Management Accountancy

Unit 14
Overhead Variances

Structure

- Concept of overhead variance
- Overhead variance analysis methods
- Three overhead variances

After the completion of this unit, you should be able to:

- Compute and interpretate overhead variances

14.1 Overhead Variance

In a standard cost system, overheads are applied at standard pre-determined rates to the standard allowed input. The input can be one of the several bases used for absorbing overheads such as labour hours, machine hours, units of outputs etc. Generally, direct labour hours are in use in standard costing. Overheads variances arise due to the difference between actual overheads cost incurred and absorbed overhead. For the calculation of overhead variances, overhead cost should be first of all identified into fixed and variable overhead. Thereafter, standard overhead recovery rates and actual overhead incurred for the actual outputs should be identified. Standard overhead recovery or absorption rates can be calculated as shown below:

$$\text{Standard Fixed Overhead Rate} = \frac{\text{Total Fixed Overhead}}{\text{Normal Capacity}}$$

$$\text{Standard Variable Overhead Rate} = \frac{\text{Total Variable Overhead}}{\text{Normal Capacity}}$$

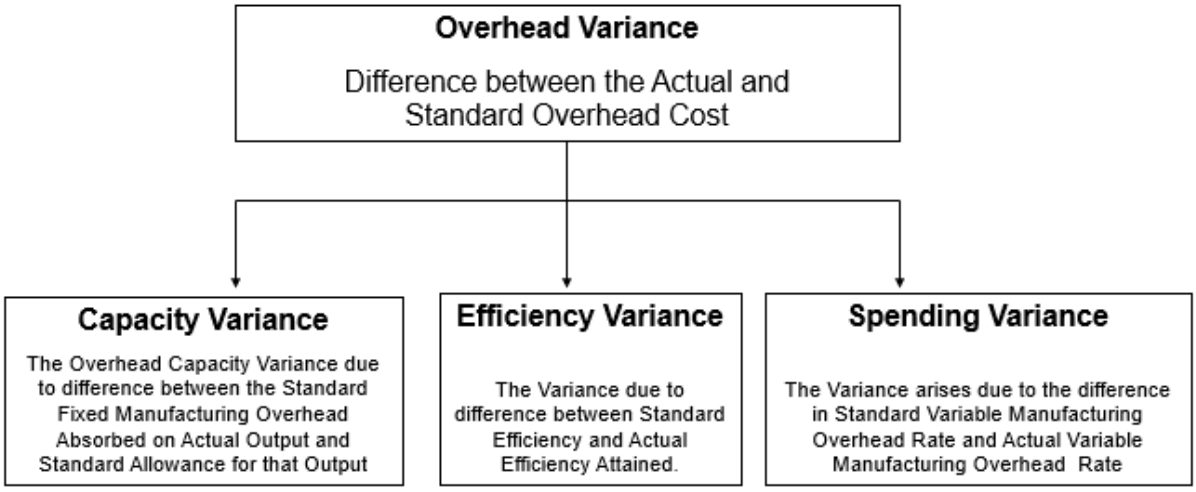
14,2 Overhead Variance Analysis Methods

Mainly, there are different four methods of analysing overhead variances as follows:

1. Two – Variance Method
2. Three – Variance Method
3. Four – Variance Method
4. Five – Variance Method

14.3 Three Variance Methods

(a) Capacity Variance (Volume Variance)
(b) Efficiency Variance
(c) Spending Variance



(Source: Author)

14.4 Computation of Overhead Variances

(a) Overhead Capacity Variance

It arises due to the difference between the standard Fixed Manufacturing Overhead absorbed on actual output and standard cost. It It can be calculated as below:

$$\text{Overhead Capacity Variance} = (SH \times SR) - [(SH \times SVOHR) + FOH]$$

Or,

$$\text{Overhead Capacity Variance} = \text{Standard Fixed Overhead Rate} \times (SH - NC)$$

Where,

SH = Standard Hours Produced,
SR = Standard Overhead Rate per Hour,
SVOHR = Standard Variable Overhead Rate per Hour
FOH = Standard Fixed Overhead
NC = Normal Capacity in Hours

If the standard hours produce excess the normal capacity, the variance indicates favourable with satisfactory utilization of fixed overhead and vice-versa.

