

(UNIT-2)

Overhead control:

Overheads are the common expenses incurred for a number of departments and cost centers or cost units. Certain items of overheads can be directly identified with a particular department or cost centre. The process of charging such items of overhead to a particular department or cost centre is known as allocation of overhead. Allocation of overhead can be made only when the amount of overhead incurred by a particular department or cost centre is known. Therefore, allocation of overheads means charging all the amount of cost to a particular department or cost centre. For example repairs and maintenance for a machine should be charged or allocated to that department where the machine is installed.

Importance of Overhead Allocation

Allocation of overhead is important for the following reasons:

- It helps to determine the product cost.
- It helps to fix the price of a product.
- It helps to measure the effectiveness of a particular department or cost centre.
- It helps to supply the cost information to the management.
- It helps to evaluate the profitability of a product line in multi-product business.
- It helps to make a proper judgment for measurement of departmental efficiency.
- It helps to provide cost information for planning, controlling and managerial decision making.
- It helps to make accurate pricing for the competitive market.
- It can be used to control wastage and defective.

Apportionment of Overhead

There are certain overheads, which are common to a number of departments or cost centres. They cannot be directly identified or allocated to a particular department or cost centre. The distribution of such overhead to several departments or cost centers proportionately on some equitable basis is known as apportionment of overheads. For example, salary paid to the general manager should be distributed to the production, administration and selling departments as the general manager looks after all the departments. Some other common expenses are electricity, rent, lighting, etc.



Basis of Apportionment of Overhead

The overheads which cannot be associated with the specific department distributed among the related departments on suitable basis are technically known as apportionment. Apportionment of overheads is made on the basis of:

- Benefits or services received
- Capacity to bear costs
- Efficiency achieved
- Analysis and research

**Bases of
difference**

Allocation

Apartmentments

1. Distribution The expenses are directly allocated The expenses are proportionately

	to the departments.	distributed to different departments.
2. Activity	The expenses incurred in a particular department are an allocation to that department.	The cost is incurred by two or more departments are apportioned on some equipment bases.
3. Burden	Under allocation, the entire expenditure is distributed to a particular department.	Under apportionment, the total expenditures are distributed among the departments.
4. Application	Allocation is made if the expenditure is related to a particular department.	Apportionment is made if the expenditure is related to a number of departments.
5. Use of suitable bases	For allocation, no base is required to include the cost to a particular department.	Under it, the expenses are distributed among the department on some suitable bases.

Absorption of Overhead

The process of the overhead of a cost center or department to different cost units or product is called absorption of overhead. In other words, it is the process of sharing of overheads by all products or jobs of the department. A basis for absorption of overhead for each department is found out so that each job or product gets due share of overhead for each department when it passes through that department.

Method of Absorption of Overhead

To determine the amount of overhead shared by the product or job of a particular department, the overhead absorption rate or overhead rate should be found out. There are several methods of absorption of overhead. The two common methods are explained as under:

- **On the basis of Labour hour rate**

Under this, the overheads are apportioned on the basis of labour hours consumed by a job. Labour hour rate is calculated by dividing the total overhead by total labour hours for a certain period of time.

Overhead rate per labour hour

Overhead rate per labour hour = Total overheads/Total labour hours

- **On the basis of Machine hour rate**

Under this, the overheads are apportioned on the basis of machine hours charged to a job. It is calculated by dividing the total machine hours.

Overhead rate per machine hour = Total overheads/Total machine hours.

Cost Accounting - CVP Analysis

Cost-Volume-Profit (CVP) Analysis is also known as Break–Even Analysis. Every business organization works to maximize its profits. With the help of CVP analysis, the management studies the co-relation of profit and the level of production.

CVP analysis is concerned with the level of activity where total sales equals the total cost and it is called as the break-even point. In other words, we study the sales value, cost and profit at different levels of production. CVP analysis highlights the relationship between the cost, the sales value, and the profit.

Assumptions

Let us go through the assumptions for CVP analysis:

- Variable costs remain variable and fixed costs remain static at every level of production.
- Sales volume does not affect the selling price of the product. We can assume the selling price as constant.
- At all level of sales, the volume, material, and labor costs remain constant.
- Efficiency and productivity remains unchanged at all the levels of sales volume.
- The sales-mix at all level of sales remains constant in a multi-product situation.
- The relevant factor which affects the cost and revenue is volume only.
- The volume of sales is equal to the volume of production.

