Cost Accounting

DEACC204

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UNIT 1: INTRODUCTION TO COST ACCOUNTING

CONTENTS

Objectives

After studying this unit, you will be able to:

- recognize the conceptual framework of cost accounting.
- appreciate the objectives of cost accounting in business world.
- use the various types of costs in classifying and recording.
- cognize the cost centers and other important terms.
- apply the cost accounting in corporate world,
- prepare the cost sheet.

Introduction

Cost accounting is a branch of accounting and has been developed due to limitations of financial accounting. The financial accounting is primarily concerned with record keeping directed towards the preparation of gross profit account, profit and loss account and balance sheet. It provides information regarding the gross profit, profit and loss that the business or enterprise is making and also its financial position on a particular period. The information concerning the business or enterprise is helpful to the management to control on business.

Cost accounting is defined as "a systematic set of procedures for recording and reporting measurements of the cost of manufacturing goods and performing services in the aggregate and in detail. It includes methods for recognizing, classifying, allocating, aggregating and reporting such costs and comparing them with standard costs.The management of every business enterprise is interested to know much more than the usual information supplied to outsiders. In order to carry out its functions of planning, decision-making and control, it requires additional cost data. The financial accounts fail, to some extent, to provide required cost data to management and hence a new system of accounting which could provide internal report to management was conceived of.

1.1 Accounting

Accounting is of following types and each accounting is having its own features and importance.

- ***FinancialAccounting:***Financial accounting is a particular type of accounting that includes a method of documenting, summarizing, and reporting the transactions arising from business operations for a period of time. Financial accounting reflects the accounting on "accrual basis" over the accounting on "cash basis".
- ***CostAccounting:*** Cost Accounting is the reporting and analysis of a company's cost structure. Cost accounting is a process of assigning costs to cost objects that typically include a company's products, services, and any other activities that involve the company.
- ***ManagementAccounting:*** Managerial accounting is the practice of identifying, measuring, analyzing, interpreting, and communicating financial information to managers for the pursuit of an organization's goals. It varies from financial accounting because the intended purpose of managerial accounting is to assist users internal to the company in making well-informed business decisions.

Although each type of accounting is having its own importance and features but after the weaknesses reached to accountants and users of Financial Accounting, so next level of accounting i.e. Cost Accounting emerges. Let us discuss the limitations of financial accounting and emergence of financial accounting.

1.2 Limitations of Financial accounting or Emergence of Cost Accounting

- ***Shows only overall performance- no distinguish between the products-*** Financial accounting shows only the results and financial figures for last one year. If any deviations needs to be made that can not be possible as final results were already shown to users.
- ***Historical in nature-***No computation of day-to-day costs is possible in financial accounting. It shows the facts and figures for one year in consolidation.
- ***No performance appraisal-***No comparison of actual and standard set of products is possible in financial accounting. The users cannot make any deviations even if want too. Once the results are published, that needs to be carried on.
- ***No material control system-***As such, in Financial Accounting, there is no system for scrap, deterioration is possible, so not possible to control the material.
- ***Nolabor cost control-***No record of idle time, incentives are many times made in financial accounting. As there is no concept applied in financial accounting.

- ***No proper classification of costs***- Financial Accounting don't distinguish between various categories of costs as in cost accounting it works.
- ***No analysis of losses-***In Financial Accounting, there is no possibility of analysis for having adverse results or not know reason for losses.
- ***Fails to supply useful data to management-***Financial Accounting provides no information about reason and future decision that can help or guide management in taking correct or favorable decisions.

1.3 Important Terms Used

A. Cost-According to Oxford Dictionary,cost means,"the price paid for something." Also, Cost is a measurement in monetary terms of the amount of resources used for the purpose of production of goods or rendering of services.

B. Costing-It enables the total cost of any unit of production or service to be ascertained with reasonable degree of accuracy and at the same time to disclose exactly how such total cost is constituted, i.e.

the value of materials used,

the amount of labour and

other expenses incurred.

C. **Cost Accountancy-**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 there from for the purposes of managerial decision making. Thus, Cost Accountancy is the science, art and practice of a Cost Accountant.

1.4 Cost Accounting

As per CIMA, London "Cost accounting is the classifying, recording and appropriate allocation of expenditure for the determination of the costs of products and services, and for the presentation of suitably arranged data for the purpose of control and guidance of management, process of ascertaining costs.

Cost accounting is a very wide term. It embraces many subjects within its folds. In general usage, it is the application of costing and cost accounting principles, methods and techniques to the science, art and practice of cost control and ascertainment of profitability of business. The Institute of Cost and Management Accountants, England has defined cost accounting as "the application of costing and cost accounting principles, methods and techniques to the science, art and practice of cost control. It includes the presentation of information derived there from for the purpose of managerial decision-making." Thus, cost accounting is the science, art and practice of a cost accountant. It is a science because it consists of organized body of knowledge, which a cost accountant must possess for proper discharge of his responsibilities.

Cost accounting involves the application of costing principle, methods and techniques for ascertaining costs and their control by comparing actual costs with the budget or standard. Cost accounting is an art also, because it includes the ability and skill with which a cost accountant has to apply his basic knowledge to particular circumstances. It involves the use of various costing techniques and methods such as marginal costing, standard costing, budgetary control etc. The applications of these techniques help him in dealing with various problems such as cost reduction, cost control, ascertainment of profitability, etc.

Cost accounting is also the practice of a cost accountant because he has to make constant efforts in the field of cost accounting. Such efforts include the information presentation to the top management for the purpose of managerial decision-making and keeping various records of business.

Features of Cost Accounting

- It is a science because it is a systematic body of knowledge having certain principles.

- It is an art as it requires the ability and skill with which a Cost Accountant is able to apply the principles of Cost Accountancy to various managerial problems.
- The continuous efforts of a Cost Accountant help in the presentation of information for the purpose of managerial decision making and keeping statistical records.
- It is a process of accounting for costs.
- It records income and expenditure relating to production of goods and services.
- It provides data on the basis of which future estimates are prepared and quotations/tenders are submitted.
- It is concerned with cost ascertainment, cost control and cost reduction.
- It establishes budgets and standards so that actual cost may be compared to find out deviations/variances.

1.5 Objectives and Functions of Cost Accounting

- ***Ascertainment of Costs-*** Ascertainment of cost is primary objective of cost accounting inthe initial stages of its development. However, in modern times this has assumed the secondary objective of cost accounting. Cost ascertainment involves the collection and classification of expenditures at the first instance. Those items of expenditures or expenses which are capable of charging directly to the products manufactured are allocated. Then the other expenses which are not capable of direct allocation are apportioned on some suitable basis. Thus the cost of production of goods manufactured is ascertained. In this process, cost accounting involves maintenance of different type of books to record various cost elements. Cost of production is ascertained by using any of the costing technique and method such as historical costing, standard costing, marginal costing, job costing, unit costing, etc.
- ***Cost Control-***At one time cost control was considered as secondary objective of cost accounting. But in modern business it constitutes the primary objective. Cost control is exercised at different stages in a industry, viz., acquisition of materials, recruiting of labour, during the production process and so on. As such, we have material cost control, labour cost control, production cost control, quality control and so on. However, control over cost is exercised through the techniques of budgetary control, historical costing and standard costing. The control techniques enable the management in knowing the operating efficiency of a business organization.
- ***Cost Reduction-***Cost reduction is the process used by companies to reduce their costs and increase their profits. Depending on a company's services or product, the strategies can vary. Every decision in the product development process affects cost.
- ***Guide to business policy-***Cost data to a great extent helps in formulating the various policies of a business or industry and in decision-making. As every alternative decision involves investment of capital outlay, costs play an important role in decision-making of
- ***Determination of Selling Price-*** Every business enterprise aims at maximizing profit. The total cost of production constitutes the basis on which selling price is fixed by adding a part of profit. Cost accounting furnishes both the total cost of production as well as cost incurred at each and every stage of production. No doubt other factors are taken into consideration before fixing of selling price such as market conditions, the area of distribution, volume of sales, etc. But cost plays the dominating role in the price fixation.

Scope of Cost Accountancy

(a) Cost Ascertainment: The main objective of Cost Accounting is to find out the Cost of product /services rendered with reasonable degree of accuracy.

(b) Cost Accounting: It is the process of Accounting for Cost which begins with recording of expenditure and ends with preparation of statistical data.

(c) Cost Control: It is the process of regulating the action so as to keep the element of cost within the set parameters.

(d) Cost Reports: This is the ultimate function of Cost Accounting. These reports are primarily prepared for use by the management at different levels. Cost reports helps in planning and control, performance appraisal and managerial decision making.

(e) Cost Audit: Cost Audit is the verification of correctness of Cost Accounts and check on the adherence to the Cost Accounting plan. Its purpose is not only to ensure the arithmetic accuracy of cost records but also to see the principles and rules have been applied correctly.

1.6 Importance of Cost Accounting

- ***Classification of Costs:***Costs involve the prime cost, direct cost, factory cost, selling cost and many other costs.
- ***Cost Control:***This is efficient for the business to focus on controlling the cost of inventory, labour and various other kind of overhead costs.
- ***Price Determination:*** Distinct fixed and variable costs are used by company or business to fix the prices of the products.
- ***Fixing the standards:***The organizations use the standards to make estimates and the budget for their future.

1.7 Advantages of Cost Accounting

There are many benefits of cost accounting to various users. Each division or user is having distinguish advantage of cost accounting that can help in managing business or getting more profitable results. Among all other users management is getting more benefits. Let us discuss these advantages.

A. Advantages to Management

- Reveals profitable and unprofitable activities
- Helps in cost control
- Helps in decision making
- Guides in fixing selling prices
- Helps in inventory control
- Aids in formulating policies
- Helps in cost reduction
- Reveals idle capacity
- Checks the accuracy of financial accounts
- Prevents frauds and manipulation

B. Advantages to Workers

Workers are benefited byintroduction of incentive plans which are anintegral part of a cost system bringing higher productivity and higher earnings for them.

C. Advantages to Society

An efficient cost system is bound to lower the cost of production, the benefit of which is passed on to the public at large, in the form of lower prices of products or services.

D. Advantages to Government Agencies and Others

A cost system produces ready figures for use by government, wage tribunals, chambers of commerce and industry trade unions, etc., for use in problems like price fixing, wage level fixing, settlement of industrial disputes, policy matters, etc.

E. Other Advantages

- A cost system reveals unprofitable activities, losses or inefficiencies occurring in any form such as wastage of man power, idle time and lost time. Also, wastage of material in the form

of spoilage, excessive scrap etc., and wastage of resources, e.g. inadequate utilization of plant, machinery and other facilities.

- Cost Accounting locates the exact causes for decrease or increase in the profit or loss of the business. It identifies the unprofitable products or product lines so that these may be eliminated or alternative measures may be taken.
- Cost Accounts furnish suitable data and information to the management to serve as guides in making decisions involving financial considerations.
- Cost Accounting is useful for price fixation purposes. Although sale price is generally related more to economic conditions prevailing in the market than to cost, the latter serves as a guide to test the adequacy of selling prices.
- With the application of Standard Costing and Budgetary Control methods, the optimum level of efficiency is set.
- Cost comparison helps in cost control. Comparison may be period to period, of the figures in respect of the same unit or factory or of several units in an industry by employing Uniform Costs and Inter- Firm Comparison methods. Comparison may be made in respect of cost of jobs, process or cost centers.
- A cost system provides ready figures for use by the Government, wage tribunals and boards, and labour and trade unions.
- When a concern is not working to full capacity due to various reasons such as shortage of demands or bottlenecks in production, the cost of idle capacity can readily worked out and repealed to the management.
- Introduction of a cost reduction programme combined with operations research and value analysis techniques leads to economy.

1.8 Limitations of Cost Accounting

Although there are many benefits of cost accounting but still there are few limitations of it. Let us discuss its obstacles.

1. Unnecessary

It is argued that maintenance of cost records is not necessary and involves duplication of work. It is based on the premise that a good number of concerns are functioning prosperously without any system of costing.

2. Expensive

It is pointed out that installation of a costing system is quite expensive which only large concerns can afford. It is also argued that installation of the system will involve additional expenditure which will lead to a diminution of profits.

3. Inapplicable

Another argument sometimes put forward is that modern methods of costing are not applicable to many types of industry.

4. Failure

The failure of a costing system in some concerns is quoted as an argument against its introduction in other undertakings.

5. System is more Complex

As the cost accounting system involves number of steps in ascertaining of cost such as collection and classification of overheads, allocation and apportionment of overheads, it is considered to be complicated system of accounts. Moreover the system makes use of several documents and forms in preparing the reports. This will tend to delay in the preparation of accounts.

6. It lacks Social Accounting

Cost accounting fails to take into account the social obligation of the business or organization. In other words, social accounting is outside the purview of cost accounting.

7. Not Suitable for Small Units

A cost accounting system is applicable only to a large business enterprise but not to a small scale one. Hence, there is limitation to its application to all types of business enterprises.

8. Implementation of Same Costing Method and Technique

All business enterprises cannot make use of a single method and technique of costing. It all depends upon the nature of business and type of product manufactured by it. If a wrong method and technique is used, it misleads the results of business.

1.9 Distinguish between Financial Accounting and Cost Accounting

The concept of accounting is to present and publish true facts and figures to users of financial statements. The financial accounting is required for presenting financial statements to users and cost accounting is important for determining the cost unit and total cost of each individual product. But still both the concepts are differ from each other. Let us discuss the difference between financial accounting and cost accounting.

Financial Accounting	Cost Accounting
1. It provides the information about the business in a general way. i.e Profit and Loss Account, Balance Sheet of the business to owners and other outside partners.	1. It provides information to the management for proper planning, operation, control and decision making.
2. It classifies, records and analyses the transactions in a subjective manner, i.e according to the nature of expense.	2. It records the expenditure in an objective manner, i.e according to the purpose for which the costs are incurred.
3. It lays emphasis on recording aspect without attaching any importance to control.	3. It provides a detailed system of control for materials, labour and overhead costs with the help of standard costing and budgetary control.
4. It reports operating results and financial position usually at the end of the year.	4. It gives information through cost reports to management as and when desired.
5. Financial Accounts are accounts of the whole business. They are independent in nature.	5. Cost Accounting is only a part of the financial accounts and discloses profit or loss of each product, job or service.
6. Financial Accounts records all the commercial transactions of the business and include all expenses i.e Manufacturing, Office, Selling etc.	6. Cost Accounting relates to transactions connected with Manufacturing of goods and services, means expenses which enter into production.
7. Financial Accounts are concerned with external transactions i.e. transactions between business concern and third party.	7. Cost Accounts are concerned with internal transactions, which do not involve any cash payment or receipt.
8. Stocks are valued at Cost or Market price whichever is lower.	8. Stocks are valued at Cost only.

1.10 Cost Classification

Cost may be defined as a resource sacrificed or foregone to achieve a specific objective. 'Sacrifice' refers to a resource that is consumed----say Rs.50,000 to lease a warehouse. 'Foregone' refers to giving up an opportunity for using a resource, for instance Rs.50,000 spent on the warehouse lease cannot be used for any other purpose.

Cost classification is the process of, grouping costs according to some of their common characteristics. A suitable classification of costs is of utmost importance in order to identify the cost with cost centers or cost units.

Costs can be classified according to: general classification and technical classification.

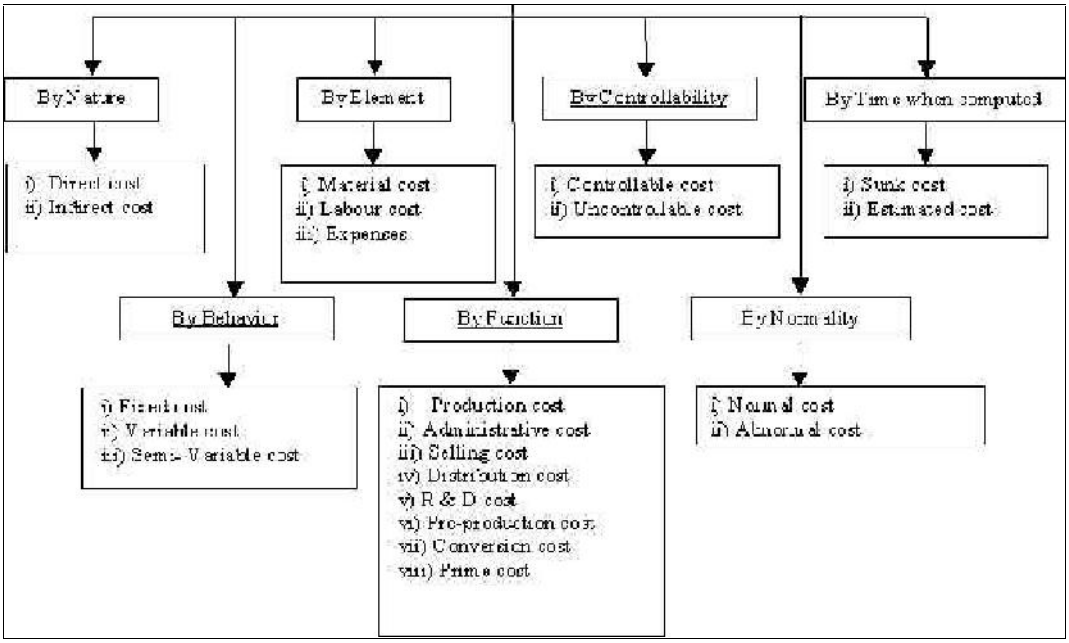

Fig 1: Classification of cost

1. By Nature Classification

- ***Materials-***As per CIMA, the cost of commodities supplied to an undertaking.Items are considered to be material when they have an excessive impact on reported profits, or on individual line items within the financial statements. Material also refers to the raw stock from which finished goods are made.
- ***Labour-***As per CIMA, the cost of remuneration (wages, salaries, commissions, bonuses, etc.) of the employees of an undertaking.Labour cost is classified as direct and indirect. They form the labour cost which in turn forms a significant percentage of the total cost of production in a manufacturing or service organization and there is need to exercise maximum care to minimize these costs.
- ***Expenses-***As per CIMA, the cost of services provided to an undertaking and the notional cost of the use of owned assets.An expense is the cost of operations that a company incurs to generate revenue. Businesses can write off tax-deductible expenses on their income tax returns, provided that they meet the IRS' guidelines. Accountants record expenses through one of two accounting methods: cash basis or accrual basis.

2. By Functions

- ***Manufacturing and Production Cost-***It is also known as factory overheads, works overheads or manufacturing overheads, these are those overheads which are concerned with the production function.

Example

The cost of materials for packaging, the cost of electricity and water, the cost of promotion and advertising, etc.

- ***Commercial Costs-***Commercial cost means those cost incurred for the purpose of the Commercialization of the Finished Product which are consistent with the budget.


Example

Expense incurred in controlling and directing an organization.Any cost incurred by a producer orwholesaler or retailer or distributor (as for shipping, etc.)

3. By Degree of Traceability

- ***Direct cost-*** Costs which are incurred for and conveniently identified with a particular cost object.


Example

For garments factory-cloth is the direct material for ready made garments.

- ***Indirect Cost-*** These are general costs and are incurred for the benefit of a number of cost object.Indirect material cost, Indirect labour cost and Indirect expenses are the three different components of the indirect expenses.


Example

Cost of the thread cannot be conveniently measured for single unit of the product.

4. By Change in Activity or Volume/ Behavior

- ***Fixed Costs-*** These remain constant over a specific range of activity for a specified period of time. It can be further classifies as Committed Costs, Discretionary Costs or Managed Costs, Step Costs as well.


Example

Rent of the factory, salary to the manager and so on.

- ***Variable Costs-*** Cost that tend to vary in direct proportion to the volume of output.


Example

The fuel for an airline. The cost for it changes with the number of flights and how long the trips are.

- ***Semi-Variable Costs-*** Cost that tend to vary in direct proportion to the volume of output.


Example

Electricity charges

5. By Accountability

- ***Controllable Costs-*** Costs which may be directly regulated at a given level of management authority. Cost which can be controlled through some measures known as controllable costs. All variable cost are considered to be controllable in segment to some extent.
- ***Non- Controllable Costs-*** Costs which may not be directly regulated at a given level of management authority. Costs which cannot be controlled are known as uncontrollable costs. All fixed costs are very difficult to control or bring down; they rigid or fixed irrespective to the level of production.

6. By Normality

- ***Normal Cost-*** Cost which is incurred on expected lines at a given level of output. Normal cost for a defined-benefit pension plan generally represents the portion of the economic cost of the participant's anticipated pension benefits allocated to the current plan year.
- ***Abnormal Cost-*** Cost which is not normally incurred at a given level of output. Abnormal cost maybe unexpected costs incurred, as a result of natural calamities or fire or accident or such other losses.

7. By Relationship with Accounting Period

- ***Capital Cost-*** Cost which incurs for long period of time and is as source of income.


Example

Purchase of heavy machinery.

- ***Revenue Cost-*** Cost which incurs is on continuous basis and is an earn an income.


Example

Repairs and renewals on machinery to make it working.

8. By Time

- ***Historical Costs-*** The costs are accumulated or ascertained only after the occurrence known as past cost or historical costs.
- ***Predetermined Costs-*** Future costs which are ascertained in advance of production.These costs are determined or estimated in advance to any activity by considering the past events which are normally affecting the costs.

9. According to Planning and Control

- ***Standard cost:***Standard cost is a cost scientifically determined by way of assuming a particular level of efficiency in utilization of material, labour and indirect expenses.The prepared standards are compared with the actual performance of the firm in studying the variances in between them. The variances are studied and analyzed through an exclusive analysis.
- ***Budget:***A budget is detailed plan of operation for some specific future period. It is an estimate prepared in advance of the period to which it applies. It acts as a business barometer as it is complete programme of activities of the business for the period covered.The control is exercised through continuous comparison of actual results with the budgets. The ultimate aim of comparing with each other is to either to secure individuals' action towards the objective or to provide a basis for revision.
- ***Committed costs:*** These are those costs that are incurred in maintaining physical facilities and managerial set up.
- ***Discretionary costs:*** Costs which can be avoided by management decisions. Such costs are not permanent.

10. By association with the Product

- ***Product Costs-*** These costs include all such costs that are involved in acquiring or making a product.
- ***Period Costs-*** These are those costs which are not necessary for production and are incurred even if there is no production.

11. For Managerial Decisions

- ***Marginal Cost-*** Marginal cost is the additional cost of producing one additional unit. Marginal cost is the same thing as variable cost.Marginal cost is the amount at any given

volume of output by which aggregate costs are changed if the volume of output is decreased or increased by one unit.


Example

Suppose it costs Rs. 1000 to produce 100 units and Rs. 1020 to produce 101 units. The average cost per unit is Rs.10, but the marginal cost of the 101 unit is Rs. 20.

- ***Out of Pocket Costs-*** Out-of-pocket expenses refer to costs that individuals pay out of their own cash reserves. Economic consequences of not being able to meet an internal or external demand from the current inventory. Such costs consist of internal costs (delays, labor time wastage, lost production, etc.) and external costs (loss of profit from lost sales, and loss of future profit due to loss of goodwill). Also called shortages costs.
- ***Differential Costs-*** This cost may be regarded as the difference in total cost resulting from a contemplated change. The Incremental Costs and Decremental Costs are the categories in differential costs, which specifies increase and decrease in costs while increase in output.
- ***Sunk Costs-*** A sunk cost is an expenditure made in the past that cannot be changed and over which management no longer has control.


Example

Spending on advertising or researching a product idea.

- ***Imputed/Notional Costs-*** These are hypothetical costs which are specially computed outside the accounting system for the purpose of decision making
- ***Opportunity Cost-*** It is the sacrifice involved in accepting an alternative under consideration.
- ***Replacement Cost-*** This is the cost at which there could be purchased an asset identical to that which is being replaced.
- ***Future Cost-*** Relevant costs for decision making are predetermined or future costs.
- ***Conversion Cost-*** It is the total cost of 'converting' a raw material into finished product

1.11 Cost Centre

A cost centre refers to a part of a factory for which costs are accumulated separately. In order to facilitate charging of costs to cost units, it is necessary to divide the factory or industry into various parts which can be used to accumulate costs for subsequent distribution. Each such part of a factory or industry is known as cost centre.

As per CIMA, A location, person, or item of equipment (or group of these), for which costs may be ascertained and used for the purpose of control.

Types of Cost Centre

- ***Operation and Process Cost Centre:***Operation cost centre consist of those machines which carry out the same operation. A process cost centre is a cost centre in which a specific process or a continuous process of operation is carried out.
- ***Production and Service Cost Centre:***A production cost centre is one where actual production process is carried out. The manufacturing and non-manufacturing costs are charged to production cost centre. A service cost centre is one which provides services to other cost centre. Only non-manufacturing costs are charged to service cost centre.
- ***Personal and Impersonal Cost Centre:*** Personal cost centre consists of a person or group of persons. Personal cost centre follows the organizational structure of a factory or organization. Under this type of cost centre, costs are analyzed and accumulated according to; say, factory manager, sales manager, store keeper, etc. Impersonal cost centre consists of a location of equipment. A cost centre relating to location may represent an area of sales, warehouse. Cost centre relating to an item of equipment could be a machine or group of machines.

Whatever may be the kinds of cost centre, it is determined by taking into consideration the following factors:

- Responsibilities and accountability to be identified,
- Volume of work to be performed,
- Uses of cost centers, and
- Cost control activities exercised.

1.12 Cost Unit

As per CIMA, unit of product or service in relation to which costs are ascertained.' Cost unit is a device used for the purpose of splitting total cost into smaller sub-divisions attributable to products or service. A cost unit simply stated is a unit of finished product, service of these in relation to which cost is ascertained and expressed. The following are some of the examples of cost units selected from different industries or organizations.

Name of the Industry or Organisation	Product	Cost Unit
Brick Industry	Bricks	Per 1,000 bricks
Power Industry	Electricity	Per kilo-watt hour
Cement Industry	Cement	Per tonne
Pharmaceutical Industry	Tablets	Per 1,000 tablets
Sugar Industry	Sugar	Per tonne
Furniture Industry	Table	Per table
Hardware Industry	Bolts and nuts	Per 1,000 pieces
Cotton Textile Industry	Yarn	Per Kg
Construction Company	House	Per contract
Transport Companies	Service	Per passenger mile
Hospital	Service	Per bed-day
Canteen	Service	Per meal

Fig 2: Examples considered for cost unit

Cost Object: Anything for which a separate measurement of cost may be desired.

1.13 Elements of Cost

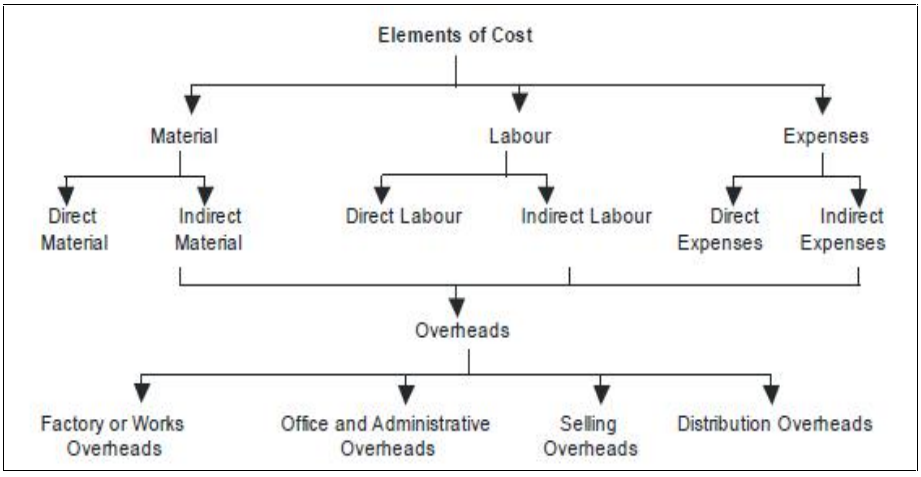

Fig 3: Elements of Cost

1.Material Cost- As per CIMA, the cost of commodities supplied to an undertaking.

A. Direct Material:Direct material is material that can be directly identified with each unit of the product. Direct material can be conveniently measured and directly charged to the product.


Example

Raw cotton in textile manufactures, sugarcane in sugar industry and leather for shoe-making industry. The cost of direct material includes the following:

- All type of raw materials issued from the store,
- Raw materials specifically purchased for the specific job or project,
- Raw materials transferred from one cost centre to another cost centre,
- Primary packing material, like cartons, cardboard boxes etc.

B. ***Indirect Material:*** They are those materials which do not normally form a part of the finished product. It has been defined as "materials which cannot be allocated but which can be apportioned to or absorbed by cost centers or cost units".


Example

Stores used in maintenance of machinery, buildings, etc., like lubricants, cotton ..waste, bricks and cements.Stores used by the service departments i.e., non-productive departments like Power house, Boiler house and Canteen, etc.

2. **Labour Cost:**As per CIMA, this is 'the cost of remuneration (wages, salaries, commissions, bonuses, etc.) of the employees of an undertaking'.

A. ***Direct labour-*** It is labour that can be identified directly with a unit of finished product. All the labour charges expended in altering the construction, composition, confirmation or condition of the product is included in it. It includes the payment of direct wages made to the following groups of direct labour:

- Direct labour engaged on the actual production of the product.
- Direct labour engaged in adding this manufacture by way of supervision, maintenance and tool setting, etc.
- Inspectors, analysts, etc. specially required for such production.

B. ***Indirect labour cost-***It is of general character and cannot be conveniently identified with a particular cost unit. The wages of that labour which cannot be allocated but which can be apportioned to or absorbed by, cost centers or cost units is known as indirect labour. In other words, wages paid to labour which are employed other than or production constitute indirect labour costs. Examples of indirect labourare: charge hands and supervisors, maintenance workers, labour employed in service departments, material handling and internal transport, apprentices, trainees and instructors, factory clerical staff and labour employed in time and security office, etc.

3. **Expenses:**As per CIMA, the cost of services provided to an undertaking and the notional cost of the use of owned assets.

A. ***Direct expenses-***According to CIMA, London, 'direct expenses are those expenses which can be identified with and allocated to cost centers or units.'They include all expenditures other than direct material and direct labour that are specifically incurred for a particular product or job. Such expenses are charged directly to the particular cost account concerned as part of the prime cost. Examples of direct expenses are: excise duty, royalty, surveyor's fees, cost of rectifying defective work, travelling expenses to the job, experimental expenses of projects, expenses of designing or drawings, repairs and maintenance of plant obtained on hire and hire of special equipment obtained for a contract.

B. ***Indirect expenses***- All indirect costs, other than indirect materials and indirect labour costs, are termed as indirect expenses. Indirect expenses are expenses which cannot be allocated but which can be apportioned to or absorbed by cost centers or cost units as rent, insurance, municipal taxes,

salary of manager, canteen and welfare expenses, power and fuel, cost of training for new employees, lighting and heating, telephone expenses, etc.

4. **Overheads:** These are the aggregate of indirect material cost, indirect labour cost and indirect expenses. Overheads may be defined as the cost of indirect materials, indirect labour and such other expenses including services as cannot conveniently be charged direct to specific cost units. Thus, overheads are all expenses other than direct expenses. Thus,

Indirect material + Indirect labour + Indirect expenses = Overheads

5. **Production overheads**: Factory or works overheads cover all indirect expenditure incurred by the undertaking from the receipt of the order until its completion is ready for dispatch either to the customer or to the finished goods store. The overheads also include: depreciation on plant and machinery, buildings and equipment, insurance charges on fixed assets, repairs and maintenance of fixed assets, electricity charges, coal and other fuel charges, rent, rates and taxes of works, etc. Also known as factory overheads, works overheads or manufacturing overheads, these are those overheads which are concerned with the production function.

6. **Office and administration overheads:** These are the indirect expenditures incurred in general administrative function, i.e., in formulating policies, planning and controlling the functions, directing and motivating the personnel of an organization in the attainment of its objectives. Office and administrative overhead consists of all expenses incurred in the direction,control and administration of a factory. Examples are the expenses in running the general office e.g., office rent, light, heat, salaries, salary to secretaries and accountants, general managers, directors, executives, investigations and experiments and miscellaneous fixed charges.

7. **Selling and distribution overheads**: Selling overheads are the costs of promoting sales and retaining customers. They are defined as 'the cost of seeking to create and stimulate demand and of securing orders.' It includes sales office expenses, salesman's salaries and commission, showroom expenses, advertisement charges, fancy packing, samples and free gifts, after sales service expenses and demonstration and technical advice to potential customers. Distribution cost includes all expenditure incurred from the time the product is completed until it reaches its destination. It includes warehouse rent, warehouse staff salaries, insurance, expenses on delivery vans and trucks, expenses on special packing for bulk transport, losses in warehouse stocks and finished goods damaged in transit and cost of repairing, etc.

1.14 Role of Cost Accountant

Cost Accountant facilitates many roles and responsibilities, let us discuss the various kinds of roles he plays in an organization.

- Establishes a cost accounting department in his concern.
- Ascertains the requirement of cost information which may be useful to organizational managers at different levels of the hierarchy.
- Develops a manual, which specifies the functions to be performed by the cost accounting department. The manual also contains the format of various forms which would be utilized by the concern for procuring and providing information to the concerned officers. It also specifies the frequency at which the cost information would be supplied to a concerned executive.
- Analyzes manufacturing operations, equipment availability and utilization.
- Performing month-end cost accounting close.
- Maintaining cost accounting system and cost ledger.
- Performing life cycle cost-benefit analysis.
- Analyzing inventory valuations.
- Monitoring unit cost variance
- Implementing cost standards for materials and labor
- Preparing cost of goods sold and production reports
- Reconciling beginning raw materials, work-in-progress and finished-goods stock

1.15 Single, output or unit costing

This method is used when production is uniform and consists of a single or two or three varieties of the same product. As per J.R. Batliboi, Single or output cost system is used in businesses where a standard product is turned out and it is desired to find out the cost of a basic unit of production.

Objectives of Single Costing

Single costing is a very simple method of costing. Its principal objectives are as follows:

- To ascertain the per-unit cost of production by dividing the total cost of production by the number of units produced.
- To estimate per unit cost of production for the future and facilitate production planning.
- Help in the preparation of tenders and fixation of selling prices.
- To facilitate a comparison of the cost of production of two accounting periods.
- To control the cost of the product through the comparative study of the costs of any two periods. Or, the comparison of the actual costs with the pre-determined standard cost.
- The analyze the expenditure by nature, classify them into the element of cost and know. The extent to which each element of cost contributes to the total cost.
- To ascertain the profit or loss of production.

Application of Cost Accounting

- Generally, cost accounting applied in Manufacturing concerns only. It can now a days applied in manufacturing and non-manufacturing concerns, but they must relate to money only.
- Wholesale and retail business.
- Banking and insurance companies.
- Railways, airways, shipping and roadways.
- Hotels, hospitals, schools, colleges, universities.

1.16 Cost Sheet

Cost sheet is a statement of cost. In other words, when costing information are set out in the form of a statement, it is called cost sheet. For determination of total cost of production, a statement showing the various elements of cost is prepared. This statement is called as a 'statement of cost' or 'cost sheet'.

Elements of Cost Sheet

Material consumed.	Selling and Distribution overhead.
Direct wages & salaries.	Valuation of stock of WIP & finished goods.
Direct expenses.	Treatment of scrap & waste.
Work overhead.	Miscellaneous income.
Administration overhead.	Interest & financial charges.
Cost of production.	Abnormal & non-recurring cost.

1.17 Preparation of Cost Sheet

The format is prescribed by authorized bodies for the preparation of cost sheet in organization. The following steps and formulas can be used for same.

1. Calculation of Materials Consumed:

Materials Consumed = (Opening stock of raw materials + Purchase of raw material + carriage inward) - (closing stock of raw material).

2. Calculation of Prime Cost:

Prime Cost = Materials consumed + direct wages + direct expenses.

3. Calculation of Factory cost:

Factory Cost = Prime cost + sum of all factory overheads.

4. Calculation of Cost of Production:

Cost of Production = Factory cost + office and administration overheads.

5. Calculation of Cost of Sales or Total Cost:

Total Cost = Cost of production + selling and distribution overheads.

6. Calculation of Total Sales:

Total Sales = Total cost + net profit.

1.17 Format of Cost Sheet

The following format is applied in organizations for the preparation of cost sheet and the data in feed into the format and results fetch, which can be used for further decision making.

Particulars		Amount	Amount
Opening Stock of Raw Material		***	
Add: Purchase of Raw materials		***	
Add: Purchase Expenses		***	
Less: Closing stock of Raw Materials		***	
Raw Materials Consumed		***	
Less;- Sale of Material Scrap (if any)		***	
Direct Wages (Labor)		***	
Direct Charges		***	
Prime cost (1)			***
Add :- Factory Over Heads:			
Factory Rent		***	
Factory Power		***	
Indirect Material		***	
Indirect Wages	Supervisor	***	
Salary		***	
Drawing Office Salary		***	
Factory Insurance		***	
Factory Asset Depreciation		***	
Less:- Sale of Factory Scrap (If any)			
Works cost Incurred			***
Add: Opening Stock of WIP		***	
Less: Closing Stock of WIP		***	
Works cost (2)			***
Add:- Administration Over Heads:-			
Office Rent		***	
Asset Depreciation		***	
General Charges		***	
Audit Fees		***	
Bank Charges		***	
Counting house Salary		***	
Other Office Expenses		***	
Cost of Production (3)			***
Add: Opening stock of Finished Goods		***	
Less: Closing stock of Finished Goods		***	
Cost of Goods Sold			***
Add:- Selling and Distribution OH:-			
Sales man Commission		***	
Sales man salary		***	
Traveling Expenses		***	
Advertisement		***	
Delivery man expenses		***	
Sales Tax		***	
Bad Debts		***	
Cost of Sales (5)			***
Profit (balancing figure)			***
Sales			***

Numerical

Mr. Zia furnishes the following data related to the manufacture of a standard product during the month of August 2020. You are required to prepare a cost sheet from the above showing, the cost per unit, cost per unit sold and profit for the period

Raw material consumed	Rs 15,000
Direct labour	Rs 5,000
Direct expenses	Rs. 4000

Machine hours worked	900 Hours
Machine hour rate	Rs 5
Administration overheads	20% of works cost
Selling overheads	Rs 0.50 per unit
Unit produced	17,100
Unit sold	16,000 @ Rs 4 per unit

Solution

Particulars	Amount	Amount
Opening Stock of Raw Material	***	
Add: Purchase of Raw materials	***	
Add: Purchase Expenses	***	
Less: Closing stock of Raw Materials	***	
Raw Materials Consumed	15,000	
Less;- Sale of Material Scrap (if any)	***	
Direct Wages (Labor)	5,000	
Direct Charges	4,000	
Prime cost (1)		24,000
Add :- Factory Over Heads: (900 hours*5)	4500	
Factory Rent	***	
Factory Power	***	
Indirect Material	***	
Indirect Wages Supervisor	***	
Salary	***	
Drawing Office Salary	***	
Factory Insurance	***	
Factory Asset Depreciation	***	
Less:- Sale of Factory Scrap (If any)		
Works cost Incurred		28,500
Add: Opening Stock of WIP	***	
Less: Closing Stock of WIP	***	

Works cost (2)		***
Add:- Administration Over Heads:- (28500*20%)	5,700	
Office Rent	***	
Asset Depreciation	***	
General Charges	***	
Audit Fees	***	
Bank Charges	***	
Counting house Salary	***	
Other Office Expenses	***	
Cost of Production (3)		**34,200**
Add: Opening stock of Finished Goods	***	
Less: Closing stock of Finished Goods (17100-16000= 1100 units*2) :34200/16100	(2200)	
Cost of Goods Sold		**32,000**
Add:- Selling and Distribution OH:- (16000 units*.50)	8000	
Sales man Commission	***	
Sales man salary	***	
Traveling Expenses	***	
Advertisement	***	
Delivery man expenses	***	
Sales Tax	***	
Bad Debts	***	
Cost of Sales (5)		**40,000**
Profit (balancing figure)		**24,000**
Sales (16000*4)		**64,000**

Summary

- Financial accounting reflects the accounting on "accrual basis" over the accounting on "cash basis".
- Cost accounting is the reporting and analysis of a company's cost structure.
- Managerial accounting is the practice of identifying, measuring, analyzing, interpreting, and communicating financial information to managers.
- Cost means,the price paid for something.
- Cost accountancy is the science, art and practice of a Cost Accountant.
- Cost reduction is the process used by companies to reduce their costs and increase their profits.
- A cost centre refers to a part of a factory for which costs are accumulated separately.
- Cost unit is a device used for the purpose of splitting total cost into smaller sub-divisions attributable to products or service.
- Single or output cost system is used in businesses where a standard product is turned out and it is desired to find out the cost of a basic unit of production.
- The costing information are set out in the form of a statement, it is called cost sheet.

Keywords

- ***Cost accounting-*** It is also the practice of a cost accountant because he has to make constant efforts in the field of cost accounting.
- ***Materials-***As per CIMA, the cost of commodities supplied to an undertaking.
- ***Labour-***As per CIMA, the cost of remuneration (wages, salaries, commissions, bonuses, etc.) of the employees of an undertaking.
- ***Expenses-***As per CIMA, the cost of services provided to an undertaking and the notional cost of the use of owned assets.
- ***Direct cost-*** Costs which are incurred for and conveniently identified with a particular cost object.
- ***Indirect Cost-*** These are general costs and are incurred for the benefit of a number of cost object.

- ***Semi-Variable Costs-*** Cost that tend to vary in direct proportion to the volume of output.
- ***Capital Cost-*** Cost which incurs for long period of time and is as source of income.
- ***Revenue Cost-*** Cost which incurs is on continuous basis and is an earn an income.
- ***Marginal Cost-*** Marginal cost is the additional cost of producing one additional unit.
- ***Single or output cost system-*** It is used in businesses where a standard product is turned out and it is desired to find out the cost of a basic unit of production.
- ***Opportunity Cost-***It is the sacrifice involved in accepting an alternative under consideration.

Self Assessment

1. Which is not a type of accounting used by financial users?

A. Financial Accounting

B. Cost Accounting

C. Management Accounting

D. Advanced Accounting

2. Cost means price paid for_____.

A. Something

B. Specific item

C. Actual product

D. None of above

3. Cost _____is the science, art and practice of a Cost Accountant.

A. Accounting

B. Accountancy

C. Patterns

D. Technique

4. Cost accounting performs the function/s as_____.

A. Cost ascertainment

B. Cost control

C. Cost reduction

D. All above

5. Cost _____ is the verification of correctness of Cost Accounts and check on the adherence to the Cost Accounting plan.

A. Accounting

B. Verification

C. Audit

D. Vouching

6. Cost accounting helps the management in _____.

A. Cost control

B. Decision making

C. Inventory control

D. All above

7. Workers are benefited by introduction of _____ which are an integral part of a cost system.

A. Incentive plans

B. Fringe benefits

C. Free education services

D. None of above

8. _____ locates the exact causes for decrease or increase in the profit or loss of the business. .

A. Cost Accounting

B. Cost Accountancy

C. Cost Patterns

D. Cost Technique

9. A _____ provides ready figures for use by the Government, wage tribunals and boards, and labour and trade unions.

A. Cost ascertainment

B. Cost control

C. Cost reduction

D. Cost system

10. Cost Accounting is only a part of the _____ accounts and discloses profit or loss of each product, job or service.

A. Advanced

B. Management

C. Financial

D. Corporate

11. _____cost means those cost incurred for the purpose of the Commercialization of the Finished Product which are consistent with the budget.

A. Finance

B. Final

C. Management

D. Commercial

12. Which is general cost and is incurred for the benefit of a number of cost object.

A. Indirect

B. Specific

C. Actual

D. Direct

13. Costs which may be directly regulated at a given level of management authority?

A. Indirect

B. Controllable

C. Uncontrollable

D. Actual

14. Which cost incurs on continuous basis and is an earn an income?

A. Capital cost

B. Controllable cost

C. Fixed cost

D. Revenue cost

15. Anything for which a separate measurement of cost may be desired, it is known as_____.

A. Cost technique

B. Cost unit

C. Cost object

D. Cost centre

16. _____ is that which can be conveniently identified with and allocated to cost units.

A. Defective material cost

B. Special material cost

C. Indirect material cost

D. Direct material cost

17. Labour Cost is the cost of remuneration of the_____ of an undertaking.

A. Employees

B. Management

C. Union

D. None of above

18. What are the aggregate of indirect material cost, indirect labour cost and indirect expenses?

A. Expenditure

B. Overheads

C. Elements

D. Techniques

19. _____ overheads which are concerned with the production function.

A. Manufacturing

B. Factory

C. Works

D. All above

20. _____method is used when production is uniform and consists of a single or two or three varieties of the same product.

A. Uniform costing

B. Mixed output

C. Single unit

D. Variable costing

21. Cost accounting applied to _____.

A. Wholesale

B. Banking

C. Hospitals

D. All above

22. When costing information are set out in the form of a statement, it is called _____.

A. Cost Sheet

B. Cost Statement

C. Cost Information

D. None of above

23. Which is/ are the elements of cost sheet?

A. Administration overheads

B. Selling overheads

C. Distribution overheads

D. All above

24. Factory cost + office and administration overheads =_____.

A. Cost of output

B. Cost of goods sold

C. Cost of sales

D. Cost of production

25. Cost of production + selling and distribution overheads = _____.

A. Cost of output

B. Cost of goods sold

C. Cost of sales

D. Cost of production

Review Questions

1. Define cost accounting.

2. Discuss the limitations or disadvantages of cost accounting.

3. "Cost accounting is becoming more and more relevant in the emerging economic scenario in India". Explain this statement.

4. "Cost accounting system that simply records costs for the purpose of fixing sale price has accomplished only a small part of its mission". Explain.

5. Is there any difference between cost accounting and financial accounting?

6. Illustrate indirect and direct expenses with the help of suitable examples.

7. What is cost classification? Classify it in detail.

8. Illustrate the different types of costs with suitable examples.

9. Briefly write a note on key elements of cost.

10. How will you determine the scope of cost accounting?

11. What are the components of total cost? Draw a format of cost sheet.

12. Prepare the cost sheet to show the total cost of production and cost per unit of goods manufactured by a company for the month of Jan. 2021 Also find the cost of sale and profit.

Particulars	₹	Particulars	₹
Stock of raw materials 1.1.2005	6,000	Factory rent and rates	6,000
Raw materials procured	56,000	Office rent	1,000
Stock of raw material 31.1.2005	9,000	General expenses	4,000
Direct wages	14,000	Discount on sales	600
Plant depreciation	3,000	Advertisement expenses	1,200
Loss on the sale of plant	600	Income tax paid	2,000
Sales	₹ 1,50,000		

Answers: Self Assessment

1. D	2. A	3. B	4. D	5. C
6. D	7. A	8. A	9. D	10. C
11. D	12. A	13. B	14. D	15. C
16. A	17. A	18. B	19. D	20. C
21. D	22. A	23. D	24. D	25. D

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 Online links

- www.futureaccountant.com
- www.icmai.in

Unit 02: Major Components of Cost

CONTENTS

Objectives

After studying this unit, you will be able to:

- recognize the conceptual framework of material control,
- use the appropriate material control technique in real world,
- know the significance of various techniques of material control.
- apprehend the concept of material losses.
- appreciate the various incentive plans for labour.

Introduction

Material is a very important factor of production in a manufacturing organization. It is the first and the most important element of cost. Materials account for nearly 50–60 per cent of the cost of production. This fact can be inferred from an analysis of the financial statements of a large number of organizations.

The term 'material' generally used in manufacturing concerns, refers to raw materials used for production, sub-assemblies and fabricated parts. The terms 'materials' and 'stores' are sometimes used interchangeably. However, both the terms differ. 'Stores' is wider in meaning and comprises many other items besides raw materials, such as tools, equipment, maintenance and repair items, factory supplies, components, jigs and fixtures. Sometimes, finished goods and partly finished goods are also included within the scope of this item.

2.1 Meaning of Material

The success of any industry or enterprise depends, to a greater extent, upon the successful control of material. Further, this input provides a number of avenues and wide scope for improvement of overall performance of the industry. Inventory control, therefore, aims at ensuring the availability of required quality material in required quantity, at required time or period and place with minimum cost.

Inventory involves investment of money and locking up of precious space which has alternate uses. It is said that inventory is a necessary evil. As a result, proper control has to be exercised over it. In controlling inventory, firms or industries use a number of techniques and models. Inventory control is generally exercised over raw materials and work in progress. The basic purpose of inventory control is to maintain optimum level of inventory. All commodities that are consumed in the process of manufacture. Materials are classified into:

- ***Direct materials-*** Those whose consumption may be identified with specific production units, and which usually become a part of the finished product. Like- leather in shoes, timber used in furniture.
- ***Indirect materials-*** Those which cannot be conveniently identified with individual cost units. Like- pins, screw, gum, nuts and bolts.

Types of Materials

- ***Raw Materials:*** Basic materials in crude form. The components of it are like finished parts made out of raw materials and aassembled to make finished product.
- ***Tools:*** Appliances used in manufacturing operations.
- ***Spare Parts:*** Used for maintenance of plant.
- ***Consumable Stores:*** For smooth running of machines.

2.2 Inventory Control

Inventory control is the process of keeping the right number of parts and products in stock to avoid shortages, overstocks and other costly problems. Inventory control focuses on cutting the number of slow-selling products a company purchases while also increasing the number of high-selling products. This saves businesses time and money because they don't have to spend lots of man-hours reordering and receiving goods that they don't really need. They avoid devoting precious warehouse space to hold those products, which cuts down on carrying costs and affords more room for faster-selling products. Inventory control includes:

- Systematic purchase of material.
- Storage and usage of materials in such a way so as to maintain an even flow of production.
- Efficient use or consumption.
- Avoiding excessive investment in inventories.

Objectives of Material Control

Material control or inventory control possesses various objectives for business. Let us discuss:

- ***Proper estimation:*** There will be proper estimations of inventory requirements-quantity, quality, specifications of inventory, etc. This will help the purchase manager to quality and quantity of materials. The purchase department has to exercise utmost care to procure the quality materials at lower prices.
- ***Stock levels:*** The stores department has also an effective role to play for stock levels. By keeping only the required quantities of materials, excess employment of capital on materials can be avoided. Further, it can reduce the loss of materials during the storage period and keep the materials in good condition.

- ***Maximum output:*** It is the production departments which are capable of extracting the maximum output from each unit of materials thereby contributing heavily to minimize the loss of materials during the production period and to maximize the productivity.
- ***No under stocking and overstocking:*** For keeping the stock of raw materials within limits in the stores i.e., to avoid overstocking and under stocking of raw materials, materials control is significant.
- ***Minimum wastage:*** The loss of material may occur on account of rust, dust, dirt or moisture, bad and careless handling of materials, poor packing and many other reasons. The causes responsible for such losses must be brought to light and utmost efforts should be made to minimize the wastage of raw materials. This is possible only by introducing an efficient materials control system.
- ***Economy in purchasing (favorable price):*** A proper system of materials control also aims at fixing responsibility of operating units and individuals connected with the purchase, storage and handling of materials.
- ***Proper quality of materials:*** The quality of finished products depends mainly on the quality of raw materials used. If quality of the raw materials is not up to desired standards, the end product will not be of desired quality which affects the sale of the product in the market resulting in loss of profits as well as goodwill of the concern. It is of vital importance to exercise strict control and supervision over the purchases, storage and handling of materials.
- ***Information about material:*** The main object of material control is to ensure smooth and unrestricted production. Production stoppages and production delays cause substantial loss to a concern.

Why Inventory Control is required?

Inventory control is very much required in manufacturing organizations. Some of the reasons are mentioned below:

- Coordination and cooperation between various departments dealing in materials.
- Central purchasing department.
- Classification and codification of materials.
- Perpetual inventory system should be operated so that up-to-date information is available about the quantity of material in stock.
- Adequate records.
- The various stock levels like minimum, maximum, etc., should be fixed for each item of material.
- Purchases of materials can be controlled through budgets.
- An efficient system of internal audit and internal check should be operated.
- Regular reporting to management.

2.3 Techniques of Inventory Control

Thus material control is the proper control of material which reduces the cost of production, minimizing the investment of fund in the purchases of material & increases the profitability of the organization.

This technique of material control is helpful in avoiding overstocking and under stocking of materials in store. The stock levels are fixed by the purchase manager and it is the duty of storekeeper to observe them. In order to requisition the stores for replenishment, the store-keeper should have a complete idea about different stock levels.

Various techniques are applied by accountants and experts while planning or implementing inventory control in actual in organizations. Some of the common techniques used are discussed below:

ABC technique	Stock levels
Economic order quantity	Proper purchase procedure
Proper storage of materials	Perpetual inventory system.
Inventory turnover ratio to review slow and non-moving materials.	Fixation of material cost standards (Used in Standard Costing).