(b) Overhead Efficiency Variance

It arises due to the difference between the standard hours produced for actual output and actual hours worked at the standard variable overhead rate. It can be calculated as below:

$$\text{Overhead Efficiency Variance} = SVOHR \times (SH - AH)$$

Where,

AH = Actual Hours Worked

If the standard hours produce excess the actual hours worked, the variance indicates favourable and vice-versa.

(c) Overhead Spending Variance

It arises due to difference between the budget overhead costs for actual hour work and actual cost incurred. This variance measures the correct efficiency or inefficiency in spending. It can be calculated as below:

$$\text{Overhead Spending Variance} = [FOH + (SVOHR \times AH)] - \text{Actual Overhead Incurred}$$

If the budgeted cost for actual output exceeds the actual cost incurred, the variance indicates favourable and vice-versa.

From the table method also, the overhead variances can be calculated. The table method is given below:

Row A	SH × SR	= × ×
Row B	(SH × SVOHR) + FOH	= × ×
Row C	(AH × SVOHR) + FOH	= × ×
Row D	Actual Overhead Incurred	= × ×

Variances:

1. Overhead Capacity Variance = Row A – Row B
2. Overhead Efficiency Variance = Row B – Row C
3. Overhead Spending Variance = Row C – Row D

It is noted that instead of hours and hourly rate, we can use days, weeks and units and unit variable cost etc.

ILLUSTRATION 1

The information relating to overhead costs are as follows:

(a) Standard Capacity based on Normal Capacity 5,000 hours:

Fixed Overhead	Rs. 5,000
Variable Overhead	Rs. 5,000
Total	Rs. 10,000

(b) Standard Hours Produced: 4,250 hours

(c) Actual Hours Worked: 4,300 hours

(d) Actual Overhead Incurred:

Fixed Overhead	Rs. 5,000
Variable Overhead	Rs. 4,000
Total	Rs. 9,000

Required: Overhead Three Variances.

SOLUTION:

Basic Calculations:

1. Standard Fixed Overhead Rate $= \frac{\text{Total Fixed Overhead}}{\text{Normal Capacity}}$

$= \frac{\text{Rs. 5,000}}{\text{5,000 hours}}$

= Rs. 1 per hour.

2. Standard Variable Overhead Rate $= \frac{\text{Total Variable Overhead}}{\text{Normal Capacity}}$

$= \frac{\text{Rs. 5,000}}{\text{5,000 hours}}$

= Rs. 1 per hour

3. Standard Overhead Rate = Rs. 1/hour + Rs. 1/hour = Rs. 2/hour

Calculation of Three Variances by Using Formula:

(a) Overhead Capacity Variance = (SH × SR) – [(SH × SVOHR) + FOH]

= (4,250 hrs × Rs. 2/hr) – [(4,250 hrs × Rs. 1/hr) + Rs. 5,000]

= Rs. 8,500 – Rs. 9,250

= Rs. 750 (UF)

(b) Overhead Efficiency Variance = SVOHR × (SH – AH)
= Rs. 1/hr. × (4,250 – 4,300)
= Rs. 50 (UF)

(c) Overhead Spending Variance = [FOH + (SVOHR × AH)] – Actual Overhead Incurred
= [Rs. 5,000 + (Rs. 1/hr. × 4,300 hrs.)] – Rs. 9,000
= Rs. 9,300 – Rs. 9,000
= Rs. 300 (F)

Alternatively, Calculation of Overhead Three Variances by Using Table:

Row A	SH × SR	= 4,250 hrs. × Rs. 2/hr	= Rs. 8,500
Row B	(SH × SVOHR) + FOH	= (4,250 hrs × Rs. 1/hr) + Rs. 5,000	= Rs. 9,250
Row C	(AH × SVOHR) + FOH	= (4,300 hrs × Rs. 1/hr) + Rs. 5,000	= Rs. 9,300
Row D	Actual Overhead Incurred		= Rs. 9,000

Variances:

(a) Overhead Capacity Variance = Row A – Row B = Rs. 8,500 – Rs. 9,250 = Rs. 750 (UF)
(b) Overhead Efficiency Variance = Row B – Row C = Rs. 9,250 – Rs. 9,300 = Rs. 50 (UF)
(c) Overhead Spending Variance = Row C – Row D = Rs. 9,300 – Rs. 9,000 = Rs. 300 (F)

