \text{Standard output for actual time} \text{ or } \text{OH rate per hour} \times \text{actual hours}$$

Continued....

Important Terms

5. Actual Overheads = Actual OH Rate per unit x Actual Output or Actual Rate per hours x Actual hours

6. Standard Hours for actual output
= $\frac{\text{Budgeted hours}}{\text{Budgeted Output}}$ x Actual Output

7. Standard output for Actual Time
= $\frac{\text{Budgeted Output}}{\text{Budgeted hours}}$ x Actual hours

Fixed OH Cost Variance

Fixed Overhead Cost Variance is the difference between standard overhead recovered or absorbed for actual output and the actual fixed overhead.

Can be computed using the formula:

Fixed OH Cost Variance = (Recovered or absorbed Fixed OH) – (Actual Fixed OH)

OR

(Actual output) x (Standard OH Rate) – (Actual OH Rate x Actual Output)

Fixed OH Expenditure Variance

Fixed Overhead Expenditure Variance is the difference between actual expenditure and budgeted expenditure

Can be computed using the formula:

Fixed OH Expenditure Variance = (Budgeted OH) – (Actual OH)

OR

(Standard OH Rate x Budgeted output) – (Actual OH Rate x Actual Output)

Fixed OH Volume Variance

Fixed Overhead Volume Variance is the difference between fixed OH recovered on actual output and fixed OH on budgeted output. It is the result of difference in volume of production multiplied by the standard rate.

Can be computed using the formula:

Fixed OH Volume Variance = (Recovered Fixed OH) – (Budgeted Fixed OH)

OR

(Standard OH Rate x Actual output) – (Standard OH Rate x Budgeted Output)

Fixed OH Efficiency Variance

Fixed Overhead Efficiency Variance is that portion of volume variance which arises due to difference between budgeted efficiency of production and the actual efficiency attained.

Can be computed using the formula:

Fixed OH Efficiency Variance = (Recovered Fixed OH) – (Standard Fixed OH)

OR

(Standard OH Rate x Actual output) – (Standard OH Rate x Standard Output for actual time)

Fixed OH Capacity Variance

Fixed Overhead Capacity Variance is that portion of volume variance which arises due to difference between budgeted capacity specified and the actual capacity attained. It reveals whether the plants are over or under utilized. This variance may arise due to break down in machinery, idle time, failure of power etc.

Can be computed using the formula:

Fixed OH Capacity Variance = (Standard Fixed OH) – (Budgeted Fixed OH)

OR

**(Standard OH Rate x Standard output for Actual time) –
(Standard OH Rate x Budgeted Output)**

Example 14

Compute Fixed OH Cost, Expenditure and Volume Variances.

Normal Capacity is 5000 hours. Budgeted Fixed OH Rate is Rs. 10 per standard hour. Actual level of capacity utilized is 4,400 standard hours. Actual Fixed OH Rs. 52,000.

Solution:

Fixed OH Cost Variance

$$= \text{Recovered Fixed OH} - \text{Actual Fixed OH}$$

$$= 44,000 - 52,000 = \text{Rs. 8,000 (A)}$$

Fixed OH Expenditure Variance

$$= \text{Budgeted Fixed OH} - \text{Actual Fixed OH}$$

$$= 50,000 - 52,000 = \text{Rs. 2,000 (A)}$$

Fixed OH Volume Variance

$$= \text{Recovered Fixed OH} - \text{Budgeted Fixed OH}$$

$$= 44,000 - 50,000 = \text{Rs. 6,000 (A)}$$

Fixed OH Calendar Variance

Fixed Overhead Calendar Variance is that portion of capacity variance which arises due to difference between the number of working days anticipated in the budget period and the actual working days in the budget period. The number of working days in the budget are arrived at by dividing the number of annual days by twelve. But the actual days of a month may be more or less than the standard days and with the result there may be calendar variance.

Can be computed using the formula:

Fixed OH Calendar Variance = (Possible Fixed OH) – (Budgeted Fixed OH)

OR

**(Standard OH Rate per hour x Possible hours) –
(Standard Rate per hour x Budgeted hours)**

Fixed OH Revised Capacity Variance will be the remaining part of capacity variance as reduced by calendar variance.

Fixed OH Revised Capacity Variance = Standard Fixed OH – Possible Fixed OH

Fixed OH Yield Variance

Fixed Overhead Yield Variance shows the gain or loss incurred by way of overhead cost incidence on account of loss or wastage in production

Can be computed using the formula:

Fixed OH Yield Variance = (Recovered Fixed OH) – (Expected Fixed OH)

Here, Expected Fixed OH = Standard OH Rate per unit x Expected Output

Expected Output means output on actual input after allowing standard loss

Example 15

A Cost Accountant was given the following information for the month of February:

- (a) Overheads cost variance: Rs. 1400 (A)**
- (b) Overheads Volume variance: Rs 1,000 (A)**
- (c) Budgeted hours for February: 1,200 hours**
- (d) Budgeted OH for February: Rs. 6,000**
- (e) Actual rate of recovery of overheads: Rs. 8 per hour**

Compute:

- (1) Overhead Expenditure variance**
- (2) Actual OH incurred**
- (3) Actual hours for actual production**
- (4) OH Capacity Variance**
- (5) OH Efficiency Variance**
- (6) Standard hours for actual production**

Solution 15**(1) Overheads Expenditure Variance**

$$\begin{aligned} &= \text{Overheads Cost Variance} - \text{Overheads Volume Variance} \\ &= \text{Rs. 1,400 (A)} - \text{Rs. 1,000 (A)} = \text{Rs. 400 (A)} \end{aligned}$$

(2) Actual Overheads incurred

$$\begin{aligned} &= \text{Budgeted Overheads} - \text{Overhead Expenditure Variance} \\ &= \text{Rs. 6,000} - \text{Rs. 400 (A)} = \text{Rs. 6,400} \end{aligned}$$

(3) Actual hours for actual production

$$\begin{aligned} &= \frac{\text{Actual Overheads incurred}}{\text{Actual rate of recovery of overhead per hour}} \\ &= 6400 / 8 = 800 \text{ hours} \end{aligned}$$

Continued....

Solution 15
(4) Overheads Capacity Variance

$$\begin{aligned}
 &= \text{Standard OH Rate (Actual Hours – Budgeted Hours)} \\
 &= 5 \times (800 \text{ hours} – 1,200 \text{ hours}) = \text{Rs } 2,000 \text{ (A)}
 \end{aligned}$$

$$\text{Standard OH Rate} = \frac{\text{Budgeted Overheads}}{\text{Budgeted Hours}} = \frac{\text{Rs. } 6,000}{1,200} = \text{Rs. } 5 \text{ per hour}$$

(5) Overhead Efficiency Variance

$$\begin{aligned}
 &= \text{Overheads Volume Variance} – \text{Overhead Capacity Variance} \\
 &= \text{Rs. } 1,000 \text{ (A)} – \text{Rs. } 2,000 \text{ (A)} = \text{Rs. } 1,000 \text{ (A)}
 \end{aligned}$$

(6) Standard hours for actual production

$$\text{Volume Variance} = \text{Standard OH Rate} \times \text{Std hours for actual production}$$

Budgeted hours are presumed to be x.

$$\text{or } 1,000 \text{ (A)} = 5 (x – 1,200)$$

$$\text{or } 1,000 \text{ (A)} = 5x – 6,000$$

$$\text{or } -5x = -5,000$$

$$x = 1,000 \text{ hrs}$$

QUESTIONS ?



Thank you

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