A. ABC Technique (Selective Control)

In this technique, materials are analyzed according to their value so that costly and more valuable materials are given greater attention and care. Here ABC has a specific meaning, like

'A' Items (Significant few) :

- High value items which may consist of only a small % of the total items.
- Should be under the tightest control on account of their high cost.
- Requires high responsibility.

'B' Items (Not few, not too many):

- Neither very cheap nor very costly.
- Should be under the normal control procedures.

'C' Items (Insignificant many):

- Low value materials which represent a very large number of items.
- Should be under simple and economical methods of control.

Example

A store has 4,000 items of consumption and a monthly consumption of Rs. 20,00,000. 320 items will have a consumption of Rs. 15,00,000. 500 items will account for Rs. 4,00,000 and 2,680 items consume material worth Rs. 1,00,000 only.

Solution

Group	No. of Items	% of Items	Value ₹	% of Value
A	320	8%	15,00,000	75%
B	1,000	25%	4,00,000	20%
C	2,680	67%	1,00,000	5%
Total	4,000	100%	20,00,000	

- Group A- items are high valued items among the other items of the enterprise, requiring greater monitoring and controlling.
- Group B- items are comparatively lesser in value among the three items given next to the Group A, require less rigid control and monitoring.
- Group C- items are the major volume of items among the 4,000 items of the enterprise which are least in value, need very little control and monitoring.

The unique features of the ABC analysis:

Nature	A Group of Items	B Group of Items	C Group of Items
Level of Control	Rigid control	Moderate control	Very little control
Order frequency	Frequency of ordering-weeks, fortnights	Once in 2 months	Once in 6 months
Lead time problem	To be cut off drastically	To be reduced moderately	Lead time problem due to clerical should be cut off
Safety stock level	Due to greater value least volume of safety stock is to be maintained	Due to moderate value-lesser safety stock is required	Due to lower value higher safety stock is required
System of Purchase	Higher value demands centralized system of procurement	Moderate value requires centralized and decentralized system of purchase	Lower value needs decentralized system of purchase
Supervision	By Senior officers	By Middle level managers	By clerical staff

B. Stock Levels

In order to guard against under-stocking and over-stocking, most of the large companies adopt a scientific approach of fixing stock levels. These levels are: (i) maximum level; (ii) minimum level; (iii) reorder level; and (iv) reorder quantity. By adhering to these levels, each item of material will automatically be held within appropriate limits of control.

1. Maximum Level: The maximum stock level represents the upper limit beyond which the quantity of any item is not normally allowed to rise. The objective behind this is to ensure that the working capital is not blocked in stores unnecessarily. This is normally equal to the aggregate of minimum stock level and the economic order quantity. It is computed the following formula:

Maximum Stock Level = (Re-order level – Re-order quantity) – (Minimum consumption × Minimum re-ordering period)

OR

Maximum Stock Level = (Re-order level – Minimum consumption) + Re-order quantity

2. MinimumLevel*:* It is that level below which stock should not normally be allowed to fall. Minimum stock level is also called safety or buffer stock. The objective behind this is to see that production activities are not stopped for want of material. Minimum level is computed by the following formula:

Minimum Stock Level = Re-order level – (Normal consumption per unit of time × Average lead time)

OR

Minimum Stock Level = Re-order level – (Normal consumption × Normal re-order period)

3. ***Reorder Level or Ordering Level:***The Re-order stock level at which the fresh order is placed for purchase of material is called the re-order inventory level. When the stock of a material reaches this level, the store-keeper should initiate action for the purchase of material. This is fixed between maximum and minimum stock levels and it will be, normally, higher than the minimum stock level. It is calculated with the help of following formula:

Re-order Level = Maximum consumption per unit of time × Maximum lead time

OR

Re-order Level = Maximum consumption × Maximum re-order period

4. Danger Level: This is a level at which normal issues of materials are stopped and materials are issued for important works or projects only. Normally, stock level should not be allowed to-fall below minimum level. If it falls below the minimum level, then it indicates that urgent action for replenishment of stock must be taken to avoid stock-out situation. Danger level is normally fixed below the minimum stock level. It is calculated with the following formula:

Danger Level = Minimum consumption per unit of time × Maximum lead time for emergency purchases

OR

Danger Level = Normal consumption × Maximum re-order period under emergency conditions

5. Average Stock Level: This is the average of maximum and minimum levels. It is calculated with the help of following formula:

Average level = (Minimum level + Maximum level)/2

Example

From the following particulars, calculate the various stock levels:

Normal consumption: 300 units per day

Maximum consumption: 420 units per day

Minimum consumption: 240 units per day

Re-order period: 10–15 days

Re-order quantity: 3,600 units

Normal re-order period: 12 days

Solution

Re-order Level = Maximum usage × Maximum re-order period

= 420 units × 15 days = 6,300 units

Minimum Level = Re-order level – Normal consumption × Normal re-order period

= 6,300 – (300 units per day × 12 days)

= 6,300 – 3,600 = 2,700 units

Maximum Level = (Re-order level + Re-order quantity) – (Minimum consumption × Minimum re-order period)

= (6,300 + 3,600) – (240 × 10)

= 9,900 – 2,400 = 7,500 units

C. Reorder Quantity (Economic Order Quantityor EOQ)

- ***Reorder quantity*** is the quantity for which order is placed when stock reaches reorder level. While setting economic order quantity, two types of costs should be taken into account:
- ***Ordering cost-*** This is the cost of placing an order with the supplier.
- ***Cost of carrying***- This is the cost of holding the stock in storage.

The ordering of materials is usually tagged with three different components of costsI.e.Acquisition cost of materials, Ordering cost of materials andCarrying cost of materials. The ordering quantity of materials may be either larger or lesser in volume, which carries its own advantages and disadvantages.If the quantity ordered is larger in volume, the following are some of the important advantages:The bulk purchase order reduces the ordering cost of the materials.The greater the size of the order leads to reduce the number of the orders in procuring the materials.

Mathematical Formulae of EOQ

$$EOQ = \sqrt{\frac{2.A.B}{C.S}}$$

where EOQ = Economic Order Quantity
A = Annual consumption in units
B = Buying or ordering cost per order
C = Cost per unit
S = Storage or carrying cost as a percentage of average inventory

Alternatively,

$$EOQ = \sqrt{\frac{2.A.B}{S}}$$

where S = Storage cost per unit per annum

Example

Calculate EOQ
Annual requirement::1600 units
Cost of materials per unit: Rs. 40
Cost placing and receiving: Rs. 50

Annual carrying cost of inventory 10% on value.

Solution

$$\text{Economic Ordering Quantity (EOQ)} = \sqrt{\frac{2AO}{I}}$$

$$EOQ = \sqrt{\frac{2 \times 1600 \times ₹50}{10\% \text{ on } ₹40}} = 200 \text{ units}$$

Task:Given the annual consumption of material is 1,800 units, ordering costs are Rs. 2 per order, price per unit of material is 32 paise and storage costs are 25% per annum of stock value. Find the economic order quantity.

D. Purchase of Materials

- **Just-in-time (JIT) Purchasing:** Just-in-time purchasing is the purchase of materials immediately before these are required for use in production. According to CIMA, London JIT purchasing is 'matching receipts of materials closely with usage so that raw material inventory is reduced to near zero level.'Just In Time (JIT) is a production and inventory control system in which materials are purchased and units are produced only as needed to meet actual customer demand.

When Companies use Just in Time (JIT) manufacturing and inventory control system, they purchase materials and produce units only as needed to meet actual customers demand. In just in time manufacturing system inventories are reduced to the minimum and in some cases are zero. JIT approach can be used in both manufacturing and merchandising companies. It has the most profound effects, however, on the operations of manufacturing companies which maintain three class of inventories – raw material, Work in process, and finished goods. The main benefits of just in time manufacturing system are the following:

1. Funds that were tied up in inventories can be used elsewhere.
2. Areas previously used, to store inventories can be used for other more productive uses.
3. Throughput time is reduced, resulting in greater potential output and quicker response to customers.

4. Defect rates are reduced, resulting in less waste and greater customer satisfaction.


Case Study

Del Computer Corporation has finally tuned its Just-in-Time system so that an order for a customized personal computer that comes in over the internet at 9 AM can be on a delivery truck to the customer by 9 P.M. In addition, Dell's low cost production system allows it to under price its rivals by 10% to 15%. This combination has made Dell the envy of the personal computer industry and has enabled the company to grow at five times the industry rate. How does the company's just in time system deliver lower costs? "While machines from Compaq and IBM can languish on dealer shelves for two months Dell does not start ordering components and assembling computers until an order is booked. That may sound like no biggie, but the price of PC parts can fall rapidly in just a few months. By ordering right before assembly, Dell figures its parts, on average, are 60 days newer than those in an IBM or Compaq machine sold at the same time. That can translate into a 6% profit advantage in components alone."

Source: Gray McWilliams, "Whirlwind on the web, "Business Week, April 7, 1997.

- **Centralization:** Centralization of purchasing means that all purchases are made by a single purchase department. Head of this department is designated as Purchase Manager or Chief Buyer.
- **Decentralization:** In decentralized purchasing, each branch or department makes its own purchases. If the branches or plants are located at different places, the decentralized purchasing can better meet the situation by making purchases in the local market by plant or branch managers.

E. Purchase Procedure

A systematic and well-defined procedure is to be followed to make the purchase of materials as any lapse in the procedure may result in the stoppage of production whose ill-effects are incalculable. The purchasing department follows the following purchase procedure:

1. **Purchase Requisition:**Purchases of materials are initiated through purchase requisitions. It is a formal request by the head of the department or other authorities to the purchase manager to purchase the specified materials.Further, he prepares the purchase requisitions on the basis of bills of materials received from the competent authorities. If the materials listed in the bill of materials are not available in the store in adequate quantity, the store-keeper will prepare the purchase requisition.On the basis of the stock levels and/or bills of materials, the store-keeper prepares the purchase requisition in triplicate copies. The original copy is sent to the purchase department, duplicate copy to the production control department and the third copy to be retained in the stores department itself for its office record.

2. Selection of Suppliers: When the purchasing department receives a duly authorized purchase requisition, a source of supply has to be selected. The important rule is to buy the best quality materials at the lowest possible price.Further, it has to update the list of suppliers by collecting the information about the new suppliers. After that, the purchase department has to decide about whether the quotations are to be invited only from one source of supply, or from a very few selected sources of supply, or from all sources of supply through advertisement. On the receipt of tenders in sealed envelopes which will be opened and a comparative statement of all the quotations will be prepared. This statement is called comparative statement of quotations.

3. Purchase Order and Follow-Up: The purchase order is the form used by purchasing department authorizing the suppliers to supply the specified materials at a price and terms stated therein.The purchase order is in the form of an agreement with the suppliers which binds both the purchaser and supplier. Because, when the order is placed, the supplier is bound to supply the necessary materials as per the terms and conditions of the order. On the other hand, the purchase order also binds the purchase manager to accept the delivery of necessary materials and to make necessary arrangement for payments, because it is the purchase manager who has placed the order.

4. Receipt of Materials: All incoming material should be received by the receiving department. This department performs the functions of unpacking the goods received and verify their quantities and conditions.The receiving department receives, unloads, unpacks and marks the materials. It also checks the quantity of materials received and compares it with the quantity mentioned in the

purchase order. Any difference between the quantity ordered and the quantity received will be recorded in the remarks. On the basis of this, receiving department will prepare the materials received note.

5. Inspection and Testing of Materials: The important function of the inspection department is to check the quality and specifications of materials received as per purchase order. After the completion of inspection, the inspection department will prepare its report called materials inspection report mentioning clearly the quality of materials received and inspected and the reasons for the rejection or shortage of material, if any. Inspection report will be prepared in four copies – one each to purchase department, stores department, accounts department and for the file of inspection department itself.

6. Return of Rejected Materials: Where materials received are damaged or are not in accordance with the specifications, these are usually returned to the supplier along with a debit note, informing him that his account has been debited with the value of materials concerned. Also, On the basis of the materials received note and the materials inspection report, the purchase department will initiate steps for the discrepancies in the material received. In case, the invoice sent by the supplier includes the cost for materials not received, then the purchase department will issue a note called material debit note to the supplier and the accounting department will be informed to make the payment only for the actual quantity of materials received.

7. Passing Invoices for Payment: When the invoices are received by the purchasing department, the process of assembling the business paper concerned with each purchase and preparation of vouchers begins. Invoices are numbered serially and entered in the invoice register.When the invoice is received from the supplier, it is sent to the stores accounting section to check both the authenticity as well as the arithmetical accuracy. The quantity and price mentioned in the invoice are checked with reference to stores received note and the purchase order respectively. For a comprehensive verification, the purchase department has to take into consideration the purchase order; materials received note, materials inspection report, materials returned note, etc. After this scrutiny, if the invoice is found to be correct by the purchase department, then a suitable endorsement is to be made by the purchase department to this effect and it is to be passed on to the accounts department for payment.

F. Inventory Turnover Ratio

Inventory or stock turnover ratio tells us how many times in a year stock is used up and replaced. The greater the stock turnover, the more efficient is the stock policy. Stock turnover rate is the ratio which the cost of materials consumed per annum bears to the average stock of raw materials. Thus,

$$\text{Stock Turnover Ratio} = \frac{\text{Cost of materials consumed during the period}}{\text{Average stock of materials during the period}}$$

Stock turnover ratio is an indicator of the rate of consumption, i.e., whether materials are moving fast or slowly. A high stock turnover ratio indicates fast moving materials and a low ratio indicates slow moving materials. Stock turnover rate may also be calculated in terms of days. This is done by dividing 365 days by the inventory turnover ratio. Thus:

$$\text{Stock Turnover in terms of days} = \frac{\text{Days of the period}}{\text{Stock turnover rate}}$$

G. Perpetual Inventory Records

The Institute of Cost and Management Accountants of England and Wales, defines perpetual inventory as "A system of records maintained by the controlling department, which reflects the physical movement of stocks and their current balances."Thus, it is a system of ascertaining current balance after recording every receipt and issue of materials through stock records. An important point which should be kept in mind is that the perpetual inventory is usually checked by a programme of continuous stock-taking. Perpetual inventory means the system of it cords whereas continuous stock-taking means the physical checking of those records with actual stocks.

These records show the movement of stores, i.e., the receipt of materials, issues of materials to production department and also balance in stock. Bin card and storesledger are the two basic perpetual inventory records.

Difference between Stores Ledger and Bin Card

There are some important differences between stores ledger and bin card. They are identified below:

Stores Ledger	Bin Card
(a) Entry will normally be made after the transaction takes place.	(a) Entry will normally be made just before or after the transaction takes place.
(b) Transactions may be summarized and then entry may be made.	(b) Each transaction is recorded individually.
(c) It records both the quantity and amount of material received, issued and balance.	(c) It records only the quantity of materials received, issued and the balance.
(d) It is kept in the costing department and therefore, entries in this record will be made by the officials in the costing department or accounts department.	(d) This record is kept in the stores departments, and therefore, entries in bin card are made by the store-keeper.

2.4 Methods of Pricing Material Issues

Inventory control, therefore, aims at ensuring the availability of required quality material in required quantity, at required time or period and place with minimum cost. Inventory involves investment of money and locking up of precious space which has alternate uses. It is said that inventory is a necessary evil. As a result, proper control has to be exercised over it. In controlling inventory, firms or industries use a number of techniques and models. Inventory control is generally exercised over raw materials and work in progress. The basic purpose of inventory control is to maintain optimum level of inventory.Different methods available for pricing the material issues. Some of the more commonly used methods of pricing material issues are discussed below:

First-in, first-out method	Last-in, first-out method
Average cost method	Replacement price method
Standard price method	Highest-in, first-out method
Next-in, first-outmethod	Specific price or identifiable cost method
Base stock method	Periodic simple average method
Periodic weighted average method	Moving simple average method
Moving weighted average method	Inflated price method

A. **First-in, First-out (FIFO) Method:** This method is based on the assumption that materials which are purchased first are issued first. It uses the price of the first batch of materials purchased for all issues until all units from this batch have been issued. After the first batch is fully issued, the price of the next batch received becomes the issue price.Three important effects of using FIFO method are:

- Materials are priced at the actual cost.
- Charge to production for material cost is at the oldest prices of materials in stock.
- Closing stock is valued at the latest price paid.

Advantages of FIFO Method

The following are the advantages of FIFO method:

(a) The method is very simple and it is easy to operate,

(b) It is claimed that since the materials are charged into production at actual cost in order of receipt,

(c) It is more accurate method,

(d) It is also realistic since items are issued to shop in order of receipt, and

(e) Valuation of stock balance is a fair commercial value.

Disadvantages of FIFO Method

This method suffers from the following disadvantages:

(a) It is cumbersome and shows inflated profits during a period of rising prices,

(b) This method can, therefore, be used satisfactory where the following conditions exist, where inventories turn over rapidly and where the inventory is not a major factor in the profit or current asset situation.

B. **Last-in, First-out (LIFO) Method:** It is based on the assumption that the last materials purchased are the first materials to be issued. Thus, the price of the last batch of the materials purchased is used first for all issues until all units from this batch have been issued, after which the price of the previous batch of materials purchased is used. Three points should be noted regarding this method:

- Material issues are priced at actual cost.
- Charge to production for material cost is at latest prices paid.
- Closing stock valuation is at the oldest prices paid and is completely out of line with the current prices.

Advantages of LIFO Method

This method has the following advantages:

(a) It tends to level profits and losses during periods of rising and falling prices,

(b) This method is also quite simple to operate, particularly when prices are fairly steady, and

(c) It keeps value of issues close to current economic values.

Disadvantages of LIFO Method

This method has the following disadvantages:

(a) It is cumbersome and shows out of date figures in the balance sheet,

(b) Valuation of stock balance may not be acceptable for income-tax purposes, and

(c) This method can be used satisfactorily where following conditions exist, price fluctuations are considerable for most of the materials, and the relative value of materials is large in comparison to the total cost of the ..product.

 This method uses the price of the last batch received for all issues until all units from this batch have been issued, when the price is the previous batch received is used.

Numerical

1). 01.03.19 Opening stock 100 units @ $1.75

2). 05.03.19 Purchased 150 units @ $1.50

3). 12.03.19 Purchased 300 @ $1.60

4). 08.03.19 Issued 200 units.

5). 18.03.19 Issued 250 units.

Assuming this business used the FIFO and LIFO method, what would the rates be for the above issues of inventory?

Solution

Stores Ledger as per FIFO

Date	Receipts			Issued			Balance		
	Qty	Rate	Amount	Qty	Rate	Amount	Qty	Rate	Amount
1/3/19							100	1.75	175
5/3/19	150	1.5	225				100 150	1.75 1.5	175 225
8/3/19				200 --100 --100	1.75 1.5	175 150	50	1.5	75
12/3/19	300	1.6	480				50 300	1.5 1.6	75 480
18/3/19				250 --50 --200	1.5 1.6	75 320	100	1.6	160

Stores Ledger as per LIFO

Date	Receipts			Issued			Balance		
	Qty	Rate	Amount	Qty	Rate	Amount	Qty	Rate	Amount
1/3/19							100	1.75	175
5/3/19	150	1.5	225				100 150	1.75 1.5	175 225
8/3/19				**200** --150 --50	1.5 1.75	225 87.5	50	1.75	87.5
12/3/19	300	1.6	480				50 300	1.75 1.6	87.5 480
18/3/19				**250** --250	1.6	400	50 50	1.75 1.6	87.5 80

C. **Average CostMethods:** These methods are based on the assumption that when materials purchased in different lots are stored together, their identity is lost, and therefore, issues should be charged at an average price.

- ***Simple Average Method*-**ICMA, England defines the simple average price as "a price which is calculated by dividing the total of the prices of the materials in the stock from which the material to be priced could be drawn, by the number of prices used in that total". 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 year or period and dividing the total of these prices by the number of prices.

Advantages of simple average method are mentioned below:

(a) It is comparatively easy to compute the issue price, and

(b) This method smoothes out fluctuations in price provided the price fluctuations are within narrow limits.

Disadvantages of simple average method are given below:

(a) This method does not attach any importance to the quantity in each consignment,

(b) Since, the value of closing stock is ascertained by finding out the difference between the value of materials before the issue and the total price of that issue, it may assign an absurd value to the closing stock,

- ***Weighted Average Method-***Under this method consider both the cost of materials and the number of units of material. In brief, the Weighted Average Price is calculated by dividing the total cost of material on the date of issue, by the total quantity of available material. It is, therefore, necessary, under this method, to compute the issue price as soon as fresh consignment is received. Any number of issues can be priced at the same rate until the receipt of a new consignment which necessitates the calculation of issue price afresh.

Advantages of Weighted Average Price Method:

(a) This method is simple and easy to operate as the computation of issue price,

(b) Value of closing stock is not distorted under this method,

(c) This method evens out even the wide fluctuations in the price, and

(d) It reduces the clerical work as the computation of new issue price.

Disadvantage of Weighted Average Price Method:

(a) If the material is purchased again and again at short intervals, the calculation work increases, and

(b) As the material is issued at average price, the production cost cannot be correctly estimated.

D. **Replacement Price Method:** Replacement price is the price at which materials would be replaced, i.e., the market price on the date of issue. This method is used when it is desired to reflect the current prices in cost.In other words, the materials are issued at the market prices of the same type of materials on the date of the issue. This method is used when it is designed to reflect current prices in cost. It is must suitable for business that buys large quantities of materials well in advance of requirements.

Advantages of Replacement or Market Price Method

(a) The material cost of the product reflects the current market price, and

(b) It is simple and easy to operate as no calculations are required to be made of the issue prices as is done in average, FIFO, LIFO methods, etc.

Disadvantages of Replacement or Market Price Method

(a) It deviates from the costing concept, in the sense that issues are not prices at actual cost,

(b) In this method, inventory valuation is not at current prices, and

(c) It involves considerable work of finding out the replacement price at the time of each issue. Sometimes replacement price is not easily available or not available at all.

E. **Standard Price Method:** Standard price is a predetermined price which is fixed for a definite period, such as a year. Under this method, all receipts are posted in the Stores Ledger Account at actual cost and issues are priced at standard price. The difference between actual and standard prices, is transferred to Material Price Variance Account.

Advantages of Standard Price Method

(a) This method facilitates the control of material cost,

(b) It is simple and easy to work,

(c) This method reduces the clerical work pertaining to the computation of issue price, and

(d) The use of standard price for material issues results in material profit or loss, and

(e) This method deviates from the costing principle, in the sense that the issue is not valued at the cost price.

F. **Highest-in, First-out (HIFO)Method:** In this method, materials issued are charged at the rate of the highest priced materials in stores. This highest rate is continued to be used until material at that highest price is exhausted, after which the next highest price is used.Under HIFO method, issues are made out of highest priced batch of material. Till the completion of issue of these units, the price of that batch is used as the issue price. After all the units in the highest priced lot of material are issued, the next highest priced batch of material in stock is issued. This process continues. Issues are always priced at higher prices and the closing stock is, therefore, valued at the lowest possible price.

This method is very suitable in fluctuating market because cost of heavily priced materials is recovered first and inventory valuation is kept at lowest which amounts to create a secret reserve. This method is not popular but is used in 'Cost-plus Contracts' with advantage.

G. **Next-in, First-out(NIFO) Method:** Here materials are not charged at a price which has been paid, but rather at a price at which an order has been placed, i.e., the price of materials that will be next received. Under NIFO method, issues are priced at the price at which order for material has been placed but not yet received. It is based on the assumption that the price of the next consignment is known before it is received. If by the time the materials are received, the production is completed, the production cost of materials shows the value of most current purchases. NIFO method is almost similar to LIFO method.


Example

In stock there are two batches of materials, one at Rs. 20 and the other at Rs. 22. There is a further batch of materials on order at Rs. 23 which has not yet been received. If materials were to be issued now, these will be charged at Rs. 23. The main argument in favour of this method is that this is a more up-to-date replacement price than the LIFO method.

H. **Specific Price or Identifiable Cost Method:** Special materials purchased exclusively for specific jobs or work orders should be charged to those specific jobs at the specific (actual) price. This method can always be used where materials are purchased and set aside for a particular job or work order until required for production.Specific Price Method is one of the methods of actual price method. In this method adopted where the materials are purchased for particular job or operation and the issue is charged with the actual cost price. This method is suitable only in the case of special purpose materials are purchased for a particular job. This method has been widely used in job order industries which carry out individual jobs or contract against specific orders. This method is simple and easy to operate and useful where the job costing is in operation.

I. **Base Stock Method:**Under this method pricing is determined on the basis of assumption made here is that a certain minimum quantity of materials maintained in stock. This minimum quantity is known as Base Stock or Safety Stock. This quantity cannot be used unless an emergency arises. The minimum stock is in the nature of fixed assets because it is created out of the first lot of the material purchased. Therefore it always valued at the actual cost price of the first lot and is carried forward as fixed assets. This method is usually applied with FIFO or LIFO.

J. **Periodic Simple Average Method:** This method is similar to simple average method except that the issue price here is computed periodically (normally at the month-end) and not at the time of each issue of material.

$$\text{Periodic simple average price} = \frac{\text{Total of purchase prices during the period}}{\text{No. of prices during the period}}$$

K. **Periodic Weighted Average Method:** Like periodic simple average method, in this method also average price is calculated at the end of a given period (which is usually one month).

$$\text{Periodic weighted average price} = \frac{\text{Total cost of materials purchased}}{\text{Quantity purchased}}$$

L. **Moving Simple Average Method:** In this method, the periodic simple average is further averaged. For this purpose, a number of periods (or months) is decided first and then the total of the periodic average prices of the given periods is divided by the number of periods taken.

M. **Moving Weighted Average Method:**In this method, the moving average price is calculated in exactly the same way as the moving simple average price except that periodic weighted average prices are taken for averaging.

Example

Let's say you have 3 observations: 4, 7, 12.

The arithmetic mean is (4+7+12) / 3 = 23/3 = 7.67

Now let's assume that you want to weight the first observation by a factor of 10, the second observation by a factor of 5 and the third observation by a factor of 2:

The weighted mean is (4x10+7x5+12x3) / (10+5+2) = 111/17 = 6.53

N. **Inflated Price Method:** This method is used where materials are subject to some inevitable losses that may arise from evaporation, breaking the bulk, etc. The issue price is slightly inflated to ensure that the loss is covered and the full cost of the material concerned is recovered. Also, this method is used to cover material losses on account of obsolescence, deterioration, and materials handling expenses. Under this method cost of materials issue, such losses and expenses are directly charged to material cost. Therefore, when the issue of materials is made, the price is to inflated to cover all the losses and expenses.

2.5 Material Losses

Losses of materials may arise during handling, storage or during process of manufacture. Such losses or wastage are classified into two:

- Normal Loss- This is that loss which has necessarily to be incurred and thus is unavoidable.
- Abnormal Loss- This is that loss which arises due to inefficiency in operations, bad luck, mischief, etc.

Control of Material Losses

- Proper storage conditions should be provided, mainly for perishable materials.
- Store room should be well guarded to avoid the risks of fire or theft, etc.
- To reduce obsolescence, materials should be issued on first-in, first-out basis.
- Accuracy of weighing instruments should be periodically checked.
- A systematic procedure should be developed regarding movement of materials from one place to another.
- Specialized material handling equipment should be employed so as to minimize losses in materials handling.

Accounting Treatment of Material Losses

In order to absorb normal material losses in cost, the rates of usable materials in stock are inflated so that such losses are covered. Alternatively, normal material loss is transferred to factory overhead. Abnormal material losses, such as those due to breakage, theft, fire, flood and abnormal evaporation, are charged to Costing Profit and Loss Account.

2.6 Employee Cost/ Labour Cost

According to Cost Accounting Standard-7 (CAS-7) issued by ICWA of India, EmployeeCost is 'the aggregate of all kinds of consideration paid, payable and provision made for future payments, for the services rendered by employees of an enterprise (including temporary, part time and contract employees). Consideration includes wages, salaries, contractual payments and benefits, as applicable, or any payment made on behalf of the employee. This is also known as labour cost.' Labourcost is of two kinds:

1. ***Direct labour cost*** is 'the cost of employees which can be attributed to a cost object in an economically feasible way.' Direct labour is expended in altering the construction, composition or condition of the product.

2. ***Indirect labour cost*** is the wages paid to those workers who are not directly engaged in converting raw materials into finished products.

Organization for Accounting and Control of Labour Cost

There are various department playing role in organizing and control the labour cost. Here are few departments performing the roles and responsibilities.

1. ***Personnel department:***This is a service department and is mainly concerned with the proper selection and training of workers and placing them on jobs best suited.

2. ***Engineering department:*** It prepares specifications of jobs makes job analysis, conducts time and motion studies, makes provision for safe working conditions.

3. ***Time-keeping department:*** This department is concerned with recording of workers' time.

4. ***Payroll department:*** This department maintains a record of job classification and wage rate of each employee and performs the function of computation of wages.

5. ***Cost accounting department:*** It classifies all cost data including labour.

2.7 Personnel Department

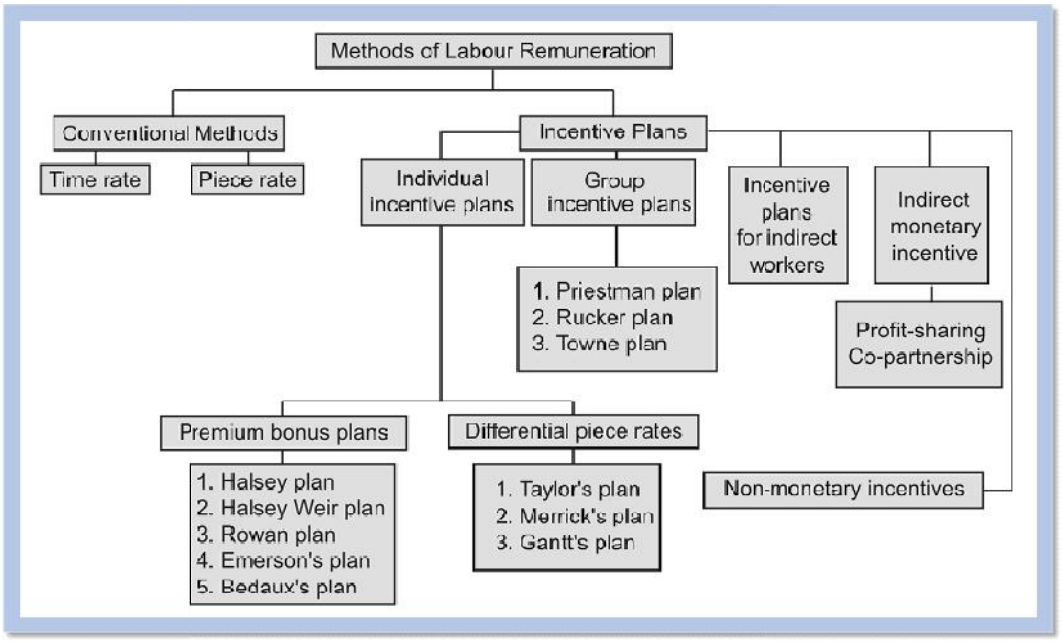
This department is concerned with recruitment, discharge and transfer, etc., of labour. On engaging a new worker, the personnel office will prepare an Employee's Record Card. This card will show full personal details of the employee, particulars of previous employment, wage rate payable and his medical category.The following departments are notified about the engagement of a new employee:

a. The department where the worker has to report for duty, a notification is made that the worker is expected to report on a certain date.

b. The payroll department is informed about the new employee's name, the name of the former employee whom he replaces, clock number, rate of pay, date of commencement, etc.

c. The time office, for recording the employee's attendance.

Methods of Remuneration (Systems of Wage Payment)



Let us discuss the methods of remuneration and incentive plans. There are two basic methods of labour remuneration:

(a) Time Rate System

(b) Piece Rate System

A. Time Rate System

Under time rate system, workers are paid according to the time for which they work. Payment may be on hourly basis, daily basis ormonthly basis.

Wages = No. of hours worked × Rate per hour

Suitability of this method:

Time wage system is suitable for the following type of situations:

- Where quality of work is more important than quantity, e.g., high class tailoring.
- Where output cannot be measured in quantitative terms, e.g., in the case of indirect workers, like watchman, cleaners and sweepers
- Where output is beyond the control of the worker or where the work of a worker is dependent on the work of other workers.
- Where work is being done on a small scale so that close supervision is possible.
- Where the worker is a learner or an apprentice.

B. Piece Rate System

Wages under this system are paid according to the quantity of work done. A rate is fixed per unit of production and wages are calculated by the formula:

Wages = Rate per unit × No. of units produced

Suitability of this method:

Piece rate system is suitable for the following type of situations:

- Where production is standardized and repetitive in nature.
- When the aim is continuous maximum production.
- Where the output of workers can be measured.
- Where workers continue at the same job for long periods.
- Where the standard time required to complete a job can be measured accurately.

2.8 Incentive Plans

Various incentive plans are being adopted by organizations for providing basic pay and bonus to workers.

A. ***Halsey Premium Plan:***It is a simple combination of time and piece rate systems. The main features of this plan are as follows:

(a) Workers are paid at a rate per hour for the actual time taken by them.

(b) A standard time is set for each piece of work, job or operation.

(c) If a worker takes standard time or more than the standard time to complete his work, he is paid wages for the actual time taken by him at the time rate. In other words, time wages are guaranteed.

(d) If a worker takes less than the standard time, he is paid a bonus equal to 50% of the time saved at the time rate fixed. The formula for calculating bonus and total earnings is as follows:

Bonus = 50% of [Time saved × Time rate]

Total earnings = Time rate × Time taken + 50% of [Time saved × Time rate]

B. ***Halsey Weir Plan:*** This method is precisely the same as Halsey Plan except that in Halsey Weir Plan the bonus is equal to 30% of the time saved.

C. ***Rowan Plan:*** This is similar to Halsey Plan except in the calculation of bonus.

(a) Wages are paid on time basis for the actual time worked by the workers.

(b) A standard time is determined for each piece of work or job.

(c) If a worker completes his work in standard time or in more than the standard time, he is paid wages for the time actually taken by him.

(d) If a worker completes his work in less than the standard time, he is entitled to a bonus.

(e) Bonus is that proportion of wages of actual time taken which the time saved bears to the standard time. Its formula is

$$\text{Bonus} = \frac{\text{Time saved}}{\text{Time allowed}} \times \text{Time taken} \times \text{Time rate}$$

$$\text{Earnings} = (\text{Time taken} \times \text{Time rate}) + \text{Bonus}$$

D. ***Taylor's Differential Piece Rate System:*** This system was introduced by F W Taylor, the father of scientific management.

(a) Day wages are not guaranteed, i.e., it does not assure any minimum amount of wages to workers.

(b) A standard time for each job is set very carefully after time and motion studies.

(c) Two piece rates are set for each job-the lower rate and the higher rate. The lower piece rate is payable where a worker takes a longer time than the standard time to complete the work. Higher rate is payable when a worker completes the work within the standard time.

E. Merrick' s Differential Piece Rate System (Multiple Piece Rate System): This is a modification of Taylor's plan. While Taylor prescribed two rates, Merrick's plan lays down three rates. The lowest rate is for the beginners, the middle rate is for the developing workers and the highest rate is for the highly efficient workers. Efficiency of the workers is determined in terms of percentages. Thus, the rates of remuneration are:

Level of efficiency	*Piece rate*
Upto 83%	Ordinary piece rate
83% to 100%	110% of ordinary piece rate
Above 100%	120% of ordinary piece rate

F.Gantt's Task and Bonus Plan: The main features of this plan are as follows:

- Day wages on time basis are guaranteed to all workers.
- This plan is a combination of time rate, differential piece rate and bonus.
- A standard is set and remuneration is calculated as follows:

(i) When output is below standard-payment at time rate.

(ii) When output is at standard-payment at time rate plus 20% bonus.

(iii) When output is above standard-payment at high piece rate.

G. ***Emerson's Efficiency Plan:*** This scheme is designed to give encouragement to the slow workers to perform better than before. Time wages are guaranteed. The standard output in this plan is fixed to represent 100% efficiency. A bonus is paid to a worker whose efficiency exceeds 66%. As efficiency increases, the bonus also increases gradually in steps, at a stated rate, so that at 100% efficiency, bonus would rise to 20% of wages. Beyond 100% the bonus increases at 1% of the basic rate for each 1per cent increase in efficiency. It can thus, be shown as below in a tabular form:

Efficiency	Bonus
(a) Below 66 2/3 %	No bonus (Only time wages)
(b) 66 2/3 % to 100%	Bonus increases in steps and rises to 20% at 100% efficiency
(c) Over 100%	20% bonus plus 1% bonus for each increase of 1% in efficiency

H. *Bedaux Plan:* In this plan, the standard time of each job is determined in minutes, known as Bedaux points or B's. One B unit represents the amount of work which an average worker can do under ordinary conditions in one minute. The standard time is determined by work study and each job is assigned a number of B's.

2.9 Labour Turnover

Labour turnover is thus defined as 'the rate of change in the composition of the labour force in an organization.It denotes the percentage change in the labour force of an organisation. It is a common occurrence that the workers do change their jobs. Either they leave their jobs for better prospects or better environments or they are forced to leave an employment. Such mobility is quite normal and known as labour turnover.

Measurement of Labour Turnover

A. Separation method:This method takes into account only those workers who have left during a particular period. Its formula is:

$$\text{Labour Turnover Rate} = \frac{\text{No. of workers who have left during a period}}{\text{Average no. of workers during the period}} \times 100^*$$

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

2. Replacement method: This method takes into account only those new workers who have joined in place of those who have left. Its formula is:

$$\text{Labour Turnover Rate} = \frac{\text{No. of workers replaced during the period}}{\text{Average no. of workers during the period}} \times 100$$

3. Flux method:This shows the total change in the composition of labour force due to separations and replacement of workers. Its formula is:

$$\text{Labour Turnover Rate} = \frac{\text{No. of workers who left} + \text{No. of workers replaced}}{\text{Average no. of workers}} \times 100$$

Example

The personnel department of aorganization gives you the following information regarding labour. Calculate labour turnover rate using the various methods of labour turnover.

Number of workers on the payroll:

At the beginning of the month 2,900

At the end of the month 1,100

During the month 20 persons quit while 80 persons are discharged. 300 workers are required during the month. Of these, 50 workers are recruited in the vacancies of those leaving while the rest were engaged in accordance with an expansion scheme.

Solution:

Average number of workers during the month: (2900+1100)/2 = 2000

Labour Turnover Rate by:

(i) Separation Method = Number of separations during a period/Average number of workers during the period × 100

LTR = 20+80/2000× 100

LTR = 5%

(ii) Replacement Method = Number of workers replaced in a period/Average number of workers during the period × 100

LTR = 50/2000× 100

LTR = 2.5%

(iii) Flux Method = (Number of separations + Number of replacements)/Average number of workers during the period × 100

LTR = (100+50)/2000× 100

LTR = 7.5%

Cost of Labour Turnover

1. Preventive costs: These costs are those which are incurred to keep the work force satisfied and to prevent or discourage them from leaving the organization. These include:

a. Cost of personnel management-only that portion of this cost which can be attributed to the efforts of the personnel department in maintaining good relations between management and workers.

b. Cost of welfare activities and services, e.g., canteen meals, co-operative stores, educational and transport facilities and housing schemes.

c. Cost of medical services.

d. Pensions schemes-to provide security and retirement benefits.

e. Extra bonus and other perquisites (in excess of those given by other similar concerns) to discourage their defecting to other undertakings.

2. Replacement costs: These costs include all such losses and wastage arising because of the inexperienced new labour force replacing the existing one as well as the cost of recruitment and training of the new workers. These include:

a. Cost of recruitment and selection of new employees.

b. Cost of training of new workers.

c. Loss of output due to some timegap in recruiting new workers.

d. Loss due to inefficiency of new workers.

e. Cost of accidents due to lack of experience of new workers.

f. Cost of extra scrap and defective work of new workers.

g. Cost of tools and machine breakdown due to faulty handling by new workers.

Discuss the causes and effects of labour turnover?

2.10 Idle Time

Idle time is defined as 'the difference between the time for which employees are paid and the employee's time booked against the cost object.' It represents the time for which they are paid but no production is obtained.

A. Treatment of Idle Time

1. ***Normal Idle Time:*** This is that wastage of labour time which cannot be avoided and has to be borne by the employer. The cost of normal idle time may be treated in one of the following two ways:

- As overhead cost it may be charged to factory overheads. For this purpose, idle time is allotted a separate standing order number. This helps in its effective control.

- As direct wages The wage rate may be inflated to make allowance for normal loss of labour time.

2. ***Abnormal Idle Time:***This is that idle time which arises due to reasons in no way connected with the usual routine of manufacture and for which employer must pay. Payment for such idle time is not included in cost and is transferred to Costing Profit and Loss Account.Examples of abnormal idle time can be cited as below:

- The time wasted due to breakdown of machinery on account of the inefficiency of the work engineers.
- Time wasted on account of the failure of the power supply.
- The time wasted due to strike or lockouts in the factory.

B. Control of Idle Time

Following measures can be adopted to control the idle time of workers:

(a) Production should be planned so that imbalances are avoided or reduced.

(b) Repairs and maintenance of plant and machinery should be regularly undertaken to avoid breakdown.

(c) Raw materials, tools and instructions should reach the worker well in time so that no time is wasted in waiting for them.

(d) Supervision should be tightened.

2.11 Overtime

Overtime is defined 'as the time spent beyond normal working hours, which is usually paid at higher rate than the normal time rate.' The extra amount beyond normal wages and salaries is called overtime premium. considered to be part of manufacturing overhead and is not assigned to any particular order. At first glance this may seem strange, since overtime is always spent working on some particular order. Why not charge that order for the overtime cost? The reason is that it would be considered unfair and arbitrary to charge an overtime against a particular order simply because the order happened to fall on the tail end of the daily production schedule.

A. Treatment of Overtime

- ***When overtime is job specific:*** When overtime is spent on a specific job at the request of a customer due to urgency of work and the customer agrees to the entire charge of overtime premium, it should be charged to the job or work order concerned.
- ***When overtime is due to general pressure:*** When a business receives more orders than it can cope with in the normal working hours and there is general pressure of work, it may be treated by one of the following two methods:

(i) Treat overtime premium as direct labour cost by inflating the wage rate and charging to different jobs at the inflated/average rate.

(ii) Alternatively, it may be treated as indirect wages and included in overheads.

- ***When overtime is due to abnormal reasons:*** Overtime arising due to abnormal factors, like accident, power failure, fire and machine breakdown, or due to factors like defective planning or faulty management, it should not be included in the cost of products and it should be charged to costing Profit and Loss Account.

Example

Assume that a press operator in a plant earns $12 per hour. She is paid time and half for over time (time in excess of 40 hours a week). During a given week, she worked 45 hours and has no idle time. Her labor cost would be allocated as follows:

Observe from this computation that only the overtime premium of $6 per hour is charged to overhead account -- not the entire $18 earned for each hour of overtime work ($12 regular rate × 1.5 = $18)

Direct labor ($12 × 45 hours) $540

Manufacturing overhead (overtime premium: $6 per hour × 5 hours) 30
Total Cost for the week $570

It is a principle of costing that all abnormal expenses and losses should not be included in costs and as such wages paid for abnormal idle time should not form part of the cost of production. The wages paid for abnormal idle time should be debited to costing Profit & Loss Account.

Fringe Benefits

- ***Leave with Pay:*** According to the Factories Act, workers are entitled to annual leave with full pay, for a specified number of days in a year. This may include casual leave, medical leave, special leave, etc. It is treated as indirect labour cost and charged to overheads. Alternatively, leave wages may be treated as direct labour cost in which case the wage rate is inflated.
- ***Holiday with Pay:*** Workers are also entitled to certain holidays like Diwali, Id, Republic Day, Independence Day, etc. Payment for such holidays should, therefore, be treated in the same way as leave pay.
- ***Profit Sharing Bonus:***Under the Payment of Bonus Act, a minimum amount of bonus is payable to workers, even if no profits are earned during a period. The bonus should, therefore, be charged to cost of production. The amount of such bonus in respect of direct labour should be included in the direct labour cost and that in respect of indirect labour should be charged to overheads of the department concerned.

Summary

- Direct materials consumption may be identified with specific production units.
- Inventory control is the process of keeping the right number of parts and products in stock to avoid shortages, overstocksand other costly problems.
- In ABC technique, materials are analyzed according to their value so that costly and more valuable materials are given greater attention and care.
- Minimum stock level is also called safety or buffer stock.
- Just-in-time purchasing is the purchase of materials immediately before these are required for use in production.
- Centralization of purchasing means that all purchases are made by a single purchase department.
- Inventory or stock turnover ratio tells us how many times in a year stock is used up and replaced.
- Replacement price is the price at which materials would be replaced, i.e., the market price on the date of issue.
- Standard price is a predetermined price which is fixed for a definite period, such as a year.
- Material losses of materials may arise during handling, storage or during process of manufacture.
- Personnel department is concerned with recruitment, discharge and transfer, etc., of labour
- Labour turnover is thus defined as 'the rate of change in the composition of the labour force in an organization.
- Preventive costs are those which are incurred to keep the work force satisfied and to prevent or discourage them from leaving the organization.
- Overtime is defined 'as the time spent beyond normal working hours, which is usually paid at higher rate than the normal time rate.'

Keywords

- ***Raw Materials:*** Basic materials in crude form.

- ***MaximumLevel:*** The maximum stock level represents the upper limit beyond which the quantity of any item is not normally allowed to rise.
- ***Danger Level:*** If material falls below the minimum level, then it indicates that urgent action for replenishment of stock must be taken to avoid stock-out situation.
- ***Ordering Cost-*** This is the cost of placing an order with the supplier.
- ***Cost of Carrying***- This is the cost of holding the stock in storage.
- ***PerpetualInventory-***A system of records maintained by the controlling department, which reflects the physical movement of stocks and their current balances.
- ***FIFO-*** It is based on the assumption that materials which are purchased first are issued first.
- ***LIFO***- It is based on the assumption that the last materials purchased are the first materials to be issued.
- ***EmployeeCost-*** Itis 'the aggregate of all kinds of consideration paid, payable and provision made for future payments, for the services rendered by employees of an enterprise
- ***Idle Time- It*** is defined as 'the difference between the time for which employees are paid and the employee's time booked against the cost object.'

Self Assessment

1. What is/are the various types of raw materials?

A. Tools

B. Spare parts

C. Consumable stores

D. All above

2. _____ are the commodities that are consumed in the process of manufacture.

A. Material

B. Spare parts

C. Actual product

D. Overheads

3. Which is not an objective of material control?

A. Minimum wastage

B. Idle labour

C. No under-stocking

D. Quality of material

4. _____inventory system should be operated so that up-to-date information is available about the quantity of material in stock.

A. Regular

B. Temporary

C. Continuous

D. Perpetual

5. An efficient system of _____audit and _____check should be operated, in material control.

A. Single

B. Verified

C. Internal

D. External

6. In _____ technique, materials are analyzed according to their value so that costly and more valuable materials are given greater attention and care.

A. PMT

B. EOQ

C. VED

D. ABC

7. _____is the quantity for which order is placed when stock reaches reorder level.

A. EOQ

B. SMP

C. ABC

D. VED

8. _____purchasing is the purchase of materials immediately before these are required for use in production.

A. Perpetual inventory

B. Just in time

C. Centralization

D. Digital

9. _____turnover ratio tells us how many times in a year stock is used up and replaced.

A. Regular

B. Replacement

C. Debtors

D. Inventory

10. Bin card and stores ledger are the two basic _____ inventory records.

A. Internal

B. Verified

C. Perpetual

D. External

11. In _____ method, the first batch is fully issued, the price of the next batch received becomes the issue price.

A. LIFO

B. HIFO

C. NIFO

D. FIFO

12. _____ is based on the assumption that the last materials purchased are the first materials to be issued.

A. LIFO

B. NIFO

C. HIFO

D. FIFO

13. _____ is a predetermined price which is fixed for a definite period, such as a year.

A. Actual Price

B. Standard Price

C. Definite Price

D. Fixed Price

14. In _____method materials are subject to some inevitable losses that may arise from evaporation, breaking the bulk, etc.

E. Regular price

F. Temporary price

G. Continuous price

H. Inflated price

15. Abnormal material losses, such as those due to breakage, theft, fire, flood and abnormal evaporation, are charged to _____.

A. Factory overheads account

B. Profit and Loss account

C. Costing Profit and Loss account

D. Reserves and Surplus account

16. _____ labour cost is the cost of employees which can be attributed to a cost object in an economically feasible way.

A. Internal

B. External

C. Indirect

D. Direct

17. _____ is a service department and is mainly concerned with the proper selection and training of workers and placing them on jobs best suited.

A. Personnel department

B. Human resource department

C. Training department

D. Placement department

18. Under time rate system, workers are paid according to the _____ for which they work.

A. Rate

B. Time

C. System

D. Wages

19. Wages under this system are paid according to the _____ of work done..

A. Rate

B. Time

C. Quality

D. Quantity

20. Bonus in Halsey Premium Plan, is _____of time saved by worker.

A. 30%

B. 40%

C. 50%

D. No bonus

21. _____ is the rate of change in the composition of the labour force in an organization.

A. Labour intensity

B. Labour incentive

C. Labour rate

D. Labour turnover

22. Labour turnover can be measured through_____.

A. Separation method

B. Replacement method

C. Flux method

D. All above

23. The difference between the time for which employees are paid and the employee's time booked against the cost object is defined as_____.

A. Labour rate

B. Idle time

C. Wages

D. Remuneration

24. Payment for _____idle time is not included in cost and is transferred to Costing Profit and Loss Account.

A. Normal

B. Timely

C. Turnover

D. Abnormal

25. The time spent beyond normal working hours, which is usually paid at higher rate than the normal time rate is _____.

A. Abnormal

B. Idle time

C. Overtime

D. Average

Answers for Self Assessment

1.	D	2.	A	3.	B	4.	D	5.	C
6.	D	7.	A	8.	B	9.	D	10.	C
11.	D	12.	A	13.	B	14.	D	15.	C
16.	D	17.	A	18.	B	19.	D	20.	C
21.	D	22.	A	23.	B	24.	D	25.	C

Review Questions

1. Calculate Re-order level, Minimum level, Maximum level and Average stock level from the following data;:

Normal usage: 300 units per week Maximum usage: 450 units per week Minimum usage: 150 units per week Re-order period: 4 to 6 weeks Re-order quantity: 2,400 units

2. Calculate EOQ

Consumption during the year 600 units Ordering cost Rs. 12 per order Carrying cost 20% on price Price per unit Rs. 20

3. Briefly explain the procedure to be followed by the purchase department for the purchase of a material till arranging for payment of the bill.

4. Write short notes on the following :

(a) Bin Card (b)Stores Requisition

5. Define and explain how do you compute the following :

(a) Maximum Level (b) Minimum Level (c) Re-order Level (d) Average Level

6. What are the methods of pricing of material issues?

7. Write short notes on the followings:

a) FIFO Method (b) Simple Average Cost Method(c) LIFO Method (d) Weighted Average Cost Method

8. Briefly explain the ABC Analysis system of stores control.

9. Outline the steps in the purchasing procedure from the time a need for material is determined until the material is stored and paid for.

10. Explain the different methods of materials issue and show their relative merits and demerits.

11. From the following particulars, prepare stores ledger account using (a) Simple Average Method, and (b) FIFO Method of pricing issues.

January 2021,
2 Purchased 400 units @ Rs. 40 per unit
4 Purchased 500 units @ Rs. 50 per unit
6 Issued 200 units
7 Purchased 600 units @ Rs.60 per unit
10 Issued 400 units
15 Issued 100 units
18 Issued 200 units
24 Purchased 450 units @ Rs. 55 per unit
31 Issued 250 units

12. Select a manufacturing concern and outline a system of materials control for it. Give specimen of various forms you will require.

13. There were 10,000 workers in a factory on 1st January 2020. New entrants in service during the year 500 and leavers were 250. Calculate labour turnover rate.

14. Cost of labour turnover is treated as an overhead expense and should not be charged direct to any work order. Why?

15. Critically evaluate the rate system and bonus system of wages payment.

16. Discuss the advantages and disadvantages of the piece rate method of payment of wages. Do you consider that workers remunerated by reference to this method should be required to maintain time records?

17. "Increased productivity as a result of Premium Bonus Plans benefits both employer and the employees". Comment on this statement.