ILLUSTRATION 2

The Kathmandu Manufactures' ltd. provided the following information about manufacturing overhead cost:

(a) Budgeted Fixed Overhead Rs.90,000
(b) Normal Capacity 30,000 Labour Hours
(c) Manufacturing Overhead Rs.5 per DLH
(d) Actual Production in 28,000 DLH 48,000 units
(e) Standard Output per DLH 1.5 units
(f) Actual Manufacturing Overhead Paid Rs.160,000

Required: Overhead Three Variances.

SOLUTION:

Basic Calculation:

1. Standard Fixed Overhead Rate $= \frac{\text{Total Fixed Overhead}}{\text{Normal Capacity}}$
$= \frac{\text{Rs. 90,000}}{\text{30,000 hours}}$
= Rs. 3 per hour
2. Standard Overhead Rate = Rs. 5 per hour
3. Standard Variable Overhead Rate = Rs. 5/hr – Rs. 3/hr.
= Rs. 2 per hour
4. Standard Hours Produced = $\frac{1}{1.5}$ × 48,000 units = 32,000 hours.

Calculation of Three Variances by Using Formula:

(a) Overhead Capacity Variance = (SH × SR) – [(SH × SVOHR) + FOH]
= (32000 hrs × Rs 5/hr) – [(32000 hrs × Rs 2/hr) + Rs 90000]
= Rs. 1,60,000 – Rs. 1,54,000
= Rs. 6,000 (F)

(b) Overhead Efficiency Variance = SVOHR × (SH – AH)
= Rs. 2/hr. × (32,000 – 28,000)
= Rs. 8,000 (F)

(c) Overhead Spending Variance = [FOH + (SVOHR × AH)] – Actual overhead incurred
= [Rs. 90,000 + (Rs. 2/hr. × 28,000 hrs.)] – Rs. 1,60,000
= Rs. 1,46,000 – Rs. 1,60,000
= Rs. 14,000 (UF)

Alternatively, Calculation of Overhead Three Variances by Using Table:

Row A	SH × SR	= 32,000 hrs. × Rs. 5/hr.	= Rs. 160,000
Row B	(SH × SVOHR) + FOH	= (32,000 hrs × Rs. 2/hr) + Rs. 90,000	= Rs. 154,000
Row C	(AH × SVOHR) + FOH	= (28,000 hrs × Rs. 2/hr) + Rs. 90,000	= Rs. 146,000
Row D	Actual Overhead Incurred		= Rs. 160,000

Variances:

(a) Overhead Capacity Variance = Row A – Row B = Rs. 160,000 – Rs. 154,000 = Rs. 6,000 (F)
(b) Overhead Efficiency Variance = Row B – Row C = Rs. 154,000 – Rs. 146,000 = Rs. 8,000 (F)
(c) Overhead Spending Variance = Row C – Row D = Rs. 146,000 – Rs. 160,000 = Rs.14,000 (UF)

ILLUSTRATION 3

The Flexible Budgeting Data regarding a manufacturing company are presented below:

Flexible Budgeting Formula = Fixed Cost + Unit Variable Cost × Units
= Rs. 90,000 + Rs. 2.00 per Hour × Hours Worked

Other Data:

Normal Capacity	30,000 hours
Hours Worked	32,000 hours
Hours Produced	28,000 hours
Total Overhead Expenses	Rs. 1,46,000

Required: Analysis of Overhead Variance (Three Variance)

SOLUTION:

Basic Calculations:

1. SH, Standard Hours Produced = 28,000 hours
2. AH, Actual Hours Worked = 32,000 hours
3. Standard Fixed Overhead Rate $= \frac{\text{Total Fixed Overhead}}{\text{Normal Capacity}}$
$= \frac{\text{Rs. 90,000}}{\text{30,000 hours}}$
= Rs. 3 per hour
4. SVOHR, Standard Variable Overhead Rate = Rs. 2 per hour
5. SR, Standard Overhead Rate = Rs. 3 + Rs. 2
= Rs. 5 per hour
6. FOH, Fixed Overhead = Rs. 90,000