Marginal Cost Equation

Equations for elements of cost are as follows:

$$\text{Sales} = \text{Variable costs} + \text{Fixed Expenses} \pm \text{Profit /Loss}$$

Or

$$\text{Sales} - \text{Variable Cost} = \text{Fixed Expenses} \pm \text{Profit /Loss}$$

Or

$$\text{Sales} - \text{Variable Cost} = \text{Contribution}$$

It is necessary to understand the following four concepts, their calculations, and applications to know the mathematical relation between cost, volume, and profit:

- Contribution
- Profit Volume Ratio (P/V Ratio or Contribution/Sales (C/S))
- Break-Even Point
- Margin of Safety

Contribution

$$\text{Contribution} = \text{Sales} - \text{Marginal Cost}$$

We have already discussed contribution in Marginal Costing topic above.

Profit-Volume Ratio

Profit / Volume (P/V) ratio is calculated while studying the profitability of operations of a business and to establish a relation between Sales and Contribution. It is one of the most important ratios, calculated as under:

P/V Ratio =

$$\begin{aligned} & \text{Contribution} \boxed{\text{Sales}} \\ = & \\ & \text{Fixed Expenses} + \text{Profit} \boxed{\text{Sales}} \\ = & \\ & \text{Sales} - \text{Variable Cost} \boxed{\text{Sales}} \\ = & \\ & \text{Change in profits of Contributions} \boxed{\text{Change in Sales}} \end{aligned}$$

The P/V Ratio shares a direct relation with profits. Higher the P/V ratio, more the profit and vice-a-versa.

Break-Even Point

When the total cost of executing business equals to the total sales, it is called break-even point. Contribution equals to the fixed cost at this point. Here is a formula to calculate break-even point:

B.E.P (in units) =

$$\begin{aligned} & \text{Total Fixed Expenses} \boxed{\text{Selling Price per Unit} - \text{Marginal Cost per Unit}} \\ = & \\ & \text{Total Fixed Expenses} \boxed{\text{Contribution per Unit}} \end{aligned}$$

Break-even point based on total sales:

$$\begin{aligned} = & \\ & \text{Fixed Cost} \boxed{\text{P/V Ratio}} \end{aligned}$$

Calculation of output or sales value at which a desired profit is earned:

=

$$\text{Fixed Expenses} + \text{Desired Profit} \div \boxed{\text{Selling Price per Unit} - \text{Marginal Cost per Unit}}$$

=

$$\text{Fixed Expenses} + \text{Desired Profit} \div \boxed{\text{Contribution per Unit}}$$

COMPOSITE BREAK EVEN POINT

A company may have different production units, where they may produce the same product. In this case, the combined fixed cost of each production unit and the combined total sales are taken into consideration to find out BEP.

- **Constant Product** - Mix Approach In this approach, the ratio is constant for the products of all production units.
- **Variable Product** - Mix Approach In this approach, the preference of products is based on bigger ratio.

Margin of Safety

Excess of sale at BEP is known as margin of safety. Therefore,

$$\text{Margin of safety} = \text{Actual Sales} - \text{Sales at BEP}$$

Margin of safety may be calculated with the help of the following formula:

Margin of Safety =

$$\text{Profit} \div \boxed{\text{Ratio}}$$

=

$$\text{Profit} \div \boxed{\text{Contribution per Unit}}$$

Break-Even Chart

Break-Even Chart is the most useful graphical representation of marginal costing. It converts accounting data to a useful readable report. Estimated profits, losses, and costs can be determined at different levels of production. Let us take an example.

Example

Calculate break-even point and draw the break-even chart from the following data:

Fixed Cost = Rs 2,50,000
 Variable Cost = Rs 15 per unit
 Selling Price = Rs 25 per unit
 Production level in units 12,000, 15,000, 20,000, 25,000, 30,000, and 40,000.

Solution:

B.E.P =

$$\text{Fixed Cost} \div \text{Contribution per unit}$$

=

$$\text{Rs } 2,50,000 \div \text{Rs } 10 \times (\text{Rs } 25 - \text{Rs } 15)$$

= 25,000 units

At production level of 25,000 units, the total cost will be Rs 6,25,000.