18. Explain the following by giving suitable examples:

(a) Halsey Premium Plan, (b) Rowan Premium Plan,c) Emerson Premium Plan, and (d) Gantt Difference Piece Rate Plan, e) Taylor Differential Piece Rate, (f) Merrick Differential Piece Rate,(g) Emerson Differential Time Rate, and (h) Halsey Weir Premium Plan.

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Web Links

www.futureaccountant.com

www.rbi.com

Unit 03: Overhead Cost

CONTENTS

Objectives

After studying this unit, you will be able to:

- familiar with conceptual framework of overhead costing.
- comprehend the allocation ad absorption of overheads.
- compare the over and under absorption of cost with actual budget.
- appreciate the accounting treatment of various overheads in business.

Introduction

Overhead has been defined by the Institute of Cost and Work Accountants, London as "the aggregate of indirect material cost, indirect wages and indirect expenses". By indirect, it means one "which cannot be allocated, but which can be apportioned to or absorbed by cost centre or cost unit". Overheads are those indirect costs which cannot be directly related to any product, job or process, because they cannot be directly attached to production activities.The total cost is divided into: Prime Cost, Factory Cost and Administrative Cost. Overhead comprises of indirect material, indirect labour and indirect expenses.

Blocker has defined the overhead costs as "Operating of a business enterprise which cannot be traced directly to a particular unit of output". Overheads are the indirect costs which cannot be

directly allocated to any particular job and production activity or process as they are not capable of being specifically identified to any particular activity.

Caution: A major part of the total cost is overheads.

3.1 Overhead Cost

The indirect costs or fixed expenses of operating a business (that is, the costs not directly related to the manufacture of a product or delivery of a service) that range from rent to administrative costs to marketing costs.

As per CIMA, London, "Overhead is the aggregate of indirect materials, indirect wages and indirect expenses".

Overhead is also known as:

a. Oncost

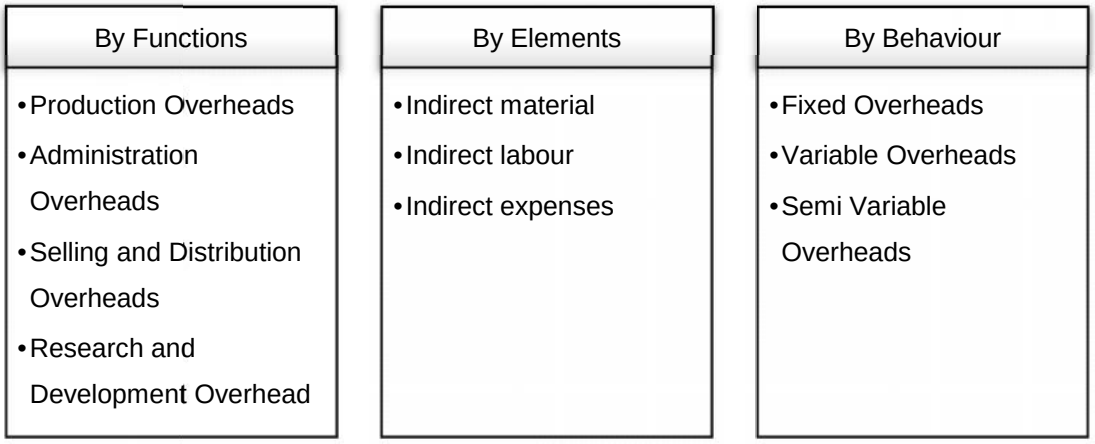
b. Burden

c. Non-productive cost

Overhead = Indirect material + indirect labour + indirect expenses

3.2 Classifications of Overhead Costs

The overhead classification depends upon the type and size of the business, nature of product, services of the product and various policies of the management regarding product or output. The following are the important basis of classification of overheads:



1. Classification- according to Functions

- ***Production Overheads:***They are indirect expenditures incurred in connection with production operations.It is also known as factory overhead, works 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 production of materials till the completion of the manufacture. Following are the production overheads e.g. rent, municipal taxes, depreciation, insurance of the factory, machines and equipments, factory lighting, heating and air-conditioning, fuel and power, drawing expenses, factory manager salary, consumable stores, small tools, repairs of factory buildings, plant, machines and equipments, store-keeping expenses, cost of idle time, overtime, holiday pay, workers' training and welfare expenses, inspection, factory telephone and stationery expenses.
- ***Administration Overheads***: Costs incurred in administration of an undertaking, not related directly to production or distribution function.These are also known as general

overheads. It is the indirect expenditure incurred in formulating the policy, directing the organization and controlling the operations of an undertaking which is not related directly to research and development or production and selling activities. The administrative overhead costs may include the following: account office expenses, audit fees, office staff salaries, postage, stationery, telephone and telegrams, legal expenses, depreciation, insurance, rent of the office building, office equipments and office furniture, bank charges, salary to general manager and office electricity expenses.

- ***Sellingoverheads:***Selling Costs are costs to stimulate demand. It is the expenditure incurred in promoting sales and retaining customers. It includes: advertisement, bad debts, quotations, price lists, salaries and commission of salesmen, selling agents, travelling expenses, postage, telephones, stationery of sales office, salary of sales manager and sales office staff, window-dressing expenses, etc.
- ***Distribution overheads:*** Distribution overheads are expenditures from the time product is manufactured till it is sold.The expenses pertaining to delivery of goods to the customers fall under this distribution overhead. It includes: packing material and expenses, carriage outward, transport expenses, maintenance, repairs, depreciation of delivery vans, depreciation, repairs of the warehouse, salary of warehouse staff, insurance of warehouse, losses in warehouse, wastage of finished goods, etc.
- ***Research and Development Overheads:*** The research expenses are the cost of searching for new and improved products, new applications of products and improved methods and techniques. The development cost is the cost of the process which begins with the implementation of the decision to produce a new or improved method and ends with the commencement of formal production of the product.

2. Classification - according to Elements

- ***Indirect materials:***They are material costs, which cannot be allocated but which are to be apportioned to or absorbed by cost centres or cost units. These are used in the manufacturing process, which cannot be allocated to a particular job or production but is absorbed by cost centers or cost units. The examples of indirect materials are consumable stores, lubricating oil, loose tools, cotton waste, etc.
- ***Indirect wages:*** They are those which cannot be allocated but which are to be apportioned to or absorbed by cost centres or cost units.It includes such wages which cannot be allocated, but which can be apportioned by cost centre or cost unit. The examples of indirect labour are salary of foremen, supervisors, works manager, store-keepers, wage of maintenance, idle time cost, holiday pay, workers compensation, employer's contribution to provident fund, overtime wages, etc.
- ***Indirect expenses:*** Expenses which cannot be allocated but which are to be apportioned to or absorbed by cost centres or cost units are indirect expenses.The expenses which cannot be allocated directly but which can be apportioned to or absorbed by cost centre or cost unit. The examples of indirect expenses are factory rent charge, charges of lighting and heating, depreciation, insurance, factory expenses, administration, selling and distribution expenses, etc.

3. Classification - according to Behaviour or Variability

- ***Fixed overheads:***These overheads remain unaffected or fixed in total amount by fluctuations in volume of output.The fixed overheads are related to the periods, and so the fixed costs are also known as Period Costs. The examples of fixed overheads are: rent and taxes of the factory and office buildings, insurance charge of plant, machine and building of factory and office, depreciation of building and machine of factory and office, salaries of foreman, works manager and other managerial staff, interest on capital, watchman's salary, monthly repairing charges, fixed charges of telephone, depreciation of office furniture, salaries of permanent staff of sales department, rent and depreciation of the sales office or the warehouse, depreciation on delivery vans, fixed expenses of guest house, etc.

Did you know: Fixed overhead is one which tends to be unaffected by variation in volume of output. But they are fixed up to a level of production.

- ***Variable overheads:***This is the cost which, in aggregate, tends to vary in direct proportion to changes in the volume of output. These costs change in the same ratio in which the output changes. It means, 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 decrease in production. It is known as direct cost. The examples of variable overhead are: fuel and power, lighting, hearing, overtime, small tools, store expenses, postage, stationery, salesman's commission, discounts to customers, bad debts, branch expenses, travelling salesman's expenses, packing charges, carriage outward, variable expenses on delivery vans, etc.


Notes: On making a comparison between fixed cost and variable cost, we find that the total fixed cost remains constant, while the total variable cost changes proportionately.

- ***Semi-variable overheads:***It is an overhead which is partly fixed and partly variable. There is hardly any difference 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 called semi-variable. Examples of Semi-variable overheads are charges of telephone and electric. The following figure shows the semi-variable overheads.

3.3 Codification of Overheads

After overheads are classified, it is found useful to allot a number or symbol to each group of expenses so that each such group is easily distinguished from others. Such numbers or symbols are codes for overheads and are called standing order numbers.Coding is a technique and method of intelligently describing in numbers or letters or a combination of overheads. Codification of overheads is useful in control of overheads. After the classification of overheads, the next step involved in cost accounting is to codify them.

Each standing order number denotes a particular type of expenditure so that items of expenses of similar nature, as and when they are incurred, are appropriately classified into one of these. A schedule or manual is maintained enlisting all standing order numbers.

Objectives of Codification of Overhead

The main objectives of codification of overheads are:

(i) To analyse overhead expenses for control purposes,

(ii) To account for all types of overheads,

(iii) To help the task of machine accounting system,

(iv) To facilitate control over them,

(v) To reduce the task of maintaining a huge number of accounts, and

(vi) To accumulate overheads systematically.

3.4 Methods of Codification

The overheads are collected from the different sources; they are grouped under different similar headings. It means that the overheads of similar nature and feature are placed under one group. Codification is the method of grouping of overheads by allotting various numbers, alphabets or other symbols to the overheads.

Codification is associated with the use of standing order numbers and cost account numbers. The numbers are provided to items of the overheads. Allotted numbers prove helpful in maintaining secrecy with simplification. There are three methods of codification as given below:

- ***Serial Number Method:*** Each head of expense is given a serial number.

S.No. 1 Material

S.No. 1.1 Direct Material

S.No. 1.2 Indirect Material

S.No. 2 Factory Overheads

S.No. 2.1 Rent on Factory Building

S.No. 2.2 Salary to Factory Manager

- ***Alphabets Method:*** The alphabet stands for the head of expense and the number shows further analysis of the expense. For example, "M" stands for Maintenance and it can be analysed as follows:

M = Maintenance

M1 = Maintenance to Factory Building

M2 = Maintenance to Power House

M3 = Maintenance to Officer Building

M4 = Maintenance to Warehouse Building

- ***Numerical Codes Method:*** For mechanized accounting, the use of alphabets is restricted and this numerical code method is, adopted in the industry. For example:

100101 Depreciation on Plant

100102 Depreciation on Building

200101 Salary to Factory Manager

200102 Salary to Managerial

3.5 Overheads Distribution

Distribution of overhead costs to cost units is one of the most complex problems of cost accounting. This is because overhead costs cannot be identified with individual cost units and there are no accounting means of exact distribution. There are some steps in Overheads Distribution, let us discuss those steps:

- Classification and collection of overheads.
- Allocation and apportionment of overheads to production departments and service departments.
- Re-apportionment of service department costs to production departments.
- Absorption of overheads of each production department in cost units.

3.6 Departmentalization of Overhead

Departmentalization of overhead refers to the process of administratively dividing the factory into different divisions or cost centre to which overheads are charged. Departmentalization of overhead is considered necessary for ensuring greater accuracy in cost ascertainment and cost control. The departmental organization of a large manufacturing concern usually consists of production departments and service departments.

Production department are those in which manual and machine operations are performed on the products produced. The number of production departments in a industry depends upon the nature of industry and they type of production operations involved. Departmentalization of overheads isthe process of allocation and apportionment of overheads to different departments or cost centres. These departments are mainly of two types:

(a) Production departments.

(b) Service departments.

Distribution of total overheads between production and service departments and the allocation of all service departments overhead to the production department is known as departmentalization of overhead costs. Departmentalization of overheads not only helps in segregating the industry overheads among production and service departments but also in accurately ascertaining the cost

of different products which pass through these departments. Departmentalization of overhead costs enables the distribution of costs of service departments to various production departments or production units.

 Example:

A cement industry usually has the following departments:

(a) Stone Crushing Department,

(b) Raw Grinding and Mixing Department,

(c) Coal Crushing and Pulverizing Department,

(d) Burning and Cooling Department,

(e) Finish, Grinding and Storing Department, etc.

3.7 Objectives of Departmentalization

- Ensures greater accuracy in cost ascertainment.
- Ensures control of overhead costs.
- Use of different methods of absorption.
- Ensure proper valuation of work-in-progress.
- Helps in Estimation of cost of service of departments.
- More accurate forecasting and estimating.
- Helps in forecasting, planning and decision-making,
- Ascertaining the cost of various departments,
- Effective control on overhead cost,
- Valuation of work-in-progress,
- Ensure greater accuracy in allocation and apportionment of overheads.

3.8 Allocation

Allocation of overhead cost refers to "the allotment of whole items of overhead costs to cost centre or cost unit". In other words, allocation implies the identification of the overhead costs with reference to particular costcentre, i.e., production and service departments to which they relate. It involves charging to a cost centre those overheads which arise solely from the existence of that centre. Obviously, prior to charging overhead to a particular department or cost centre or cost unit, the exact amount of overhead expense attributable to it must be known allocation of overheads. Allocation of overheads is, therefore, the process of distribution of overhead expenses on a departmental basis. Some items like wages paid to maintenance workers cannot be directly attributed to product but can be specifically attributed to the maintenance service department. Such items of cost as indirect materials, indirect labour, etc., can also be allocated to different departments or cost centre.'The assignment of whole items of cost directly to a cost centre.'

Allocation of overheads should meet both of the following conditions:

1. The cost centre must have caused the overhead cost to be incurred

2. The exact amount incurred in a cost centre must be known.

3.9 Apportionment

Apportionment refers to the distribution of overheads among different departments or cost centre on suitable basis. It involves charging a share of the total overhead cost to a number of cost centres, Indirect expense such as rent, lighting and telephone charges, general managers salary, etc., incurred for the entire factory need to be apportioned between different production and service

departments on an equitable basis. The service department overhead costs, in turn, need to be apportioned among the production departments. Finally, the aggregate overhead cost of each production department is charged to the cost centre or cost unit, i.e., products, processes or jobs. This type of apportionment is known as absorption of overhead. Apportionment may be defined as 'the distribution of overheads to more than one cost centre, on some equitable basis.'

Distinction between Allocation and Apportionment

The terms allocation and apportionment are often used interchangeably. Although, the purpose of both is the identification and allotment of overheads to cost centre or cost unit, but there is difference between the two. The following points will make the distinction clear:

- Allocation refers to the distribution of overheads on departmental basis, while apportionment is a process of distribution of overhead costs of one department to the other department.
- Allocation is a much wider term than apportionment, as it leads to apportionment. Overheads cannot be usually allocated to products as they cannot be identified easily, but they can be apportioned to products on some equitable basis.
- Certain overheads like telephone and electricity charges can only be allocated to products, if they are apportioned on sound equitable basis.
- Allocation needs no basis for the distribution of overheads among production and service departments, while apportionment needs a equitable basis for the distribution of one department overhead cost to other departments or cost centres or cost units.
- Cost allocation deals with whole items, whereas cost apportionment is concerned with charging a share of the aggregate overhead to a number of departments or cost centres or cost units.

3.10 Principles of Apportionment

The apportionment works on following principles while distributing the overheads in an organization. These principles are to be followed to avail results while allocating or apportioning the overheads.

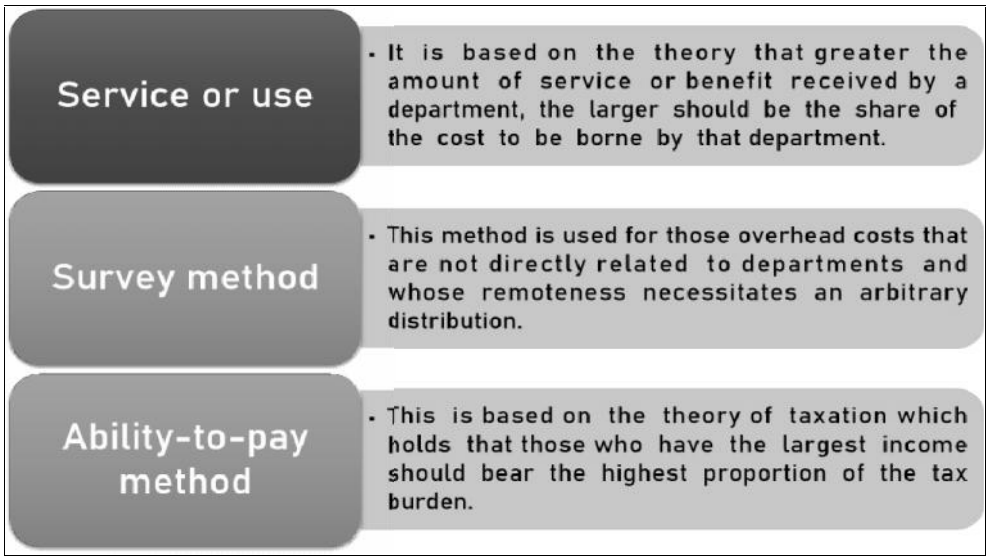


Fig 1: Principles of Apportionment of Overheads

Bases of Apportionment

The overheads while apportioning needs an appropriate base for distribution. One cannot choose any base for overheads apportioning. Here is the table showing for overheads cost and its bases for apportioning.

	Overhead Cost	Bases of Apportionment
1	I) Rent and other building expenses II) Lighting and heating III) Fire precaution service IV) Air-conditioning	Floor area, or volume of department
2	I) Fringe benefits II) Labour welfare expenses III) Time keeping IV) Personal office V) Supervision	Number of workers
3	I) Compensation to workers II) Holiday pay III) ESI and PF contribution IV) Fringe benefits	Direct wages
4	General overheads	Direct labour hours, or Direct wages, or Machine hours
5	I) Depreciation of plant and machinery II) Repairs and maintenance of plant and machinery III) Insurance of stock	Capital values
6	I) Power/ steam consumption II) Internal transport III) Managerial salaries	Technical estimates
7	I) Lighting expenses	No. of light points, or Area
8	Electric power	Horsepower of machines, or number of machine hours, or value of machines
9	I) Material handling II) Stores overheads	Weight of material, or volume of material, or value of material

Fig 2: Bases for apportionment of overhead cost

3.11 Re-Apportionment of Overheads

The process of assigning service department overheads to production departments is called reassignment or re-apportionment. Service departments are those departments which do not directly take part in the production of goods. Such department provides ancillary services. Examples of such departments are boiler house, canteen, stores, time office, dispensary, etc.

Methods used for the reapportionment of service department expenses over the production department:

A. Direct re-distribution method: Under this method service department costs are apportioned over the production departments only, ignoring the services rendered by one service department to the other.

B. Step Method or Non-reciprocal method: This method gives cognizance to the service rendered by service department to another service department. The sequence here begins with the department that renders service to the maximum number of other service departments.

C. Reciprocal Service Method: These methods are used when different service departments render services to each other, in addition to rendering services to production departments.

In such cases various service departments have to share overheads of each other. The methods available for dealing with reciprocal services are

(i) Simultaneous equation method;

(ii) Repeated distribution method;

(iii) Trial and error method.

Following is the bases of apportionment for service department.

	Service department	Bases of apportionment
1.	Store-keeping department	Number of material requisitions, or value/ quantity of material consumed in each department
2.	Purchase department	Value of materials purchased for each department, or no. of purchase orders placed
3.	Time-keeping department and payroll department	Number of employees, or total labour or machine hours
4.	Personal department	Rate of labour turnover, or number of employees in each department
5.	Canteen, welfare and recreation services	Number of employees, ir total wages
6.	Maintenance department	Number of hours worked in each department
7.	Internal transport service	Value or weight of goods transported. Or distance covered
8.	Inspection department	Direct labour hours or machine operating hours
9.	Drawing office	No. of drawings made or man hours worked

Fig 3: Bases of Apportionment for service department

3.12 Absorption of Overheads

Absorption rates are computed for the purpose of absorption of overheads in costs of the cost units. There are mainly six methods for determining absorption rates.According of ICMA, London, "Overhead absorption is the allotment of overhead to cost units". The apportionment of overhead expenses of the cost centres to cost units on some equitable basis is referred to as overhead absorption. Generally, all products, jobs, processes or services pass through one or more producing cost centre. The overhead expenses relating to a cost centre are ultimately to be charged to the products, jobs, etc., which pass through that centre. Thus, charging of overheads of a cost centre to the cost units in such a way that the cost of each unit of production of the cost centre includes an equitable share of the total overhead of that cost centre. This is known as Absorption of overheads.

Overhead absorption rate = Total overheads of cost centre/Total units in base.

Application of rates to cost units

In order to arrive at the overhead cost of each cost unit, the overhead rate is multiplied by the number of units of base in the cost unit. Thus:

Overhead absorbed = No. of units of base in the cost unit × Overhead rate.

3.13 Under-Absorption and Over-Absorption of Overheads

Overheads are apportioned or allotted to cost units on an estimated basis. But it is quite natural that the overhead so estimated may be different from the amount of overhead actually incurred.Hence the question of under or over absorption of overhead arises when there is a difference. Where

theamount of under or over-absorbed overheads is significant, a supplementary overhead absorption rate is calculated to adjust this amount in the cost. However, adjustment is made in the cost of:

- work-in-progress;
- finished stock; and
- Cost of sales.

A. Under-absorption

Under-absorption of overheads means that the amount of overheads absorbed in the production is less than the amount of actual overheads-Incurred.

It represents under stating the costs as the overheads incurred are not fully recovered in the cost of jobs or processes, etc. Under-absorption is also termed as 'under recovery'. When the amount of overheads absorbed is less than the amount of overheads actually incurred, it is called under-absorption or under-recovery.For example if the overheads absorbed on a predetermined basis are Rs. 1, 00,000 and the actual overheads incurred are Rs. 1, 20,000, there is under-absorption to the extent of Rs. 20, 000.

B. Over-absorption

When the amount of overheads absorbed is more than the amount of actual overheads incurred, it is known as over-absorption or over-recovery.Over-absorption of overheads means the excess of overheads absorbed over the actual amount of overheads incurred. In other words when the amount absorbed is more than the expenditure incurred due to expenses being less than the estimates it would mean over-absorption of overheads. Usually over-absorption inflates the cost. Over- absorption is also formed as 'over recovery'.

For example the overheads recovered are Rs. 3, 00,000 and the actual production overheads are Rs. 2, 75,000 then there will be over-absorption of Rs. 25, 000(3, 00,000 – 2, 75,000).

Accounting Treatment for absorption of overheads.

- ***Writing off to Costing Profit and Loss Account*** - This method is used when the under or over-absorbed amount is quite negligible and it is not worthwhile to absorb it by supplementary rate.
- ***Carry over to the next year -*** Under this method the under or over-absorbed amount is transferred to Overhead Reserve Account or Suspense Account for carrying over to the next accounting year.

Reasons of Under/Over-Absorption of Overheads

The under or over-absorption of overheads may arise due to any one or more of the following reasons:

(i) Wrong estimation of overhead expenses: The actual overhead expenses may be substantially less or more than the estimated amount.

(ii) Wrong estimation of work done: The amount of work done may greatly exceed or may be substantially less than the estimated work. For example if actual work is 8,000 working hours against estimated working hours of 10,000, then the expenses charged to job will be 20% less.

(iii) Error in using method of absorption: Sometimes the method of absorption may not be suitable. If the percentage of direct material method is used, fluctuation in prices of material may lead to under or over-absorption of overheads.

(iv) Seasonal fluctuation in overhead: Due to seasonal nature of work, overhead may fluctuate from one period to another period.

(v) Under or over utilization of capacity: There may be under or over-absorption of overhead due to under or over utilization of productive capacity.

(vi) Wrong estimation of output: When the actual output substantially differs from the anticipated output, it leads to under or over-absorption of overheads.

Capacity Utilization and Overheads

Capacity of a factory refers to its ability to produce with the resources and facilities available at its disposal. There are specific capacitylevels which are used by accountants for calculation and absorption of overheads.

- ***Maximum Capacity -*** This is the maximum production capability of a plant which can be achieved only under perfect conditions.
- ***Practical Capacity -*** This is the maximum capacity less output or time lost due to unavoidable factors like plant repairs and maintenance, setting up time, holidays, etc., and other normal losses.
- ***Capacity Based on Sales Expectancy -*** This is a capacity which is based on expected sales and is determined after a careful study of the market conditions.
- ***Actual Capacity -*** This is the capacity actually achieved during a particular period. This is known only after the period is over and may be below or above the capacity based on sales expectancy.
- ***Normal Capacity -*** This is the long-term average of the capacity based on sales expectancy.

Determination of Overheads

There are some specific formulas used for determining the overheads.

A. Production Overheads

- ***Direct Materials Cost Percentage Rate:*** Under this method, the amount of overheads to be absorbed by a cost unit is determined by the cost of direct materials consumed in producing it.

Overhead Rate= Production overheads/Direct materials*100

- ***Direct Labour Cost Percentage Rate:*** The overhead rate under this method is computed by dividing the production overheads by the direct labour cost.

Overhead Rate= Production overheads/Direct labour cost*100

- ***Prime Cost Percentage Rate:*** This method is based on the premise that both materials and labour give rise to factory overheads and thus the total of the two, i.e., prime cost should be taken as the base for absorption of factory overheads. In a way, this is a combination of the material cost and labour cost methods.

Overhead Rate= Production overheads/Prime Cost*100

- ***Direct Labour Hour Rate:***This is a rate per hour and not a percentage rate. It is obtained by dividing the total production overheads by the total number of direct labour hours for the period.

Overhead Rate= Production overheads/Direct labour hours*100

- ***Machine Hour Rate:*** Machine hour rate is the overhead cost of running a machine for one hour. This rate is obtained by dividing the amount of factory overheads apportioned to a machine by the number of machine hours for the period under consideration.
- ***Rate per Unit of Output:*** It is the simplest of all the methods. This rate is determined by dividing the total overheads of a department by the number of units produced.

2. Administration Overheads (Office or General Overheads)

They may be defined as the indirect expenditures incurred in formulating the policy, directing the organization and controlling the operations of an undertaking.

- Percentage of works cost Administration overhead cost is generally absorbed as a percentage of works cost.

Overhead rate = (Admn. Overheads/ works cost) × 100

- Percentage of sales Sometimes office and administration overheads are absorbed as a percentage of sales.

Overhead rate = (Administration overheads/Sales) x 100)

- Ppercentage of conversion cost Conversion cost is the cost of converting raw material into finished goods.

Overhead rate =(Administration overheads/ Total conversion cost) x 100)

3. Selling and distribution overheads

Selling cost is the cost of seeking to create and stimulate demand (sometimes termed marketing) and of securing orders.

- A rate per unit of sales: The total selling and distribution overheads to be absorbed are divided by the number of units sold to arrive at a rate per unit.
- A percentage of selling price: This method is recommended when the concern is selling more than one type of product.

Overhead rate = (Selling and distribution overheads/Sales)x100

- A ppercentage of works cost In this method, a percentage of selling overheads to works cost is ascertained.

Overhead rate = Selling and distribution overheads/Total works cost.

Summary

- Overheads are those indirect costs which cannot be directly related to any product, job or process, because they cannot be directly attached to production activities.
- After overheads are classified, it is found useful to allot a number or symbol to each group of expenses so that each such group is easily distinguished from others.
- Codification is the method of grouping of overheads by allotting various numbers, alphabets or other symbols to the overheads.
- Distribution of overhead costs to cost units is one of the most complex problems of cost accounting.
- Departmentalisation of overhead refers to the process of administratively dividing the factory into different divisions or cost centre to which overheads are charged.
- The process of assigning service department overheads to production departments is called reassignment or re-apportionment.
- Capacity of a factory refers to its ability to produce with the resources and facilities available at its disposal.

Keywords

- ***OverheadCosts:*** Operating of a business enterprise which cannot be traced directly to a particular unit of output.
- ***Production Overheads:***They are indirect expenditures incurred in connection with production operations.
- ***Administration Overheads:*** Costs incurred in administration of an undertaking, not related directly to production or distribution function.
- ***Allocation:T***he allotment of whole items of overhead costs to cost centre or cost unit".
- ***Under-absorption:*** The overheads means that the amount of overheads absorbed in the production is less than the amount of actual overheads-Incurred.
- ***Over-absorption:***Theoverheads means the excess of overheads absorbed over the actual amount of overheads incurred.

- ***Actual Overhead:*** The amount of manufacturing overhead actually incurred during an accounting period.

Self Assessment

1. _____is the aggregate of indirect materials, indirect wages and indirect expenses.

A. Expenditure

B. Incentive

C. Turnover Rate

D. Overheads

2. Overhead is also known as_____.

A. On cost

B. Burden

C. Non productive

D. All above

3. Selling Costs are costs to stimulate _____.

A. Supply

B. Demand

C. Both a and b

D. None of above

4. _____overheads are partly fixed and partly variable.

A. Fixed

B. Variable

C. Static

D. Semi variable

5. Overheads remain unaffected or fixed in total amount by fluctuations in volume of _____.

A. Process

B. Idle time

C. Output

D. Input

6. After overheads are classified, it is found useful to allot a number or symbol to each group of expenses, this process is known as _____.

A. Codification

B. Symbolisation

C. Categorization

D. Classification

7. Symbols are codes for overheads and are called _____order numbers.

A. Fixed

B. Standing

C. Flexible

D. Symbol

8. _____of overheads is the process of allocation and apportionment of overheads to different departments or cost centres.

A. Departmentalization

B. Apportionment

C. Allocation

D. Cost object

9. _____ is the assignment of whole items of cost directly to a cost centre.

A. Absorption

B. Allocation

C. Apportionment

D. Allotment

10. _____may be defined as 'the distribution of overheads to more than one cost centre, on some equitable basis.

A. Absorption

B. Allocation

C. Apportionment

D. Allotment

11. When the amount of overheads absorbed is less than the amount of overheads actually incurred, it is called _____.

A. Over apportionment

B. Under apportionment

C. Over absorption

D. Under absorption

12. When the amount of overheads absorbed is more than the amount of overheads actually incurred, it is called _____.

A. Over apportionment

B. Under apportionment

C. Over absorption

D. Under absorption

13. _____ of a factory refers to its ability to produce with the resources and facilities available at its disposal.

A. Ability

B. Capacity

C. Utilization

D. Scarcity

14. Which capacity levels can be used for measuring capacity of resources?

A. Normal

B. Practical

C. Actual

D. All above

15. Machine hour rate is the overhead cost of running a machine for one _____.

A. Week

B. Day

C. Hour

D. Month

Answer for Self Assessment

1.	D	2.	D	3.	B	4.	D	5.	C
6.	A	7.	B	8.	A	9.	B	10.	C
11.	D	12.	C	13.	B	14.	D	15.	C

Review Questions

1. What are overheads? How are they classified? Discuss in detail with a chart.

2. Define fixed, variable and semi-variable expenses giving examples of each.

3. Write short notes on the Codification of Overheads,

4. What is the difference between apportionment of overheads and absorption of overheads?

5. Discuss the various methods of absorption of factory overheads. Under what conditions, it is said to be over-absorption of factory overheads?

6. Explain Absorption and Allocation of overheads. What are the main methods? Explain machine hour rate method.

7. Explain the system and basis of apportionment of factory overheads on machines.

8. What is the process of ascertaining machine hour rate? What factors do you keep in view while ascertaining the rate?

9. What are the methods of codification of overheads? Discuss in detail.

10. Describe Departmentalisation? Discuss its objectives.

11. Discuss the bases of apportionment and reapportionment of overheads?

12. Discuss various capacity levels with the help of example.

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Unit 04: Process Costing

CONTENTS

Objectives

After studying this unit, you will be able to:

- Recognize the conceptual framework of process costing.
- Appreciate the objectives of process costing in business world.
- Apprehend the accounting treatment of abnormal losses and abnormal gains.
- Compare the cost and profits in different processes.
- Comprehendthe methods used in process costing for computing the equivalent production .
- Recognize the conceptual framework of joint products, co-products and by products.
- Compare and compute methods of apportionment.
- Comprehend the application of joint cost and subsequent cost.

Introduction

Industries which are engaged in the manufacture of products which involve continuous operation or process are known as process industries. These industries have their special features. The costing system should be designed bearing in mind the salient features.

Process costing represents a type of cost procedure for continuous production industries. In such industries, output consists of like units, each unit being processed in the same manner. Therefore, it is assumed that the same amount of raw materials, labour and overhead is chargeable to each unit processed. The cost of unit at the end of any manufacturing process can be easily determined provided costs are accumulated on a process basis and record of units produced is available.

Process costing is also one important method of costing. It refers to costing of operation(s) or process (es) involved in converting raw materials into finished goods or products. Its main objective is to provide an average cost of product.

4.1 Process Costing

Process costing is probably the most widely used method of cost ascertainment. It is used in mass production industries producing standard products, like steel, sugar and chemicals. Process costing is the only reasonable approach to determining product costs in many industries.

According to CIMA, "The costing method applicable where products or services result from a sequence of continuous operations or processes. Costs are arranged over the units produced during the period".

According to Kohler, "A method of accounting whereby costs are charged to processes or operations and averaged over units produced; it is employed principally where a finished product is the result of a more or less continuous operation, as in paper mills, refineries, canneries and chemical plants; distinguished from job costing, where costs are assigned to specific orders, lots or units".

4.2 Essential Characteristics of Process Costing

Process costing is essential step in companies where different processes are adopted to complete the project.

- The production is continuous and the final product is the result of a sequence of processes.
- The products or goods are processed and Costs are accumulated process-wise.
- The products are standardized and homogeneous.
- The sequence of operations or processes is specific and predetermined.
- The cost per unit produced is the average cost which is calculated by dividing the total process cost by the number of units produced.
- The finished product of each but last process becomes the raw material for the next process in sequence and that of the last process is transferred to the finished goods stock.
- Some loss of materials in processes (due to chemical action, evaporation, etc.) is unavoidable.
- Processing of a raw materials may give rise to the production of several products. These several products produced from the same raw material may be termed as joint products or by-products.
- Both direct and indirect costs are accumulated in each process.
- If there is a stock of semi-finished goods, it is expressed in terms of equivalent units.

Applicability in Industries

Process costing may be used in a wide number of industries. The following types of industries may be used process costing:

- Production or manufacturing industries, such as cement, rubber, glass, textiles, paper, iron, steel, aluminium, milk-dairy, biscuits, soap-making, flour milling industries, etc.
- Public utility services, such as water supply, generation of electricity, health services, etc.
- Mining industries, such as coal, steam, gas, oil, coking industries, etc.
- Chemical and distilleries industries, etc.

4.3 Types of Process Costing

Process costing is calculated through various modes but before that let us discuss its various types. There are three types of process costing, which are:

- ***Weighted average costs-*** This version assumes that all costs, whether from a preceding period or the current one, are lumped together and assigned to produced units. It is the simplest version to calculate.
- ***Standard costs-*** This version is based on standard costs. Its calculation is similar to weighted average costing, but standard costs are assigned to production units, rather than actual costs; after total costs are accumulated based on standard costs, these totals are compared to actual accumulated costs, and the difference is charged to a variance account.
- ***First-in first-out costing (FIFO)-*** FIFO is a more complex calculation that creates layers of costs, one for any units of production that were started in the previous production period but not completed, and another layer for any production that is started in the current period.

Process Costing and Job Costing— AComparison

Both the aspects, process costing and job costing are different from one another. Let us differentiate the two terms and understand the real aspect of that.

- ***Production:*** In job costing, production is customized, while it is standardized in process costing.
- ***Assignment:*** In job costing, it is calculating the cost of each job. In process costing, the cost is first determined by the process and then decided based on the number of units produced.
- ***Reduction in Cost:*** With job costing, there are fewer scopes of reduction in costs; the opposite is true with process costing.
- ***Cost Transfer:*** Costs cannot be transferred in job costing, but can be transferred from one process to another in process costing.
- ***Individuality:*** Because all jobs are different from each other, all products have individuality in job costing. Because process costing means products are produced in high volume, they lack individuality.
- ***Industry:*** Job costing is best for industries where products or services are customized based on consumers' demands. Process costing is best for mass production industries with standardized products.
- ***Losses:*** In job costing, losses are not separated, but with process costing, losses can be separated.
- ***Work in Progress:*** With job costing, there may or may not be any work in progress (WIP). With process costing, there is always WIP at the beginning and end of a period.
- ***Size of Job:*** Job costing is best for small production units, while process costing is best for large production units.
- ***Record Keeping:*** For job costing, keeping records is tedious and time-consuming, but process costing keeps things streamlined and efficient.

4.4 Process Costing Procedure

Process costing meant a certain procedure which needs to be followed for computing cost and profits, in any organization.

- The factory is divided into number of processes and an account is maintained for each process.
- Each process account is debited with material cost, labour cost, direct expenses and overheads allocated or apportioned to the process.
- The output of the process is transferred to next process in sequence. It means, output of one process is input of other process.
- The finished output of the last process is transferred to finished goods account.

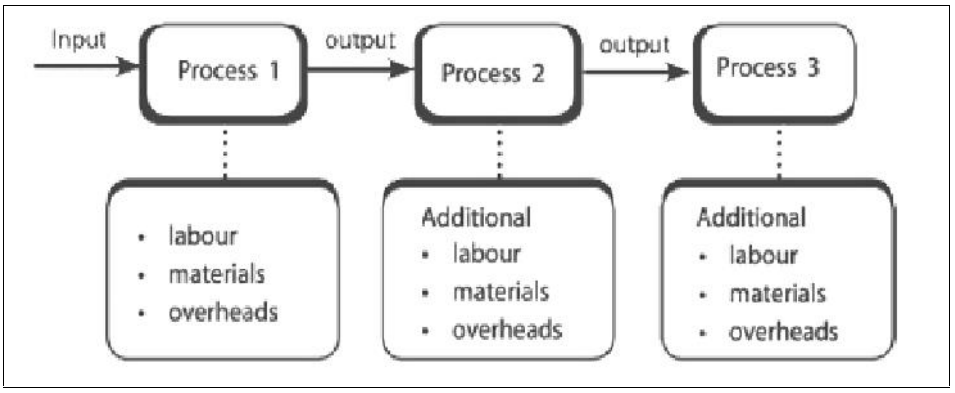

Fig 1: Process Costing Procedure

4.5 Process Losses and Wastages

Wastage represents the portion of a basic raw material lost in processing, having no recovery value. Wastage may be visible, e.g. remnants of basic raw materials, or invisible, disappearance of basic raw material through evaporation, smoke, etc. In process type of industry, wastage may have lower reusable value.

Normally in each process, there is a residue left after transfer of the partially completed product to the next process. For example, in case of crushing of oil seeds, oil produced will be passed on to the refining process and oil cakes will be left. This is not wastage as it can be sold in the market. But the quantity of oil produced plus the quantity of cake left will not equal the quantity of oil seeds. It will be slightly less. The quantity not accounted for is a loss and effort should be to keep it as low as possible. The residue, if it can be sold in the market and if it can be used as a material for another finished product, is known as a by-product. In the process of converting coal into coke, useful by-products such as coal tar, sulphate of ammonia are obtained.

In industries which employ process costing, a certain amount of loss occurs at various stages of production. It is, therefore, necessary to keep accurate records of both input and output.Process losses may by classified into

(a) Normal, and

(b) Abnormal.

A. Normal Process Loss

This is the amount of loss which is unavoidable because of the nature of raw materials or the production technique and is inherent in the normal course of production e.g., loss of weight because of evaporation or melting etc. Such wastage may also take place while stamping product components out of a big metal sheet. This wastage is normally expressed as a percentage of the quantity of output. This percentage of normal wastage of a particular process is determined on the basis of the experience of previous years.

That amount of loss which cannot be avoided because of the nature of material or process is normal process loss. Such a loss is quite expected under normal conditions. It is caused by factors, like chemical change, evaporation, withdrawals for tests or sampling and unavoidable spoiled quantities.

Accounting Treatment of Normal Loss

Normal loss is generally determined as a percentage of input. Such wastage is not physically present, obviously it cannot have any value. However, when normal loss is physically present in the formof scrap, it may have some value, which is credited to the Process Account.

Caution: In the case of normal wastage, all production expenses incurred are charged to the good units of output. Thus, normal wastage becomes the part of cost of production and increases the cost of output. If the normal wastage takes place at the beginning of the process or during it, it is supposed that the lost units were never introduced in the process and thus normal wastage is charged to the units completed as well as to the work in process.

B. Abnormal Process Loss

This type of loss consists of loss due to carelessness, machine breakdown, accident, use of defective materials, etc. Thus, it arises due to abnormal factors and represents a loss which is over and above the normal loss.

Sometimes the percentage of wastage or loss may exceed the determined standard percentage of normal wastage. Any wastage exceeding the normal percentage is termed abnormal loss or wastage. Such loss or wastage is not a part of production. It is credited out of the concerned process account as a loss to the costing profit and loss account. The value of abnormal wastage is calculated with the help of the following formula:

(Normal Cost/Normal Output)*Units of abnormal loss

Accounting Treatment of Abnormal Process Loss

- Allow for normal loss in the manner described earlier.
- After considering normal loss, find out the cost per unit in that process.

  Cost per unit=(Total cost-Value of normal loss)/Units introduced-Normal loss units
- Multiply the cost per unit by the number of units of abnormal loss. This gives the total value of abnormal loss.
- Credit relevant Process Account with quantity(value) of abnormal loss.
- The balance figure in the Process Account is the cost of good units produced in the process. This can also be found by multiplying cost per unit with the number of good units produced.
- Open 'Abnormal Loss Account' and debit it with the quantity and value of abnormal loss shown in the Process Account. Sale proceeds from abnormal loss are credited to Abnormal Loss Account. Any balance left in this account is net loss and transferred to Costing P&L Account.

Abnormal Gain or Effectiveness

The normal process loss represents the loss that would be expected under normal conditions. It is an estimated figure. The actual loss may be greater or less than the normal loss. If the actual loss is greater than normal loss, it is known as abnormal loss. But if actual loss is less than normal loss, a gain is obtained which is termed as abnormal gain or effectiveness. The value of abnormal gain is calculated in a manner similar to abnormal loss.

If the quantum of wastage is less than the predetermined percentage of normal wastage, the difference is called as abnormal gain or effectives. This does not effect the cost of production. It is shown on the debit side of the Process Account and credit side of the Abnormal Gain Account. Like abnormal loss, it is ultimately transferred to Costing Profit and Loss Account.

This value is calculated at the rate at which the effective output would have been valued if normal wastage had taken place according to expectation. This formula for calculation of the value of abnormal gain or effectives is:

(Normal cost of normalproduction/Unit so normal production)* Units of abnormal effectiveness

At the end of the accounting year, the abnormal effectives account is transferred to the credit side of profit and loss account.

Did you know: The value of the abnormal effectives is debited to the concerned process account and credited to the abnormal effectives account.

Example: The product of Ajay company passes through three distinct processes called I, II and III respectively. From past experience, it is ascertained that wastage is incurred in each process as under:

Process I2%

Process II 5%

Process III 10%

In each case, the percentage of wastage is computed on the number of units entering the process concerned. The wastage of each process possesses a scrap value. The wastage of process I and II is sold at Rs. 5 per 100 units and that of process III @ Rs. 20 per 100 units. The following information is obtained for the month March, 2020. 20,000 units of crude material were introduced in Process I at the cost of Rs. 8000.

	Process I	Process II	Process III
Materials consumed	4,000	1,500	1,000
Direct labour	6,000	4,000	3,000
Expenses	1,000	500	1,500
Output (in unit)	10,500	10,250	15,000

Prepare Process Accounts.

Solution

Process Account I

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Materials	20,000	8,000	By Normal wastage	400	20
" Introduced materials		4,000	" Abnormal wastage	100	97
" Direct labour		6,000	" Output transferred to process II @ ₹ 0.97 per unit	19,500	18,883
" Expenses		1,000			
	20,000	19,000		20,000	19,000

Process Account II

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Process II a/c	19,500	18,883	By Normal wastage	975	48
" Materials		1,500	" Output transferred to process III @ ₹ 1.34 per unit.	19,250	25,807
" Direct labour		4,000			
" Expenses		500			
" Abnormal gain	725	972			
	20,225	25,855		20,225	25,855

Process Account III

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Process II a/c	19,250	25,807	By Normal wastage	1,925	385
" Materials		1,000	" Abnormal wastage	1,425	2,543
" Direct labour		3,000	" Output transferred to Finished stock Account @ ₹ 1.78 per unit.	15,900	28,379
" Expenses		1,500			
	19,250	31,307		19,250	31,307

4.6 Oil Refinery Processes

Oil refineries have normally three processes:

(a) Crushing Process: In crushing process raw material i.e., oil seeds or coconut or copra etc. are used. Other expenses of the process are debited. Sale of bags or sacks is credited. Oil cakes or oil residue are sold as a by-product. The output is crude oil transferred as input in the next process. There may be loss in weight in the process.

(b) Refining Process: Crude oil from Crushing Process is debited. Other materials, wages and overheads of the process are debited. Loss-in-weight if any in this process is credited. The output of process is refined oil. Fats and residual oil may be obtained as by-products which are credited. The output being refined oil is transferred to the Finishing Process.

(c) Finishing Process: Refined oil obtained from Refining Process is debited. Other materials, wages and overheads of the process are also debited. Sale of by-product and loss-in-weight are credited. The balance of this process is credited as cost of production of refined oil. Cost of drums or tins for storage of refined oil is also debited to find out cost of stored finished oil.

4.7 Internal Process Profits (Inter-process Profits)

In some businesses, it is a practice to charge the output of each process to the next process not at cost but at a price showing profit to the transferor process. The transfer price may be either the current market price or cost plus a fixed percentage.

The usual practice is to transfer the materials to the next process at cost and from the last process to the finished stock account also at cost. But sometimes the transfer is made at market price. It should be noted that merely to add a margin of profit to the cost while transferring the materials to the next process cannot serve any useful purpose. The transfer should be made at the current market price. Following are the main objectives of inter process profit:

- To show whether the cost of production completes with the market price, and
- To make each process stand on its own efficiency and economies.

If the market price be higher than cost, a process account will reveal profit. Then the stock in the next process will not be valued at cost. The value of stock will include a margin of profit which is not proper for balance sheet purposes.

Objectives of inter process profit

- To show whether the cost in each process competes with the market prices.
- To make each process stand on its own efficiency and economy.
- To assist in making decisions, such as to buy a partly-processed material rather than to process work internally or to sell a partly-processed product or to process it further.

Reason for Calculation of Inter Process Profit

The output of one process is transferred to the subsequent process at cost price. However sometimes, the transfer is made at cost + certain percentage of profit. This is done when each process is treated as a profit center. In such cases, the difference between the debit and credit side of

the process account represents profit or loss and is transferred to the Profit and Loss Account. The stocks at the end and at the beginning contain an element of unrealized profits, which have to be written back in this method. If the profit element contained in the closing inventory is more than the profit element in the opening inventory, profit will be overstated and vice versa. Profit is realized only on the goods sold, thus to obtain the actual profit the main task would be to calculate the profit element contained in the inventories. In order to compute the profit element, in closing inventory and to obtain the net realized profit for a period, three columns have to be shown in the ledger for showing the cost, unrealized profit and the transfer price.

4.8 When Outputis Partly Sold and Partly Transferred to theNext Process

Sometimes the output of a process may be partly sold and partly transferred to the next process for further processing.For example, in a textile mill, part of the output of a spinning process may be sold and the remaining output is passed on to the weaving process for further processing. A part of the output so sold will contain an element of profit or loss which will be revealed in the Process Account. But when a part of theoutput issent to warehouse for sale, it is at cost and does not contain an element of profit or loss.

Example: **Numerical**

A certain product passes through three processes before it is completed. The output of each process is charged to next process at a price calculated to give a profit of 20% on transfer price (i.e. 25% on the cost price). The output of Process III is charged to finished goods stock account on a similar basis. There was no work in progress at the beginning of the year and overheads had been ignored. Stocks in each process have been valued at prime cost of the processes. The following data are obtained at the end of December2019.

Particulars	**Process I (Rs.)**	**Process II (Rs.)**	**Process III (Rs.)**	**Finished Stock (Rs.)**
Direct Material	30,000	20,000	40,000	-
Direct Wages	20,000	30,000	10,000	-
Stock as on 31st December	10,000	20,000	30,000	30,000
Sales	-	-	-	1,70,000

From the above information prepare,

(a) Process cost accounts showing the profit element at each stage

(b) Actual realized profit

(c) Stock valuation as would appear in the Balance Sheet

Solution

Dr. Process I A/c Cr

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
To Material	30,000	30,000	–	By Transfer to Process II A/c	50,000	40,000	10,000
To Wages	20,000	20,000	–				
Total	50,000	50,000	–				
Less: Closing Stock c/d	10,000	10,000	–				
Prime Cost	40,000	40,000	–				
Gross Profit 25% on cost	10,000	–	10,000				
Total	50,000	40,000	10,000	Total	50,000	40,000	10,000
Stock b/d	10,000	–	10,000				

Dr. Process II A/c Cr

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
To Transfer from Process I	50,000	40,000	10,000	By Transfer to Process III	1,00,000	72,000	28,000
To Materials	20,000	20,000	–				
To Wages	30,000	30,000					
Total	1,00,000	90,000	10,000				
Less: Closing Stock c/d	20,000	18,000	2,000				

Dr. Process III A/c Cr

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Prime Cost	80,000	72,000	8,000				
Gross Profit 25% on cost	20,000	–	20,000				
Total	1,00,000	72,000	28,000	Total	1,00,000	72,000	28,000
Stock b/d	20,000	28,000	2,000				

Dr. Finished Stock A/c Cr

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
To Transfer from Process II	1,00,000	72,000	28000	By Transfer to Finished Stock	1,50,000	97,600	52,400
To Materials	40,000	40,000	--------				
To Wages	10,000	10,000					
Total	1,50,000	1,22,000	28,000				
Less: Closing Stock c/d	30,000	24,400	5,600				
Prime Cost	1,20,000	97,600	22,400				
Gross Profit – 25% on cost	30,000	-------	30,000				
Total	1,50,000	97,600	52,400	Total	1,50,000	97,600	52,400

Dr. Finished Stock A/c Cr

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
To Transfer from Process III	1,50,000	97,600	52,400	By Sales	1,70,000	78,080	91,920
Less: Stock c/d	30,000	19,520	10,480				
Total	1,20,000	78,080	41,920				
Gross Profit 25% on cost	50,000	---	50,000				
Total	1,70,000	78,080	91,920	Total	1,70,000	78,080	91,920
Stock b/d	30,000	19,520	10,480				

Working Notes

(A) Calculation of Profit on Closing Stock:

Cost of stock = [Cost column/Total column] x Stock Process I

= Amount of profit

= nil

1. Process II = [Cost column/Total column] x Stock

=Rs. 90,000/Rs. 1,00,000 x 20,000

= Rs. 18,000

Profit = Rs. 20,000 – Rs. 18,000 = Rs. 2,000

2. Process III = Rs. 1,22,000/Rs. 1,50,000 x 30,000

= Rs. 24,400

Profit = Rs. 30,000 – Rs. 24,400 = Rs. 5,600

3. Finished Stock = Rs. 97,600/Rs. 1,50,000 X Rs. 30,000

= Rs. 19,520

Profit = Rs. 30,000 – Rs. 19,520 = Rs. 0,480

B. Actual Realized Profit is as shown

Particulars	Apparent Profit from Process (₹)	Unrealized Profit in Closing Stock (₹)	Actual Profit [Gross] (₹)
Process I	10,000	Nil	10,000
Process II	20,000	2,000	18,000
Process III	30,000	5,600	24,400
Finished Stock	50,000	10,480	39,520
Total	1,10,000	18,080	91,920

C. Stock Valuation for Balance Sheet purpose:

Particulars	Amount (₹)
Process I	10,000
Process II	18,000
Process III	24,400
Finished Stock	39,520
Total	91,920

4.9 Work-in-progress (Equivalent Production)

Equivalent production represents the production of a process in terms of completed units. In other views, it means converting the uncompleted production into its equivalent of completed units. In every process, an estimate is made of the percentage completion of any work-in-progress. A production statement and a cost statement will then be prepared.

Process costingmainly dealswith continuous type of production. At the end of the accounting period, there may be some work-in-progress, i.e., semi-finished goods may be in the pipeline. The valuation of such work-in-progress is done in terms of equivalent or effective production.

The work-in-progress is inspected and an estimate is made of the degree of completion, usually on a percentage basis. It is most important that this estimate is as accurate as possible because a mistake at this stage would affect the stock valuation used in the preparation of final accounts.

