COST ACCOUNTING
AN INTRODUCTION

In the beginning the scope of accounting was limited to keeping of records of business transactions and to prepare Profit & Loss Account from the view of financial results and Balance Sheet from the view of financial position. In this system profit analysis was the main criterion for measuring the efficiency of an enterprise. Later on, it was realised that along with profit analysis the cost analysis is also equally important. In fact, cost computation, cost control and cost analysis have become very useful and important aspects in this era of severe business competition and in this context a new branch of accounting known as 'Cost Accounting' has emerged.

MEANING AND DEFINITIONS OF COST ACCOUNTING

Cost accounting is a specialised branch of general accounting in which detailed and systematic information related to cost of goods or services are maintained in such a way as to obtain detailed information about total and per unit cost and guidance for the analysis and control of cost. Some of the definitions of cost accounting are as follows :

(1) "Cost Accounting is the technique and process of ascertainment of cost."

—I. C. M. A., London

(2) "Cost Accounting is the provision of such analysis and classification of expenditure as will enable the total cost of any particular unit of production to be ascertained with reasonable degree of accuracy and at the same time to disclose exactly how such cost is constituted."

—Walter W. Bigg

(3) "Cost Accounts are accounts supplementary or subsidiary to financial accounts and are compiled for the purpose of giving additional information as to the detailed cost of working of an undertaking or any particular section thereof."

—L. B. Dicksee

(4) "Costing is the classifying, recording and appropriate allocation of expenditure for the determination of the cost of products or services, and for the presentation of suitably arranged data for the purpose of control and guidance of the management. It includes the ascertainment of the cost of every order, job, contract, service or unit as may be appropriated. It deals with the cost of production, selling and distribution."

—Harold J. Wheldon

Conclusively, cost accounting may be defiend as the body of concepts, methods, techniques and procedures used to compute, analyse or estimate the costs, profitability and performance of individual products, services or departments and other segments of an enterprise.

COST : CONCEPTS AND DEFINITIONS

Or

COST, COSTING, COST ACCOUNTING AND COST ACCOUNTANCY

The concept of cost accounting can be understood properly only when we understand various inter-related and many a times interchangeable terms like 'Cost', 'Costing', 'Cost Accounting' and 'Cost Accountancy'. In this context the concept of these terms has been explained as follows :

Cost

I.C.M.A., London has defined the term 'cost' as a noun as well as a verb. As a noun it means "the amount of expenditure (actual or notional) incurred on or attributable to a specified thing or activity." As a verb, it means to ascertain the cost of a specified thing or activity. The specific thing or activity may be a product, job, services, process or any activity. Thus, cost can be termed as the amount of resources given up in exchange for some goods or services. The resources given up are cash or cash equivalent values sacrificed to obtain some goods or services. In other words, "Cost is a foregoing, measured in monetary terms, incurred or potentially to be incurred to achieve a specific objective." According to **Cost Accounting Standard-1** "Cost is a measurement in monetary terms of the amount of resources used for the purpose of production of goods or rendering services." It should also be understood that the word cost can rarely stand alone and should be qualified as to its nature and limitations.

Costing

"The techniques and process of ascertaining costs is known as Costing." —*I.C.M.A.*

Costing relates to the determination of cost of a product manufactured or service rendered. In order to ascertain cost, it involves system, methods and techniques of accumulation, classification and analysis of cost.

The technique refers to principles and rules which are applied for ascertaining cost. There are various techniques of ascertaining costs, such as Historical or Absorption Costing, Marginal Costing, Standard Costing, Uniform Costing, etc., which can be applied for specific purposes.

The process of ascertaining cost includes the day to day routine of determining cost through the process related to allocation, apportionment and absorption of costs, besides the presentation of statement of cost, showing how the costs have been arrived at.

Cost Allocation. Allocation is the process whereby cost items are charged direct to a cost unit or cost centre, *i.e.*, a cost can be specifically identified with a department that cost is allocated to that department.

Cost Apportionment. Apportionment is the process of division of costs among two or more cost centres on estimated basis of benefit received.

Cost Absorption. It is a process of ascertaining the charge of indirect cost per unit of production or service. In other words, the overhead is absorbed by the physical units manufactured or units of services rendered during a period or for specific job.

Cost Accounting

"Cost Accounting is the process of accounting for cost from the point at which expenditure is incurred or committed to the establishment of its ultimate relationship with cost centres and cost units. In its widest usage it embraces the preparation of statistical data, the application of cost control methods and the ascertainment of the profitability of activities carried out or planned." In short "Cost Accounting involves a study of those concepts, tools and techniques, which help in ascertaining and analysing costs."

Cost Accounting is the method of accounting for total cost and per unit cost of product, service, order, process or job. Cost comprises three elements, viz., material, labour and expense. The recording and accounting for all these elements of cost find their treatment in cost accounting. All the costs incurred from the very beginning of manufacturing operation till the final stage of disposal of goods find their recording and accounting in cost accounting.

Further, cost accounting serves as a tool of management process and evaluates monetary and non-monetary data to provide necessary, adequate and reasonable information for integral planning, control of business operations, managerial decisions and special analysis.

Cost Accountancy ⇒ Management + Accounting.

"Cost Accountancy is the application of costing and cost accounting principles, methods and techniques to the science, art and practice of cost control and the ascertainment of profitability. It includes the presentation of information derived therefore for the purpose of managerial decision-making."

The term 'Cost Accountancy' includes (i) Costing and (ii) Cost Accounting. Its purposes are (i) Cost-control and (ii) profitability-ascertainment. It serves as an essential tool of the management for decision-making.

Cost-control is the objective of cost accountancy but the application of cost-control methods lies in the domain of cost accounting. The cost-control methods are : (i) Budgetary Control, (ii) Standard Costing and (iii) Responsibility Accounting.

The cost-control does not necessarily mean cost-reduction. If the prices of material and labour go up and consequently the operation cost goes up, the cost can be said to be within control even with the increased cost provided there is no abnormal wastage or greater idle capacities or any marked inefficiency. However, the costs reduced as a result of application of cost-control methods are very much welcomed.

Profitability is different from profit-making. Profitability is the potentiality to make profit, inherent in the business, or in a enterprise. An enterprise may be capable to yield a profit of ₹ one lakh, but due to non-applicability of cost accounting techniques, it may be earning only a profit of ₹ 60,000. In other words, the actual profit in this case is ₹ 60,000, while the profitability of the enterprise is ₹ one lakh.

The ascertainment of profitability is the function or the objective of cost accountancy but the application of methods for its ascertainment is the task of cost accounting.

DIFFERENCE BETWEEN COSTING, COST ACCOUNTING AND COST ACCOUNTANCY

	Basis of Difference	*Costing*	*Cost Accounting*	*Cost Accountancy*
1.	Meaning and relation	It is concerned with ascertainment of cost.	It is concerned with recording of cost.	It is concerned with the principles, techniques and methods of costing adopted by the business.
2.	Scope	It is very narrow in its scope.	It is narrow in its scope.	It is much wider in its scope.
3.	Point of functioning	It begins where accountancy ends.	It begins where costing ends.	It is the starting point of costing system.
4.	Persons involved	It is related with cost accountant.	This work is related with cost clerks.	It involves cost accountant as well as management accountant.

NATURE, FEATURES AND CHARACTERISTICS OF COST ACCOUNTING

The nature and main characteristics of cost accounting can be identified as under :

(1) ***Specialised Branch of Accounting*** : Cost accounting is a specialised branch of accounting which covers collection, classification, recording, apportionment, determination and control of cost. Though it is based on double entry system but has its own concepts and conventions also.

(2) ***Art and Science Both*** : Cost accounting is a science because it has its own principles and rules, which are followed on regular basis and in a systematic manner. It is also an art because its principles and techniques are used in solving the business problems through cost data.

(3) ***Recognised as a Profession*** : As cost accounting is a specialised branch of knowledge, it is recognised as a profession also. The Institute of Cost and Works Accountants of India provides professional assistance to cost accountants and frames the rules for their professional working and approach.

(4) ***Determination of various Components of Total Cost*** : It ascertains cost of products and services through the process of accumulation, classification, analysis and recording. The elements of cost include (a) material, (b) labour and (c) expenses. The main function of this

system is to determine total cost and cost per unit. It also determines the cost of incomplete work or job in case if the work remains uncompleted.

(5) ***Application of Statistical Data of Computing Profit and Cost*** : The extensive use of this system involves application of statistical data, control methods and techniques and determining profitability. The statistical data are helpful in preparation of cost sheet, cost statement, various cost accounts and are used for the purpose of cost comparison.

(6) ***Helpful to Management*** : This system provides information and measures for control and guidance for various levels of management.

SCOPE OF COST ACCOUNTING

The scope of cost accounting is very broad. An organisation having an effective cost accounting system helps the management in performance of their responsibilities in an efficient and effective manner. In brief, cost accounting covers the following aspects :

1. ***Classification of Cost.*** The cost classification is the process of grouping costs according to their characteristics. In this context the cost can be classified according to elements, functions, nature, controllability, normality and relevance to decision-making.

2. ***Cost Recording.*** After cost classification, cost transactions are recorded in various ledger accounts.

3. ***Cost Allocation.*** It includes allotment of whole items of cost to cost centres or cost units according to pre-determined basis.

4. ***Cost Determination.*** It is also called as 'cost measurement' and it means computation of cost of individual products, services, departments or other segments of an enterprises. It can be done by preparing cost sheet or statement of cost. Production account can also be prepared for this purpose.

5. ***Cost Control***. It is an important aspect of cost accounting and for this purpose various techniques such as standard costing, budgetary control, inventory control, quality control, etc can be adopted.

6. ***Cost Comparison.*** It referes to comparison of current cost with previous cost or cost of similar other concerns.

7. ***Cost Reporting.*** It means communication of cost data on regular basis which may be used by management for decision-making or which are made available to government or some outside agencies.

8. ***Cost Reduction.*** It means permanent and genuine reduction in per unit cost of goods produced or services rendered.

9. ***Cost Analysis.*** It involves the estimation of relationship between costs and various determinants of costs.

10. ***Cost Audit***. It means an examination of the appropriateness of the cost accounting system adopted by the business and effectiveness of its implementation.

IMPORTANCE AND ADVANTAGES OF COST ACCOUNTING

(1) To Management and its Functions

(i) ***Planning.*** Planning involves policies, procedures, methods, programmes and budgets. These factors seek guidance from cost-information for their determination. The budget is usually the most important tool in planning and the 'budgetary-control' plays a useful part in the control phase of the management. The objectives are set in the budgets and the actual performances are compared with the budget-targets. This helps the cost accounting in planning.

(ii) ***Organisation.*** The activities of the manufacturing enterprise are grouped into functions like production, administration, selling and distribution. The cost of each function is ascertained by applying costing techniques and is analysed according to department, process or operation to make them useful for comparative study.

(iii) ***Motivation.*** Human beings, unlike machines, are guided more by incentives, affection, sentiments and emotions. Labour force being an important element in cost of manufacture, is motivated by the incentive plans of remuneration. There are various incentive plans of wage payment and cost accounting measures the results of the application of these remunerating incentives with the labour-performances and helps the management to decide how best the labour can be motivated.

(iv) ***Control.*** Control is an important function of cost accounting. Control ensures the quantitative and qualitative performance of work in the organisation, exposes the management

lapses and helps the management to adopt the remedial measures to plug the loopholes before it is too late. Standard costing, Budgetary control and Responsibility accounting are the methods which cost accounting provides to exercise control. Budgets and/or standards are set-up for materials, labour, overheads, sales, finance and other allied activities and the actual performances are compared with the budgets and standards so set. The variances arising out are studied and located to bring to light the lapses in the performances.

(2) Other Advantages of Cost Accounting

(i) ***Control on Wastage of Material and Labour***. This system keeps a good check and control on the purchase, storing and issue of materials. The wastage of materials in the form of spoilage, excessive scraps, etc., is revealed and controlled. Similarly, with the proper recording of labour costs, the inefficiencies do not go unchecked; the idle time, overtime and labour turnover remain within limits and the wastage of time is duly controlled.

(ii) ***Economy in Cost***. The cost reduction programmes together with operation research and value analysis techniques contribute a great deal in economising the costs.

(iii) ***Proper Utilisation of Plant***. The proper utilization of plants and machines to the full desired capacity is measured and wastages and idle capacities are controlled.

(iv) ***Budgetary Control***. With the help of standard costing and budgetary controls, the optimum level of efficiency is set and compared with actual performances. The variances help the 'management by exception' which means that the management has to keep an eye only on those variances which are below the norms and not to bother for the organisation as a whole.

(v) ***Periodical Profit & Loss Account***. Perpetual Inventory System exercises inventory control and helps continuous stock-taking which facilitates preparation of periodical profit & loss account.

(vi) ***Cost Comparison***. Cost comparison is necessary for cost control. The comparison of costs of jobs, processes, cost centres, etc. between the two periods or the comparison of costs of different firms under Inter-firm Comparison System helps to control the costs.

(vii) ***Use in Policy Decisions***. Marginal costing helps the management in deciding the internal policies of sales, price fixation, increase in production, etc., and the differential costing helps to choose the better of the two alternatives open to the management.

(3) Advantages to Employees

Cost accounting system is useful to the employees also. It is wrong to suppose that it exploits the labour class. This system believes in (a) imparting training to workmen and to make them efficient, (b) introducing incentive plans of remuneration, and (c) providing welfare amenities. In the event of a dispute arising, the cost records help to do away with the misunderstandings.

(4) Advantages to Consumer

Cost accounting system provides cost control which leads to reduction in cost of product and services. These help the organisation to offer product and services to the consumers at lower price and of good quality.

(5) Advantages to Government

This system is useful for Government for deciding the state subsidy to industry and also for economic planning and development by the State. The Government requires various details of cost in formulating various economic policies, such as Tax policy, Business policy, Industrial policy, Financial policy, Import-Export policy, etc.

(6) Advantages to Investors

The Banks and other investors also find it useful to make investment in the companies which employ costing methods because it helps in determining the worthiness of credit being granted to them.

INSTALLATION OF COSTING SYSTEM

Installation of a cost system is not an expense but an investment as the rewards are much greater than the expenses incurred. The cost system is for the business and not the business for a system of cost. Therefore, the system has to be so designed as to meet the specific needs of the enterprise.

(A) General Considerations for Installing Costing System

The general considerations to be observed in installing a costing system are as follows :

1. ***Objective of Installation the System.*** Whether the objective of installing the costing system is limited to a specific area, *e.g.*, material management, or fixing selling price, or to arrive at a certain managerial decision; or the objective is to install the system for covering all the aspects of cost affecting the business, is to be decided. The approach to install the system will be dependent on its objective.

2. ***Areas of Operation.*** Having decided the objective, the areas of operation of the system are to be studied, by which the management can be best benefited. If production is slack, attention will have to be paid to increase it; if production is good but the sales are receding, study will have to be made to increase the sales and action taken according to the results of study and analysis.

3. ***Organisation of the Business.*** No system of cost installation would succeed until the organisation structure of the business is taken into account. The organisational part would help to determine the scope of working and improvement.

4. ***Conception and Reception of the Idea.*** The idea of the installation of the cost system is to be placed before the staff and the workers in a manner that it is well received and not objected to on flimsy grounds. The success of the system would depend on the co-operation of the persons engaged in the enterprise, and the co-operation will be forth-coming only if the ideas and plans are well-conceived and received. The benefits of introducing the system to all the sections should be well-explained.

5. ***Collection of Data and Prompt Information.*** The cost data works as a base for decision-making. Therefore, a proper system should be evolved for the collection of the required cost data and information promptly. Secondly, there should be a system to verify the correctness of the data supplied, otherwise the conclusions drawn may be wrong and time spent in its working may go waste.

6. ***Cost Records and Cost Books.*** The maintenance of cost records and cost books depends on the size and nature of the business, but the basic requirements are to be provided as are needed to meet the objective of cost system in that business. The manner in which the financial accounts could be interlocked into an integral accounting system has to be studied and worked out. Proper books and records are to be kept and maintained to meet the requirements of either of the two situations mentioned above.

7. ***Control System for the Elements of Cost.*** System would have to be devised for recording and controlling costs of materials, labour and overheads, in accordance with costing principles and procedures.

8. ***Type and Method of Costing.*** The choice of method of costing would depend on the nature of production, *e.g.* Job Cost method or the Process Cost method. For cost control, standard costing along with budgetary control may have to be selected and applied. Similarly, for decision-making, Marginal and Differential costing techniques may be found useful. Preparations for the application of the particular method and technique/type should be made initially.

9. ***Responsibility Accounting.*** Responsibility accounting is a technique of cost control by delegating and locating responsibility for costs, on individuals or a group of individuals, departments, etc., known as responsibility centres. It has to be judged whether a particular official who had been assigned a particular function, has implemented the same or not within the time allotted to him, and thus the responsibility has got to be fixed for failure-action of

individual persons, for the sake of control of cost. For this purpose, a system of responsibility accounting should be evolved.

(B) Specific Considerations for Installing Costing System

The specific considerations as distinct from general considerations to be kept in view while installing a cost system are as follows :

1. ***Size and Nature of Business.*** In a business of big size, a detailed cost system is necessary while in a small business, the system should be within the requirements so that the expenses on the installation and its working may not outweigh the utility.

2. ***Products.*** The nature of product determines the method of costing to be applied. If the material content of the product is more valuable, the material cost records need be kept in comparatively more elaborate manner so as to make material cost control effective. Same is the position with regard to labour and overheads.

3. ***Organisation.*** The organisational set up for a costing system should be so modelled that the control part is exercised by the Cost Accountant, as such, the present organisational set up of the costing department needs close study to suggest necessary changes.

4. ***Functional Study.*** The functional divisions of an undertaking based on cost are (a) Manufacturing, (b) Administration, and (c) Selling & Distribution. A study of the present working of the different departments is necessary to suggest improvements.

(C) Principles for Smooth Working

The following principles should be kept in mind while introducing the cost system :

1. The system should be simple and easy to operate.

2. The system should be flexible, so that it may be expanded or contracted as per needs of the business.

3. The existing pattern should be disturbed only as little as may be considered desirable.

4. The desired changes be introduced gradually and not in haste.

5. Confidence be created by the Cost accountant in the minds of management and executives regarding the utility of the system, so as to avoid unnecessary criticism and to obviate obstacles.

(D) Line of Action

The following line of action is recommended for the installation of cost system :

1. Determination of the type of costing and the method of costing, as may be suitable for the undertaking.

2. To prepare forms, cards, report-proformas, books, etc., for keeping records of all the elements of cost, *viz.*, material, labour and overheads.

3. To decide issues regarding material cost control, *i.e.*, purchase, storing, issue and valuation.

4. To decide matters regarding labour cost control, *i.e.*, job evaluation, merit rating, appointment, time recording, division of work, remuneration of labour and other allied problems like idle time, overtime, labour turnover, casual workings, etc. Where the work is carried on more by machines, proper records be kept for the machines.

5. To suggest a suitable system for the collection, classification and analysis of all types of overheads, *i.e.*, manufacturing, administrative and selling and distributive.

6. To decide the methods of allocation and apportionment of overheads among the Production departments and Service departments which should be earlier clearly demarcated, and to decide the method of absorption of overheads.

7. To decide normal capacity of production and prepare budgets and standards.

8. To maintain books of cost control accounts based on double-entry principle.

9. To devise information system by which the costing department may communicate to other departments and receive reports and other necessary information promptly.

DIFFERENCE BETWEEN COST ACCOUNTING SYSTEM AND FINANCIAL ACCOUNTING SYSTEM

Basis of Difference	*Cost Accounting*	*Financial Accounting*
1. *Need of Accounts*	Kept by business engaged either in manufacturing or in rendering services where the cost per unit is to be ascertained.	Kept by all types of business houses, big or small, whether engaged in trading, manufacturing or non-profit making associations.
2. *Record of Expenses*	Maintain full and detailed records pertaining to all the three elements of cost, *viz.*, materials, labour and expenses.	Record all types of expenses and incomes and also items of profit appropriation. However, they do not keep detailed records of elements of cost.
3. *Availability of Information*	Provide data and reports to management for cost-ascertainment, planning, control and decision-making.	Provide general information to management and outside parties in the form of Profit & Loss A/c and Balance Sheet of the business as a whole.
4. *Ascertainment of Cost*	Ascertain the cost of each product, job or order and then show profit/loss made on each.	Do not show profit/loss on each product, job or order individually.
5. *Period of Information*	Provide information to management as and when desired, daily, weekly, monthly, quarterly, etc.	Provide operating net results and financial position at the end of financial year.
6. *Estimates vs. Actual*	To calculate the cost, the indirect expenses included therein are based on estimates.	Show historical costs, *i.e.*, they include expenses having actually been incurred in the financial year.
7. *Focus Area*	Greater control is exercised on materials and stores, labour and overhead costs by budgetary control and standard costing. No emphasis is given to cash-in-hand and Bank transactions.	Greater emphasis is laid on cash and financial position. They do not attach that importance to control of materials, labour and overheads.
8. *Calculation of Tender Price*	As the cost is available, it is easier to fix selling price and quote for tender.	No correct tender prices can be quoted,
9. *Comparison of Cost*	The production costs of a period can be compared with previous corresponding period and the difference analysed.	Such comparison of costs of individual production is not easy.
10. *Relative Efficiency*	Provide information on the relative efficiencies of plant, machinery, labour and departments.	The relative efficiency of workmen, plants, etc. cannot be easily judged.
11. *Valuation of Stock*	Stocks are valued at costs.	Stocks are valued at cost price or market price, whichever is lower.
12. *Internal vs. External*	These accounts are for internal transactions and do not form the basis of receipts and payments to outside parties.	They form basis for external transactions also, and record receipts, payments and credit transactions.
13. *Legal Compliance*	The Companies Act has made it obligatory for certain industries to maintain Cost Accounting, otherwise it is voluntary to maintain cost them.	It is almost necessary to maintain this accounting to run business. To meet the requirements of Companies Act, and Income-tax Act, it is obligatory to keep them.
14. *Presentation*	Charts, graphs, diagrams, statements, etc. are much used in this system for informatory reports to management.	Not much use is made of such presentation in this system.

COST ELEMENTS, CONCEPTS AND CLASSIFICATION (AS PER CAS-1)

"A classification has to be made to arrive at the detailed costs of departments, processes, production orders, jobs or other cost units. The total cost of production can be found without such analysis, and in many instances an average unit cost could be obtained but none of the advantages of an analysed cost would be available." —**Harold J. Wheldon**

ELEMENTS OF COST

"Cost is the amount of expenditure (actual or notional) incurred on, or attributable to, a given thing." —*I.C.M.A.*

"Cost is a measurement, in monetory terms, of the amount of resources used for the purpose of production of goods or rendering services." —*CAS-1*

The elements of cost are :

(I) Materials Cost, (II) Labour Cost, and (III) Expenses.

I. MATERIALS COST

"Material cost is the cost of material of any nature used for the purpose of production of a product or a service." —*CAS-1*

It is worth mentioning that material cost includes cost of procurement, freight inwards, taxes and duties, insurance, etc. directly attributable to the acquisition. Trade discounts, rebates, duty drawbacks, refunds on account of modvat, cenvat, sales tax and other similar items are deducted in determining the cost of material.

Materials cost is of two types, *viz.*, (i) Direct Materials Cost, and (ii) Indirect Materials Cost.

(i) ***Direct Materials Cost.*** Direct material cost has been defined in Cost Accounting Standards (CAS-1) as a "Cost of material which can be directly allocated to a cost centre or a cost object in economically feasible way.

Thus, direct material cost can be termed as a cost which can be identified easily and economically traced directly with the final or end product.

Direct materials includes the following :

(a) the cost of those materials which enter into and form major part of the product, *e.g.*, timber in furniture-making; clay in brick-making; cement, stones, etc. in building; yarn for cloth-producing, etc.;

(b) materials specially purchased or requisitioned for a specific or a particular job, process, or work order and used therein;

(c) materials passing from one process or operation to the other, for instance, in the process costing the finished product of a process becomes the direct materials for the next or the succeeding process;

(d) the primary packing materials, *e.g.*, match-box for keeping match-sticks, cigarette cartons for keeping cigarettes, etc.

Direct Materials are also known as 'Process Materials', 'Prime Cost Materials' or 'Productive Materials'.

(ii) ***Indirect Materials Cost*** : Indirect Material Cost has been defined in **CAS-1** as "the cost of material which can not be directly allocable to a particular cost centre or cost object."

Allocation means, 'to relate the entire cost of an item to a respective cost centre or cost units.' This thus means that the cost which has been incurred directly for a cost centre, should directly be allocated to that cost centre. But where the cost has been incurred which relates to more than one cost centre, for example, power, fuel, repair and maintenance etc. whose benefit is enjoyed by all the cost centres, and whose costs, which cannot be allocated, are to be apportioned to or absorbed to cost centres or cost units. These are the materials which cannot be traced as a major part of product but are distributed to various cost centers or cost units on some equitable basis. In other words, Indirect materials cost is the cost of those materials which do not form major part of the product but which help the production and which can be conveniently assigned to specific physical units, for example :

(a) Lubricating Oil, Fuel, Cotton waste etc., required for operating and maintaining plant and machinery;
(b) Small tools;
(c) Stores used for repairs and maintenance.

Items of small values like thread, gum, nails, etc., though forming part of the product and thus reckoned as Direct Materials, are treated as 'Indirect Materials' for the reasons that it is difficult to calculate the cost per unit of that material. The thread or gum used in book-binding, nails used in shoes, etc., are the examples.

II. LABOUR COST

According to **CAS-1**, "Labour cost means the payment made to the employees, permanent or temporary for their services." Thus labour cost includes salaries and wages paid to permanent employees, temporary employees and also to employees of the contractor. Here, salaries and wages include all fringe benefits like Provident Fund Contribution, gratuity, ESI, overtime, incentives, bonus, ex-gratia, leave encashment, wages for holidays and idle time, etc.

Labour Cost is sub-divided into : (i) Direct Labour Cost, and (ii) Indirect Labour Cost.

(i) ***Direct Labour Cost.*** Direct Labour Cost has been expressed by **CAS-1** as "the cost of wages of those workers who are readily identified or linked with a cost centre or cost object."

Thus, wages paid to workers who are engaged in production process, *i.e.*, engaged in convering the shape of the raw material, whose time can be conveniently and economically traced to units of product or service can be referred to as direct wages on direct labour cost *e.g.*, carpenters for furniture making, weavers for textiles and all workmen engaged in assembling parts, polishing, etc., in a moter-car manufacturing concern. Direct labour is also known as Process Labour, Operating Labour, Prime Cost Labour or Productive Labour.

Thus, direct labour cost can be identified to cost centre or cost units and can be allocated to the cost centre or cost units to which it relates.

(ii) ***Indirect Labour Cost*** "is the wages of the employees which are not directly allocable to a particular cost centre."

It is the cost of labour not directly engaged in the production operations but engaged to assist or help the production operations, *e.g.,* Watchmen, Store-keepers, Inspectors, Repair and maintenance workers, etc. The labour cost of these persons cannot be directly identified with a job, process or production order and so it cannot be charged directly to that job, process or operation.

The examples of indirect labour cost are :

(1) Wages of indirect labour;
(2) Wages of idle time;
(3) Remuneration of repair and maintenance services;
(4) Workmen's compensation;
(5) Holiday pay;
(6) Overtime wages.

III. EXPENSES

The expenses as the third element of cost mean the expenses other than Materials and Labour. It is defined by I.C.M.A. as *"the cost of services provided to an undertaking and the notional cost of the use of owned assets."* According to **CAS-1**, "Expenses are other than material cost or labour cost which are involved in an activity."

Expenses are of two types : (i) Direct Expenses, and (ii) Indirect Expenses.

(i) ***Direct Expenses*** : "Direct expenses are the expenses other than direct material or direct labour which can be identified or linked with the cost centre or cost object."

Thus the Direct Expenses are those expenses which are directly identified with a particular job, process or operation. These expenses are incurrred specially on particular job or process and are in no way connected with some other jobs or processes. These expenses are also known as Chargeable expenses, Process expenses, Prime cost expenses or Productive expenses. The examples are :

(a) Cost of Railway freight, carriage, etc. incurred on the materials purchased only for a specified job or process;
(b) Hiring charges of a special plant, machine or tools commissioned for a specific contract;
(c) Cost of operating a machine used on a particular job;
(d) Royalty paid to lessor for a particular lease contract;
(e) Cost of special patterns, designs or plants for a particular job or work order;
(f) Research or experimental expenses related to a particular work order;
(g) Fees paid to surveyors, architects, etc., specialy appointed for a particular work etc.

(ii) ***Indirect Expenses*** : "Indirect expenses are the expenses other than of the nature of material or labour and can not be directly allocated to a particular cost centre" —**CAS-1**

Indirect expenses are those expenses other than indirect material cost and indirect labour cost which cannot be directly identified with a particular job, process or work order but are common to jobs or process. These expenses include : (i) Factory expenses, (ii) Office and Administration expenses, and (iii) Selling and Distribution expenses.

DIFFERENCE BETWEEN DIRECT AND INDIRECT EXPENSES

	Basis of Difference	*Direct Expenses*	*Indirect Expenses*
1.	Relationship with Production	Direct expenses are directly related with production, *i.e.* they increase or decrease directly in the proportion of increase or decrease in production.	Inidrect expenses are not directly related with production.
2.	Relationship with Prime Cost	Direct expenses are the parts of Prime Cost.	Indirect expenses are added after the calculation of Prime Cost.
3.	Production Decision	If sale price realised is less than the total of direct expenses, the production may be dropped *i.e.* direct expenses play an important role in production decision.	Indirect expenses do not play significant role in production decision.
4.	Coverage Scope	Direct expenses include direct materials, direct labour and other direct expenses.	Indirect expenses include factory overhead, office overhead and selling and distribution overheads.

OVERHEADS

Overheads may be referred as the cost of indirect material, indirect labour and such other expenses, which cannot be conveniently charged directly to specific cost centre or cost units. Overheads are the aggregate of the following : (1) Indirect Materials Cost; (2) Indirect Wages or Indirect Labour Cost; and (3) Indirect Expenses.

CAS-1 defines overheads as follows :

"Overheads comprise of indirect materials, indirect employee costs and indirect expenses which are not directly identifiable or allocable to a cost object in an economically feasible way."

COST : CONCEPTS AND CLASSIFICATION

Classification of cost is the process of grouping the components of cost under a common designation on the basis of similarities of nature, attributes or relations. It is the process of identification of each item and the systematic placement of like items together according to their common features. Items grouped together under common heads may be further classified according to their fundamental differences. The same cost may appear in several different classification depending on the purpose of classification.

Cost is classified normally in terms of a managerial objective. Its presentation normally requires sub-classification. Such sub-classification may be according to nature of the cost elements, functional lines, areas of responsibility, or some other useful break-up. The appropriate sub-classification depends upon the uses to be made of the cost report.

