

MODULE**2****Overheads****2.1. OVERHEADS****2.1.1. Meaning and Definition of Overheads**

Overhead is the sum of indirect materials, indirect labour and the indirect expenses incurred that cannot be separately identified as on what product they are incurred and cannot be separately allocable to a particular cost centre in an effective manner. It is the total of all the indirect costs which are not directly attributable. It is also known as on cost.

According to CIMA, London, "Overhead is the aggregate of indirect materials, indirect wages and indirect expenses."

According to Harper, "Overheads are those costs which do not result from the existence of individual cost units."

According to Blocker and Weltmer, "Overhead costs are the operating costs of a business enterprise which cannot be traced directly to a particular unit of output."

Thus, overheads is the sum of the indirect costs which a cost accountant is not able to segregate among different cost units.

Factory overhead include all manufacturing cost except direct material and direct labour (lubricating oil, wages of indirect labour etc) and also known as work overheads. When too much overhead cost is charged to products as they are made, the result is overapplied overhead. Overapplied factory overhead will always result when a predetermined factory overheads rate is employed and overhead incurred is less than applied overhead.

2.1.2. Objectives of Overheads

Some of the major objectives of overheads are as follows:

- 1) To calculate the budgeted factory overhead rates and use the same for factory overhead in production.
- 2) To identify and apply the appropriate cost drivers for overhead application.
- 3) To determine the meaning and the need of normalised overhead rates.
- 4) To prepare profit & loss statement by adopting variable-costing approach.
- 5) To prepare profit & loss statement by adopting absorption-costing approach.
- 6) To calculate the production-volume variance i.e., overhead flexible budget variance is calculated as the difference between actual variable overhead cost and flexible budget variable overhead and depict how the same would be shown in the statement of profit & loss.

2.1.3. Advantages of Overheads

Following are the advantages of the overheads:

- 1) **Calculate the Full Cost of Outputs or Activities:** Overheads determine the complete cost of the output and the operational activities. The above information assists in managing the cost and the product mix, services, locations and the customers. Overheads serve the base to segregate the profitable operations from the non-profitable operations, for pricing the services and to decide whether a job is to be carried in-house or is required to be outsourced. Particularly organisations that are engaged in broadcasting activities, full cost information is required to differentiate between the in-house and the outsourced productions.
- 2) **Manage and Control Costs:** Calculation and the identification of the overheads help management to make the personnel responsible for the deviations occurring within their scope. Budgets are allocated for the various departments and they are made accountable for any variance found.
- 3) **Reports to Internal and External Stakeholders:** Reporting to the internal and external stakeholders is another important aspect of overheads. They serve the information of what resources have been used at different levels and also assure the usage-level for the core product or services of the company.

2.1.4. Steps for Distribution of Overheads

Following are the steps for the distribution of overheads:

- 1) Classification of overheads,
- 2) Collection of overheads,
- 3) Primary overhead distribution summary:
 - i) Cost Allocation of overheads, and
 - ii) Apportionment of overheads,
- 4) Secondary overhead distribution summary/ Re-apportionment of Service Department's Overheads, and
- 5) Absorption of overhead.

2.2. CLASSIFICATION OF OVERHEADS

Classification of overheads means to group different expenses under the overhead into distinct groups based on the same features.

The Terminology of CIMA defines classification as "The arrangement of items in logical groups having regard to their nature (Subjective Classification) or the purpose to be fulfilled (Objective Classification)".

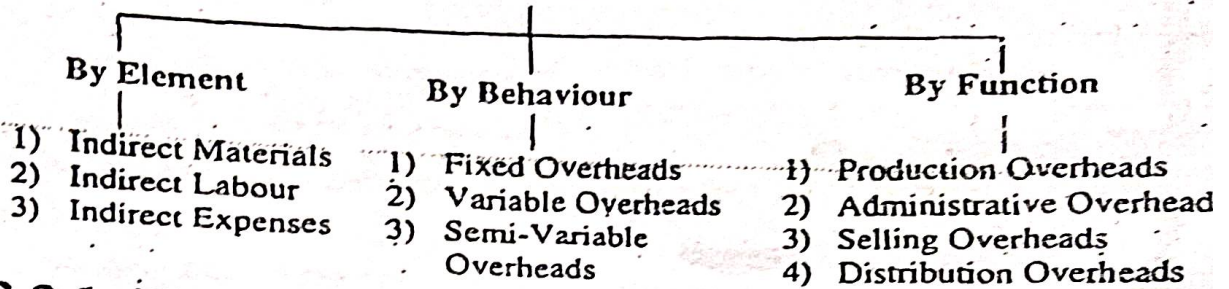
Thus, In simple words, classification defines the method of segregating the items into different groups on the basis of some common features. It is significant to classify the items accurately and effectively in order to meet the ultimate objectives.

The classification of overheads is based on:

- 1) Nature of business,
- 2) Size of business, and
- 3) Nature of product produced/service rendered.

Generally, classification of overheads is done on the basis of:

Classification of Overheads



2.2.1. Elementwise Classification

Under this method, the total overheads are split into three basic parts, indirect material, indirect labour and the indirect expenses. These three elements are described below:

- 1) **Indirect Materials:** Those materials which are not separately identifiable with the product they belong to but are as significant as the others in completing the manufacturing process are the indirect materials. For example, dust for cleaning the plant and machinery; lubricants, coolants, engine oil, etc. in maintenance of the machinery. In many cases, petty materials like thread, glue, buttons, zip, etc., are termed as the indirect materials in manufacturing the shirts and shoes as the same are used in very small quantities.
- 2) **Indirect Labour:** Indirect labour comprises of that labour cost that cannot be directly attributable to a particular product or service. For example, wages paid to supervisors, store keeper, production manager, quality control manager, security officer, accounts officer, etc. These costs do not directly result in the production of goods and services but assist in carrying out the operations.
- 3) **Indirect Expenses:** Those expenses that are not separately recognised with regards to a particular product or service are known as the indirect expenses. These are the common expenses incurred for the goods, jobs or services but cannot be allocated specifically. For example, rent, rates, taxes, postage, telegram, electricity, insurance premium, etc.