4.10 Equivalent Production

Equivalent production represents the production of a process in terms of completed units. Work-in-progress at the end of an accounting period are converted into equivalent completed units.

$$\text{Equivalent production} = \text{Completed units} + \left(\text{No. of units of work in progress}\right) \times \left(\text{Degree of completion in \%}\right)$$

The techniques of calculating equivalent production are as follows:

(a) Firstly the opening incomplete or work-in-progress units should be converted into equivalent units as incomplete.

Example:

(a) Opening work-in-progress is 500 units which are 60% complete, therefore only 40% work is to be done on these units in the process. Thus, on these units a cost of 500 × 40% = 200 units will be incurred in the process to complete these,

(b) To above units, add units started and finished during the production period or units completed in the process. These will be new units introduced less closing units and units scrapped,

(c) Thereafter, add equivalent units of closing units, and

(d) The total of all these will be equivalent production.

Equivalent unit should be calculated separately for each element of cost (viz. material, labour and overheads) because the percentage of completion of the different cost component may be different.

Evaluation of Equivalent Production

- Find out the total cost (net) for each element of cost, i.e., material, labour and overheads. Scrap value of normal loss is deducted from the material cost.
- Ascertain the cost per unit of equivalent production separately for each element of cost. This is done by dividing the total cost of each element by the respective number of equivalent units.
- At this rate of cost per unit, ascertain the value of finished production and work-in-progress.
- For the purpose of computation of equivalent production and its evaluation, the following three statements are generally prepared:

(a) Statement of equivalent production

(b) Statement of cost (per unit)

(c) Statement of evaluation

- These three statements may also be combined in one comprehensive statement called 'Statement of Production, Cost and Evaluation.'
- The problem on equivalent production may be divided into four groups.

  I. when there is only closing work-in-progress but without process losses

  II. When there is only closing work-in-progress but with process losses

  III. When there is only opening as well as closing work-in-progress without process losses

  IV. When there is opening as well as closing work-in-progress with process losses

Let us discuss the different situations and their accounting treatment in process costing.

A. When there is no opening stock and no process loss

- ***Normal Loss -*** Equivalent units of normal loss are taken as nil. In other words, a normal loss is not added in the equivalent production. However, realizable value of normal scrap is deducted from the cost of material so as to calculate the net material cost. This net material cost becomes the basis of calculating the material cost per unit in the statement of cost.
- ***Abnormal Loss -*** This is treated as if this were good production lost. Abnormal loss, thus, is added to equivalent production with due consideration to its degree of completion. Unless the degree of completion is specified, it may be assumed that abnormal loss units are 100% complete in respect of all elements of cost.
- ***Abnormal Gain -*** Units of abnormal gain are represented by good finished production. It is therefore, always taken as 100% complete in respect of all elements of cost, i.e., material, labour and overheads. Abnormal gain is deducted to obtain equivalent production.

B. When there is opening as well as closing stock of work-in-progress

In such a case there are different methods of calculating equivalent production. Let us discuss:

1. FIFO

This method is based on the assumption that work-in-progress moves on a first-in-first out basis. This means that unfinished work on the opening stock is completed first, before work on any new units is taken up.Computation of Equivalent Production under FIFO Method.

- State the opening stock of work-in-progress in equivalent completed units. This is done by applying the percentage of work needed to complete the unfinished work of the previous period.
- Ascertain the number of units introduced into the process and deduct the number of units of closing work-in-progress. This gives the number of units started and completed during the period. Add these units to the opening stock of work-in-progress calculated in (i) above.
- Add to the above the equivalent completed unit of closing work-in-progress. This can be determined by applying the percentage of work done on the finished units at the end of the period.

2. Average Cost Method

In this method, the cost of opening work-in-progress is not kept separately but is averaged with the additional costs incurred during the period. This method thus combines the cost of opening work-in-progress and new production. In order to find out the cost per unit of equivalent production, the cost of each element (material, labour and overheads) applicable to the opening work-in-progress is added to the cost incurred in the current period for that element. A single cumulative total and unit cost is obtained. Units completed and transferred as well as closing work-in-progress will be valued at this average unit cost.

Did you know?

How to Choose Between FIFO and Average Method

Use FIFO - If the cost of the opening work-in-progress in one lump sum figure and the stage of completion is given.

Use Average - If the cost of opening work-in-progress is given in terms of materials, labour and overhead but the stage of completion is not given.

FIFO or Average-Your Choice - If the degree of completion and the cost in terms of materials, labour and overheads of the opening work-in-progress are given, then one has a choice between FIFO and Average methods.

Where the question specifies a method to be followed, then that method must be followed.

4.11 Format of Equivalent Production

Let us discuss the various formats for equivalent production, which are to be maintained by companies for process costing.

(1) Format of statement of Equivalent Production :

Input		Output		Equivalent Production					
Particulars	Units	Particulars	Units	Material		Labour		Overheads	
				%	Units	%	Units	%	Units
Opening Stock	xx	Units completed	xx	xx	xx	xx	xx		
Units Introduced	xx	Normal Loss	xx	--	--	--	--		
		Abnormal Loss	xx	xx	xx	xx	xx		
	xx	Equivalent Units	xx	xx	xx	xx	xx	xx	Xx

(2) Statement of cost per Equivalent Units :

Element of costing	Cost (₹)	Equivalent Units	Cost per Equivalent Units (₹)
Material Cost (Net)	Xx	Xx	Xx
Labour Cost	Xx	Xx	Xx
Overheads Cost	Xx	xx	Xx
	xx		Xx

(3) Statement of Evaluation

Particulars	Element of cost	Equivalent Units	Cost per equivalent units (₹)	Cost (₹)	Total Cost (₹)
Units completed	Material	xx	xx	Xx	
	Labour	xx	xx	xx	
	Overheads	xx	xx	xx	Xx
Closing WIP	Material	xx	xx	xx	
	Labour	xx	xx	xx	
	Overheads	xx	xx	xx	Xx
Abnormal Loss	Material	xx	xx	xx	
	Labour	xx	xx	xx	
	Overheads	xx	xx	xx	Xx

4.12 Joint Products

According to Shukla, Grewal and Gupta, "Joint products represent two or more products separated in the course of the same processing operations, usually requiring further processing, and each product being in such proportion that no single product can be designated as a major product".

Joint products are produced simultaneously by a common process or series of processes, with each product processing more than a nominal value in the form in which it is produced. The definition emphasizes the point that the manufacturing process creates products in a definite quantitative relationship. An increase in one product's output will bring about an increase in the quantity of the other products, or vice versa, but not necessarily in the same proportion.

The term joint products is used for two or more products of almost equal economic value, which are simultaneously produced from the same manufacturing process and the same raw material.Joint product cost cay be defined as that cost which arises from the common processing or manufacturing of products produced from a common raw material. Whenever two or more different products are created from a single cost factor, a joint product cost results. A joint cost is incurred prior to the point at which separately identifiable products emerge from the same process.

Characteristics of Joint Products

- Joint products are produced from the same raw material in natural proportions.
- They are produced simultaneously by a common process.
- They are comparatively of almost equal value.
- Joint products may be saleable after separation or may be further processed by incurring additional costs to make them saleable or an improved product.

Example: The production of coke, for which coal is the original raw material. In addition to coke as its major product, the process produces sulfate of ammonia, light oil, crude tar and gas. The greater quantity of gas is not sold but is used to fire the coke ovens and the boilers in the power plant. The coke ovens are the split-off point for cost assignments. The cost of each product consists of a pro rata share of the joint cost plus any separable or subsequent costs incurred in order to put the products into saleable condition.

Co-products

Co-products refer to more than one product being manufactured by a company but need not necessarily arise from the same raw material and manufacturing process and the quantity of each co-product can be changed by the management.

- **Subsequent Costs**

Subsequent (or attributable) costs, are those costs which are incurred after the separation or split-off point. These are separately incurred for individual joint or by-products and thus are identifiable with each product.

Accounting for Joint Products

Accounting for joint products means the apportionment of joint cost to each of the joint product. Such apportionment serves the following objectives:

- To determine the cost per unit of products.
- To help in inventory valuation.
- To determine the profit or loss on each line of product.
- To determine the price of each product.

4.13 Methods of Apportionment of Joint Cost

There are various methods for apportionment of joint cost. Let us discuss these methods and their importance.

1. Sales Value Method

Under this method, the joint cost is apportioned on the basis of sales value at the split off point. The logic is that a product should bear the share of the joint cost according to its sale price. If sales price is higher than that of the other products, more share of joint cost should be charged to that product and if it is comparatively less than that of other products, less share of joint cost should be charged to the same. Though logically this method seems to be sound, in practice, charging higher share of joint cost to the product with higher sales value may not be justified due to the fact that lesser efforts are required for manufacturing of the same.

On the basis of unit prices-In this method, the selling prices per unit of various joint products is taken as the basis for apportionment of joint costs. In other words, joint cost is apportioned to various joint products in the ratio of selling prices of individual joint products without any regard to the quantities.

On the basis of sales value-In this method, the apportionment is done on the basis of weighted sales value, i.e., number of units produced and sold × selling price per unit. This method thus gives due consideration tothe quantities of various joint products produced.

2. Reverse Cost

In this method, the joint cost is apportioned on the basis of net value of each product. The net value is calculated by deducting the following from the sales value.

a) Estimated profit margin.

b) Selling and distribution costs.

c) After split off processing costs.

The net values of individual products so obtained are taken as the basis for apportioning joint costs. This is known as reverse cost method because net values are calculated by working backwards from sales values. This method is particularly used when products are not sold at their stage at split off point but require further processing.

3. Physical Units Method

Under this method, the joint cost is apportioned on the basis of relative weight, volume or quantity, etc., of each product, obtained at the point where the split-off occurs. These physical units refer to weight or measure such as pounds, tonnes, gallons, bales, volume etc. This method is suitable where the joint products will be measurable in the same units. This method cannot be applied when joint products consist of different types of units like liquids and solids.

4. Average Unit Cost Method

In this method, the joint cost is apportioned by using the average unit cost which is obtained by dividing the total joint cost by the total number of units produced of all the products. The average

cost per unit of each product is the same. The joint cost is apportioned to the joint products by computing the average unit cost of the product units. The average unit cost is computed by dividing the total manufacturing cost by the total number of units produced of all products. This method is useful where all the products produced are uniform with each other in all the respects.This method will not be useful if the production units are not similar with each other.

5. Survey Method

Survey Method is also termed as "Points Value Method." In this method, joint costs are allocated on the basis of percentage or points value is assigned to each products according to their relative importance. This method is also taken into various relevant factors such as volume, mixtures, selling price, technical engineering and marketing processes. The ratio of joint costs can be calculated by physical quantities of each products are multiplied with the weight age points. This method apportions the joint cost to various products, on the basis of the results of a survey or technical evaluation. In this survey, various factors, like volume, selling price, marketing process, etc., are studied and points or weights are assigned to each product. Costs are apportioned on the basis of such weights or points.

6. Contribution Margin Method

This method is also called as "Gross Margin Method." According to this method joint costs are allocated or apportioned as fixed cost and variable cost incurred at the point of separation. Joint fixed costs are apportioned on the basis of contribution of each product whereas variable portion of joint costs are apportioned according to the volume of units produced.

7. Weighted Average Method

Under this method, weights are assigned to each unit based upon size of the units, difference in type of labor employed, material consumption, market share, efforts of labor required and so on. The joint cost is apportioned on the basis of the weights assigned to each product. This method is highly useful if the weights assigned are on objective basis. If subjective element creeps in, the method may not give accurate results.

8. Market Value Method

This method is also termed as "Relative Sales Value Method." According to this method, the number of units of each product manufactured is multiplied by the product's selling price to obtain the sales value of production. The portion of total joint costs allocated to each product is equal to the ratio of the sales value of each product's total market value.

4.14 By- Products

By-products have been defined as "any saleable or usual value incidentally produced in addition to the main product". Thus, the main difference between by-products and joint product is that in case of the former, generally no extra expense is to be incurred, whereas in the case of the latter additional expenditure will be necessary before the products can be sold. By-products are products of relatively small value which are incidentally and unavoidably produced in the course of manufacturing the main product. By-products are relatively considered less important. For example, molasses obtained from production of sugar or ash available when boilers are run would be by-products.By-products may be-

(a) Those sold in their original form without further processing.

(b) Those which require further processing in order to be saleable.

Distinction between Joint Products and By Products

Relative sales value: If the sales value of all the products are more or less equal, they are treated as joint products. If, however, there are wide differences, the product with the greater sales value is treated as the main product and the products of lower value are treated as by-products.

Objective of manufacture: If the objective of manufacturing is product A, then unwanted products B and C be treated as by-products.

Policy of management: The management may decide to treat a particular product as the main product and the other products as by-products. Alternatively, it may choose to treat all products as joint products.

Accounting for By-Products

- **Where by-products are of small total value-**In such a case it is not considered practicable to apportion any part of the joint cost to by-products. The net income realized by the sale of by-products may be treated as:

(i) It may be treated as 'miscellaneous income' and credited to the Costing Profit and Loss Account.

(ii) It may be credited to the process account in which the by-product has arisen.

- **Where by-products are of considerable total value-**In this case, it is proper to apportion a part of the joint cost to by-products. This is debited to by-product account and credited to the main product account or the relevant process account. Any cost incurred in further processing of the by-product is debited to by-product account. The by-product account is credited with its sales value and any profit/loss arising out of this account is transferred to costing Profit and Loss Account.
- **Where by-products require further processing-**In such situations, the share of by-product in joint-cost at the split-off point may be arrived at by subtracting the profit and the further processing cost from the realizable value of the products, i.e., by using Reverse Cost Method.
- **Where by-product is utilized in the undertaking itself-**In those cases where by-products are used by the company itself as a raw material for some other process, such by-products may be priced at the opportunity cost. The opportunity cost is that cost which would have been incurred had the by-product been purchased from an outside firm.

If the by-products have relatively unimportant market value, it is neither feasible nor practicable to attempt to apportion to the by-products any part of the joint costs of production upto the point of split off.

Accounting Treatment when By-products Need Further Processing

In this case, obviously the by-product is of some importance and it would be necessary to determine the cost of by-product at the point it is separated from the main product. This cost should be determined on the basis of physical management or the market value at the separation point. After having ascertained the share of joint costs on the by-product, it will be necessary to have a separate account for it in which the expenses for further processing will be charged. The total of this account will be the cost of raw materials for the other products.

Case Study:

Accounting for Spoiled Units

The House Hold Aids Company assembles clip clothespins in three sections, and uses process costing. Under normal operating conditions, each section has a spoilage rate of 2%. However, spoilage can go as high as 5% and is usually discovered when a faulty pin enters process or on final completion by a section.

The spring mechanism is the only material which can be saved from a spoiled unit. The production supervisor assigns a worker once or twice a week to remove the springs from spoiled units. The salvaged springs are placed in bins at the assembly tables in section No1 to be used again. No accounting entry is made of this salvage operation.

In the past, the controller has made no attempt to account for spoilage separately. Lost unit costs have been absorbed by the units transferred out of the section and those remaining in the process. However, because spoilage is increasing, a different method is needed. The spoiled work should be broken into normal and abnormal spoilage. The cost of normal spoilage should be absorbed by good completed units. All materials salvaged should be assigned a value and placed in materials inventory. Sectional materials costs should be reduced by the value assigned to salvaged materials.

Abnormal spoilage should be charged to factory overhead account. The cost to be included in this account should be the amount accumulated against a clothespin up to the point of being scraped, and the total loss in scraped clothespins should be shown in the cost of production report of the department responsible for the loss.

https://www.transtutors.com/questions/the-house-hold-products-company-assembles-clip-clothespins-in-three-sections-and-use-2550813.htm#answer

Summary

- In process costing the products or goods are processed in one or more processes.
- Cost are compiled on time basis: for production, for a given accounting period, for each process.
- Wastage represents the portion of a basic raw material lost in processing, having no recovery value.Wastage may be visible.
- Costing for joint products implies the assignment of a portion of the joint cost to each of the joint product.
- Unless the joint costs are properly and reasonably apportioned to different joint products produced, the cost of joint products will vary considerably and this will affect valuation of inventory, pricing of products and profit or loss on sale of different products.
- Equivalent production represents the production of a process in terms of completed units. In other views, it means converting the uncompleted production into its equivalent of completed units.
- In every process, an estimate is made of the percentage completion of any work-in-progress. A production statement and a cost statement will then be prepared.
- Costing for joint products implies the assignment of a portion of the joint cost to each of the joint product.
- Unless the joint costs are properly and reasonably apportioned to different joint products produced, the cost of joint products will vary considerably and this will affect valuation of inventory, pricing of products and profit or loss on sale of different products.
- Equivalent production represents the production of a process in terms of completed units.
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Keywords

- ***Compiled Cost:***Ppresentation of complete cost in a accurate way.
- ***Manufacturing Plant:***Aplant consisting of one or more buildings with facilities for manufacturing.
- ***Mining Units:*** Specified area of plant from which minerals are extracted.
- ***Scrap:*** A small piece or amount left over.
- ***Abnormal Gain:*** Gain out of abnormal effective usage
- ***By-products:*** Secondary product.
- ***Equivalent Production:*** Number of units produced and material used.
- ***Market Price:*** Price of a commodity in the market.
- ***Physical Unit:*** A unit of measurement.

Self Assessment

1. _____costing is the only reasonable approach to determining product costs in many industries.

A. Financial

B. Standard

C. Management

D. Process

2. Several products produced from the same raw material may be termed as _____.

A. Joint product

B. Single product

C. Actual product

D. None of above

3. What is/ are the various types of process costing?

A. Weighted average

B. Standard costing

C. FIFO

D. All above

4. _____ is a more complex calculation that creates layers of costs.

A. LIFO

B. HIFO

C. NIFO

D. FIFO

5. In process costing, the _____ of the process is transferred to next process in sequence.

A. Input

B. Sequence

C. Output

D. Flow

6. Process losses can be classified as_____.

A. Normal loss

B. Natural loss

C. Nominal loss

D. All above

7. The amount of loss which cannot be avoided because of the nature of material or process is _____process loss.

A. Normal loss

B. Natural loss

C. Nominal loss

D. All above

8. When normal loss is physically present in the form of scrap, it may have some value, which is _____ to the Process Account .

A. Credited

B. Debited

C. No treatment

D. Adjusted

9. _____loss consists of loss due to carelessness, machine breakdown, accident, use of defective materials, etc.

A. Normal

B. Controllable

C. Adjusted

D. Abnormal

10. _____is a practice to charge the output of each process to the next process not at cost but at a price showing profit to the transferor process. .

A. Advance process

B. Managed process

C. Inter process

D. Corporate culture

11. Sometimes the output of a process may be _____ sold and _____transferred to the next process for further processing.

A. Fully, partly

B. Partly, Fully

C. Fully, Fully

D. Partly, Partly

12. A part of the output so sold will contain an element of profit or loss which will be revealed in the _____ Account.

A. Process

B. Output

C. Profit and Loss

D. Product

13. When a part of the output is sent to warehouse for sale, it is at cost and does not contain an element of _____?

A. Profit

B. Profit and Loss

C. Loss

D. Stability

14. _____ represents the production of a process in terms of completed units.

A. Finished goods

B. Sale of products

C. Work in process

D. Equivalent production

15. For computation of equivalent production and its evaluation, which statements are generally prepared?

A. Statement of equivalent production

B. Statement of cost (per unit)

C. Statement of evaluation

D. All above

16. Normal loss is not _____ in the equivalent production.

A. Subtracted

B. Added

C. Multiplied

D. Divided

17. Units of _____ are represented by good finished production, it is always taken as 100% complete in respect of all elements of cost.

A. Normal loss

B. Normal gain

C. Abnormal loss

D. Abnormal gain

18. What is/ are the methods of calculating equivalent production?

A. FIFO

B. LIFO

C. HIFO

D. NIFO

19. The term _____is used for two or more products of almost equal economic value.

A. Main product

B. Scrap

C. By product

D. Joint product

20. _____ refer to more than one product being manufactured by a company but need not necessarily arise from the same raw material .

A. Co products

B. By products

C. Joint products

D. None of above

21. _____costs, are those costs which are incurred after the separation or split-off point.

A. Administration

B. Selling

C. Distribution

D. Subsequent

22. Which method/s is not used for apportionment of joint cost?

A. Sales value method

B. Reverse cost method

C. Survey method

D. Cost of production

23. _____ are products of relatively small value which are incidentally and unavoidably produced in the course of manufacturing the main product.

A. Joint products

B. Co products

C. By products

D. Wasted products

Answer for Self Assessment

1.	D	2.	A	3.	D	4.	D	5.	C
6.	A	7.	A	8.	A	9.	D	10.	C
11.	D	12.	A	13.	B	14.	D	15.	D
16.	B	17.	D	18.	A	19.	D	20.	A
21.	D	22.	D	23.	C				

Review Questions

1. Define Process Costing and explain its working procedure.

2. Distinguish between Process Costing and Job Costing.

3. Discuss the Process Costing and explain its objectives.

4. In a factory the product passes through two processes I and II. A loss of 5% is allowed in process I and 2% in process II, nothing being realised by disposal of wastage. During May, 2020, 10000 units of materials costing Rs. 6 per unit were introduced in Process I. The other costs are:

	Process I (₹)	Process II (₹)
Direct materials	—	6,140
Direct wages	10,000	6,000
Overheads	6,000	4,600

The output was 9,300 units from process I. 9,200 units were produced by process II, which were transferred to the warehouse. 8000 units of the finished product were sold @ Rs. 15 per unit. The selling and distribution expenses were Rs. 2 per unit. Prepare (a) Process accounts, and (b) a

statement of profit or loss of the factory for May 2020, assuming there were no opening stocks of any type.

5. Write short notes on abnormal gain or abnormal effective in process costing.

6. Write short notes on:

(a) Inter-Process Profit (b) Equivalent Production

7. A product is obtained after passing it through three processes. The following information is collected for August, 2020:

	Process A	Process B	Process C
Materials	₹ 5,200	₹ 3,960	₹ 5,924
Wages	₹ 4,000	₹ 6,000	₹ 8,000
Output in units during the month	950	840	750
Normal loss	5%	10%	15%
Value of scrap per unit	₹ 4	₹ 8	₹ 10

Additional information are given below: 1,000 units @ Rs. 6 each were introduced in Process A. There was no stock of materials or WIP at the beginning or at the end of that month. The production overhead was RS. 18,000 for that month. Prepare the necessary process accounts indicating normal loss, abnormal loss and abnormal gain.

8. Define joint products, by-products and give example of each.

9. Explain the various ways for apportioning of Joint cost to joint products.

10. What is the concept of Equivalent Production? Explain in detail.

11. Explain briefly the distinction between Joint Products and By-products.

12. What are equivalent units of production? State the two principal methods of calculating equivalent units.

13. What are various methods of accounting for By-products? Briefly explain each of the methods.

14. What do you mean by inter-process profit? Discuss its procedure.

Further Readings

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Web links

www.futureaccountant.com

www.rbi.com

Unit 5: Job and Batch Costing

CONTENTS

Objectives

After studying this unit, you will be able to:

- cognize the procedure for job costing
- appreciate the methods for computing batch costing
- comprehend the concept of EBQ

Introduction

Job costing is a method of costing applied in industries where production is measured in terms of completed jobs. Industries where job costing is generally applied are printing press, ship building, repair workshops, foundry, automobile garage and other similar manufacturing units which manufacture to customer's specific requirements.

Job costing is a method of costing whereby cost is compiled for a job or job order/work order. The production is against customer's orders and not for stock. The cost is not related to the unit of production but is a cost for the job, e.g., printing of 1,000 ledger sheets, repairs of 10 equipments, instead of printing one sheet or repair of one equipment. The elements of cost comprising prime cost viz. direct materials, direct labour and direct expresses are charged directly to the jobs concerned, the overhead/indirect expenses charged to a job is an apportioned portion of the departmental overhead.

Batch Costing is applicable to general engineering industries which produce components in convenient economical batches for subsequent assembly or manufacture on mass scale,

comparatively small items of products. Except for the difference that in batch costing, a batch instead of a job constitute the cost unit for which costs are compiled, the procedure for batch costing is similar to that of job costing. Separate job cost sheets are maintained for each batch of components manufactured and for the assembly of finished products. When products are stocked for sale, a greater degree of control is required.

5.1 Concept of Job and Batch Industries

All industries and organizations have their own aspect of doing work. Many are operating their businesses at customer demand and other are operating on mass basis. So, all industries may be broadly classified into two categories:

Job order industries

Mass production industries

- **Job order industries**

In job order industries, production work is done against orders from customers. Each job work needs special treatment and can be clearly distinguished from other jobs. Each job is completed as per customer's specifications. Examples of job order industries are printing press, construction of buildings, bridges, roads ship building.

- **Mass production industries**

In mass production, firms manufacture uniform types of products. Since production is of standard products, it is on a mass scale and on a continuous basis. No customer orders or specifications are required for production. Examples of mass production industries are textiles, paper, sugar, chemicals and steel.

5.2 Job Costing

Job costing or job order costing is a method of cost ascertainment used in job order industries. Job costing is a method of costing under which the cost of each job is ascertained separately. It is that form of specific order costing which applies where work is undertaken to customer's special requirements.

CIMA defines job costing as "A form of specific order costing which applies where work is undertaken to customer's special requirement. As distinct from contract costing, each job is a comparatively short duration". It implies that under job costing, production is always against the customer's special requirement.

Kohler defines job costing as "a method of cost accounting whereby cost is compiled for a specific quantity of product, equipment, repair on other service that moves through the production process as a continuously identifiable unit, applicable material, direct labour, direct expense and usually a calculated portion of the overhead being charged to a job order".

Job costing is usually adopted by the concerns where a specific job is done for a stipulated price.

5.3 Features of Job Costing

There are certain characteristics of job costing which can be used or applied in organizations at the time of production of units at customers demand. Let us discuss the features of job costing:

- The production is generally against customer's order and not for stocks.
- Under job costing method, production is intermittent and not continuous.
- Each job has its own characteristics and needs special treatment.
- Each job is treated as a cost unit under this method of costing.
- The work-in-progress differs from period to period according to the number of jobs is hand.
- There is no uniformity in the flow of production from department to department.

- The emphasis is on the between division the direct and indirect expenses is laid upon.
- Job costing is adopted by manufacturing organizations as well as non-manufacturing organizations.
- Under this method, the profit and loss can be ascertained in respect of each job.
- Each job is distinctively identified by a production order throughout the production stage.

Objectives of Job Costing

There are many objectives of job costing, which help the companies in satisfying the customers demand and to earn profits for orgnaizations itself. Let us discuss few of them:

- Cost of each job/order is ascertained separately. This helps in finding out the profit or loss on each individual job.
- It enables the management to know those jobs which are more profitable and those which are unprofitable.
- It provides a basis for determining the cost of similar jobs undertaken in future. It thus helps in future production planning.
- It helps the management in controlling costs by comparing the actual costs with the estimated costs.

5.4 Advantages and Disadvantages of Job Costing

Advantages

The various advantages of job costing are as follows:

- Job costing is useful in quoting cost plus contract.
- Job costing facilitates identification and control of spoilages and defectives.
- Job costing facilitates estimation of cost of similar jobs.
- It helps the management to know about the profitability of the jobs.
- Job costing is helpful to ascertain the cost as well as the profit or loss for each job separately.
- The data of the job costing are quite helpful for the future planning.
- Job costing helps in making detailed analysis of cost of materials, labour, direct expenses and overheads.

Disadvantages

The disadvantages or weaknesses of job costing are as follows:

- It is expensive to operate as it requires considerable detailed official or clerical work.
- With the increase in the official or clerical works the chances of errors or mistakes are increased.
- Job costing does not facilitate control of cost unless it is used with standard or budgetary costing.
- Job costing cannot be efficiently operated without highly developed production control system. The job costing method requires intricate factory organisation system.
- To get accurate results, job costing requires some pre-requisites. In its absence job costing will not give accurate results.
- It is expensive as cost is accumulated and ascertained for each job separately.
- When drastic economic changes take place cost comparison becomes difficult.

Completion of Jobs

When jobs are completed, the cost is transferred to cost of sales account. The total cost of jobs completed during each period is set against the sales to determine the profit or loss for the, period.

5.5 Job Costing Procedure

The procedure that is commonly applicable to a normal sale transaction equally applies in case of job costing. The procedure for job costing involves the following:

(i) ***Receiving an Enquiry:*** First of all a customer seeks an enquiry about the price, quality and other terms and conditions of the job before placing an order.

(ii) ***Estimation of the Price of the Job:*** The cost accountant estimates the cost of job after considering the various elements of cost and keeping in mind the specification of customer. This is based on the cost of execution of similar job in the past years and considering the possible changes in the various elements of the cost. Estimated costs are also compared with the actual costs to find out the variation in the actual profit.

(iii) ***Receiving of Order:*** The customer will then place the order if he is satisfied with the quotation price, other terms and conditions of executing the job.

(iv) ***Job Order Number:*** When an order is received from the customer, it is allotted a certain number. Every job order is known by its number throughout its production process.

(v) ***Production Order***: When a job is accepted, the production planning department prepares a production order or job order. Production order or job order is a written order issued to the manufacturing department to proceed with the job.

(vi) ***Recording of Costs:*** Cost is ascertained for each job separately. Costs are collected and recorded for each job. The costing department collects the costs and records them in the job cost sheet.The sources of collection of various costs may be considered as materialcost, directlabourcost, directexpenses and overheads:

(vii) ***Completion of the Job:*** On completion of a job, the production department sends a completion report of job to the costing department. On the basis of the report, the costing department completes the job cost sheet and calculates profit or loss on each job. Actual cost recorded in the job cost sheet is compared with the budgeted cost so as to reveal the efficiency or inefficiency of operations.

(viii) ***Dispatch of Goods:*** The finished products are then packed and delivered to the customer as per the delivery schedule. Payment is settled as per the agreed mode of payment.

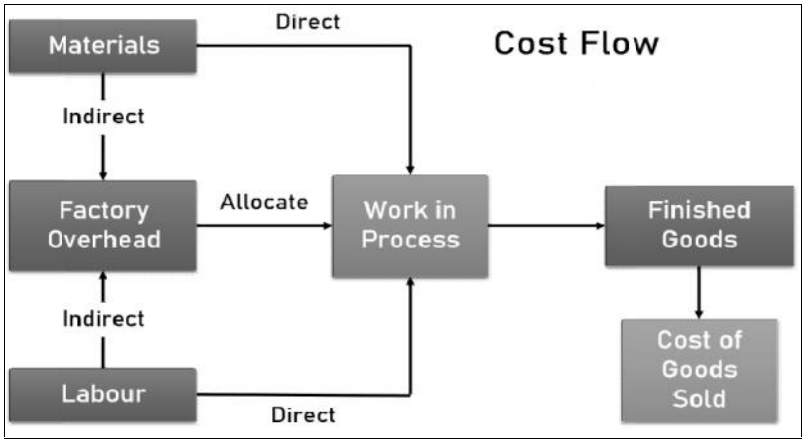

Fig 1: Job Costing Procedure

5.6 Job Cost Sheet

The unique accounting document under job costing is the job cost sheet. Receipt of production order is the signal for the cost accountant to prepare a job cost sheet on which he will record the

cost of materials used and the labour and machine time taken.A separate job cost sheet is prepared for every job undertaken. This is to facilitate the calculation of cost of the job separately. The main idea of preparing job cost sheet is to show in detail the cost components or elements of the total cost of executing a job. Job cost sheet is used to record direct materials, direct wages and overheads applicable to the job.

A job cost sheet facilitates the determination of profit or loss on every job. Estimated costs are also recorded on the job cost sheet which facilitates comparison of actual costs with the estimated cost and variation in the cost is known.

A specimen form of job cost sheet is given below:

JOB COST SHEET

Customer..... ..... Job No.
Date of Commencement..... Date of Completion .....

Material Cost			*Labour Cost*				*Factory Overheads (Absorbed)*			
Date	*Material Req. No.*	*Amount* ₹	*Date*	*Hours*	*Rate* ₹	*Amt* ₹	*Deptt*	*Hours*	*Rate* ₹	*Amt* ₹
Total			Total				Total			

Profit/Loss		*Cost Summary*	
	₹		₹
Price Quoted	.....	Material	
Less: Cost	.....	Labour	
	.....	**Prime cost**	
Profit or Loss	.....	Factory overheads	
	.....	**Works cost**	
		Adm. overheads	
		Cost of production	
		Selling and dist overheads	
		Total cost	

Fig 2: Job Cost Sheet

Example:

The following information is extracted from the job ledger of Neelam Enterprises in respect of Job Number 510:

Materials Rs. 7,000

Wages 100 hours @ Rs. 7

Variable overheads incurred for all jobs Rs. 15,000 for 5,000 labour hours.

Find the profit if the job is billed for Rs. 9,000.

Solution

Job Cost Sheet for Job No. 510

Particulars	Amount (₹)
Materials	7,000
Wages 100 hours @ ₹ 7	700
Variable overheads : 100 hours @ ₹ 3[1]	300
Total Cost	8,000
Profit	1,000
Billed Amount	9,000

Working note: Rate of variable overheads per hour = 15,000/5,000 = Rs. 3

Cordek Ltd

Cordek Ltd was formed in 1973 to introduce specialist new products and services to the construction industry. Cordek has been at the forefront of developing innovative solutions manufacturing a wide range of products for a variety of applications. Having researched the market for suitable suppliers they contacted Vizual. Their requirements were based around a Job Costing System that gave them the ability to record time employees' spend on a particular job and/or task, and to be able to enter budgetary figures against jobs and be notified when a job is over budget.

Their main focus was on ease-of-use for their employees allowing them to record hours spent against the jobs they are working on. The management team required a further breakdown of how much time was spent on individual tasks within that particular job.

CaptureIT can cope with unlimited numbers of jobs and tasks, which means it is easily able to cope with all costing requirements.

https://www.theconstructionindex.co.uk/company/Cordek-Limited/2483/

5.7 Batch Costing

This is a variation of job costing. While job costing is concerned with costing of jobs that are made to a customer is requirements, batch costing is used when production consists of limited repetitive work and a definite number of articles are manufactured in each batch to be held in stock for sale to customers generally. Thus, a batch is a cost unit consisting of a group of identical items.The method is applicable to general engineering industries which produce components in convenient economical batches for subsequent assembly or manufacture on mass scale, comparatively small items of products. Except for the difference that in batch costing, a batch instead of a job constitute the cost unit for which costs are compiled, the procedure for batch costing is similar to that of job costing. Separate job cost sheets are maintained for each batch of components manufactured and for the assembly of finished products. When products are stocked for sale, a greater degree of control is required.

Under this method the cost is ascertained in respect of a batch of goods or components manufactured.

Examples. of such products are hardware (such as nuts, bolts, pins, screws, etc.) and Bakery products (such as breads, cakes, biscuits, etc.). So industries which manufacture products of this nature make use of batch costing. Other examples of industries which adopt batch costing are shoe manufacture, toys, ready-made garments, tyres and tubes, drugs and pharmaceuticals, spare parts and component parts as in the case of automobiles, radios, TV's, refrigerators, machineries, etc.

In order to know the cost of production of a batch of articles, a batch cost sheet is prepared.

5.8 Essentials of Batch Costing

The main essentials of batch costing are as under:

- This method is used where small parts of considerable number are produced, such as industries producing machinery parts, machine tools, etc.
- No special costing principles are involved, each batch constituting a separate unit divided into sub-units of each piece produced.
- Entire production is divided into economic groups or batches and usual and appropriate costing methods are applied to each batch or group.

- The advantages of the method are that the unit cost of every group is determined so that the total production cost is broken down into its constituent parts and profit and loss of each and every batch is known separately.
- As production cost and volume of sales vary considerably from batch to batch, it sometimes becomes difficult to allocate overhead charges equitably. It is main drawback of the method.

5.9 Advantages and Disadvantages of Batch Costing

Advantages

Following are the main advantages of batch costing:

- The accounting work is considerable reduced as a group of homogeneous jobs constitute a batch.
- It takes the benefit of reduced cost of production arising out of economic batch quantity.
- The loss of time under job costing arising out of inter-job transfer of materials, labours and tools is minimised under batch costing.
- There is the advantages of consistent cost of production of every article produced in a batch under batch costing.
- Supervision becomes easy and more effective by means of spreading over the supervision's time over all the units constituting the batch. Thus, the idle time of supervisor's as well as workers are eliminated.

Disadvantages

The main disadvantages or limitations of batch costing are:

- Determination of a batch from various jobs often pose problem. It is difficult to come across absolute homogeneity of jobs.
- If the production of a batch is wrongly undertaken, say, owing to sub-standard materials or defective operations, the whole batch of articles is to be discarded which will become a great loss to the manufacturer. Pharmaceutical and drugs products offer best example to this point of disadvantage.
- When quantity of goods to be manufactured differs from customer to customer, again it becomes difficult to determine the batch.

Difference between Batch Costing and Job Costing

Batch costing does not differ from job costing in respect of accounting procedure. There are two points of differences between batch costing and job costing. They are:

- Under batch costing, a batch of articles produced constitutes a cost unit. But under job costing, each and every job is treated as a cost.
- Under batch costing, production is taken up to be held in stock sold on demand and also a receiving specific order from customers. On the other hand, under job costing, production is undertaken only against specific orders.

5.10 Batch Costing Procedure

A certain procedure is applied for batch costing by organizations which makes it easy for them to maintain appropriate records.

- Each batch is given a batch number in the same way as a job is given a job number.
- Direct materials, direct labour and direct expenses which can be identified with the batch are recorded on the Batch Cost Card.
- The costing of materials requisitions and time sheets follows normal job costing principles.
- Overheads are absorbed on one of the bases already explained as is done is job costing.
- When a batch is completed, the total cost of the batch is divided by the quantity produced in the batch to arrive at the cost per unit or per dozen etc., as required.

- Larger the batch size, the lower is the setting up cost per article.

5.11 Economic Batch Quantity (EBQ)

The concept of economic batch quantity is quite similar to economic order quantity. In batch costing, the determination of economic batch quantity assumes more importance. In fact, determining the size of the batch is a problem by itself under batch costing. This is so because, if the batches are many, the (i.e., quantity of production is less in every job) economies arising out of large scale production is not taken advantage of. Therefore, it is always necessary to determine the optimum size of the batch or economic batch quantity before the production is started. The economic batch quantity also helps in eliminating the setting up time involved whenever a batch of articles is produced.

In industries where batch costing is employed, an important point is the determination of the optimum quantity in a batch at which cost per unit is minimum. This is known as an Economic Batch Quantity. While determining economic batch quantity, two type of costs are considered:

Setting-up costs-This is the cost of setting the machine and the tools for production of a particular batch. This is of a fixed nature. Therefore, when the size of the batch is large, setting-up cost per article in the batch is lower.

Carrying cost-This includes the cost of storage, interest on capital invested, etc. Larger size of a batch leads to higher carrying costs. In determining the economic batch quantity, there are five main considerations:

(a) The cost and time taken in setting up the tools on the machines.

(b) The cost and time taken in manufacturing the parts.

(c) The interest on capital invested in the parts.

(d) The cost of storage.

(e) The rate of consumption or sale of the parts.

The concept of economic batch quantity is an example of the law of increasing returns and takes advantage of economies of large scale production.

Different formulas are developed to determine the economic batch quantity. One such formula is given below:

$$EBQ = \sqrt{\frac{2.U.S}{C}}$$

where
EBQ = Economic Batch Quantity
U = No. of units to be produced in a year
S = Set-up costs per batch
C = Carrying cost per unit of production.

Fig 3: Formula for Economic Batch Quantity

Numerical

Compute the economic batch quantity for a company using batch costing with the following information:

Annual demand for the component 12,000

Set-up cost per batch Rs. 120

Carrying cost per unit of production Rs. 0.36

Solution

$$\text{Economic Batch Quantity} = \sqrt{\frac{2US}{C}}$$

$$= \sqrt{\frac{2 \times 12,000 \times 120}{036}}$$

$$\text{EBQ} = 2,828 \text{ units}$$

Summary

- Job costing is a method of costing applied in industries where production is measured in terms of completed jobs.
- Industries where job costing is generally applied are printing press, ship building, repairworkshops, foundry, automobile garage and other similar manufacturing units which manufacture to customer's specific requirements.
- Job costing is helpful to ascertain the cost as well as the profit or loss for each job separately.
- The data of the job costing are quite helpful for the future planning.
- Batch Costing is used where small parts of considerable number are produced, such as industries producing machinery parts, machine tools, etc.
- No special costing principles are involved, each batch constituting a separate unit divided into sub-units of each piece produced.
- Entire production is divided into economic groups or batches and usual and appropriate costing methods are applied to each batch or group.

Keywords

- ***Economic batch quantity:*** optimal batch quantity he
- ***Job costing:*** calculation of costs involved a construction
- ***Production cost:*** combined costs of raw material and labor incurred in producing goods
- ***Supervision cost:*** small monthly fee to offset the costs of supervision
- ***Work-in-progress:*** piece of work that is not yet finished

Self Assessment

1. In _____ industries, production work is done against orders from customers.

A. Capital intensive

B. Labour intensive

C. Mass production

D. Job order

2. Each job is completed as per _____ specifications..

A. Customer

B. Supplier

C. Company

D. All above

3. In _____, firms manufacture uniform types of products..

A. Capital intensive

B. Labour intensive

C. Mass production

D. Job order

4. In mass production industries, production is on a mass scale and on a _____ basis. .

A. Regular

B. Interval

C. Fixed

D. Continuous

5. _____ is a method of cost ascertainment used in job order industries.

A. Process Costing

B. Product Costing

C. Job Costing

D. Order Costing

6. When jobs are completed, the cost is transferred to _____ account..

A. Cost of sales

B. Cost of production

C. Cost of goods sold

D. Profit and Loss

7. When an order has been accepted, an individual _____ must be assigned to each job so that separate jobs are identifiable.

A. Order Number

B. Job Number

C. Job Code

D. Job Symbol

8. The unique accounting document under job costing is the job _____.

A. Cost Sheet

B. Statement

C. Sheet

D. Costing

9. _____ is used when production consists of limited repetitive work and a definite number of articles are manufactured.

A. Job Costing

B. Batch Costing

C. Process Costing

D. Order Processing

10. A batch is a cost unit consisting of a group of _____ items.

A. Different

B. Specific

C. Identical

D. Related

11. Direct materials, direct labour and direct expenses which can be identified with the batch are recorded on the _____.

A. Job Cost Card

B. Job Sheet

C. Job Statement

D. Job Cost Sheet

12. The cost of setting the machine and the tools for production of a particular batch is known as _____.

A. Ordering cost

B. Setting up cost

C. Inventory cost

D. Carrying cost

13. _____includes the cost of storage, interest on capital invested.

A. Ordering cost

B. Setting up cost

C. Inventory cost

D. Carrying cost

14. Setting up cost is of _____nature.

A. Fixed

B. Variable

C. Semi Variable

D. Static

15. Larger the batch size, the _____ is the setting up cost per article.

A. Higher

B. Lower

C. Same

D. Fluctuated

Review Questions

1. Define job costing. What are the main features of job costing? Give a proforma of cost sheet under such a system.

2. What is the concept of job costing? Discuss its advantages and limitations.

3. What is a job cost sheet? What kind of data generally appear on job cost sheet?

4. What is batch costing? How does it differ from job costing? Explain.

5. Write an explanatory note on job cost sheet by providing a proforma cost sheet.

6. Briefly explain the purpose of job costing and the procedure for ascertaining the job costs.

7. What is batch costing? What are its salient features?

8. What is meant by Economic Batch Quantity? How is it computed?

9. Following information is extracted from the job ledger in respect of Job No. 324:

Materials Rs. 6,800, Wages 80 hours @ Rs. 5 per hour, and Variable overheads incurred for all jobs Rs. 10,000 for 4,000 labour hours. Find out the profit if the job is billed for Rs. 9,000.

10. Compute the economic batch quantity for a company using batch costing with the following information:

Annual demand for the component 24,000 ;Set-up cost per batch Rs. 240 ;Carrying cost per unit of production Rs. 0.72

Answers: Self Assessment

1. D	2. A	3. C	4. D	5. C
6. A	7. B	8. A	9. B	10. C
11. A	12. B	13. D	14. A	15. B

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Unit 06: Contract Costing

CONTENTS

Objectives

After studying this unit, you will be able to:

- recognize the conceptual framework of contract costing,
- appreciate the features of contract costing in business world.
- comprehend the various concepts used in contract costing for computation purpose,
- appreciate the technique used for preparation of various accounts in contract costing.

Introduction

In principle, contract costing is similar to job costing as it follows the principles of job costing. Contract costing is, therefore, a type of job costing and the entire contract, instead of job, constitutes cost unit. This method of costing which is also known as Terminal Costing is applied in industries engaged in the construction of buildings roads, dams, bridges, banks, parts, etc. In this method, a separate number is allotted for every contract and all related costs are accumulated for each contract. The person who undertakes the work to complete is known as 'contractor' and the person who gets the work done through contractor is known as 'contractee'.contract costing is a type of specific order costing under which there is a attribution of costs to individual contracts. The important objectives of contract costing are as follows:

- To determine the total cost of the contract,
- To determine the profit or loss for each or every contract, and
- To facilitate control of cost of each contract.

6.1 Contract Costing

Contract costing, also known as terminal costing, is a variant of job costing. In this method of costing, each contract is a cost unit and an account isopened for each contract in the books of the contractor to ascertain profit/loss thereon.Contract costing is a type of job costing in which a contract constitutes a unit of cost. The principles of job costing are applicable to contract costing and embrace the same basic principles of cost ascertainment.

A contractor undertakes a small number of big contracts at a time. For example, builders, civil engineering firms, constructional and mechanical engineering firms etc.

Contract for Delhi Metro is a recent example. Konkan Railway is another example of contract costing. In contract costing there are two parties involved – Contractor (who undertakes the job to be completed) and contractee (owner or the person for whom job is completed). In contract costing, the cost unit is the contract itself. Contracts are completed at the work site generally by the contractor.

The ICMA, London defines contract costing as, "that form of specific order costing which applies where work is undertaken to customer's special requirements and each order is of long duration or period."

In other words, "ContractCosting is the technique of ascertaining cost of a contract."

6.2 Features of Contract Costing

There are certain characteristics of Contract Costing, which are to be used by organizations while computing results and cost from different contracts.

- Contracts are generally of large size and, therefore, a contractor usually carries out a small number of contracts in one year.
- A contract generally takes more than one year to complete.
- Work on contracts is carried out at the site of contracts, not in factory premises.
- Each contract undertaken is treated as a cost unit.
- Contract is done for a specific consideration which is known as contract price.
- A separate contract account is prepared for each contract in the books of the contractor to ascertain profit or loss on each contract.
- Most of the materials are specially purchased for each contract. These will, therefore, be charged direct from the suppliers' invoices.
- Any materials drawn from the store is charged to contract based on material.
- Specialist sub-contractors may be employed for say, electrical fittings, welding work, glass work, etc.
- Plant and equipment may be purchased for the contract or may be hired for the duration of the contract.
- Labour cost and most expenses (e.g., electricity, telephone, insurance, etc.) are also direct.
- There is no heavy investment on assets initially in the case of contract costing.
- Payments by the customer (contractee) are made at various stages of completion of the contract based on architect is certificate for the completed stage.
- Penalties may be incurred by the contractor for failing to complete the work within the agreed period.

Distinction between Contract Costing and JobCosting

- Contract is big in size whereas a job is small
- Contract work is done at site whereas jobs are usually carried out in factory premises.
- A contract takes more time to complete whereas a job usually takes less time to complete.
- In contract costing, most of the costs are chargeable direct to contract accounts, whereas under job costing, direct allocation to such an extent is not possible.
- In contract costing, no heavy investment on assets whereas job costing involves heavy investment on assets initially.
- Under contract costing, the price is paid in various installments depending upon the progress of work. In job costing, the selling price of a job is paid after completing the job in full.
- Contract costing pertains to construction while the job costing is confined to production.
- In contract costing, the cost computation is simple while in the job costing it is complex because of the overheads.
- Contract costing is adopted in long-term contracts whereas the job costing is confined to finished goods for a small duration of time.
- In contract costing, the profit and loss can be ascertained in either completed or uncompleted stages while in the job costing it's done only on the stage of completion.

6.3 Cost- Plus Contracts

Cost-plus contract is a contract in which the price is not fixed at the time of entering the contract. The contract price is determined by adding a specified amount or percentage of profit to the costsallowed in the contract. The contractee compensates the contractor for all allowable costs actually incurred by him. Over and above these costs the contractor is paid a fixed amountor a fixed percentage of cost as profit.

Advantages of Cost-Plus Contracts

A. To the Contractor:

- There is no risk of loss being incurred on such contracts.
- It protects him from the risk of fluctuations in market prices of material, labour, etc.
- It simplifies the work of preparing tenders and quotations.

B. To the Contractee:

- The contractee can ensurea fair price of the contract by being entitled to audit the accounts of the contractor.

Disadvantages of Cost-plus Contracts

- **A. To the Contractor:**
- The contractor is deprived of the advantages which would have accrued due to favourable market prices.
- The contractor has to suffer for his own efficiency. This is because profit is usually based as a percentage of cost and efficient working resulting in lower cost also leads to lower profits.

B. To the Contractee:

- The contracteehas to pay more for the inefficiency of the contactor as the contractor has no incentive to reduce costs.
- The price the contracteehas to pay is unknown until after the completion of work.

6.4 Contract Costing Procedure

- ***Contract Account:***Every contract is allotted a separate number and a separate account is opened for each contract.
- ***Direct Costs:*** Most of the costs of a contract can be allocated direct to the contract. All such direct costs are debited to the contract account. Direct costs for contracts include, cost of direct materials, cost of direct labour, cost of direct expenses, cost of supervision, depreciation of plant and machinery, and sub-contract costs.
- ***Indirect Costs:*** Indirect costs are often absorbed on some arbitrary basis as a percentage on prime cost or materials or wages, etc. Overheads are normally restricted to head office and storage costs.
- ***Transfer of Materials or Plant:*** When materials, plant, etc. are transferred from the contract, the contract account is credited by that amount.
- ***Contract Price:*** The contract account is also credited with the contract price. However, when a contract is not completed at the end of financial year, the contract account is credited with the cost/value of the work-in-progress as on that date. Work-in-progress includes value of certified work and the cost of uncertified work.
- ***Profit or Loss Account:*** The balance of contract account represents profit or loss which is transferred to profit and loss account. However, when contract is not completed within the financial period, only the part of the profit arrived is taken into account and the remaining profit (balance profit) is kept as reserve to meet any contingent loss on the complete portion of the contract.

Caution: Contract account is also debited with overheads which tend to be small in relation to direct costs.

Cost of Materials

Materials includematerials specifically purchased for the contract and materials issued from store against material requisition notes. The cost of both these types of materials is debited to the contract account.

- **Materials Returned to Store**

Whenever materials are issued in excess of requirements, for instance, cement, sand, pipes and bricks, these are later returned to the store accompanied by a Material Return Note which gives the details of the materials returned. Such returned materials are credited to contract account.

- **Materials at Site**

At the end of each accounting period, value of materials lyingunused at site is credited to contract account and is carried forward for charging against the next period.

6.5 Cost of Labour and Plant

- **Cost of Labour**

All wages of workers engaged on a particular contract are charged direct to the contract, irrespective of the type of work they perform. When several contracts are running at different locations, payroll is normally sectionalized to have separate payroll for each contract.

- **Plant**

There are two different methods of dealing with depreciation of plant in contract account:

1. Contract account is debited with the cost of the plant installed. When the contract is completed or the plant is no longer required, the plant is revalued, and contract account is credited with this

revalued or depreciated figure. In case plant is sold on the completion of the contract, the contract account is credited with its sale proceeds.

2. Alternatively, contract account is simply debited with the amount of depreciation. It is usual to use this method when plant is sent to contract only for a short period.

6.6 Contract Ledger

A contract is known by the number allotted to it, as for instance, Contract No. 401, Contract No. 402 and so on. This number and the terms and conditions of the contract pertaining to it are recorded in the contract ledger. A specimen of the contract ledger is given below:

Contract Ledger

Contract No.	:	Contract Price	: .....
Date of Completion	:	Terms of Payment	: .....
Site	:	Work Certified	: .....
Remark	:	Date	: .....

Date	Particulars	Materials (₹)		Wages (₹)		Direct Charges (₹)		Plant (₹)		Indirect Expenses (₹)		Total (₹)
	Total											

Fig 1: Contract Ledger

In contract ledger, a separate contract account is prepared for each individual contract, so that for a specific contract all cost can be accumulated at one particular place.

All the expenses likely to be incurred on contract, such as direct materials, direct labour, direct expenses, indirect expenses, cost of specific plant, outstanding expenses, sub-contract cost and the depreciation of the common plant being used at the same time on other contract etc., are debited.