Basic Rules for Classification of Cost

1. Classification of cost is the arrangement of items of costs in logical groups having regard to their nature (subjective classification) or purpose (objective classification).
2. Items should be classified by one characteristic for a specific purpose without ambiguity.
3. Scheme of classification should be such that every item of cost can be classified.

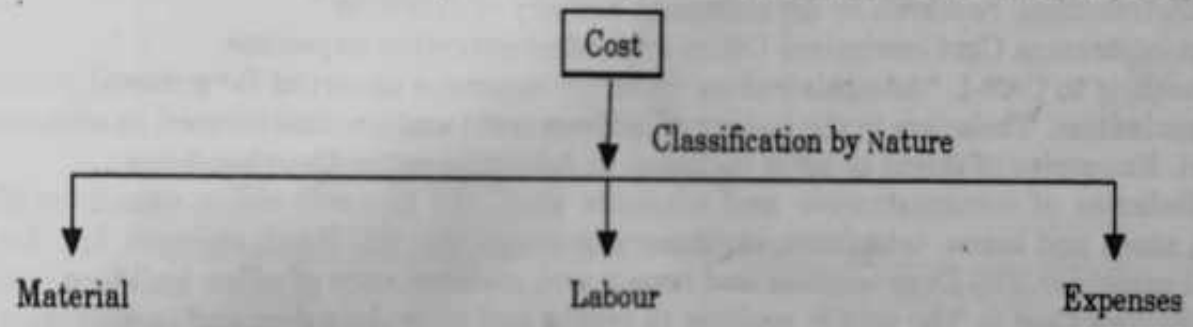
Basis of Classification :

According of CAS-1, cost may be classified on the following basis :

I. Nature of Expenses
II. Relation to Cost Centre-Traceability
III. Functions/Activities.
IV. Behaviour : Fixed, Sem-variable or Variable.
V. Management Decision-Making.
VI. Production Process
VII. Time Period

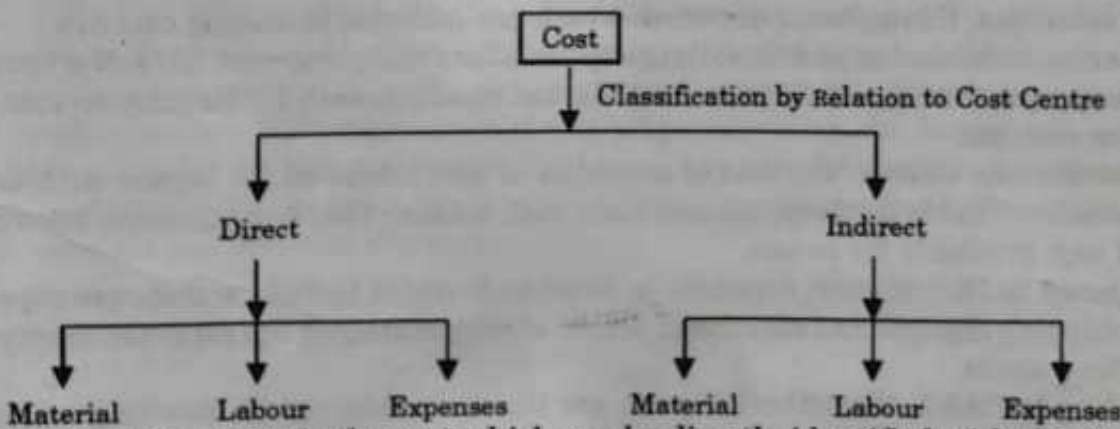
I. According to Nature of Expense

Costs should be gathered together in their natural groupings such as material, labour and other expenses. Items of costs differ on the basis of their nature. On this basis the elements of cost can be classified in the following three[1] categories : (i) Material (ii) Labour (iii) Expenses.



II. According to Relation to Cost Centre

According to this basis, classification should be made on the basis of method of allocation of cost to a cost unit. If an expenditure can be allocated to a cost centre or cost object in an economically feasible way, then it is called direct otherwise the cost component will be termed as indirect. This classification can be explained with the help of following chart :



Direct Cost : Direct cost is the cost which can be directly identified with the final product or service. It is a cost which is easily and economically be attributed to the cost unit directly. Direct cost has three components : Direct Material Cost, Direct-Labour Cost and Direct Expenses.[2] Sum of direct costs is called as Prime Cost.

1 These elements have already been discussed in detail in this chapter.
2 These components have already been discussed in detail in this chapter.

Indirect Cost : An indirect cost is the cost which cannot be economically traced directly with the final product *i.e.* it is associated with the manufacture of two or more units of finished product. These are also known as Common cost. Indirect cost has three compoments : indirect material cost, indirect labour cost and indirect expenses.

III. According to Functions or Activities

On the basis of functions or activities, costs may be classified into five major categories : (1) Production, (2) Administration, (3) Selling, (4) Distribution, (5) Research and Department.

(1) ***Production Cost*** : It is the cost of sequence of operations which begins with supplying materials, labour and services and ends with primary packing of the product. According to **CAS- 1**, "Production cost is the cost of all items involved in the production of a product or service. It includes all direct and all indirect costs related to the production.

This cost is also known as 'Manufacturing Cost' or 'Factory Cost'.

The main items, which are included in the indirect cost related to production, are as follows: (i) Salaries for staff for production planning, technical supervision, factory administration, etc. (ii) Normal idle time cost, (iii) Expenses for stores management, (iv) Security expenses in the factory, (v) Labour welfare expenses, (vi) Dispensary and canteen expenses, (vii) Depreciation of plant and machines, (viii) Repair and maintenance of factory building and plant and machineries, (ix) Insurance, (x) Quality control, etc.

(2) ***Administration Cost*** is "the cost of formulating the policy, directing the organisation and controlling the operations of an undertaking, which is not related directly to a production, selling, distribution, research or development activity or function." —*I.C.M.A.*

Administration Cost comprises Office and Administration expenses.

According to **CAS-1**, "Administration costs are expenses incurred for general management of an organisation. These are in the nature of indirect costs and are also termed as administrative overhead. Examples of items to be in included in Administrative Overhead are :

(i) Salaries of administrative and accounts staff, (ii) General office expenses like rent, lighting, rates and taxes, telephone, stationery, postage, etc. (iii) Bank charges, (iv) Audit fees, (v) Legal expenses, (vi) Depreciation and repair and maintenance of office building, etc.

(3) ***Selling Cost*** is "the cost of seeking to create and stimulate demand (sometimes termed 'marketing') and securing orders." It is also known as Selling expenses or Selling overheads whcih include all the expenses of Selling Department.

According to **CAS-1**, "Selling costs are indirect costs related to selling of products or services and include all indirect costs in sales management for the organisation." It is worth mentioning that selling costs include all costs not only relating to regular sales but also relating to sales promotion activities. Examples of expenses which are included in selling cost are :

(i) Salaries, commission and travelling expenses for sales personnel, (ii) Advertisement cost, (iii) Legal expenses for debt realization, (iv) Market research cost, (v) Royalty on sale, (vi) After sales service cost, etc.

(4) ***Distribution Cost*** is "the cost of sequence of operations which begins with making the packed product available for despatch and ends with making the re-conditioned returned empty package, if any, available for re-use." —*I.C.M.A.*

It is known as Distribution expenses or overheads which include warehouse expenses, cost of freight, shipping charges and also the expenses of reconditioning the returned empty packages for using them again.

According to **CAS-1**, "Distribution costs are the costs incurred in handling a product from the time it is completed in the works until it reaches the ultimate consumer."

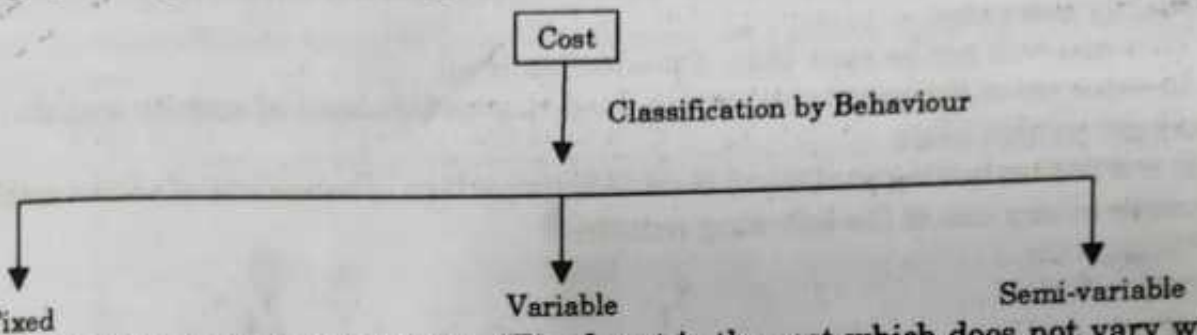
(5) ***Research and Development Cost*** : Research and Development Cost are the cost for undertaking research to improve quality of a present product or improve process of manufacture, develop a new product, market research, etc. and commercialization thereof.

On the whole Research cost comprises the cost of development of new product and manufacturing process; improvement of existing products, process and equipment; finding new

ses for known products; solving technical problem arising in manufacture and application of roducts etc. Development cost includes the cost incurred for commercialization/implementation f research findings.

V. According to Behaviour of Cost

Cost are classified based on behaviour as fixed cost, variable cost and semi-variable cost epending upon response to the changes in the activity levels.



(1) ***Fixed Cost*** : According to **CAS-1**, "Fixed cost is the cost which does not vary with the hange in the volume of activity in the short run. These costs are not affected by temporary luctuation in the activity of an enterprese. These costs are also known as 'Period Cost' Examples f fixed cost are : salaries, rent, depreciation, audit fees, etc."

Fig. 2. Total Fixed Cost

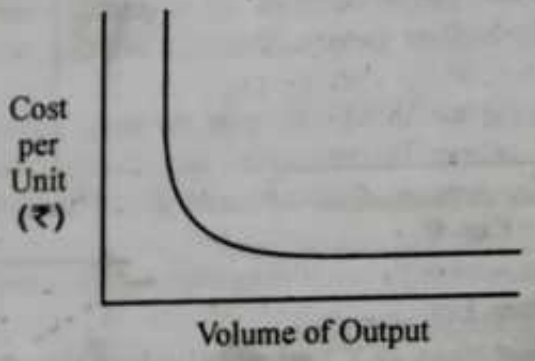


Fig. 3. Fixed Cost per Unit

It is clear that though the total amount of fixed cost does not vary but fixed cost per unit aries with the change in output. If production decreases, fixed cost per unit increases and if roduction increases fixed cost per unit decreases.

(2) ***Variable Cost*** : According to **CAS-1**, "Variable cost is the cost of elements which tends to irectly vary with the volume of activity. Variable cost has two parts (a) Variable Direct Costs nd (b) Variable Indirect Costs. Variable indirect costs are termed as variable overhead."

Thus Variable costs or Product costs are those which increase in direct proportion with the ncrease in production or which decrease in direct proportion with the decrease in production, .g., Direct Materials, Direct Labour, Power, Fuel etc. They are also known as Product Costs. Thus, variable cost tends to change proportionately with the change in quantum of production ut per unit variable cost remains the same.

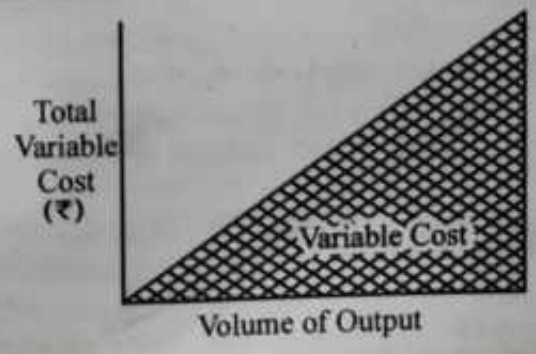


Fig. 4. Total Variable Cost

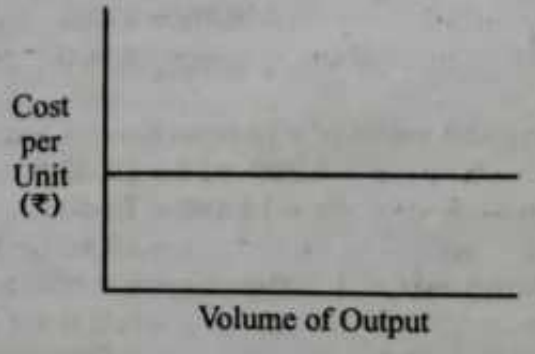


Fig. 5. Variable Cost per unit

(3) ***Semi-fixed or Semi-variable Cost*** : According to **CAS-1**, "Semi-variable costs contain both fixed and variable elements. They are partly affected by fluctuations in the level of activity."

This is a cost which changes but not in direct proportion to the increase or decrease in the production-output, e.g., Repairs and Maintenance, Electricity bill, Telephone bills, etc. These costs are made up of fixed and variable elements.

The main features of semi-variable cost are as follows :

1. This cost increases with the increase in the level of activity but not in the same proportion as the activity increases.
2. This cost will not be zero, even if production is nil.
3. In some cases this cost may remain fixed to a certain level of activity and thereafter, it may increase on slab basis.

It is worth mentioning that there is no definite pattern of behaviour of semi-variable costs. It may move in any one of the following patterns :

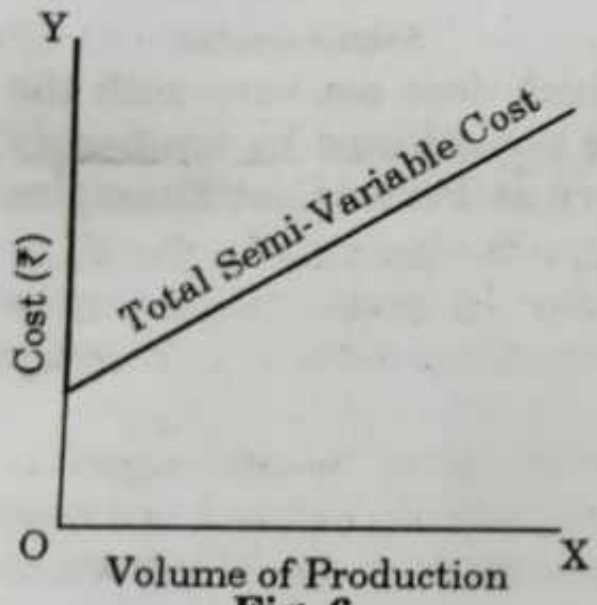


Fig. 6

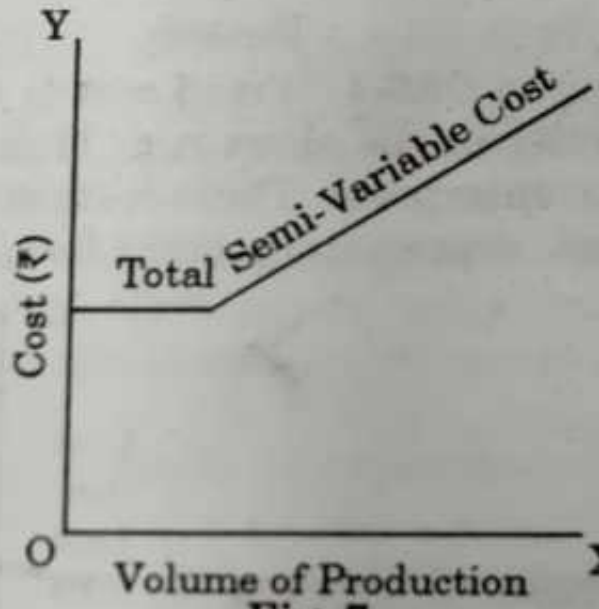


Fig. 7

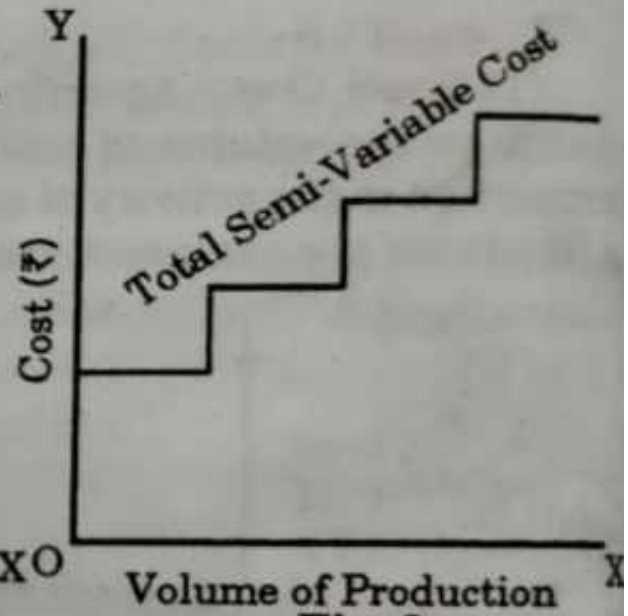


Fig. 8

V. According to Relevance to Decision-making and Control

Costs are classified for the purpose of management decision-making under different circumstances as under :

(1) ***Marginal Cost*** : As per **CAS-1**, "Marginal cost is the aggregate of variable costs, *i.e.*, prime cost plus variable overhead. Marginal cost per unit is the change in the amount at any given volume of output by which the aggregate cost changes if the volume of output is increased or decreased by one unit."

Marginal cost refers to variable cost only. It does not include fixed cost as shown in the following figures :

Unit	*Total Cost (₹)*	*Marginal Cost (₹)*
0	600 (fixed)	—
1	1,000	400
2	1,400	400
3	1,800	400
4	2,000	400

(2) ***Differential Cost*** : As per **CAS-1**, "Differential cost is the change in cost due to change in activity from one level to another."

Differential Cost is found by using the principle which highlights the points of differences in cost by adoption of different alternatives. This technique is used in export pricing, new products and pricing of goods sought to be promoted in new markets, either within the country or outside.

The algebraic difference between the relevant cost at two levels of activities is the differential cost. When the level of activity is increased, the differential cost is known as *incremental cost* and when the level of activity is decreased, the decrease in cost is known as *decremental cost*.

Output Unit in lakh	*Differential Unit in lakh*	*Total Cost (₹ lakh)*	*Differential cost (₹ lakh)*	*Differential cost per unit (₹)*
(a) 1.00	—	30.00	—	—
(b) 1.20	0.20 (b)–(a)	35.00	5.00	25.00
(c) 0.80	0.20 (a)–(c)	26.00	– 4.00	– 20.00

(+) Incremental cost, (–) Decremental cost

(3) ***Opportunity Cost*** : As per **CAS-1**, "Opportunity cost is the value of alternatives foregone by adopting a particular strategy or employing resources in specific manner." In simple words the cost which are related to the sacrifice made or the benefits foregone are opportunity costs. To take an example, if a part of the factory building has been let out on rent and now we want to use that portion for installing a plant, we would naturally lose the rent that we used to get. So the loss of rent is the opportunity cost which would arise due to putting the part of that factory building to an alternate use available to the owner, and this cost should be kept in view while installing the plant.

The opportunity cost is considered for selection of a project or justification of investment, studying variability of an investment option.

(4) ***Replacement Cost*** : It is the cost of replacing a material or asset, by purchase from the current market. If 'X' material was originally purchased @ ₹ 250 per kg and now it can be replaced by purchase from the market at the current rate of ₹ 280 per kg, the replacement cost is ₹ 280 per kg.

(5) ***Relevant Cost*** : "Relevant Costs are costs for a specific purpose or situation. In the context of decision making relating to a specific issue, only those costs which are relevant are considered. A particular cost item may be relevant in a decision-making and may be irrelevant in some other decision-making situation. For example, present depreciated cost of machine is relevant in case of decision of its sale but it is irrelevant in case of decision of its replacement.

(6) ***Imputed Costs*** : As per **CAS 1**, "Imputed costs are hypothetical or notional costs, not involving cash outlay, computed only for the purpose of decision-making." Thus, it is a hypothetical cost required to be considered to make costs comparable. If the owner of the factory charges rent of the factory to the cost of production to make cost comparable with that of those undertakings which run production in rented factories, it is an imputed cost as the rent has actually not been paid. Same is the case with charging Interest on one's own capital.

(7) ***Sunk Cost*** : A cost which has been incurred in the past and is not relevant to the particular decision-making is sunk cost. If it is decided to replace the existing plant, the written down book value of the plant less the sale value of the existing plant is a sunk or irrecoverable cost. Sunk costs are generally historical cost in nature.

(8) ***Normal Cost*** : Normal Cost is a cost that is normally incurred at a given level of output in the conditions in which that level of output is achieved. Normal cost includes those items of cost which occur in the normal situation of production process or in the normal environment of the business. The normal idle time is to be included in the ascertainment of normal cost.

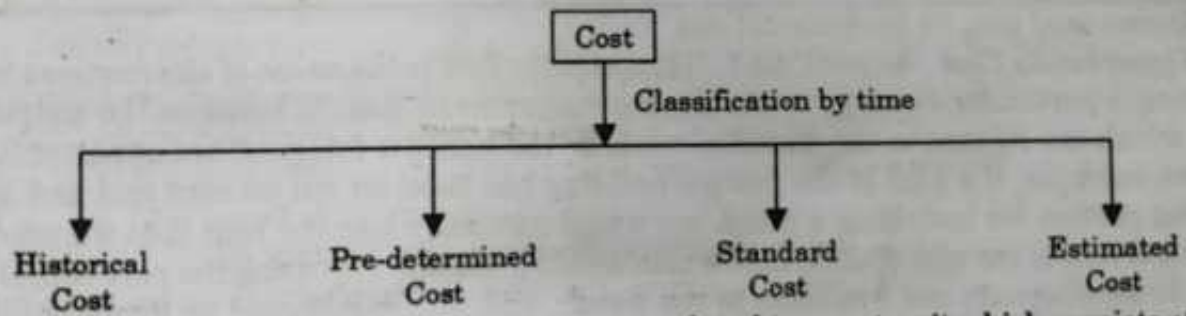
(9) ***Abnormal Cost*** : Abnormal Cost is an unusual or a typical cost whose occurrence is usually irregular and unexpected and due to some abnormal situation of the production. Abnormal cost arises due to idle time for some heavy break down or abnormal process loss. They are not considered in the cost of production for decision making and are charged to profit and loss account.

(10) ***Avoidable Cost*** : Avoidable Costs are those cost which under given conditions of perfomance efficiency should not have been incurred. Avoidable costs are logically associated with some activity or situation and are ascertained by the difference of actual cost with the happening of the situation and the normal cost. When spoilage occurs in manufacture in excess of normal limit, the resulting cost of spoilage is avoidable cost. Cost variances which are controllable may be termed as avoidable cost.

(11) ***Unavoidable Cost*** : Unavoidable Costs are inescapable costs which are essentially to be incurred, within the limits or norms provided for. It is the cost that must be incurred under a programme of business restriction. It is fixed in nature and inescapable.

(VI) According to Nature of Production Process

On the basis of nature of production or manufacturing process costs may be classified as follows :



(1) ***Batch Cost*** : Batch cost is the aggregate cost related to a cost unit which consists of a group of similar articles which maintain their identity throughout one or more stages of production.

(2) ***Process Cost*** : When the production process is such that goods are produced from a sequence of continuous or repetitive operations or processes, the cost incurred during a period is considered as process cost. The process cost per unit is derived by dividing the process cost by number of units produced in the process during the period.

(3) ***Operation Cost*** : Operation Cost is the cost of a specific operation involved in a production process or business activity. When there are distinctly separate operations involved in a process cost for each operation is found out for effective control mechanism.

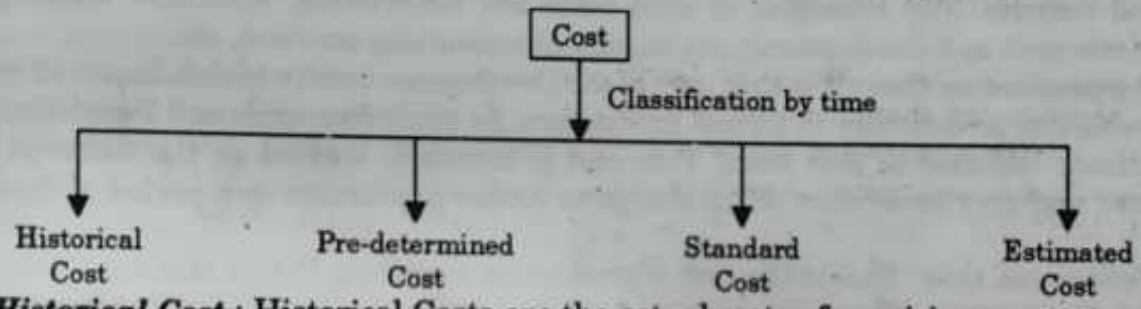
(4) ***Operating Cost*** : Operating Cost is the cost incurred in conducting a business activity. Operating costs refer to the cost of undertakings which do not manufacture any product but which provide services.

(5) ***Contract Cost*** : Contract cost is the cost of a contract with some terms and conditions of adjustment agreed upon between the contractee and the contractor. Contract cost is usually applied to major long term contracts as distinct from short term job costs. Escalation clause are sometimes provided in the contract in order to take care of anticipated change in material price, labour cost etc.

(6) ***Joint Cost*** : Joint Costs are the common cost of facilities or services employed in the output of two or more simultaneously produced or otherwise closely related operations, commodities or services. When a production process is such that from a set of same input, two or more distinguishably different products are produced together, products of greater importance are termed as joint products and products of minor importance are termed as by-products and the cost incurred prior to the point of separation of the products are termed as Joint Costs. For example, in a petroleum refinery industry, petrol, diesel oil, kerosene oil, naptha, tar etc. are produced jointly in the refinery process.

VII) According to Time Period

A cost item is related to a specific period of time and cost can be classified according to the system of assessment and specific purpose as indicated in the following ways :



(1) ***Historical Cost*** : Historical Costs are the actual costs of acquiring assets or producing goods or services. They are *'post mortem'* costs ascertained after they have been incurred and they represent the cost of actual operational performance. Historical costing system follows a system of accounting to which all values (in revenue and capital accounts) are based on costs actually incurred or as relevant from time to time.

(2) ***Pre-determined Cost*** : Pre-determined Costs for a product are computed in advance of production, on the basis of a specification of all the factors affecting cost and cost data. Pre-determined cost may be either standard or estimated.

(3) ***Standard Cost*** : As per I.C.M.A., "It is a predetermined cost which is calculated from management's standards of efficient operation and the relevant necessary expenditure. It may be used as a basis for price fixing and for cost control through vaiance analysis. Thus, standard cost is a predetermined cost or estimate which is compared with the actual cost in order to determine variance and carry out an analysis of variance for cost control.

(4) ***Estimated Cost*** : Estimated Costs of a product are prepared in advance prior to the performance of operations or even before the acceptance of sale orde₹ Estimated cost is found with specific reference to product in question, and activity level of the plant. It has no link with actual and hence it is assumed to be less accurate than the standard cost.

In addition to above discussed clssification of cost as explained under Cost Accounting Standard-1, **some other concepts of cost are as follows :**

(1) ***Controllable Cost*** : This is a cost which can be influenced by the action of a specified member of an undertaking. The organisation is divided into departments or responsibility centres each managed by a Head. The costs of a particular department or centre are guided by the person-in-charge of the department. The cost which can be controlled by a 'specified member' who is generally an important link in the management is the controllable cost. The Head of a cost-centre or a department has control over variable costs only which include Prime cost and other variable overheads. So the controllable costs are the variable costs.

PRICING OF MATERIALS ISSUED

To know the separate cost of each product or job, correct pricing of materials issued is essential. However, it is a difficult task. The materials issued from the store are purchased at different dates and at different prices. Generally, the purchase price and the market price also differ. At what rate the materials issued from the store should be priced, it is an important question.

The principal methods of pricing of material issues are as follows :

(A) Cost Price Methods : (1) First in, First Out Method—FIFO (2) Last in, First Out Method—LIFO (3) Highest in, First Out Method—HIFO (4) Base Stock Method (5) Specific Price Method

(B) Average Cost Price Methods : (1) Simple Average Method (2) Weighted Average Method

(C) Market Price Methods : (1) Replacement Price Method (2) Realisable Price Method

(D) Notional Price Methods : (1) Standard Price Method (2) Inflated Price Method.

(A) COST PRICE METHODS

Cost price means the price at which the material has been received in the store. In addition to purchase price of material it includes some other items also such as freight, octroi, insurance etc. Discounts in purchase price is also taken into consideration.

(1) First in First Out Method (FIFO)

Under this method, the materials first received in the store are the first to be issued, *i.e.* the order in which the materials are received in the store are issued at their cost price in the same order. Thus, the FIFO method follows the principle that materials received first are issued first. After the first lot or batch of material purchased is exhausted, the next lot is taken for supply. The inventory is priced at the latest costs.

It should be noted that the assumption of FIFO is only for accounting purpose *i.e.*, the physical flow of materials need not necessarily be in the order of the flow of costs, though normally materials would be expected to move out of stock on approximately a FIFO basis because oldest stocks are usually used up first.

Advantages : The following are the advantages of the method :

(1) *Simple and Easy* : This method is easy to understand and simple to operate.

(2) *Logical* : It is a logical method because it takes into consideration the normal practice of utilising first those materials which are received first. Thus it minimises the deterioration or obsolescence.

(3) *Valuation of Stock at Market Price* : The price of the material in hand at the end is found almost equal to the market price of such material.

(4) *Useful in case of Falling Prices* : This method is useful when prices are falling. This method is also useful when transactions are limited and prices of materials are fairly steady.

(5) *Issue at Purchase Price* : Under this method materials are issued at purchase price and thus the method recovers the cost price of the materials.

Disadvantages : The main disadvantages of the method are as follows :

(1) *Difficult in Storage* : It is very difficult to separately store the material purchased at different prices and on different dates.

(2) *Different Prices on Same Date* : The price of the material issued to different jobs on the same date may be different.

(3) *Difference in Cost and Market Price* : As the material is issued on old prices, the production cost may not be equal to the market price.

(4) *Not Suitable when Prices Rise* : If the prices are increasing in the market, then this method is not suitable.

(5) *Possibility of Clerical Error*. If raw material is purchased frequently at fluctuating prices, this method can increase the possibility of clerical error.

Suitability of FIFO Method : This method is suitable (a) when prices of materials are falling in market because under this method material purchased earlier at higher price is charged to cost of production and remaining stock may be shown at replacement cost or near to recent market price. (b) when the material is subject to obsolescence or deterioration.

Impacts of FIFO Method : (1) *Impact on Cost* : In this method, cost of production does not reflect the current market price of materials because purchase prices of earliest and subsequent lots of purchases are adopted for the costing of material issued. Many a times different prices of different lots are to be used in single issue of material. Moreover, the cost of production is understated or overstated depending upon the fluctuations in the prices of materials in the market.

(2) *Impact on Inventory Valuation* : The total value of stock is also influenced with the rise or fall in the cost of materials. However, the value of closing stock tends to reflect current market prices.

(3) *Impact on Profit* : The overall profit remains unaffected because the difference in value of issue of material is compensated by corresponding difference in the value of closing stock. However, profit of a particular product or job may be affected.