2.2.2. Behaviourwise Classification

Different characteristics are exhibited by the overheads in the short duration based upon the level of the production and sales. This is termed as the behaviour of the overheads. Under this, the overheads are classified as under:

- 1) **Variable Overhead:** Those overheads which directly fluctuate with change in level of production are known as the variable overheads. The unit cost of overhead however remains the same. For example, power consumption, stores and consumables consumption, etc.
- 2) **Fixed Overhead:** Those overheads which remain the same, regardless of the production levels are termed as the fixed overheads. The amount of overheads are same even if full capacity is utilised or even when production is carried out. In short, such expenses are fixed in nature and they remain same for a particular period of time. For example, depreciation and amortisation, rental expenses, staff salary, etc.

- 3) **Semi-Fixed Overhead:** Under this category, some portion of the overheads is fixed and some is variable and thus it may also be termed as the semi-variable overhead. Likewise, some overheads exhibit the characteristics of fixed overheads i.e. they remain constant despite the level of production, while some exhibit the characteristics of variable overheads i.e. they change with the change in the level of the production. For example, maintenance expenses, telephone expenses, stationery and service department expenses. Like in case of telephone expenses some monthly rental is fixed and after that billing is done on the basis of the usage. So, there is an element of both fixed and the variable expenses.

2.2.3. Functional Classification

An organisation can engage in carrying out functions of production, administration, selling, marketing, finance, research and development, etc. The functional classification divides the overheads in the following manner:

- 1) **Production Overhead:** It is also termed as the factory overhead, works overhead or manufacturing overhead. It is the sum total of all the three ingredients i.e. indirect material, indirect labour and the indirect expenses incurred in respect of carrying out the production. The manufacturing activities commence with the procurement of the material and terminate with the packaging of the finished goods.

Following are the Examples of production overhead:

i) **Indirect Material Cost**

- Cost of consumable stores and supplies like cotton waste, lubricating oil, coolant, engine oil etc.
- Cost of printing, postage and stationery, etc. used in Production Department.

ii) **Indirect Labour Cost**

- Salary of supervisor, quality inspector, works manager, accounts incharge and departmental superintendents.
- Contribution to ESI, P.F., leave pay, maternity benefits, staff welfare expenses, etc.

iii) **Indirect Expenses**

- Rent, rates and taxes of factory building.
- Repairs, insurance and depreciation of factory building, plant and machinery, furniture and other assets.
- Factory telephone expenses.
- Lighting, heating and cleaning of factory.

- 2) **Administration Overhead:** It is the sum total of expenses incurred towards indirect material, indirect wages and indirect expenses during formulation of the policies, administration and controlling function of the firm. They are also termed as the office overhead or the general overhead.

Following are the examples of administration overhead:

i) **Indirect Materials Cost**

- Cost incurred towards printing, postage and stationery which is used in administration department.
- Cost of dusters, brushes, etc., for cleaning of the office.

ii) Indirect Labour Cost

- a) Salary of managing director, whole-time director, general manager, finance manager, accounts manager, secretary, legal manager and other staff working in administration department.
- b) Remuneration of internal and statutory cost, financial auditors & legal advisors.

iii) Indirect Expenses

- a) Rent, rates and taxes of office building.
- b) Repairs, insurance and depreciation of office building, equipment and furniture and other assets.
- c) Telephone expenses of administration office.
- d) Lighting, heating and cleaning of administration office.

- 3) **Selling Overhead:** The expenses incurred to boost the sales and retain the existing customers are known as the selling overhead. It includes the cost that is incurred towards indirect materials, indirect labour and indirect expenses for promoting the sales and reaching out to the customers.

Following are the examples of selling overhead:

i) Indirect Materials Cost

- a) Cost incurred towards printing, postage and stationery which is used in sales department.
- b) Cost of catalogues, price lists, packing material, etc.

ii) Indirect Labour Cost

- a) Salary of sales director, sales managers, sales officers, salesmen and other staff working in sales department.
- b) Commission paid to the selling agents.

iii) Indirect Expenses

- a) Rent, rates and taxes of sales office, showroom and exhibition centres.
- b) Repairs, insurance and depreciation of sales office building, equipment, furniture and other assets.
- c) Telephone expenses of sales office.
- d) Lighting, heating and cleaning of sales office.
- e) Advertisement expenses.
- f) Bad debts.
- g) Debt collection charges.
- h) Salesmen's travelling expenses.
- i) Entertainment expenses incurred on customers.

- 4) **Distribution Overhead:** The expenses incurred towards providing after sale service to the customers in order to maintain and satisfy the demand is known as the distribution expenses. It is the sum total of the expenses incurred towards the indirect material, indirect labour and the indirect expenses to make the firm's product reach the customers.

Following are the examples of distribution overhead:

i) Indirect Materials Cost

- a) Cost incurred towards printing, postage and stationery which is used in distribution office.
- b) Cost involved in secondary packaging.

- c) Cost of materials used in reconditioning of the empty containers returned by customers for reuse.
- ii) Indirect Labour Cost
 - a) Staff salary attached to distribution office like packers, dispatch staff, etc.
 - b) Driver's salary of the distribution vehicle.
- iii) Indirect Expenses
 - a) Rent, rates and taxes of distributing office and godown.
 - b) Repairs, insurance and depreciation of distribution office building, equipment, furniture and delivery van.
 - c) Telephone expenses of distribution office.
 - d) Lighting, heating and cleaning of distribution office.
 - e) Depreciation, repairs and running expenses of delivery vans.
 - f) Freight and carriage outward.
 - g) Insurance of finished stock in godown.