In the credit side of the contract account, the cost of raw material returned to supplier, to store, transferred to other contracts, material sold, material damaged, material in hand, material stolen, plant returned to store, plant sold, plant transferred to other contracts, plant at site are shown. The material and plant 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 contract account is credited by the contract price. If at the end of the financial year the contract remains in complete then contract account is credited by cost of work-in-progress amount. In this work-in-progress, the cost of certified work and uncertified work are included. At the end, the profit or loss on contract is determined as per rules stated ahead in respect to contract account.

6.7 Notional Profit

Notional profit is the difference between the value of work-in-progress certified and the cost of work-in-progress certified. It is computed as,Notional profit is the difference between cost of work certified and value of work certified. The formula is as follows:

Notional Profit = Value of work certified – (Cost of works to date – Cost of work not yet Certified)

		₹
	Value of work certified	20,00,000
Add:	Cost of work not yet certified	1,50,000
		21,50,000
Less:	Cost of work to date	19,00,000
	Notional Profit	2,50,000

If in any year, cost of work done exceeds the value of certified work and uncertified, the result will be a notional loss.

6.8 Estimated Profit

Estimated profit represents the excess of the contract price over the estimated total cost of the contract. It is computed as follows:

		₹
	Contract Price	30,00,000
Less:	Total cost already incurred	21,00,000
		9,00,000
Less:	Estimated additional costs to complete the contract	3,50,000
	Estimated Profit	5,50,000

6.9 Portion of Profit to be Transferred to P&L Account

Profit can be accurately calculated only when contract is complete. If a contract extends two, three or more years, the contractor will have to wait for calculation of profit till the contract is completed. This is not desirable; hence, profit has to be calculated on the contract even if the contract is not completed. But profit on incomplete contract should be calculated after providing adequate sums for meeting unknown contingencies. For calculating profit on incomplete contract abundant caution and conservative approach are required so as to cover risk and uncertainty during the balance of period of execution of contract.

There are no hard and fast rules regarding the calculation of profit of incomplete contract. However, profit should be taken only in respect of certified work and uncertified work should be valued at cost. When profit is based on the basis of certified work, it is known as 'profit earned'. Following rules may be followed for calculating profit to be taken to profit and less account:

Rules

- When work certified is less than 1/4 of the contract price, no profit is transferred to Profit and Loss Account.
- When work-in-progress certified is 1/4 or more but less than 1/2 of contract price, then generally 1/3 of profit is transferred to P&L Account.
- When work certified is 1/2 or more but less than 9/10 of the contract price, then 2/3 of the profit to be transferred to P & L Account.
- When contract is near completion, then the estimated profit should be calculated on the whole contract.
- Loss on Uncompleted Contracts should be transferred in full to the P&L Account, whatever be the stage of completion of the contract.

$$(a)\ \text{Estimated profit} \times \frac{\text{Work certified}}{\text{Contract price}}$$

$$(b)\ \text{Estimated profit} \times \frac{\text{Work certified}}{\text{Contract price}} \times \frac{\text{Cash received}}{\text{Work certified}}$$

$$(c)\ \text{Estimated profit} \times \frac{\text{Cost of work to date}}{\text{Estimated total cost of work}}$$

$$(d)\ \text{Estimated profit} \times \frac{\text{Cost of work to date}}{\text{Estimated total cost of work}} \times \frac{\text{Cash received}}{\text{Work certified}}$$

6.10 Escalation Clause

This clause is often provided in contracts to cover any likely changes in the price of materials, labour etc. Thus, a contractor is entitled to suitable enhance the contract price if the cost rises beyond a given percentage. The objective of this clause is to safeguard the interest of contractor against unfavorable changes in cost. The escalation clause is of particular importance where prices of materials and labour are anticipated to increase or where quantity of materials and labour time cannot be accurately estimated.

Just as an escalation clause safeguards the interest of the contractor by upward revision of the contract price or contract value, a de-escalation clause may be inserted to look after the interest of the contractee by providing for downward revision of the contract price or contract value in the event of cost going down beyond an agreed level.

6.11 Retention Money and Cash Ratio

It is a usual practice not to pay the full amount of work certified. The contractee may pay a fixed percentage, say 80% or 90% of the work certified, depending upon the terms of the contract. This is known as Cash Ratio.

The balance amount not paid is known as Retention Money. This retention money is a type of security for any defective work which may be found in the contract later on.Usually the contractee stipulates in the contract deed that he would withhold a part of the contract price to be paid at a later stage after completion of the contract. This is to make sure that the contractor has performed all work relating to contract on the most satisfactory manner and that no repair work arises within a prescribed time limit. The amount so withheld by the contractee is known as retention money. It safeguards the interest of the contractee against the contractor, who may at time perform sub-standard work and gain there from.

Extra Work

Sometimes the contractor is required to do some extra work like additions or alterations in the work originally done as per agreement. The contractor will charge extra money for such extra work. The cost of such extra work is debited to the contract account and extra price realized is credited to the contract account.

6.12 Work Certified and Work Uncertified

When the contract is not completed till the end of the accounting year, the architect is required to value the work-in-progress. Such work-in-progress is classified into work certified and work uncertified.

- **Work Certified**

Work certified represents that portion of the contract that has been duly approved by the architect of the contractee. This is denoted in terms of money value in contract account and appears on the credit side of the contract account. Work certified is valued at contract price (i.e., selling price), and includes an element of profit.

- **Work Uncertified**

This is that part of the work-in-progress which is not approved by the architect or engineer. This is valued at cost and thus does not include an element of profit. Both work certified and uncertified appear on the credit side of the contract account and also on the assets side of the balance sheet.

Loss of Completed Contract and Incomplete Contract

Every loss on contract, whether completed or incomplete, should be transferred to profit and loss account in full. This treatment is justified on the basis of prudence concept. While accounting the loss on contract, stage of completion of contract work is not considered. In case of incomplete contract, if it is expected that is future also contract is subject to losses, it is advisable to make a provision for contingencies.

6.13 Work-in-Progress

The work-in-progress represents the value of work which is in progress as a contract and requires further completion. The value of WIPappears on the asset side of the balance sheet and is ascertained as under:

Amount of work certified	.....	
Amount of work uncertified	.....	.....
	_____	
Less: Profit transferred to WIP	.....	
Less: Cash received	.....	.....
	_____	_____
	Amount of Work-in-Progress	.....

6.14 Balance Sheet

At the time of preparation of balance sheet, the contractee's account deserves a special mention. The contractee's account is not to be shown as a debtor for the full contract price unless the work has been completed. Likewise the sum received from the contractee under various installments should not be shown as a liability on the balance sheet. On completion of contract, if the contractee still owes the amount to the contractor, his account is shown as a debtor for the amount due from him. When the contractee pays full amount, his account is closed and his account will not appear in the balance sheet.

Example: Numerical

Vikas undertook a contract for the construction of a building. Materials purchased Rs. 2,00,000. Materials supplied from stores Rs. 30,000. Materials returned to stores Rs. 4,000. Material costing Rs. 5,000 were stolen and materials worth Rs. 6,000 destroyed by fire. Materials costing Rs. 3,000 were sold for Rs. 2,600. Materials in-hand Rs. 25,000. Materials worth Rs. 50,000 were received from other building contract which was completed. Materials of Rs. 2,400 transferred to other contracts. Show the above particulars in Contract Account.

Solution

Contract Account

Particulars	₹	Particulars		₹
To Material purchased	2,00,000	By Materials returned to stores		4,000
To Materials supplied from stores	30,000	By Materials transferred to other contracts		2,400
To Materials received from other contract	50,000	By Material sold		2,600
		By Profit & loss account:		
		Loss on material sold	400	
		Material stolen	5,000	
		Loss by fire	6,000	11,400
		By Materials in hand		25,000

Example: Numerical

Show how would you deal with plant in Udai Contract Account with the following information:

Plant issued to contract on 1st June, 2019 costing Rs. 2,00,000, Plant costing Rs. 16,000 was transferred to Vikas Contract on 30.11.2019, Plant costing Rs. 6,000 was stolen and another costing Rs. 5,000 was destroyed by fire. The plant was insured against fire to the full value. Plant costing Rs. 20,000 was sold for Rs. 19,000. Plant at the end of the year was valued by charging depreciation @20% per annum on 31st March, 2020.

Solution

Contract Account

Particulars	₹	Particulars		₹
To Plant account	2,00,000	By Vikas contract account		
		Plant transferred		
		Cost	16,000	
		Less : Dep. @20% for 6 months	1,600	14,400
		By Profit & loss account (Plant stolen)		6,000
		By Fire insurance company (Plant destroyed by fire)		5,000
		By Sale of plant		19,000
		By Profit and loss account (Loss on plant sold)		
		Cost	20,000	
		Less : Sold	19,000	1,000
		By Plant at site		
		Cost (2,00,000– 47,000)	1,53,000	
		Less : Dep. @20% for 10 months	25,500	1,27,500

Example: Numerical

Prepare the Contract Account on 31st March, 2019 from the following particulars:

Materials purchased Rs. 1,90,000

Materials issued from stores Rs. 40,000

Direct wages Rs. 2,54,000

Direct expenses Rs. 20,000

Plant purchased Rs. 1,70,000

Proportionate establishment charge Rs. 50,000

The contract was for Rs. 15,00,000 and up to 31st March, 2019, Rs. 6,00,000 had been received in cash which represented 80% of work certified. The materials at site unconsumed was valued at Rs. 25,000. The contract plant was to be depreciated by Rs. 17,000.

Solution

Contract Account

Particulars		₹	Particulars		₹
To	Materials purchased	1,90,000	By	Materials at site	25,000
To	Materials issued from stores	40,000	By	Work certified	7,50,000
To	Direct wages	2,54,000		(6,00,000×100/80)	
To	Direct expenses	20,000			
To	Establishment charges	50,000			
To	Depreciation on plant	17,000			
To	Notional profit	2,04,000			
		7,75,000			7,75,000
To	Profit & loss account	1,08,800[1]	By	Notional profit	2,04,000
To	Work-in-progress account	95,200			
		2,04,000			2,04,000

Working note:[1] $\text{Profit} = \text{Notional profit} \times \frac{2}{3} \times \frac{\text{Cash received}}{\text{Work certified}}$

$$= 2,04,000 \times \frac{2}{3} \times \frac{6,00,000}{7,50,000} = ₹\,1,08,800$$

Summary

- Under contract costing, the price is paid in various installments depending upon the zzprogress of work. In job costing, the selling price of a job is paid after completing the job in full.
- Contract costing pertains to construction while the job costing is confined to production.zz
- In contract costing, the cost computation is simple while in the job costing it is complex zzbecause of the overheads.
- Contract costing is adopted in long-term contracts whereas the job costing is confined to zzfinished goods for a small duration of time. contract costing is the technique of ascertaining cost of a contract.

Keywords

- ***Ascertaining Cost***: determining cost
- ***Contract Cost:*** Cost relating to specific contract

- ***Material Cost:*** Expenditure on raw materials and supplies

Self Assessment

1. Contract costing, also known as _____ costing.

A. Job

B. Batch

C. Order

D. Terminal

2. Contract costing embrace the same basic principles of _____.

A. Cost absorption

B. Cost apportionment

C. Cost allocation

D. Cost ascertainment

3. A contractor undertakes a _____ number of _____ contracts at a time.

A. Small, Small

B. Small, Big

C. Big, Small

D. Big, Big

4. Contracts are completed at the _____ generally by the contractor.

A. Office

B. Premises

C. Warehouse

D. Work site

5. Under contract costing, work is undertaken to _____ special requirements.

A. Government

B. Supplier

C. Customer

D. Employees

6. Each contract undertaken is treated as a _____.

A. Cost unit

B. Cost centre

C. Cost object

D. None of above

7. Under contract costing, materials drawn from the store is charged to contract on the basis of _____.

A. Contractor notes

B. Material requisition notes

C. Stores ledger

D. Supplier notes

8. Most expenses like, electricity, telephone, insurance, etc. are _____.

A. Direct

B. Indirect

C. Fixed

D. Variable

9. An amount, known as _____, is withheld by the contractee.

A. Allotted money

B. Retention money

C. Paid amount

D. Architect fees

10. _____ is a contract in which the price is not fixed at the time of entering into the contract.

A. Absorbed contract

B. Allocated contact

C. Cost plus contract

D. Alloted contract

11. Whenever materials are issued in excess of requirements, these are later returned to the store accompanied by a _____.

A. Material debit note

B. Material credit note

C. Material requisition note

D. Material return note

12. _____ is the difference between the value of work-in-progress certified and the cost of work-in-progress certified.

A. Gross profit

B. Estimated profit

C. Notional profit

D. Net profit

13. _____ represents the excess of the contract price over the estimated total cost of the contract.

A. Average profit

B. Estimated profit

C. Notional profit

D. Net profit

14. When work certified is less than 1/4 of the contract price, _____ is transferred to Profit and Loss Account.

A. 25% of profit

B. 66.67% of profit

C. 90% of profit

D. No profit

15. _____is often provided in contracts to cover any likely changes in the price or utilization of materials and labour.

A. Preliminary clause

B. Estimated clause

C. Escalation clause

D. Architect certificate

Answer for Self Assessment

1.	D	2.	D	3.	B	4.	D	5.	C
6.	A	7.	B	8.	A	9.	B	10.	C
11.	D	12.	C	13.	B	14.	D	15.	C

Review Questions

1. What is contract costing? To which industries is it found suitable?

2. How does contract costing differ from job costing? Discuss contract costing procedure in detail.

3. Explain the various features of contract costing.

4. What is a contract account? What important points should be borne in mind in its preparation?

5. What are the main features of cost-plus contract? Discuss its advantages and disadvantages.

6. Write short notes on theCost-plus contract and Escalation clause

7. How will you treat profit on incomplete contracts in cost account?

8. Discuss contract ledger and prepare a specimen of the contract account.

9. Explain the different methods of computing profits in contract accounts.

10. Write short notes on the following:

(a) Loss of completed and incomplete contract

(b) Notional profit

(c) Profit on incomplete contract.

11. Rajendra took a contract on 1st April, 2019. The contract price was Rs. 7,50,000. The expenses were made upto its completion i.e. 30th September, 2020 as follows. Prepare Contract Account.

	₹		₹
Material purchased	50,000	Establishment charges	6,000
Material issued from stores	1,50,000	Plant issued	3,00,000
Materials from other contract	1,00,000	Material returned to stores	20,000
Wages	2,50,000	Material at the end	8,000
Direct expenses	10,000	Plant in the end	2,00,000

12. Mahesh Building contractors undertook building construction contract, contract price being Rs. 15,00,000. Contract started on 1st April, 2019. Following expenses were incurred during the year:

Direct material purchased	Rs. 2,40,000
Material issued from stores	Rs. 3,30,000
Material received from other contract	Rs. 75,000
Direct wages	Rs. 2,70,000
Indirect expenses	Rs. 75,000
Plant and machinery	Rs. 3,00,000
Accrued direct wages	Rs. 15,000
Accrued expenses	Rs. 7,500
Material returned to stores	Rs. 15,000
Material transferred to other contract	Rs. 21,000
Material lost by fire	Rs. 10,500
Plant stolen	Rs. 30,000
Materials in hand on 31st March, 2019	Rs. 12,000
Plant in hand on 31st March, 2019	Rs. 2,43,000

The contract was completed on 31st March, 2019 but only three-fourth contract price was received upto this date. Prepare Contract Account and Contractee Account and also show the items in Balance Sheet.

Further Readings

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- Pandey, I.M., Management Accounting, Excel Book, New Delhi, 2007.
- Richard G. Schroeder, Myrtle W. Clark, Myrtle W. Clark, Jack M. Cathey, Financial Accounting Theory and Analysis: Text Readings and Cases, John Wiley & Sons Inc.
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Web Links

www.futureaccountant.com

www.managementstudyguide.com

Unit 07: Service Costing

CONTENTS

Objectives

After studying this unit, you will be able to:

- recognize the conceptual framework of service costing.
- apprehend the unit cost in service sectors.
- use the various methods used in service sector for computing service cost.
- appreciate the pricing of service sector.

Introduction

We often hear people using the term 'Service Costing' somewhat loosely. Some use it to meana costing system adopted by petrol pumps or garages which service motor vehicles while others employ it to denote costing of services rendered by service centres. However, with the increasein the important role of the service sector in the national economy, the topic has assumedimportance.

Service costing is that part of operation costing which is used in all organisations that provideservices instead of producing of goods. For calculating the price of each service, it is verynecessary to collect all the expenses relating to those services. We make a cost sheet in which weshow all the cost relating to specific service. These costs are calculated on the time basis.

The aim of this unit is to enable the students to understand the meaning of service costing and itsimplications for management.

7.1 Service Costing

Service costing, also known as Operating Costing is a method of cost ascertainment used in those undertakings which provide services. Example, transport companies, electricity companies, hospitals, cinema houses, schools, colleges etc. use service costing to find out cost per unit.

Service costing involves the method of determination of the cost of services. At the end ofspecified periods, collection of operating costs takes place and the aggregate of these costs isduly 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 variousdepartments within the organisation or organisations providing services to outside firms namelypersonnel's maintenance, canteen, hospitals, boiler house, captive power units, computer servicesdepartment, hotels, electricity companies, road maintenance, water supply, goods transport,transport of passengers, educational institutions, accounting firms, management consultancyfirms etc. Service organisations/internal service departments render a variety of services. Owing to thepeculiarities of services, different cost accounting treatment is required.

Service costing is also called 'Operating costing'.

According to CIMA London, Operating costing/Service costing is that form of operation costing which applies where standardized services are rendered either by an undertaking or by a service cost centre within an undertaking.

This method of costing is applicable to activities that render a service.

7.2 Features of Service Organisations

Service organisations possess its number of features which distinguish them from otherorganisations. The main features are:

- ***Definition of cost unit difficulty:*** Service organisations provide a wide variety of services,this could range from catering services, transport services, public utility services toprofessional services. Consequently, it generally becomes difficult to define the cost unit.
- ***Labour intensive activities:*** These organisations employ many people forrunning the business. The manpower cost incurred is much higher in relation to machinerelated cost.
- ***Services cannot be stored:*** It can be said that services are like a perishable commodity. Oncea service has been rendered, it cannot be stored. It must be used or else it is wasted.
- ***Major inputs cannot be stored:*** The major input in such industries is labour. The firmshould utilise their services. In the absence of this, labour remains idle. The efforts of idlelabour cannot be stored and utilised as and when required.
- ***Intangible products:*** Service organisations do not produce tangible goods. Instead, theyare engaged in providing services to the public.

7.3 Characteristics of Service Costing

Service Costing possess certain features which can be used actively by service organizations for getting maximum benefits.

- Services rendered to customers are of unique and standardized type.
- A large proportion of the total capital is invested in fixed assets and comparatively less working capital is required.
- Services are produced on an uninterrupted/ regular basis.
- The distinction between fixed cost and variable cost is of particular importance. This is because the economics and scale of operations considerably affect the cost per unit of service rendered.
- For example, fixed cost like insurance per passenger will be lower if buses in transport company run capacity packed.
- Operating costing method is related to provide various types of services to customers.
- Costs are generally computed period-wise and order-wise.
- The demand for the services of enterprises or organizations or industries adopting operatingcost method for costing fluctuates.

7.4 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 and 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 cost 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.

Users of Service Costing

Service or Operating Costing is used both by service organisations and by departments withinorganisations rendering services to other departments. These are given below:

- **Service Organisations:**Organisations which are engaged in the business of rendering servicesto outsiders with the view to earning profit are known as service organisations.

Example: Service organisations include Power generation and distribution firm, nursing homes, transport firms, educational institutions, management consultancy firms, accounting firms, shipping firms, airlines etc.

- **Internal Service Departments:** These are departments within organisations render services tothe production department and also to other departments.

Example: Internal services departments include hospital, crèche, canteen, boiler house which produces steam for production department, computer services department, captive power generation unit, transport department operating vehicles for transporting staff, inputs and finished goods, water supply and maintenance services etc.

Case Study:**Litigation Work**

Dua and Associates is a law firm specialising in carrying out litigation work for clients. It has 25 professionals who work for clients (5 partners and 20 associates). The average budgeted total compensation per professional for 1999 is Rs. 1,04, 000.Each professional is budgeted to have 1,600 billable hours to clients in 1999. Dua and Associates is a highly respected firm and Al professionals work for clients to their maximum1,600 billable hours. All professional labour costs are traceable to jobs on a per hour basis. The budgeted indirect cost (legal support) in 1999 is Rs. 22,00,000. The indirect costs are allocated to the jobs using professional labour hours as the allocation base. In this example for ascertaining the cost of Job Company consider single direct cost rate (i.e. Professional labour) and single indirect cost rate.

http://220.227.161.86/18859sm_finalnew_cp7.pdf

7.5 Service Cost Unit

To compute the service cost, it is necessary to understand the unit for which he 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 the 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.

Example: Hotels may use the 'Occupied Room Days' as an appropriate unit for cost ascertainment and control

The cost units may be of the following two types:

A. Simple Cost Unit

B. Composite Cost Unit

A. Simple cost unit

Per unit cost is calculated by dividing total production cost by number of units produced. This method is also known as single costing. This method is known as 'single costing' as industries adopting this method manufacture, in most cases, a single variety of product.

Undertaking	Cost unit
1. Transport	Per kilometre or per mile
2. Water works	Per 1,000 litres
3. Municipality	Per km of road maintained
4. Canteen	Per meal or per dish

B. Composite Cost Unit

In service undertakings, generally a composite cost unit is used. In this type, two units are rolled into one. For example, in a transport company, weight of goods as well as distance covered should be taken into account in evolving a cost unit, i.e., a tonne-kilometre, which means 1 tonne of goods transported to 1 km.

Undertaking	Cost unit
1. Transport	Per passenger-km or Per tonne-km
2. Hospital	Per bed per day
3. Hotel	Per room per day
4. Cinema	Per seat per show (or per man show)
5. Electricity	Per kilowatt hour (kWh)

It is computed in two ways:

A. Simple Average Method (Commercial Basis)

B. Weighted Average Method (Absolute Basis)

In absolute tonne-km, cost units between each two stations is calculated separately in tonne-kms and then totalled up. But in commercial tonne-km, the trip is considered as a whole and it is arrived at by multiplying the total distance in kms by average load quantity.

Weighted Average or Absolute basis : MT-Kilometer :

= (20 MT × 80 Kms) + (12 MT × 120 Kms) + (16 MT × 160 Kms)

= 1,600 + 1,440 + 2,560 = 5,600 MT-Kilometer

Simple Average or Commercialbasis : MT-Kilometer :

= [{(20+12+16) / 3} MT ×{(80+120+160) Kms]

= 16 MT × 360 Kms = 5,760 MT–Kilometer

Advantages and Disadvantages of Service Costing

- **Advantages:**

No inventory- There is no record of stock or inventory while computing service cost in organization.

Being expert- The person computing the service cost is an expert and skilled in managing work.

- **Disadvantages:**

Difficult Valuation- It is quite difficult to compute service cost without having appropriate knowledge and information.

Demand Cutback- There can be changes and fluctuations in demand of services, which disturb the costing structure.

7.6 Evaluation of Cost of Various Service Organisations

Service costing or operating costing is applied to the many undertakings like Transport undertakings, Electricity undertakings, Hotel undertakings, Hospital and Nursing homes, Canteen services, Cinema companies, Municipal services, Educational institutions, Public libraries, and Distribution services. Following are some examples of operating cost unit:

Service Organisations	Cost Unit
Goods transport	Per tonne km.
Passenger transport	Per passenger km.
Electricity	Per kilowatt hour (kwh)
Hotel	Per room per day
Hospital and Nursing homes	Per bed per day
Canteen	Per meal or per lunch or per dinner or per dish
Cinema	Per sheet per show
Water supply	Per 1000 gallon water
Boiler houses	Kilograms of steam supplied
Road maintenance	Per kilometre

Fig 1: Cost Unit for Various services

Classification of Service Costing

Operating costs are classified into the following three categories:

- ***Fixed or Standing Charges-***These are expenses which are more or less fixed nature. For example, in case transport service, road licence fee, garage rent, insurance premium, taxes, depreciation, interest on capital, salary to driver-conductors-cleaners, general supervision charges, establishment expenses, etc. are standing charges. In case of Nursing home and Hospital, the depreciations pertaining to the cost of building, equipment, beds, insurance, etc. are fixed charges.

- ***Maintenance or Semi-variable charges-*** They are semi-variable or semi-fixed in nature. They include expenditure on repairs and maintenance, spares and accessories, tyres and tubes, painting charges, telephone charges, etc.
- ***Running or Variable Charges-***These are variable cost and variable nature. Running charges are expenses which are incurred on the actual running of the vehicle. For example, in case of hospital, the cost of medicine, laundry, etc., will represent the running charges. In case of transport service petrol, diesel, grease, oil, salaries and wages to drivers, conductors and cleaners on the basis of distance, depreciation calculated on the basis of mileage or kilometers run are running or variable charges.

7.7 Service Cost Units for Different Organizations

Let us discuss the various organizations and their cost units for computation and results thereof.

A. Transport Costing

For costing transport services, organizations may classify costs into fixed, operating and maintenance category for cost accumulation purpose in respective cost sheet. Cost unit used by organizations involved with transport services may be simple or composite. For internal use, a simple cost unit like rate per hour or rate per kilometer may be used. However, for external purpose (e.g., for charging clients) composite cost units like rate per ton-km (for goods transport) or rate per passenger-km (for passenger transport) should be used.

Objectives of Transport Costing

- To fix the rates of carriage of goods or passengers based on operating costs.
- To decide the hire charges where vehicles are given on hire.
- To determine what should be charged to departments or others using the service.
- To compare the cost of using own motor vehicles and that of using alternate forms of transport.
- To compare the cost of maintaining one vehicle with another or one group of vehicles with another group.

Determination of Number of Cost Units

The cost unit in passenger transport is usually a passenger kilometer and in goods transport it is a tonne-kilometer.

Log Sheet

Most of the details required for transport costing are obtained from log sheet. A log sheet is maintained for each vehicle to record details of trips, running time, capacity, mileage, etc., on daily basis. These details also enable the management to avoid idleness of vehicles, to prevent waste of capacity and to guard against unnecessary duplication of trips.

Did you know?

A daily log sheet or log book is maintained for each vehicle to record details of each trip. This sheet is completed by the driver and is handed over to the manager. The log book also contains records relating to repair expenses incurred during journeys performed.

Transport Costing Procedure

Costs are classified and accumulated under the following heads:

- **Standing or fixed charges*:*** These are constant costs and are incurred irrespective of the mileage run. Such costs, therefore, should not be allocated to specific journeys based on mileage.
- **Running or variable charges:** These costs are those which vary in direct proportion to mileage run and so variable cost per unit may be computed straightaway.

Service Cost Sheet

Operating Cost Sheet for the period.....

Cost unit .....

No. of cost units .....

Particulars	*Total* ₹	*Per unit* ₹
Standing Charges:		
Licence fee		
Road tax		
Garage rent		
Insurance		
Driver's wages		
Conductor's wages		
Cleaner's wages		
Administration cost		
(*A*) Total		
Variable Charges :		
Petrol/diesel		
Oil, grease		
Depreciation		
Repair and maintenance		
Tyres and tubes		
(*B*) Total		
Grand Total (A) + (B)		

Fig 2: Service Cost Sheet for Transport

Task: **Numerical**

Following are the details regarding transportation of goods by a transport company. If the total cost is Rs. 8,000, calculate cost per quintal-km.

Date	Quantity in quintals	Distance in km
10.12.2020	30	50
12.12.2020	15	100
15.12.2020	10	60
20.12.2020	20	70

Solution

- ***Commercial Quintal-kms*** = Average load × Total kms travelled

= [(30+15+10+20) ÷ 4] × (50+100+60+70)

= 18.75 quintals × 280 kms

= 5,250 Quintal-Kms

- ***Absolute Quintal-kms*** = (30 quintals × 50 kms) + (15 quintals × 100 kms) +

(10 quintals × 60 kms) + (20 quintals × 70 kms)

= 1500+1500+600+1,400

= 5,000 quintal-kms

Therefore, Cost per quintal-kms = Rs. 8,000 (total cost) ÷ 5000 quintal-kms

= Rs. 1.60 [in Absolute terms]

Notes: How do you decide the unit of cost in case of Transport Costing? Explain.

B. Hotel Services Costing

Hotel services costing is adopted by those services-based concerns which are involved with the activities like provision for food and accommodation, recreation facilities, business facilities, shopping facilities etc. The expenses are usually classified into fixed and variable categories with reference to each cost center like laundry, housekeeping, restaurant, etc.

Selection of the cost unit requires a careful consideration of cost-output relationships. Cost unit for measurement of output might be different for each cost center. The 'number of clothes washed' is the most appropriate cost unit for a laundry, while for a restaurant, the number of meals provided is the most appropriate cost unit. To fix tariff for accommodation or to fix a comprehensive tariff, cost unit may be cost per 'bed-night occupied'.Depending on the nature of services provided by the hotel, cost data should be presented in cost statement. The aim is to satisfy the information needs of the managers who are responsible for cost management in their respective areas.

Objectives of Hotel Costing

The main objectives of hotel costing are:

- Ascertainment of cost per unit,
- Interfirm comparisons,
- Analysis of cost of hotel for decision-making,
- Collection of cost data and its analysis for cost control, and
- It is advisable to select different cost units.

Service Cost Sheet

Particulars	Amount (₹)
(A) Fixed Charges:	
Staff salaries	
Wages for attendants	
Repairs	
Depreciation	
Interest on investment	
Interior decoration	
Rent of premises	
Administrative expenses	
Linen	
Total	
(B) Variable Charges:	
Lighting and heating	
Power	
Sundries	
Total	
(C) Total Operating Cost (A +B)	
(D) Total Room Days	
(E) Rent per room day = Total Operating Cost ÷Total Room Days	

Task:**Numerical**

Following are the information given by an owner of Udai Hotel. You are required to advise him what rent should be charged from the customers per day, so that he is able to earn 25% on cost other than interest:

Managerial staff salaries Rs. 1,80,000 p.a.

Repairs to building Rs. 10,000 p.a.

Cost of building Rs. 4,00,000

Rate of depreciation 5% p.a.

Room attendant's salary Rs. 2 per day. The salary is paid on daily basis and services of room attendants are needed only when the room is occupied. There is one room for one attendant. Lighting, heating and power charges: The normal lighting expenses for a room if

it is occupied for the whole month is Rs. 50 per room. Power is used in winter only and normal charges are Rs. 20 p.m. for a room, if room is occupied.

EquipmentsRs. 1,00,000

Rate of depreciation 10%

Internal decoration Rs. 20,000 p.a.

Interest @ 5% may be charged on its investment of Rs. 5,00,000 in the building and equipment.

Linen Rs. 14,800 p.a.

Sundries Rs. 16,600 p.a.

There are 100 rooms in the hotel and 80% of the rooms are normally occupied in summer and30% of the rooms are occupied in winter. You may assume that period of summer and winter issix months each. Normal days in a month may be assumed to be 30.

Solution

Working Note:

(1) Calculation of Total Room Days:

Summer: 100 rooms × 6 months × 30 days × 80% = 14,400

Winter: 100 rooms × 6 months × 30 days × 30% = 5,400

Total Room Days = 19,800

(2) Rent per room per day = 4,59,500 ÷ 19,800 = 23.21 or Rs. 23 (Approx.)

Operating Cost Sheet of Udai Hotel

Particulars of Expenses		Amount in (₹)
Managerial staff salaries		1,80,000
Repairs to building		14,800
Depreciation on building @ 5%		20,000
Depreciation on equipment @ 10%		10,000
Room attendant's salaries :		
Summer: ₹ 2 × 100 rooms × 80% × 30 days × 6 months =	28,800	
Winter: ₹ 2 × 100 rooms × 30% × 30 days × 6 months =	10,800	39,600
Lighting, heating and power charges:		
Summer: ₹ 50 × 6 months × 100 rooms × 80% =	24,000	
Winter: ₹ 50 × 6 months × 100 rooms ×30% =	9,000	
	33,000	36,600
Power: ₹ 20 × 6 months × 100 rooms × 30% =	3,600	
Internal decoration		20,000
Linen		14,800
Sundries		16,600
Interest on investment @ 5% on ₹ 5,00,000		25,000
	Total Operating Cost	3,72,600
Add: Profit 25% on Cost other than interest (25% on ₹ 3,47,600 (3,72,600 – 25,000) = ₹ 86,900		86,900
Total Rooms Rent for the year		4,59,500
Total Room Days		19,800(1)
Rent per room per day = Total Room Rent ÷ Total Room Days		23.00(2)

C. Hospital Services Costing

For costing purpose, hospital services should be feasibly divided into respective cost centers like outpatient's department, wards, pathology center, operation theatre, kitchen, laundry, cleaning. And costs are to be accumulated with reference to each cost center to support critical decision-making needs of hospital management.

The operating cost for hospital services is to be classified into fixed and variable categories. Costs that can be identified with specific cost centers are assigned to them directly. Common costs are apportioned to various cost centers on some equitable basis.Cost unit to be used in hospital services depends on the types of services provided by the hospitals, cost centres with reference to which cost data is accumulated and pattern of decision made by the hospital. Due to the varied nature of services provided by hospital, it is often difficult to prescribe an appropriate cost unit for hospital services.

Cost Centre	Cost Unit
Operation theatre	Cost per standard operation [each operation, minor or major, should be converted into the number of standard operations]
Pathology centre	Cost per standard test [each test, minor or major, should be converted into the number of standard tests]
Kitchen	Number of inpatient days
Laundry	Number of inpatient days
Out patients department	Number of outpatient visit
Wards	Number of patient-days available or patient-days occupied
Cleaning	Spaces cleaned

Objectives of Hospital Costing

The main objectives of hospital costing are:

- To calculate cost of per patient per day,
- Inter comparison between two or more hospitals or nursing homes,
- Analysis of cost of hospital or nursing home for decision-making, and
- Collection of cost data for cost control.

D.Power-house and Electric Supply Services

Powerhouse is involved in generating power from water, steam, sunlight and gas and supplies to different organization or units. Generally, the cost incurred in powerhouse services can be divided into fixed and variable categories. A powerhouse needs to prepare a statement of cost to ascertain per unit cost of energy to be supplied. The 'Board of Trade Units' may be used as a cost unit for electricity generation.

Caution: A statement of cost is prepared to find out the cost of per unit. This may be per KWT or KWH. The costs are normally classified into: Steam production cost and Electricity generation costs or Fixed charges, Maintenance charges and Variable charges.

Service Cost Sheet

Units of Electricity Generated: .....

Particulars of Expenditure	Total Cost (₹)	Cost per unit (₹)
(A) Fixed Charges :		
Depreciation		
Supervision		
Administrative overhead		
Interest on capital		
Total		
(B) Variable and Maintenance Charges :		
Cost of steam used		
Cost of coal		
Wages to operators		
Lubricants, spares and stores		
Repairs and maintenance		
Total		
(C) Total Operating Cost (A+B)		
(D) Cost of per unit = Total Operating Cost ÷ Total Units Generated		

Fig 2: Service Cost Sheet for Power House

Task: **Numerical**

The following cost data pertaining to the year 2019-2020 are collected from the books of Prakash Power Company Limited. Prepare an operating cost sheet showing the cost of generation of power per unit of Kwh.

Total units generated 15,00,000 units	
Operating labour	Rs. 16,500
Plant supervision	Rs. 5,250
Lubricants & supplies	Rs. 10,500
Repairs and maintenance	Rs. 21,000
Administrative overheads	Rs. 9,000
Capital cost	Rs. 1,50,000

Coal consumed per kwh. For the year is 1.5 lbs. and cost of coal delivered to the power stationis Rs. 33.06 per metric tonne. Depreciation rate chargeable is 4% per annum and interest on capitalis to be taken as at 7%.

Solution

Statement of Operating Cost of Prakash Power Company Limited for the Year 2019-2020

Total Units Generated: 15,00,000

Particulars of Expenses		Amount (₹)
(A) Fixed Charges :		
Plant supervision		5,250
Administrative overheads		9,000
Depreciation (4% on ₹ 1,50,000)		6,000
Interest on capital (7% on ₹ 1,50,000)		10,500
	Total	30,750
(B) Variable Charges :		
Coal used		33,735 (1)
Lubricants & supplies		10,500
Repairs and maintenance		21,000
Operating labour		16,500
	Total	81,735
(C) Total Cost of Generation (A +B)		1,12,485
(D) Cost of Generation of per unit of kwh.(1,12,485 ÷ 15,00,000)		0.075 paise

Working note:

(1) Cost of one tonne (2,205 lbs) = Rs. 33.06

For 1 kwh the coal consumption is 1.5 lbs for 15,00,000 kwh the coal consumption is= 1.5 × 15,00,000 = 22,50,000 lbs

Cost of 22,50,000 kwh = Rs. 33.06 × 22,50,000 ÷ 2,205= Rs. 33,735

E. Boiler House Services

A boiler house is established to produce steam which is used in electric power generation, air conditioning and air compression. Cost of a boiler house needs to be disclosed with reference to steam production cost and electric generation cost.

Steam production cost may include cost elements like cost of fuel, labor cost, cost of water, indirect materials etc. Electric generation cost includes indirect labor, maintenance costs and other fixed overheads.Cost unit to be used in case of boiler house service is cost per unit of steam generated.

F. Canteen Costing

A canteen is established in most of the industries for welfare facility. Generally, they are eitherpartly or fully subsidies. A supervisor is usually made responsible for the running of a canteen.He is held accountable to the factory manager or the personnel manager of the industry. Acanteen serves meals, tea and coffee, etc.

Objectives of Canteen Costing

The main objectives of canteen costing are:

- To calculate cost of per lunch, dinner, etc. per day,
- Inter comparison between two or more canteens,
- Analysis of cost of canteen for decision-making, and
- Collection of various types of cost data for cost control of canteen.

Collection of Cost Data

The collections of costs are done under account headings. The main account headings used forthe purpose are given hereunder:

- ***Provision:*** Rice, flour, meat, fish, eggs, vegetables, vegetable oil, fruits, soft drinks, coffee,sugar, tea, spices, milk, etc.
- ***Labour:*** Supervisor, kitchen assistants, cooks, porters, waiters, sweepers, brushes, cleaningmaterials, disinfectants, etc.
- ***Services:*** Power, gas, steam, water, electricity, etc.
- ***Consumable Stores***: Crockery, cutlery, table linen, dust bins, glass ware, etc.
- ***Miscellaneous Overheads:*** Depreciation, rent and rates, insurance premium, etc.

The sale of meals and subsidy bring in revenue for the canteen. Depending upon the type ofmeal served namely principal meal, tea and snacks etc., the colour of coupons issued to theworkers vary.The canteen supervisor is vested with the responsibility for cost control.Consequently, the collection of costs is done by him in such a way that it is possible to controlcosts.

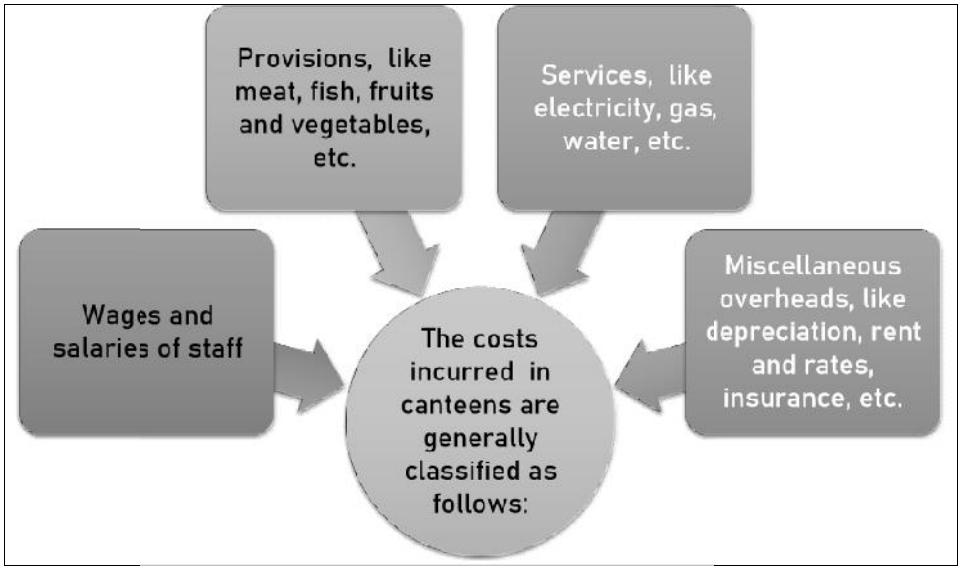

Fig 3: Canteen Costs

G. Cinema Costing

Cinema houses are one of the operating service rendering undertakings. This method is alsoimportant method of service costing.

Objectives of Cinema Costing

Following are the main objectives of Cinema Costing:

- To calculate rate for each show and each class,
- Cost analysis of cinema house for management decision-making,
- Inter comparison between two or more cinema house, and
- Collection of cost data for cost control of cinema house.

H. Other Service Costing

Many other service organizations are also considered for service costing. Costing for IT and ITES, for Toll Roads, for Educational Institutions, for Insurance Companies and for Financial Institutions. All sectors are using service costing techniques to compute and getting the results thereof.

Summary

- Service sector companies provide their customers with services or intangible products.
- The activities of service sector may be used for both: (i) Provision of services to outsidecustomers (ii) Provision of services internally (i.e. captive consumption).
- The types of services that may be provided, by service sector are of diverse nature andhave their own peculiarities and requirements in respect of the cost accounting treatment.
- The Terminology of CLMA defines Service Costing as the cost of specific services andfunctions, e.g., maintenance, personnel, canteen etc. These may be referred to as servicecentres, 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 aggregateof these costs is duly divided by the quantity of services provided in the period. This givesthe cost per unit.
- Service organisations/internal service departments render a variety of services.Owing to the peculiarities of services, different cost accounting treatment is required.

Keywords

- ***Costing of Hospital:*** It is related to ascertaining the cost of medical services rendered by anursing home or dispensary belonging to an industry or organisation.
- ***Daily Log Sheet or Log Book:*** It is maintained for each vehicle to record details of each trip.Fixed or Standing Charges: These are expenses which are more or less fixed nature.
- ***Internal Services:*** Departments within organisations render services to the production departmentand also to other departments.
- ***Running or Variable Charges:*** These are variable cost and variable nature. Running charges areexpenses which are incurred on the actual running of the vehicle.
- ***Service Costing:*** The Terminology of CLMA defines Service Costing as the cost of specific servicesand functions, e.g., maintenance, personnel, canteen, etc.
- ***Service Organisations:***Organisations which are engaged in the business of rendering servicesto outsiders with the view to earning profit are known as service organisations.
- ***Transport Costing:*** Refers to the determination of the cost per unit of service i.e., cost of per Notespassenger – kilometer and the cost of per tone – kilometer.

Self Assessment

1. Service costing, also known as _____ costing.

A. Terminal

B. Batch

C. Order

D. Operational

2. Services rendered to customers are of unique and _____ type.

A. Heterogeneous

B. Targeted

C. Different

D. Standardized

3. A large proportion of the total capital is invested in _____ assets.

A. Current

B. Fixed

C. Fictitious

D. Intangible

4. Services are produced on a _____ basis.

A. Term

B. Customer Demand

C. Often

D. Regular

5. Where the services costing apply?

A. Internal

B. External

C. Both a and b

D. None of above

6. The service costing is required for in-house services provided by a _____centre.

A. Service Cost

B. Profit

C. Revenue

D. Investment

7. When services are offered to outside customers as a _____ centre in consonance with organisational objectives.

A. Service Cost

B. Profit

C. Revenue

D. Investment

8. Cost incurred are collected, accumulated for a certain period or volume, recorded in the _____.

A. Cost accounting system

B. Cost sheet

C. Cost unit

D. Cost statement

9. Hotels may use the '_____' as an appropriate unit for cost ascertainment and control

A. Number of beds

B. Occupied room days

C. Eaten meals

D. All above

10. Service cost units are _____.

A. Simple

B. Composite

C. Both a and b

D. None of above

11. Cost unit in passenger transport is usually a _____.

A. Kilometer vehicle

B. Tonne kilometer

C. Seat kilometer

D. Passenger kilometer

12. Cost unit in goods transport is usually a _____.

A. Kilometer vehicle

B. Tonne kilometer

C. Seat kilometer

D. Passenger kilometer

13. A _____ is maintained for each vehicle to record details of trips, running time, capacity, mileage, etc. on daily basis.

A. Cost Sheet

B. Log Sheet

C. Profit and Loss

D. Composite Sheet

14. _____are constant costs and are incurred irrespective of the mileage run.

A. Direct Charges

B. Indirect Charges

C. Running Charges

D. Standing Charges

15. _____are those which vary in direct proportion to mileage run and so variable cost per unit may be computed straightaway.

A. Direct Charges

B. Indirect Charges

C. Running Charges

D. Standing Charges

Answers for Self Assessment

1.	D	2.	D	3.	B	4.	D	5.	C
6.	A	7.	B	8.	A	9.	B	10.	C
11.	D	12.	B	13.	B	14.	D	15.	C

Review Questions

1. What do you mean by operating costing? Discuss its methods.

2. Discuss the nature and applications of operating costing.

3. What are the classifications of operating cost?

4. What are the objectives of transport costing? Explain.

5. What is power house costing? Explain its objectives.

6. Define hotel costing. Discuss its objectives in detail.

7. What do you mean by cinema costing? Discus its objectives.

8. Define hospital costing. Explain various objectives of hospital costing.

9. What do you mean by canteen costing? Discuss its objectives.

10. Singh Travels, a transport company, is running a fleet of six buses between two towns 75kms apart. The seating capacity of each bus is 40 passengers. The following particulars areavailable for the month of May, 2020.

(i) Salaries of office and supervisory staffRs. 1,500	
(ii) Wages of drivers, conductors and cleaners	Rs. 3,600
(iii) Taxes and insuranceRs. 2,400	
(iv) Interest and other charges	Rs. 3,000
(v) Repairs and maintenanceRs. 1,200	
(vi) Depreciation	Rs. 3,000
(vii) Diesel and oilsRs. 10,320	
Total	Rs. 25,020

The actual passengers carried were 80% of the seating capacity. All buses ran on all day inthe month. Each bus made one trip per day. Find out the cost per passenger-kilometre.

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Web Links

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Dr. Manpreet Kaur, Lovely Professional University

Unit 08: Standard Costing and Variance Analysis

CONTENTS

Objectives

After studying this unit, you will be able to:

- recognize the conceptual framework of standard costing
- compare the standard cost and standard costing
- cognize the setting process for standard costing
- apply the variance analysis to compute deviations while evaluating performances
- evaluate the favorable and adverse effect of material variances
- compute the differences between standard labor cost and actual labor cost

Introduction

The success of an industrial organisation depends, to a greater extent, upon how effectively it has controlled its costs. In order to exercise proper control over the costs, historical system to costing provides a very little scope. Because, historical system to costing collects and records the costs in the various books of accounts after they have been incurred. Historical system serves only one purpose, viz., ascertainment of costs that again a post-mortem of the case. Costs in two different periods or levels of activity may fluctuate widely and may adversely affect profit figure.

Standard costing is a very important device of cost control, as it detects not only variation in volume but also variation in costs. That is to say, the standard costing will highlight what a product should cost, and the reasons for the excess of actual costs over that of what would have been. In brief, a standard costing helps in minimising costs as far as practicable to enhance efficiency in performance by setting up standard for expenses and performance of production.

8.1 Historical Costing

Historical costs are the actual costs which have been incurred in the past. Such costs are ascertained only after these have been incurred. Historical costing does not help to detect mistakes and inefficiencies leading to variation in profit. The reasons for the cost fluctuation apart from volume variation may be detected by introduction of standard costing.

8.2 Limitations of Historical Costing

- No basis for cost control.
- Historical costs cannot be used for the purpose of cost control as the cost has already been incurred before the cost figures can become available to management.
- No yardstick for measuring efficiency.
- Historical costs do not provide any yardstick against which efficiency can be measured. It only indicates the actual cost which is of little value in measuring performance efficiency.
- Delay in availability of information.
- Cost data under historical costing is obtained too late and is not of much use in price quotations and production planning.
- Expensive system.
- Historical costing is comparatively an expensive system of costing as it involves the maintenance of a larger volume of records.

8.3 Standard Costing

Standard costing is a cost accounting technique which compares the results of actual production with the basic standard, as anticipated, in terms of costs so as to determine the reasons for discrepancies between the anticipated and actual costs.

According to Chartered Institute of Management Accountants (CIMA), London, "Standard costing is the predetermined cost based on technical estimates for materials, labour and overhead for a selected period of time for a prescribed set of working conditions".

In other words, "Standard costing is a technique that uses standard costs which are predetermined and controls through detection of variances. It is an effective tool for evaluation of performances and for enforcing control over performances and costs as well involved in connection with such performances."

The technique of standard costing can be useful in all types of industries, but it is more commonly used in industries producing standardized products which are repetitive in nature.

Standard costing is more widely applied in process and engineering industries andis not suitable for job order industries.

Features of Standard Costing

The salient features of standard costing are as follows:

- Ascertainment of standard costs under each element of cost, i.e., material, labor and expenses,
- Comparison of actual cost with standard cost and finding out the variance of actual from standard,
- Recording of standard cost for various elements of total cost,

- Recording simultaneously actual cost,
- Locating the factors responsible for such variances, and
- Reporting to management for taking proper action to maximize the efficiency.

Objectives of Standard Costing

The important objectives of standard costing are as follows:

- The primary objective of standard costing is setting standards and requiring the personnel to achieve the predetermined aims,
- To provide a formal basis for assessing performance and efficiency,
- To exercise control over all the items of costs pertaining to production, administration, selling and distribution,
- To create cost-consciousness among the employees of the industry,
- To develop team spirit among the human resources of the industry or organisation,
- To final and submit the various reports promptly to the managerial personnel regularly about the progress and also how the costs to-date compare with the corresponding standards. This is done with the objective of enabling the top management to take efficient and necessary decisions,
- To provide a basis for estimating, and
- To assists in setting budgets.

8.4 Standard Costing System

A system needs to be developed in an organization for better results and output. Standard costing system involves the following steps:

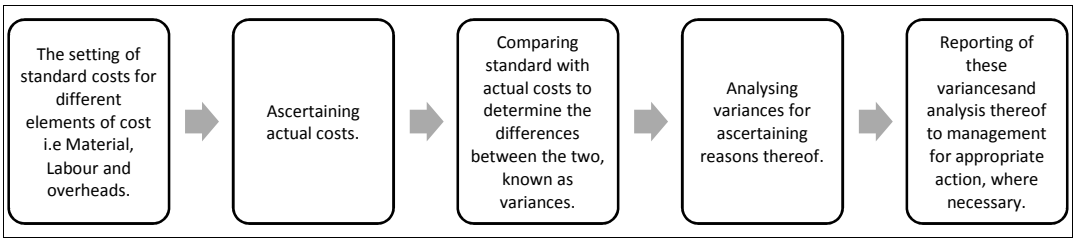


Fig 1: Steps in standard costing system

Applicability of Standard Costing

The application of standard costing requires certain conditions to be fulfilled. These are:

- A sufficient volume of standard products or components should be produced.
- Methods, operations and processes should be capable of being standardized.
- A sufficient number of costs should be capable of being controlled.

8.5 Standard Cost

Standard cost is a predetermined cost. It is a determination in advance of production, of what should be the cost. When standard costs are used for the purposes of cost-control, the techniqueis known as the standard costing.

ICMA, London defines standard cost as, "A predetermined cost, which is calculated from management standards of efficient operations and, the relevant necessary expenditure. It may be used as a basis for price-fixing and for cost control through variance analysis."

According to Walter Scott, "Standard costs are predetermined cost, i.e., they are costs calculated before production to cover the product to be manufactured."

Standard cost is a predetermined cost and refers to that amount which ought to be incurred. It is computed in advance of production on the basis of a specification of all the factors, influencing costs, required for production as inputs. A standard cost is an estimated expense that normally occurs during the production of a product or performance of a service. In other words, this is theoretically the amount of money a company will have to spend to produce a product or perform a service under normal conditions.