Illustration 4

From the following particulars prepare Stores Ledger Account showing issue of materials for the month of December under First in-First out method :

Receipts			Issues	
Date	*Qty. of Materials* (kg)	*Rate* (per kg) ₹	*Date*	*Qty. of Materials* (kg)
Dec. 3	200	20.00	Dec. 4	100
" 18	300	18.00	" 10	50
" 28	50	15.00	" 20	300
			" 30	100

Solution

Stores Ledger Account

(for the month of December)

Name of Material	:	M	Maximum Level	:	350 kg
Bin Card No.	:	40	Minimum Level	:	20 kg
Code No	:	126	Reorder Level	:	50 kg
Method	:	FIFO	Unit	:	kg

	Receipts				Issues					Balance			
Date	*Invoice No.*	*Qty.* (kg)	*Rate* ₹	*Amount* ₹	*Req. No.*	*Work Order No.*	*Qty.* (kg)	*Rate* ₹	*Amount* ₹	*Qty.*	*Rate* ₹	*Amount* ₹
Dec. 3		200	20	4,000	—	—	—	—	—	200	20	4,000
4		—	—	—	—	—	100	20	2,000	100	20	2,000
10		—	—	—	—	—	50	20	1,000	50	20	1,000
18		300	18	5,400	—	—	—	—	—	50 300	20 18	6,400
20	—	—	—	—	—	—	50 250	20 18	5,500	50	18	900
28		50	15	750	—	—	—	—	—	50 50	18 15	1,650
30		—	—	—	—	—	50 50	18 15	1,650	Nil	—	Nil
		550		10,150			550		10,150			

(2) Last in, First Out (LIFO) Method

In this method, the materials purchased in the last are issued first on the cost price. For pricing materials issues, the price of the last purchase is used unless it is fully exhausted. When the last lot received is exhausted, the material purchased just before it, is issued. In the mean time if a new lot is received in the Store then the immediate issue of material will be made from the recent lot received at the cost at which it is received.

Advantages : The following are the advantages of the system :

(1) *Easy Method* : As regards calculation it is an easy method.

(2) *Issue Price near to Market Price* : As the issue price remains almost equal to the market price, the cost price of the product or job can be easily known.

(3) *Issue at Purchase Price* : The issued material are valued at purchase price, hence the cost is correctly determined and there is no profit or loss.

(4) *Suitable if Prices are Increasing* : If the prices of material are increasing then as regard to FIFO method, this method shows less profit and thus results in saving of tax.

Disadvantages : The disadvantages of the method are as follows :

(1) *Valuation of Closing Stock* : The closing stock is priced at a very old price which may not show the correct position of the business.

(2) *Less Practical* : The method is not practical because in practice the material which is purchased first, is issued first.

(3) *Problem of Storing* : Much space is needed for separately storing the material purchased at different prices.

(4) *Variation in Prices* : The pricing of materials issued on the same date may vary.

Suitability of LIFO Method : This method is suitable in times of rising prices because product cost will tend to be more realistic since material cost is charged at more recent market price. Moreover, this method shows the conservative profit figure by valuation of stock at value before price rise and provides a hedge against inflation.

Impacts of LIFO Method : (1) *Impact on Cost of Production* : As the prices of the latest purchased materials are used for the pricing of issue of material, the issue price will be at a more recent current market price. Consequently, cost of production will tend to be more realistic.

(2) *Impact on Inventory Valuation* : As the closing stock is valued at earlier rates, the valuation does not reflect the current market price.

(3) *Impact on Profit* : The overall profit is not affected because the difference in issue price is compensated by the price adopted for the valuation of stock. However, profit of a particular product or a job may be affected due to different rates of materials to different products. In case of rising prices, this method results in a reduced margin of profit resulting in deduction in tax-liability.

***Illustration* 8**

With the help of the following particulars, prepare Stores Account showing issue of materials on the basis of Last in, First out :

Purchases		*Issues*	
August 3, 2021	750 kg @ ₹ 2.00	August 19, 2021	850 kg
August 18, 2021	350 kg @ ₹ 2.10	August 26, 2021	450 kg
August 25, 2021	600 kg @ ₹ 2.20	August 29, 2021	510 kg
August 28, 2021	500 kg @ ₹ 2.30	August 30, 2021	150 kg

Solution

Stores Ledger Account (LIFO)

Date	Reeceipts			Issues			Balance		
	kg.	*Rate*	*Amt.*	*kg.*	*Rate*	*Amt.*	*kg.*	*Rate*	*Amt.*
2021		₹	₹		₹	₹		₹	₹
Aug. 3	750	2.00	1,500	—	—	—	750	2.00	1,500
Aug. 18	350	2.10	735	—	—	—	750	2.00	1,500
							350	2.10	735
Aug. 19	—	—	—	350	2.10	735			
				500	2.00	1,000	250	2.00	500
Aug. 25	600	2.20	1,320	—	—	—	250	2.00	500
							600	2.20	1,320
Aug. 26				450	2.20	990	250	2.00	500
							150	2.20	330
Aug. 28	500	2.30	1,150	—	—	—	250	2.00	500
							150	2.20	330
							500	2.30	1,150
Aug. 29	—	—	—	500	2.30	1,150	250	2.00	500
				10	2.20	22	140	2.20	308
Aug. 30	—	—	—	140	2.20	308			
				10	2.00	20	240	2.00	480

Balance on 30th Aug., 2021 = 240 kg @ ₹ 2.00 = ₹ 480.

Illustration 9

Prepare a Store Ledger from the following information as per LIFO method for March, 2021 :

Receipts		*Issues*	
March 1	300 units @ ₹ 2 per unit	March 3	125 units
March 14	250 units @ ₹ 3 per unit	March 16	175 units
March 20	560 units @ ₹ 2.50 per unit	March 22	90 units

On March 24, 10 units issued on March 16 were returned by the department to the stores and on 31st March a difference of 4 units was found as per physical verification. Shortage of units is assumed to be considered as normal loss, so it is charged as overhead.

Solution

Stores Ledger Account (LIFO)

Date	Receipts			Issues			Balance		
	Qty.	*Rate*	*Amount*	*Qty.*	*Rate*	*Amount*	*Qty.*	*Rate*	*Amount*
2021	units	₹	₹	units	₹	₹	units	₹	₹
March 1	300	2	600	—	—	—	300	2	600
March 3	—	—	—	125	2	250	175	2	350
March 14	250	3	750	—	—	—	175	2	
							250	3	1,100
March 16	—	—	—	175	3	525	175	2	
							75	3	575
March 20	560	2.50	1,400	—	—	—	175	2	
							75	3	
							560	2.50	1,975
March 22	—	—	—	90	2.50	225	175	2	
							75	3	
							470	2.50	1,750
March 24	10 (Returned)	3	30	—	—	—	175	2	
							75	3	
							470	2.50	1,780
							10	3	
March 31	—	—	—	10	3	30	175	2	
				4	2.50	10	75	3	
				(shortage)			466	2.50	1,740

(3) Highest in First Out Method (HIFO)

In this method, materials purchased at the highest price are issued first irrespective of th date of purchase. After this, the material of the next highest price is issued. This method is base on the principle that the highly priced material should be consumed at the earliest. Thus, i HIFO method, the production absorbs the high cost of materials and closing stock is valued a lower rates. This method is mainly used in case of cost plus contracts or monopoly products a it is helpful in increasing the price of the contract or products.

The method is suitable in fluctuating market because cost of high priced materials i recovered first and inventory valuation is kept at lowest which amounts to create a secre reserve. However, the method has not been adopted widely.

(4) Base Stock Method

Under this method a certain minimum stock of material at a specific rate is always maintained and movement of stock takes place above this minimum base stock. The stock over the base stock can be valued by adopting any method. Thus, like FIFO, LIFO or HIFO this method is not an independent method. The base stock is always maintained and is used in case of specific need. This method is useful in those industries where raw materials are the basic material, for *e.g.* (a) in leather, oil refineries and crude oil, etc., (b) where production process is of a longer duration and maintaining minimum stock is essential.

(B) AVERAGE COST PRICE METHODS

Under this method, the material is issued at the average cost price irrespective of the date and price of purchase. The following are the forms of the method :

(1) Simple Average Method

Under this method, for determining the issue price, the quantity of material purchased is not considered. The average price is calculated by adding the prices at which materials on different dates were purchased during the period and dividing the total of these prices by the number of prices taken into consideration for calculating the average price. In other words, simple average price is calculated by dividing the total of prices of materials in the stock from which materials are issued by the number of prices entering in the calculation. The method is suitable when at every time, the material is issued in almost equal quantity and there is not much variation in the purchase price of materials.

Advantages :

(1) *Mixed form of Price* : The method is a mixed form of market price and cost price.

(2) *Tendency of Equality in Rates* : Due to calculation of average of different purchases prices, the tendency of equality in different rates is arrived at.

Disadvantages :

(1) *Unreliable Results* : In case of fluctuations in the quantity of material purchased on different dates, the results become unreliable.

(2) *Calculation Problem* : It becomes difficult to calculate the average again and again.

***Illustration* 14**

Prepare Stores Ledger account from the following details of receipts and issues of materials. The basis of valuation of issues is simple average price.

Receipts			*Issues*	
Date	*Qty. of Materials* (kg)	*Rate (per* kg) ₹	*Date*	*Qty. of Materials (kg)*
Dec. 4	200	10.00	Dec. 6	100
Dec. 18	300	12.00	Dec. 20	200
Dec. 22	100	16.00	Dec. 25	300

(2) Weighted Average Method

Under this method, for determining the issue price, the quantity of material available in the stock and the price both are considered. In brief, the weighted average price is calculated by dividing the total cost of avilable material on the date of issue, by the total quantity of available material. At this price, the material is issued. This method of pricing is suitable for those materials, the prices of which fluctuate more.

Advantages : (1) *Scientific Method* : This method is scientific and argumentative because under this method, the total cost of the material available in the bin is provided by the total quantity of material. In fact, after reaching the bin, the new and old material mix up, i.e., there remains no separate existence in the bin, of the material separately purchased on the different dates.

(2) *Simple Calculation* : As regards calculation work, this method is simple because the issue price once calculated continues till the new material is purchased.

(3) *Mixed form of Price* : This method is a mixed form of market price and cost price.

(4) *Appropriate Valuation of Closing Stock* : In this method, the balance of the closing stock is shown at appropriate price which can be used in financial accounts also.

Disadvantages : (1) *Calculation Problem* : If the material is purchased again and again at short intervals, the calculation work increases.

(2) *Problem in Cost Estimation* : As the material is issued at average price, the production cost cannot be correctly estimated.

***Illustration* 16**

From the following particulars, prepare Stores Ledger Account for the month of January 2021 showing material issue prices on the Weighted Average Price Method :

Receipts of Materials			*Issues of Materials*	
Date	*Units*	*Rate per unit* (₹)	*Date*	*Units*
January 1, 2021	500	2	January 1, 2021	400
January 10, 2021	200	3	January 15, 2021	100
January 18, 2021	400	4	January 22, 2021	200
January 27, 2021	300	5	January 31, 2021	300
January 29, 2021	Return 10 units (issued on 15th Jan.)			

2 units normal loss was revealed on Jan. 28 during stock verification.

Solution

Stores Ledger Account (Weighted Average Price Method)

Date	**Receipts**			**Issues**			**Balance**		
	Units	*Rate*	*Amt.*	*Units*	*Rate*	*Amt.*	*Units*	*Amt.*	*Rate*
2021		₹	₹		₹	₹		₹	₹
Jan. 1	500	2	1,000	400	2	800	100	200	2
Jan. 10	200	3	600	—	—	—	300	800	2.67
Jan. 15	—	—	—	100	2.67	2.67	200	533	2.67
Jan. 18	400	4	1,600	—	—	—	600	2,133	3.555
Jan. 22	—	—	—	200	3.555	711	400	1,422	3.555
Jan. 27	300	5	1,500	—	—	—	700	2,922	4.174
Jan. 28	—	—	—	2 (loss)*	—	—	698	2,922	4.186
Jan. 29	10	2.67	26.70	—	—	—	708	2,948.70	4.165
Jan. 31	—	—	—	300	4.165	1,249.50	408	1,699.20	4.165

MATERIAL/INVENTORY COST CONTROL CONCEPT AND TECHNIQUES (*INCLUDING* TREATMENT OF MATERIAL LOSSES)

INVENTORY : MEANING AND DEFINITIONS

Inventory refers to all those physical stock of goods which are held by manufacturing or business units in their store for smooth sailing of general operation of their business. From the view of inventory, material is not of fixed nature but is kept in the store so that it may either be used in manufacturing process or may be sold in routine business activities. Some important definitions of inventory are as follows :

1. "Inventory is often defined as an idle resource of any kind, having an economic value in the sense, that raw material can be converted into semi-finished goods and with additional value becomes finsihed goods." —*P. Gopalakrishnan*

2. "Inventory means a schedule of items held at a particular point of time." —*I.C.M.A.*

It is worth mentioning that in narrower meaning the term 'inventory' is used for stock of goods but in wider meaning it covers all those resources which are idle but have potential economic value. However, from the point of view of routine business activities, it is defined as a stock of goods which are kept in the store in order to ensure smooth and efficient running of business operations. It may consist of raw material, work-in-progress, components, parts, equipments, finished goods, etc.

TYPES OF MATERIALS

Materials has the following types :

1. ***Materials of Raw Material*** : It has the following two types :

(i) Direct Material

(ii) Indirect Material

(i) *Direct Material* : Direct material is an inseprable part of produced or manufactured commodity. Its existance can easily be recognised in its production process. For example, in production of a machinery iron is a direct material. Such material is a part of prime cost.

(ii) *Indirect Material* : Indirect material is such material whose existance cannot easily be recognised in the production of produced or manufactured commodities. For example, in the production of readymade garments thread and studs are indirect material. This type of material is a part of factory cost.

2. ***Materials of work-in-progress*** : The material which has not been used at present in production process but it is to be used in future, stock of such material is called materials of work-in-progress. In Such type of materials, materials expenses, labour expenses and works expenses are included.

3. ***Materials of finished Goods*** : The materials which has been completely finished in production process and has come out of such process, stock of such material is called materials of finished goods. In other words, it is stock of such type of goods which is ready for delivery.

4. ***Materials of equipments*** : In this type of materials parts of machinery, loose tools, screws and bolts etc, are included.

5. ***Materials of other Goods*** : In includes lubricating oil, cleaning cloth, fuel etc.

MEANING OF INVENTORY/MATERIAL CONTROL

Inventory control is an integral part of production control which includes both physical as well as financial control on material. Physical control lays emphasis that proper quality of material should be ensured in proper quantity at the proper time and at proper place so as to avoid the situation of shortage or surplus of material. Financial control helps in minimising the cost of material and investment in inventory. Some definitions of inventory control may be placed as under :

1. "Inventory contol may be defined as the planning, ordering and scheduling of materials used in manufacturing process." —*Westing, Fine and Zing*
2. "Inventory control is a planned method of determining what to indent, whom to indent, how much to indent and how much to stock so that purchasing and storing costs are the lowest possible without affecting production and sales." —*P. R. Gokran*
3. "Inventory control is a managerial tool which controls economic order quantity and re-order level and it also takes care of the fact that material in necessary quantity and at minimum cost should always be available in store." —*P. Gopalakrishnan*

OBJECTIVES OF INVENTORY/MATERIAL CONTROL

The main objectives of inventory/material control are as follows :

(I) Operating Objectives

1. ***Availability of Materials*** : The primary objective of inventory control is to ensure continuous availability of material so that production process may go on smoothly. In this context, proper attention is paid on planning, coordination and control of material management.

2. ***Avoidance of Wastage*** : Another important objective of inventory control is to minimise risk due to leakage, theft, embezzlements of materials and spoilage of material due to rust, dust and dirt.

3. ***Promotion of Manufacturing Efficiency*** : Availability of proper material at proper time and in proper quantity helps in improving the efficiency of manufacturing process.

4. ***Better Service to Customers*** : Maintenance of sufficient stock of finished goods helps in prompt execution of orders and it fulfils the objective of better service to customers.

5. ***Determination of different Levels*** : In inventory control various levels of inventory are determined such as minimum stock, maximum stock, re-order level, economic order quantity, etc.

6. ***Efficient System of Storage*** : It involves proper accounting records and safety of stock and provides necessary information network for physical verification of stock.

(II) Financial Objectives

1. ***Optimum Investment*** : An important financial objective is to maintain optimum investment in inventory. It means that situation of over or under-investment should be avoided because under-investment may interrupt the production process unnecessarily whereas over-investment may increase the cost of capital.

2. ***Minimum Cost of Inventory*** : Another basic financial objective of inventory control is to minimise the cost of inventory by adopting the policy of E. O. Q. and procuring detailed information from various suppliers.

3. ***Optimum Stock Turnover*** : Efforts are also made to maintain optimum ratio of stock turnover. This turnover means : $\frac{\text{Cost of goods sold}}{\text{Average stock}}$.

Functions of Material Control

Main functions of material control are as follows :

1. To keep sufficient stock of raw material which is to be supplied in production process.
2. To minimise the capital investment in purchasing of materials.
3. To check every of theft, wastage and spoliage of material.
4. To keep sufficient record of the material which has been sent to the store.
5. To keep materials in the stores in such a way that it can be taken out easily at the time of need.
6. To transfer the materials at right time.
7. To keep complete records regarding orders of materials.

Scope of Material Control

The following main activities are performed in the scope of material control :

(a) *Techniques of material control :*

(i) A. B. C. Analysis
(ii) V.E.D. Analysis
(iii) H.M.L. Analysis
(iv) F.S.N. Analysis
(v) S.D.E. Analysis
(vi) S.O.S. Analysis
(vii) Determination of stock level analysis
(viii) Economic Order quantity analysis
(ix) Analysis of material wastage or losses
(x) Other techniques of material control : 1. Just-in-time inventory system, 2. Material turnover ratio, 3. Control Ratios.

(b) Purchases of materials
(c) Storing of materials
(d) Issue of materials
(e) Verification of materials : (i) Perpetual inventory technique, (ii) Periodic inventory technique.

ADVANTAGE OR IMPORTANCE OF INVENTORY/MATERIAL CONTROL

In existing competitive business environment inventory control has become a very useful device. Its advantages may be studied under following heads :

1. ***Smooth Functioning of Production Process*** : The most important advantage of inventory control is the facility of smooth and continuous functioning of production process. Such a system is developed by fixing minimum stock, maximum stock, re-order level, etc., so that the required quality and quantity of material always remains available in the store and production work goes on smoothly.

2. ***Increase in Profit*** : Efficient inventory control helps in minimisation of material cost, optimisation of investment in material and maintenance of optimum level of stock turnover. It all increase the profits of the firm.

3. ***Minimum Spoilage of Material*** : Effective inventory control minimises the loss of material due to wastage, leakages, theft, obsolescence, etc. It, on the one hand, reduces the cost of production and on the other it facilitates the efficient use of material resources of the country.

4. ***Stability in Employment*** : Inventory control provides advantage of stability in employment. If there is lack of effective control, production process may be interrupted and need of worker's lay-off may arise. On the other hand, need of sudden recruitment may come up in order to fulfil additional orders. Inventory control balances both these extreme situations.

5. ***Effective System of Records*** : Inventory control makes accounting and records more effective which increases the effectiveness of financial control.

REQUIREMENTS OR BASIC PRINCIPLES OF MATERIAL/INVENTORY CONTROL

A good system of material control is one which may fulfil the following requirements :

1. ***Proper Cooperation and Coordination*** : There should be proper cooperation and coordination among various departments relating to material such as purchasing, receiving and inspection, storage, sales, production, accounting and financing.

2. ***Centralised Purchasing*** : One purchasing department should be authorised to make all purchases to ensure proper and expertise procedure.

3. ***Scheduling, Classification and Codification*** : There should be proper scheduling of materials along with a scientific method of classification and codification of materials.

4. ***Inspection of Materials*** : There should be proper inspection of materials when they are received by the receiving department.

5. ***Use of Standard Forms*** : Standard Forms should be used for requisition, placing the order, noting receipt of goods, authorising issue of materials and transfer of materials from one job or department to other.

6. ***Economy in Purchasing and Use*** : Budget should be prepared and proper techniques should be used to ensure economy in purchasing and use of materials.

7. ***Good Method of Issue Operation*** : A good method of issue of materials should be followed so that materials may be made available upon requisition to departments in the right quantity and at the right time.

8. ***Well-planned Storage of Materials*** : The storage of materials should be managed in such a way so that it may avoid losses from damage, deterioration, evaporation and pilferage, etc.

9. ***Internal Check*** : A system of internal check should be applied so that all transactions involving materials are properly approved and automatically checked.

10. ***Perpetual Inventory System*** : Perpetual inventory system of materials should be operated together with continuous stock checking so that it may be possible to determine at any time the quantity and value of each kind of material in stock.

11. ***Proper Determination of Stock Levels*** : Various stock levels such as minimum, maximum and re-ordering levels for each type of materials should be fixed properly so as to avoid the situation of shortage or extra-surplus of material stock.

12. ***Careful Choice of Material Issue Pricing*** : A careful choice should be made in respect of pricing of material issue because it affects the cost of production and the value of closing stock in the stores.

13. ***Proper Records and Accounting*** : A system should be developed for proper records and accounting of materials purchased, issued from stock, inventory balances, goods returned to vendors, goods spoiled, etc.

METHODS AND TECHNIQUES OF INVENTORY/MATERIAL CONTROL

The important techniques or the methods generally used to effect control over the inventory are the following :

1. Budgetary techniques for inventory planning;
2. Selective inventory control techniques;
3. Technique to decide the Economic Order Quantity (E.O.Q.), *i.e.*, how much to purchase at one time economically;
4. Techniques to determine the various limits/levels of inventory and among other to decide when to purchase;
5. Perpetual inventory system and the system of store verification;
6. Ascertainment of Slow Moving Stocks;
7. Control Ratios.

Some of the important technique have been discussed in detail :

1. BUDGETARY TECHNIQUES

For the purchase of raw materials and stocks, what we require is a Purchase Budget to be prepared in terms of quantities and values involved. The sales stipulated as per Sales Budget of the corresponding period generally works out to be the key-factor to decide the production quantum during the budget period, which ultimately decides the purchases to be made and the inventories to be planned, keeping in view (i) the stocks or stores already available with the company, (ii) the nature of the articles to be purchased—durable or perishable, (iii) the availability of the articles in the market all the year round or during a particular season only, (iv) the prices to be offered and discounts to be availed, (v) the opportunity costs involved, (vi) the capital to be made available, etc.

None the less, it is easy to determine the material quantities with their specifications, required to meet the needs of the production planned, yet the financial aspect of the purchases is more important and significant. The quantities are, of course, decided by the production engineers but while doing so, they have in their minds the quantities and the specifications of the materials required, and they do not have much of concern with the financial involvements which of course, is a matter concerning the high-ups in the management who are to look to their cash-budgets, the credit facilities available, and the estimated future production costs with the materials planned to be purchased. Sometimes, this situation calls for an intensive study of the value analysis and the opportunity costs, as the objective of the inventory control is to achieve and contain maximum efficiency in production with the optimum investment in inventory. *Charles T. Horngren,* in his book, "*Cost Accounting—a Managerial Emphasis*" says, "The major goal of inventory control is to discover and maintain the optimum level of inventory investment."

2. SELECTIVE INVENTORY CONTROL TECHNIQUES

Generally different types of inventories are kept in the store, but all inventories are not equal from the view of price or usage importance. In such a case it is not appropriate to follow the same technique of control for all types of materials, but special attention is required to control the material of high usage value or the items which are scarce. Such techniques are known as selective techniques of inventory control. Some important selective techniques are as follows :

(I) A.B.C. Analysis Technique

The full name of A.B.C. technique is 'Always Best Control'. In this technique, the items are divided into three categories as follows :

Category A : High consumption value items,

Category B : Moderate consumption value items,

Category C : Low consumption value items.

The policy of control is followed in accordance with above levels of consumption value. It means very strict control on items of category 'A', moderate control on items of category 'B' and general control on items of category 'C'. This technique is based on the general principle of management that "Take care of the Pound, the Penny will take care of itself."

Though the classification of inventory into three categories is determined on the basis of policy adopted by the firm, the general suggested pattern for this purpose is as follows :

Category	*% of Units or Quantity of Material*	*% of Total Usage Value of Material*
A	5% to 10%	70% to 75%
B	20% to 25%	15% to 20%
C	70% to 75%	5% to 10%

The following steps are taken in ABC analysis techique :

(a) First of all, list of all items of inventory is obtained along with information on their uni cost and the periodic, usually annual requirement.

(b) The annual usage value of each item is determined by multiplying unit cost wit number of units required and on the basis of respective usage values, the items ar ranked in descending order.

(c) Each item is categorised as 'A', 'B' or 'C' on the basis of usage value and as pe pre-determined policy for this purpose.

(d) Finally, the percentages of units and usage value in each category are calculated.

than the cost of carrying or storing the excess inventories. On the other hand, where the total annual purchases, as in 'C' List, cost less *i.e.*, 10% only with 50% items, there would be less placing of orders and higher safety stocks. List 'A' and 'B' items are to be ordered for purchase according to the budget planning as done by the Production Planning Department, while less emphasis is given to the purchase of List 'C' items.

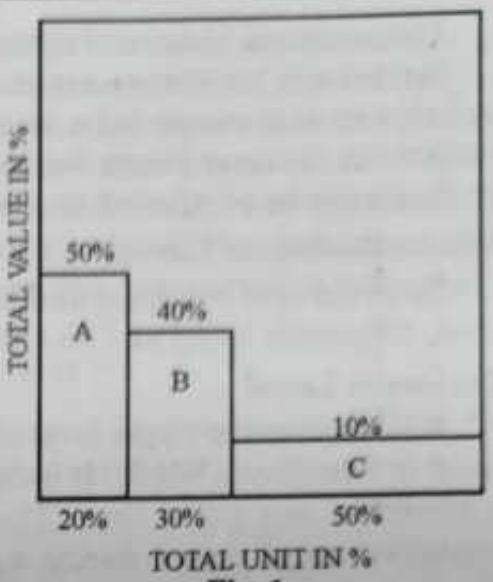


Fig. 1

(II) V.E.D. Analysis Technique

This technique is generally used in control of spare parts and components. Its full name is Vital, Essential and Desirable Analysis. In this analysis spare parts are divided into following three categories :

(a) ***Vital*** : Those parts are placed in this category which are vital, *i.e,* without which the production process would come to a standstill. Arrangement is made to maintain continuous necessary stock of such parts so that production process may go on smoothly.

(b) ***Essential*** : This category covers those parts which are essential for the efficiency of production system. It may be noted that although the system would not altogether stop for want of these parts, yet their non-availability might cause temporary losses in or dislocation of production.

(c) ***Desirable*** : It stands for such category of parts which are not vital and essential for production system and non-availability of these parts do not immediately causes a loss of production.

(III) H.M.L. Analysis Technique

This technique is similar to the ABC analysis with the difference that in ABC technique inventory is classified on the basis of total usage value, whereas in HML analysis, the items are classified on the basis of unit cost. 'H' stands for High, 'M' for Medium and 'L' for Low unit cost.

(IV) F.S.N. Analysis Technique

This analysis is based on the consumption pattern of inventory. The items are classified into three categories : F—Fast-moving, S—Slow-moving and N—Non-moving. This speed classification helps in the arrangement of stocks in the stores and in determining the distribution and handling patterns.

(V) S.D.E. Analysis Technique

This technique is used on the basis of availability of various items of inventory. In this analysis, 'S' stands for scarce items which are in short supply, 'D' stands for difficult items which are available but cannot be procured easily while 'E' represents easily available items from local market.

(VI) S-O-S Analysis Technique

This technique is used when proper strategy of material's purchased is to be determined. In this analysis, items are classified into two categories : (a) Seasonal items and (b) Off-Seasonal items.

4. DETERMINATION OF INVENTORY OR MATERIAL LIMITS AND LEVELS

When to Purchase ? The next important point after the determination of EOQ is to decide as to when the order for purchase should be placed. The answer is simple. The order for purchase should be placed when the stock is reduced by usage to the Order Point. The Order Point is one where the order should be placed for the economic order quantity. For deciding Order Point, two things, *viz.*, (1) Lead Time, and (2) Usage during Lead Time, are the determining factors. Lead Time is the supply time, or to be more specific, Lead Time is "the time interval between placing an order and having materials on the factory floor ready for production. . . . ."

—*'Cost Accounting' by Matz, Curry & Frank*

Usage means the use of materials by consumption for production.

Sometimes purchases are made in large bulk in a season if the goods are seasonal, *i.e.* available in one season only, or at a time when it is feared that the goods may not be found available in the near future due to some reason. Special items for which no limit or order-points are fixed may be purchased as and when needed.

Determination of Levels

To avoid over-stocking and under-stocking each item of the inventory has the Maximum Level, Minimum Level and an Order Point.

Maximum Level

It is a summit or upper level of keeping the material in stock and is also known as 'Maximum Limit' or 'Maximum Stock'. It indicates the maximum quantity of the inventory item which can be stored at any given time. The fixation of this level is dependent on various factors like production requirement during a given period, availability of funds, space in storeroom available, cost of carrying, nature of material whether inflammable or evaporative etc., availability of the supply in the market during a particular season or throughout the year, quantity discounts available, present prices and future prices, import facilities, economic order quantity determined for purchases, etc. Generally, Maximum Level is equal to Minimum Stock + Economic Order Quantity. Maximum stock level can be expressed in the formula given as below :

Maximum Level = Order Point – (Minimum Usage Rate × Minimum Lead Time) + EOQ or Re-order Quantity

Minimum Level

It is also known as 'Buffer Stock', 'Safety Stock', 'Minimum Limit', or 'Minimum Stock'. It indicates the minimum level of stock that should always be maintained in stock so that there is no risk of stoppage of production. It implies that the supply of the material ordered for purchase should arrive by the time the Minimum Level is reached by usage. The fixation of this level depends on Lead Time *i.e.*, if the lead time is fixed longer, less minimum stock is necessary, and *vice versa*. The usage of inventory during lead time is the other factor, *i.e.*, if the usage of inventory is more during lead time than forecasted, the minimum level would be reached sooner than anticipated. Thirdly, cost of carrying is quite important, as the minimum stock is required to be maintained in stock, all the time. The formula for calculating Minimum Level is :

Minimum Level = Order Point – (Average Usage Rate × Average Lead Time)

Balancing Inventory and Stock-outs and Computation of Safety Stocks

The minimum stock is the safety which works as a cushion against stoppage of production. If the safety stock is too large, the carrying costs would be too high, and if the safety is too small there are chances of stock-out and in that case the non-carrying costs would be too high. The optimum minimum level or the safety stock is that quantity where both the carrying costs and the non-carrying costs are the minimum balanced. The carrying costs and the non-carrying costs are the same as explained under Economic Order Quantity concept. Stock-out means 'running out of stock'. So stock-out costs are related to decrease in production, loss of sales, loss of customer-goodwill, purchases in emergency at high costs, loss of quantity discounts, payment of overtime wages, etc. These are all non-carrying costs.