2.3. COLLECTION OF OVERHEADS

It is important to estimate the amount of overheads for every organisation. The overheads are usually estimated on the basis of past data adjusted against the familiar future changes. It means to note down the individual expenses incurred in the costing records that are maintained by the firm. Under this, every document or invoice must carry a cost centre code along with the cost accounts number and the standing order number to make the collection procedure easy.

Following are the source documents which are used for the collection of the overheads:

- 1) **Invoices:** These includes the bills of the services or the material that is received by the firm from the outside agencies. They serve as the evidence input documents based on which the payments are to be done. These payments are then transfered in the financial accounts and the indirect expenses are collected only through these invoices.
- 2) **Stores Requisitions:** These serves as the base for accounting of the indirect materials. These requests carry a cost centre code, which denotes the job or the service for which the material is used along with the name of the cost centre and their head. This cost centre code is of significance while allocating the indirect material cost.
- 3) **Subsidiary Records:** In accounts necessary provisions are made for the expenses that are to be incurred in the near future. Such provisions are reflected in the subsidiary books. For example, provision is made for outstanding rent, salary and other expenses. So these records also serve as the source documents for collection of the overheads.
- 4) **Wages Analysis Books:** The wage book depicts various control accounts. These accounts can be used while maintaining the records for indirect wages and salaries.

- 5) **Estimation from Financial Accounts:** Some expenses are charged over different accounting periods. For example, heavy advertisement expenses, prepaid expenses, etc. These expenses are apportioned among different accounting periods. The best possible way for their collection is the financial records of the company.

2.4. PRIMARY DISTRIBUTION

After the collection of the overheads is done on the basis of the various source documents, they need to be duly allocated and apportioned among different production and the service departments. Such phenomenon of allocating and apportionment is known as departmentalisation or primary distribution of overheads. Primary distribution comprises of the following two types of overheads:

- 1) Cost Allocation of Overheads Expenses.
- 2) Cost Apportionment of Overhead Expenses.

2.4.1. Cost Allocation of Overheads

Allocation of overheads is the mechanism of allocating the different overhead among the production cost and the service cost centres/ departments. Allocation is concerned with whole items of costs. In other words, the overheads expenses of an item, charged specifically to a single department is known as allocation. For example, wages of the maintenance staff which is ascertained from the record books can be directly allocated to the maintenance cost centre. In order to identify costs that related to a specific product an allocation base should be chosen that has a cause and effect relationship. Factory overheads should be allocated on the basis of activities related to cost incurred.

According to CIMA, allocation is "the charging of discrete, identifiable items of cost to cost centres or cost units. Where a cost can be clearly identified with a cost centre or cost unit, then it can be allocated to that particular cost centre or cost unit."

Some of the overheads that are directly allocable to different departments and the cost centres are insurance and depreciation of the plant & machinery, fuel, oil and departmental electricity metered.

2.4.1.1. Format of Statement Showing the Allocation of Overheads

Statement showing the Allocation of Overheads

Items of Overheads Allocated	Production Departments		Service Departments	
	P ₁ (₹)	P ₂ (₹)	S ₁ (₹)	S ₂ (₹)
Direct Material	—	—
Direct Wages	—	—
Direct Expenses	—	—
Indirect Material
Indirect Wages
Total Overheads Allocated

2.4.1.2. Reasons for Allocation of Overheads

Following are the reasons behind allocation of overheads:

- 1) To provide timely input for economic decisions;
- 2) For encouraging the managers and the employees;
- 3) To give ground for the cost incurred; and
- 4) To report and communicate to the internal and external interested parties.

2.4.1.3. Methods of Allocation of Overheads

Overheads can be allocated in the following three ways:

- 1) **Single-Rate Method:** Under this, all the expenses are grouped together in one of the cost pools and using a single base rate, these costs are allocated to cost objects. No differentiation is made between the fixed and the variable costs and all the costs are allocated collectively.

The single rate is calculated as per the following formula:

$$\text{Rate} = \frac{\text{Manufacturing overhead costs}}{\text{Labour hours}}$$

- 2) **Dual-Rate Method:** Under this method instead of having one cost pool, the same is split into two cost pools i.e. one for the fixed costs and the other for the variable costs.

Different costs allocation base are used for allocating cost of each pool. Two cost drivers are made which are based on the expenses made by the provider department.

For allocating the variable cost current usage of the user departments are considered while long-term commitments are considered for allocating the fixed costs.

- 3) **Actual Rates versus Budgeted Rates:** When the actual rates are used there is lesser uniformity of charges to the cost objectives. In the case of actual rates some more fluctuations are observed that alter the total cost of the end product.

Budgeted rates on the other side are constant and lesser variations are found in the charges to the cost objectives and ultimately to the end product. Whenever there are chances that the variations in the actual rates will mislead the allocation process, then budgeted rates are preferred.

2.4.2. Cost Apportionment of Overheads

Some overhead costs such as electricity, rent, salary of factory manager and canteen expenses, etc. are incurred for the entire factory and cannot be assigned to a particular department.

Such costs should be apportioned or distributed among the departments based on the proportion of benefits received by them. In simple word, it is a process of assigning share of indirect costs to cost centers.

According to CIMA, apportionment is "the allotment of two or more cost centres of proportions of the common items of cost on the estimated basis of benefit received."