Calculation of Three Overhead Variances by Using Table

Row A	SH × SR	= 28,000 hrs. × Rs. 5/hr.	= Rs. 1,40,000
Row B	(SH × SVOHR) + FOH	= (28,000 hrs × Rs. 2/hr) + Rs. 90,000	= Rs. 1,46,000
Row C	(AH × SVOHR) + FOH	= (32,000 hrs × Rs. 2/hr) + Rs. 90,000	= Rs. 1,54,000
Row D	Actual Overhead Incurred	= Rs. 1,46,000	= Rs. 1,46,000

Variances:

(a) Overhead Capacity Variance = Row A – Row B = Rs. 1,40,000 – Rs. 1,46,000 = Rs. 6,000 (UF)

(b) Overhead Efficiency Variance = Row B – Row C = Rs. 1,46,000 – Rs. 1,54,000 = Rs. 8,000 (UF)

(c) Overhead Spending Variance = Row C – Row D = Rs. 1,54,000 – Rs. 1,46,000 = Rs. 8,000 (F)

ILLUSTRATION 4

Determine Three Various Overhead Variances from the following information.

Actual Hours Worked 3,100

Fixed Overhead (4,000 hours) Normal Capacity Rs. 16,000

Actual Production 25 units

Standard Man Hour per unit 60

Standard Overhead Rate per Standard Man Hour Rs. 10

Actual Overhead Incurred Rs. 32,500

SOLUTION:

Basic Calculations:

1. SH, Standard Hours Produced = 25 units × 60 hours per unit
   = 1,500 hours
2. AH, Actual Hours Worked = 3,100 hours
3. Standard Fixed Overhead Rate $= \frac{\text{Total Fixed Overhead}}{\text{Normal Capacity}}$
   $= \frac{\text{Rs. 16,000}}{\text{4,000 hours}}$
   = Rs. 4 per hour
4. SR, Standard Overhead Rate = Rs. 10 per hour
5. SVOHR, Standard Variable Overhead Rate = Rs. 10 – Rs. 4
   = Rs. 6 per hour
6. FOH, Fixed Overhead = Rs. 16,000

Calculation of Three Overhead Variances by Using Table

Row A	SH × SR	= 1,500 hrs. × Rs. 10/hr.	= Rs. 15,000
Row B	(SH × SVOHR) + FOH	= (1,500 hrs × Rs. 6/hr) + Rs. 16,000	= Rs. 25,000
Row C	(AH × SVOHR) + FOH	= (3,100 hrs × Rs. 6/hr) + Rs. 16,000	= Rs. 34,600
Row D	Actual Overhead Incurred	= Rs. 32,500	= Rs. 32,500

Variances:

(a) Overhead Capacity Variance = Row A – Row B = Rs. 15,000 – Rs. 25,000 = Rs. 10,000 (UF)

(b) Overhead Efficiency Variance = Row B – Row C = Rs. 25,000 – Rs. 34,600 = Rs. 9,600 (UF)

(c) Overhead Spending Variance = Row C – Row D = Rs. 34,600 – Rs. 32,500 = Rs. 2,100 (F)

ILLUSTRATION 5

The following are the data relating to overhead expenses of company:

(a) Normal Capacity 1,00,000 Direct Labour Hour
(b) Standard Time for 1 unit of output 4 hours
(c) Flexible Budget Data = Fixed Cost + Unit Variable Cost × Units Produced
= Rs, 1,50,000 + Rs. 10 × Per Unit Produced
(d) Unit Produce 27,500 units
(e) Labour Hours Paid 1,05,000
(f) Total Overhead Cost Paid Rs, 4,23,000

Required: Overhead Cost Variance Analysis Showing Three Variances.