Order Point

It is also known as 'Ordering Level' or 'Reorder Point' or 'Reordering Level or 'Ordering Limit'. It has been stated earlier that Order Point is a point at which order for supply of materials or goods is placed. This level is fixed between the minimum and maximum stock level. To decide the Order Point, three factors are considered, *viz.*, (1) Lead Time, (2) Usage during Lead Time and (3) Minimum Limit or the Safety Stock. If the Lead Time, and the Usage during lead time

are certain and uniform, no necessity arises for a safety stock. But this assumption is rare and large probabilities are that one or both the factors deviate. Hence, the need for safety stock arises. Much has been discussed about the safety stock under the 'Minimum Limit' above. The moment safety limit is fixed, the determination of Order Point becomes easy.

Proper care is to be exercised in fixing the lead time because if the materials or goods arrive before the expiry of the lead time, it would mean more stocks during the unexpired lead time, and so more carrying costs. The reverse situation increases the non-carrying costs and it amounts to depletion of safety stocks.

The formula for determining Order point or Re-order level is :

Re-order Level or Ordering Point = Maximum Rate of Usage × Maximum Lead Time

Danger Level

In addition to the minimum, maximum and reordering levels there is another level called *Danger level*. This level is below the minimum level and when the actual stock reaches this level necessary steps are taken to replenish stock. When the normal lead time is not available, the purchase quantity cannot be accurately fixed. So, it is fixed in such a way that the actual stock does not fall below danger level by the actual lead time. This means, that the minimum level contains a cushion to cover contingencies.

Some concerns fix danger level below the re-ordering level but above the minimum level. If action for purchase is taken as soon as the stock reaches the re-ordering level, the danger level bears no significance except that, when the stock reaches the danger level (but not yet the minimum level) a reference may be made to the purchase department to ensure that delivery is received before the actual stock reaches the minimum level.

When the danger level is fixed below the minimum, it being reached by the actual stock, the defect in the system is detected and *corrective measure* becomes necessary. When the danger level is fixed above the minimum, it being reached by the actual stock, *preventive measure* is to be taken so that the stock may not go below the minimum level.

The danger level can be determined by using the following formulae :

Danger Level = (Average Usage Rate × Emergent Lead Time)

Average Stock Level

This level is determined by adding half the quantity of E.O.Q. in minimum level. To express in way of formula it can be as follows :

$$\text{Average Stock Level} = \text{Minimum level} + \frac{1}{2}\text{(E.O.Q. or Re-order Quantity)}$$

3. ECONOMIC ORDER QUANTITY

An important objective of inventory control is to minimise the cost of inventory and for this purpose various aspects and levels of inventory are considered. One of these aspects is to determine the size of order so that total inventory cost may be minimum and if there is any offer of discount, etc. by the supplier, that should be exploited properly. In this context an important concept is *'Economic Order Quantity'* (E.O.Q.), which is also known as *'Economic Lot Size'*.

Meaning of Economic Order Quantity

The concept of 'Economic Order Quanity' was first developed by *F.N. Harris* in the year 1915. E.O.Q. is that size of purchase order which minimises total inventory cost under the assumed conditions of certainty.

Mathematically, E.O.Q. is the size of purchase order at which total ordering cost and total carrying cost are equal to each other and total of both is the minimum. In other words, the E.O.Q. approach is designed to achieve a balance between total ordering cost and total carrying cost.

In fact, E.O.Q. can also be called as an 'ideal' or 'optimal' size of orders in which it is kept in consideration that ordering and carrying cost of inventory should be minimum. In this context, whereas on the one hand the size of order is increased in order to avail the benefits of trade

discount and economy of transportation, at the same time the size is not allowed to increase unnecessarily so as to avoid undue increase in the cost of insurance, interest, storage, etc.

Factors Affecting the Size of Economic Order

Though the size of economic order is determined with the help of formulae, the following factors are considered in practice to make the order size ideal and optimal :

(1) ***Economy in Transportation Cost*** : In determination of E.O.Q. efforts are made to minimise the transportation cost per unit of material and in this context necessary adjustments are also made. For example, if the rate of freight is ₹ 100 per 50 kg or its fraction and on the basis of formula E.O.Q. comes 142 kg. It may be determined as 150 kg, because there will be no extra freight on additional quantity of 8 kg. Similarly, there may be economy in freight if full truck load is utilised.

(2) ***Benefits of Facilities offered by Supplier*** : Sometimes, the supplier may offer trade discount on order size of particular quantum or above, rebate in transportation cost (F.O.R. etc.) and concession in packing expenses. These factors are also analysed in determining E.O.Q.

(3) ***Financial Position of the Business*** : The financial position of the business also affects the size of E.O.Q. The limitations of financial resources may reduce the order size, whereas the facility of financial resources may motivate to increase the size of order. If financial resources are to be arranged from external sources than the cost of borrowing is compared with the saving of large-sized order.

(4) ***Future Availability of Materials*** : At the time of determination of order size it is also considered that what is expected about future availability of materials. If there are expectations of short-supply or increased prices in future, there will be incentive to increase the size of order. On the contrary, if there are chances of increased supply or decreased prices, the size may be curtailed.

Assumptions of Economic Order Quantity

The calculation of E.O.Q. is based on certain assumptions which are as follows :

(1) ***Consumption at Constant Rate*** : The first assumption of E.O.Q. is that the rate of material consumption is certain and constant.

(2) ***Stability in Cost*** : The second assumption is that different costs of material will remain constant during a certain period. These costs include purchase price of material, ordering cost and carrying cost.

(3) ***Certainty of lead time*** : It is assumed that lead time or procurement time, that is the time between placing an order and its delivery is known and fixed.

(4) ***Instantaneous Replenishment*** : It is also assumed that the inventory is replenished immediately as the stock level reaches exactly to minimum stock.

(5) ***Continuous Supply*** : It is also assumed in the calculation of E.O.Q. that supply of material is always available and whenever needed, the material can be procured immediately or on the basis of fixed lead time.

RELEVANT COSTS FOR INVENTORY CONTROL DECISIONS

Various decisions of inventory control such as economic order quantity, re-order level, use of quantity discount, etc. are based on certain costs relevant to material. These costs are as follows :

1. ***Purchase or Production Cost*** : If materials is purchased from outside sources, the concept of purchase price or cost of purchase is used. On the contrary, if it is produced within the organisation the term production cost is used. This cost, *i.e.*, purchase cost or production cost is also called as 'nominal cost'. This cost may remain constant per unit or may vary with size either on account of economies of large-scale production or discount on large bulk.

2. ***Ordering Cost or Set-up Cost*** : 'Ordering Cost' is also known as 'procurement cost' or 'acquisition cost'. It includes costs associated with the processing and follow-up of the purchase

order. Generally, the expenses of following activities are included in ordering cost—(i) preperation of demand letter of material from various departments, (ii) inviting quotations from various suppliers, (iii) selection of proper supplier, (vi) floatation of order, (v) follow-up of orders, (vi) inspection of goods at the time of its receipt. In short, ordering cost includes cost of paper work and postage involved in placing the order, cost of inspection and cost of accounting and making payments.

It may be noted that generally the ordering cost is of fixed nature and is not influenced by the size of order, *i.e.*, it remains constant whether the order size is 100 units or 500 units. Hence, with every increase in size of order, ordering cost per unit as well as total ordering cost goes on decreasing. For example, annual requirement is 1,000 units and cost per order is ₹ 20. If single order of 1,000 units is place, total ordering cost will be ₹ 20. If order size is 500 units, two orders will be placed in a year and total ordering cost will be $20 \times 2 = ₹ 40$. Total ordering cost can be calculated by the following formula also :

$$\text{Total Ordering Cost} = \frac{R}{q_0} \times C_0$$

Where, R = Annual requirement of material in units

q_0 = Quantity per order, C_0 = Cost per order.

On the basis of above example, the nature of ordering cost may be explained by the following table :

Annual Requirement (R)	*Order Size (q_0)*	*No. of Orders* $\left(\frac{R}{q_0}\right)$	*Cost per Order* (C_0) (₹)	*Total Ordering Cost* (₹)
1,000	100	10	20	200
1,000	200	5	20	100
1,000	250	4	20	80
1,000	500	2	20	40
1,000	1,000	1	20	20

The table may be presented in the form of following diagram also :

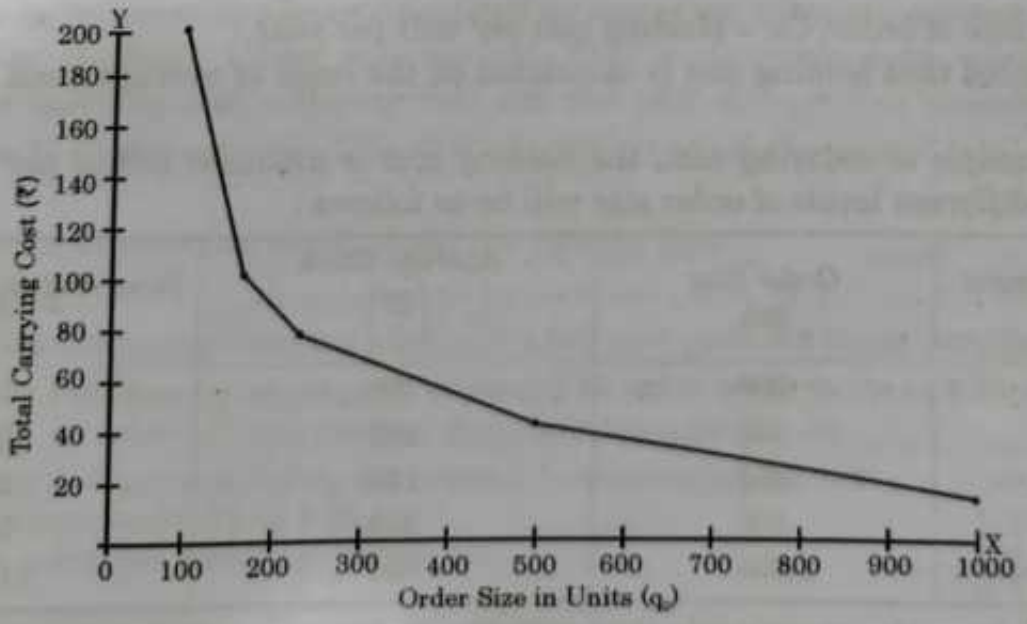


Fig. 2

The parallel term of the ordering cost when goods are produced within the organisation is he 'set-up' Cost. It refers to the cost incurred in relation to developing the production schedules nd the resources employed in making the production system ready. It is calculated especially

in job production. It includes all the cost components of changing over the production process to manufacture the ordered item. It also comprises cost of time lost in changing the production process and any clerical cost included in sending an order to production department.

3. ***Carrying Cost or Holding Cost*** : It is also known as 'Storage Cost' or 'Possession Cost'. It represents the cost that is associated with physical storage of material from the date of its receipt to the date of its use or sale. This cost is usually expressed as a rate per unit or as a percentage of inventory value for a fixed time, *viz.*, ₹ 2 per unit or 10% of inventory value. Sometimes, it may be expressed on joint basis also, *viz.*, ₹ 2 per unit + 5% of inventory value. It is denoted by the symbol of C_H in different formulae.

The main items to be included in holding cost are as follows :

(I) *Capital Cost* :
(i) Interest on capital invested in inventory,
(ii) Opportunity cost (loss of earnings on capital invested in material, which could alternatively be utilised elsewhere),

(II) *Cost of Storage & Handling* :
(i) Rent or Depreciation of building, where inventory is stored,
(ii) Clerical cost of maintaining stock records,
(iii) Expenditure on watchman or other personnel of store,
(iv) Cost of insurance of inventory and godown,
(v) Expenditure on lighting arrangement of store,
(vi) Expenditure on internal handling of material,
(vii) Expenditure on equipments being used for the protection of material.

(III) *Cost of Obsolescence and Deterioration* :
(i) Loss due to obsolescence,
(ii) Deterioration cost due to reduction in weight, change of colour, decrease in inner contents, etc.
(iii) Pilferage, etc.

Total annual holding cost is calculated as follows :

$$\text{Total Holding (Carrying) Cost} = \frac{q_0}{2} \times C_H$$

where, q_0 = size of order, C_H = Holding cost per unit per year.

It may be noted that holding cost is calculated on the basis of average stock. Hence, q_0 is divided by 2.

If in the example of ordering cost, the holding cost is assumed as ₹ 2 per unit, annual ordering cost at different levels of order size will be as follows :

Annual Requirement (R)	*Order Size (q_0)*	*Average Stock* $\left(\frac{q_0}{2}\right)$	*Total Annual Holding Cost (₹)*
1,000	100	50	100
1,000	200	100	200
1,000	250	125	250
1,000	500	250	500
1,000	1,000	500	1,000

It is evident from the above table that with the increase in order size, total holding cost goes or increasing in the same proportion. This feature can be depicted with the help of following diagram (Fig. 3) :

(4) ***Opportunity Cost*** : These costs represent those profits which may be earned by performing alternate work. In this context following costs are important :

(a) *Quantity Discount* : Quantity discount in an additional discount which is obtained by purchasing a fixed or more quantity of material. Hence, large sized-order is planned to avail of the benefit of such discount. Such planning may give benefit of quantity discount and reduction in total ordering cost but it increases total carrying cost. In such a case, that order size is determined at which total inventory cost is minimum.

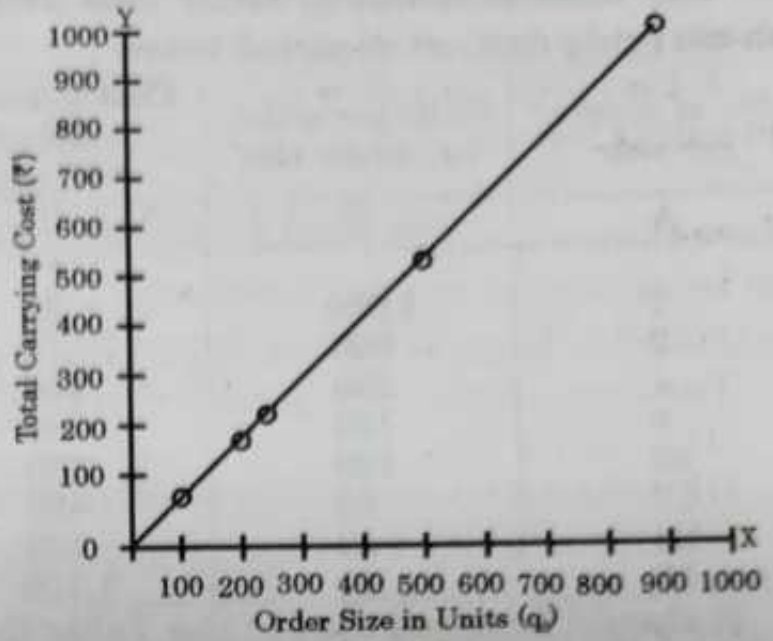


Fig. 3

(b) *Stock-out Cost* : It refers to the cost or loss due to shortage of goods. If the stock-out is internal, there is the cost of idle machine, idle time, loss of man-hours, penalty on account of delay in supply, etc. If it is external, *i.e.*, supply of finished goods, it would result in a loss of potential sales or loss of firm's goodwill.

Determination of Economic Order Quantity (E.O.Q.)

It has been said that the placing of order of that quantity would be economic where the Carrying cost is equal to or almost equal to the Non-carrying cost.

The following information or data is necessary to calculate the Economic Order Quantity :

(i) Annual Usage in units, *i.e.*, Total units to be purchased yearly.

(ii) Cost of Placing per Order, *i.e.*, Non-carrying cost per order, *e.g.*, clerical costs, stationery, postage, telephone, transport, etc.

(iii) Annual Carrying cost per unit, *i.e.*, Carrying cost percentage × Price of one unit (to be applied on the average inventory).

MACHINE HOUR RATE METHOD

Machine hour rate is one of the methods of absorbing factory overhead. This method is commonly used in those industries where machines are primarily used because in these industries overheads are mostly concerned with machines.

MEANING OF MACHINE HOUR RATE

'Machine Hour Rate' means per hour operating cost of a machine. In other words, the amount obtained by dividing the operating expenses of a machine during a specific period by the hours of use of machine during that period is called 'Machine Hour Rate'. According to *I.C.M.A.*, "The machine hour rate is an actual or predetermined rate of cost apportionment for overhead absorption, which is calculated by dividing the cost to be apportioned or absorbed by the number of hours for which a machine or machines are operated or expected to be operated". Thus :

$$\text{Machine Hour Rate} = \frac{\text{Total Factory Overheads}}{\text{Total Machine Hours}}$$

Suppose, factory overheads in a period is ₹ 10,000 and 4 similar machines are operating in the factory. The factory overheads for a machine will be ₹ 2,500. If the machine operates for 500 hours during that period, the machine hour rate will be $\left(\frac{2,500}{500}\right)$ = ₹ 5 per hour. Now suppose, a job is completed by the machine in 10 hours, the factory overhead to be absorbed by the machine will be ₹ 50 (5 × 10).

FACTORS AND PROCESS OF MACHINE HOUR RATE METHOD

This method is applicable where work is carried on mostly by the machines because the overheads in such a case are more related to the machines. The following is the procedure adopted to determine rate :

(i) The factory overheads of the factory are first apportioned to the different machines or group of machines on certain logical basis. An individual machine is treated to be a cost centre and sometimes a group of machines which work together may also be treated to be a cost centre for the purpose of apportionment.

(ii) The working hours of a machine are calculated for the period, for which the machine is to run.

(iii) If the overheads of a machine cost centre are divided by the effective machine hours, we get the machine hour rate pertaining to the machine, or the group of machines, as the case may be.

(iv) Where a job is completed by a single machine, the hours spent by the job on the machine are multiplied by the machine hour rate to determine the overheads chargeable to the job. If a job is completed or worked by two or more machines, the hours spent on each

machine are multiplied by the rate of that related machine, and the overheads so calculated for the different machines, in total, are the overheads chargeable to the job.

(v) The estimated hours forming the base for calculation should often be compared with the actual hours worked, and necessary adjustment affected.

(vi) A comprehensive or composite Machine hour rate can also be computed by including wages of the machine operator to the total overheads allocated to the machine.

BASIS OF APPORTIONMENT OF FACTORY OVERHEADS TO THE MACHINES

In this respect the following points should be considered :

(1) The expenses which are apportioned on machines, are entire factory overheads and not machine expenses itself. Machine is treated as cost centre.

(2) The factory overheads include expenses related to machines, for *e.g.*, depreciation of machine, power expenses, repair expenses, etc.

(3) Those expenses which are directly related to machines and directly allocated to the respective machine in entirety, for *e.g.*, depreciation of machine, repairs, etc.

(4) Those factory overheads which are of mixed nature and cannot be directly allocated to any specific machine, they are apportioned on suitable basis to various machines.

(5) Some overheads are such, which cannot be related to machines, such as store expenses, rent of building, repair of building, employees welfare expenses, etc. These expenses are apportioned and absorbed on some other suitable basis or are apportioned and absorbed by considering a close basis to machine hour rate.

The basis are the following :

(1) ***Rent, Rates, Taxes, etc.*** : Floor area occupied by the machines.

(2) ***Depreciation*** : Actual depreciation as per Plant Register.

(3) ***Lighting*** : Number of bulbs or wattage used for lighting by the machines.

(4) ***Heating*** : Floor area occupied by the machines or technical estimates.

(5) ***Power*** : Horse power of each machine, or technical estimate by meter reading.

(6) ***Repairs and Maintenance*** : Allocation as per actual repairs or according to hours worked by the machines.

(7) ***Supervisory Expenses*** : Number of hours devoted by the supervisors on each machine.

(8) ***Labour Welfare Expenses*** : In the ratio of number of employees engaged on machines.

(9) ***Insurance :*** In the ratio of machine value keeping into consideration the insurance period.

(10) ***Lubricating Oil, Cotton Waste and Consumable Stores*** : These expenses are allocated on the basis of machine hour worked in certain time period, otherwise on the basis of size of machines. Record of consumable stores should be maintained for each machine.

(11) ***Interest included in Hire-Purchase*** : Where machines are purchased on hire-purchase system. Their interest is also paid along with original purchase price. The original purchase price is a capital expenditure and not an overhead. But, the interest which is paid is treated as overhead if the same is not treated as capital expenditure.

(12) ***Miscellaneous Expenses*** : The indirect material costs of oil, cotton-waste, lubricants should be charged by allocation. Insurance charges be distributed according to the values of machines. Other expenses should be apportioned on some suitable basis.

Generally interest is not treated as capital expenditure. In such a situation, the interest should be charged as overhead of that machine to which it relates. Depreciation is charged on original purchase price.

There are certain overheads which have little relationship with machines, *e.g.*, Stores expenses, Wages of Works Manager, Foreman, other Indirect Workers, Planning and Research expenses, Stationery & Printing, Telephone expenses, Street lighting, etc. These overheads can be apportioned to machines on the basis of *machine-hours* which are production-hours.

PRESENTATION OR COMPUTATION OF MACHINE HOUR RATE

There is no rule or law regarding the manner in which the computation should be done and presented. There is only a convention that the overheads are bifurcated into (1) *Standing Charges*, and (2) *Machine Expenses*.

(1) Standing Charges

In the context of machine hour rate, standing charges denote such expenses which are not related to running of machine and which require to be incurred even when the machine remains idle. Some important expenses of this group are as follows :

(i) Rent of Factory Building;
(ii) Rates or Tax and Insurance of Factory Building;
(iii) Insurance Premium of Machine;
(iv) Salary of Manager, Supervisor, Foreman and Watchman;
(v) General Lighting;
(vi) Cotton waste, Cloth waste and Lubricating oil;
(vii) Consumable stores;
(viii) Sundry supplies;
(ix) *Operator's Wages* : Generally, it is treated as direct labour cost and is shown in Prime Cost. However, if an operator manages several machines, the wages should be shown as standing charge. Some authors consider the calculation after adding operator's wages as 'Comprehensive Machine Hour Rate'.
(x) *Interest* : Interest on loan taken for the purchase of machine or interest on hire purchase is a financial expenditure and generally it is ignored in computation of machine hour rate. However, some authors consider it as a standing charge. Students should give proper note in this context.

As per information or requirement of the question, the standing charges for a specific period are totalled together. The total is divided by the working hours of the machine during that period, thus obtaining hourly rate of standing charges.

(2) Machine Expenses

Machine expenses are machine running expenses and they include the following items:

(i) ***Depreciation on Machine.*** Per hour depreciation on machine is calculated as follows:

$$\text{Depreciation per Hour} = \frac{\text{Cost of Machine + Installation Charges – Scrap Value}}{\text{Total Working Life in Hours}}$$

Note : (a) If the life of the machine is given in number of years, its annual depreciation will be calculated and then divided by number of working hours of the year.
(b) If the fixed annual percentage of depreciation is given, it may be treated as a standing charge.

(ii) ***Power Expenses.*** If per hour expenses of power consumed are given in the question, that will be taken into account. If per hour power consumption is given in units, it will be multiplied by the rate of power per unit.

(iii) ***Repairs and Maintenance.*** Generally, repairs and maintenance expenses for the whole life of machine or for a specific period are given and per hour cost is obtained by dividing them by the number of hours during that period.

It may be mentioned that machine expenses are calculated generally for hourly rate individually, *i.e.*, hourly rate is calculated separately for depreciation, power and repair and maintenance. The idea behind this bifurcation is that while calculating hourly rate for absorption at different times in a week or month, the standing hourly rate may remain constant and only the machine expenses hourly rate need be worked out.

Some persons bifurcate the overheads into (1) Fixed Expenses, and (2) Variable Expenses. There is nothing wrong about it as it is a matter of convention only. But to equate Fixed Expenses to Standing Charges, and to equate Variable Expenses to Machine Expenses may at times be

misleading. For example, depreciation of machine charged on annual basis is a fixed cost, but is shown generally under Machine Expenses. Likewise, many of the Standing Charges items may occur to be variables, depending on the nature and use of expenses.

Machine Idle time and Setting time

If the working hours budgeted for a machine are 48 hours in a week, but this machine remains idle for 4 hours in that week, we should calculate the rate on 44 hours and not on 48 hours. By doing so, the cost of idle time which is an overhead, would also be absorbed by the machine hour rate.

Secondly, each machine requires a setting time before it starts production. The time spent on setting the machine should be included in calculating the effective hours of the machine. If a machine takes one hour in setting and then it works for another 19 hours for the production process, its effective hours will be 20 for the calculation of machine hour rate, so as to absorb the overhead of one hour setting time.

SPECIMEN FOR COMPUTATION OF MACHINE HOUR RATE

Computation of Machine Hour Rate

Base Period..... Working Hours.....

Particulars	*Total*	*Per Hour*
(A) *Standing Charges* :	₹	₹
1. Rent, Rates and Taxes	.....	
2. Lighting and Heating	.....	
3. Supervision Charges	.....	
4. Insurance of Factory and Machine	.....	
5. Cotton waste, Consumable Stores, Lubricants	.....	
6. Labour Welfare Expenses	.....	
7. Other Fixed Charges	.....	
Total Standing Charges		
Standing Charges per hour = $\frac{\text{Total Standing Charges}}{\text{Working Hours}}$		.....
(B) *Machine / Variable Charges* :		
1. Depreciation = $\frac{\text{Cost} - \text{Scrap Value}}{\text{Working Hours of Life}}$		.....
2. Repairs and Maintenance		.....
3. Power = Units per hour × Rate per unit		.....
4. Steam and Water		.....
Machine Hour Rate		

MERITS AND DEMERITS OF MACHINE HOUR RATE METHOD

Merits

(1) ***Scientific method in case of more use of machines*** : Where most of the work in production process is done through machines, machine hour rate is a scientific method for apportionment and absorption of factory overheads.

(2) ***Division in Fixed and Variable Expenses*** : Factory overheads are divided into standing (fixed) and machine (variable) charges in the computation of machine hour rate. Thus, M.H.R. can be obtained separately for fixed and variable expenses.

(3) ***Measurement of Efficiency of Machines*** : With the help of M.H.R., one can easily compare the operating cost and efficiency of various machines.

(4) ***Knowledge of Idle Time*** : Idle time of each machine can be brought to the knowledge of management.

(5) ***Facility in Estimation*** : It facilitates in estimation of cost of production, setting of standards and fixing selling prices.

LABOUR COST ACCOUNTING

LABOUR COST CONTROL PROCEDURE, LABOUR TURNOVER, IDLE TIME AND OVERTIME

(IN THE CONTEXT OF CAS-7)

"Labour Cost, representing the human contribution to production, is an important cost factor which requires constant control, measurement and analysis." **—Matz, Curry & Frank**

Introduction

In business having factory system, labour now requires a harmonious and congenial atmosphere, and a treatment based on healthy human relationship for success. A rational approach to the problems of labour, fair maintenance of wage records for wage ascertainment, fair wage policy and the incentives for earning more wages go a long way in providing a sense of security and stability to the workmen, in minimising the labour turnover, and in exercising effective labour cost control.

CLASSIFICATION OF LABOUR

Labour can be classified in the following manner :

1. ***Direct Labour*** : Direct labour is that which is directly charged to a production or manufacture of a particular product or unit. For example, wages paid to labour paid working on plant and machinery, wages paid to a worker directly employed in a production of a cloth, wages paid to a worker working in a furniture industry for making furniture etc. In short, wages paid to a worker who is engaged in production or manufacturing process is called direct labour or productive labour. As such direct labour is related with quantity of production so it is a variable expenses which changes according to the quantity of production.

2. ***Indirect Labour*** : Indirect labour or wages is paid to those workers who are not directly engaged in the manufacturing of product. Such wages cannot be identifies to particular job or product. It is related with technical, geeral management and control of the production unit. Indirect labour may be explained as loading and unloading charges, salary of foreman, salary of mechanic, salary of guard. Indirect Labour is not a part of Prime Cost. So it is considered as works overhead.

COMPOSITION OF LABOUR COSTS

Labour costs include all expenses incurred by the employer on workers by way of wages and other monetary payments and also the benefits given to them of non-monetary nature. Thus, costs include :

1. ***Monetary Payments***. These include (i) Basic wage or salary, (ii) Dearness Allowance, (iii) Production or Profit Bonus, (iv) Employer's Contribution to Provident Fund, (v) Employees State Insurance (E.S.I.), (vi) Gratuity, (vii) Pension, (viii) Holiday Pay, and (ix) Any other Allowance like City Allowance, Medical Allowance, Leave Travel Allowance, etc.

2. ***Non-Monetary Benefits, or Fringe Benefits***. These include (i) Recreation facilities, (ii) Medical & Health facilities, (iii) Canteen-subsidised meals, (iv) Educational facilities to children of employees, (v) Housing facilities, etc.

LABOUR TURNOVER

Labour turnover is an index denoting change (in and out) in the labour force for an organisation during a specified period. In every industrial unit, workers leave their jobs and new workers have to be appointed to replace them. The ratio of the replaced workers to the total number of workers is called Labour Turnover Ratio. If more workers leave the factory, the turnover would be high, and *vice versa*. A high turnover is a costly affair and must be avoided.

Causes of Labour Turnover

The workers leave the factory either by (i) resignation, or by (ii) discharge by the employer, or (iii) due to a cause not within one's control.

Causes for Resignation : The causes may be :

1. Low wages paid as compared to the wages paid in other factories;
2. Ill health and bad working conditions;
3. Lack of safety measures;
4. Dissatisfaction due to various causes such as (a) hours of work, (b) improper placement, (c) unfair method of promotion, (d) bad relationship with supervisor, or with fellow-workers, (e) bad training facilities, etc.
5. Marriage of women workers, in some cases.

Causes for Discharge :

1. Incompetence;
2. Insubordination, disobedience and disregard of the rules and regulations;
3. Unpunctuality or lack of attention to duty;
4. Accidents or suffering from infectious disease;
5. Immoral character.

Causes not within control :

1. Seasonal character of the industry where work is carried on during some part of the year only;
2. Death of the worker.

Effect of Labour Turnover on Cost

The Labour Turnover in excess of normal rate is high turnover and the turnover below the normal rate is low turnover. It is always better to keep the turnover low, but it should not be construed that the factories with low turnover are always more productive. There may be low turnover in a factory for the reason that the workers engaged therein are below standard and so they cannot find better place in other factories. Low turnover in the senior scales may not provide promotion opportunities to the young and promising employees and so they may like to shift to other factories for better prospects.

A high turnover has an adverse effect on the cost of production due to the following reasons :

1. Change in workers interrupts production and the production goes down.

2. New-comers take time in learning the factory procedure and the work procedure.
3. The tools and the machines cannot be handled as efficiently by the new workers as hitherto done by the old staff. There are chances of more breakdowns and greater cost of repairs of machines.
4. What is true of machines is also true of material handling and usage by the new workers.
5. The rate of accidents may increase, the rate of defectives in the finished output may increase, and there may be increased wastage of time.
6. The cost of making selections, and the cost of imparting training to the new entrants would further increase the cost and reduce the profits.