Standard Costs and Estimated Costs-comparison

Standard cost	Estimated cost
1. *Nature* Standard cost aims at what the cost SHOULD be.	Estimated cost is an assessment of what the cost WILL be.
2. *Basis* Standard costs are planned costs which are determined on a scientific basis after taking into account certain level of efficiency.	Estimated costs are based on average of the past figures, taking into consideration anticipated changes in future.
3. *Relation to accounts* In standard costing system, standard costs are usually incorporated into the accounts, from which variances of actual from standard are ascertained.	Estimated costs are used as statistical data for comparing with actual figures. Such costs are not entered in the books of accounts.
4. *Use* Standard costs are meant to be used for a concern operating on a standard costing system.	Estimated costs may be used in any concern operating on a historical cost system.
5. *Purpose* Standard costs serve the purpose of cost control.	Estimated costs do not serve the purpose of cost control. Such costs serve other purposes, like quoting selling price of new products, decision to buy or manufacture, etc.

8.6 Determination of Standard Costs

Setting up a standard costing system in an organisation, the following preliminary steps should be carefully considered based on technical and operational aspects of the organisation, manufacturing industry and organisation process etc.

- ***Establishment of Cost Centre-*** Cost centre has been defined as "A location, person or item of equipment (or group of these) in respect of which costs may be ascertained and related to cost units." The organisation or industry should be divided into cost centres so that responsibilities may be fixed and line of authority may be defined. An officer acting as in charge of a cost centre should be conversant with his responsibility and the cost to be controlled by him.
- ***Classification and Codification of Accounts:-***Accounts are to be classified in order to facilitate collection and analysis. With this end in view, codes may be used. A code is a symbolic representation of any particular item of information. For example, Direct materials 01 – 10; Direct labour 11 – 19; Direct expenses 20 – 29; Indirect materials 30 – 39; Indirect labour 40 – 49; Indirect expenses 50 – 59
- ***Types of Standards-***Usually, the following standards are often found to be operative in the standard costing technique. Such standards are like basic standard, ideal standard, current standard and attainable standard.
- ***Setting the Standards-***After choosing the standard, the setting of standard is vested with the standard committee. It is similar to the budget committee. It consists of purchasing manager, production manager, production engineer, personnel manager, sales manager and cost accountant and other functional heads of the organisation. The cost accountant is more important than the others and he has to supply the necessary cost figures and coordinate the activity committee. He must ensure that the setting standards are accurate.

8.7 Setting up of Standard Costs

Standards in respect of various elements of costs and the process of their establishment only have been discussed here. Normally, standard costs are set in respect of the following:

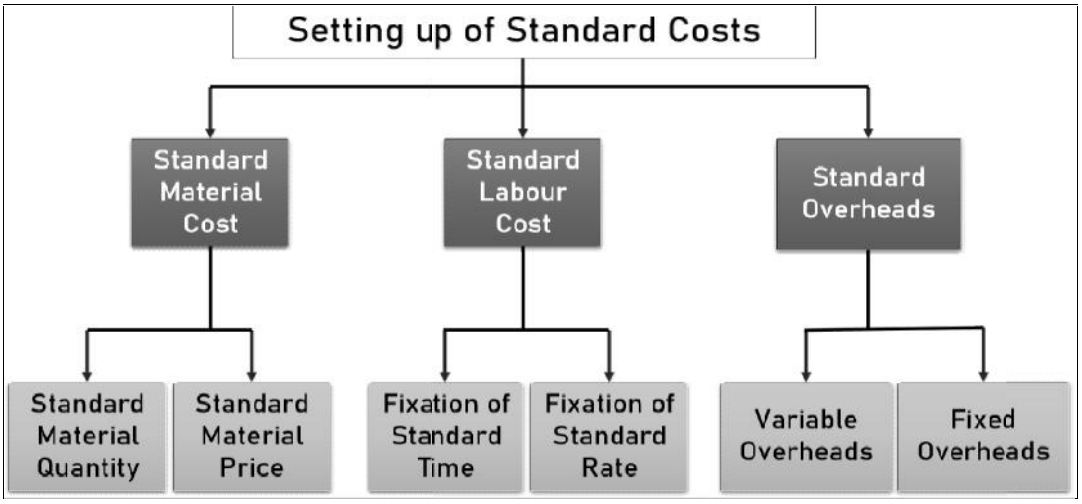


Fig 2: Setting of Standard Cost

(i) Standard Material Cost: The cost of materials for any product depends upon the quantityof materials and prices of materials. The setting of standard costs for direct materialsinvolves:

(a) Standard material quantity, and

(b) Standard material price.

Standards set in respect of all these two combined together shall give standard values orcosts of materials.

(ii) Standard Labour Cost: The standard labour cost is equal to the standard time for each operation multiplied by the standard labour rate. Setting of standard cost of direct labourinvolves:

(a) Fixation of standard time, and

(b) Fixation of standard rate.

Standard labour time or hours and standard labour rate will give standard labour cost.

(iii) Standard Overheads: Setting of standard cost of overheads involves:

(a) Determination of standard overhead costs,

(b) Estimation of production, and

(c) Computations of standard overhead rate are the problems of the fixation of standardoverhead cost.

Overheads are divided into fixed, variable and semi-variable. Standard overhead rate isdetermined for these on the basis of past records and future trend of prices. It is calculatedfor a unit or for an hour.Standardisation of overhead costs can be done with reference to a particular level ofactivity.

Standard Cost Card or Standard Cost Sheet

On standard being established for each element of cost for a product, it is recorded in a card or sheet. This card or sheet is known as standard cost card or standard cost sheet. Thus, a standard cost card is a record of the standard material, labor, overhead costs.

Standard card reveals the specified production or units, the quantity and price of each type of material consumed, the time and rate of labor to be employed, the overheads to be absorbed and the total costs. A standard cost card or sheet should be used for each or every product showing total standard cost of output comprising various elements of costs.A standard cost card or sheet should be used for each or every product showing total standardcost of output comprising various elements of costs.

Specimen of Standard Cost Card

Name of Product :		No. :		
Description :		Date of Setting Standard :		
S.No.	**Particulars**	**Quantity or Hour**	**Rate (₹)**	**Standard Cost (₹)**
(a)	Direct materials			
	Material – M	---	---	--
	Material – N	---	---	--
		---		--
	Less : Normal loss	---	Scrap value	--
	Normal Output	---		--
(b)	Direct labour	---	---	--
(c)	Overheads :			
	Fixed	---	---	--
	Variable	---	---	--
	Total Cost			--
	Profit			--
	Selling Price			--

Fig 3: Specimen of Standard Cost Sheet

Problems in Setting Standard Costs

The problems involved in setting standard costs, apart from the inevitable problems of forecasting error, include the following:

- The cost of setting up and maintaining a system for establishing standards,
- Deciding how to incorporate inflation into planned unit costs,
- Deciding on the quality of materials to be used, because a better quality of material will cost more, but perhaps reduce material wastage,
- Estimating materials prices where seasonal price variations or bulk purchase discounts may be significant,
- Deciding on the appropriate mix of component materials, where some change in the mix is possible,
- Agreeing a labour efficiency standard, and
- Possible behavioral problems. Managers responsible for the achievement of standards might resist the use of a standard costing control system for fear of being blamed for any adverse variances.

Caution: Preliminaries in Establishing a System of Standard Costing

- ***Establishment of Cost Centres:*** The first step in the establishment of a system of standard costing is the establishment of cost centres with clearly defined areas of responsibility.
- ***Classification of Accounts:*** Accounts are classified according to the purpose in hand. Classification may be by function, revenue item, etc. For speedy collection and analysis of accounts, codes and symbols may be used.

Discuss various types of standards?

8.8 Standard Hour

Standard hour is the quantity of output, or an amount of work, performed in one hour. TheICMA defines standard hour as, "The quantity of work achievable at standard performanceexpressed in term of a standard unit of work in a standard period of time."

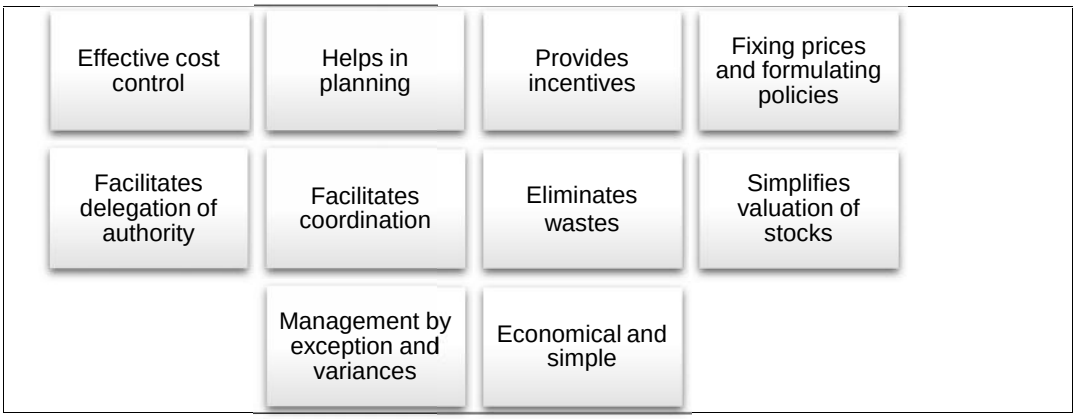
The standard hour is a convenient measure of production. Whatever may be the type of productor their unit of measurement (e.g., units, tonne, kilogram, gallon, dozen, litres etc.) the standardhour is capable of measuring them. It is also useful in ascertaining overhead variances.

Advantages and Disadvantages of Standard Costing

Standard costing is basically a tool of control in the hands of management. It helps the management in many ways, but mainly in cost control and cost reduction. It also aids in evaluating the performance, measuring the efficiency and making correct predications.

In order to reap the full advantages or benefits of standard costing, the business organisation should also keep some points in their mind. These can be considered as precautions to be taken while adopting standard costing technique. If a business organisation fails to take note of these, the same will act as limitations or disadvantages.

A. Advantages of Standard Costing



- Standard costing provides a valuable guidance to management in several managerial functions, such as in formulating policies, in determining prices, etc.,
- Standard costing helps to pinpoint the responsibility of variation in the cost. The system also identifies the specific reason therefore so that prompt remedial action could be taken,
- Standard costing, due to the stress of the standard cost and variance analysis, makes the whole industry or business organisation cost conscious, workers and foremen are encouraged to realize the importance of efficient operations,
- Stock can be valued at standard cost, and this will in turn reduce fluctuation of profits due to adoption of different methods for stock valuation.
- It facilitates timely cost reports to management and a forward-looking mentality is encouraged at all levels of the management. It is a basis for the implementation of an incentive system or method for the employees,
- It helps to exercise control over the costs as the variances can regularly be ascertained and corrective measures can be initiated at the right time,
- It helps to promote the labor efficiency and productivity,
- Management by exception is possible, since it is possible to separate the efficient from in efficient operations,
- Standard costing is of immense benefit for cost audit since if variances are satisfactorily explained, the accuracy of costing can be safety assumed,
- Standard costing provides faster reporting of operating data. It is most important due to the fact that the value of any information declines as it relates to a period farther and farther in the past,

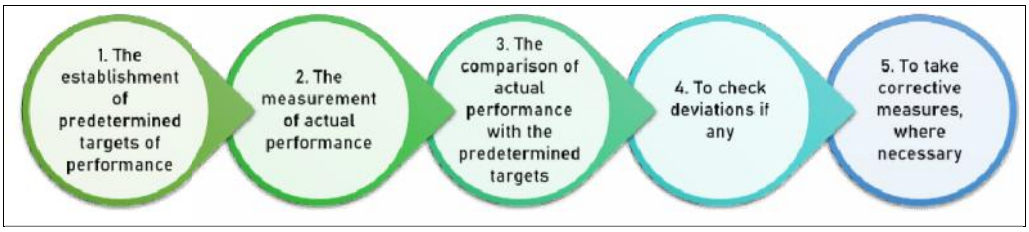
- Standard costing provides a common denominator for comparison between one period to another,
- Standard costing provides a stable product cost per unit. The actual cost of a product may vary from period to period due to much reason. It cannot be used as a basis of price fixation of a product,
- Standard costing helps in business or organisation planning, budgeting and marginal costing. It is very useful in planning and budgeting,
- Standard costing simplifies the cost control procedure as the figures for control purposes are easily and directly obtained. Thus, there is saving in the accounting computation,
- It facilitates to reduce clerical and accounting cost and managerial time,
- It reduces avoidable wastages and losses, and
- Standard costing highlights areas of strengths and weakness.

Disadvantages or Limitations of Standard Costing

- Ascertainment of standards requires high degree of technical skill and is, therefore, costly. That is why, small business organizations may find it difficult to establish standard costing owing to their limited financial resources,
- Standard costing is applied for planning and controlling manufacturing costs. Thus, it cannot be applied in a service organisation or industry,
- The managerial executives can only be held responsible for variances if such variances arise from actions which can be controlled by them. This means that for fixing responsibilities. The controllable and non-controllable portions of the variances should be separated. But the segregation of variances into controllable and non-controllable portions may often become a difficult task,
- Another disadvantage or limitation relates to the reliability of the standard set—both from the difficulty of establishing the standard and subsequently maintaining its accuracy,
- Standard costing is not suitable for all types of business organisation. If the organizations deal with non-standardised products and jobs, they may find the system of standard costing unsuitable, and
- There may be an increase in the non-productive activities, e.g., measuring work, compiling forms, reporting of variances etc.

Standard Costing vs Budgetary Control

A. Points of Similarity



B. Points of Difference

Standard costing	Budgetary control
1. ***Scope*** Standard costs are developed mainly for the manufacturing function and sometimes also for marketing and administration functions.	Budgets are compiled for different functions of the business such as sales, purchases, production, cash, capital expenditure, research and development.
2. ***Intensity*** Standard costing is intensive in application as it calls for detailed analysis of variances.	Budgetary control is extensive in nature and the intensity of analysis tends to be much less than that in standard costing.
3. ***Relation to accounts*** In standard costing, variances are usually revealed through accounts.	In budgetary control, variances are normally not revealed through accounts and control is exercised by statistically putting budgets and actuals side by side.
4. ***Usefulness*** Standard costs represent realistic yardsticks and, are therefore, more useful for controlling and reducing costs.	Budgets usually represent an upper limit on spending without considering the effectiveness of the expenditure in terms of output.
5. ***Basis*** Standard costs are usually established after considering such vital matters as production capacity, methods employed and other factors which require attention when determining an acceptable level of efficiency.	Budgets may be based on previous year's costs without any attention being paid to efficiency.
6. ***Projection*** Standard cost is a projection of cost accounts.	Budget is a projection of financial accounts.

8.9 Analysis of Variances

When a comparison between the actual and the standard is made, some difference is usually found. The difference between the actual and the standard is called variance. When actual cost is less than standard cost or actual result is better than standard result, it is known as favorable variance.

On the other hand, when actual cost exceeds standard cost or actual result is not up to standard, it is known as unfavorable or adverse variance. In accounting language, the unfavorable and favorable variances are known as debit and credit variances, respectively. The analysis of variance will help to pinpoint responsibilities.

Example: The purchase manager will be held responsible for unfavorable material price variance, the production manager for unfavorable material usage variance, the sales manager for unfavorable sales volume variance, etc.

Principles of Analysis of Variance

A number of principles must be borne in mind at the time of calculation of standard costvariances. These are as follows:

- Variances should be stated in monetary terms. In other words, it should be expressed in the currency,
- Variances should be analyzed product-wise. In other words, it should be calculated for each product,
- Variances could be favorable or unfavorable (adverse), and
- Total cost variance happens to be the difference between the standard cost of actual output and the actual cost incurred.

Important Terms used in Variance Analysis

- **Cost Variance-**According to CIMA, London, Terminology, variance analysis is the process of computing the amount of variance and isolating the causes of variance between actual and standard.
- **Favourableand Unfavorable Variances-**Where the actual cost is less than standard cost, it is known as favourable or credit variance. On the other hand, where the actual cost is more than standard cost, the difference is referred to as unfavourable, adverse or debit variance.
- **Controllable and Uncontrollable Variances-**If a variance can be regarded as the responsibility of a particular person, with the result that his degree of efficiency can be reflected in its size, then it is said to be a controllable variance. If a variance arises due to certain factors beyond the control of management, it is known as uncontrollable variance.

- **Methods Variance-**According to CIMA, London Terminology, methods variance is 'the difference between the standard cost of a product or operation, produced or performed by the normal method and the standard cost of a product or operation, produced or performed by the alternative method actually employed.'
- **Revision Variance-**Revision variance is the difference between the standard cost originally set and the revised standard cost.

Thus:

$$\text{Revision variance} = \text{Original standard cost of actual output} = \text{Revised standard cost of actual output}$$

Essentials of Effective Variance Report

- The reports should be simple, clear and quick. If reports do not inform management, in a clear and unmistakable manner, of what has taken place and what action may be taken, they may not fully serve their purpose.
- The reports should show the results of the period in view and assess the level of efficiency achieved.
- The reports should show a comparison of results achieved with those planned.
- The amount, of details included in a report should vary according to the person for whom it is intended. For example, reports for top management should be summaries of periodic activities while reports for department heads should be detailed and should show individuals responsible for sub-standard and above standard operations.
- Variances arising out of each factor should be correctly segregated. Moreover, controllable variances should be separated from uncontrollable variances and analysis of uncontrollable variances should be made with the same care as for controllable variances.
- Special attention should be focused on significant variances, thereby following the 'principle of exception' rule.
- Wherever possible, the use of charts and graphs should be made in variance reports.

8.10 Control Ratios

In addition to variances, certain control ratios are commonly used by management for controlling operations. These ratios are generally expressed in terms of percentage. If the ratio is 100% or more, it indicates a favourable position and versa, if the ratio is less than 100%, it indicates unfavourable position.

A. Efficiency Ratio

It is defined as the standard hours equivalent to the work produced expressed as a percentage of actual hours spent in production. Thus, this ratio shows whether actual time taken in production is more or less than the time allowed by the standard. Its method of calculation is:

$$\text{Efficiency ratio} = \frac{\text{Standard hours for actual output}}{\text{Actual hours worked}} \times 100$$

B. Activity Ratio

It is defined as 'the standard hours equivalent to the work produced, expressed as percentage of budgeted standard hours.' This ratio shows the extent to which the production facilities have been utilized as compared with that contemplated in budgets. Its formula is:

$$\text{Activity ratio} = \frac{\text{Standard hours for actual output}}{\text{Budgetary hours}} \times 100$$

C. Capacity Ratio

It shows the relationship between actual hours worked and the budgeted hours. Its formula is:

$$\text{Capacity ratio} = \frac{\text{Actual hours worked}}{\text{Budgeted hours}} \times 100$$

8.11 Disposition of Variances

When standard costs are not entered in the books of accounts and are used only as a statistical information, no adjustments are required at the end of the period for the variances. However, when standard costs are incorporated into the accounting system through journals and ledgers, there arises a question of adjustment and disposition of variances at the end of the accounting period.

Methods of disposition of variances

A. Transfer to Profit and Loss Account-Under this method, all variances are transferred to profit and loss account at the end of the accounting period. Thus, the stocks of work-in-progress and finished stock and cost of sales are maintained at standard costs.

B. Allocation of Variances to Inventories and Costs of Sales-Under this method, variances are distributed over stocks of work-in-progress, finished stock and cost of sales. This will result in showing inventories and costs of sales at actual costs.

C. Combination Method-The best and most logical way is to combine the first two methods by analysing the variances according to the causes and disposing them off according to the underlying reasons for their existence.

Classification and Computation of Variances

The classification and computation of variances are the objectives of standard costing. Variances can be found out with respect to all the elements of cost, i.e., direct material, direct labor and overheads. For understanding of the classification and computation of variances, variances are classified into, Material Variances, Labour Variances, Overhead Variances, and Sales Variances.

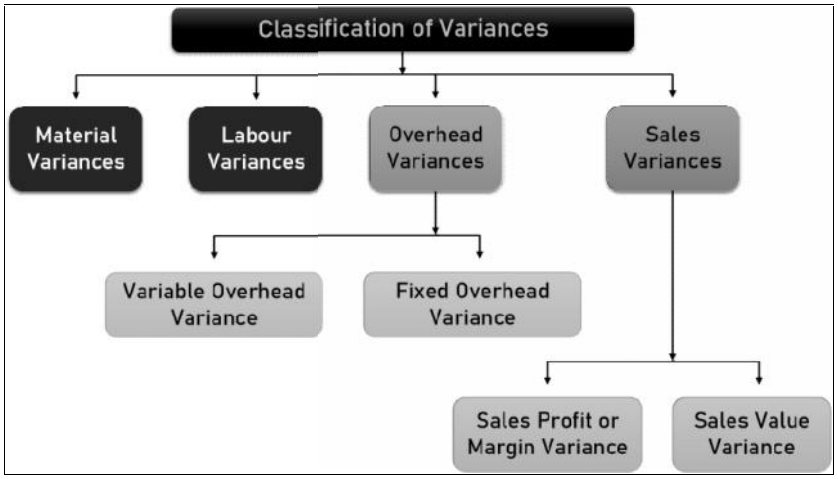


Fig 4: Classification of Variances

8.12 Material Variances

Material Variances means, there is deviation between standard and actual meterial cost, price , quantity and so on. In case of materials, the following may be the variances. Let us discuss them in detail along with computation.

- Material Cost Variance,
- Material Price Variance,
- Material Usage or Quantity Variance,
- Material Mix Variance, and

- Material Sub-Uses or Yield Variance.

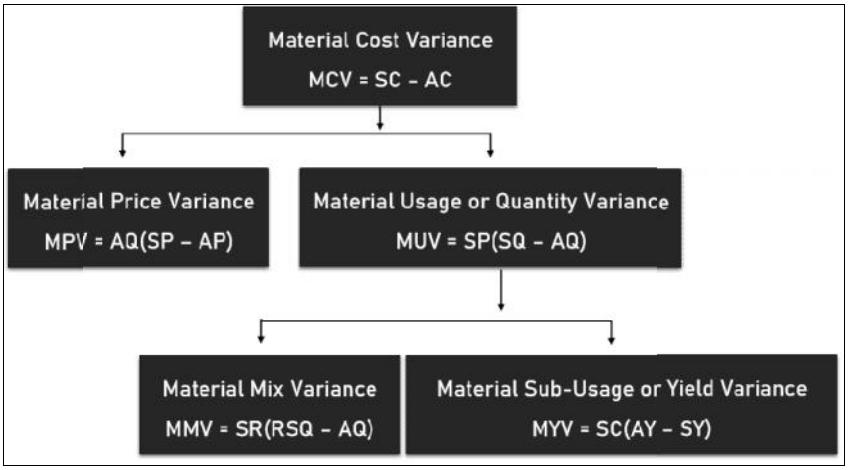


Fig 5: Material Variances

- **Material Cost Variance**

The material cost variance is also called material total variance. Material cost variance is the difference between the standard cost of actual production and the actual cost of materials used. The material cost variance is calculated as follows:

Material Cost Variance= Standard cost of materials – Actual cost of materials used
MCV = (SQ × SP) – (AQ × AP) OR MCV = SC – AC

If the standard cost is more than the actual cost, the variance will be favourable and on theother hand, if the actual cost is more than the standard cost, the variance will be adverse orbeunfavourable.

- **Material Price Variance**

The material price variance is the difference between the standard price and the actual purchase price for each unit of material multiplied by the actual quantity of material purchased.

It is preferable to base the price variance on the actual quantity of material purchased and not on the actual quantity used in order that price variances can be reported for control purposes as soon as possible i.e., when the materials are purchased.

Material price variance is calculated as follows:

Material Price Variance= Actual quantity × (Standard price – Actual price)
MPV= AQ × (SP – AP)

Material price variance may be due to several reasons, e.g.,

- ✓ Quality of materials being different from that of standard,
- ✓ Changes in price policies,
- ✓ Changes in the inward transport charges, and
- ✓ Failure to obtain quantity discounts resulting in higher prices.

- **Material Usage or Quantity Variance**

It indicates the deviation caused from the standard due to difference in quantities used. It is that portion of the material cost variance which is due to the difference between the standard quantity of materials specified for the actual output and the actual quantity of materials used. It is calculated by multiplying the standard price with the difference between the actual and standard quantities.

It may be expressed as:

Material Usage Variance= Standard price × (Standard quantity for actual output –Actual quantity)
MUV = SP × (SQ for actual output – AQ)

There may be several causes which may lead to usage or quantity variance. Some of them are mentioned below:

- ✓ Changes in specifications or design of product,
- ✓ Use of different grades of materials,
- ✓ Change in labor performance,
- ✓ Use of non-standard material mix,
- ✓ Lack of proper tools and machines,
- ✓ Defective production requiring further materials for rectification, and
- ✓ Accounting errors

- **Material Mix Variance**

It is that portion of the material usage variance which is due to the difference between standard and the actual composition of a mixture. In other words, this variance arises because the ratio of materials being changed from the standard ratio set. It is calculated as the difference between the standard price of standard mix and the standard price of actual mix.

Material Mix Variance= Standard rate (Revised standard quantity – Actual quantity)
MMV = SR (RSQ – AQ)
Revised Standard Quantity= Total weight of actual mix / Total weight of standard mix*Standard quantity

It is clear that if there is no difference between standard quantity and revisedstandard quantity, there will be no revised usage variance. Revised usage and sub-usagevariance will be calculated for each item of material used in the mix separately.

- **Material Sub-Usage Variance**

If there is difference between standard quantity for actual output (as used in usage variance) and revised standard quantity (as used in mix variance), their variance will be known as material sub usage variance or material revised usage variance.

Material Sub-Usage or Revised Usage Variance= Standard price (Standard quantity for actual output – Revised standard quantity)
MSUV = SP (SQ – RSQ)

- **Material Yield Variance**

It is that portion of the direct material usage variance which is due to the difference between the standard yield specified and the actual yield obtained. The variance arise is due to abnormal contingencies like spoilage, chemical reaction etc. Yieldvariance is also known as scrap variance or waste variance.

When actual mix and standard mix are the same:
Standard yield rate (Standard yield – Actual yield)
When the actual mix and the standard mix differ from each other:
Standard rate (Actual standard yield – Revised standard yield)

Example: **Numerical**

The standard material required manufacturing one unit of product A is 10 Kg. and the standard price per Kg. of material is Rs. 2.50. The cost accounts records, however, reveal that 11,500 Kg. of materials costing Rs. 27,600 were used for manufacturing 1,000 units of product A. Calculate the material cost, material price and material usage variances.

Solution

Standard price of material per Kg. = Rs. 2.50

Standard usage per unit of Product A = 10 Kg.

Standard usage for an actual output of 1,000 units of product A = 1,000 × 10 Kg. = 10,000

Kg.

Actual usage of material = 11,500 Kg.

Actual cost of materials = RS. 27,600

Actual price of material per Kg. = 27,600/ 11,500 = Rs. 2.40

1. Material Cost Variance:

Standard cost of material – Actual cost of material

(10,000 Kg. × Rs. 2.50) – (11,500 Kg. × Rs. 2.40)

Rs. 25,000 – Rs. 27,600

Rs. 2,600 (Adverse)

2. Material Price Variance:

Actual quantity (Standard price – Actual price)

11,500 Kg. (Rs. 2.50 – Rs. 2.40)

11,500 × 0.10 = Rs. 1,150 (Favorable)

3. Material Usage Variance:

Standard price (Standard quantity – Actual quantity)

Rs. 2.50 (10,000 Kg. – 11,500 Kg.)

Rs. 2.50 × 1,500

Rs. 3,750 (Adverse)

8.13 Labor Variances

The labor variances can be computed and analyzed in the same way as material variances have been carried out. Labor variances can be analyzed in the following way:

- Labor Cost Variance,
- Labor Rate Variance,
- Labor Efficiency or Time Variance,
- Labor Mix Variance,
- Labor Idle Time Variance, and
- Labor Yield Variance.

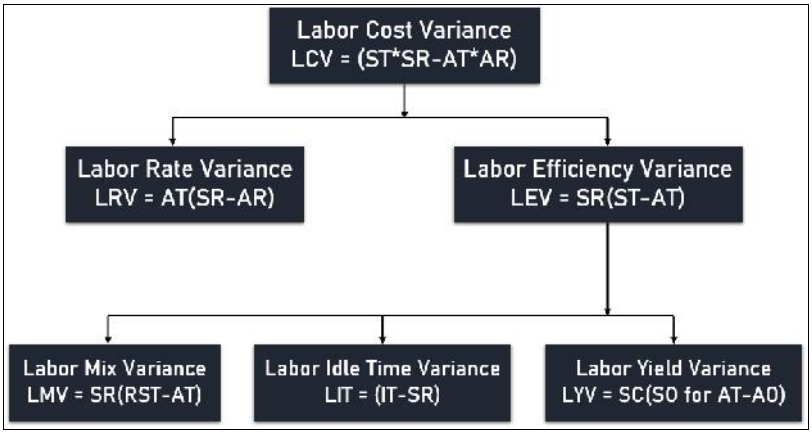


Fig 6: Labour Variances

- **Labor Cost Variance**

Labor cost variance represents the difference between the standard labor costs and the actual labor costs. The terminology of ICMA defines labor cost variance as, "the difference between the standard labor cost and actual labor cost incurred for the production achieved".

Labor cost variance can be calculated with the help of the following formula:

Labor Cost Variance= Standard cost of labor – Actual cost of labor
(Standard time × Standard rate) – (Actual time × Actual rate)
(ST × SR) – (AT × AR)

If the actual labor cost is lower than the standard labor cost, the variance is favorable. On the other hand, if the actual labor cost is higher than the standard labor cost, the variance will be adverse.

- **Labor Rate Variance**

It is the difference between the standard and the actual direct labor rate per hour for the total hours worked. ICMA defines labor rate variance as, "the portion of the wages variance which is due to the difference between the standard rate specified and actual rate paid."This variance is like material price variance; labor rate variance is calculated as follows:

Labor Rate Variance= Actual time × (Standard rate – Actual rate)
AT × (SR – AR)

Labor rate variance may arise due to any one of the following reasons:

- Payment at a rate higher or lower than the standard rate,
- Change in the method of payment of remuneration,
- Grades of employees changed, and
- Inclusion of new workmen.

Did you know?

If the actual rate is lower than the standard rate, the variance is favourable.Otherwise, the variance will be adverse.

- **Labor Efficiency Variance**

The labor efficiency variance is the difference between the actual hours taken to produce the actual output and the standard hours that this output should have taken, multiplied by the standard rate per hour. The terminology of ICMA defines labor efficiency variance as, "the difference between the standard hours for the actual production achieved and the hours actually worked, valued and the standard labor rate".This variance can be calculated with the help of the following formula:

Labor Efficiency Variance= Standard rate × (Standard time – Actual time)
SR × (ST – AT)

If actual time is less than standard time or actual production is more than standard production, the variance will be favourable and vice-versa. The variance may be favourable or adverse because of the many reasons, let us discuss:

Favorable Reasons	Adverse Reasons
Improved method of production,	Unsatisfactory working conditions,
Employment of more efficient workers,	Improper supervision,
Introduction of new and improved tools,	Employment of less skilled workers,
Good working condition,	Less material specification leading to difficulty in operation,
Use of best quality materials,	Inferior quality of materials,
Right man at right work.	Lack of cooperation between labors,

- **Labor Mix Variance**

This variance is like material mix variance, and it arises whenever there is a deviation in the grade of labor employed from the standard labor mix. That means, when the actual composition of labor force is not in accordance with the standard mix, this variance arises. It is calculated as below:

Labor Mix Variance= Standard rate × (Revised standard time – Actual time)
SR (RST – AT)
Revised Standard Time= Total actual time/ Total standardtime× Standard time

- **Labor Idle Time Variance**

The idle time variance represents the difference between hours paid and hours worked, i.e., idle hours multiplied by the standard wage rate or labor rate per hour. This variance may arise due to illness, machine breakdown, holdups on the production line because of lack of material. The formula is:

Labor Idle Time Variance = Abnormal idle time × Standard rate per hour
IT × SR

Idle time variance will be always unfavourable or adverse.

- **Labor Yield Variance**

It is like material yield variance. It is the difference between the standard labor output and actual output or yield. It is calculated as below:

Labor Yield Variance= Standard cost per unit × (Standard output for actual time –Actual output)
SC × (SO for AT – AO)

Example: **Numerical**

Given the following particulars, calculate the labor variances.

Standard hours : 40 @ Rs. 3 per hour

Actual hours : 50 @ Rs. 4 per hour

Solution

A. Labor Cost Variance

(ST × SR) – (AT × AR)

(40 × 3) – (50 × 4)

120 – 200

Rs. 80 (Adverse)

B. Labor Rate Variance

AT (SR – AR)

50 (3 – 4) = 50 × 1

Rs. 50 (Adverse)

C. Labor Efficiency Variance

SR (ST – AT)

3 (40 – 50) = 3 × 10

Rs. 30 (Adverse)

Case Study: **Effect of Assumed Standard Levels**

Harden Company has experienced increased production costs. The primary area of concern identified by management is direct labour. The company is considering adopting a

standard cost system to help control labour and other costs. Useful historical data are not available because detailed production records have not been maintained.

To establish labour standards, Harden Company has retained an engineering consulting firm. After a complete study of the work process, the consultants recommended a labourstandard of one unit of production every 30 minutes, or 16 units per day for each worker. The consultants further advised that Harden's wage rates were below the prevailing rate of $ per hour.

Harden's production vice-president thought that this labour standard was too tight, and from experience with the labour force, believed that a labour standard of 40 minutes per unit or 12 units per day for each worker would be more reasonable. The president of Harden Company believed the standard should be set at a high level to motivate the workers and to provide adequate information for control and reasonable cost comparison. After much discussion, management decided to use a dual standard. The labour standard of one unit every 30 minutes, recommended by the consulting firm, would be employed in the plant as a motivation device, while a cost standard of40 minutes per unit would be used in reporting. Management also concluded that the workers would not be informed of the cost standard used for reporting purposes. The production vice-president conducted several sessions prior to implementation in the plant, informing the workers of the new standard cost system and answering questions. The new standards were not related to incentive pay but were introduced when wages were increased to $7 per hour.

The standard cost system was implemented on January 1, 19. At the end of six months of operation, these statistics on labour performance were presented to executive management:

	January	February	March	April	May	June
Production (units)	5,100	5,000	4,700	4,500	4,300	4,400
Direct labour hours	3,000	2,900	2,900	3,000	3,000	3,100
Quantity Variances:						
Variance based on labour standard (one unit each 30 minutes)	$3150 U*	$2,800 U	$3,850 U	$5,250U	$5,950 U	$6,300 U
Variance based on cost standard (one unit each 40 minutes)	$2,800 F	$3,033 F	$1,633 F	-0-	$933U	$1,167 U

*U = Unfavourable; F = Favourable

Materials quality, labour mix, and plant facilities and conditions have not changed to any great extent during the six month period.

Questions:

1. Discuss the impact of different types of standards on motivations, and specifically the likely effect on motivation of adopting the labour standard recommended for Harden Company by the engineering firm.

2. Evaluate Harden Company's decision to employ dual standards in its standard cost system.

http://accounting4management.com/standard_costing_variance_analysis_case_study.html

Summary

- Standard costing is a very important device of cost control, as it detects not only variationin volume but also variation in costs. That is to say, the standard costing will highlightwould have been. In brief, a standard costing helps in minimising costs as far as practicableto enhance efficiency in performance by setting up standard for expenses and performanceof production.

- Standard is a desired attainable objective, a performance, a good, a model. Usually, standarddenotes a predetermined rate or amount against which actual performance in activity iscompared as a measure to evaluate.
- Standard cost is a predetermined cost and refers to that amount which ought to be incurred.It is computed in advance of production on the basis of a specification of all the factors,influencing costs, required for production as inputs.
- Standard costing is the system of cost accounting which makes use of predetermined standard cost relating to each element of cost-materials, labour and expenses, for each lineof product manufactured of service applied.
- The technique of standard costing can be useful in all types of industries, but it is morecommonly used in industries producing standardized products which are repetitive innature.
- Standard costing is basically a tool of control in the hands of management. It helpsmanagement in many ways but it mainly helps in cost control and cost reduction. It alsoaids in evaluating the performance, measuring the efficiency and making correctpredications.
- Standard costing provides a stable product cost per unit. The actual cost of a product mayvary from period to period due to much reason. It cannot be used as a basis of pricefixation of a product.
- Attainable standard is a standard which can be attained if a standard unit of work is carriedout efficiently, on a machine properly utilised or material properly used.
- Standard cost is the resultant effect of a number of factors that vary from time to time indifferent situations, both internal and external.
- On standard being established for each element of cost for a product, it is recorded in acard or sheet. This card or sheet is known as standard cost card or standard cost sheet. Thus,a standard cost card is a record of the standard material, labour, overhead costs.

Keywords

- ***Basic Standard:*** The terminology of ICMA defines basic standard as "A standard established foruse over a long period from which a current standard can be developed."
- ***Current Standard:*** According to ICMA, it is "A standard which is established for use over a shortperiod of time and is related to current conditions."
- ***Ideal Standard:*** The terminology of ICMA defines ideal standard as, "A standard which can beattained under most favourable conditions. No provision is made, for example, for shrinkage,spoilage or machine breakdowns.
- ***Standard Cost Card:*** It is a record of the standard material, labour, overhead costs.Standard Cost: It is a predetermined cost. It is a determination in advance of production, of whatshould be the cost.
- ***Standard Costing:*** It is the system of cost accounting which makes use of predetermined standardcost relating to each element of cost-materials, labour and expenses, for each line of productmanufactured of service applied.
- ***Standard Hour:*** It is the quantity of output, or an amount of work, performed in one hour.
- ***Standard***: It refers to an indicator which is used to evaluate performance, quality etc.
- ***Variance:*** The difference between the actual and the standard is called variance.

Self Assessment

1. _____ are the actual costs which have been incurred in the past.

A. Budgeted Costs

B. Standard Costs

C. Pre determined Costs

D. Historical Costs

2. Historical costs fails due to_____.

A. No basis for cost control

B. No yardstick for measuring efficiency

C. Delay in availability of information

D. All above

3. Standard costing is the _____ based on technical estimates for materials, labour and overhead for a selected period of time.

A. Budgeted Costs

B. Standard Costs

C. Pre determined Costs

D. Historical Costs

4. A _____is an estimated expense that normally occurs during the production of a product or performance of a service.

A. Historical cost

B. Standard cost

C. Budgeted cost

D. Standard cost

5. _____ is a desired attainable objective, a performance, a good, a model.

A. Accounting

B. Costing

C. Standard

D. Vouching

6. For speedy collection and analysis of accounts, _____ and symbols may be used.

A. Numbers

B. Alphabets

C. Signs

D. Codes

7. Which are the current standards that are revised at regular intervals?

A. Ideal standards

B. Practical standards

C. Normal standards

D. All above

8. While setting _____ standard, the quality and size of material items to be consumed should be standardized.

A. Quantity

B. Ideal

C. Practical

D. Normal

9. Standard time for labour should be scientifically determined by _____ and _____ studies.

A. Time, Work

B. Effectiveness, Efficiency

C. Bonus, Remuneration

D. Time, Motion

10. Standard costing helps in_____.

A. Cost control

B. Planning

C. Coordination

D. All above

11. The difference between the actual and the standard is called _____.

A. Error

B. Action

C. Deviation

D. Variance

12. When actual cost is less than standard cost or actual result is better than standard result, it is known as _____ variance.

A. Favorable

B. Specific

C. Adverse

D. Decided

13. Variances should be stated in _____terms.

A. Quality

B. Monetary

C. Non monetary

D. Actual

14. If a variance arises due to certain factors beyond the control of management, it is known as _____ variance.

A. Capital

B. Controllable

C. Fixed

D. Uncontrollable

15. _____defined as the standard hours equivalent to the work produced expressed as a percentage of actual hours spent in production.

A. Reliable ratio

B. Relevant ratio

C. Efficiency ratio

D. None of above

16. Material _____ variance is the difference between the standard cost of actual production and the actual cost of materials used.

A. Defect

B. Price

C. Value

D. Cost

17. If the actual cost is more than the standard cost, the variance will be _____.

A. Adverse

B. Favorable

C. Specific

D. None of above

18. Actual _____ × (Standard price – Actual price)= MPV

A. Price

B. Quantity

C. Rate

D. Hour

19. Standard price ×(Standard_____for actual output–Actual quantity)= MUV

A. Price

B. Quantity

C. Rate

D. Hour

20. _____variance is also known as scrap variance or waste variance.

A. Uniform

B. Mixed

C. Yield

D. Mix

21. If the actual labor cost is _____ than the standard labor cost, the variance is favorable.

A. Pre determined

B. Same

C. Higher

D. Lower

22. _____ the portion of the wages variance which is due to the difference between the standard rate specified and actual rate paid.

A. LRV

B. LCV

C. LEV

D. LYV

23. Actual _____ × (Standard rate – Actual rate)= LRV

A. Value

B. Cost

C. Rate

D. Time

24. The _____ variance represents the difference between hours paid and hours worked.

A. Labour rate

B. Labour efficiency

C. Labour hour

D. Idle time

25. _____is the difference between the standard labor output and actual output.

A. LEV

B. LRV

C. LYV

D. LMV

Answers for Self Assessment

1.	D	2.	D	3.	C	4.	D	5.	C
6.	D	7.	D	8.	A	9.	D	10.	D
11.	D	12.	A	13.	B	14.	D	15.	C
16.	D	17.	A	18.	B	19.	B	20.	C
21.	D	22.	A	23.	D	24.	D	25.	C

Review Questions

1. Discuss the utility of variance analysis in cost control. What are the major causes forefficiency, volume, capacity and calendar variance?

2. Point out the differences between standard costing and historical costing. Give in brief theadvantages and disadvantages of the two systems.

3. If cost information is limited to an analysis of actual costs, state how this would effectcostcontrol.

4. Discuss the basic principles in any standard costing system.

5. What are the several types of standards and what are the assumptions as to the factors onwhich these standards are based?

6. Define 'standard cost' and 'standard costing'. In what type of industries, standard costingis employed? State the advantages of standard costing.

7. Describe the process of determining standard costs.

8. State the various classifications of variances. How are these variances computed?

9. Differentiate between material and labour variances.

10. Enumerate the different types of material variances and write a brief note on each one ofthem.

11. Find out different labour variances.

	Standard	Actual
Output	1,000 units	1,200 units
Rate of payment	@ ₹ 6 per unit	Wages paid with bonus ₹ 8,000
Time taken	50 hours	40 hours

12. The standard material required manufacturing one unit of product A is 20 Kg. and the standardprice per Kg. of material is Rs. 5.00. The cost accounts records, however, reveal that 23,000 Kg. Ofmaterials costing Rs. 55,200 were used for manufacturing 2,000 units of product A. Calculate thematerial cost, material price and material usage variances.

Further Readings

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Web Links

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http://www.accountingcoach.com/online-accounting-course/30Xpg01.html

http://220.227.161.86/19740ipcc_ca_vol2_cp11.pdf

Unit 09: Book Keeping in Cost Accounting

CONTENTS

Objectives

After studying this unit, you will be able to:

- comprehend the principles accounts maintained for non-integral accounts.
- cognize the features of integrated accounts in business world.
- apprehend the importance of reconciling cost and financial accounts.
- apply the accounting system for reconciliation in business.

Introduction

Integral or Integrated system is a system of accounting under which only one set of account books is maintained to record both the Cost and Financial transactions. The system implies the merger of both cost and financial accounts in one set of books. Also, a system in which the cost accounts are distinct from financial accounts, the two sets of accounts being kept continuously in agreement by the use of control accounts or made readily reconcilable by other means are non integrated accounts.

When cost accounts and financial accounts are separately maintained in two different sets ofbooks, two profit and loss accounts will be prepared—one for costing books and second forfinancial books. The profit or losses shown by the cost accounts may not agree with the profit orloss shown by financial accounts or books. Therefore, it becomes necessary that profit or lossshown by the two sets of accounts is reconciled.

When cost and financial accounts are maintained separately, the profit shown by one set ofbooks may not agree with that of the other set. In such a situation, it becomes necessary toreconcile the results (profit/loss) shown by two sets of books.There are certain items, which appear in financial books only and are not recorded in costaccounting books e.g. loss on sale of fixed assets; expenses

on stamp duty; interest on bank loanetc. Similarly, there may be some items, which appear in cost accounts only and do not find aplace in the financial books e.g. notional rent; notional interest etc

9.1 Integral System

Integral or Integrated system is a system of accounting under which only one set of account books is maintained to record both the Cost and Financial transactions. The system implies the merger of both cost and financial accounts in one set of books. The two sets of account books merge into a composite system

According to CIMA, London defines "Integral system as a system in which the financial and cost accounts are interlocked to ensure that all relevant expenditure is absorbed into the cost accounts."

Benefits of Integral System

There are certain advantages of integral system of accounting to users:

- There is no need for reconciliation because there will be only one figure of profit or loss as there is only one set of books.
- This system is economical because it avoids duplication of recording the transactions in two separate set of books.
- Accounting information is readily available and the correctness of the data is automatically checked.
- It enables the introduction of mechanised accounting.
- A better understanding exists among the staff.

9.2 Features of Integral System

There are various characteristics of integral system, which can be used for better results and appropriate accounts.

- There is no need for cost ledger because all control accounts are maintained in the financial ledger.
- There is no need to open a Cost Ledger Control Account because both the aspects (i.e., debit and credit) of all transactions are recorded in respective accounts.
- Subsidiary ledgers i.e., Stores Ledger, Work-in-Progress Ledger and Finished goods ledger are maintained as is done in non-integrated accounting. In addition, a Sales Ledger (containing personal accounts for each customer) and a Purchase Ledger (containing personal accounts for each supplier) are also maintained.
- Overhead ledger is maintained to contain separate accounts for factory, administration and selling and distribution overhead.

Integrated or Integral Accounting

Integrated or Integral accounting is a system in which cost and financial accounts are kept in the same set of books. In such a system, transactions of both cost and financial accounts are recorded in one combined set of books based on double entry system.

Features- Integral Accounting

There are certain characteristics of Integrated Accounting which can help users to understand the organizations accounts easily and that help them to make adequate decisions.

- In integral accounting, there is no need to open a Cost Ledger Control Account as it is possible to complete double entry without this account.
- Subsidiary ledgers, i.e., stores ledger, work-in-progress ledger and finished goods ledger are maintained as is done in non-integrated accounting.
- In addition, a sales ledger (containing personal accounts of all customers) and a purchase ledger (containing personal accounts of all suppliers) are also maintained. Overheads ledger is maintained to contain separate accounts for factory, administration and selling and distribution overheads.

- For each subsidiary ledger, a control account is opened in the general ledger.
- Balance in various overheads control accounts represents over or under absorption which is transferred to Profit and Loss Account.
- Degree of integration must be determined in advance. Many firms integrate the cost and financial accounts completely while other firms integrate the two only upto a stage of prime cost or factory cost.
- A suitable coding system is generally developed to serve the purposes of both cost accounts as well as financial accounts

.

9.3 Essential Prerequisites- Integrated Accounting

There are certain pre requisites of integrated accounting which are to be fulfilled before applying it into real.

- ***Degree of Integration:*** The degree of integration of the two sets of accounts should be determined. It is the management which has to decide on full or partial integration. Full integration changes the entire accounting records.
- ***Suitable Coding System:*** A suitable coding system must be developed to serve the accounting purposes of both financial and cost accounts.
- ***Accounting Policy***: An agreed routine with regard to the treatment of provision for accruals, pre-paid expenses, other adjustments necessary for the preparation of interim accounts.
- ***Co-ordination:*** Prefect co-ordination should exist between the staff responsible for the financial and cost aspects of the accounts and an efficient processing of various accounting documents should be ensured.

9.4 Non - Integrated Accounts

According to CIMA, London, "A system in which the cost accounts are distinct from financial accounts, the two sets of accounts being kept continuously in agreement by the use of control accounts or made readily reconcilable by other means.'

In financial books, there are three types of accounts:

- Personal e.g., debtors and creditors
- Real e.g., cash, stocks, fixed assets, etc.
- Nominal e.g., wages, lighting, heating, discounts, rent and rates, etc.

Ledgers to Be Maintained

There are some ledgers and accounts which are to be maintained by organizations for getting appropriate figures and results. Different ledgers have different importance and that needs to be understand in real by accountants to apply while making accounts.

- ***Cost ledger:*** This is the principal ledger in cost books which controls all other ledgers in the costing department. It contains all impersonal accounts and is similar to general ledger of financial accounts.
- ***Stores ledger:*** This ledger maintains a separate account for each item of store (raw material, components, consumable stores, etc.). It is used for recording receipts, issues and balances of stores, both in quantity and amount.
- ***Work-in-progress ledger or job ledger:*** It contains a separate account for each job in progress. Each such account is debited with the material costs, wages and overheads chargeable to the jobs and credited with the cost of work completed.
- ***Finished goods ledger:*** It contains an account for each item of finished product.

9.5 Control Accounts

Control accounts are the total accounts in the cost ledger. In these accounts, entries are made once in each accounting period on the basis of the periodical totals of transactions in related subsidiary ledgers and books. The opening balance of control account should always equal the total of opening balances on each individual account in the stores ledger.

Advantages of Control Accounts

- Control accounts present the management with a summary of detailed information contained in various subsidiary ledgers.
- It makes possible the division of accounting work among ledger keepers, thereby resulting in specialization in work.
- It permits prompt preparation of profit and loss account and balance sheet, at the end of each period, by providing stock figures without delay.
- It provides internal check leading to greater accuracy of records.
- It provides a basis for reconciliation of cost and financial accounts.

Principal Accounts to be maintained

Except certain ledgers there are few principal accounts also which needs to be maintained by organizations to get relevant and reliable facts and figures for decision making.

- **Stores Ledger Control Account:** This account deals with material transactions. It is a summary of the value of stores received, issued and balance in store. Receipts are posted from goods received notes or invoices to the debit side of this account. Similarly, issues of materials are posted from material requisitions or materials issues analysis sheet to the credit side of this account. The balance of this account represents the total balance of stock which should agree with the aggregate of the balances of individual accounts in the Stores Ledger.
- **Wages Control Account***:* This account records wage transactions in aggregate. Postings are made from wages analysis sheet. This account is debited with gross wages (paid and accrued) and is closed by transfer of direct wages to work-in-progress and indirect wages to factory, administration and selling and distribution overheads control accounts.
- **Factory Overheads Control Account***:* This account deals with factory overheads in aggregate. It is debited with indirect material cost, indirect wages and indirect expenses and is credited with overheads absorbed, which are transferred to work-in-progress. The balance in this account represents under or over-absorbed overheads and is transferred to Overheads Adjustment Account or Costing Profit and Loss Account.
- **Work-in-progress Ledger Control Account***:* This account starts with opening balance of work-in-progress and is debited with materials, labour and factory overheads charged. It is credited with cost of finished goods. Closing balance shows the value of unfinished jobs.
- **Finished Goods Ledger Control Account:**This account starts with opening balance of finished stock. It is debited with cost of finished goods transferred from work-in-progress control account and the amount of administration overheads absorbed. This account is credited with cost of sales by transferring to cost of sales account. The closing balance of this account represents the cost of goods remaining unsold at the end of the period.
- **Administration Overheads Account***:* This account is debited with administration overhead cost incurred and is credited with overheads absorbed by finished goods. The balance in this account represents under or over-absorbed overheads which is transferred to Overheads Adjustment Account or to Costing Profit and Loss Account.
- **Cost of Sales Account***:* This account is debited with the cost of goods sold by transfer from finished goods ledger control account and also selling and distribution overheads absorbed. It is closed by transfer to Costing Profit and Loss account.

- **Selling and Distribution Overheads Account:**This account is debited with selling and distribution overheads incurred and is credited with overheads absorbed by cost of sales. It is closed by transferring the balance to costing Profit and Loss Account or Overheads Adjustment Account for under or over-absorbed overhead.
- **Overheads Adjustment Account:**This account is debited with under-absorbed overheads for factory, administration and selling and distribution overheads and is credited with over-absorbed overheads. The balance in this account represents the net amount of over or under-absorption which is transferred to Costing Profit and Loss Account.
- **Costing Profit and Loss Account:** This account is debited with the cost of sales, abnormal losses and under-absorbed overheads. It is credited with sale value of goods sold, abnormal gains and over-absorbed overheads. The balance in this account represents costing profit or loss which is transferred to cost ledger control account.
- **Cost Ledger Control Account:** This account is also known as General Ledger Adjustment Account or Financial Ledger Control Account. The purpose of this account is to complete the double entry and make the cost ledger self-balancing. As no personal accounts are kept in the cost books, in order to complete the double entry, all accounts relating to financial accounts but not required for cost accounting are debited or credited to the cost ledger control account.

Case Study: ABN AMRO is a Dutch based bank with around 20,000 employees.

Achieving long-term value creation is enabled by both integrated thinking and reporting. In terms of the journey, some organizations start with integrated thinking and others initially focus their efforts on their reporting. ABN AMRO's starting point in 2015 was integrated reporting and using the guiding integrating reporting principles in the International Integrated Reporting Framework to enhance their reporting and communication on value creation.