SOLUTION:

Basic Calculations:

1. SH, Standard Hours Produced = 27,500 units × 4 hours per unit
= 1,10,000 hours
2. AH, Actual Hours Worked = 1,05,000 hours
3. Standard Fixed Overhead Rate $= \frac{\text{Total Fixed Overhead}}{\text{Normal Capacity}}$
$= \frac{\text{Rs. 1,50,000}}{\text{1,00,000 hours}}$
= Rs. 1.50 per hour
4. SVOHR, Standard Variable Overhead Rate $= \frac{\text{Rs. 10}}{\text{4 units}}$
= Rs. 2.50 per hour
5. SR, Standard Overhead Rate = Rs. 1.50 per hour + Rs. 2.50 per hour
= Rs. 4 per hour
6. FOH, Fixed Overhead = Rs. 1,50,000

Calculation of Three Overhead Variances by Using Table

Row A	SH × SR	= 1,10,000 hrs. × Rs. 4/hr.	= Rs. 4,40,000
Row B	(SH × SVOHR) + FOH	= (1,10,000 hrs × Rs. 2.50/hr) + Rs. 1,50,000	= Rs. 4,25,000
Row C	(AH × SVOHR) + FOH	= (1,05,000 hrs × Rs. 2.50/hr) + Rs. 1,50,000	= Rs. 4,12,500
Row D	Actual Overhead Incurred	= Rs. 4,23,000	= Rs. 4,23,000

Variances:

(a) Overhead Capacity Variance = Row A – Row B = Rs. 4,40,000 – Rs. 4,25,000 = Rs. 15,000 (F)
(b) Overhead Efficiency Variance = Row B – Row C = Rs. 4,25,000 – Rs. 4,12,500 = Rs. 12,500 (F)
(c) Overhead Spending Variance = Row C – Row D = Rs. 4,12,500 – Rs. 4,23,000 = Rs. 10,500 (UF)

ILLUSTRATION 5

The Details of Overhead Cost of a Manufacturing company and other information have been provided:

Output in Units	10,000	20,000
Indirect Materials	10,000	20,000
Indirect Labour	20,000	40,000
Supervision	20,000	30,000
Heat Light and Power	10,000	15,000
Maintenance Cost	10,000	15,000
Depreciation Cost	30,000	30,000

	100,000	150,000

Additional Information:

Normal Capacity 10,000 DLH.

DLH Required for 1 units of Output 0.50 DLH.

Actual Output 22,000 units

Actual Hours Worked 9,500 DLH.

Actual Overhead Cost Paid Rs. 1,46,900.

Required: (a) Budgeted Overhead Cost for 15,000 units.

(b) Overhead Cost Three Variances.

SOLUTION:

(a) Budgeted Production Cost for 15,000 units = FC + (UVC × LA)

= Rs. 50,000 + (Rs. 5 per unit × 15,000 units)

= Rs. 1,25,000

Working Note: Computation of Cost Behaviour for 10,000 Units

Costs	Cost Behaviour	Variable Cost per Unit (Rs)	Fixed Cost (Rs.)
Indirect Material	Variable	1	–
Indirect Labour	Variable	2	–
Supervision	Semi-variable	1	10,000
Heat, Light and Power	Semi-variable	0.50	5,000
Maintenance Cost	Semi-variable	0.50	5,000
Depreciation Cost	Fixed	–	30,000
Total		5	50,000

Segregation of Semi-variable Costs: Supervision Cost:

$$\text{Variable Cost per Unit} = \frac{\text{Difference in Cost}}{\text{Difference in Output}} = \frac{\text{Rs. 10,000}}{\text{10,000 units}}$$

= Rs. 1 per unit

Fixed Overhead Cost (at 10,000 units Output) = Total Cost – Total Variable Cost

= Rs. 20,000 – (Rs. 1 per unit × 10,000 units)

= Rs. 10,000

Heat, Light and Power Cost:

$$\text{Variable Cost per Unit} = \frac{\text{Difference in Cost}}{\text{Difference in Output}} = \frac{\text{Rs. 5,000}}{\text{10,000 units}}$$

= Rs. 0.50 per unit

Fixed Overhead Cost (at 10,000 units Output) = Total Cost – Total Variable Cost

= Rs. 10,000 – (Rs. 0.50 per unit × 10,000 units)

= Rs. 5,000

Maintenance Cost:

$$\text{Variable Cost per Unit} = \frac{\text{Difference in Cost}}{\text{Difference in Output}} = \frac{\text{Rs. 5,000}}{\text{10,000 units}}$$