Measurement of Labour Turnover

Labour Turnover is measured by applying any one of the following three Methods :

1. ***Separation Method*** : The following formula is used for calculating labour turnover :

$$= \frac{\text{Number of employees left during a period}}{\text{Average number of employees during the period}} \times 100$$

$$\text{Average Number} = \frac{\text{No. at the beginning} + \text{No. at the end}}{2}$$

Multiplication of the formula by 100 indicates ratio of the turnover in percentage.

2. ***Replacement Method*** : The formula applied for calculating labour turnover by replacement method :

$$= \frac{\text{Number of replacements in the period}}{\text{Average number of employees during the period}} \times 100$$

In this method, only the actual replacements are counted irrespective of the number of workers left. If new workers are appointed for expansion programme, they are excluded from the number of replacements.

3. ***Flux Method*** : The method uses the following formula for calculating the labour turnover :

$$= \frac{\text{Number of Separations} + \text{Number of Replacements}}{\text{Average number of employees during the period}} \times 100$$

This method is the combination of Method 1 and Method 2.

The choice of the method among the above depends upon whether emphasis is given to the separations, or to replacements or to both. Whichever method is once used, it should be followed for comparative value. *The Institute of Cost and Management Accountants, London, however recommends the Replacement Method.*

Cost of Labour Turnover

There are two types of costs : (i) Preventive costs, and (ii) Replacement costs.

(1) The *Preventive Costs* are those which are incurred to provide such facilities and amenities to the workers that they may be tempted to continue at their job in the factory and not leave it, for example :

(i) Personnel administration : Only that portion of the cost of this department which is related to the maintenance of good relationship between labour and management.
(ii) Medical Services—Preventive as well as curative.
(iii) Welfare activities and services.
(iv) Miscellaneous schemes and benefits, *e.g.*, Provident Fund Scheme, Pension Scheme, Bonus, Incentives Schemes, etc.

(2) The *Replacement Costs* are those incurred to recruit new workers and also the costs consequent or incidental to replacement, for example :

(i) Cost of selection and appointment.
(ii) Training cost.
(iii) Loss of output due to delay in recruitment of workers.
(iv) Cost of inefficiency of new workers.
(v) Cost of breakage of tools and machinery.
(vi) Cost of increased spoilage and defectives.
(vii) Cost of frequent accidents.

The treatment of Preventive and Replacement costs is to charge them as overhead and apportion to the different departments in the ratio of the workers.

IDLE TIME

The time when the worker does no work and remains idle, is the idle time. So the idle time cost represents the wages paid for the time lost. The following are its causes :

1. ***Lack of proper planning.*** That the production work should go on smoothly, depends upon proper planning. If the workers do not have material at the right time, or the machines are not kept fit for working, the time goes waste. Sometimes, delay in the preceding process delays the operations of the succeeding process. Here also the workers have to wait due to faulty planning or bad management.

2. ***Carelessness in Supervision.*** If the foreman of a department does not take his duty seriously, the labour working under him also becomes careless and spoils time in the idle way.

3. ***Confrontation between labour and management.*** The confrontation between labour and management arising from any cause, wastes time in discussions, dialogues, strikes etc., and the wages paid, if any, for this period form the idle time cost.

4. ***Economic factors.*** Trade depression, or severe competition lowers the production, and labour remains effectively unutilized.

5. ***Other reasons.*** The electricity may fail or the machine may breakdown for some or more time. They make labour to remain idle for the time being.

The time lost between gate and place of work, break for tea, time lost between one job and the other are the normal causes leading to idle time.

Idle time may also arise due to manipulation in job booking. Some labour may be booked for personal or non-productive Jobs, *e.g.*, grass-cutting, gardening etc.

The above causes can be grouped into (i) Productive, (ii) Administrative and (iii) Economic, also

Productive. The cause may be (i) Waiting for instructions for work, tools or raw materials (ii) Machine breakdown, power failure etc., (iii) Time lost between the gate and the place of work or between one job and the other, etc.

Administrative. The causes may be (i) Lack of proper planning; (ii) Bad management (iii) Confrontation with labour; etc.

Economic. The causes are (i) Trade depression, severe competition; (ii) Seasonal production etc. The unforeseen causes may be fire, flood, storm etc.

Treatment of Idle Time Costs

Idle time does not limit itself in its effect to the wages paid for the time but has wider implications. The plant, machines, equipments, and other accessories also become idle during that period, and the fixed cost continues to be incurred. As such, idle time need be reduced as far as possible.

Idle time cost can be divided into two types: (i) *Normal* and (ii) *Abnormal.* Normal idle time can be further divided into (a) Controllable and (b) Uncontrollable.

Normal idle time is one which is incidental to production. The cost of normal and controllable idle time should be charged as an overheads expense to the production. If the responsibility for this type of idle time can be fixed upon a particular department, the cost should be charged to the overheads of that department and absorbed in the production cost of that department.

The normal but uncontrollable idle time is one arising due to time lost between the gate and place of work, between one job and the other, time lost in setting the machine, tea breaks etc. The cost of this type should be charged to the job at an inflated labour rate. For example, a job takes 10 hours to complete, the idle time of the above type is 10%, and the rate of labour payment is ₹ 2 per hour. In this case, 9 effective hours would be required to bear the cost of 1 20 @ ₹ 2.22 per hour.

The idle time which is beyond control, is an abnormal one. Idle times due to strikes lock-outs, long spell of electric failure or machine breakdown, fire, flood, storm, etc. are of abnormal nature. The cost of the abnormal idle time should be charged to the costing Profit & Loss Account and not to the production. If of the 10 hours, in the above example, 1 hour is abnormal idle time, the job or the production will be charged with ₹ 18 and the Costing P. & L. A/c with ₹ 2.

Cost of Idle Capacity and Idle Facilities

Expenses incurred on account of loss in capacity usage is known as idle capacity cost. If a plant has capacity to produce 2,000 articles, but it produces only 1,500 articles only as the demand is limited in the market, the idle capacity is 500 articles.

Idle Time is a part of idle capacity as due to idle capacity, idle time does arise.

Where Idle Capacity arises due to abnormal causes, such as, trade depression, recession etc., and the plant remains unutilized for a long time, the idle capacity is known as Idle Facility. Idle Facility means that the factory has the facilities of plant, machines etc., but these facilities

OVERTIME

The time worked over and above the normal hours is termed as Overtime. The remuneration usually paid for the overtime work is at double the normal rate.

Need of Overtime

The need for overtime works arises due to :

1. *Increase in demand* for the products where the production during the normal hours falls short to meet it;
2. *Shortage of workers* due to absence or non-availability and so it is decided to give overtime work to the existing staff;
3. *Utilization* of *perishable raw material* by working overtime;
4. *Execution of urgent orders*, or to complete the work on the same day;
5. *Shortage of equipments*, machines, or space for the completion of jobs;
6. *Lack of administrative control on workers*, on account of which the production during normal hours remains less than the standard output and overtime work has to be done by the workers.

Disadvantages of Overtime Working

1. Work efficiency is reduced. It is too much to expect of a tired worker to work as efficiently during overtime as in normal hours;
2. Worker's health is adversely affected;
3. The quality of the output is affected; and
4. The cost of production rises due to increased labour cost.

Treatment of Overtime Cost

According to the Factories Act, 1948, a worker is to be paid double the rate of his wages (including allowances) for overtime work beyond 9 hours a day or 48 hours a week. Suppose, a worker works for 60 hours in a week and his weekly rate of pay is ₹ 72 for 48 hours of the week, he would be entitled to the following wages :

Wages for normal 48 hours	₹ 72	
Normal wages for overtime 12 hours $= \frac{₹\ 72}{48} \times 12 =$ ₹ 18 (a)		Total overtime
Extra payment for overtime 12 hours as per provisions of the Factory Act $= \frac{₹\ 72}{48} \times 12 =$ ₹ 18 (b)		₹ 36
Total	₹ 108	

Treatment of the Overtime Payment

(i) Normal wages for 12 overtime hours, ₹ 18 (a) will be charged to the concerned job order (or to the standing order No. if the worker is an indirect worker), and the extra payment ₹ 18 (b) will be charged to the overhead.

(ii) If the overtime wages are incurred to execute the order at the instance of the customer, the entire amount of ₹ 36 is charged to the cost of the order and is realised from the customer.

(iii) If overtime working is a regular feature in a factory to meet the capacity shortage, the entire amount of ₹ 36 should be charged as direct wages to the products.

(iv) If overtime is due to carelessness on the part of the management, it should be treated as a part of the overhead expense.

(v) If overtime is due to abnormal conditions such as flood, earthquake, etc. its cost should be charged to Costing Profit & Loss A/c.

Procedure for Control of Overtime Work

The procedure for control of overtime work involves the following steps :

1. Total overtime work should be duly authorised after analysing the reasons for it.
2. Overtime cost should be charged against the concerned department because it helps in proper investigation and planning of production in future.

6

METHODS OF WAGE PAYMENT : TIME RATES, PIECE RATES AND INCENTIVE SCHEMES

CHARACTERISTICS OF AN IDEAL WAGE PAYMENT SYSTEM OR FACTORS TO BE CONSIDERED BEFORE ADOPTING A PARTICULAR SYSTEM OF WAGE PAYMENT

The characteristics of an ideal wage payment system may be enumerated as follows :

1. ***Fair to both the Parties***. The system of wage payment should be such as may be acceptable gladly to the employer and the employees. For this purpose, the employer should decide the system in consultation with the workers.
2. ***Easy to Calculate***. The workers should be in a position to calculate their wages correctly and feel assure that they have been correctly paid. Easy calculations will help the employer also in maintaining simple records.
3. ***Related to Efficiency***. 'Fair remuneration for fair output', should be the idea, and remuneration should be related to the individual efficiency of the workers.
4. ***Minimum Wage guaranteed***. There should be a guarantee of minimum wage to the workers to enable them to maintain their basic standard of life and to do away with uncertainty-concept.
5. ***Incentive-oriented***. The wage system should be such that the workers may feel encouraged to produce more and earn more wages.
6. ***Quality Improvement-oriented***. In the race to earn more wages with an increase in production, the chances are that the quality of the output may deteriorate. The system should, therefore, ensure 'better wages for better quality' and 'better performance'.
7. ***Definite Wage-base***. The basis or the method of wage payment should be clearly defined and announced in advance to the workers, and it should not be changed frequently to suit the interest of the employer, otherwise a sense of distrust may develop in the workers towards the scheme. A change in the system should be effected only after taking the workers into confidence.
8. ***Flexibility***. The system should not be rigid but flexible so as to allow amendments as the necessity arises.
9. ***Adherence to Laws and Agreements***. The system adopted should adhere to the state laws and should not violate agreements made with the Trade Unions.
10. ***Real Wages***. The wages paid should not be eroded by inflation or devaluation of money. For this purpose, dearness allowance and other allowances should be paid to compensate.
11. ***Ability to Pay***. The system should correlate with the ability or capacity of the organisation to pay the wages, and should keep in view the wage-rates prevalent in the locality, area or industry.

NEED FOR INCENTIVE SCHEMES

Incentive schemes induce the workers to produce more and earn more. In a country like India, where there is a constant problem to stabilize the prices and to curb inflation, increased production is the only answer and so incentive schemes need to be introduced. These schemes are useful to the workers also as they get the scope to earn more wages and improve their standard of living.

Factors for Selecting Incentive Scheme

The following factors should be considered for selecting an incentive scheme :

1. ***Productivity***. The object of the incentive scheme is to increase productivity. Therefore, this factor is very important. The increased productivity lowers the cost to the benefit of the employers.

2. ***Simplicity***. The scheme should be simple in operation and well understood by the workers. The scheme should be amenable to the setting up of standards and the comparison of the results with the actuals.

3. ***Cost Reduction***. The scheme, when introduced, is bound to increase the pay-bill of the workers, and thus increase the cost. But the simultaneous increase in production would reduce the cost per unit of production. The fixed overheads remain constant up to a certain limit of plant capacity. As such, the increased productivity reduces the cost of fixed overheads per unit.

4. ***Better Labour Psychology***. The scheme should not affect workers' health adversely, should reduce labour turnover and help to improve the standard of living of the workers.

METHODS OF REMUNERATION OR WAGE PAYMENT

The methods of remuneration or wage payment can be classified into :

(I) Time Rate System,
(II) Payment by Results—Piece Rate System,
(III) Incentive Schemes :
  (A) Premium Bonus Methods,
  (B) Combination of Time and Piece Rates,
  (C) Group System of Bonus Payment,
  (D) Other Incentive Schemes.

Broadly, the basic methods are *two* only—(1) Time Rate and (2) Piece Rate. The incentive schemes and other methods are the outcome of modified application of these two systems.

(I) TIME RATE SYSTEM

Meaning : In this system a worker is paid on the basis of time spent for the day or according to the hours of the day, regardless of the output. This system is also known as time work, day work, day wage rate or day rate. The wage rate of the day worker may be fixed on hourly, daily, weekly, fortnightly or monthly basis depending on the practice followed in the concern.

The wages are calculated as follows :

$$\text{Wages} = \text{Hours worked} \times \text{Hourly wage rate}$$

Suitability of the system. This system is suitable in the following cases :

1. Where the articles of *output are of artistic taste, e.g.*, drawings or paintings, as in such cases quality and precision are of primary importance.
2. Where the *production cannot be measured into units,* or where *standard time cannot be fixed* for the working, *e.g.*, repairs and maintenance.
3. Where the worker, however efficient he may be, cannot work at his speed due to *faulty machine or equipment,* or other allied factors.
4. Where *work has to undergo several processes* and so the work is dependent upon the preceding process for the workers of the succeeding process.

Advantages. The advantages of the time rate system are :

1. It is one of the oldest systems of wage payment and has proved the test of time due to *simplicity in making calculations* and recording wages.
2. Workers are *assured of steady income* of wages.
3. The *quality of production improves* as the workers are in no hurry to produce many more units at the risk of poor quality and negative of machines and tools.
4. It is *suitable for different grades of workers* where wages are paid according to different grades.

Disadvantages. The disadvantages of the system are :

1. As the day wages can be received regardless of the quantity produced, the workers do not feel encouraged to produce more. *Initiative is killed* for want of incentive.
2. It leads to greater wastage of time on the part of workers and *requires greater supervision of* the production work.
3. As the efficient and less efficient workers in the same grade are paid equally, the *worker's efficiency is discounted.* The inefficient does not try to improve, while the efficient worker leans towards minus virtue.
4. Workers getting wages without sufficient output to their credit, find *enough time to plan trade union activities,* strikes, etc.
5. The *productivity is decreased,* the labour cost increases, the job schedules are upset, bottlenecks in production are created, and the profits ultimately go down.

The following illustrations show the calculations of wages under Time Rate System :

CLASSIFICATION OF TIME RATE SYSTEM

The Time Rate System can further be classified into : (a) High Wage Rate, (b) Graduated Time Rate, (c) Differential Time Rate.

(a) ***High Wage Rate***. Under this system, wages are paid at a rate higher than the normal rate paid in different organisation in the industry or region. The idea behind it is to attract the most efficient available workers to the factory and increase productivity. The cost of higher wages paid under this scheme is compensated by reduced fixed overheads, less supervision cost and reduced labour cost per unit owing to increased production.

(b) ***Graduated Time Rate***. Under this method wages are paid at time rates which vary according to (i) merit-rating of the workers, or (ii) changes in the cost of living index. If the cost of living goes up, the wages also go up proportionately and *vice versa*. Thus, the workers get the real wages. Similarly, the workers having higher merit rating get higher wages and the workers with lower rating get lower wages.

(c) ***Differential Time Rate***. Workers are paid time rate according to their individual efficiencies and skills. They are paid normal rate upto the level of standard efficiency and the rate increases in steps for efficiency slabs beyond the standard. As the efficiency is measured in terms of output, this method does not fall strictly under the area of time rate system.

(II) PAYMENT BY RESULTS—PIECE RATE SYSTEM

Meaning : The payment of wages under this system is based upon the output of the worker. The rate is fixed per piece of work and the worker is paid according to the pieces of work completed or the volume of work done by him, irrespective of the time taken by him in completing that work. A workman is free to earn as much as his ability, energy or skill would allow him to produce.

Suitability of the System. This system is suitable in the following cases :

1. Where the production can be measured in standard units.
2. Where strict supervision is not possible.
3. Where quality and precision are not of primary importance.

Advantages. The advantages of the system are :

1. It provides initiative and *incentive to the workers* to produce more.
2. The *productivity increases* and cost of production per unit goes down.
3. As there is *little wastage of time* on the part of workers, the fixed overheads and resources like plant, machinery and space are well utilized.
4. *Workers* feel free to work, *compete with fellow workers,* exhibit their efficiency and earn more wages.
5. *Less supervision is required* over the workers, and happy relations are maintained with them.
6. It is easy to calculate the labour cost of products.

Disadvantages. The disadvantages are as follows :

1. In the race to earn more wages by producing more, the *quality of products is likely to deteriorate.* So it requires strict inspection and quality control.
2. Continuous and increased working for some days may cause *fatigue and ill health to the workers.*
3. To speed up production, the machines, tools and equipments are sometimes not handled with the care that they require, and so the workers expose themselves to accidents besides causing loss of *breakdown to the machines, equipments, etc.*
4. The inefficient workers earning lesser wages start feeling jealous of other workers who earn more. This creates *unhealthy atmosphere.*
5. The workers feel *insecure of earnings* during the days of ill health, holidays, etc.
6. This system is *not useful for quality products.*
7. The spoilage, defectives and *wastage of materials increases.*

The Piece Rate System can be classified into :

(i) Straight Piece Rate, (ii) Piece Rates with Graduated Time Rates and (iii) Differential Piece Rates.

(i) ***Straight Piece Rates.*** It is a simple method of making payment at a fixed rate per unit for the units manufactured.

Wages Earned = Number of units produced × Rate per unit

The rate is fixed taking into consideration (a) Time rate for the same class of workers and (b) Standard output during a given time.

(ii) ***Piece Rates with Graduated Time Rates.*** Under this system, the minimum wages equal to time wages are guaranteed. If the piece rate earnings are less than the time wage for the day, the worker gets the time wage, and if the piece rate earnings are more than the time wage, the worker gets piece rate earnings. Other methods under this heading are :

(a) Worker is paid the guaranteed wage according to time rate plus a piece rate payment for units above the minimum required and

(b) Worker is paid piece rate with dearness allowance or cost of living bonus.

(iii) ***Differential Piece Rates.*** Under this system, efficient workers are paid wages at a higher rate, and inefficient workers, at a lower rate. A definite standard of efficiency is set for each job and for efficiency below or above the standard, different piece rates are paid according to different levels of efficiency. The following two methods of wage payment are studied under this system :

(a) Taylor Differential Piece Rate Method, and (b) Merrick Differential Piece Rate Method

(a) *Taylor Differential Piece Rate Method* : F.W. Taylor, the father of Scientific Management, introduced this method on the basis of his Time, Motion and Fatigue studies. He thought to improve the efficiency of workers by suggesting two rates of payment of wages : (i) a higher rate

to the workers who produce equal to or more than the standard fixed for production during the day, and (ii) a lower rate to the workers who do not achieve the standard.

Illustration 3

The standard output fixed for the day is 8 units. The rate of payment for workers producing the standard output or more is ₹ 3 per unit and the rate for other is ₹ 2.50 per unit. Calculate the wage payment for the day if the output is (a) 10 units, (b) 8 units, (c) 7 units and (d) 6 units.

Solution

Units of Output	*Rate of Payment*	*Day Wages*	*Cost per Unit*
	₹	₹	₹
(a) 10 (Above Standard)	3.00	30.00	3.00
(b) 8 (Standard)	3.00	24.00	3.00
(c) 7 (Below Standard)	2.50	17.50	2.50
(d) 6 (Below Standard)	2.50	15.00	2.50

Taylor Differential Piece Rate Method has the following characteristics :

1. The standard is set after a careful study of Time, Motion and Fatigue.
2. There are two rates of payment, higher wage rate for those who achieve the standard, and the other lower wage rate for those who work below the standard.
3. There is no guarantee for day wages, as this scheme is worked out purely on piece-work basis.
4. The cost per unit of production remains the same for each category of workers.
5. The efficient worker is rewarded while the inefficient is punished.
6. The success of this scheme depends on setting the right standard. If the standard is slightly higher, the workers feel a great pinch and object to.

(b) *Merrick Differential Piece Rate Method.* We have noted that in the Taylor Method, the effect on the wages is quite sharp in the marginal cases. To remove this defect Merrick suggested three piece rates for a job as follows :

Percentage of Standard Output	*Payment under Merrick Method*
Upto 83%	Normal Piece rate
Above 83% and upto 100%	110% of Normal Piece rate
Above 100%	120% of Normal Piece rate

This method classified the workers into three categories, *viz.* (i) Novice, (ii) Average and (iii) Efficient. This scheme is akin to the Taylor Method and does not guarantee the minimum day wage. The advantage of this method is that it does not penalise the worker as Taylor Method does, and secondly, as and when a new worker attains 83% efficiency, he feels encouraged to improve and earn 110% rate.

(III) INCENTIVE SCHEMES

(A) Premium Bonus Methods

Under this heading, the following methods are important : (1) Halsey Premium Scheme; (2) Halsey-Weir Scheme; (3) Rowan Premium Scheme.

1. ***Halsey Premium Scheme (Constant Sharing Scheme).*** F.A. Halsey, an American Engineer, invented this plan in 1891. Under this plan, (i) Time rate is guaranteed; (ii) Standard time is fixed for the job or operation; (iii) The workers producing more than the standard, or the workers completing the work in less than the standard time fixed, get bonus in addition to the ordinary time wage; (iv) The bonus or the premium, by whatever name called, is 30 to 70 percent of the wages of time saved, the usual percentage being 50%; (v) The remaining of the bonus percentage is shared by the employer.

The formula for calculating total wages under Halsey premium scheme is :

Total Wages = Time taken × Hourly rate + % of premium (Time saved × Hourly rate)

Merits of Halsey Premium Scheme :

(1) Day wage or the *time rate is guaranteed*. Even if output is less than the standard, one gets the time wage;

(2) It makes *distinction between efficient and inefficient workers* and induces the inefficient to come up to standard;

(3) Workers get premium for the output above the standard. It provides *incentive to the workers* to produce more;

(4) As the premium is not 100% but only 50% or so, the *employers feel happy* about it as they share the remaining 50%;

(5) With increased production, *fixed overhead costs* per unit *are reduced;*

(6) The scheme is very *simple and is understood easily* by the workers.

Demerits of Halsey Premium Scheme :

(1) A significant share of the bonus goes to the employers. So the *workers oppose* it;

(2) *Quality* of output *suffers* as the workers are in haste to save time;

(3) *Incentive is not so attractive* as it is with the piece work;

(4) Where the workers start saving more than 50% of the time, they earn premium in huge amounts, which the employers do not relish.

2. ***Halsey-Weir Scheme.*** This scheme is similar to Halsey scheme except that in this scheme the workers and employers share the premium in 1 : 2 ratio. This scheme was introduced by G. and J. Weir Ltd. in Glasgow.

3. ***Rowan Premium Scheme (Variable Sharing Scheme).*** Mr. James Rowan introduced this scheme in Glasgow in 1901. It is similar to Halsey scheme but the premium concept here is different. Here the premium is in the ratio of Time saved to Standard time, calculated on the ordinary wages.

The formula for calculating wages is :

$$\text{Total Wages} = \text{Time Taken} \times \text{Hourly Rate} + \left(\frac{\text{Time Saved}}{\text{Standard Time}} \times \text{Time Taken} \times \text{Hourly Rate} \right)$$

This scheme also guarantees day wage as is done by Halsey Scheme.

Illustration 7

On the basis of information given in Illustration 5(a), calculate earnings according to Rowan Plan.

Solution

$$\text{Total Wages} = \text{Time Taken} \times \text{Hourly Rate} + \left(\frac{\text{Time Saved}}{\text{Std. Time}} \times \text{Time Taken} \times \text{Hourly Rate}\right)$$

$$\text{Total Wages} = 6 \times 2.50 + \left(\frac{2}{8} \times 6 \times 2.50\right)$$

$$= 15 + \left(\frac{3}{2} \times 2.50\right) = 15 + \frac{7.00}{2} = 15 + 3.75 = ₹\ 18.75$$

Merits of Rowan Premium Scheme. It has all the merits and advantages as the Halsey Premium Scheme possesses. (See the merits of Halsey Premium Scheme). Besides, it removes two defects of Halsey Premium Scheme, *viz.* :

(1) Where the workers save more than 50% of time, they do not earn premium in huge amounts, as is done in Halsey Scheme.

(2) Quality of output does not suffer to the extent it does in Halsey Scheme, as the Premium incentive is not too much.

Demerits of Rowan Premium Scheme : It has following demerits :

(1) The employers share the bonus earned by workers. So the workers feel the pinch.

(2) Incentive is not so attractive as it is with the piece work rate, or with Halsey Scheme on saving more than 50% time.

Comparison of Halsey and Rowan Methods of Wage payment

If Halsey and Rowan methods of wage payment are compared, there are following similarities : (1) In both methods standard work and standard time are determined,

(2) Both methods ensure the payment of minimum wages.

(3) Time is the base of premium in both methods.

The main difference between these two method is the calculation of premium, which can be explained with the help of following example.

Suppose standard time is 8 hours and the rate of wage is ₹ 2 per hour. Calculate wages of A, B, C and D under Halsey and Rowan methods, who have completed the work within 7, 6, 4 and 3 hours respectively. Rate of premium under Halsey method is 50%.

Worker	*Hours*		*Premium (₹)*		*Total Wages of Standard Time (₹*	
	Time Taken	*Time Saved*	*Halsey*	*Rowan*	*Halsey*	*Rowan*
A	7	1	1	1.75	14 + 1 = 15	14 + 1.75 = 15.75
B	6	2	2	3	12 + 2 = 14	12 + 3 = 15
C	4	4	4	4	8 + 4 = 12	8 + 4 = 12
D	3	5	5	3.75	6 + 5 = 11	6 + 3.75 = 9.75

It is clear from the analysis of above table that (1) During initial stage of time saving comparative more premium is pond under Rowan method (2) If the rate of premium is 50%, for 50% saving in time equal premium is given under both methods (3) With the increase in saving of time premium goes on increasing under Halsey method.

Moreover (1) The formula for the calculation of premium in Halsey method is simple whereas it is comparatively complicated in Rowan method. (2) In Halsey method rate of premium is fixed, whereas in Rowan system premium is calculated on the basis of ratio of time sowed to standard time.

(B) Combination of Time and Piece-Rates

Under this group, the following methods are chosen for study :

(i) Gantt Task Bonus Scheme;

(ii) Emerson Efficiency Bonus Scheme or Empiric Scheme;

(iii) Points Scheme, *viz.*, (a) Bedaux, and (b) Haynes;

(iv) Accelerated Premium Schemes.

(i) ***Gantt Task Bonus Scheme.*** It is a method combining time rate, bonus scheme and piece rate. The day wage under this system is guaranteed. A standard or high task is set for production. The workers working below the standard get time rate only, and the workers attaining the standard get wages inclusive of a bonus of 20% of time rate, which if converted into cost per unit, is known as the piece rate. This piece rate once thus fixed for the standard, works as the uniform piece rate for the units produced over and above the standard. In short :

Output	*Payment*
(a) Output below standard	Guaranteed Time Rate
(b) Output at standard	Time Rate plus Bonus of 20% (usually) of Time Rate
(c) Output over standard	High Piece Rate on worker's output (*i.e.*, Bonus of 20% of Time Rate)

***Illustration* 15**

Standard Time : 8 Hours; Standard output: 8 units; Rate of Payment ₹ 3 per hour. Bonus: 20% of wages. Units actually produced are 6, 7, 8 and 10. Work out the total wages and cost per unit by Gantt method.

Solution

Units of Output	*Time Hours*	*Rate per hour*	*Day Wages*	*Bonus 20%*	*Total Wages*	*Cost per Unit*
		₹	₹	₹	₹	₹
6	8	3.00	24.00	—	24,00	4.00
7	8	3.00	24.00	—	24.00	3.42
8	8	3.00	24.00	4.80	28.80	3.60
10	8	3.00	24.00	12.00*	36.00	3.60

* Standard output (8 units) per unit cost ₹ 3.60

So, 10 units cost = 10 × 3.60 ₹ 36.00

Daily wages ₹ 24.00

10 units bonus ₹ 12.00

It is clear from the above that labour cost per unit is reduced as the efficiency approaches the standard. The rate at the standard is the piece rate which remains uniform for higher level of efficiency.

(ii) ***Emerson Efficiency Bonus Scheme or Empiric Scheme***. This method was developed by Mr. Harrington Emerson. In this method, the standard of efficiency is set at $66\frac{2}{3}\%$ or 2/3 of fixed standard. The workers who show higher efficiency, get the bonus at the rate percent given in the premium table. The rate percentage of bonus or the premium increases with the increase in efficiency, so that at 100% efficiency, the premium is 20% of time rate.

Under Emerson method, the wages at different levels of efficiency is calculated as follows :

(a) If a worker does work up to 2/3 of standard, he is paid wages according to time, *i.e.*,

Earnings : Actual Time (AT) × Rate per hour (R)

(b) If a worker does work more than 2/3 but up to 100% of standard, he is paid premium at different rates at different levels of efficiency as per rate percent given in the premium table, *i.e.*,

$$\text{Earnings} = (\text{AT} \times \text{R}) + (\%\ \text{Bonus} \times \text{AT} \times \text{R})$$

(c) If a worker does work at 100% efficiency, the premium is paid at the rate of 20%, *i.e.*,

$$\text{Earnings} = (\text{AT} \times \text{R}) + (20\% \times \text{AT} \times \text{R})$$

(d) For efficiency above 100% one gets a bonus of 20% above basic wage plus 1% for each 1% increase in efficiency. Thus, at 125% efficiency, the bonus would be 45% (*i.e.*, 20% + 25%).

crosses the standard mark. These schemes are difficult and complicated to work and are not very popular.

(C) Group System of Bonus Payment

Group System of bonus payment is adopted where :

(a) output of individuals cannot be measured but the output of workers working in a batch or group is collectively measured;

(b) the nature of the work requires a collective effort; and

(c) it is desired to introduce a team spirit in the workers.

The system has the following *advantages* :

(i) The supervisors and the operatives join their hands together as a team, and work together smoothly and without conflict with anyone.

(ii) The excessive waste of time and materials is eliminated.

(iii) The production increases due to team spirit and cost of production is reduced.

The *disadvantages* are :

(i) The share of bonus to individuals is small and the efficient as well as inefficient workers share equally.

(ii) There is little incentive to the lazy and lethargic workers to improve their performance. The efficient workers are not awarded according to their merits. So the efficient ones also become dull after some time.

The following are the main group schemes, for study under this heading :

(i) Priestman's Output Bonus Scheme,

(ii) Cost Bonus Scheme.

(i) ***Priestman's Output Bonus Scheme***. Under this system, bonus is paid not only to the workers but to the staff of the factory as a whole, on collective basis. Where the actual production exceeds the budgeted production of a specified period, bonus is paid to all the employees at a rate percent by which the production has increased. If the production has gone up by 8%, the employees will get their normal pay plus a bonus at 8% of their pay.