ABN AMRO uses the core and more approach to reporting which allows for a more targeted approach to concisely telling its story and addressing the interests from different stakeholder groups. The Integrated Annual Review is their core report concisely bringing together relevant information on how the bank creates value for various stakeholders. Additional 'more' reports include a suite of reports and disclosures including the annual financial report, SDG report, human rights report, and an impact report. This reporting approach is based on targeting different stakeholders with specific information that they are seeking.

ABN AMRO's journey has since evolved to focus on integrated thinking. A bank-wide integrated thinking community was established in 2017 and comes together every quarter. This group identifies, monitors and reports on value-creating topics (currently around 35 significant value creating topics) for which different functions and teams are responsible e.g., human resources for human capital information. As a result of this greater internal connectivity, pre-financial information is increasingly integrated and used across the bank to make better decisions related to long-term value creation.

Although initially slow to become actively involved in the process, the finance team has become a critical part of the community providing needed data and support. Value creating topics and indicators evolve over time, so integrated thinking is a continuous and dynamic process – what was relevant historically may not be as relevant today or in the future – and can change quickly according to external events and trends.

https://www.ifac.org/knowledge-gateway/preparing-future-ready-professionals/discussion/case-study-abn-amro-integrated-thinking-reporting-impact

9.6 Reconciliation of Accounts

In cost accounts, overheads are generally absorbed on the basis of a predetermined overheadrate, whereas in financial accounts actual expenditure on overheads is recorded, this will alsocause a difference between the figures of profit shown under financial and cost accounts.Different methods of valuation of closing stock adopted in cost and financial accounts will alsocause a difference in the results shown by the two sets of books. In financial accounts the methodgenerally followed is cost

or market price, whichever is less whereas in cost accounts differentmethods of pricing of material issues such as LIFO, FIFO, average etc. are used.

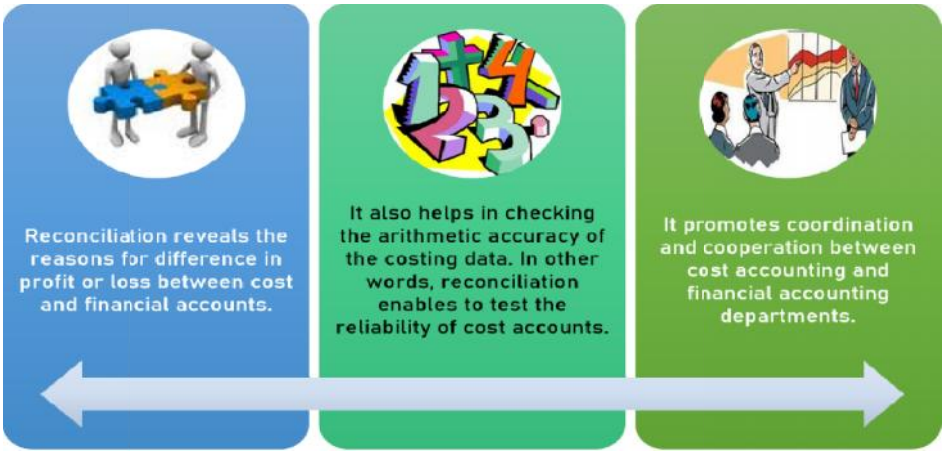
Use of different methods of depreciation is also responsible for the variation of profit shown bytwo sets of books. In financial accounts, depreciation may be charged according to written downvalue method whereas in cost accounts it may be charged on the basis of the life of the machine.Abnormal items not included in cost accounts also cause a difference in profit. If such items ofexpenses are included, cost ascertained will not be correct.

When cost accounts and financial accounts are separately maintained in two different sets of books, two profit and loss accounts will be prepared—one for costing books and second for financial books. The profit or losses shown by the cost accounts may not agree with the profit or loss shown by financial accounts or books. Therefore, it becomes necessary that profit or loss shown by the two sets of accounts is reconciled.

According to Wheldon, "No system is complete unless it is linked up with the financial accounting, that results shown by both cost and financial accounting may be reconciled."

In the words of Eric L. Kohler, "Reconciliation is the determination of the items necessary to bring the balances of two or more related accounts or statements, into agreement."

Need for Reconciliation



- To ensure the mathematical accuracy and reliability of cost accounts in order to have cost ascertainment, cost control and to have a check on the financial accounts.
- Reconciliation helps in formulation of various policies regarding overheads, depreciation and valuation of stock.

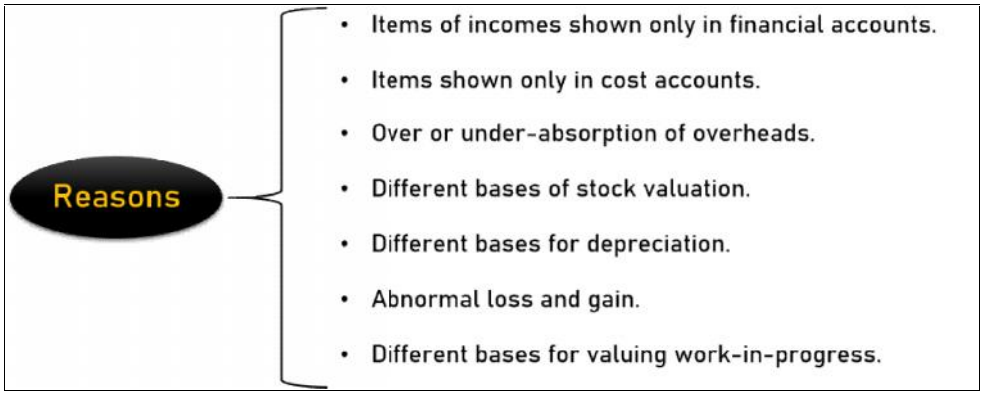
Difference between Cost and Financial Accounts

There is a difference between accounting books due to some of items not entered in cost or financial books. Let us discuss the points of difference between them:

- There are certain items, which appear in financial books only and are not recorded in cost accounting books e.g. loss on sale of fixed assets; expenses on stamp duty; interest on bank loan etc. Similarly, there may be some items, which appear in cost accounts only and do not find a place in the financial books e.g. notional rent; notional interest etc.
- In cost accounts, overheads are generally absorbed on the basis of a predetermined overhead rate, whereas in financial accounts actual expenditure on overheads is recorded, this will also cause a difference between the figures of profit shown under financial and cost accounts
- Different methods of valuation of closing stock adopted in cost and financial accounts will also cause a difference in the results shown by the two sets of books. In financial accounts the method generally followed is cost or market price, whichever is less whereas in cost accounts different methods of pricing of material issues such as LIFO, FIFO, average etc. are used.
- Use of different methods of depreciation is also responsible for the variation of profit shown by two sets of books. In financial accounts, depreciation may be charged according to written down value method whereas in cost accounts it may be charged on the basis of the life of the machine.

9.7 Reasons for Differences in Profit

There are some specified reasons which assures the difference between two books of accounts and hence in profit as well. Let s discuss the reasons.



- **Items of Incomes Shown Only in Financial Accounts**

There are a number of items which are included in financial accounts but find no place in cost accounts. While reconciling any items under this category must be considered. Such items are classified into three categories.

Purely Financial Charges	Purely Financial Incomes	Appropriations of Profit
1. Loss on investments	1. Rent receivable	1. Donations and charities
2. Discount on debentures	2. Transfer fees received	2. Income tax
3. Interest on bank loan	3. Income tax refund	3. Dividend paid
4. Fines and penalties	4. Cash discount received	4. Transfers to reserves and sinking funds
5. Goodwill written off	5. Interest received on investments	5. Any other items which appear in profit and loss appropriation account
6. Loss due to theft and fire	6. Profits on the sale of fixed assets	
7. Provision of depreciation	7. Damages received	
8. Cash discount allowed	8. Cash discount received	
9. Capital expenditure	9. Brokerage received	

- **Items Shown Only in Cost Accounts**

There are certain items which are included in cost accounts but not in financial accounts.

- Nation depreciation on assets fully depreciated in the books
- National rent of the owned building and no rent is payable
- Interest on capital employed but not actually paid
- National salaries
- **Over or Under-absorption of Overheads**: Overheads absorbed in cost accounts on the basis of estimation like percentage on direct materials, percentage on direct wages, etc. may be more or less than the actual amount incurred. If overheads are not fully absorbed, i.e. the amount in cost accounts is less than the actual amount, the shortfall is called under-absorption.

On the other hand, if overhead expenses in cost accounts are more than the actual, it is called over-absorption. Thus, under or over-absorption of overheads leads to difference in two accounts. Sometimes, selling and distribution expenses are ignored in cost accounts and as such costing profit will be higher and thus requires reconciliation.

- **Different Bases of Stock Valuation**: In cost accounting, stock are valued according to the method adopted in stores accounts i.e., FIFO, LIFO, etc. On the other hand, valuation of

stock in financial accounts is invariably based on the cost or market price, whichever is less. Different stock values result in some difference in profit or loss shown by the two sets of account books.

- **Different Bases for Depreciation:**In cost accounts, the assets may be depreciated on the straight line method, whereas in financial accounts, a different method of depreciation such as reducing balance method or sinking policy method or a different method is followed. The difference in the method of depreciation followed in these systems of accounts results in a difference of profit.
- **Abnormal Loss and Gain**: Abnormal losses and abnormal gains are completely kept separate from cost accounts or they are transferred to costing profit and loss account. If they are not included in cost accounts then the profit shown by these two sets of book will vary and adjustment for which has to be done. If these losses are transferred to costing profit and loss account then the profit will tally with the profit as shown by financial accounts. These losses are like—theft, loss by fire, idle time loss etc.
- **Different Bases for Valuing Work-in-progress:**Work-in-progress is valued either at the stage of prime cost, works cost or cost of production. In cost accounts, the basis followed may be quite different than that followed in financial accounts.

Task Define the concept of reconciliation statement. What is the need for reconciliation statement?

9.8 Methods of Reconciliation

To apply or use the reconciliation in accounts, first of all, accountant has to ascertain the points of difference between cost accounts and financial accounts. Then, start with the profit as per cost accounts. After making all the above additions and deductions in costing profit, the resulting figure shall be the profit as per financial books. The above treatment of items will be reversed when the starting point in the Reconciliation Statement is the profit as per financial accounts or loss as per cost accounts.

(a) **Regarding items of expenses and losses**:

Add: Items over-charged in cost accounts

Deduct: Items under-charged in cost accounts

(b) **Regarding items of incomes and gains**:

Add: Items under-recorded or not recorded in cost accounts

Deduct: Items over-recorded in cost accounts

(c) **Regarding valuation of stock**:

Opening Stock.

Add: Amount of over-valuation in cost accounts

Deduct: Amount of under-valuation in cost accounts

Closing Stock.

Add: Amount of under-valuation in cost accounts

Deduct: Amount of over-valuation in cost accounts

Advantages of Reconciliation

There are various benefits of reconciliation of accounts:

- The arithmetical accuracy can be checked in both the sets of books.

- It helps in detecting frauds as for example; any wrong entry of stock of material in stores ledger owing to theft can be brought to light by comparing with the stock of financial accounts.
- It enables to set right under or over absorption of overheads in cost accounts by making use of supplementary rates.
- Separate maintenance of cost accounts has the advantage of exemption from statutory audit as the purpose of cost accounts is to ascertain and control cost rather than ascertainment of profit,
- Reconciliation facilitates location of areas of inefficiencies.

Performa of Reconciliation Statement

		₹	₹
	Profit as per cost accounts		
Add:	1. Over-absorption of overheads		
	2. Financial incomes not recorded in cost books		
	3. Items charged only in cost accounts (Notional rent and interest on capital, etc.)		
	4. Over-valuation of opening stocks in cost books		
	5. Under-valuation of closing stock in cost books		
Less:	1. Under-absorption of overheads		
	2. Purely financial charges		
	3. Under-valuation of opening stock in cost books		
	4. Over-valuation of closing stock in cost books		
	Profit as per financial accounts		

Fig 1: Proforma of Reconciliation Accounts

Example

- Depreciation in cost accounts is Rs. 3,000 and that in financial accounts is Rs. 3,400. This has the effect of increasing costing profit by Rs. 400 as compared to financial profit. Then in order to reconcile, Rs. 400 will be deducted from costing profit.
- Interest on investments received amounting to Rs. 3,000 is not recorded in cost accounts. This will have the effect of reducing profit by Rs. 3,000. Then in order to reconcile, this amount of Rs. 3,000 for interest should be added in the costing profit.

Memorandum Reconciliation Account

This is an alternative to Reconciliation Statement. The profit as per cost accounts is the starting point and is shown on the credit side of this account. All items which are added to costing profit for reconciliation are also shown on credit side.

The items to be 'deducted' from costing profit for reconciliation are shown on the debit side. The balance figure is the profit as per financial accounts. It is only memorandum account and does not form part of the double entry books of account.

Caution

The procedure of its preparation is similar to that of reconciliation statement, the only difference is that items shown under "+" column are shown on the credit and items shown under " column are shown on the debt side of the memorandum reconciliation account

9.9 Proforma of Memorandum Reconciliation Statement

Pro forma of Memorandum Reconciliation Account

	₹		₹
To (Item to be deducted)	—	By Profit as per cost accounts	—
To (Item to be deducted)	—	By (Item to be added)	—
To (Item to be deducted)	—	By (Item to be added)	—
To (Item to be deducted)	—	By (Item to be added)	—
To (Item to be deducted)	—	By (Item to be added)	—
To Profit as per financial accounts (balancing figure)	—	By (Item to be added)	—

Fig 2: Proforma of Memorandum Reconciliation Accounts

Numerical

The cost books of a company show a profit of Rs. 50,000 while the net profit as per financial books is Rs. 29,500. On the basis of the following information, prepare a statement remitting the two profits for the year ended 31st March, 2020.

Particulars	Cost Books (₹)	Financial Books (₹)
Factory expenses	20,000	22,000
Office expenses	12,000	10,000
Selling and distribution expenses	8,000	7,000
Dividend received	–	5,000
Loss on sale of furniture	–	1,500
Income-tax	–	10,000
Goodwill written-off	–	5,000
Interest on capital	–	10,000

Solution

Reconciliation Statement

for the year ending 31st March, 2020

Particulars		Amount (₹)
Profit as per cost account		50,000
Add : Office expenses over-charged in cost books	2,000	
Selling and distribution expenses over-charged in cost books	1,000	
Dividend received not recorded in cost books	5,000	8,000
		58,000
Less : Factory expenses under-charged in cost accounts	2,000	
Loss on sale of furniture not recorded in cost accounts	1,500	
Income tax not charged in cost books	10,000	
Goodwill written-off not charged in cost books	5,000	
Interest on capital not charged in cost accounts	10,000	28,500
Profit as per Financial Accounts		29,500

Summary

- Integral or Integrated system is a system of accounting under which only one set of account books is maintained to record both the Cost and Financial transactions.
- Integrated or Integral accounting is a system in which cost and financial accounts are kept in the same set of books.
- Control accounts are the total accounts in the cost ledger. In these accounts, entries are made once in each accounting period on the basis of the periodical totals of transactions in related subsidiary ledgers and books.
- When cost accounts and financial accounts are separately maintained in two different setsof books, two profit and loss accounts will be prepared—one for costing books and secondfor financial books.
- The profit or losses shown by the cost accounts may not agree with the profit or lossshown by financial accounts or books. Therefore, it becomes necessary that profit or lossshown by the two sets of accounts is reconciled.
- It is important to note that the question of reconciliation of cost and financial accountsarises only under non-integral system.
- However, under the integral accounts, since cost accounts and financial accounts areintegrated into one set of books and only one profit and loss account is prepared, theproblem of reconciliation does not arise.
- The need for reconciliation arises due to the reasons for the difference in the profit or lossin cost and financial accounts, to ensure the mathematical accuracy and reliability of costaccounts in order to have cost ascertainment, cost control and to have a check on thefinancial accounts.
- The cost and financial accounts are reconciled by preparing a Reconciliation Statement ora Memorandum Reconciliation Account.
- Reconciliation statement is a popular and important method of cost accounts and financialaccounts.
- Memorandum Reconciliation Accountis presented in debit and credit formbut it is not a part of double entry system of book-keeping. So it is kept as a memorandumaccount only.

Keywords

- ***Cost Accounting***: Its purpose and objective is internal reporting to management.
- ***Cost Ledger***: It is the principle ledger of cost department in which impersonal accounts arerecorded.
- ***Financial Accounting:*** The purpose and objective of financial accounting is external reportingmainly to owners, creditors, tax authorities, government and investors.
- ***Integral Accounts:*** Under this type of accounting cost accounts and financial accounts are integratedinto one set of books and only one profit and loss account is prepared, the problem of reconciliationdoes not arise.
- ***Memorandum Reconciliation Account:*** This account is presented in debit and credit form but itis not a part of double entry system of book-keeping. So it is kept as a memorandum account only.
- ***Non-integral System of Accounting:*** It is the system of accounting in which separate ledgers aremaintained in cost and financial accounts by accountants.
- ***Reconciliation:*** Reconciliation is a process whereby profits revealed by two sets of books a ret allied after ascertaining the reasons for disagreement of the two profits.
- ***Reconciliation Statement:*** Reconciliation statement is a popular and important method of costaccounts and financial accounts.
- ***Cost ledger:*** This is the principal ledger in cost books which controls all other ledgers in the costing department.

Self Assessment

1. _____ is a system of accounting under which only one set of account books is maintained to record both the Cost and Financial transactions.

A. Terminal

B. Cost

C. Financial

D. Integral

2. In integrated system, there is no need for_____ because there will be only one figure of profit or loss.

A. Cost Sheet

B. Designed Target

C. Accounting

D. Reconciliation

3. Integral System enables the introduction of _____ accounting.

A. Assisted

B. Mechanised

C. Economical

D. Recognised

4. Subsidiary ledgers are maintained as is done in_____ accounting..

A. Terminal

B. Financial

C. Integrated

D. Non integrated

5. In _____accounting, there is no need to open a Cost Ledger Control Account as it is possible to complete double entry without this account?

A. Internal

B. External

C. Integral

D. Non integral

6. _____ ledger is maintained to contain separate accounts for factory, administration and selling and distribution overheads.

A. Overheads

B. Cost

C. Revenue

D. Investment

7. Balance in overheads control accounts represents over or under absorption which is transferred to _____.

A. Balance Sheet

B. Profit and Loss Account

C. Revenue Ledger

D. Investment Sheet

8. A suitable _____ must be developed to serve the accounting purposes of both financial and cost accounts.

A. Coding system

B. Cost sheet

C. Cost unit

D. Cost statement

9. _____is the principal ledger in cost books which controls all other ledgers in the costing department.

A. Stores Ledger

B. Cost Ledger

C. WIP ledger

D. FG Ledger

10. _____ledger maintains a separate account for each item of raw material, components, consumable stores, etc.

A. Stores Ledger

B. Cost Ledger

C. WIP ledger

D. FG Ledger

11. _____is the determination of the items necessary to bring the balances of two or more related accounts into agreement..

A. Composite Ledger

B. Stores Ledger

C. Cost Sheet

D. Reconciliation

12. In cost accounts, overheads are generally absorbed on the basis of a _____ overhead rate.

A. Standard

B. Predetermined

C. Reconciled

D. Absorbed

13. Which is not the purely financial charges that are shown in financial accounts?

A. Loss on investments

B. Damages received

C. Fines and penalties

D. Capital expenditure

14. _____is an alternative to Reconciliation Statement.

A. Direct Charge Sheet

B. Legal Report

C. Log Sheet

D. Memorandum reconciliation statement

15. Which is the purely financial incomes that are shown in financial accounts?

A. Loss on investments

B. Damages received

C. Fines and penalties

D. Capital expenditure

Answer for Self Assessment

1.	D	2.	D	3.	B	4.	D	5.	C
6.	A	7.	B	8.	A	9.	B	10.	A
11.	D	12.	B	13.	B	14.	D	15.	B

Review Questions

1. Explain 'reasons for difference' between cash profit and financial profit.

2. Discuss the causes of difference between integrated accounting and non integrated accounting.

3. What value do you attach to the reconciliation of cost accounts and financial accounts?

4. Explain the main reasons for the difference in the net profits shown by the two sets ofaccounts.

5. Explain the reconciliation procedure. Under what circumstances, a reconciliation statementcan be avoided?

6. What is the purpose of reconciliation cost and financial accounts? Indicate the possiblesources of difference between them.

7. Explain the procedure of reconciling the profit as shown by cost and financial accounts.

8. Explain the difference between reconciliation statement and memorandum reconciliationaccount. Prepare an imaginary memorandum reconciliation account.

9. Distinguish between reconciliation statement and reconciliation account.

10. What is a profit and loss reconciliation statement? How is it prepared? Taking imaginaryfigures, you are required to prepare a statement.

11. State the steps involved in the preparation of reconciliation statement.

12. Calculate the amount of profit as per profit and loss account on the basis of the following

Information:

Profit as per cost account Rs. 16,000.
Factory overheads were under-recorded in cost account by Rs. 320.
Depreciation charges were over recovered in cost account by Rs. 200.

Administrative expense was under recorded in financial accounts by Rs. 400.
Provision for income-tax made in financial books is Rs. 9,600.
Goodwill written-off Rs. 250 was not recorded in financial book.
Interest received on investment during the year Rs. 300.
Transfer fee amounting to Rs. 100 were received during the year in connection withregistration of transfer of shares.

13. Discuss the features and objectives of integrated accounting to users?

14. List out important principal accounts to be maintained in accounting and their purpose?

Further Readings

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Unit 10:Marginal Costing and CVP Analysis

CONTENTS

Objectives

After studying this unit, you will be able to:

- cognize the difference between absorption costing and marginal costing.
- apprehend the scope of marginal costing.
- compute profit using CVP analysis.
- develop the skills in management to make adequate decisions for controlling cost and earning profits.

Introduction

Marginal Costing is not a method of costing like job, batch or contract costing. It is in fact atechnique of costing in which only variable manufacturing costs are considered whiledetermining the cost of goods sold and also for valuation of inventories. In fact, this techniqueis based on the fundamental principle that the total costs can be divided into fixed and variable.While the total fixed costs remain constant at all levels of production, the variable costs go onchanging with the production level. It will increase if the production increases and will decreaseif the production decreases. The technique of marginal costing helps in supplying the relevantinformation to the management to enable them to take decisions in several areas.

As cost-volume-profit analysis is a part of marginal costing.Cost-volume-profit (CVP) analysis estimates how changes in costs (both variable and fixed),sales volume, and price affect a company's

profit. CVP is a powerful tool for planning anddecision making. In fact, CVP is one of the most versatile and widely applicable tools used bymanagerial accountants to help managers make better decisions.Thus, cost-volume-profit analysis is the analysis of three variables, viz., cost, volume and profit.In cost-volume-profit analysis, an attempt is made to measure variations of various costs andprofit with the volume. Profit as a variable is the reflection of a number of internal and externalconditions which exert influence on sales revenue and costs. CVP analysis can address manyissues, such as the number of units that must be sold to break even, the impact of a givenreduction in fixed costs on the break-even point, and the impact of an increase in price on profit.Additionally, CVP analysis allows managers to do sensitivity analysis by examining the impactof various price or cost levels on profit.

10.1 Absorption Costing

Absorption costing means that all of the manufacturing costs are absorbed by the units produced. It is the oldest and widely used technique of cost ascertainment. Cost is made up of direct costs plus overhead costs absorbed on some suitable basis. Absorption costing is useful if:

- there is only one product,
- there is no inventory,
- overhead recovery rate is based on normal capacity instead of actual level of activity.

Features of Absorption Costing

There are various features of absorption costing, which can be adopted for betterment of results, by organizations.

- Both variable and fixed costs are charged to output.
- There may be over or under absorption of overheads.
- Stocks are valued at full cost.
- Cost per unit of output varies with change in level of output.
- Profit is Total sales less total costs of goods sold.
- Fixed factory expenses are included in unit cost and inventoryvalue.

10.2 Advantages and Disadvantages of Absorption Costing

Advantages of Absorption Costing

- This method recognizes that both variable and fixed costs are relate to production.
- Absorption costing is the basis of price determination.
- It results in better matching of cost and revenue.
- Valuation of stock based on absorption costing is more realistic.
- It results in lesser fluctuations in profits if production level is more or less stable
- Profit computation based on absorption costing is considered more accurate and is widely acceptable.
- Managers are made accountable for both fixed and variable costs.
- It helps in calculating Gross Profit and net profit separately in income statement.

Limitations of Absorption Costing

- Difficulty in comparison and control of cost.
- Not helpful in managerial decisions.
- Fixed cost inclusion in cost is not justified.
- It is not helpful in preparing a flexible budget.
- Difficulty in cost control.
- Higher valuation of inventories.

10.3 Marginal Cost

Marginal Cost is defined as, 'the change in aggregate costs due to change in the volume of production by one unit'. Marginal cost means the cost of the marginal or last unit produced.It is also defined as the cost of one more or one less unit produced besides existing level of production.Marginal costing distinguishes between fixed costs and variable costs as conventionally classified. The marginal cost of a product is its variable cost.

Marginal Costing has been defined as, 'Ascertainment of cost and measuring the impact on Notesprofits of the change in the volume of output or type of output. This is subject to one assumptionand that is the fixed cost will remain unchanged irrespective of the change.'

Example

If the total number of units produced are 800 and the total cost of production is Rs. 12,000, if one unit is additionally produced the total cost of production may become Rs. 12,010 and if the production quantity is decreased by one unit, the total cost may come down to Rs. 11,990. Thus the change in the total cost is by Rs. 10 and hence the marginal cost is Rs. 10. The increase or decrease in the total cost is by the same amount because the variable cost always remains constant on per unit basis.

This is normally taken to be;

- direct labor,
- direct material,
- direct expenses and the variable part of overheads.

The marginal costing involves firstly the ascertainment of the marginal cost andmeasuring the impact on profit of alterations made in the production volume and type.

Marginal Cost = Variable Cost = Direct Labour + Direct Material + Direct Expense + Variable Overheads

10.4 Income Statement Under Marginal Costing

Particulars	Amount ₹	Amount ₹
Sales		
Less: Variable Costs		
Contribution		
Less: Fixed Costs		
Profit		

Fig 1: Income Statement used in marginal costing

If the company is producing more than one product, the contribution from each product iscombined as a pool from which the total fixed cost is deducted. Fixed cost is not charged toeach product unless it is identifiable with a product. The income statement [with imaginaryfigures] in such case is prepared as shown below:

XYZ Ltd.

Income Statement Under Marginal Costing

Particulars	Product X ₹	Product Y ₹	Product Z ₹	Total ₹
Sales:	20,00,000	35,00,000	27,00,000	82,00,000
Less: Variable Cost	12,00,000	17,50,000	16,00,000	45,50,000
Contribution	8,00,000	17,50,000	11,00,000	36,50,000
Less: Fixed Cost	–	–	–	20,00,000
Profit				16,50,000

It can be seen from the above statement that the contribution made by each product towards thefixed cost can be measured and thus the priority for each product can be decided. If any productdoes not contribute anything towards the fixed cost, the management may decide to close itdown.

10.5 Characteristics of Marginal Costing

Marginal costing is not a separate method of costing but it is a techniqueof costing distinct from the traditional costing which is also called as 'Absorption Costing'. Thedistinguishing features of marginal costing are as follows:

- In marginal costing, costs are segregated into fixed and variable. Only variable costs arecharged to the production, i.e. included in the cost of production. Fixed costs are notincluded in the cost of production, which means that they are not absorbed in the production.However this does not mean that they are ignored or not taking into consideration at all.They are taken into consideration while computing the final profit or loss by debitingthem to the Costing Profit and Loss Account.
- It is a technique of costing which is used to ascertain marginal cost and to know the impact of variable cost on the volume of output.
- Variable costs alone are charged to production. Fixed costs are recovered from contribution.
- Selling price is based on marginal cost plus the contribution.
- In marginal costing, valuation of inventory is done atvariable cost only. This means, that variable costs only are taken into consideration whilevaluing the inventory. Fixed costs are eliminated from the inventory valuation becausethey are largely period costs and relate to a particular period or year.

Example

A Ltd. is currently producing 25 000 units of product 'P'. The variable cost perunit is Rs. 7 while fixed cost is Rs. 2,00,000. The company is able to sell 20,000 units and 5000 units areunsold. While valuing this inventory, the valuation will be done at Rs. 7 per unit, the value willbe 5 000 units × Rs. 7 per unit = Rs. 35,000. It will be seen that the total cost of production is Rs. 7 [variable cost per unit] + Rs. 8 [fixed cost per unit at the present level] = Rs. 15 but the valuationwill be at Rs. 7 per unit only which is the variable cost per unit. [Principle of valuation of inventoryi.e. cost price or market price whichever is low will be applied and in the example it is presumedthat the selling price is more than the variable cost per unit.

10.6 Scope of Marginal Costing

Marginal Costing is not limited to control cost or evaluating performance but more than it. It helps the organization to fix selling price, plan the profit or also management to take certain decisiions for future.

Fig 2: Scope of marginal costing

10.7 Importance of Marginal Costing

Marginal costing is benefitted to various users in number of ways. It has proved to be an invaluable technique in the hands of management. The importance of the technique can be summed up as follows:

- Simple to understand and easy to operate.
- No problem in computing fixed overhead recovery rates.
- Illogical carry forward of fixed costs of one period to the next period as part of value of closing stock can be avoided.
- Guides the management about the profitability at different levels of production and sales.
- Serves as a very valuable technique of decision-making as it provides necessary information regarding make or buy, fixation of selling price and accepting export orders etc.

Differences between Marginal Costing and Absorption Costing

- The costing method in which variable cost is apportioned exclusively, to the products is known as Marginal Costing. Absorption Costing is a costing system in which all the costs are absorbed and apportioned to products.
- In Marginal Costing, Product related costs will include only variable cost while in the case of Absorption costing, fixed cost is also included in product related cost apart from variable cost.
- Marginal Costing divides overheads into two broad categories, i.e. Fixed Overheads and Variable Overheads. Look at the other term Absorption costing, which classifies overheads in the following three categories Production, Administration and Selling & Distribution.
- In marginal costing profit can be ascertained through the help of Profit Volume Ratio [(Contribution / Sales) * 100]. On the other hand, Net Profit shows the profit in case of Absorption Costing.
- In Marginal Costing variances in the opening and closing stock will not influence the per unit cost. Unlike Absorption Costing, where the variances between the stock at the beginning and the end will show its effect by increasing/decreasing per unit cost.
- In marginal costing, the cost data is presented to outline total cost of each product. On the contrary, in absorption costing, the cost data is presented in traditional way, net profit of each product is ascertained after deducting fixed cost along with their variable cost.

Fixed costs should not be absorbed in the cost of production but should be chargedto the Costing Profit and Loss Account. On the other hand, under absorption costing allindirect costs i.e. overheads are first apportioned and then absorbed in the productionunits.

Numerical

For a particular product, the following cost data is given:

For a particular product, the following cost data is given:

	Per unit (₹)
Selling Price	20
Variable cost	12
Fixed cost	4
Normal production	52000 units

For the four consecutive periods, the following additional data are given:

	Period 1 Units	Period 2 Units	Period 3 Units	Period 4 Units	Total Units
Opening stock	-	-	12000	4000	-
Production	52000	60000	48000	60000	220000
Sales	52000	48000	56000	64000	220000
Closing stock	-	12000	4000	-	-

Prepare a statement showing the profit for different periods under both marginal costing method& absorption costing method.

Solution

Under Marginal Costing

Particulars	Period 1 (₹)	Period 2 (₹)	Period 3 (₹)	Period 4 (₹)	Total (₹)
Sales – (i)	1040000	960000	1120000	1280000	4400000
Opening stock	-	-	144000	48000	-
Production	624000	720000	576000	720000	2640000
Total	624000	720000	720000	768000	2640000
Less: Closing stock	-	144000	48000	-	
Cost of goods Sold (ii)	624000	576000	672000	768000	2640000
Contribution (i) – (ii)	416000	384000	448000	512000	1760000
Less: Fixed Cost 52000 units @ 4	208000	208000	208000	208000	832000
Profit	**208000**	**176000**	**240000**	**304000**	**928000**

Under Absorption Costing

Particulars	Period 1 (₹)	Period 2 (₹)	Period 3 (₹)	Period 4 (₹)	Total (₹)
Sales – (i)	1040000	960000	1120000	1280000	4400000
Opening stock @ ₹ 16 per unit	-	-	192000	64000	
Cost of Production ₹ 16 per unit	832000	960000	768000	960000	3520000
Total	832000	960000	960000	1024000	3520000
Less: Closing stock @ ₹ 16 per unit	-	192000	64000	-	-
Cost of goods sold (Actual)	832000	768000	896000	1024000	3520000
Less: Over-absorbed	-	32000		32000	64000
Overheads		(Notes 1)		(Notes 3)	
	832000	736000	896000	992000	3456000
Add: Under-absorbed			16000		16000
Overheads			(Notes 2)		
Cost of Sales after adjusting under/over absorbed overheads - (ii)	832000	736000	912000	992000	3472000
Profit [(i) – (ii)]	**208000**	**224000**	**208000**	**288000**	**928000**

10.8 CVP Analysis

The intention of every business activity is to earn profit and maximize it.CVP analysis, also known as CVP relationship aims at studying the relationships existing among following factors and its impact on the amount of profits:

- Selling price per unit and total sales amount
- Total cost, which may be fixed or variable, and
- Volume of sales

Cost-volume-profit (CVP) analysis estimates how changes in costs (both variable and fixed), sales volume, and price affect a company's profit. CVP is a powerful tool for planning and decision making. In fact, CVP is one of the most versatile and widely applicable tools used by managerial accountants to help managers make better decisions.The cost-volume-profit analysis is the relationship among cost, volume and profit. Profit of abusiness organisation depends upon a number of factors such as selling price, sales volume, perunit of variable cost, fixed cost and sales mix. The cost-volume-profit analysis explains the interrelationships of these variables for decision-making. The management is always interested inknowing that which product or product mix is most profitable; what effect a change in thevolume of output will have on the cost of production and profit etc.

The basic purpose of cost-volume-profit analysis is to determine the impact of fluctuations incost and volume on the financial results of the business firm or organisation. All these problemsare solved with the help of the cost-volume-profit analysis.

According to CIMA, London, "Cost-volume-profit analysis is the study of the effects on future profits of changes in fixed cost, variable cost, sales price, quantity and mix."

Under cost-volume-profit analysis, when volume of output increases, unit cost ofproduction decreases, and vice-versa; because, the fixed cost remains unaffected. When theoutput increases, the fixed cost per unit decreases. Therefore, profit will be more, whensales price remains constant.

10.9 Objectives of Cost-Volume-Profit Analysis

Following are the main objectives of cost-volume-profit analysis:

- To achieve the minimum level of sales for avoiding losses
- To arrive at the desirable product mix so as to maximize profit.
- The required level of sales that will fetch the planned rate of profit.
- To ascertain the most viable product and the least profits required to gain ground in the market.
- To determine the resultant impact on cost-volume-profit relationships on account of the planned expansion of activities.
- To ascertain the effect of changes in the volume of output, costs and prices on the planned profit.
- To determine the sale of a product of a plant to be discontinued or the operation of the business firm should be temporarily stopped.

10.10 Marginal Cost Equation

The element of cost can be written in the form of an equation. This equation is known as'marginal cost equation'. The equation is shown below:

Sales = Variable cost + Fixed cost + Profit or S = VC + FC + P
Sales – Variable cost = Fixed cost + Profit or S – VC = FC + P
Sales – Variable cost = Contribution or S – VC = C

From the above marginal cost equation, we can understand that in order to earn profit, thecontribution must be more than the fixed cost. To avoid any loss, the contribution must be equalto fixed cost. Let us discuss the important terms and formulas used for marginal costing.

A. Contribution

The important element of the marginal cost equation is the 'contribution' factor which is resulted from the sales value after deduction of variable costs. It has been stated above that 'contribution' is the composition of fixed costs plus profit. Contribution is also known as gross margin. In the other words, contribution is the difference between sales and marginal cost. Contribution enables to meet fixed costs and add to the profit.

Contribution = Selling Price-Variable Cost, or

=Fixed Expenses+ Profit

S-V=F+P

Contribution minus fixed cost is profit, but where fixed cost is more thancontribution, the difference is loss.

B. Profit-Volume Ratio

The profit-volume ratio, popularly known as the P/V ratio, expresses the relation of contribution to sales. This ratio is also known as contribution to sales or the marginal income ratio.

The formula for computing the P/V ratio is given below:

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 \quad \text{OR} \quad = \frac{C}{S} \times 100$$

$$\text{P/V Ratio} = \frac{\text{Contribution per unit}}{\text{Selling price per unit}} \times 100 \quad \text{OR} \quad = \frac{\text{C per unit}}{\text{SP per unit}} \times 100$$

In addition to above, the P/V ratio can be expressed in the following further forms:

$$\text{P/V Ratio} = \frac{\text{Fixed cost} + \text{Profit}}{\text{Sales}} \times 100 \quad \text{OR} \quad = \frac{F+P}{S} \times 100$$

$$\text{P/V Ratio} = \frac{\text{Sales-Variable cost}}{\text{Sales}} \times 100 \quad \text{OR} \quad = \frac{S-V}{S} \times 100$$

$$\text{P/V Ratio} = \frac{\text{Change in profit (In two periods)}}{\text{Change in sales (In two periods)}} \times 100$$

The profit-volume ratio is often expressed as a percentage and is a guide to theprofitability of a business firm. Normally, this ratio is expressed in percentage. P/V ratiois very important in decision-making. It can be used for the calculation of BEP and inproblems regarding profit sales relationship.

Uses of Profit-Volume Ratio

The profit-volume ratio is usually used to ascertain the following:

- To determine the variable cost for any volume of sales.
- To determine the volume of sales required to earn a given profit.
- To fix the selling prices.
- To locate the break-even point and margin of safety.
- To determine the volume of sales required for maintaining the present level of profit, ifselling price is reduced.
- To compute the profit when margin of safety is given.

C. Break-Even Analysis

Break-even analysis is a technique of studying cost-volume-profit relationship. This analysis may be interpreted in broad as well as in narrow sense. In its narrow sense, the break-even analysis determines the break-even point. It is a point to indicate no profit and no loss situation of the project taken up for implementation.If the same is used in broad sense, the analysis is toindicate the probable profit or loss at any given level of activity. Break-even analysis is alsoknown as cost-volume-profit analysis.

According to Joseph Baggot, 'Break-even analysis refers to a system of analysing cost into itsfixed and variable components to determine the probable profits at given level of activity."

In the words of Car Heyel, "Break-even analysis is a method of studying the relationship amongsales revenue, fixed costs and variable expenses to determine the minimum volume at whichproduction can be profitable." Break-even analysis is aimed at measuring variations of cost withvolume. It is a useful technique in business decision-making.

Break-Even Point

Break-even point is a point where the total sales or revenue are equal to total costs. In breakevenpoint, there is no profit or loss in the volume of sales. In other words, it is a point at whichno profit no loss situation prevails in the operating activity of a business firm. This indicates thatthe break-even point is the minimum level of production at which total cost is recovered and noprofit or no loss is sustained.

The following fundamental formula is used to calculate break-even point:

$$\text{Break-even Point (in ₹)} = \frac{\text{Fixed cost} \times \text{Sales}}{\text{Contribution}} \quad \text{OR} \quad = \frac{\text{Fixed cost}}{\text{P/V ratio}}$$

$$\text{Break-even Point (in units)} = \frac{\text{Fixed cost}}{\text{Contribution per unit}} \quad \text{OR} \quad \frac{\text{FC}}{\text{C per unit}}$$

D. Margin of Safety

Margin of safety is an important concept in marginal costing approach. Margin of safety is the difference between the actual sales and the sales at break-even point. This is represented by excess sales over and above the break-even point. The margin of safety refers to amount by which sales revenue can fall before a loss is incurred. That is, it is the difference between the actual sales and sales at the break-even point.

Margin of safety indicates the soundness of the business firm. High margin ofsafety indicates the soundness of a business firm because even with substantial fall in saleor fall in production, some profit shall be made. Small margin of safety on the other handis an indicator of the weak position of the business firm and even a small reduction in saleor production will adversely affect the profit position of the business firm.

Margin of safety can be calculated with the help of the following formula

$$\text{Margin of Safety} = \text{Total sales} - \text{Sales at B.E.P.}$$

$$\text{OR} \quad \text{Margin of Safety} = \frac{\text{Profit}}{\text{P/V ratio}}$$

$$\text{OR} \quad \text{Margin of Safety} = \frac{\text{Profit}}{\text{Contribution}}$$

$$\text{Margin of Safety (as a percentage)} = \frac{\text{Margin of safety}}{\text{Total sales}} \times 100$$

To improve the margin of safety, the following measures may be adopted:

- Increase the level of production,
- Increase the selling price,
- Reducing the fixed and variable costs,
- Substitute the existing products by more profitable products, and
- Changing to a product mix that improves P/V ratio.

10.11 Numericals

A. Contribution Margin

L and T manufacture a device that allows users to take a closer look at icebergs from a ship. The usual price for the device is Rs. 100. Variable costs are Rs.70 per unit. They receive a proposal from a company in Newfoundland to sell 20,000 units at a price of Rs. 85.

Solution:

- 85 – 70 = Rs. 15 contribution margin.

Rs. 15 × 20,000 units = Rs. 300,000 (total increase in contribution margin)

- Sales (20,000 x Rs. 85) = Rs. 1,700,000

Variable costs (20,000 x Rs. 70) = (1,400,000)

Contribution margin= 300,000

B. Profit-Volume Ratio

Sales Rs. 50,000

Marginal cost Rs. 20,000

Solution:

- Contribution = Sales – Marginal cost = 50,000 – 20,000 = Rs. 30,000
- P/V Ratio = Contribution/ Sales*100 = 30,000/ 50,000*100 = 60%

C. Break-Even Analysis

Selling price Rs. 20 per unit; Variable cost `RS. 14 per unit; Fixed cost Rs. 60,000

Solution:

- Break-even Point (in Rs.) = Fixed cost/ Contribution per unit* SP per unit

= 60,000/6 *20

= 12,00,000/6

= Rs. 2,00,000

- Break-even Point (in units) = Fixed cost/ Contribution per unit

= 60,000/ 6= 10,000 Units

Numerical

From the following details find out:

(i) P/V Ratio, (ii) Break-even Point, and (iii) Margin of safety.

Sales Rs. 1,00,000

Total cost Rs. 75,000

Fixed cost Rs. 20,000

Net profit Rs. 25,000

Solution

1. P/V Ratio = Contribution/ Sales*100

= 45,000/ 1,00,000*100

= 45%

2. Break-even Point (in Rs.) = Fixedcost/ P/Vratio

= 20,000/ 45*100

= Rs. 44,444

3. Margin of Safety = Profit/ P/Vratio

= 25,000/ 45*100

= Rs. 55,556 (Approx.)

10.12 Applications of CVP Analysis

Marginal cost helps management to make decision involving consideration of cost and revenue.Basically, marginal costing furnishes information regarding additional costs to be incurred if anadditional activity is to be taken up or the saving in costs which may be expected if an activityis given up. This can be compared with the benefit expected from the proposed course of actionand thus the management will be able to take the appropriate decision.

Decision-making describes the process by which a course of action is selected as the way to dealwith a specific problem. A decision involves the act of choice and the alternative chosen out ofthe available alternatives.

According to Heinz Weihrich and Horold Koontz, "Decision-making is defined as the selectionof a course of action from among alternatives."

George R. Terry says, "Decision-making is the selection based on some criteria from two ormore possible alternatives."

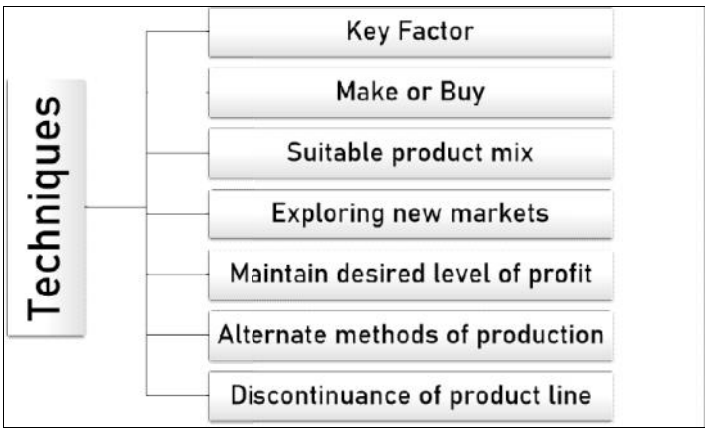

Fig 3: Applications for decison making

A. Key Factor or Limiting Factor

Key factor is nothing but a limiting factor or deterring factor on sales volume, production, labor, materials and so on. The limiting factors are studied in the lights of the contribution. The limiting factor is bearing the inverse relationship with the volume of contribution.

Case

A company manufactures and markets 3 products A, B and C. All the three products are manufactured from same set of machines. Production is limited by machine capacity.Indicate priorities for products A, B and C with a view to maximising profits. Following is the data available for each of the three products.

Solution

Particulars	Product A	Product B	Product C
Raw material cost per unit	2.25	3.25	4.25
Direct labor cost per unit	0.5	0.5	0.5
Other variable cost per unit	0.3	0.45	0.71
Selling price per unit	5	6	7
Standard machine time required per unit	39 minutes	20 minutes	28 minutes

B. Make or Buy decision

The make or buy decision involves whether to manufacture a product in-house or to purchase it from a third party. The outcome of this analysis should be a decision that maximizes the long-term financial outcome for a company.

Case

TVS Motors, a two wheeler manufacturing company is finds that the cost of manufacturing a chain guard in its own workshop is Rs. 8.00 each.

The same is available in the market at Rs. 6.50 with an assurance of continuous supply.

The cost data for manufacturing chain guard is as follows:

Materials Rs. 3.

Direct labor Rs. 2.

Other variable expenses Rs. 1.

Fixed expenses Rs. 2.

You are required to suggest whether the company should make or buy this component?

How the answer will be different in case the supplier reduces the price from Rs. 6.50 to Rs. 5.50?

Solution

1.

MAKE	BUY
Materials Rs. 3 Direct labor Rs. 2 Other variable expenses Rs. 1 Fixed expenses Rs. 2 TOTAL = Rs. 8 The manager will choose the option to manufacture the product here, as the cost will increase by 0.5 Rs. if they go for other option.	Supplier Price Rs. 6.5 Fixed expenses Rs. 2 TOTAL = Rs. 8.5

2.

MAKE	BUY
Materials Rs. 3 Direct labor Rs. 2 Other variable expenses Rs. 1 Fixed expenses Rs. 2 TOTAL = Rs. 8	Supplier Price Rs. 5.5 Fixed expenses Rs. 2 TOTAL = Rs. 7.5 The manager will choose the option to purchase the product here, as the cost will increase by 0.5 Rs. if they go for other option.

C. Fixation of Price

Product pricing is a most important function of management. One of the purposes of cost accounting is the ascertainment of cost for fixation of selling price of product. Marginal cost of a product represents the minimum price of the product. During normal circumstances, price of product is based on full cost. The theory is that only those products should be produced or sold which make the largest contribution towards the recovery of fixed costs. The selling price fixation is also done under different circumstances.

Case

P/V ratio is 50% and the marginal cost of the product is Rs. 60. What will be the selling price?

Solution

1. Selling Price = Variable cost/ (100- P/V ratio)

= 60/ (100- 50%)

= 60*100/ 50

= Rs. 120

Verification: P/V Ratio = Contribution/ Sales* 100

OR = S-V/ S*100

= 120 -60 / 12* 100

= 60/ 120* 100

= 50%

D. Selection of a Profitable Product Mix

In a multi-product manufacturing organisation, a problem is faced by the management as to which product mix or sales mix will give the maximum profit. The product mix which gives the maximum profit must be selected.Product mix is the ratio in which various products are produced and sold. The marginal costing technique helps the management in taking decisions regarding changing the ratio of product mix which gives maximum contribution or in dropping unprofitable product line. The product which has comparatively less contribution may be reduced or discontinued.

Case

Present the following information to show to the management: (i) the marginal cost of product and the contribution per unit, (ii) the total contribution and profits resulting from each of the following sales mixtures:

	Type of Products	Per unit (₹)
Materials	X	10
	Y	9
Wages	X	3
	Y	2

Fixed cost ₹ 2,000.

Variable costs are allocated to products as 100% of wages.

Selling price	X	₹ 20
	Y	₹ 16

Sales mixtures:

(a) 1,000 units of product X and 2,000 units of product Y,

(b) 1,500 units of product X and 1,500 units of product Y,

(c) 2,000 units of product X and 1,000 units of product Y.

Solution

(i) Statement of Marginal Cost:

	Type of Products	
	X (₹)	Y (₹)
Materials	10	9
Wages	3	2
Variable cost (100% of wage)	3	2
Marginal Cost	16	13
Selling price	20	16
Less: Marginal cost	16	13
Contribution	4	3

(ii) Product Mix Choice:

Particulars	(a) ₹	(b) ₹	(c) ₹
Total sales	52,000(1)	54,000(1)	56,000(1)
Less : Marginal cost	42,000(2)	43,500(2)	45,000(2)
Contribution	10,000	10,500	11,000
Less : Fixed cost	2,000	2,000	2,000
Profit	8,000	8,500	9,000

Therefore, sales mixture (c) will give the highest profit and as such, mixture (c) can be adopted.

Working notes:

(1) (1,000×20 + 2,000×16) = 52,000, (1,500×20 + 1,500×16) = 54,000, and (2,000× 20 + 1,000×16) = 56,000

(2) (1,000×16 + 2,000×13) = 42,000, (1,500×16 + 1,500×13) = 43,500, and (2,000× 16 + 1,000×13) = 45,000

E. Decision to Accept a Bulk Order

Large scale purchasers may demand products at less than the market price. A decision has to be taken now whether to accept the order or to reject it. By reducing the normal sales price, the volume of output and the sales can be increased. If the sales price is below the total cost, rejection of the order is aimed at.

In marginal costing, the offer may be accepted, if the quoted sales price is above marginal cost, because of the reason that existing business contribution can recover the fixed cost and the margin of profits. In such cases, the contribution made by bulk orders will be an addition to the profit. But the sales price should not be less than the marginal cost. However, it should not affect the normal market price.

Case

ABC to industrial depression, a plant is running at present, at 50% of its capacity. The following details are available:

	Cost of Production per unit
Materials	₹ 2.5
Labour	₹ 1.5
Variable cost	₹ 3.0
Fixed cost	₹ 1.5
	₹ 8.5

Production per month in units	20,000
Total cost of production	₹ 1,70,000
Sales price	₹ 1,50,000
Loss	₹ 20,000

An exporter offers to buy 6,000 units per month at the rate of ₹ 7.50 per unit and the company hesitates to accept the offer for fear of increasing its already operating losses.

Advise whether the company should accept or decline this offer.

Solution

Particulars	Existing (20,000 units) (₹)	Offer (6,000 units) (₹)	Total (₹)
(a) Sales	1,50,000	45,000	1,95,000
(b) Marginal cost :			
Materials @ ₹ 2.5 per unit	50,000	15,000	65,000
Labour @ ₹ 1.5 per unit	30,000	9,000	39,000
Variable cost @ ₹ 3 per unit	60,000	18,000	78,000
Total Marginal Cost	1,40,000	42,000	1,82,000
Contribution (a – b)	10,000	3,000	13,000
Less : Fixed cost	30,000	--	30,000
Profit/Loss	(-) 20,000	3,000	(-)17,000

The firm must accept the offer, because the amount of loss stands reduced from ₹ 20,000 to ₹ 17,000.

F. Closure of a Department or Discontinuing a Product

Marginal costing technique shows the contribution of each product to fixed cost and profit. If a department or a product contributes the least amount, then the department can be closed or its production can be discontinued. It means the product which gives a higher amount of contribution may be chosen and the rest should be discontinued.

Case

The records of Rajesh Limited which has three departments give the following figures:

Particulars	Department X (₹)	Department Y (₹)	Department Z (₹)	Total Amount (₹)
Sales	15,000	19,000	23,000	57,000
Marginal cost	14,000	7,000	17,000	38,000
Fixed cost	3,000	4,000	11,000	18,000
Total cost	17,000	11,000	28,000	56,000
Profit/Loss	(–) 2,000	(+) 8,000	(–) 5,000	(+) 1,000

The management wants to discontinue product Z immediately as it gives the maximum loss. How would you advise the management?