2.4.2.1. Format of Statement Showing the Apportionment of Overheads

Statement showing the Apportionment of Overheads

Items of Overheads Apportioned	Basis of Apportionment	Production Department		Service Department	
		P ₁ (₹)	P ₂ (₹)	S ₁ (₹)	S ₂ (₹)
Fixed Power Generation Cost	Normal Capacity				
Variable Power Generation Cost	Actual Power Consumption (kwh)	.....	.....	.....	.....
Lighting	No. of Light Points	.....	.....	.....	.....
Depreciation	Asset Value	.....	.....	.....	.....
Insurance	Asset Value	.....	.....	.....	.....
Rent, Rates and Taxes	Floor Area	.....	.....	.....	.....
Repairs	Floor Area	.....	.....	.....	.....
Stores Overheads	Direct Material	.....	.....	.....	.....
Employee's Insurance Charges	Direct Wages	.....	.....	.....	.....
Staff Welfare Expenses	No. of Workers	.....	.....	.....	.....
Supervision Expenses	No. of Workers	.....	.....	.....	.....
Total Overheads Apportioned		.....	.....	.....	.....

Note: In the preparation of statement of 'Primary Overhead Distribution Summary' both the statement of 'Allocation of Overheads' and 'Apportionment of Overheads' get combined to evaluate the total departmental overheads cost.

2.4.2.2. Basis of Apportionment

Common bases of apportionment of overheads may be summarised as below:

Overhead Cost	Basis of Apportionment
1) i) Rent and other building expenses ii) Lighting and heating iii) Fire precaution service iv) Air-conditioning	Floor area or Volume of department
2) i) Fringe benefits ii) Labour welfare expenses iii) Time keeping iv) Personnel office v) Supervision vi) Canteen expense	Number of workers
3) i) Compensation to workers ii) Holiday pay iii) ESI and PF contribution iv) Fringe benefits	Direct wages
4) General overhead	Direct labour hours, or Direct wages or Machine hours
5) i) Depreciation of plant and machinery ii) Repairs and maintenance of plant and machinery iii) Insurance of stock	Capital values
6) i) Power/steam consumption ii) Internal transport iii) Managerial salaries	Technical estimates
7) Lighting expenses	Number of light points or Area
8) Electric power	Horse power of machines or Number of machine hours or Value of machines

9) i) Material handling ii) Stores overhead	Weight of materials, or Volume of materials or Value of materials
10) Operating manager	Machine hour
11) Administration overhead	Works cost, Conversion cost, Sales value

2.4.3. Difference between Cost Allocation & Cost Apportionment

Basis of Differences	Cost Allocation	Cost Apportionment
1) Definition	Allocation refers to "the allotment of whole items of cost to cost centres or cost units."	Apportionment refers to "the allotment of proportions of items of cost to cost centres or cost units."
2) Deals With	Allocation is concerned with whole items of costs.	Apportionment is concerned with proportions of items of cost.
3) Type of Process	Allocation is a direct process.	Apportionment is done only indirectly using suitable bases.
4) Treatment of Overhead Cost	Overheads should preferably be allocated.	An overhead may be apportioned if it cannot be allocated.
5) Includes	Allocation deals with items such as indirect wages, overtime and idle time cost, power, depreciation of machinery, supervision, etc.	Apportionment is generally for expenses such as fire insurance, lighting and heating, time keeping expenses, canteen expenses, medical and other welfare expenses, etc.

The process of allocation and apportionment of expenses may be clearly illustrated by the following example in which a detailed step by step procedure and a calculation of different items are given with the formula.

2.6. ABSORPTION OF OVERHEADS

The process of absorption of overheads is also known as Application, Levy or Recovery of overheads. It involves proper allocation and apportionment of the total factory overheads to each production department. It is also called as 'applied factory overheads'.

Absorption of factory overheads constitutes the last step in the process of overhead distribution. The first step involves the distribution of total factory overheads to the production department by allocating department costs and apportionment of common costs over different production and service departments.

This process also includes the redistribution of service department costs to production department. Through the output of department, an equitable base is formed for the absorption of total overheads of each production department at the end after the redistribution process. Overhead absorption exercise will be most useful when selling price can be based on costs.

According to CIMA, absorption of overhead is "the process of absorbing all overhead costs allocated or apportioned over a particular cost centre or production department by the units produced."

Common Bases for Absorption of Production Overheads from Production Cost Centres to Products or Services.

Bases of Denominator	Applicability
Unit of Production	When single product is produced or several products are similar in specification.
Direct labour cost	When conversion process is labour intensive and wage rates are substantially uniform.
Direct labour hour	When conversion process is labour intensive.
Machine Hour or Vessel Occupancy or Reaction Hour or Crushing Hour, etc.	When production mainly depends on performance of the base.

Various units such as machine hours, direct labour hours, direct wages or production units may be used for the purpose of apportionment. All relevant factors should be considered before choosing the unit. Then, the absorption rate is obtained by dividing the total overheads with the produced units (as a base).

2.6.1. Difference between 'Apportionment' and 'Absorption' of Overheads

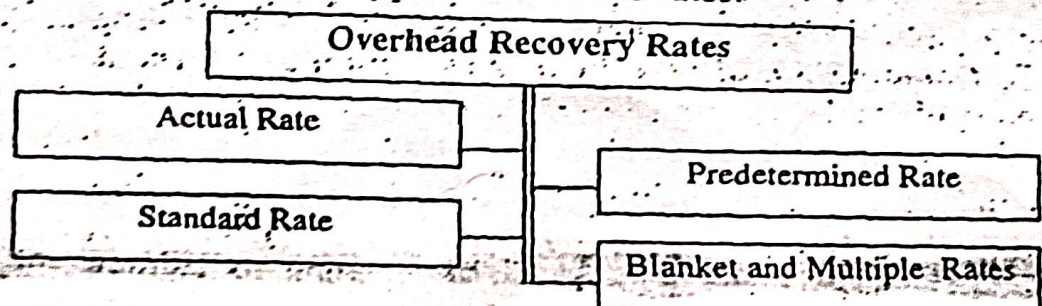
Apportionment of overheads and absorption of overheads are different from each other in the following manner:

Apportionment of Overheads	Absorption of Overheads
1) In the case of apportionment, the proportions of cost items are allotted to cost centers, and any department's specific overhead portion is determined.	In the case of absorption, the overheads are allotted to cost units.
2) The process of apportionment gets completed before Absorption.	One cannot make absorption without completing the apportionment.
3) In the case of apportionment, proper proportions or ratios are used.	In the case of absorption, the percentage rates of overheads are used.