Where there is mixed production, *i.e.*, various types of products are manufactured, the standard of production is fixed on points basis.

$$\text{Bonus Percentage} = \frac{\text{Increased Total Output}}{\text{Standard Output}}$$

Generally, the standard output is decided for a week where weekly bonus is declared, otherwise the period is decided in consultation with labour.

(ii) ***Cost Bonus Scheme***. Under this scheme, if the actual cost is less than the standard cost of production, bonus is allowed to the employees of the factory to the extent of savings effected in the cost of production. Thus, the payment of the bonus is dependent not only on the labour output but also on the economy effected in material and overheads. The incentive in this system is remote as the cost of production is not directly related with the efforts of the workers.

Certain American cost saving plans which may be applied to the direct as well as indirect labour are discussed below :

(a) *Nunn-Bush Scheme*. A percentage on the sale value is fixed for the direct labour cost. The amount calculated at this percentage is credited to a find. The actual labour cost is debited to this fund and the balance remaining to the credit of this fund is distributed as bonus to all the workers and the employees.

(b) *Scanlon Scheme*. Here also a fund is credited of the normal cost of wages and salaries, and the fund is debited with the actual labour costs. The relationship between wages and sales value is maintained as in the above Nunn-Bush scheme, but here only two-thirds to three-fourths of the remaining credit balance is paid as the bonus and the balance kept as reserve for future contingencies.

(c) *Rucker Scheme*. Here the bonus is in constant proportion to the 'added value' of manufacture, and is not related to the total value of sales. The term 'added value' means the enhanced market value of the product by effecting change in its form, shape, or location etc. If the utility of a product is improved by manufacture, the increased market value thereof is the added value. While deciding the value added by manufacture, the value of material is not taken into account. But it is not conversion cost also, as the market value includes profit.

Under this scheme, the ratio between wages and 'added value' is determined, and if the ratio of the wages is reduced because of increase in added value, bonus payment is made to bring the reduced wage ratio in level with the earlier ratio.

This scheme is highly complicated and not popular.

(d) *Towne Gain Scheme*. According to this scheme, if the labour cost stands reduced in comparison to the standard set for labour cost, 50% of the saving so effected is distributed as bonus *pro-rata* with the wages earned. This scheme induces the reduction in cost of labour, as the supervisory staff also shares the bonus.

(D) Other Incentive Schemes

Other incentive schemes may be divided into :

(i) Indirect Monetary Schemes, *e.g.*, (a) Profit Sharing and (b) Co-partnership;

(ii) Non-monetary Incentives.

(i) *Indirect Monetary Schemes* : (a) *Profit Sharing Scheme*. Under this scheme, the workers are paid in addition to their ordinary wages, a share in the profit of the undertaking, as agreed to, regarding rate or percentage earlier.

(b) *Co-partnership Scheme*. In co-partnership scheme, the employees are permitted to share in the capital of the business, by purchase of company's shares, either out of the loan advanced to them by the company or out of bonus earned by them. The employee's shares carry the right to receive dividend on them. The voting rights are restricted in some cases, while some companies permit all the rights and privileges which ordinarily a share carries. The scheme is also known as 'Co-ownership Scheme' as the employees become the owners by being the shareholders.

(ii) *Non-monetary Incentives*. These incentives are provided by the undertaking to make the conditions of service more attractive, and to promote better health and atmosphere in the workers. Such incentives may be free or subsidised. The examples are :

1. Recreational facilities;
2. Medical and health facilities;
3. Canteen-subsidised meals;
4. Providnt Fund, Pension, Gratuity, E.S.I. benefits;
5. Educational facilities to the children of the employees;
6. Housing facilities, etc.

ACCOUNTING FOR OVERHEADS : COLLECTION AND CLASSIFICATION

MEANING OF OVERHEAD EXPENSES

"Overheads comprise of indrect materials, indirect employee cost and indirect expenses which are not directly identifiable or allocable to a cost object in an economically feasible way."

—Cost Accounting Standard-3

Thus, overheads are those indirect cost which cannot be directly related to any specific product, job or process, because they cannot be directly attached or marked to any specific activity or cost centre.

The Total Cost is broadly divided into (1) Prime Cost, which comprises Direct material, Direct labour and Direct expenses; and (2) Overhead, comprising Indirect material, Indirect labour and Indirect expenses. Thus, the expenses incurred over and above the head of Prime Cost are known as Overhead expenses.

Different terms are in use for overheads, such as :

Oncost	Non-productive costs
Burden	Overhead costs
Loading	Overhead expenses or charges

I.C.M.A. London does not recommend the use of 'On-cost' or 'Burden'. The general term in use is the 'Overhead' which may be used as a noun or an adjective.

Overheads are the indirect costs which cannot be directly allocated to any specific job, activity or process as they are not capable of being specifically indentified to any particular activity.

OVERHEAD ACCOUNTING

A major portion of total cost belongs to overheads. In order to control cost, it is utmost necessary to account and control overheads. In cost accounting for recording of overheads and exercising control over it, the overheads and matter related to overheads have been classified into two parts :

(i) Classification, Codification & Collection of overheads.
(ii) Allocation, Apportionment and Absorption of overheads.

CLASSIFICATION OF OVERHEADS

The Overheads can be classified according to : (i) Elements; (ii) Functions; (iii) Behaviour, and (iv) Controllability.

I. Element-wise Classification

According to elements overhead is divided into following three parts :

(1) ***Indirect Materials Cost*** is the cost of those materials which are used in the manufacturing process, which cannot be traced into the finished product and hence, the cost of which cannot be allocated but which can be apportioned to, or absorbed by, cost centres or cost units. Consumable stores, lubricating oil, loose tools, cotton waste, etc., are the examples.

(2) ***Indirect Labour Cost*** is the cost of wages and salaries which cannot be allocated but which can be apportioned to, or absorbed by, cost centres or cost units.* Salary of foremen, supervisors, works manager, store-keepers, etc., wages of maintenance dept., idle time cost, holiday pay, workmen's compensation, employer's contribution to Provident Fund, overtime wages, etc., are the examples.

(3) ***Indirect Expenses*** are the expenses which cannot be allocated but which can be apportioned to, or absorbed by, cost centres or cost units. Factory rent, lighting, heating, depreciation, insurance, other factory expenses, all administration, selling and distribution expenses fall under this group.

The aggregate of indirect material, indirect labour and indirect expenses is termed as indirect cost and it is a cost which cannot be charged directly to a cost centre, or a job, or product but which can only be distributed to cost centres on some reasonable basis. The indirect cost is a common cost attributable to more than one job or product, and so it requires apportionment.

II. Function-wise Classification

Overhead is divided according to functions into following categories :

(1) ***Works or Factory Overhead***. It is also known as Production overhead or Manufacturing overhead. The production overhead is the indirect cost which includes indirect material, indirect labour and indirect factory expenses. It includes all overheads incurred from the stage of procurement of materials till the completion of the manufacture and the primary packing of the product, but excludes all administration, selling and distribution expenses. A list of Representative items of this group is given below :

1. Rent, municipal taxes, depreciation, insurance, etc. of the factory land and buildings;
2. Depreciation, insurance, etc. of the factory plant, machines and equipments;
3. Factory lighting, heating and air-conditioning;
4. Fuel and power;
5. Consumable stores, small tools, etc.;
6. Indirect materials, such as cotton waste, lubricating oil, brushes, etc.;
7. Repairs of factory buildings, plant, machines and equipments;
8. Store-keeping expenses;
9. Cost of idle time, overtime, holiday pay, etc.;
10. Salary of foremen, time-keepers, works manager, etc.;
11. Repairs and maintenance of Power house;
12. Salaries of staff involved in Production Planning, Technical supervision and Factory administration;
13. Quality control expenses;
14. Haulage;
15. Drawing office expenses;
16. Expenses of service departments such as tool rooms, engineering and maintenance, pollution control, etc.
17. Other expenses, *e.g.*, Workers' training and welfare, Inspection, Research and Development, Factory Telephone and Stationery, etc.

(2) ***Office and Administration Overhead***. All expenses pertaining to office administration, business management and business administration are included under this head, *i.e.*, the cost ncurred in formulation and implementation of policy so as to achieve the objectives of the rganisation. The administrative overhead costs may include the following :

1. Account office expenses, Audit fees;
2. Office salaries;
3. Postage, Stationery, Telephone, E-mail & Fax;

* See Chapter 2 for detailed study.

4. Legal expenses;
5. General administration expenses;
6. Depreciation, Insurance, Rent, etc. of the office buildings, office equipments, and office furniture;
7. Bank charges;
8. Office air-conditioning and electricity expenses. etc.

(3) ***Selling Overhead***. The expenses pertaining to creation and stimulation of demand of the product and services and to obtain orders are termed as selling overheads. It includes :

1. Advertisement, general market research and analysis;
2. Sales-incentives
3. Quotations, Price lists;
4. Salaries and Commission of salesmen, selling agents;
5. Travelling expenses of salesmen;
6. Sales office expenses—postage, telephones, stationery, salary of sales manager and sales office staff;
7. Window-dressing expenses, etc.
8. Warranty claims;
9. Expenses of after-sales services.

(4) ***Distribution Overhead***. The expenses pertaining to delivery of goods to the customers fall under this group, *e.g.*,

1. Packing material and expenses;
2. Carriage outward and transport expenses;
3. Maintenance, Repairs, Depreciation of Delivery vans;
4. Warehouse expenses—Rent or Depreciation, Repairs of the warehouse, Salary of warehouse staff, Insurance of warehouse goods, etc.
5. Wastage of finished goods.

III. Classification According to Behaviour

The overheads can be classified according to behaviour or variability into (1) Fixed, (2) Variable, and (3) Semi-variable (also known as Semi-fixed). Some expenses vary in proportion to the volume of output, some do not change but remain fixed, and the third category of expenses or overheads is one which remains partly fixed and partly variable.

(1) ***Fixed Overheads***. Fixed overhead is one which tends to be unaffected by variation in volume of output. The fixed overheads are related to the periods, and so the fixed costs are also known as Period Costs, *e.g.*, the rent of the building, or the salaries of the office staff. The examples of fixed overheads are :

(i) *Relating to Factory* :

1. Rent and taxes of the factory land and building;
2. Insurance charges of plant, machine, building, etc.;
3. Depreciation of building, machine etc., where depreciation is based on effluxion of time;
4. Salaries of foreman, Works manager and others paid on time basis;
5. Interest on capital (if considered as an item of cost).

(ii) *Relating to Office and Administration* :

1. Manager's salary, and the salary of the office staff;
2. Rent or depreciation, and Insurance of the office building;
3. Other expenses incurred periodically, *e.g.*, watchman's salary, monthly repairing charges of type machine, fixed charges of telephone, depreciation of office furniture, etc.

(iii) *Relating to Selling and Distribution* :

1. Salaries of permanent staff;
2. Rent or depreciation of the sales office, or the warehouse;

3. Depreciation of departmental furniture, delivery vans;
4. Fixed expenses of Guest House, etc.

A characteristic of the fixed overhead is that the rate of output per unit reduces as the production increases and *vice versa*. Suppose, the fixed overhead cost is ₹ 2,000. If 100 units are produced, the cost per unit will be ₹ 20, and if the production increases to 200 units, the cost per unit will go down to ₹ 10 per unit. The per unit cost changes but the total cost remains the same.

Secondly, the fixed overhead is not always absolutely fixed. If a plant or the department is closed for some time, several items of fixed overhead disappear. For example, permanent staff may be transferred to other departments, or the building used by the department earlier may now be utilized for some other purpose and so on.

(2) ***Variable Overheads***. The variable overhead is one which tends to vary directly with volume of output. The variable cost increases in direct proportion with the increase in production, and decreases in the same proportion with the decrease in production. It is known as Direct cost. The examples of variable overhead are :

Indirect Material; Indirect Labour; Fuel and Power; Lighting; Heating; Overtime; Small tools; Store expenses; Postage; Stationery; etc.

In the sphere of sales and distribution, the variables vary with volume of sales or distribution. The examples are :

Salesman's commission; Discounts to customers; Bad debts; Branch expenses; Postage; Stationery; Travelling salesman's expenses; Packing charges; Carriage outward; Variable expenses on delivery vans; etc.

The total amount of variable overhead expenditure changes in direct proportion to the volume, but the cost per unit remains constant, or the same.

(3) ***Semi-variable Overhead***. It is an overhead which is partly fixed and partly variable. It means that a part of the expense does not change while the other part of the same expense changes with change in the volume of output. Generally, no costs are truly fixed or truly variable.

Semi-variable overheads are also known as Semi-fixed overheads. There is hardly any differnce between these two terms. However, if the fixed part of the item of expense is more than the variable, it may be called Semi-fixed. Similarly, where variable part is greater than the fixed part, it may be named Semi-variable. Here we would use the term 'Semi-variable' only.

IV. Classification According to Controllability

The overheads can be classified on the basis of controllability into (a) Controllable and (b) Uncontrollable.

The controllable cost is one which can be controlled by the action of a specified member of the department or organisation. The variable costs fall under this category. The uncontrollable cost is one which cannot be influenced by the action of a specified member of the undertaking. Generally, the fixed costs belong to this category.

Extra-Ordinary Expenses or Losses. If any indirect expense which is of abnormal nature or extra-ordinary, then such expenses should not be included in production overheads but should be transferred to costing profit & loss account. If it is included in the production overhead, then normal cost of production cannot be determined and thus, comparison in future cannot be made possible. Following the few examples of extra-ordinary expenses : loss by flood, loss by removal of plant, loss by fire, breakage of machines etc.

V. Normalcy-wise Classification

On the basis of normalcy overheads are divided into two parts. These parts are as follows :

(i) ***Normal Overheads*** : These are the overheads which are done at a given level of output to achieve such level of output normaly. These overheads are included in the production cost.

(ii) ***Abnormal Overheads*** : These overheads are such overheads whcih are not incurrred in attaining given output level normaly. For example : loss due to fire, strike and lockouts, theft, shutdown of power supply, breakdown of machinery etc. Such overheads should not be included in production cost but should be charged to costing profit and loss account.

CODIFICATION OF OVERHEADS

After collection of overheads, these are classified under different appropriate headings. Therefore, overheads of similar nature are place under the same one group. This grouping is done by the method of codification. The codification is the method of grouping different overheads by assigning number or symbol to them. The main object of codification is to bring simplicity, equality and purity in the collection and classification of the overheads. The codification is done with the use of standing order numbers and cost accounting numbers. Standing order numbers are those numbers which are provided to items of the overhead of production while cost accounting numbers are such numbers which are provided to the items of office and administration, and distribution overheads. Codification of overheads may be done under following methods :

(i) Alphabetical Method
(ii) Numerical Method
(iii) Alphabetical and Numerical Method.

COLLECTION OF OVERHEADS

"Collection of overheads means the pooling of indirect items of expenses from books of accounts and supportive/corroborative records in logical groups having regards to their nature and purpose." —*CAS-3*

The sources from which the overheads are collected are the following :

(i) ***Purchase Journal and Invoices.*** The Purchase Journal gives information about the indirect material and stores purchased. Invoices for materials are entered in the material control accounts and the invoices for expenses are entered in the overhead control accounts.

(ii) ***Store Requisition Forms***. Store requisition prepared for the issue of indirect materials like cotton waste, lubricants, brushes, soap, brooms, etc., are helpful in ascertaining the overheads to be charged to the department to which issued.

(iii) ***Wages Analysis Book***. This book gives information regarding Indirect wages, overtime bonus, etc., to be treated as overhead.

(iv) ***Cash Book***. All expenses incurred in cash find their place in Cash Book. So such overheads are paid in cash and not entered elsewhere in the above books, can be collected from this book.

(v) ***Journal***. This book gives information about the accrued charges and the payments made in advance, besides depreciation, interest, notional rent and adjustments.

(vi) ***Different Registers and Reports***. Information about depreciation can be had from the Plant and Machinery Register. Reports regarding scrap, waste, spoiled material, idle time, idle machines and idle facilities help to collect the overheads.

OVERHEADS : ALLOCATION, APPORTIONMENT (DEPARTMENTA-LISATION) AND ABSORPTION (IN THE CONTEXT OF CAS-3)

"It is in the distribution and apportionment of Overhead Expenses that the most difficult problems in cost are met."
—J.R. Batliboi

PROBLEMS IN DISTRIBUTION OF OVERHEADS

The distribution of overheads to cost units and cost centre is one of the most difficult problems in the smooth operation of a cost accounting mechanism. The prime cost or direct cost consisting the cost of direct material, direct labour and direct expenses are allocated directly to cost units or cost centres as they are easily identified. But in respect to overheads, *i.e.*, the expenses over and above prime cost, create problem in associating it to cost centre or cost units as these costs cannot be identified directly to cost units and cost centres. Hence, in order to determine the cost of job or activity or department, these costs need to be distributed to various cost units or cost centres on some suitable basis. Thus, necessary steps or plans are taken for distribution of overheads to cost units or cost centres.

DISTRIBUTION SCHEME OF PRODUCTION OVERHEADS

1. Classification and Collection of overheads.
2. Allocation and Apportionment of overheads to production and service departments.
3. Re-apportionment of service department cost to production department.
4. Absorption of overheads of each production department in cost units.

The process of collection and classification of overheads have been dealt in detail in previous chapter. The next step related to allocation, apportionment, re-apportionment and absorption is being discussed here in detail.

Definitions

I.C.M.A. has given the following definitions of allocation, apportionment and absorption :

1. ***Cost Allocation*** : "The allotment of whole items of cost to cost centres or cost units."

2. ***Cost Apportionment*** : "The allotment of proportions of items of cost to cost centres or cost units."

3. ***Overhead Absorption*** : "It is the process of absorbing all overhead costs allocated or apportioned over particular cost centre or production department by the units produced."

Distinction between Allocation, Apportionment and Absorption of Overheads

Allocation of cost involves the process of charging total expenditure or whole items of cost to cost centres or cost units, whereas the apportionment of overheads involves the process of charging overheads to cost centres or cost units in the specified proportions. Absorption of overheads takes place only after the allocation and apportionment of overhead expenses. In simple terms, the overhead costs are either allocated or apportioned over different cost centres or cost units and thereafter, they are absorbed on some suitable basis by the output of the same cost centres.

DEPARTMENTALISATION OF OVERHEADS—ALLOCATION AND APPORTIONMENT OF OVERHEADS

Various manufacturing process functions differ from each other and are performed by different departments within the factory premises. In those organisations, where such divisions for various functions are established, they may be related to actual production of goods while others may be providing services thereto.

For smooth and efficient functioning of activities, the factory may be divided into divisions and sub-divisions referred to as departments. Thus, the allocation and apportionment of overheads to production and service departments is known as departmentalisation of overheads. The division of factory into sub-division is done in such a manner, that each department represents a division of activity of the organisation. The departments in a factory can be broadly categorised into production or manufacturing departments and service departments.

A production department or manufacturing department is one which carries on operations and process of production of articles or commodities manually or by machines. A service department is not directly related or engaged in production but it renders special type of service to benefit all other departments.

1. ***Allocation of Overhead.*** "Allocation of overheads is assigning a whole item of cost directly to a cost centre"[1], *i.e.*, to the job, process or to the product etc. The nature of the expense is such that it can easily be identified and allocated to the cost centre or to the cost unit of production. For example, salary paid to the foreman of a production department can be identified and allotted to it. Similarly, salary of the sales manager is allocated to the sales department. Other examples are cost of small tools, idle time cost, overtime cost, depreciation of machinery, etc. the full cost of which may be identified and allocated to the related cost centre.

2. ***Apportionment of Overhead***. "Apportionment of overheads is distribution of overheads to more than one cost centre on some equitable basis."[1] Where the expense is common and related to various cost centres or units then it is to be allotted to different cost centres on an appropriate basis. This process is known as 'apportionment'. For example, rent of the factory is an expense which cannot be allocated to any one department, but is to be shared by all the production departments and service departments on suitable basis, *e.g.*, floor area basis.

Primary and Secondary Distribution of Overheads

In case of multi-product environment, there are common service cost centres which are providing services to the various production cost centres and other service cost centres. The cost of services are required to be apportioned to the relevant cost centres. First step to be followed is to apportion the overheads to different cost centres and then second step is to apportion the cost of service cost centres to production cost centres on an equitable basis. The first step is termed as primary distribution and the second step is termed as secondary distribution of overheads.

BASIS OF APPORTIONMENT OF FACTORY OVERHEADS OR PRIMARY DISTRIBUTION OF FACTORY OVERHEADS

The following are the basis of apportionment of factory overheads :

1. ***Percentage or Proportion Relative to Departmental Values of Buildings and Plants.*** Overheads related to buildings and plants are apportioned in the ratio of their values, *e.g.*, rent, depreciation, insurance, interest on capital (if included in cost).

2. ***Floor Area of Departmental Buildings***. The overheads are apportioned on the basis of floor area occupied by each department or cost centre. This is a better method than the one above where the values of the buildings are not uniform, to cover expenses like lighting, heating, rent, etc.

1 Cost Accounting Standard-3 (CAS-3)

3. ***Departmental Production Hours.*** The overheads are apportioned on the basis of production hours worked in each department. These hours may be direct labour hours or the machine hours. This is a simple method and is used when no other appropriate method is available. The expenses of factory management, administration, supervision, research and experimentation, etc., are apportioned on this basis. Where most of the work is carried on by the machines, machine hours are taken into consideration.

4. ***Number of Employees in each Department.*** Expenses like canteen expenses, labour welfare expenses, wages of time-keepers, common room expenses, dispensary expenses, etc., are apportioned on the basis of number of employees in each department.

5. ***Technical Estimate.*** This basis is applied to apportion the following expenses :

(i) *Electricity expenses.* This expense can be apportioned on the basis of number of bulbs, or watts of electricity, used in each department. If the departments have their separate meters, the expenses of electricity can be apportioned in the ratio of meter readings.

(ii) *Air, Gas and Water expenses.* These expenses can also be apportioned on technical estimates in the ratio of meter readings.

Given below is a schedule showing Basis of Apportionment of overheads, along with alternative suggestions in the Remarks column, to facilitate better understanding :

	Overheads	*Basis of Apportionment*	*Remarks (Alternatives)*
1.	Consumable Stores	Direct Analysis (Allocation) *i.e.*, actuals	
2.	Material Handling charges	Weight of materials	
3.	Stores Services, Store-keeping expenses	Value of stores issued	
4.	Rent and Rates	Floor Space	Capital values of buildings
5.	Electric Light	Technical Estimate	No. of light points, floor space, hours used.
6.	Electric Power	Technical Estimate, H.P. kWh	
7.	Fire Insurance on plants	Value of Plants	Or according to risk involved
8.	Plant Repairs	Allocation, *i.e.*, actuals	Or value of Plants
9.	Depreciation	Capital values	
10.	Canteen expenses, time-keeping, welfare, compensation to workers, Employees State insurance contribution	Number of workers	Or Wages of each department
11.	Creche expenses	Number of Female workers	
12.	Transport Service expenses	Ton km	Or No. of packages, Truck hours, Crane hours
13.	Internal transport	Weight of material consumed	Or No. of packages, value of material consumed or transported to depts.
14.	Delivery costs	Weight, volume	
15.	Miscellaneous expenses	Direct Wages	
16.	Inspection expenses	Hours spent for inspection	

RE-APPORTIONMENT OF SERVICE DEPARTMENTS OVERHEAD
OR
SECONDARY DISTRIBUTION OF FACTORY OVERHEADS

The second step is to re-apportion the Service Departments Cost to the Production Departments, on the basis of service received. For example, the overheads of the Stores Dept. may be apportioned on the basis of number of store requisitions or store values of stores issued.

The process of redistribution of the overhead cost of service department among the production department is known as secondary distribution.

Principles of Re-Apportionment or Secondary Distribution

The principles upon which the apportionment is based are the following :

1. ***Service or Utility Principle***. It is based on the concept that the share of overheads borne by a cost centre should be in proportion to the service received by it, or the utility derived by it.

2. ***Survey Principle***. This principle is adopted when it is difficult to select a more suitable method of apportionment. The service or the utility received by the different departments may possibly be different from one period to the other. So a survey is made of the various factors influencing the apportionment. A Works Manager devotes his time to different production centres. So a survey may be made to find out the time given by him to each department so that his salary may be apportioned to different centres on the basis of time given.

3. ***Ability to Pay Principle***. This is based on the principle 'what the traffic may bear'. The departments which contribute greater profits share more of the overheads, and the departments which are weak or are new, share less of them. The products of a new department may still have to find out a market, and if the products are to bear full overheads, the cost will increase and the products may not compete well.

4. ***Efficiency or Incentive Principle***. Under this principle, production budget is set and the overheads are also budgeted to achieve the production target. If the production is more than the

budgeted one, the rate of overhead per unit of production will be less than the budgeted rate. It speaks of better efficiency. So the apportionment is made on the basis of standards set for each cost centre.

There are two methods used to apportion the Service Departments costs to the Production Departments, *viz.*,

(i) Apportionment only to the Production Departments, and

(ii) Apportionment to the Service as well as Production Departments.

(i) ***Apportionment only to Production Departments.*** In this case the total amount of overhead of service cost centre of each service department is distributed to the production departments, on an appropriate basis and ignores the services rendered by one service centre to other service centre. Generally, following are the basis of which a close or nearer basis has to be adopted for each departmental overhead :

Direct Labour Hours; Direct Wages; Machine Hours; Number of Requisitions for store service; Number of Employees; Horse Power or Wattage-for Power; Weight of material-for internal transport; Capital values; etc.

This method of apportionment of Service Cost Centre overhead is also termed as Re-distribution method.

(ii) ***Apportionment to the Service as well as Production Departments***. This basis is argued on the ground that it is not only the production departments which receive the benefit of a service department, but other service departments also receive the benefit from each other among them.

There are two methods dealing with this view :

(A) Descending departmental apportionment or Non-reciprocal basis, and

(B) Inter-departmental apportionment or Reciprocal basis.

(A) *Descending departmental apportionment.*

In this method, the service cost centres are ranked in order of the magnitude of overhead to be reapportioned or on the basis of the number of service cost centre to whom services have been rendered by the particular service cost centre.

The overhead of the service cost centre ranked first is reapportioned to all other cost centre including service centre. The overhead of the service cost centre ranked second would then be apportioned to all the cost centres except the service cost centre ranked first. In this manner the cost of other service centre are apportioned. This method is also termed as Step Method or Non-reciprocal basis of secondary distribution.

(B) *Inter-departmental apportionment.*

This method is more recognized as it gives due weightage to inter-service transfers. This method is also termed as reciprocal service method.

There are three methods to work out inter-departmental apportionment :

(1) *Simultaneous Equation Method*

The Simultanceous Equation Method is to be adopted to take care of secondary distribution of cost of service cost centres to production cost centres with the help of mathematical formulation and solution steps to be followed are :

(i) Proportion of service benefits received by different cost centres from a cost centre are assessed on the basis of records.

(ii) The same ratios are used as coefficients in the equations framed for apportionment of cost of service cost centres to production cost centres.

(iii) Solution of the equations gives the cost of service cost centres.

(iv) Cost of service cost centres to be distributed to production cost centres.

(2) *Repeated Distribution Method* : Steps to be followed under this method are :

(i) The proportion at which the costs of a service cost centres are to be distributed to production cost centres and other service cost centres are determined.

(ii) Costs of first service cost centre are to be apportioned to production cost centres and service cost centres in the proportion as determined in step (i).

(iii) Similarly, the cost of other service cost centres are to be apportioned.

(iv) This process as stated in (ii) and (iii) are to be continued till the figures remaining undistributed in the service cost centres are negligibly small. The negligible small amount left with service centre may be distributed to production cost centres. This method is also known as '*Step Ladder*' method.

Illustration 4

ABSORPTION OF OVERHEADS

The final step in the Distribution Plan of production overheads is to recover or absorb the overheads in the cost of products, individual jobs, processes, batches, or other convenient units. The overheads falling to the share of a department through the process of allocation or apportionment, is to be absorbed by the cost units of that department. What we require ultimately is to determine the cost of production, and so the overheads are ultimately to be merged by absorption into the cost units. This is known as 'Absorption of Overheads'.

DETERMINATION OF OVERHEAD RATES

The total overheads divided by the quantity or the value of the base selected determine the overhead rate. The following are the overhead rates :

1. Actual Rate; 2. Predetermined Rate, and 3. Standard Rate.

1. Actual Rate

Actual rate is ascertained by dividing the actual overhead by the actual quantity produced or value of the base. Base means Direct materials, Direct wages, Direct labour hours, Machine hours, Production units, or any other convenient method used to determine the rate. So

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

or

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

Actual Rate method is not much helpful as the actual rate can be ascertained only after the accounting period is over when the actual figures would be available. This results in delay in finding out the costs of current production. Secondly, actual rate is liable to wide fluctuations from period to period for the following reasons :

(a) Some items of overheads are not uniformly spread over all the accounting period, e.g., repairs, overtime premiums, leave pay, etc.

(b) Some expenses are such which are incurred only periodically, *e.g.*, insurance premiums, taxes, etc.

(c) The production activity is affected by the seasonal and cyclic factors. So the actual overheads may vary from month to month.

2. Predetermined Rate

Predetermined overhead rate refers to the rate determined before the commencement of the period during which the same would be used. The rate is calculated with reference to the amount of overhead decided in the budget and a predetermined volume of production in terms of the base which will be used in denominator in calculating overhead absorption rate :

$$\frac{\text{Estimated factory overhead for the budgeted period}}{\text{Estimated direct material Cost of normal production}} \times 100$$

This rate should be determined taking into consideration the changed conditions, if any, as ascertained in the budget.

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

This rate is of practical use in costing.

3. Standard Rate

In Standard costing, the standard rate is used in place of predetermined rate, and is calculated as follows :

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

Blanket and Multiple Rates. These two terms are also used in relation to the overheads rates.

Blanket (Single) Rate. It is a single rate computed for the entire factory, and is calculated by dividing the total overheads of the entire factory by the total quantity or the value of the base of entire factory.

Multiple Rates. These are separate rates, one each for specific production dept., service dept., cost centre, product line, etc. These rates are common in use, and are also known as Departmental Rates.

The Blanket rate is misleading where products pass through one or more different processes or departments, as shown below :

Department	*Machine Hours*	*Overheads* ₹	*Departmental Rate*	*Blanket Rate*
A	5,000	1,000	20%	
B	12,000	1,200	10%	
C	3,000	7,800	260%	
	20,000	10,000		50%

If a product Y is manufactured in A dept., and takes 200 machine hours, its overheads @ 20% should be ₹ 40 only whereas the blanket rate will be ₹ 100, at 50%. It is, therefore, erroneous.

UNIT OR OUTPUT COSTING-I
(COST SHEET, COST STATEMENT AND PRODUCTION ACCOUNT)

"Single or Output Cost System is used in business where a standard products is turned out and it is desired to find out the cost of a basic unit of Production." —**J. R. Batliboi**

Unit or Output costing is used in those industries or organisations where standard products are produced from a common process and all the units produced are more or less similar to each other. This method is also known as single costing method.