(Calculated as $(25000 \times 14) + 2,50000$)

Statement showing Profit & Margin of safety at different level of production
 Break Even Sale = Rs 6,25,000 (25,000 x 25)

Production (In Units)	Total Sale (In Rs)	Total Cost (In Rs)	Profit (Sales - Cost) (In Rs)	Margin of safety (Profit/Contribution per unit) (In Units)
12000	3,00,000	4,30,000	-1,30,000	
15000	3,75,000	4,75,000	-1,00,000	
20000	5,00,000	5,50,000	-50,000	
25000	6,25,000	6,25,000	(B.E.P)	(B.E.P)
30000	7,50,000	7,00,000	50,000	5,000

40000	10,00,000	8,50,000	1,50,000	15,000
-------	-----------	----------	----------	--------

The corresponding chart plotted as production against amount appears as follows:

Standard Costing and Variance Analysis:

This is a collection of **variance formulas/equations** which can help you calculate variances for direct materials, direct labor, and factory overhead.

1. Direct materials variances formulas
2. Direct labor variances formulas
3. Factory overhead variances formulas

Direct Materials Variances:

Materials purchase price variance Formula:

Materials purchase price variance = (Actual quantity purchased × Actual price) – (Actual quantity purchased × Standard price)

Materials price usage variance formula:

Materials price usage variance = (Actual quantity used × Actual price) – (Actual quantity used × Standard price)

materials quantity/usage variance formula:

Materials price usage variance = (Actual quantity used × Standard price) – (Standard quantity allowed × Standard price)

Materials mix variance formula:

(Actual quantities at individual standard materials costs) – (Actual quantities at weighted average of standard materials costs)

Materials yield variance formula:

(Actual quantities at weighted average of standard materials costs) – (Actual output quantity at standard materials cost)

Direct Labor Variances:

Direct labor rate/price variance formula:

(Actual hours worked × Actual rate) – (Actual hours worked × Standard rate)

Direct labor efficiency/usage/quantity formula:

(Actual hours worked × Standard rate) – (Standard hours allowed × Standard rate)

Direct labor yield variance formula:

(Standard hours allowed for expected output × Standard labor rate) – (Standard hours allowed for actual output × Standard labor rate)

Factory Overhead Variances:

Factory overhead controllable variance formula:

(Actual factory overhead) – (Budgeted allowance based on standard hours allowed*)

Factory overhead volume variance:

(Budgeted allowance based on standard hours allowed*) – (Factory overhead applied or charged to production**)

Factory overhead spending variance:

(Actual factory overhead) – (Budgeted allowance based on actual hours worked***)

Factory overhead idle capacity variance formula:

(Budgeted allowance based on actual hours worked***) – (Actual hours worked × Standard overhead rate)

Factory overhead efficiency variance formula:

(Actual hours worked × Standard overhead rate) – (Standard hours allowed for expected output × Standard overhead rate)

Variable overhead efficiency variance formula:

(Actual hours worked × Standard variable overhead rate) – (Standard hours allowed × Standard variable overhead rate)

Variable overhead efficiency variance formula:

(Actual hours worked × Fixed overhead rate) – (Standard hours allowed × Fixed overhead rate)

Factory overhead yield variance formula:

(Standard hours allowed for expected output × Standard overhead rate) – (Standard hours allowed for actual output × Standard overhead rate)

*Fixed overhead budgeted + Standard hours allowed × Standard variable overhead rate

**Standard hours allowed for actual production × Standard overhead rate

***Fixed overhead budgeted + Actual hours worked × Standard variable overhead rate

Relevant Articles:

- » Definition and Explanation of Standard Cost
- » Purposes and Advantages of Standard Costing System
- » Setting Standards
- » Materials Price Standard
- » Materials Price Variance
- » Materials Quantity Standard
- » Materials Quantity Variance
- » Direct Labor Rate Standard
- » Direct Labor Rate Variance
- » Direct Labor Efficiency Standard
- » Direct Labor Efficiency Variance
- » Factory Overhead Cost Standards
- » Overall or Net Factory Overhead Variance
- » Overhead Controllable Variance
- » Overhead Volume Variance
- » Overhead Spending Variance
- » Overhead Idle Capacity Variance
- » Overhead Efficiency Variance
- » Variable Overhead Efficiency Variance
- » Fixed Overhead Efficiency Variance
- » Mix and Yield Variance

- » Variance Analysis Example
- » Standard Costing and Variance Analysis Formulas
- » Management by Exception and Variance Analysis
- » International Uses of Standard Costing System

Advantages, Disadvantages, and Limitations of Standard Costing.