2.6.2. Overhead Recovery Rates

Overhead rate is determined by dividing the total overheads by the quantity or the value of other determined units.

Following figure shows various types of overhead rates:



- 1) **Actual Rate:** This rate is determined by dividing the actual overhead by the actual quantity or value of the base. Direct materials, direct labour hours, direct wages, machine hours or production units may be used as a base to calculate the actual rate.

$$\text{Actual Rate} = \frac{\text{Actual overhead expenses incurred during a period}}{\text{Actual quantity or value of the base for the period}}$$

$$\text{Or} \quad = \frac{\text{Actual Overheads}}{\text{Actual Base}}$$

- 2) **Predetermined Rate:** This rate is determined by dividing the budgeted overheads by the budgeted units of the year. Following formula is used for the purpose of calculating predetermined rate.

$$\text{Predetermined Rate} = \frac{\text{Estimated or Budgeted overheads}}{\text{Estimated or Budgeted Base (Quantity or value)}}$$

This rate helps in directing the total overheads of the year by the total units. This rate is also used in costing.

- 3) **Standard Rate:** Standard rate is determined by dividing the standard overhead by the standard base.

Following formula is used for this purpose:

$$\text{Standard Rate} = \frac{\text{Standard Overhead}}{\text{Standard Base}}$$

- 4) **Blanket and Multiple Rates:** These are explained below:

- i) **Blanket Rate:** It denotes a single rate computed for the entire factory.

Following formula is used for the purpose of calculating 'blanket rate':

$$\text{Blanket Rate} = \frac{\text{Total Overheads for the Factory}}{\text{Total Quantity/Value of the base for the Factory}}$$

- ii) **Multiple Rates:** These are the different rates calculated for each of producing department, cost centres or product lines, etc. these rates are also known as departmental rates.

Blanket rate may give inaccurate results in the case where products goes through one or more different departments or processes.

2.6.3. Steps in Absorption Overhead

Following steps are involved in the process of absorption overhead:

Step 1: Computation of Overhead Absorption Rate: The determination of absorption of overheads in cost of the cost units are mostly done by absorption rates. This rate can be calculated by different ways also.

Generally, to calculate the overhead rate the total amount of overheads of department or cost centre is divided by the number of units in the base like machine hours, direct labor cost, price cost, no. of cost units, etc.

$$\text{Overhead Absorption Rate} = \frac{\text{Total Overheads of Cost Centre}}{\text{Total Units in Base}}$$

Only one rate is calculated for each group of overhead.

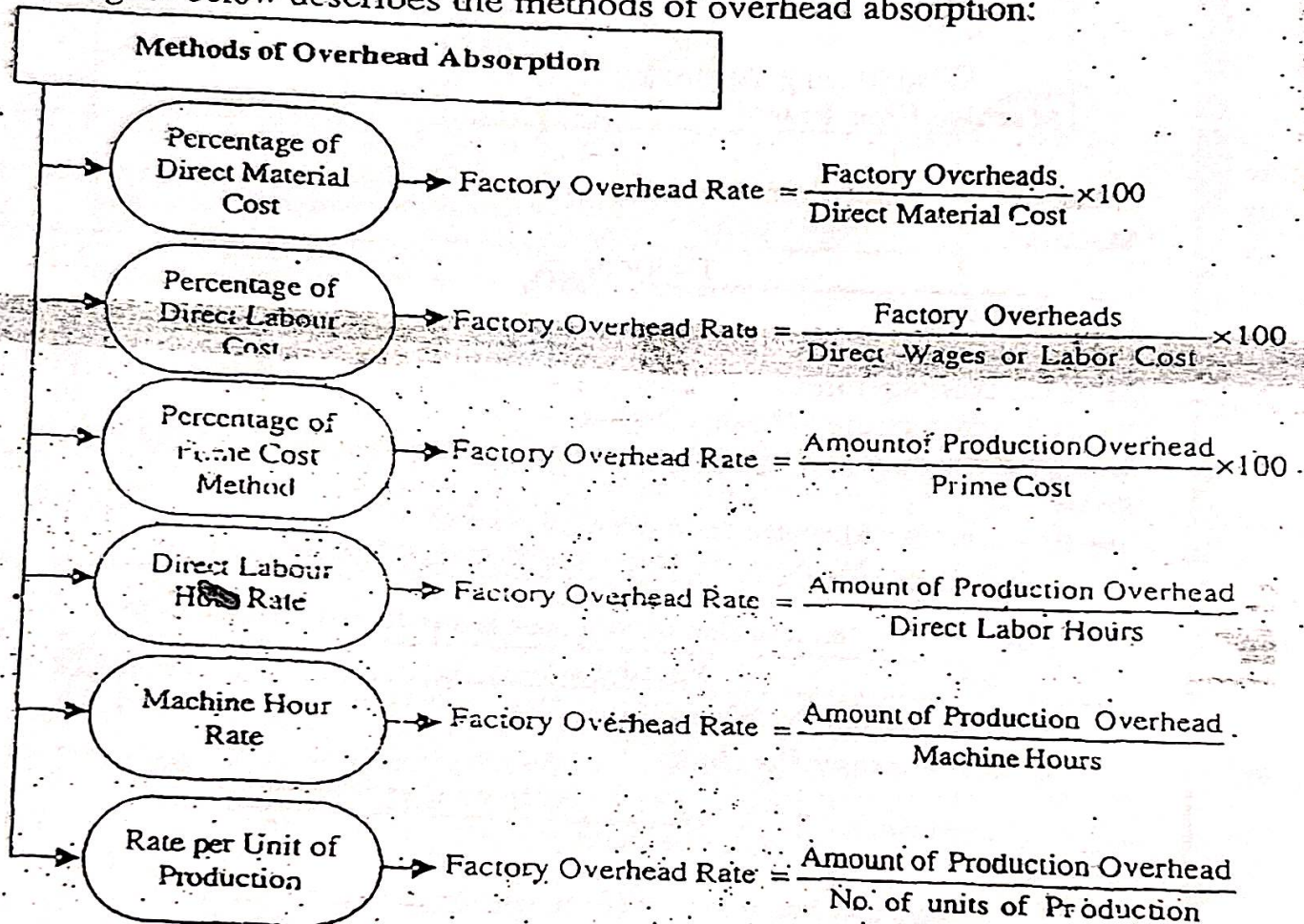
Step 2: Application of Rates to Cost Units: Overhead rate is multiplied by the number of units of base in the cost unit to get at the overhead cost of each cost unit.