DEFINITIONS OF UNIT OR OUTPUT COSTING

Herold J. Wheldon—"Production cost accounting or unit cost accounting is such a method of cost ascertainment which is based on production unit. It is applicable where the production work is done continuously and the units are of same types or manufactured identical."

Walter W. Bigg—"Unit costing method is a method of costing applied to ascertain the cost per unit or production where standard and identical products are manufactured."

From the analysis of the above definitions it is clear that generally this method is used in those industries, where following characteristics are found :

(i) Production should be uniform or homogeneous and a continuous affair;
(ii) The units of production should be identical;
(iii) The cost units should be physical and natural;
(iv) Per unit cost has to be determined, for example per, ton, per metre, per kg, etc.

Generally, these characteristics are found in following industries—Coal mines, Sugar mills, Cloth mills, Flour mills, Cement factory, Brick kilns, etc.

OBJECTIVES OF UNIT OR OUTPUT COSTING

The following are the main objectives for its application :

(i) To know the total cost of production and per unit cost within specific period.
(ii) To classify cost under related categories such as Prime Cost, Works Cost, Cost of Production, etc. and having its detailed analysis in order to determine per unit cost.
(iii) To determine the effect of each element of cost on total cost so as to have control over cost.
(iv) To compare the cost during two or more periods and to make efforts for cost control on the basis of comparative analysis.
(v) To determine proposed setting price to earn desired profit.
(vi) To determine tender price on the basis of Cost data and future prospects.

In this method there is no need of apportionment of cost because all the expenses are made on a similar type of production. But where production is done for various grades or for various size, their expenses have to be apportioned on the basis of size or grades in detail.

ELEMENTS OF COST UNDER UNIT OR OUTPUT COSTING

In Output Costing, in order to determine total cost and per unit cost, collection of various elements of cost is done as follows :

Materials : The quantity and value of material consumed is determined by preparing a Material Abstract. The materials which are issued from stock are valued on an appropriate basis.

Labour : As required, Wages Analysis Sheet are prepared so that direct and indirect labour cost can be determined. Where production is not done on various jobs, there is no need of maintaining job cards. But where job has been distributed among various departments or sub-jobs and a particular worker has to work in various departments or jobs, their job card is required, so that with the help of these job cards the remuneration of the workers may be apportioned to various departments or jobs.

Direct Expenses : In addition to material and labour, there are certain other expenses incurred which are termed as direct expenses. These expenses are directly related to production, hence they are charged to respective production unit by preparing a summary-sheet.

Overheads : The overheads are debited to production for the period for which the cost is being determined. These overheads expenses are taken from the financial records. There are certain expenses which cannot be determined before the end of the accounting period. For these expenses, an estimate is made in beginning of the year and are apportioned on appropriate basis. These estimates are based on the past year expenses and if required, considering the current expenses. These estimates are reviewed from time to time. These overheads are the total of indirect material, indirect labour and indirect expense. In output costing, for in depth analysis of overheads, these are classified as Factory Overheads, Office or Administrative Overheads and Selling and Distribution Overheads. As per need, these overheads can also be classified on the basis of nature as fixed overhead, variable overhead and semi-variable overhead.

METHODS OF DETERMINING UNIT COST

In those industries where production is carried out on mass scale and on a continuous basis and standard products are manufactured, the total cost and per unit cost can be determined by the use of following methods :

(1) Cost Sheet, (2) Statement of Cost,
(3) Production Account.

COST SHEET

Meaning of Cost Sheet

Cost Sheet is a statement which is used to determine the total cost of goods produced or units in a specific period and in which total cost, per unit cost and the cost incurred at various stages from manufacturing a products to the stage of making it saleable are shown. In this way, it can be said that cost sheet is a statement in which the cost of production is presented in an analytical way. This statement as per convenience, can be prepared on weekly, monthly or quarterly intervals.

Definitions of Cost Sheet

ICMA, London—"Cost Sheet is a document which provides for the assembly of the detailed cost of a cost centre or cost unit."

Wheldon—"Cost Sheets are prepared for the use of management and consequently they must include all the essential details which may assist the manager in judging the efficiency of production."

W. W. Bigg—"The expenditure which has been incurred upon production for a period is extracted from the financial books and the store records set out in a memorandum statement. If this statement is confined to the disclosure of the cost of units produced during the period, it is termed as Cost Sheet."

On going through the above definitions, the Cost Sheet presents the following facts :

(i) Total quantity of production.
(ii) Total cost of total quantity produced.
(iii) Per unit cost of total quantity produced.
(iv) Various components of cost at various stages of production *viz.*, Prime cost, Factory cost, Cost of production, Cost of goods sold, etc.
(v) Direct and Indirect cost of production.
(vi) The proportion of each individual cost to total cost expressed in percentage.
(vii) Comparative cost of two periods and its analysis, etc.

Characteristics and Objects of Cost Sheet

(1) The cost sheets are prepared under Unit Costing method of costing because its object is to determine per unit cost.
(2) The cost sheet is a periodic document which may be prepared weekly, fortnightly, monthly or quarterly.
(3) The object of preparing a cost sheet is to ascertain the total cost and the burden of each individual cost on the cost per unit of production for the period.

Advantages of Cost Sheet

A cost sheet is advantageous in the following ways :

(1) ***Determination of Selling Price*** : Cost sheet helps in fixing the selling price of the product.

(2) ***Control on Expenses*** : Cost sheet helps the management to compare the costs of any two periods, and ascertain the inefficiencies and control the expenses.

(3) ***Help in Minimising the Expenses*** : Cost sheet helps in minimising the expenses during the period of trade depression and competition.

(4) ***Comparative Study of Cost*** : Where different factories producing similar products are run by the same management at different places, a comparative study of the costs of the different factories is possible through the cost sheets prepared by them.

(5) ***Benefit to Common Man*** : It helps in cost-control, cost-reduction and better management, the benefit of which goes to the common people as they can get good products at reasonable price.

DIFFERENCE BETWEEN COST ACCOUNT AND COST SHEET

The points of difference are :

(1) ***Double Entry System*** : Cost account is based on double entry principle and has Dr. and Cr. sides while it is not so with cost sheet.

(2) ***Use*** : Cost accounts are used to prepare Production A/cs, Process A/cs, Contract or Job A/cs, Ledger A/cs, etc. These accounts show the costs but only after the end of the year or period when they are closed. But cost sheets are prepared during the currency of production weekly, monthly, etc. Secondly, the cost sheets render cost information related to that period only for which they are prepared.

(3) ***Comparative Study*** : Cost sheets are helpful to know comparative costs, to exercise cost control and costs reduction effectively and to fix up selling prices and quote for articles; but the accounts are not such a guide.

(4) ***Per unit Cost*** : Cost sheets ascertain cost per unit, but the cost accounts do not show cost per unit in a detailed or analytical way as the cost sheets do.

(5) ***Reconciliation*** : The cost accounts are useful in reconciling the profits of financial books with cost books, while the cost sheets are not.

(6) ***Basis*** : Cost accounts are prepared on the basis of cost sheet, whereas cost sheet is not prepared on the basis of cost accounts.

(7) ***Guidance to Managers*** : Cost Sheet works as a yardstick for cost control & guidance to managers but cost accounts are not so helpful.

TYPES OF COST SHEET

The various types or forms of cost sheet are as follows :

(1) Simple Cost Sheet,
(2) Cost Sheet with Profit,
(3) Cost Sheet with Statement of Profit,
(4) Comparative Cost Sheet.

(1) Simple Cost Sheet

In simple cost sheet, the expenses on each item of cost are classified and shown under various headings and along with total cost of product, per unit cost of each item of expense is also determined. This cost sheet shows only the total cost of product and cost per unit but does not show the profit.

SPECIMEN OF SIMPLE COST SHEET

Cost Sheet (*for March .....*)

(Output : .....) (Unit : .....)

Particulars	*Total Cost*	*Cost per Unit*
	₹	₹
Direct Material	—	—
Direct Wages	—	—
Direct or Chargeable Expenses	—	—
(a) *Prime Cost*	—	—
Works Overhead or Factory Overhead*		
(By any method of allocation, say a percentage of direct labour)	—	—
(b) *Works Cost*	—	—
Office Overhead* (By any percentage on works cost)	—	—
(c) *Cost of Production*	—	—
Selling and Distribution Expenses*	—	—
(d) *Total Cost*	—	—

* The items of expenses included in it have been discussed later on in this chapter.

A specimen of cost sheet has also been given in **Cost Accounting Standard-1** (CAS-1), which is as follows :

Particulars	₹	₹
1. Direct Material Cost (a)		
2. Direct Labour Cost		
3. Direct Expenses		
4. Prime Cost (1 + 2 + 3)		
5. Production Overhead		
6. Administrative Overhead		
7. Research and Development Cost		
8. Cost of Production (b) (4 + 5 + 6 + 7)		
9. Selling Cost		
10. Distribution Cost		
11. Cost of Sales (8 + 9 + 10)		

Note : To arrive at value at different points as indicated above, adjustments with opening and closing stock is necessary at following different points :

(a) Opening and Closing Stock of Raw Materials.
(b) Opening and Closing Stock of Work-in-progress and Finished goods.

(2) Cost Sheet with Profit

This Cost Sheet is prepared in accordance to the above cost sheet and along with the total cost of production and per unit cost, it also shows the total profit earned. This profit is the difference between sales value and total cost.

SPECIMEN OF COST SHEET WITH PROFIT

Cost Sheet (*for March .....*)

(Output : .....) (Unit : .....)

Particulars			*Total Cost*	*Cost per Unit*
			₹	₹
Opening Stock of Direct Raw Material		—		
Add : Purchases during the year		—		
Add : Incidental Expenses regarding purchases (Carriage, Freight, Octroi, Custom duty, etc.)		—		
		—		
Less : Closing Stock of Direct Raw Material	—			
Less : Defective Materials Returned	—			
Less : Residue used in other products	—	—		
Cost of Direct Raw Material Consumed			—	—
Direct Wages/Labour Charges or Productive Wages			—	—
Direct Expenses/Chargeable Expenses			—	—
		Prime Cost	—	—
Add : Factory Overheads/Works Overheads/ Factory Oncost or Works Oncost :				
Indirect Wages/Unproductive Labour			—	—
Fuel	By any method of allocation may be Prime Cost or Direct Wages		—	—
Power			—	—
Coal			—	—
Light & Water			—	—
Factory Insurance			—	—
Rent of Factory			—	—
Dep. on Factory Building/Machine			—	—
Repairs on Factory Building/Machine, etc.			—	—
			—	—
Add : Opening Stock of Work-in-Progress			—	—
			—	—
Less : Closing Stock of Work-in-Progress			—	—
			—	—
Add : Additional Overburden on Rectification			—	—
			—	—
Less : Sale of Scrap/Defective, etc.		*Factory / Works Cost*	—	—
Add : Office and Administrative Overheads/Office and Administration Oncost :				
Legal Expenses	Appropriated by any % on works cost		—	—
Office Expenses			—	—
Office Salaries			—	—
Office Lighting			—	—
Adm. Expenses			—	—
Printing & Stationery			—	—
Fees of Directors			—	—
Telephone & Telegrams			—	—
Managing Director's Salary (Office)			—	—
Dep. on Office Building/Furniture, etc.			—	—
Repairs to Office Buidling/Furniture, etc.			—	—
		Office Cost or Cost of Production	—	—

Add : Opening Stock of Finished Goods		—	—
Less : Closing Stock of Finished Goods		—	—
	Cost of Goods Sold	—	—
Add : Selling & Distribution Overheads :			
Advertisement		—	
Discount		—	—
Travelling Expenses		—	—
Salesman Commission		—	—
Dep. on Delivery Vans		—	—
Packing & Distribution Charges		—	—
Bad Debts		—	—
Upkeep of Delivery Vans		—	—
Warehouse Rent, etc.		—	—
	Cost of Sales	—	—
Profit (Certain % on Total Cost or Sales)		—	—
	Selling Price	—	—

(3) Cost Sheet with Statement of Profit

This method of preparing the Cost Sheet is considered as more proper and reliable. In this cost sheet, only the cost of production is shown and for the purpose of profit determination a separate Statement of Profit & Loss is prepared. The cost of production is the aggregate of prime cost, factory overheads and office and administration overheads and for profit determination, in Statement of Profit, selling and distribution overheads are added to cost of production to arrive at total cost. The total cost is then deducted from sales to determine profit or loss.

SPECIMEN OF COST SHEET WITH STATEMENT OF PROFIT

Cost Sheet (*for*.....)

(Output : .....)

Particulars	*Total Cost*	*Cost per Unit*
	₹	₹
Raw Material Consumed	—	—
Direct Labour/Wages	—	—
Direct Expenses	—	—
Prime Cost	—	—
Factory/Works Overheads :		
Factory Expenses	—	—
Light	—	—
Rent of Factory	—	—
Unproductive Wages, etc.	—	—
Factory/Works Cost	—	—
Office & Administrative Overheads :		
Office Salaries	—	—
Office Rent	—	—
Dep. on Office Building & Equipment	—	—
General Expenses, etc.	—	—
Cost of Production	—	—

Statement of Profit

Particulars	Total Cost	Cost per Unit
	₹	₹
Cost of Production for.....units @ ₹....per unit	—	—
Selling & Distribution Overheads :		
Selling Expenses	—	—
Bad Debts	—	—
Discount	—	—
Advertisement, etc.	—	—
Cost of Sales	—	—
Profit	—	—
Sales / Selling Price	—	—

(4) Comparative Cost Sheet

Comparative Cost Sheet can be prepared for two purposes. First, when a study has to be made for the comparison of cost of two periods then comparative cost sheet is prepared. In this type of comparative sheet, a comparison of each item of expenses during the relevant two periods can be made and it can be determined that on which item the cost per unit has increased, decreased or has remained stable. Thus, the reasons for the above changes can be examined and analysed which can help in controlling of cost.

Secondly, when a manufacturer produces similar type of two products and wants to determine the difference in cost of each item of expense and further wants to take a decision as to manufacturing of which product can be more profitable, the information in this regard can be easily made available from comparative cost sheet.

SPECIMEN OF COMPARATIVE COST SHEET

Comparative Cost Sheet

Period / Product		Particulars	*Period / Product*	
Total	*Cost per kg*		*Cost per kg*	*Total*
₹	₹		₹	₹
—	—	Raw Materials (Direct)	—	—
—	—	Direct Wages	—	—
—	—	*(a) Prime Cost*	—	—
		Works Expenses :		
—	—	Fuel	—	—
—	—	Electric Power	—	—
—	—	Repairs	—	—
—	—	Depreciation	—	—
—	—	Rent, etc.	—	—
—	—	*(b) Works Cost* :	—	—
		Office Expenses :		
—	—	Office Salaries	—	—
—	—	Office Lighting, etc.	—	—
—	—	*(c) Total Cost*	—	—
—	—	Profit (% on C.P. or S.P.)	—	—
—	—	*(d) Selling Price*	—	—

STATEMENT OF COST

Where a statement is prepared to show total cost and the profit or loss, but where it is not desired to find out cost per item of expense, the statement so prepared is the Statement of Cost. If from this statement the cost per unit has to be determined then it can be had by dividing the total cost by the number of units produced. In cost sheet, per unit cost of each item of expense is calculated whereas in statement of cost it is not done.

In some statements, percentage of each component costs is to be reckoned on the total cost, *e.g.*, percentage of prime cost and its components on the total cost, percentage of Factory overhead or Factory cost on total cost, etc. Similarly percentage of Gross Profit or Net Profit on turnover is worked out for the purpose of cost control through cost comparison.

DIFFERENCE BETWEEN COST SHEET AND STATEMENT OF COST

Though various items of cost are arranged in the same sequence in cost sheet as well as in statement of cost and various elements of cost are also similar in both these documents. However, there are some technical differences as given below :

(1) In cost sheet, per unit cost of each item of expense is calculated whereas it is not shown in statement of cost.

(2) Cost sheet can be prepared only when quantity of output is given in the question. If quantity is not given in the question, then statement of cost is prepared.

(3) Cost sheet is more useful than Statement of Cost in case of comparison of cost of two products or two periods.

UNIT OR OUTPUT COSTING-II
(CALCULATION OF ESTIMATES, TENDER AND QUOTATION PRICE)

One of the main advantages of cost accounting is that it helps in estimating the cost of any job or order or service in advance. Generally, a manufacturer on several occasions, has to supply in advance the tender price of a job or order to a prospect customer. This tender price is quoted considering the cost of the work to be done in future and by adding a certain margin of profit to the cost. In order to determine the total estimated cost, a manufacturer considers his past experience and past cost and also in addition, pays significant attention and consideration to the possible changes in past cost (increase or decrease) in future. In order to achieve this objective, each element of cost of production should be analysed individually and all indirect expenses should be classified into fixed, variable and semi-variable expenses for the purpose of detail analysis. Procuring the order for any tender depends upon the estimated cost which has been quoted. Hence, tender price, estimated price or quotation price should be determined carefully so as to be competitive. In brief, the above three prices can be understood as follows :

(1) ***Tender Price*** : A formal statement of price, at which the goods are agreed to be supplied or work order is to be executed, which is sent in reply to an invitation is called tender. Generally, it is given in a sealed envelope and implies a competitive price as being stated. This term is generally used in governmental transactions.

(2) ***Quotation Price*** : A statement of price that is quoted for a work order to be executed or service to be rendered or goods to be supplied, is called a "Quotation". This term is generally used in other than government transactions.

(3) ***Estimation Price*** : An approximate price of a work order or goods or service, calculated on the basis of general opinion and judgement is called an 'Estimation'. While preparing an estimation, the general work, views, opinions and personal judgements play the dominant roles. As a result, the price so stated, would only be an approximate price.

Generally, in calculation of Tender price or in Estimated price the following costs are included :

(a) Cost of Direct Material.
(b) Cost of Direct Labour.
(c) Cost of Direct Expenses.
(d) Share of Factory Overhead.
(e) Share of Office & Administrative Overhead.
(f) Share of Selling and Distribution Overhead.
(g) Desired percentage of Profit.

In this way, tender price can be expressed as under :

Tender Price = Cost + Profit

Points to be Remembered while Determining Tender Price

In order to calculate tender price following points should be taken into consideration :

(1) *The quantity or units to be produced*. On the basis of analysis of the past period, it should be observed as to what change will be in overheads which can be fixed, variable and semi-variable if there is a change in size and type of product or units required.

(2) In order to determine the tender price, the past accounting records should be taken into consideration to know what was the previous cost. If there is a change in the price of material, labour and expenses, it should accordingly be adjusted in the tender price.

(3) The tender price should be carefully ascertained, because a difference by a single rupee can outclass the manufacturer from the race of acquiring the order.

(4) Where per unit tender price has been demanded, their Cost Sheet are very helpful in this job as whatever change has been there in any element of cost, can be easily adjusted.

(5) Where a quotation is to be given for a job, then after determining the cost of direct material and direct labour, overheads can be determined by charging it on a certain percentage to a relevant basis and thus total cost can be determined whereby a certain percentage of profit can be added.

(6) In order to determine tender price, a statement of cost is prepared where adjustments are made in material, labour and overheads for prospect changes in price.

(7) In calculation of tender price it should be kept into considration carefully whether the profit percentage is to be calculated on the basis of cost price or the selling price. In this context the difference can be understood by the following example :

***Illustration* 1**

The cost price of a tender is ₹ 2,00,000. What will be the tender price if the profit is added 20% on tender price? What will be the difference on tender price, if the profit is to be added 25% on cost price?

Solution

		₹
Cost Price		2,00,000
Profit 20% on Tender Price = $\frac{2,00,000 \times 20}{100 - 20}$		50,000
	Tender Price	2,50,000
Cost Price		2,00,000
Profit 25% on Cost Price = $\frac{2,00,000 \times 25}{100}$		50,000
	Tender Price	2,50,000

It means that 20% on tender price is equal to 25% on cost price.

CALCULATION OF TENDER PRICE

In various situations and on the basis of information obtained for calculating tender price the estimated cost sheet can be prepared as follows :

(I) When past period cost and units produced are given and tender price is to be determined for a particular quantity.

(II) When past period production quantity is not given and absorption overhead rate is to be determined for determining tender price.

(III) When tender price has to be determined on the basis of behaviour or nature of cost.

(IV) Determination of tender price when costs are given in percentage.

I. WHEN PAST PERIOD COST AND UNITS PRODUCED ARE GIVEN AND TENDER PRICE IS TO BE DETERMINED FOR A PARTICULAR QUANTITY

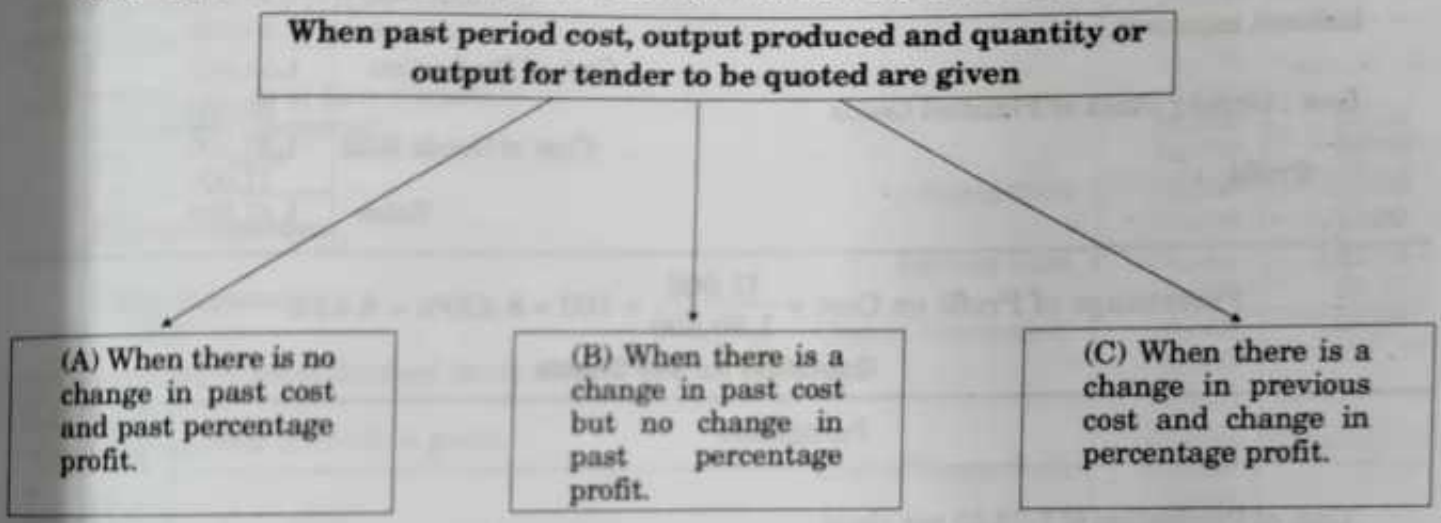
When for determining tender price, past period output quantity and total cost information is provided and tender price is to be quoted for a specific quantity, then in such cases for determination of tender price following process will be applied :

(1) First of all, a cost sheet is prepared from the cost information received of the past period and per unit cost of various costs shown therein is calculated.

(2) The quantity as desired in the tender will be multiplied by the cost per unit of each element of cost in order to determine the total cost for tender. It may be multiplied with total cost per unit if there is no change in any element of cost.

(3) At the end, for price determination for tender, the desired profit margin will be added to the total cost calculated.

This type of tender can have three forms which can be understood as follows :



(A) WHEN THERE IS NO CHANGE IN PAST COST AND PAST PERCENTAGE PROFIT

In this form of tender, first of all past period Cost Sheet is prepared and cost per unit of every element of cost and percentage profit is determined. Thereafter, the tender for desired quantity is prepared. For this purpose, the quantity of desired tender is multiplied by cost per unit of each element of cost in order to ascertain total cost. In this total cost the desired profit is added. The percentage of profit will remain the same which was in the previous period whose calculation is either done at cost or sales value.

Illustration 2

The following figures relate to the costing of a Tarpaulin manufactured in respect of a certain type of sheet for a period of three months :

	₹
Stock of Materials, 1st January	5,500
Stock of Materials, 31st March	3,500
Factory wages	83,000
Materials purchased	61,500
Sales	1,41,500
Indirect expenses	13,000
Finished stock, 1st January	Nil
Finished stock, 31st March	29,000

The number of sheets manufactured during three months was 2,200 and the price is to be quoted for 648 sheets in order to realise the same percentage of profit as for the period under review, assuming no alteration in rates of wages and cost of materials.

Prepare a cost sheet for the manufacture of 2,200 sheets and quotation for 648 sheets.

CONTRACT COSTING (INCLUDING ACCOUNTING STANDARD-7)

MEANING OF CONTRACT COSTING

Contract costing is a part of specific order costing method where work is performed as per equirement or specification of the customer or contractee. In fact, contract costing is that ethod of costing which is applied in those organisations where various contracts of non-repetive nature is taken. Contract is a work or job of a large size which continues in one or more han one accounting year. Hence, separate contract account is prepared for each contract. The ain object of contract costing is : (i) to determine the total cost of the contract, and (ii) to etermine the profit or loss on each individual contract.

The terms of contract regarding work to be undertaken, period in which to be completed, alue of the contract, advances to be made by the contractee to the contractor on the certificate f architect, compensation payable by the contractor for the breach of contract, etc., are decided pon between the two parties before the work is started. These contracts are related to the works f construction of roads, buildings, bridges, dams and banks, ports, etc.

FEATURES OF CONTRACT COSTING

The main features of contract costing are as follows :

(1) The work on contract is performed at the contract site which is separate from the work place of contractor.
(2) A contract may be of a large size which may be completed in more than one accounting year.
(3) Each contract is a separate unit for cost determination.
(4) Contract is completed as per the instruction of the contractee *i.e.*, due consideration is given to the instruction, size, colour, form and design etc. as desired by the contractee.
(5) Contract is done for a specific consideration which is known as contract price.
(6) The contractor is paid in instalments which is done after the work completed has been certified. The work is certified by the engineer, valuer, expert or architect of the contractee.

CONTRACT LEDGER

A Contract Ledger book is kept in which a separate account for each contract is opened. A ontract is known by the number allotted to it, as for instance, Contract No. 101, Contract No. 02, and so on. This number and the terms and conditions of the contract pertaining to it are ecorded in the Contract Ledger. In addition to it the following information related to contract re also mentioned above the contract ledger sheet :

(1) Place of completing the contract.
(2) Date of commencement of contract.
(3) Date of completion of contract.
(4) Contract price.
(5) Terms and conditions of receiving instalments.
(6) Date and amount of work to be certified, etc.

PREPARATION OF CONTRACT ACCOUNT

In contract ledger a separate contract account is prepared for each individual contract, so that for a specific contract all costs can be accumulated at one particular place. All the expenses likely to be incurred on contract, such as direct material (received from various sources), direct labour, direct expenses, sub-contract cost, cost of specific plant, indirect expenses, outstanding expenses and the depreciation of the common plant being used at the same time on other contracts etc., are debited.

In the credit side of the contract account, the cost of the raw material returned to supplier, to store, transferred to other contracts, material stolen, material damaged, material sold, material in hand, plant returned to store, plant transferred to other contracts, plant sold, plant at site are shown. The plant and material which are stolen are treated as abnormal loss and hence, transferred to profit and loss account.

In addition to above items, if the contract is completed then the contract account is credited by the contract price. If at the end of the year the contract remains incomplete then contract account is credited by cost of work-in-progress amount. In this work-in-progress, the costs of work certified and work uncertified are included. At the end, the profit or loss on contract is determined as per rules stated below in respect to contract account :

SPECIMEN OF CONTRACT ACCOUNT

A specimen of the Contract A/c is presented showing the debit and credit items, below :

The Indian Housing Construction Ltd.

Contract No. C—141.....
Particulars & Terms of Contract.....
Date Started..... Date Completed.....
Place of Work.....
Contract Price.....Terms of Payment.....
Escalation Clause, if any.....

Dr. **Contract Account No. .....** Cr.

Particulars	*Amount*	*Particulars*	*Amount*
	₹		₹
To Materials :		By Materials :	
(i) Direct Material Purchased —		(i) Returned to Suppliers —	
(ii) Issued from Stores —		(ii) Returned to Stores —	
(iii) Transferred from Other Contract —		(iii) Transferred to other Contract —	
	—	(iv) Sold —	
To Wages —		(v) At Site/In hand —	
Add : Outstanding Wages —			—
	—	By Plant :	
To Direct Expenses	—	(i) Returned to Store —	
To Indirect Expenses	—	(ii) Transferred to other Contract —	
To Plant :		(iii) Sold —	
(i) Cost of Specific Plant if used exclusively in the contract	—	(iv) At Site/In hand (the depreciated value of plant if used exclusively in the contract) —	
(ii) Depreciation of plant if used in other contracts	—		—
To Statement of P & L (Profit on sale of plant or material)	—	By Statement of Profit & Loss : (i) Material Lost, Stolen or Destroyed —	
To Sub-contract Costs	—		
To Cost of Extra Work done	—	(ii) Plant Lost, Stolen or Destroyed —	
To Statement of P & L (if the contract is complete) (bal. fig.)	—	(iii) Loss on sale of Plant & Material —	
Or		By Contractee A/c (Contract price in case of completed contract) + (Extra work Price)	

To Work-in-Progress A/c (balancing figure) (if work certified is less than 1/4th of contract price)		Or	
Or	—	By Work-in-Progress A/c :	
To Balance c/d (if work certified is more than 1/4th of contract price)	—	(i) Value of Work Certified	—
		(ii) Cost of Work Uncertified (In case of an incomplete contract)	—
To Statement of Profit & Loss (Statement of P & L to be credited at the end of the year)	—	By Balance b/d	—
To Work-in-Progress A/c (Profit kept as reserve)	—		
	—		—

The Contract accounts in simple form may be understood as follows :

If the Contract is Complete

Contract Account

	₹		₹
To Materials	—	By Materials Returned	—
To Wages	—	By Plant Returned	—
To Plant & Machinery	—	By Material at Site	—
To Other Expenses	—	By Plant at Site	—
To Statement of P & L (if Profit)	—	By Contractee A/c (Contract Price)	—
		By Statement of P & L (if Loss)	—
	—		—

If the Contract is Incomplete

Contract Account

	₹		₹
To Materials	—	By Statement of P&L :	
To Wages	—	Material Lost	—
To Plant & Machinery	—	Plant Lost	—
To Other Expenses	—	By Plant/Materials Returned	—
To Balance c/d	—	By Plant at Site	—
(Notional Profit)		By Material at Site	—
		By Work-in-Progress :	
		Work Certified	—
		Work Uncertified	—
		By Statement of P & L (if Loss)	—
	—		—
To Statement of P & L	—	By Balance b/d	—
To Work-in-Progress A/c	—		
	—		—

EXPLANATION OF VARIOUS ITEMS SHOWN IN DEBIT AND CREDIT SIDES OF CONTRACT ACCOUNT

(A) Explanation of items of Debit Side of Contract Account

1. ***Direct Materials***. The materials for the contract can be received from the following sources :

(a) *By issue from storeroom.*

(b) *By direct purchase from the market.* All such materials which are not available with the storekeeper but are required for the contract are purchased directly from the market.