= Rs. 0.50 per unit

Fixed Overhead Cost (at 10,000 units Output) = Total Cost – Total Variable Cost

= Rs. 10,000 – (Rs. 0.50 per unit × 10,000 units)
= Rs. 5,000

(b) Basic Calculations for Determination of Overhead Three Variances:

1. SH, Standard Hours Produced = 22,000 units × 0.50 hours per unit
= 11,000 hours
2. AH, Actual Hours Paid = 9,500 hours
3. Standard Fixed Overhead Rate $= \frac{\text{Total Fixed Overhead}}{\text{Normal Capacity}}$
$= \frac{\text{Rs. 50,000}}{\text{10,000 hours}}$
= Rs. 5 per hour
4. SVOHR, Standard Variable Overhead Rate $= \frac{\text{Rs. 5}}{\text{0.50 hours}}$
= Rs. 10 per hour
5. SR, Standard Overhead Rate = Rs. 5 + Rs. 10
= Rs. 15 per hour
6. FOH, Fixed Overhead = Rs. 50,000

Calculation of Three Overhead Variances by using Table

Row A	SH × SR	= 11,000 hrs. × Rs. 15/hr.	= Rs. 1,65,000
Row B	(SH × SVOHR) + FOH	= (11,000 hrs × Rs. 10/hr.) + Rs. 50,000	= Rs. 1,60,000
Row C	(AH × SVOHR) + FOH	= (9,500 hrs × Rs. 10/hr.) + Rs. 50,000	= Rs. 1,45,000
Row D	Actual Overhead Incurred	= Rs. 1,46,900	= Rs. 1,46,900

Variances:

(a) Overhead Capacity Variance = Row A – Row B = Rs. 1,65,000 – Rs. 1,60,000 = Rs. 5,000 (F)
(b) Overhead Efficiency Variance = Row B – Row C = Rs. 1,60,000 – Rs. 1,45,000 = Rs. 15,000 (F)
(c) Overhead Spending Variance = Row C – Row D = Rs. 1,45,000 – Rs. 1,46,900 = Rs. 1,900 (UF)

ILLUSTRATION 6

A company operates a standard cost system and showed the following data for the month of March, 19×9:

	Actual	Budgeted
No. of Working Days	22	20
Man Hours	4,300	4,000
Overhead per Hour		Re. 0.50
Hours per Unit of Output		10
Budgeted Fixed Overhead Incurred	Rs. 1,800	
No. of Units Produced	425	
Actual Overhead Incurred	2,100	

Required: Calculate Overhead Variances using Three-Variance Formula.

SOLUTION:

Basic Calculations for Determination of Overhead Three Variances:

1. SH, Standard Hours Produced = 425 units × 10 hours per unit

= 4,250 hours

2. AH, Actual Hours Paid = 4,300 hours
3. Standard Fixed Overhead Rate $= \frac{\text{Total Fixed Overhead}}{\text{Normal Capacity}}$

$= \frac{\text{Rs. 1,800}}{\text{4,000 hours}}$

= Rs. 0.45 per hour

4. SR, Standard Overhead Rate = Rs. 0.50 per hour
5. SVOHR, Standard Variable Overhead Rate = Rs. 0.50 – Rs. 0.45

= Rs. 0.05 per hour

6. FOH, Fixed Overhead = Rs. 1,800

Calculation of Three Overhead Variances by Using Table

Row A	SH × SR	= 4,250 hrs. × Rs. 0.50/hr.	= Rs. 2,125
Row B	(SH × SVOHR) + FOH	= (4,250 hrs × Rs. 0.05/hr.) + Rs. 1,800	= Rs. 2,012.50
Row C	(AH × SVOHR) + FOH	= (4,300 hrs × Rs. 0.05/hr.) + Rs. 1,800	= Rs. 2,015
Row D	Actual Overhead Incurred	= Rs. 2,100	= Rs. 2,100

Variances:

(a) Overhead Capacity Variance = Row A – Row B = Rs. 2,125 – Rs. 2,012,50 = Rs. 112.50 (F)
(b) Overhead Efficiency Variance = Row B – Row C = Rs. 2,012,50 – Rs. 2,015 = Rs. 2.50 (UF)
(c) Overhead Spending Variance = Row C – Row D = Rs. 2,015 – Rs. 2,100 = Rs. 85 (UF)

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