$$\text{Overhead absorbed} = \text{No. of units of base in the cost unit} \times \text{Overhead rate}$$

For example, machine hour rate is ₹50 and a cost unit has used 10 hours of the machine, overhead absorbed will be = 10 hours × ₹50 = ₹500.

2.6.4. Methods of Absorption of Overheads

The figure below describes the methods of overhead absorption:



2.6.5. Under and Over Absorption of Overhead

When actual overhead of a period is equal to the Actual Rate, there is no case of under or over recovery. If the predetermined rate is applicable on the overheads, the absorption of overheads can be less or more than the actual overheads. When the absorption of overhead is not more than overheads incurred is called **under-absorption**. When the incurred overheads are less than the absorbed overheads is called **over-absorption**.

The conditions under which under-absorption is observed are as follows:

- 1) When actual expenses are more than the estimations; where absorption rate is based on estimated figure and the actual expense is more than the absorbed value.
- 2) The quantity of production is not more than the estimated quantity.
- 3) The worked hours are less than the estimated hours.

The Over-absorption is observed when the above mentioned conditions are completely overturned.

Reasons of Under and Over-absorption

Following one or more reasons are responsible for occurrence of under or over-absorption:

- 1) When there is error in estimation of overheads;
- 2) When there is error in estimation of quantity of production;
- 3) When seasonal changes are observed in overheads;
- 4) When uncertain changes are occurs in the productive capacity.

Treatment of Under or Over Absorption of Overheads

Under or over absorption of overheads may be disposed of in any one of the following ways:

- 1) **Use of Supplementary Rates:** Where the amount of under or over absorption is considerable, the cost of jobs or products is adjusted by means of a supplementary rate.

This rate is arrived at by dividing the amount of under or over absorption by the base that was followed for absorption. This rate may be positive or negative. Positive rate is used when there is under-absorption and negative rate is applied when there is an over-absorption.

$$\text{Supplementary Rate} = \frac{\left(\begin{array}{c} \text{Amount of under or over} \\ \text{absorbed overheads} \end{array} \right)}{\left(\begin{array}{c} \text{Base (direct materials, labor,} \\ \text{labor hours, machine hours)} \end{array} \right)}$$

How to Use

- i) **In Case of Under-Absorption:** The Cost of Sales, Stocks of Finished Goods and Work-in-progress are increased by applying positive supplementary rate.
- ii) **In Case of Over-Absorption:** The Cost of Sales, Stocks of Finished Goods and Work-in-progress and reduced by applying negative supplementary rate.

- 2) **Write off to Costing Profit and Loss Account Method:** This method is usually used when the amount of under/over absorbed overheads is not very large, or the under/absorption of overheads is due to abnormal reasons like defective planning, idle capacity, etc. In this case, even large amounts are written off to Profit and Loss Account. The amount of under absorbed overheads is transferred to the debit of Costing Profit and Loss Account and the amount of over absorbed overheads is transferred to the credit of Costing Profit and Loss Account.

3) **Carry Over to Next Accounting Period Method:** This method is usually used when the period of normal business cycle is more than 1 year and overhead rates are determined on a long-term basis. In case of new projects more output in the next period(s) than that in initial stages is expected. The amount of under absorbed overheads is transferred to the debit of Overhead Reserve/Suspense Account and the amount of over absorbed overheads is transferred to the credit of Overhead Reserve / Suspense Account.

2.7. ACTIVITY BASED COSTING (ABC)

2.7.1. Meaning and Definition of ABC

Activity Based Costing (ABC) is a system by virtue of which the cost is allocated in different activities instead of different products and services. This further ensures that the overhead costs are assigned in an accurate manner to different products and services.

According to Chartered Institute of Management Accounts (CIMA) London, "Cost attribution to cost units on the basis of benefits received from indirect activities, i.e., ordering, setting-up, assuring quality, etc." So, Activity based costing is quite general and can be adopted while using an order costing system and a process costing system.

According to Horngren, "Activity based costing is a system that focuses on activities as fundamental cost objects and utilizes cost of these activities as building blocks or compiling the costs of other cost objects". Activity based costing also ensures strategic cost management. It depicts the consumption of the resources in different activities and also allocates the costs of the product or customers on the basis of their consumption pattern.

2.7.2. Features of Activity Based Costing

Following are the features of activity based costing:

- 1) Activity based costing enhances the cost pools that are required for the accumulation of the overhead costs. So, the overhead costs are not allocated on the basis of company-wise pool or the departmental pool rather they are allocated on the basis of the driving activities.
- 2) The overheads are attributed to different jobs or the products in the ratio of the cost driving activities. A single rate calculated on the basis of direct labour hour or machine hour is avoided.
- 3) In this case, the per unit cost calculated is more accurate and the overheads are completely traceable.
- 4) It helps in the elimination of the non-value added items as costs are identified during the course of the activities. This elimination will further assist in bringing down the cost of the product.