(c) *By transfer from other contract* : When there are more than one contract simultaneously being continued, then some material not being used in any contract can be transferred to other contract.

(d) *Material supplied by the contractee* : Sometimes, the contractee may supply certain materials from his own stock for use in the works. Such materials are not debited to the contract account but shown in a separate memorandum record outside the accounts.

contractor is not to add any profit to the uncertified work. So the work done but uncertified is to be valued only at the cost of it, and not at the contract price.

The 'Work-in-progress A/c' is debited and Contract A/c is credited by the cost of uncertified work, in case of incomplete contract if profit is to be ascertained. This entry is reversed in the beginning of the next year.

So Work-in-Progress A/c is debited with the *value* of certified work and the *cost* of uncertified work and the contract account is credited.

4. ***Contract Price*** : The contract price is the value of the contract agreed to be paid to the contractor by the contractee on the satisfactory completion of the contract. So on the completion of the Contract, the Contract A/c is credited with the contract price and 'Contractee's A/c' is debited.

We know that the contractor had been drawing advances from the contractee on the basis of certificates, each time debiting Bank A/c and crediting Contractee's A/c. Now on the completion of the contract, the balance of the amount as shown by the Contractee's A/c will be received from the contractee, and thus his account will be closed.

DETERMINATION OF PROFIT/LOSS ON CONTRACT

Accounting for long-term construction contracts involves question as to when revenue should be recognized and how to measure the revenue in the books of contractor. As the period of contract is long, work of construction starts in one year and is completed after few years. Therefore, the problem which arises as how profit and loss should be determined on contract by the contractor.

As per Accounting Standard (AS)-7, Construction Contract, issued by ICAI it had earlier laid down two methods to determine profit or loss :

(i) on year to year basis based on percentage of completion, or

(ii) whether profit/loss should be determined only on completion of contract.

Till the revision of this accounting standard both the methods were recommended. However, now the revised standard has eliminated the second option and only the percentage of completion method for recognizing the revenue has been recommended. This method justifies the accrued system of accounting which is one fundamental accounting assumption. It has been discussed in detail later on in this chapter.

Profit or Loss on Contract : The excess of credit over the debit items of the Contract A/c is the profit, and the whole of it can be taken into account. The excess of debit over the credit items is loss. Profit on contract is various situation can be calculated as follows :

(1) ***Profit/Loss on Completed Contracts***. Till the end of the financial year, completed contracts on which either lump-sum amount has to be received or to be received in instalment, are recorded in credit side of contract account. In this regard following entries are made :

Contractee's Personnel A/c Dr.

To Contract A/c No. .....

After passing this entry the difference will be calculated and it will be transferred to Profit & Loss Account.

(a) *In case of Profit.* When credit side of contract account is more than debit side :

Contract A/c Dr.

To Profit & Loss A/c

(b) *In case of Loss.* When debit side of contract account is more than credit side :

Profit & Loss A/c Dr.

To Contract A/c

(2) ***Profit or Loss on Incomplete Contract***. Where a contract takes more than one financial year for it to complete, it is usual to take into account a part of the profit only to the Profit & Loss Account. If there is a loss, the whole of the loss is transferred to the P. & L. A/c.

As per general principle, the profit should not be calculated on incomplete contracts. In this regard there are various views of experts : Firstly, anticipation of profit is against the accounting principles. Secondly, net profit cannot be determined till the contract is completed. Those contracts which appear to be profitable at present, may incur a loss in future. Thirdly, income tax will be payable before actually due.

In contrast, some experts are of the opinion to calculate profit so as to eliminate the fluctuations in profit.

It is equally not advisible to postpone the ascertainment of profit till the completion of the contract which extends over a number of years, for the reason that in a year when no major contract is completed, the account will show no profit to the business and in the year of completion of the contract large profits will be shown by the accounts. Secondly, it is better to work out the profits each year to judge the performance of the contract each year. The whole of the excess of credit over the debit items of the Contract A/c in case of incomplete contract cannot be considered to be the true profit earned as reserve has to be created for the unseen future until the contract is completed and the final picture of profit emerges.

What part of the notional profit should be credited to the profit & loss account each year, depends on the practice and circumstances of the case. The general rules are :

(i) *If the value of certified work is less than 1/4th of the contract price* (less than 25%), no profit is taken into account, and the balance of the Contract A/c is transferred to the Work-in-Progress A/c.

(ii) *If the certified work is 1/4th or more than 1/4th, but less than 1/2 of the contract price* (between 25% and 50%), only 1/3 of the computed profit as reduced to the cash basis (cash received on work certified), should be credited to the Profit & Loss Account. The formula is :

$$\text{Profit} = \text{Computed profit, } i.e., \text{ Cr. Balance of Contract A/c} \times \frac{1}{3} \times \frac{\text{Cash received}}{\text{Work certified}}$$

The balance of the computed profit is a reserve and is transferred to Work-in-progress A/c.

(iii) *If the value of certified work is 1/2 or more than 1/2 of the contract value* (between 50% and 90%), 2/3 of the computed profit as reduced to the cash basis is credited to P & L A/c.

$$\text{Profit} = \text{Cr. balance of Contract A/c} \times \frac{2}{3} \times \frac{\text{Cash received}}{\text{Work certified}}$$

(iv) *If the contract work has sufficiently advanced, or the contract is almost complete* (say between 90% and 100%), *the profit is ascertained as follows :*

The expenses of the part of the contract remaining to be executed are estimated, and added to the expenses already incurred, to give an idea of the total cost of the full contract. On deducting the estimated total cost from the contract price, we get the notional or the computed profit or estimated profit. Of this estimated profit only that part is credited to P & L A/c as is reduced by the proportion of (i) 'Work certified' to 'Contract price', or more conservatively, (ii) 'Cash received' to 'Contract Price' so :

	₹
Estimated Profit :	
Total Contract Price	
Less : Estimated Cost of Contract on Completion*	
Estimated Profit on Completion	

* Estimated Cost of Contract on Completion is calculated as under :

Net Expenditure on Contract to date	
Add : Estimated Expenditure on Contract still to be incurred so as to complete the contract	
Estimated Cost of Contract on Completion	

(i) Profit = Estimated Profit on completed contract $\times \frac{\text{Work Certified}}{\text{Contract Price}}$

The contract was completed on 30th September, 2020 and the contract price was duly received. Provide depreciation @ 10% on plant and charge indirect expenses @ 20% on wages. Prepare Contract Account in the books of Xavier.

Solution

Contract Account

(for the six months ended 30th September, 2020)

Date	*Particulars*	*Amount*	*Date*	*Particulars*	*Amount*
2020		₹	2020		₹
April 1	To Materials Purchased	26,000	Sept. 30	By Materials in hand	1,000
to	To Wages	35,000	Sept. 30	By Plant at site	9,000
Sept. 30	To Direct Expenses	20,000		(Cost ₹ 10,000 *less* Depreciation (@ 10%, ₹ 1,000)	
	To Plant Purchased	10,000			
	To Indirect Expenses :		Sept. 30	By Yakub (Contract Price)	75,000
	@ 20% on Wages		Sept. 30	By Profit & Loss Account (Loss)	13,000
	$\left(\frac{35,000 \times 20}{100}\right)$	7,000			
		98,000			98,000

Note : Calculation of materials purchased has been made as follows :

	₹
Materials Consumed	25,000
Add : Materials in hand at the end	1,000
Materials Purchased	26,000

II. INCOMPLETE CONTRACTS

In case of incomplete contract, for calculating profit and loss on contracts, the work-in-progress is to be calculated. Work-in-progress has a significant place in contract account hence, it is being discussed here :

WORK-IN-PROGRESS ACCOUNT

Work-in-progress is the work which is not yet completed and for calculating profit & loss on incomplete contracts it has to be taken into consideration. In the debit side of WIP A/c following items are shown :

(i) Value of work certified,

(ii) Cost of work done but not yet certified.

In the credit side of WIP A/c, that portion of the notional profit which is not treated as profit and which is kept as reserve is shown :

W.I.P. Account

	₹		₹
To Contract A/c :		By Contract A/c	
Work certified	—	(Profit reserved)	—
Work uncertified	—	By Balance c/d	—
₹		₹	

X. ESCALATION CLAUSE (make flexible)

Escalation clauses are provided in the contract or agreement entered into with the contractee, as safeguards against any likely changes in price or utilisation of material and labour. Such a clause provides that in the event of a specified contingency taking place, the contract price would stand enhanced accordingly. There may also be a 'De-escalation Clause' to provide that in the event of prices going down, the contract price wil be reduced accordingly.

PROCESS COSTING
(*INCLUDING* JOINT PRODUCTS AND BY-PRODUCTS)

"Process costing is used to ascertain the cost of each stage of manufacture where material is passed through various operations to obtain a final product to result, with by-products in many cases at different stages"

—**Lunt and Ripley**

MEANING OF PROCESS COSTING

Process costing is a method of costing applied to industries where the material has to pass through two or more processes for being converted into a finished product. Each process is treated as a cost centre. The cost of each process is accumulated and per unit cost is determined. For this purpose the following formula is applied :

$$\text{Cost per unit of each process} = \frac{\text{Cost of Output in the process}}{\text{Normal number of units in the process}}$$

In this method, the output of the first process works as the raw material of the second process and the output of the second process works as the raw material of third process and so on. In this manner, the raw material passes through various processes till it reaches the last process from where the entire process is completed and the product is made ready for sale.

This method is used in the manufacture of chemical products, soap, vegetable oil, paints, varnishes, etc., where the production is continuous and the product has to pass from one process to the other until completion.

CHARACTERISTICS OF PROCESS COSTING

The characteristics of Process Costing are as follows :

1. The production is continuous and the end product is the result of a sequence of processes. Each plant is *divided into separate process centres* and each process-centre processes a single product.
2. The *product is homogeneous,* and the units produced are identical and standardised. The units of any one process are indistinguishable from each other, although the units of one process may differ from the units of the other process. The units of 'A' process may differ from those of 'B' process, but the units of 'A' process will be similar to each other.
3. The sequence of operations for *processing* the product is *specific* and predetermined.
4. The *finished product of one process works as raw material for the next* or the succeeding process until completion.
5. To complete the production work, the *sequence of process is clearly defined* and activities of the process are also clearly identified.
6. Production is done on *large scale.*
7. The cost per unit of production is the average cost which is determined by dividing the total cost of production by total units of production.

8. In each process, there is a *certain quantity of loss* which cannot be eliminated. This loss is called as normal loss. This loss is due to the nature of raw material, for *e.g.*, loss in weight, vaporisation, chemical reaction, etc. This loss is borne by good units.
9. It is also possible to obtain *joint product or by-product* from the use of raw material or production technology.
10. Chances of *abnormal loss or abnormal gain may* also be there which are dealt separately in process costing.
11. *Inter-process profit are* also kept in consideration when output is transferred to next process at market price.
12. The *concept of equivalent production* is also recognised in process accounts, *i.e.*, those units which are at the stage of work-in-progress are made equivalent to completed units.

Industries where Applied or Uses of Process Costing

This costing method is applied to the following industries :

A. ***Manufacturing Industries.*** Iron and steel, cement, paper, rubber, ceramics, automobile plants, ice, paints industries, etc.

B. ***Chemical Industries.*** Chemicals, perfumery, soap, oil, medicines, etc.

C. ***Mining.*** Mineral oil, coal, sulphur, gold, iron, zinc, gas, etc.

D. ***Public Utility Works.*** Electricity generation and distribution, water supply, gas supply, etc.

DISTINCTION BETWEEN JOB COSTING AND PROCESS COSTING

Job costing includes batch and contract costing. The distinction between job and process costings is as under :

	Job Costing	*Process Costing*
1.	Unit is one and specific and work is done by specific order.	Production is divided into several units and the units are uniform. Production is continuous.
2.	One job is not related to or dependent on each other.	The succeeding process is dependent on the preceding one.
3.	The costs are collected against job order number separately.	The unit cost is computed by dividing total cost by total output, and it is an average cost.
4.	The cost of job can be ascertained only on the completion of the job.	The process cost is ascertained at the end of cost period, for each process separately.
5.	The cost of a job is not transferred to the other.	The cost of a process is transferred to the next process.
6.	There may or may not be work-in-progress.	Due to continued production work-in-progress is a regular feature.
7.	Cost control is difficult.	Cost control is easy due to uniform production.

GENERAL PRINCIPLES OF PROCESS COSTING

The general principles are as follows :

1. Materials, wages and overheads are collected according to processes or operations in a period.

2. The record of each process is so maintained that the output, waste and scrap of each may be correctly ascertained.

3. The total cost of each process is divided by the units manufactured in that process, and thus the cost of each unit of that process is computed.

4. The work-in-process at the end is calculated in terms of equivalent units for costing.

PROBLEMS OF PROCESS COSTING

The main object of process costing is to determine the per unit cost of production each process individually and collectively. In order to have information of it, consideration has to be paid on wastage of material, joint and by-product and profit in each process.

(1) Wastage of Material

Where a material passes through various processes, then there is some amount of wastage due to chemical reaction, vaporisation, wear and tear, etc. This wastages of normal or abnormal nature have their impact on cost of the product. The solution to it can be found by process costing.

(2) By-Products and Joint Products

There are certain types of product, the production of which leads to attainment of some secondary products or products of same level automatically which are termed as joint product or by-product. The expenses incurred jointly on joint products have to be distributed on each joint product. This leads to ascertainment of cost of individual product through process account.

(3) Margin of Profit

Whether there is a profit or loss on product manufactured, can be obtained only after the product passes through all the processes and can be made comparable by the market price. But more important than it is to determine whether the processes are profitable or not. The output of one process may be transferred to next process at market value or by adding a certain percentage of profit to cost. The effect of this policy results in inclusion of profit in value of closing stock of the respective process. Thus, except the first process, the closing stock of all the remaining products have an element of profit included in the value of stock. This profit is imaginary but not real, because the goods are actually not sold. Hence, what is the amount of profit included in the closing stock and what is the actual cost, becomes a matter of study in process costing.

PREPARATION OF PROCESS COST ACCOUNTS

Items of Debit Side of Process Account

For each process a separate account is opened. All the expenses are debited to the process. Generally, the following items are debited to process accounts :

Materials. The basic material related to production is shown in the first process. This material is shown at its cost. In process accounts, the quantity as well as the value both are shown. In the same way some material may be used in other process. Hence, whatever material is used in concerned process, it should be debited to the respective process.

Labour. In each process, work is performed by separate workers. The wages paid to these workers should be debited to the process to which the workers are functioning upon. It may be possible that a worker or few workers may be working on more than one process. In this case, the wages paid to the worker or workers will have to be distributed to the processes on the basis of the time spent by the worker/workers on each process. In this process, process card prepared on the basis of job card are very helpful.

Direct Expenses. All those expenses which are exclusively incurred for a respective process are debited to the process account as direct expenses.

Indirect Expenses. All those expenses which are jointly concerned with various processes are called indirect expenses. These expenses are distributed to individual process on some suitable basis.

Abnormal Gain. If in any process, the actual production is more than the normal production, then the excessive production over normal production is termed as abnormal gain. The cost and

WASTAGE AND ITS TREATMENT

The term 'wastage' in the wider usage includes waste, scrap and spoilage which go to reduce the quantity content of the product. The wastage may be of two types : (I) Normal wastage and (II) Abnormal wastage.

(1) Normal Wastage

Normal wastage is one which is incidental to production due to unavoidable reasons and it also results due to inherent nature of the particular process and is uncontrollable in shorter period of time and is within standard limit. This normal wastage generally occurs due to evaporation, shrinkage, breakages, spoilage for various reasons. While fixing the standard, a study of the past performances and the wastage in the immediate previous years is necessary.

Treatment in Accounts. The normal wastage reduces the quantity of output. As this loss is borne by the production, the cost per unit of output goes up to that extent. If there is any saleable scrap, it is sold and the realised amount is credited to the process account. If the wastage does not fetch any value, the quantity of wastage is recorded in the quantity column and nil figure is shown in the amount column. It is to say, that the normal losses are ultimately borne by the good units of production.

Normal Loss or having no realisable value

(2) Abnormal Wastage

Abnormal wastage is one which is in excess of the normal wastage, arising due to abnormal causes or due to unforeseen factors. A cause which is not common to production, or the occurrence of which is not to be generally experienced in the ordinary course of production, is an abnormal cause. The defective materials, sickness of machines, managerial carelessness, natural calamity, fire, machine-breakdown etc., are the examples of the causes of abnormal wastage.

Treatment in Accounts : The loss on account of abnormal wastage is not borne by production, but by Profit and Loss Account. 'Abnormal Wastage A/c' is debited and Process A/c is credited with the cost of abnormal wastage. If this wastage is sold in the market, Abnormal Wastage A/c is credited with the realised price and the balance is transferred to the P. & L. A/c.

The cost of abnormal loss can be calculated by using the following formula:

$$\text{Cost of Abnormal Loss} = \frac{\text{Normal Cost}}{\text{Normal Output}} \times \text{Abnormal Loss in Units}$$

JOINT PRODUCTS AND BY-PRODUCTS

Joint Products

In certain industries, two or more than two products of equal significance and value are produced simultaneously in a process. Such products are called 'Joint Products'. Motor spirit, kerosene oil, fuel oil, lubricating oil, wax, tar and asphalt are the examples of joint products produced from crude petroleum.

'Cost Accountants' Handbook' defines joint products as "Two or more products separated in the course of the same processing operations, usually requiring further processing, each product being in such proportion that no single product can be designated as a major product."

So joint products are those which :

A. are produced in the same process, with the same materials,

B. are separated in the course of same process,

C. are comparatively of the same importance and value, and

D. require further processing to finish them into more useful and valuable products.

Joint Products and Co-products

Joint products and co-products are used synonymously in common parlance, but technically there is a distinction between the two. The joint products are like twins born of the same mother there is at the same time, while co-products are two or more products which are contemporaneous but which do not emerge from the same material in the same process. For instance, timber boards made from different trees are co-products but not the joint products because they are made not from one tree but from different trees. In an automobile industry, motor cars, jeeps, trucks, scooters, etc., are co-products. It depends on the choice of the manufacturer whether to produce more of cars or more jeeps. This is not the case with joint products as the products do necessarily emerge here in the same process.

By-products

'Cost Accountants' Handbook' defines by-products as "Products recovered from materials discarded in a main process, or from the production of some major product, where the material value is to be considered at the time of severance from the main product."

So by-products are those which :

A. come forth as a result of the production of the main product,

B. are produced from the discarded material or the scrap of the main product,

C. are of less importance or value as compared to that of main product, and

D. possess a value which can be obtained by the sale thereof.

The examples of by-products are the following :

In Dairy industries, Butter or Cheese is the main product, but butter-milk is the by-product.

In an Oil refinery, Petrol is the main product, while sulphur, chemical fertilisers, and bitumen are the by-products.

In Sugar industry, Sugar is the main product and molasses is the by-product.

By-products and Secondary Products

Both the by-product and the secondary product are subsidiary products. By-product arises with the main product, but the secondary product does not arise out of the same process. The term 'Secondary' is a relative term and is used to compare the relative importance with any primary product whether it may or may not be the product arising out of the same processing operation.

Distinction between Joint Product and By-product

From the above study, it is clear that :

(1) Joint products are of the equal economic importance, while the by-products are of lesser importance;

(2) Joint products are produced all together in a process, while the by-products are produced from the scrap or the discarded materials of the main product;

(3) Joint products are not produced just incidentally, their production is definite. But by-products emerge incidentally also.

(4) Joint products require further processing, while the by-products generally do not require to be processed any further.

Apportionment of Joint Costs

The main point in the accounting for costs in case of joint products and by-products is the apportionment of joint costs. There are common costs incurred in both the cases upto the point of separation, and after this split-off point the independent costs are debited to each of them, more so, to the joint products where further processing is required in the form of independent products. As the joint products become independent products after the split-off point, each of them may behave like a main product and have its by-product.

The concept of joint costs, separate cost, Joint products and By-products can be illustrated with the help of following chart :

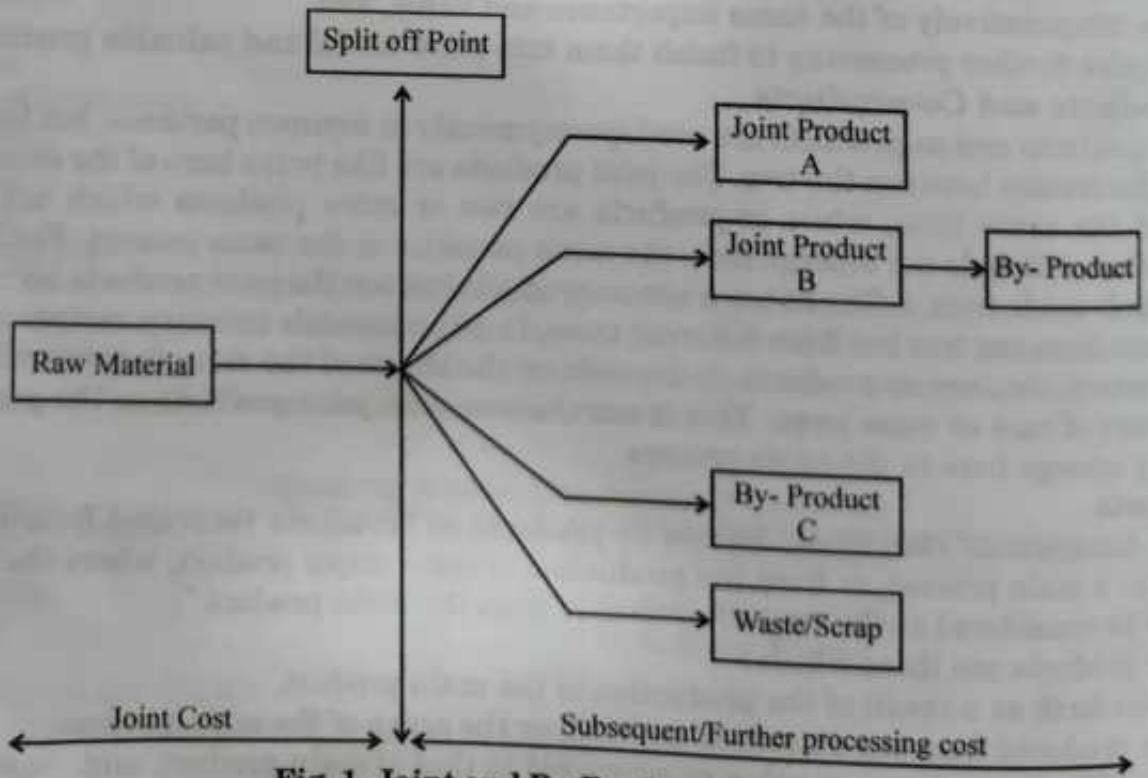


Fig. 1. Joint and By-Products & Costing

OPERATING COSTING

MEANING OF SERVICE COSTING

The Terminology of CLMA defines Service Costing as the cost of specific services and functions, *e.g.*, maintenance, personnel, canteen, etc. These may be referred to as service centres, departments or functions.

Service costing involves the method of determination of the cost of services. At the end of specified periods, collection of operating costs takes place and the aggregate of these costs is duly divided by the quantity of services provided in the period. This gives the cost per unit.

The word 'service' as used in this context is worth noting. It means services rendered by various departments within the organisation or organisations providing services to outside firms amely personnel's maintenance, canteen, hospitals, boiler house, captive power units, computer services department, hotels, electricity companies, road maintenance, water supply, goods transport, transport of passengers, educational institutions, accounting firms, management consultancy firms etc.

Service organisations/internal service departments render a variety of services. Owing to the peculiarities of services, different cost accounting treatment is required.

FEATURES OF SERVICE ORGANISATIONS

Service organisations possess its number of features which distinguish them from other organisations. The main features are :

1. ***Definition of cost unit difficulty*** : Service organisations provide a wide variety of services, this could range from catering services, transport services, public utility services to professional services. Consequently it generally becomes difficult to define the cost unit.
2. ***Labour intensive activities*** : These organisations employ a large number of people for running the business. The manpower cost incurred is much higher in relation to machine related cost.
3. ***Services cannot be stored*** : It can be said that services is like a perishable commodity. Once a service has been rendered., it can not be stored. It has to be used or else it is wasted.
4. ***Major inputs cannot be stored*** : The major input in such industries is labour. The firm should utilise their services. In the absence of this, labour remains idle. The efforts of idle labour cannot be stored and utilised as and when required.
5. ***Intangible products*** : Service organisations do not produce tangible goods. Instead, they are engaged in providing services to the public.

NATURE AND CHARACTERISTICS OF SERVICE COSTING

The nature and characteristics of operating costing are as follows :

(i) Service costing method is related to provide various types of services to customers,
(ii) Costs are generally computed period-wise and order-wise,
(iii) In service costing, standing or fixed, maintenance and running charges are calculated,
(iv) The services of a industry or organisation may be sold to the public or may be used within the organisation, and
(v) The demand for the services of enterprises or organisations or industries adopting operating cost method for costing fluctuates.

APPLICATION OF SERVICE COSTING

Internal

The service costing is required for in-house services provided by a service cost centre to other responsibility centres as support services. Examples of support services are Canteen and hospital for staff, Boiler house for supplying steam to production departments, Captive Power generation unit, operation of fleet of vehicles for transport of raw material to factory or distribution of finished goods to the market outlets, IT department services used by other departments, research & development, quality assurance, laboratory etc.

External

When services are offered to outside customers as a profit centre in consonance with organisational objectives as an output like goods or passenger transport service provided by a transporter, hospitality services provided by a hotel, provision of services by financial institutions, insurance and IT companies etc.

In both the situation, all costs incurred are collected, accumulated for a certain period or volume, recorded in the cost accounting system and then expressed in terms of a cost unit of service.

SERVICE COSTING *Vs.* PRODUCT COSTING

Service costing differs from product costing (such as job or process costing) in the following ways due to some basic and peculiar nature.

(i) Unlike products, services are intangible and can not be stored, hence, there is no inventory for the services.

(ii) Use of Composite cost units for cost measurement and to express the volume of outputs.

(iii) Unlike a product manufacturing, employee (labour) cost constitutes a major cost element than material cost.

(iv) Indirect costs like administration overheads are generally have a significant proportion in total cost of a service as unlike manufacturing sector, service sector heavily depends on support services and traceability of costs to a service may not economically feasible.

SERVICE COST UNIT

To compute the Service cost, it is necessary to understand the unit for which the cost is to be computed. All the costs incurred during a period are collected and analysed and then expressed in terms of a cost per unit of service.

One specific issue with service costing is the difficulty in defining a realistic cost unit that represents a suitable measure of the service provided. The cost unit to be applied needs to be defined carefully and frequently, a composite cost unit may be deemed more appropriate.

For example, Hotels may use the 'Occupied Room Days' as an appropriate unit for cost ascertainment and control.

Other typical cost units that may be used include :

Service industry	*Unit of cost (examples)*
Transport Services	Passenger-km., (In public transportation) Quintal-km., or Ton-km. (In goods carriage)
Electricity Supply service	Kilowatt-hour (kWh)
Hospital	Patient per day, room per day or per bed, per operation etc.
Canteen	Per item, per meal etc.
Cinema	Per ticket.
Hotels	Guest Days or Room Days
Bank or Financial Institutions	Per transaction, per services (e.g. per letter of credit, per application, per project etc.)
Educational Institutes	Per course, per student, per batch, per lecture etc.
IT & ITES	Cost per project, per module etc.
Insurance	Per policy, Per claim, Per TPA etc.

COMPUTATION OF OPERATING COST OF SPECIFIC SERVICES

(I) TRANSPORT OPERATING COSTING

Transport operating costing is applied in those organisations where services are provided for carriage of passengers or carriage of goods from one place to another. In these organisations, cost related to services provided as regard to transportation are collected and classified in such a manner so that cost per unit of transportation service may be ascertained. Though, transport services can be related to air, water and land, but here the study deals with the cost of transport service specifically provided by means of land, especially by bus or truck.

Objects

The objects of Transport costing are :

1. To ascertain the cost per unit of operating the vehicles and to fix the rates for the carriage of goods or passengers.
2. To compare the cost per unit of the motor vehicles with the cost of other means of transport, and to find out the profitable routes.
3. To compare the cost of one motor vehicle with the cost of the other motor vehicle. This helps to ascertain the efficiency of each vehicle and to control the cost of each vehicle.
4. To keep a control over the cost of petrol, lubricants and maintenance.
5. To help to fix hire charges of the vehicles where the vehicles are given on hire.
6. To help to apportion the cost of transport in the different departments availing of the services of transport.

Unit of Cost

The cost unit of the passenger vehicles whether in bus transport or in railways is the 'Passenger-kilometre' or 'Passenger-mile'. In case of goods transport, it is 'Ton-kilometre' or 'Ton-mile'. In both the cases, the unit is a compound unit. If 4 tons load is carried for 8 kilometre, the service rendered would be $4 \times 8 = 32$ Ton-kilometre. There are two possible methods of calculating 'Ton-km' *viz.*, (1) Absolute, and (2) Commercial, as explained with the following example :

TRANSPORT OPERATING COSTING PROCEDURE

In order to determine the cost of transport services provided by the transport organisations, the following accounting procedure is followed :

(1) Collection of transport cost
(2) Classification of transport cost
(3) Construction of operating cost sheet

(1) Collection of Transport Cost

For determination of service cost in transport organisation, all the cost related to transport service is collected continuously. Generally, in these type of organisations detailed information as regard to each vehicles is collected. For this purpose a separate log book is kept for each vehicle.

Log Book

Log book is an important record maintained for each vehicle. This book contains the full information about the vehicles regarding its history, capital cost, capacity, maintenance and running details, etc. The information in the log book is divided in three parts as follows :

First Part. The following information appears in the first part :

1. Name of the vehicle, 2. Date of Purchase, 3. Firm's name from which purchased, 4. Purchase price, 5. Purchase price of tools and equipments, 6. Capacity of passengers or load, 7. Registration Number, 8. Taxes paid, 9. Insurance policy Number, insurer's name, premium paid, etc, 10. Estimated working life, amount of yearly depreciation and scrap value at the end of life.

(2) Classification of Transport Cost

The transport cost can be classified into three parts :

1. ***Running or Operating Charges*** : The expenses which are incurred on running the vehicles or keeping the vehicles in mobility are called as running or operating charges. It means that if the vehicle stands still or does not operate any day then these expenses will not be incurred. These expenses of each vehicle may vary day to day. The examples of such charges are as follows :

(i) Depreciation—It is calculated on km basis;

(ii) Cost of petrol, diesel, lubricants, etc;

(iii) Payment to Drivers, Conductors, Cleaners, etc., if such payment is made on the basis of time (per day, per hour) or on the basis of distance covered;

(iv) Overtime to Drivers, Conductors, Cleaners, etc.