2.7.3. Demerits of Traditional Costing

Following are the demerits of the traditional costing, which led to the development of ABC:

- 1) Traditional costing fails to capture cause and effect relationship.

- 2) Traditional costing often fails to highlight inter-relationship among activities in different departments.
- 3) Growing dissatisfaction among the working executives regarding traditional costing which is based on averages and estimation.
- 4) Traditional costing systems are driven by the need to value stocks rather than to provide meaningful product cost.
- 5) Direct labour has shrunk as a percentage of total cost for majority of manufacturing companies. Still it is most common basis of over-loading overheads to products.
- 6) Overhead costs are no longer a mere burden to be minimized. Overhead functions such as product design, quality control, customer service, production planning and sales order processing are as important to the customer as physical processes on the shop floor.
- 7) Complexity has increased. Product ranges are wider. Product cycles are shorter and demand for quality is higher.
- 8) Market place is very competitive.
- 9) Availability of computer has enhanced requirement for improvement in information gathering technology for advanced decision-making to gain competitive advantage.

2.7.4. Objectives of Activity Based Costing

Following are the primary objectives of the ABC system:

- 1) To calculate the correct product cost by assigning the overhead cost in a careful manner after considering various factors.
- 2) To calculate the optimum product mix and the price fixation.

Following are few other objectives of ABC system:

- 1) It involves identification of the value added activities.
- 2) To reduce the non-value added activities.
- 3) To allocate the costs as per the involved activities.
- 4) To allocate costs, according to the negotiations done by the customer.
- 5) To ensure that quality products are produced.
- 6) To assist in the correct calculation of the cost for fixation of the selling price.
- 7) To provide timely information related to the different activities and customers.
- 8) To concentrate on the cost activities that gives maximum value.
- 9) To constantly review the area for improvement in the products and reducing the costs.
- 10) To set the optimum product mix, yielding the maximum level of profit.

2.7.5. Applications of Activity Based Costing

Following are the applications of activity based costing:

- 1) **Activity Costs:** The basic purpose of ABC is to trace the activities so as to ensure that the activity costs are incurred as per the industry standards. ABC also provides the feedback to measure the cost of the services as well as to reduce the cost.

- 2) **Customer's Profitability:** Since majority costs incurred on an individual customer are only the product cost. However, there are also overheads that are involved like customer service, handling of the product return and the cooperative marketing agreements.

Under the ABC system, these costs are attributed among different activities so that the activity gets to share the overheads and there is no unjust burden on some of the jobs or products. This system may reduce costs for the certain jobs, may also increase the cost of certain products. The customers are focussed who is bringing more profits to the company.

- 3) **Distribution Cost:** Different mediums like retail, e-commerce, distribution network, mail order catalogues are used by a company to sell its products. So, the costs incurred towards maintaining these networks are overhead costs and it is important to allocate these costs in all the channels in an appropriate manner to reap the benefits of such distribution channel.
- 4) **Make or Buy:** ABC gives an insight of all the costs that are incurred in the house while manufacturing a product so that the activities requiring high cost can be outsourced to outside agencies.
- 5) **Margins:** Under ABC system, proper costs are attributed towards different jobs and services. Therefore, the actual cost can be ascertained. It now becomes possible for a company to know their actual profit margin involved in different products and they can further fix their product mix.
- 6) **Minimum Price:** Actual ascertainment of the cost is the base for majority of the selling decisions of the company. Only after a company knows its cost, then by adding up the reasonable margin, it can quote its products in the market. Under this, the company will be in a better position to face market competition. ABC analysis is an efficient determinant of the distributor of the cost among different activities.
- 7) **Production Facility Cost:** Segregation of the overhead costs of the facility-wise level is easy and it enables the comparison among the costs of production between different facilities.

2.7.6. Core Areas of Activity Based Costing

There are four main areas involved in this flow:

- 1) **Cost Object:** Just like the product and the customer needs measurement, cost objects also require the cost measurement.
- 2) **Activities:** They are the sum of the tasks involved and are concerned with the functions related to the cost objects. Two types of activities are mentioned as under:
 - i) **Support Activities:** Support activities are, for example, scheduling production, set-up machine, purchase materials, inspect items, customer orders, supplier records, etc.
 - ii) **Production Process Activities:** Under this, the production process includes the machine products and the assembled products.

On many occasions, the cost centres used traditionally and those used under the ABC system are similar. When the purchasing department and the purchasing activity, both are treated as the cost centres, the support activities will also be similar to the cost-centre opted under the traditional approach.

- 3) **Cost Pool:** It may also be termed as the cost centre. Thus, an activity cost centre is another name for the activity cost pool.
- 4) **Cost Drivers:** They are the reasons behind the emergence of the overhead costs. It is also a factor of change, as a result of which, change is observed in the total cost of a related object.

2.7.7. Cost Drivers

The direct cause of incurring a cost is referred to as a 'cost driver'. It has a direct impact on the amount of total cost incurred. For example, if a person has to identify the cost of electricity consumed during a particular time period then in such a case the cost driver will be the number of units consumed because it is the main cause that determines the cost.

Cost drivers are considered as an important factor that affects the management of finances and the future profits of an organisation. The analysis of cost drivers enables an organisation to limit its cost of production in such a manner that it does not exceed the revenue earned by it.

The accounting for cost drivers helps the businesses in computing the total cost of production and applying the same to find out the price of product.

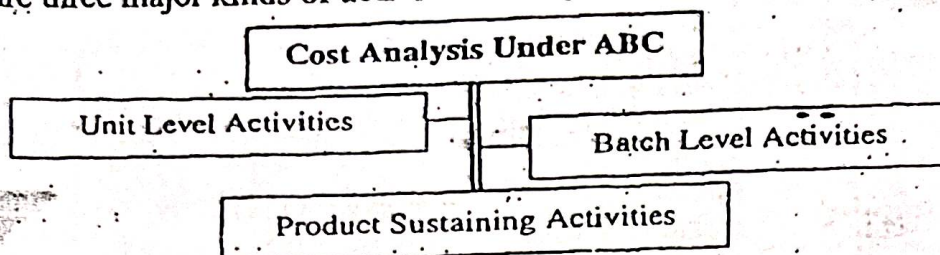
Some of the important examples of cost drivers in a business organisation are as follows:

i) Machine setups,	ii) Purchase orders,
iii) Quality Inspections,	iv) Production orders (Scheduling),
v) Engineering change orders,	vi) Shipments,
vii) Materials Receipts,	viii) Inventory movements,
ix) Maintenance requests,	x) Scrap/rework orders,
xi) Machine time,	xii) Power consumed,
xiii) Miles driven,	xiv) Computer-hours logged,
xv) Beds occupied, and	xvi) Flight-hours logged.

2.7.8. Cost Analysis under ABC

Researches made by Robin Cooper, Robert S. Kaplan and others show that many of the firms' resources, those represented by the so-called fixed costs, can be explained not by the amount of output produced but by the diversity of company products; customers, distribution channels, and product lines. As organisations try to expand output, they do not increase the sales of a single product to a single customer. They expand output by introducing new models, new lines of business, new distribution channels, and new customers. In the process of increasing diversity and complexity, the organisational infrastructure increases to meet the demands created by the new products, customers and distribution channels. The activity-based approach is an attempt to show that most, if not all, of them are really variable.

There are three major kinds of activities in organisations:



2.7.8.1. Unit Level Activities

The costs of some activities (mainly primary activities) are strongly correlated to the number of units produced. For example, the use of indirect material consumables tends to increase in proportion to the number of units produced. Another example of a unit level activity is the inspection or testing of every item produced, if this was deemed necessary or, perhaps more likely, every 100th item produced. Unit-level activities happen each time a unit of a product is produced. Such costs will increase as the number of units produced increases. Cost drivers include direct labour hours, machine hours and the number of units produced. Such cost drivers are volume-related, and are the same drivers used in a traditional system. The following table gives examples of these activities:

Table 2.1: Unit-Level Activities

Examples of Unit-Level Costs	Possible Cost Drivers
Power costs	Machine hours
Maintenance costs	Labour hours
Labour costs	Units of output
Factory supplies	
Depreciation of general use of machines and equipment	
Depreciation of maintenance equipment	

2.7.8.2. Batch Level Activities

The costs of some activities (mainly manufacturing support activities) are driven by the number of batches of units produced. The cost of batch-level activities changes with the number of batches produced. A batch is a group of units that are produced together. The number of units in a batch can vary. It is important to remember that it does not matter how many units are in a batch because the cost per batch for a particular activity will be the same. The total cost increases as the number of batches increases, whereas in traditional systems, costs of batch-related activities are treated as fixed costs. But, it would be better to account for batch-related costs using ABC.

An important point to remember is that products made in many small batches will be allocated more of these costs, simply because batch-related costs increase with the number of batches produced. Where one large batch is produced, batch-related costs remain low. Therefore, products that are complex and produced in small batches will be allocated a larger share of batch-related costs because they make more use of such activities. Table 2.2 gives examples of these activities.

Table 2.2: Batch-Level Activities

Examples of Batch-Level Costs	Cost Drivers
Purchase requests	Number of requests
Materials procurement	Number of suppliers orders
Purchase order processing	Number of orders processed
Equipment set-ups	Number of set-ups
Materials handling	Kilograms of materials handled
	Number of movements
Quality inspection	Number of inspections
	Hours of inspection time

2.7.8.3. Product Sustaining Activities

The costs of some activities (often once only activities) are driven by the creation of a new product line and its maintenance, for example, designing the product, producing parts specifications and keeping technical drawings of products up to date. Advertising costs fall into this category if individual products are advertised rather than the company's name.

Product-sustaining activities are activities performed that allow for the production and sale of individual products. Their costs relate to the different types of products made and sold, and the total cost does not depend on the number of units or batches produced. Normally, such costs are higher where a company produces many different products. ABC may be used to allocate such costs if the right cost driver has been found. Table 2.3 gives examples of these activities.

Table 2.3: Product-Sustaining Activities

Examples of Product-Sustaining Costs	Cost Drives
Testing facility costs	Number of tests; Hours of testing time
Parts administration costs	Number of part types
Parts carrying costs	Number of parts
Design costs	Hours of design time

2.7.9. Benefits of ABC

ABC system has the following benefits:

- 1) The nature of the overhead costs, their relation to products, services, customers and the market segments are established by ABC system.
- 2) It assists in allocating the resources to the activities that result in maximum economic benefit.
- 3) It establishes a bridge between the profitability analysis and the operational decisions.
- 4) The non-value added items are easily identified under this system.
- 5) Correct information is provided on the performance as more emphasis is given on activities instead of resources.
- 6) The cost drivers of each activity are understood properly and better control is facilitated.
- 7) It provides correct information on the margin and correct fixation of price.

- 8) The organisation becomes dynamic and better strategies can be prepared.
- 9) It helps to prepare better strategies and thus, the organisation becomes dynamic.

2.7.10. Weaknesses of ABC

ABC system has the following disadvantages:

- 1) It is not, the medicine for all the problems.
- 2) A number of resources are required.
- 3) For providing the products at a competitive rate, too much attention given to the customers. Therefore, other key areas are ignored.
- 4) Customs segmentation may lose its roots.
- 5) Opportunity cost is not considered.