Solution

Statement of Marginal Cost

Particulars	X (₹)	Y (₹)	Z (₹)	Total (₹)
Sales	15,000	19,000	23,000	57,000
Less: Marginal cost	14,000	7,000	17,000	38,000
Contribution	1,000	12,000	6,000	19,000
Fixed cost				18,000
Profit				1,000

Department Z gives a contribution of ₹ 6,000. If department Z is closed, then it may lead to further loss. Therefore, Z will be continued.

Summary

- Marginal Costing is not a method of costing like job, batch or contract costing.In fact, this technique is based on the fundamental principle that the total costs can bedivided into fixed and variable.
- The total fixed costs remain constant at all levels ofproduction, the variable costs go on changing with the production level.
- It will increase if the production increases and will decrease if the production decreases.
- The technique of marginal costing helps in supplying the relevant information to themanagement to enable them to take decisions in several areas.
- Marginal Costing has been defined as, 'Ascertainment of cost and measuring the impacton profits of the change in the volume of output or type of output. This is subject to oneassumption and that is the fixed cost will remain unchanged irrespective of the change.'
- An important feature of marginal costing is the valuation of inventory is done at variablecost only. This means, that variable costs only are taken into consideration while valuingthe inventory.
- Fixed costs are eliminated from the inventory valuation because they are largely periodcosts and relate to a particular period or year.
- An important application of marginal costing is the area of profit planning.
- Profit planning, generally known as budget or plan of operation may be defined as theplanning of future operations to attain a defined profit goal.

- The marginal costing technique helps to generate data required for profit planning anddecision-making.
- Decision – making should be on the basis of the relevant information. Through the marginalcosting technique, information about the cost behaviour is made available in the form offixed and variable costs.
- Cost-volume-profit (CVP) analysis estimates how changes in costs (both variable andfixed), sales volume, and price affect a company's profit.
- CVP is a powerful tool for planning and decision making. In fact, CVP is one of the mostversatile and widely applicable tools used by managerial accountants to help managersmake better decisions.
- The important element of the marginal cost equation is the 'contribution' factor which is resulted from the sales value after deduction of variable costs.
- Contribution is also known as gross margin. In the other words, contribution is thedifference between sales and marginal cost.
- The profit-volume ratio, popularly known as the P/V ratio, expresses the relation ofcontribution to sales. This ratio is also known as contribution to sales or the marginalincome ratio. The profit-volume ratio is often expressed as a percentage and is a guide tothe profitability of a business firm.
- Break-even point is a point where the total sales or revenue are equal to total costs. Inbreak-even point, there is no profit or loss in the volume of sales.
- Margin of safety is an important concept in marginal costing approach. Margin of safety isthe difference between the actual sales and the sales at break-even point. This is representedby excess sales over and above the break-even point.
- Decision-making describes the process by which a course of action is selected as the wayto deal with a specific problem. A decision involves the act of choice and the alternativechosen out of the available alternatives.

Keywords

- ***Absorption Costing:*** It is a method by which all direct cost and applicable overheads are chargedto products or cost centres for finding out the total cost of production.
- ***Key Factor Analysis:*** The preparation of a plan after taking into consideration the constraints, ifany, on the various resources. These constraints are also known as limiting factors or principalbudget.
- ***Marginal Costing:*** It is in fact a technique of costing in which only variable manufacturing costsare considered while determining the cost of goods sold and also for valuation of inventories.
- ***Profit Planning:*** Generally known as budget or plan of operation may be defined as the planningof future operations to attain a defined profit goal.
- ***Break-even Analysis:*** It refers to a system of analysing cost into its fixed and variable componentsto determine the probable profits at given level of activity.
- ***Break-even Point:*** It is a point where the total sales or revenue are equal to total costs. In breakevenpoint, there is no profit or loss in the volume of sales.
- ***Contribution:*** It is the difference between sales and marginal cost.
- ***Cost-volume-profit Analysis:*** It is the study of the effects on future profits of changes in fixedcost, variable cost, sales price, quantity and mix.
- ***Margin of Safety:*** It is the difference between the actual sales and the sales at break-even point.
- ***Marginal Cost Equation:*** The element of cost can be written in the form of an equation which iscalled marginal cost equation.

- ***Profit-volume Ratio:*** Popularly known as the P/V ratio, it expresses the relation of contributionto sales.

Self Assessment

1. _____ is the oldest and widely used technique of cost ascertainment.

A. Terminal costing

B. Cost accounting

C. Marginal costing

D. Absorption costing

2. Absorption costing is the basis of _____.

A. Cost

B. Revenue

C. Price determination

D. All above

3. _____ is the change in aggregate costs due to change in the volume of production by one unit.

A. Terminal costing

B. Cost accounting

C. Marginal costing

D. Absorption costing

4. The term _____ means difference between Sales and Marginal cost.

A. Profit volume ratio

B. Break even point

C. Margin

D. Contribution

5. Marginal costing is based on the _____ between product costs and period costs.

A. Addition

B. Multiplication

C. Distinction

D. Division

6. CVP relationship aims at studying the relationships existing among _____.

A. Selling price

B. Total cost

C. Volume of sales

D. All above

7. _____analysis estimates how changes in costs both variable and fixed, sales volume and price affect a company's profit.

A. Marginal

B. CVP

C. BEP

D. PV

8. Contribution enables to meet _____ and add to the profit.

A. Variable costs

B. Fixed costs

C. Fines and penalities

D. Capital expenditure

9. _____is a point to indicate no profit and no loss situation of the project taken up for implementation.

A. CVP

B. PV ratio

C. ABC

D. BEP

10. _____ is the difference between the actual sales and the sales at break-even point.

A. Cost volume profit

B. Margin of Safety

C. Break even sales

D. None of above

11. _____ is bearing the inverse relationship with the volume of contribution.

A. Margin of safety

B. Sales mix

C. Make or buy

D. Key factor

12. _____involves whether to manufacture a product in-house or to purchase it from a third party.

A. Margin of safety

B. Sales mix

C. Make or buy

D. Key factor

13. _____ is the ratio in which various products are produced and sold.

A. Margin of safety

B. Sales mix

C. Make or buy

D. Key factor

14. Large scale purchasers may demand products at less than the _____.

A. Direct cost

B. Total cost

C. Standard price

D. Market price

15. _____ of a product represents the minimum price of the product.

A. Sales price

B. Marginal cost

C. Absorption cost

D. Total cost

Review Questions

1. Define Marginal Costing? How variable and fixed costs are treated inmarginal costing?

2. What do you mean by key factor analysis?

3. Explain the features of marginal costing.

4. Discuss the differences between the marginal costing and absorption costing.

5. Discuss fully the applications of marginal costing.

6. Explain the concept of profit planning and cost control as an application of marginalcosting.

7. What do you mean by break-even analysis? What are its assumptions?

8. Discuss the importance of breakeven point, margin of safety, contribution and profitvolumeratio in relation to marginal costing.

9. "The break-even concept is fundamentally a static analysis." Discuss the statement andexplain the limitations of the concept.

10. "The technique of marginal cost can be valuable aid to management." Discuss this statementand give your views.

11. Determine the amount of fixed expenses from the following particulars: Sales Rs. 4,80,000; Direct Materials Rs. 1,60,000; Direct Labor Rs. 1,00,000; Variable Overheads Rs. 40,000 and Profit Rs. 1,00,000.

12. Fixed Overheads Rs. 4,80,000; Variable Cost per Unit Rs. 30 and Selling Price per unit Rs. 60. Find out:

a. Break even sales in units

b. If the selling price is reduced by 10%, what will be the new break even point?

13. The following information is available from the records of Jindal steels as on 31 March 2019 and 2020.

	2019 (Rs. In Lakhs)	2020(Rs. In Lakhs)
Sales	400	500
Profit	62	80

Calculate:

1. P/V Ratio
2. Fixed expenses.
3. The Break-Even level of sales
4. Sales required to earn a profit of Rs 90 Lakhs
5. Profit or loss that would arise if the sales were Rs 300 Lakhs.

14. A company has earned a contribution of Rs. 4,00,000 and net profit of Rs. 3,00,000 on sales of Rs. 16,00,000. What is the margin of safety?

15. A company annually manufactures 10,000 units of product at a cost of Rs. 4 per unit and there is a home market for consuming the entire volume of production at a sale price of Rs. 4.25 per unit. In year 2019, there is a fall in the demand for home market which can consume 10,000 units only at a sale price of Rs. 3.72 per unit. The analysis of cost per 10,000 units is:

Material	Rs. 15,000
Wages	Rs. 11,000
Fixed Overheads	Rs. 8,000
Variable Overheads	Rs. 6,000

The foreign market is explored and it is found that this market can consume 20,000 units of the product if offered at a sale price of Rs. 3.55 per unit. It is also discovered that for additional 10,000 units of product (over initial 10,000 units), the fixed overheads will increase by 10%. Is it worthwhile to try and capture the foreign market?

Answers: Self Assessment

1. D	2. D	3. C	4. D	5. C
6. D	7. B	8. B	9. D	10. B
11. D	12. C	13. B	14. D	15. B

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Unit 11: Life Cycle Costing

CONTENTS

Objectives

After studying this unit, you will be able to:

- cognize the conceptual framework of Life Cycle Costing
- evaluate the performance of Product Life Cycle Costing and Project Life Cycle Costing
- comprehend the concept of product life cycle costing
- recognize the purpose of project life cycle costing

Introduction

Life cycle costing as its name implies, costs the cost object i.e. product, project, etc. over its projected life. It is used to describe a system that tracks and accumulates the costs and revenues and attributes to cost object from its inception to its abandonment. The profitability of any given object can, therefore, be determined at the end of its economic life.Life cycle costing is different from traditional cost accounting system which report cost object profitability on a calendar basis i.e. monthly, quarterly and annually. In contrast, life cycle costing involves tracing cost and revenue on a product to product basis over several calendar periods. Costs and revenue can be analyzed by time period, but the emphasis is on cost revenue accumulation over the entire life cycle of each product.Life cycle costing is more heavily used by businesses that place an emphasis on long-range planning, so that their multi-year profits are maximized. An organization that does not pay attention to life cycle costing is more likely to develop goods and acquire assets for the lowest immediate cost, not paying attention to the heightened servicing costs of these items later in their useful lives.

11.1 Life Cycle Costing

Life cycle costing is a system that tracks and accumulates the actual costs and revenues attributable to cost object from its invention to its abandonment. Life Cycle Cost (LCC) of an item represents the total cost of its ownership, and includes all the cots that will be incurred during the life of the item to acquire it, operate it, support it and finally dispose it.Life cycle costing is the process of

compiling all costs that the owner or producer of an asset will incur over its lifespan. These costs include the initial investment, future additional investments, and annually recurring costs, minus any salvage value.

According to author, "The total cost throughout its life including planning, design, acquisition and support costs and any other costs directly attributable to owning or using the asset".

In essence, Life Cycle Costing is a means of estimating all the costs involved in procuring, operating, maintaining and ultimately disposing a product throughout its life.

Life cycle costing is different from traditional cost accounting system which reports cost object profitability on a calendar basis (i.e. monthly, quarterly and annually) whereas life cycle costing involves tracing costs and revenues of a cost object (i.e. product, project etc.) over several calendar periods (i.e. projected life of the cost object).

11.2 Life - Cycle Cost Analysis (LCCA)

Life-cycle costing has been defined by Consortium of Advanced Management - International, CAM - I as 'accumulation of costs for activities that occur over the entire life-cycle of a product, from inception to abandonment by the manufacturer and the customer.'

It is also defined as 'summations of cost estimates from inception to disposal for both equipments and projects, as determined by an analytical study and estimates of total costs experienced in annual time increments during the project life, with consideration for time value of money.'

Objective of LCAA

The objective of life-cycle cost analysis is to help the management in choosing the most cost-effective alternative, from a number of available options, so as to achieve the lowest long-term cost of ownership.

Characteristics of Life Cycle Costing

Certain features are there which are used by organizations to avail benefits from life of the product and project.

- Product life cycle costing involves tracing of costs and revenues of a product over several calendar periods throughout its life cycle.
- Product life cycle costing traces research, design and development costs and total magnitude of these costs for each individual product and compared with product revenue.
- Each phase of the product life-cycle poses different threats and opportunities that may require different strategic actions.
- Product life cycle may be extended by finding new uses or users or by increasing the consumption of the present users.

Discounting in LCAA

Value of money decreases with time, i.e., a sum of money received today is worth more than an equivalent amount received at a later date, say after one year. This is called discounting, which is a technique used to compare costs and benefits that occur in different time periods.

11.3 Elements of LCC

Life cycle costing has many kinds of costs which has their own role and significance is computing life of product and project; running in an organization. Let us discuss these elements.

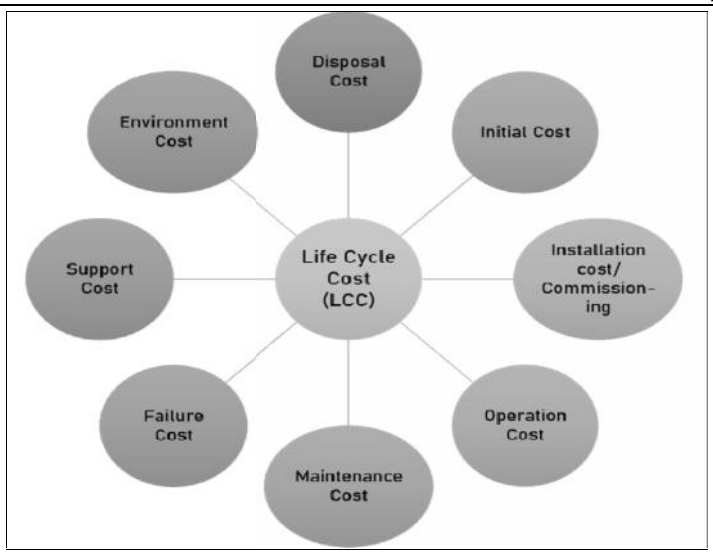

Fig 1: Elements of LCC

- ***Disposal Cost***

The term cost of disposal is used to describe the incremental expense directly attributed to the disposal of an asset, contract, or cash-generating entity. Cost of disposal is oftentimes a future liability that flows as an expense to the income statement as it is incurred.

- ***Environmental Cost***

Environmental Costs means costs incurred in connection with acquiring and maintaining all environmental permits and licenses for the Product, and the Product's compliance with all applicable environmental laws, rules and regulations, including capital costs for pollution mitigation or installation of emissions control.

- ***Support Cost***

Support Cost are the Expenses or cost incurred in process which are not directly associated with the final product or service provided by a firm. It is called as the support cost related to the product or service.

- ***Initial cost***

It means the moneys required for the capital construction or renovation of a major facility. Initial cost means, with respect to any Unit, the purchase price paid to the Company with respect to such unit by the member to whom such Unit was originally issued.

- ***Failure Cost***

Failure costs are those incurred by a manufacturer when it produces defective goods. There are two types of failure costs, which are internal and external. Internal failure costs occur before goods are shipped to customers, while external failure costs arise subsequent to shipment.

- ***Installation Cost***

Installation Cost means the costs and expenses incurred and paid for by Tenant in performing alterations in accordance with plans and specifications approved by Landlord for its initial occupancy, as evidenced by paid receipts for materials supplied and services rendered by independent contractors.

- ***Operation Cost***

Operating costs or operational costs, are the expenses which are related to the operation of a business, or to the operation of a device, component, piece of equipment or facility. They are the cost of resources used by an organization just to maintain its existence.

- ***Maintenance Cost***

The term maintenance expense refers to any cost incurred by an individual or business to keep their assets in good working condition. These costs may be spent for the general maintenance of items like running anti-virus software on computer systems or they may be used for repairs such as fixing a car or machinery.

11.4 Life Cycle Costing Process

Life cycle costing is a three-staged process. The first stage is life cost planning stage which includes planning LCC Analysis, Selecting and Developing LCC Model, applying LCC Model and finally recording and reviewing the LCC Results.The Second Stage is Life Cost Analysis Preparation Stage.The third stage Implementation and Monitoring Life Cost Analysis.

Stage 1: LCC Analysis Planning

- The Life Cycle Costing process begins with development of a plan, which addresses the purpose, and scope of the analysis. The plan should:
- Define the analysis objectives in terms of outputs required to assist a management decision.
- Make the detailed schedule with regard to planning of time period for each phase, the operating, technical and maintenance support required for the asset.
- Identify any underlying conditions, assumptions, limitations and constraints (such as minimum asset performance, availability requirements or maximum capital cost limitations) that might restrict the range of acceptable options to be evaluated.
- Identify alternative courses of action to be evaluated. The list of proposed alternatives may be refined as new options are identified or as existing options are found to violate the problem constraints.
- Provide an estimate of resources required and a reporting schedule for the analysis to ensure that the LCC results will be available to support the decision-making process for which they are required.

Stage 2: Life Cost Analysis Preparation

- The Life Cost Analysis is essentially a tool, which can be used to control and manage the ongoing costs of an asset or part thereof. It is based on the LCC Model developed and applied during the Life Cost Planning phase with one important difference: it uses data on real costs.
- The preparation of the Life Cost Analysis involves review and development of the LCC Model as a "real-time" or actual cost control mechanism. Estimates of capital costs will be replaced by the actual prices paid. Changes may also be required to the cost breakdown structure and cost elements to reflect the asset components to be monitored and the level of detail required.
- Targets are set for the operating costs and their frequency of occurrence based initially on the estimates used in the Life Cost Planning phase. However, these targets may change with time as more accurate data is obtained, from the actual asset operating costs or from the operating cost of similar another asset.

Stage 3: Implementing and Monitoring

- Implementation of the Life Cost Analysis involves the continuous monitoring of the actual performance of an asset during its operation and maintenance to identify areas in which cost savings may be made and to provide feedback for future life cost planning activities.

Example, it may be better to replace an expensive building component with a more efficient solution prior to the end of its useful life than to continue with a poor initial decision.

11.5 Types of Life CycleCosting

There are two types of life-cycle costing:

A. ***Product Life Cycle-*** Product life cycle is thus a pattern of expenditure, sale level, revenue and profit over the period from new idea generation to the deletion of product from product range.
B. ***Project Life Cycle-***Project life-cycle costing includes costs associated with acquiring, using, caring for and disposing of physical assets.

Let us discuss the product life cycle and project life cycle in detail.

A. Product Life Cycle

Each product has a life cycle, which varies from few months to several years. For example, in case of camera, photocopying machines, etc. the life is more than 100 years whereas in the case of black and white TV/VCR, it is for few years only. Product life cycle is thus a pattern of expenditure, sale level, revenue and profit over the period from new idea generation to the deletion of product from product range.

Characteristics of Product Life Cycle

The major characteristics of product life-cycle concept are as follows:

- The products have finite lives and pass through the cycle of development, introduction,growth, maturity, decline and deletion at varying speeds.
- Product cost, revenue and profit patterns tend to follow predictable courses through theproduct life cycle. Profits first appear during the growth phase and after stabilising duringthe maturity phase, decline thereafter to the point of deletion.
- Profit per unit varies as products move through their life cycles.
- Each phase of product life cycle poses different threats and opportunities that give rise todifferent strategic actions.
- Products require different functional emphasis in each phase such as an R&D emphasis inthe development phase and cost control emphasis in the decline phase.
- Finding new uses or new users or getting the present uses to increase their consumption,this may extend the life of the product.

Various Stages of Product Life Cycle

Typically the life cycle of a manufactured product will consist of the following stages:

- ***Market research:*** This usually means that market research will establish what product thecustomer wants, how much he is prepared to pay for it and how many he will buy.
- ***Specification:*** When market research has established what is to be made, the designspecification will give such details as required life, maximum permissible maintenancecosts, maximum permissible manufacturing cost, the number required, the delivery date,the required performance of the product.
- ***Design:*** With a precise specification, the designers can produce the drawings and processschedules which define the geometry of the product and some of the manufacturingprocesses.
- ***Prototype manufacture:*** From the drawings it will possible to manufacture a small numberof the product. These prototypes will be used to develop the product and eventually todemonstrate that it meets the requirements of the specification.
- ***Development:*** When a product is first made it rarely meets the requirements of thespecification and changes have to be made. This method of testing and changing isdevelopment.
- ***Tooling:*** Tooling up for production can mean building a production line costing severallakhs of rupees, building expensive jigs, buying special purpose machine tools or, in someother say, making a very large investment.
- ***Manufacture:*** The manufacture of a product involves the purchase of the raw materials,the purchase of bought-out components, the use of labour to make and assemble theproduct and the use of supervisory labour.
- ***Selling:*** When the product is fit to sell and available, it may be necessary to spend moneyon a campaign to sell the product.
- ***Distribution:*** In the process of selling the product, it must be distributed to the salesoutlets and to the customers.

- ***Product support:*** The manufacturer or supplier will have to make sure that spares andexpert servicing are available for the life of the product. The manufacturer or the suppliermay even have to offer free servicing and parts replacement during the early life of theproduct.
- ***Decommissioning or replacement:*** When a manufacturing product, comes to an end, theplant used to build the product must be reused, sold, scrapped, or decommissioned in away that is acceptable to society.

Phases of Product Life Cycle

There are four phases of product life cycle and these are as follow:

- ***During introductory phase,*** a product is launched into the market, its customers are innovators. Competition is almost negligible and profits are non-existent.
- ***Under growth phase***, sales and profits rise, at a rapid pace. Competitors enter the market often in large numbers. As a result of competition, profits starts declining near the end of the growth phase.
- ***During the phase of maturity*** sales continue to increase, but at a decreasing rate. When sales level off, profits of both producers and middlemen decline. The main reason is intense price competition; some firms extend their product lines with new models.
- ***Decline in sales*** volume characterizes the last phase of the product life cycle. The need or demand of the product disappears. Availability of better and less costly substitutes in the market accounts for the arrival of this phase.

The thrust of product life cycle costing is on the distribution of costs among categories changes over the life of the product, as does the potential profitability of a product. Hence, it is important to track and measure costs during each stage of a product's life cycle.

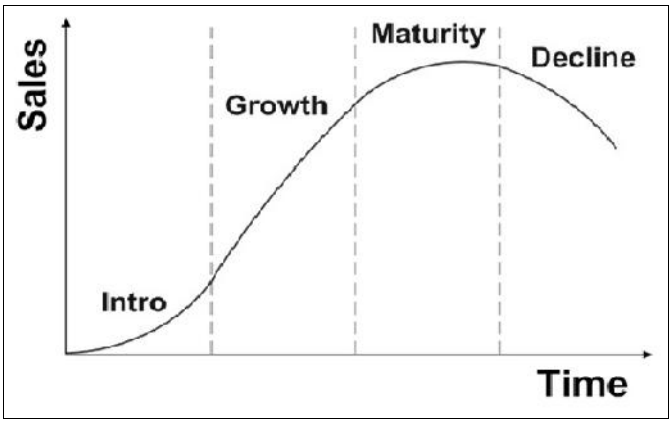

Fig 2: Phases of Product Life Cycle

A. Project Life Cycle Costing

"Project life-cycle costing includes costs associated with acquiring, using, caring for and disposing of physical assets." At the same time costs generated by the acquisition, use, maintenance and replacement of permanent physical assets in respect of feasibility studies, research design, development, production, maintenance, replacement and disposal as well as support, training and operating are also included in project life-cycle cost.

Components of a ProjectCost

- Costs of research, design, testing, production, construction or purchase of capital equipment i.e., cost of acquisition.
- Costs of transportation and handling of capital equipment.
- Cost of maintenance of capital equipment.

- Costs incurred in operations like, energy costs, various facilities costs and utility costs.
- Training costs.
- Costs of holding spare parts, warehousing etc.
- Costs of purchasing any technical data (information).
- Retirement and disposal costs at the end of economical life of the capital equipment.

Purpose of Project Life-cycle Costing Analysis

- ***Choose between two or more assets:*** Using life cycle costing helps you make purchasing decisions. If you only factor in the initial cost of an asset, you could end up spending more in the long run. For example, buying a used asset might have a lower price tag, but it could cost you more in repairs and utility bills than a newer model. Life cycle cost management depends on your ability to make a smart investment. When you are deciding between two or more assets, consider their overall costs, not just the price tag in front of you.
- ***Determine the asset's benefits:*** How do you know if you should buy an asset? Generally, you weigh the pros and cons of your purchase. But if you only consider the initial, short-term cost, you won't know if the asset will benefit your business financially in the long run.By using life cycle costing, you can more accurately predict if the asset's return on investment (ROI) is worth the expense. If you only look at the asset's current purchase cost and don't factor in future costs, you will overestimate the ROI.
- ***Create accurate budgets:*** When you know how much an asset's total price is, you can create budgets that represent your business's actual expenses. That's way; you won't underestimate your business's costs.A budget is made up of expenses, revenue, and profits. If you underestimate an asset's cost on your budget, you are overestimating your profits. Failing to account for expenses can result in overspending and negative cash flow.

Uses of Project Life-cycle Costing

- When projects are to be operated in capital intensive industry.
- Where projects have sizeable on-going constructing program.
- Where projects depend on numerous and expensive items of plant with consequent substantial replacement programs.
- Where projects relate to major expansion.
- Where projects contemplate the purchase or design or development of expensive new technology.
- Where projects are sensitive to disruption due to down-time.

LCC Applications

Life cycle costing can be applied as:

- As an evaluation technique to choose between options (buildings, components, materials, finishes etc.)
- As a basis for predicting future running costs.
- As a management tool – to ensure facility is being used effectively and value for money is being maximized.
- As a basis for budgeting for future expenditure.
- As a mean for considering total cost rather than just capital cost (to guide project decision).

Life Cycle Priorities

The corporate objective of owning an asset varies:

- ***Public Sector Client*** – concern with customer satisfaction and satisfy social needs. E.g. factory, NKF building.
- ***Private Sector Client*** – concern with overall project profitability. E.g. CPF Bldg, Treasury Bldg etc.

11.6 Advantages and Disadvantages of Project Life Cycle Costing

Advantages of Project LCC

- ***Encourages Long- Term Strategic Planning:*** PLCC encourages forward planning and consideration of future costs. This will assist in forming a fully accurate cost for the entire project, instead of one particular aspect of it.
- ***Supports downstream strategic budgeting:*** PLCC will produce high quality early estimate, that can be used to prepare budget. This is known as strategic budgeting. This is difficult to implement but very useful if it is done properly.
- ***Influences the overall cost viability of the project:*** Construction no longer become a cost window. It is part of the many windows. Hence, decision on high cost can be made, taking into account the subsequent low running cost. PLCC allows various phases to be put into perspective, and highlight area where input is required.
- ***Influences early stage decision making:*** PLCC will affect early stage decision. For 2 identical investments of similar costs, its running cost may be totally difference. It is wrong to consider just their capital cost alone. By using LCC, early stage decision will also take into consideration subsequent running cost.

Disadvantages of Project LCC

- ***The assumption of a known and deterministic life cycle:*** Some projects may not have a known life cycle. Hence not possible to predict accurately on many aspects of the project life cycle. The unknown factors may have significant effect on the overall project cost.
- ***High cost of performance:*** High cost due to planning and analysis works, if PLCC model is to be accurate. As it involves complex cost model that is costly to set up and operate.
- ***High sensitivity to changing requirements:*** Because the model is very complex, it is highly sensitive to change input data. Small changes in the current situation or conditions may have a considerable impact on the future cost.

Summary

- Life cycle costing as its name implies, costs the cost object i.e. product, project, etc. over its projected life.
- Life cycle costing is different from traditional cost accounting system which report cost object profitability on a calendar basis i.e. monthly, quarterly and annually.
- Product life cycle costing involves tracing of costs and revenues of a product over several calendar periods throughout its life cycle.
- Failure costs are those incurred by a manufacturer when it produces defective goods.
- The manufacturer or supplier will have to make sure that spares and expert servicing are available for the life of the product.
- Life cycle costing as its name implies, costs the cost object i.e. product, project, etc. over its projected life. It is used to describe a system that tracks and accumulates the costs and revenues and attributes to cost object from its inception to its abandonment.

- Life cycle costing is different from traditional cost accounting system which report cost object profitability on a calendar basis i.e. monthly, quarterly and annually. In contrast, life cycle costing involves tracing cost and revenue on a product to product basis over several calendar periods.

Keywords

- ***Differentiation:*** It enhances profitability whenever the extra price the product commands outweighs the added costs of achieving the differentiation.
- ***Economies or Diseconomies of Scale:*** Economies of scale arise whenever activities can be performed more cheaply in larger volumes than smaller volumes and from the ability to spread out certain costs like R&D and advertising over a greater sales volume.
- ***Life Cycle Costing:*** Life cycle costing as its name implies, costs the cost object i.e., product, project, etc. over its projected life. It is used to describe a system that tracks and accumulates the costs and revenues attributes to cost object from its inception to its abandonment.
- ***Discounting-***Value of money decreases with time, i.e., a sum of money received today is worth more than an equivalent amount received at a later date, say after one year.
- ***Disposal Cost-***The term cost of disposal is used to describe the incremental expense directly attributed to the disposal of an asset, contract, or cash-generating entity.
- ***Operating costs or operational costs-*** These are the expenses which are related to the operation of a business, or to the operation of a device, component, piece of equipment or facility.
- ***Project Life Cycle-***Project life-cycle costing includes costs associated with acquiring, using, caring for and disposing of physical assets.
- ***PrototypesManufacture-*** It will be used to develop the product and eventually to demonstrate that it meets the requirements of the specification.

Self Assessment

1. _____costing costs the cost object i.e. product, project, etc. over its projected life.

A. Projected

B. Product

C. Financial

D. Life cycle

2. The profitability of any given object can be determined at the _____ of its economic life.

A. Decline

B. Growth

C. Start

D. End

3. Life-cycle cost analysis is to help the management in choosing the most _____ alternative to achieve the lowest long-term cost of ownership.

A. Assisted

B. Cost effective

C. Hogh rated

D. Recognised

4. _____ is a technique used to compare costs and benefits that occur in different time periods.

A. Life cycle

B. Forecasting

C. Integrated

D. Discounting

5. Cost of _____ is often times a future liability that flows as an expense to the income statement as it is incurred.

A. Initial

B. Failure

C. Disposal

D. Environmental

6. _____ Cost is the cost incurred in process which are not directly associated with the final product or service provided by a firm.

A. Service

B. Initial

C. Failure

D. Disposal

7. _____ failure costs occur before goods are shipped to customers, while _____failure costs arise subsequent to shipment.

A. External; Internal

B. Internal; External

C. Revenue; Cost

D. Cost; Revenue

8. The term maintenance expense refers to any cost incurred by business to keep their _____ in good working condition.

A. Assets

B. Products

C. Projects

D. Trends

9. _____life-cycle costing includes costs associated with acquiring, using, caring for and disposing of physical assets.

A. Stores

B. Project

C. Asset

D. Product

10. The third and final stage in LCCA is _____ and monitoring.

A. Implementation

B. Review

C. Deviation

D. Analysis

11. During _____stage, competition is almost negligible and profits are non-existent.

A. Growth

B. Decline

C. Maturity

D. Introduction

12. Project cost includes_____.

A. Cost of research

B. Cost of design

C. Cost of maintanence

D. All above

13. _____concern with customer satisfaction and satisfy social needs.

A. Private sector client

B. Public sector client

C. Project sector client

D. Product sector client

14. Life cycle cost _____depends on your ability to make a smart investment.

A. Sheet

B. Analysis

C. Log Report

D. Management

15. During _____ stage need or demand of the product disappears.

A. Growth

B. Decline

C. Maturity

D. Introduction

Answers for Self Assessment

1.	D	2.	D	3.	B	4.	D	5.	C
6.	A	7.	B	8.	A	9.	B	10.	A
11.	D	12.	D	13.	B	14.	D	15.	B

Review Questions

1. Define Life Cycle Costing? Also explain the term Life cycle costing analysis.
2. What do you mean by discounting?
3. What are the features of life cycle costing?
4. What do you mean by LCC? Also discuss the elements of life cycle costing?
5. Discuss the life cycle costing process in detail?
6. Distinguish between product life cycle and project life cycle?
7. What do you mean by product life cycle and its features in detail?
8. Describe the various stages of product life cycle in detail?
9. Explain the phases of product life cycle diagrammatically?
10. Define project life cycle and purpose of project life cycle analysis?
11. Discuss the benefits and limitations of project life cycle costing?

Further Readings

- Bhar. K.B. (2008) Cost Accounting, Methods & Problem, Academic Publishers.
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http://www.accountingcoach.com/online-accounting-course/30Xpg01.html

http://220.227.161.86/19740ipcc_ca_vol2_cp11.pdf

Unit 12: Product Life-Cycle Costing

CONTENTS

Objectives

After studying this unit, you will be able to:

- comprehend the various phases of product life cycle costing.
- determine various costs in product life cycle.
- apply the costs associated with phases of product life cycle costing.
- cognize the applications of product life cycle costing.
- recognize the purpose of experience curve in determine product costs.

Introduction

The term "life cycle costing" refers to the cost of a cost object, such as a product, project, or other service, over the course of its expected life. It's a term that refers to a system that tracks and collects costs, revenues, and cost object properties from start to finish. The profitability of any given object can, therefore, be determined at the end of its economic life.Traditional cost accounting systems show cost object profitability on a calendar basis, i.e. monthly, quarterly, and annually. Life cycle costing is different. Life cycle costing, on the other hand, entails tracing cost and revenue from one product to the next over multiple calendar months. Costs and income can be broken down by time period, but the focus is on cost-to-revenue accumulation throughout the course of a product's whole life cycle. Businesses that prioritise long-term planning in order tooptimize multi-year earnings are more likely to adopt life cycle costing. An organisation that ignores life cycle costing is more likely to develop commodities and acquire assets at the lowest possible price, ignoring the increased servicing costs of these objects later in their useful lifetimes.

12.1 Product Life Cycle

Each product has a life cycle, which varies from few months to several years. For example, in case of camera, photocopying machines, etc. the life is more than 100 years whereas in the case of black and white TV/VCR, it is for few years only. Product life cycle is thus a pattern of expenditure, sale level, revenue and profit over the period from new idea generation to the deletion of product from product range.

Phases of Product Life Cycle

- During *introductory* phase, a product is launched into the market, its customers are innovators. Competition is almost negligible and profits are non-existent.
- Under *growth* phase, sales and profits rise, at a rapid pace. Often, a huge number of competitors enter the market. Profits begin to decline near the conclusion of the expansion phase as a result of competition.
- During the phase of *maturity* sales continue to increase, but at a decreasing rate. When sales fall flat, both producers and middlemen lose money. The main cause for this is fierce pricing rivalry; some companies are expanding their product ranges to include new models.
- The*decline* stage of a product's life cycle is marked by a decrease in sales volume. The product's need or demand has vanished. The arrival of this phase is due to the availability of superior and less expensive substitutes on the market.

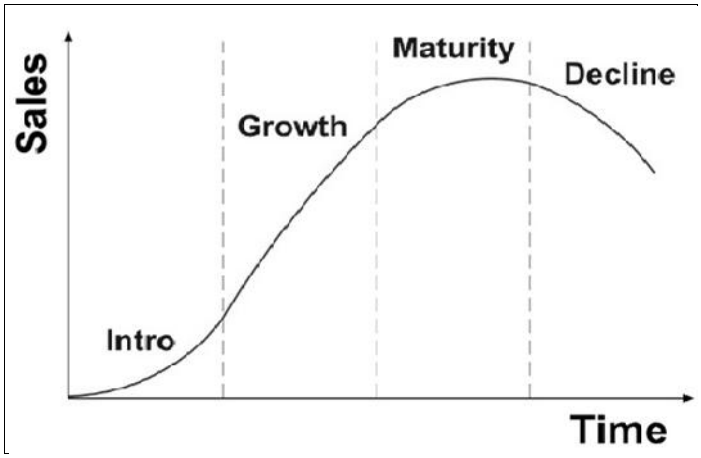

Fig 1: Phases of PLC

Characteristics of Product Life Cycle

- The products have a finite lifespan and go through the development, introduction, growth, maturity, decline, and deletion cycles at different rates.
- Throughout the product life cycle, cost, revenue, and profit trends tend to follow predictable paths.Profits first appear during the growth phase and after stabilizing during the maturity phase, decline thereafter to the point of deletion.
- Profit per unit varies as products progress through their life cycles, with each phase posing various challenges and opportunities, requiring different strategic responses.
- Products require different functional emphasis in each phase such as an R&D emphasis in the development phase and cost control emphasis in the decline phase.
- Finding new uses or new users or getting the present uses to increase their consumption, this may extend the life of the product.

Stages of Product Life Cycle

Product Life Cycle has certain stages. Let us discuss:

- ***Market research:*** This usually means that market research will establish what product the customer wants, how much he is prepared to pay for it and how many he will buy.

- ***Specification:*** The design specification will include specifics such as the needed life, maximum permissible maintenance expenses, maximum permissible manufacturing cost, the number required, the delivery date, and the product's required performance after market research has determined what is to be created.
- ***Design:*** Designers can create drawings and process schedules that define the geometry of the product and some of the production processes using a precise specification.
- ***Prototype manufacture:*** It will be feasible to manufacture a modest number of the product based on the drawings. These prototypes will be used to develop the product and, finally, to show that it complies with the specification's requirements.
- ***Development:*** When a product is first made it rarely meets the requirements of the specification and changes have to be made. This method of testing and changing is development.
- ***Tooling:*** Building a manufacturing line that costs many thousands of rupees, building expensive jigs, purchasing special purpose machine tools, or, in other words, making a huge investment are all examples of tooling up for production.
- ***Manufacture:*** The manufacture of a product involves the purchase of the raw materials, the purchase of bought-out components, the use of labor to make and assemble the product and the use of supervisory labor.
- ***Selling:*** When the product is ready to sell and is available, it may be required to invest in a marketing campaign to promote it.
- ***Distribution:*** The product must be disseminated to sales outlets and customers during the selling process.
- ***Product support:*** The maker or supplier must ensure that spare parts and expert service are available throughout the duration of the product's life cycle. During the early stages of the product's life, the maker or supplier may be required to provide free servicing and parts replacement.
- ***Decommissioning or replacement:*** When a manufacturing product, comes to an end, the plant used to build the product must be reused, sold, scrapped, or decommissioned in a way that is acceptable to society.

12.2 Product Life Cycle Costing

The focus of product life cycle costing is on how the distribution of expenses within categories, as well as a product's potential profitability, evolves over time. As a result, tracking and measuring expenses at each stage of a product's life cycle is critical.

Features of Product Life Cycle Costing

- Product life cycle costing entails tracking a product's costs and revenues throughout numerous calendar periods over the course of its entire life cycle. Costs and revenues can be broken down into time intervals, but the focus is on cost and income accumulation over the course of a product's whole life cycle.
- Product life cycle costing tracks the expenses of research and development, among other things, incurred by specific products over the course of their lives, allowing the overall amount of these expenditures to be recorded and compared to product revenues generated at different times.

Benefits of Product Life Cycle Costing

- ***Maximise Returns:***The product life cycle costing method leads to earlier revenue or cost reduction initiatives than would otherwise be considered. In order tomaximise the return on a product, a number of elements must be addressed.
- ***More accurate and Realistic:*** A more precise and realistic evaluation of revenues and expenses, at least within a specific life cycle stage, should lead to better judgments.

- ***Long term Rewards:***In contrast to short-term profitability, product life cycle thinking can create long-term rewarding.
- ***Cost Effectiveness:*** It provides an overarching framework for considering total additional costs over a product's whole life cycle, making it easier to analyse portions of the whole where cost effectiveness could be enhanced.
- ***Better Decision:***With the support of an accurate and realistic estimate of revenues and expenditures within a specific life cycle stage, better decisions may be made.
- ***Important Information:***It gives crucial data for making more informed pricing decisions. In this method, all costs incurred during the product's lifetime are used to determine the product's price.
- ***Capital Budgeting Decisions:***Life cycle costing is critical when making capital budgeting decisions since it takes into account both capital and revenue costs associated with a product's life cycle.
- ***Earlier Action:***Product life cycle costing allows you to take action early in the process to generate income and minimise the product's cost. It gives the manager the opportunity to assist and make plans for producing income from the product.
- ***Covering Costs:***This costing includes all costs associated with research and development, design, marketing, manufacturing, distribution, and after-sales service, among other things.
- ***Total Incremental Costs:***This costing system establishes an overall framework for calculating total incremental costs over a product's complete life cycle.

Theory of new product development and its application

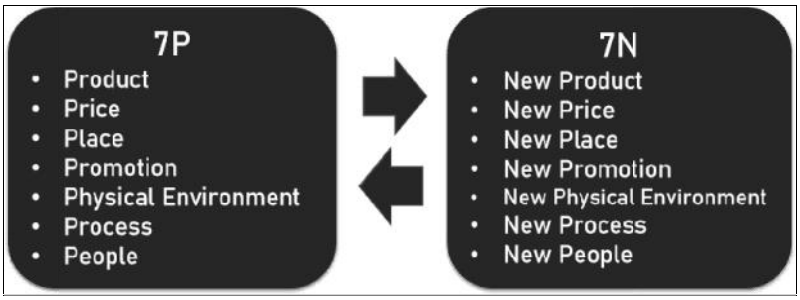

Fig 2: New Product Development Theory

12.3 Product LifecycleManagement

Product lifecycle management (PLM) is the process of overseeing a product's whole lifecycle, from conception to engineering, design, and manufacturing, as well as product service and disposal.

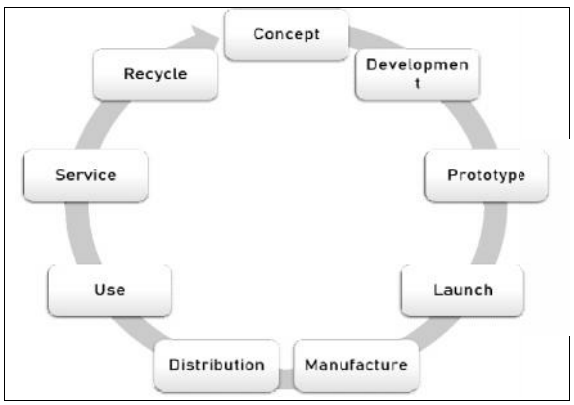

Fig 3: PLM

12.4 Primary Areas in PLM

There are certain primary areas which need to be considered while managing product life cycle.

- ***Systems engineering (SE)*** is committed to achieving all requirements, particularly customer needs, and to coordinating the systems design process by involving all relevant disciplines. Reliability Engineering, a subset of Systems Engineering, is a key part of life cycle management.
- ***Product and aportfolio m2 (PPM)***is responsible for managing resource allocation, tracking progress, and developing plans for ongoing new product development initiatives (or in a holding status). Portfolio management is a technique that helps executives keep track of new product development and make trade-off decisions when allocating limited resources.
- ***Product design (CAx)*** is the process of developing a new product that a company will sell to its customers.
- ***Manufacturing process management (MPM)***is a set of technologies and procedures for defining how items will be made.
- ***Product data management (PDM)*** is concerned with capturing and maintaining product and/or service information throughout their development and usable life. Change management is a crucial component of PDM/PLM.

12.5 Process for PLM

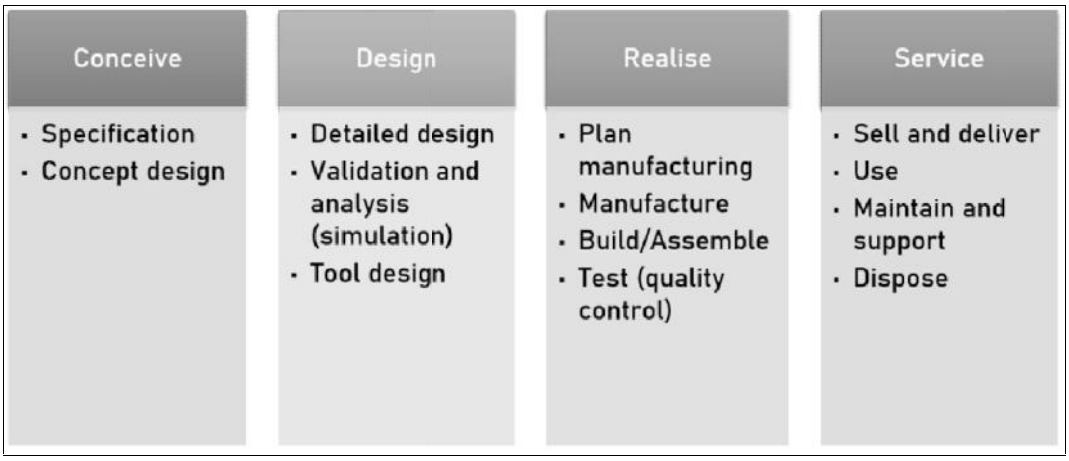

Fig 4: Steps in PLM

- **Conceive**

The first stage is to define the product needs based on the perspectives of the customer, company, market, and regulatory organisations. The primary technical parameters of the product can be defined using this specification. Parallel to this, the basic concept design work is completed, which defines the product's aesthetics as well as its primary functional characteristics. These procedures employ a variety of mediums, ranging from pencil and paper through clay models and 3D CAID computer-aided industrial design software.

The investment of resources into research or analysis-of-options may be incorporated in the conception phase in some concepts – for example, bringing the technology to a degree of maturity that allows it to move to the next phase. Life-cycle engineering, on the other hand, is an iterative process. It's always possible that things won't work out at any phase, forcing you to go back to the beginning - possibly all the way to conception or research. There are numerous instances to choose from. This phase of the New Product Development process collects and analyses market and technical risks using KPIs and a scoring mechanism.

- **Design**

The detailed design and development of the product's form begins here, moving through prototype testing, pilot release, and full product launch. It can also include existing product redesign and ramp for improvement, as well as planned obsolescence. CAD is the most common design and development tool. Simple 2D drafting or 3D parametric feature-based solid/surface modeling can

be used. Hybrid modeling, reverse engineering, KBE (knowledge-based engineering), NDT (nondestructive testing), and assembly construction are examples of such software.Many technical disciplines are covered in this stage, including mechanical, electrical, electronic, embedded software, and domain-specific, such as architectural, aerospace, and automotive. There is also the examination of the components and product assembly, in addition to the actual construction of geometry. CAE (computer-aided engineering) software, either integrated into the CAD programme or standalone, is used to perform simulation, validation, and optimization tasks.

Stress analysis, FEA (finite element analysis); kinematics; computational fluid dynamics (CFD); and mechanical event simulation are some of the activities that these are utilised for (MES). Dimensional tolerance (engineering) analysis is one of the activities that CAQ (computer-aided quality) is utilised for. Another work carried out at this stage is the sourcing of purchased components, which may be done through procurement systems.

- **Realize**

The production technique is specified once the design of the product's components is finalised. This covers CAD processes like tool design, which includes creating CNC machining instructions for the product's parts as well as specialised tools to make those parts using integrated or independent CAM (computer-aided manufacturing) software. This will also include process simulation tools for activities like casting, moulding, and die-press forming. CPM comes into play once the manufacturing method has been determined.This includes CAPE (computer-aided production engineering) and CAP/CAPP (computer-aided production planning) tools for factory, plant, and facility layout, as well as production simulation, such as press-line simulation and industrial ergonomics, and tool selection management.

After components are made, computer-aided inspection equipment and software can be used to compare their geometrical form and size to the original CAD data. Sales product configuration and marketing documentation work runs concurrently with engineering tasks. Transferring engineering data (geometry and part list data) to a web-based sales configuration and other desktop publishing tools is an example of this.

- **Service**

Managing "in-service" information is the final part of the lifecycle. This can include giving help and information to customers and service professionals for repairs and maintenance, as well as trash management and recycling. This may need the usage of software such as MRO (Maintenance, Repair, and Operations Management). Every product has an end-of-life date. Whether it's the disposal or destruction of physical goods or information, it's important to think about it carefully because it could be legislated and so have consequences.

Benefits of Product Lifecycle Management

- Improved product quality and reliability.
- Reduced prototyping costs.
- More accurate and timely requests for quote (RFQ) (solicitations from suppliers).
- Quick identification of sales opportunities and revenue contributions.
- Savings through the re-use of original data.
- A framework for product optimization.
- Reduced waste.
- Improved ability to better manage seasonal fluctuation management.
- Improved forecasting to reduce material costs.
- Maximized supply chain collaboration.

12.6 Benefits and Limitations of Product Life Cycle

Benefits of PLC

- ***Strategies–*** The number 1 benefit of Product life cycle is that it can help you to define the strategies which can be used based on the life cycle stage. So, if a product is in the growth stage, a lot of advertising and investments are required to keep it in the growth stage. Thus, strategizing becomes easier with the Product life cycle.
- ***Decision making –*** Whenever you are presented with multiple options, you need more data to take a decision on which direction to move in. Product life cycle helps managers with such decision making because it has the sales data as well performance over time data. The combination of these 2 can help managers take decisions faster.
- ***Forecasting sales becomes easier–*** With enough expertise, it is simpler to predict how a product will progress through its life cycle and, as a result, what sales levels it will accomplish.
- ***Competitive advantage–*** In addition to managing their own product life cycle, a marketing manager can also monitor the life cycle of competitors' products (provided they have the sales data). This gives a decent idea of what the competitors must be going through in terms of preparation. As a result, the company conducting the analysis has a competitive advantage because it is one step ahead of the competition.

Example: When Samsung introduces a new mobile phone, it anticipates that the phone will grow for one or two months, mature for three to six months, and then begin to decline as buyers look for new models. On average, a single device in the Samsung Smartphone portfolio lasts 2–3 years at most, while product series such as Galaxy or Note may last longer.

Limitations of the PLC

- ***Fluctuations in sales data–***One major problem in the Product life cycle is that the graph is completely dependent on sales data. Thus if there are fluctuations in the sales data, then the graph is useless and cannot be used to predict precisely the movement of products or the overall product rise and decline. Such fluctuations can arise due to production issues, seasonal sales of the product or due to any other reason.
- ***Delay in sales data–*** Another limitation for the product life cycle is that there is delay in collecting and analysing the sales data. Sales is generally recorded after the movement of goods and besides this, the actual movement of one product from one life cycle to another might be recorded months down the line. This is because of delay in analytics.
- ***Varying market conditions–*** There may be a variance in the sales data due to varying market conditions. Therefore products which are hit in one place, might not be hit in other regions or territories due to the differences in consumption patterns of those territories.
- ***Effect of other elements–*** There are various other elements which effect the product life cycle. Product itself is just one P amongst the 4 P's of marketing and there are three other elements such as Price, Place, promotions or even people and packaging. Overall Marketing, Logistics, Price etchave an effect on the sales of the product and hence the stages and their length in the PLC might vary based on these elements.
- ***Not applicable to brands or service–*** Product life cycle is generally applicable to products only and not applicable to brands or services. For example – Microsoft has so many products which have come and gone but this does not mean that the brand Microsoft is in Maturity stage or decline stage. Some products of the brand are growing whereas others are maturing or declining.

Applications of ProductLifeCycleCosting

- Selection of the most beneficial procurement strategy
- Determination of cost drivers
- Selection among various options
- Selection of sources of procurement
- Strategic decision-making and design trade-off
- Assessment of application of new technology
- Optimization of training needs
- Forecasting
- Improvement of comprehension of basic design associated parameters in product design and development
- Policy formulation regarding incentives.

Product Life Cycle Stages Analysis

A product has to pass through certain stages and certain features are there and all these features has certain stages. Let us discuss the actual stages in certain features.

Identifying Features	Stages			
	Introduction	Growth	Maturity	Decline
Sales	Low	High	High	Low
Investment Cost	Very High	High(Lower than intro stage)	Low	Low
Competition	Low or no competition	High	Very High	Low
Advertising	Very High	High	High	Low
Profit	Low	High	High	Low

Activities of Product Life Cycle

	Introduction	Growth	Maturity	Decline
Sales	Low sales	Rapidly rising sales	Peak sales	Declining sales
Costs	High cost per customer	Average cost per customer	Low cost per customer	Low cost per customer
Profits	Negative	Rising profits	High profits	Declining profits
Customers	Innovators	Early adopters	Middle majority	Laggards
Competitors	Few	Growing number	Stable number beginning to decline	Declining number

Strategies				
Product	Offer basic product	Offer product extensions, service, warranty	Diversify brand and models	Phase out weak items
Price	Use cost-plus	Price to penetrate market	Price to match or beat competitors	Cut price
Distribution	Build selective distribution	Build intensive distribution	Build more intensive distribution	Go selective: phase out unprofitable outlets
Advertising	Build product awareness among early adopters and innovators	Build awareness and interest in the mass market	Stress brand differences and benefits	Reduce to level needed to retain most loyal customers
Sales Promotion	Use heavy sales promotion to entice trial	Reduce to take advantage of heavy consumer demand	Increase to encourage brand switching	Reduce to minimal level

Fig 5: PLC Analysis

12.7 Product LifeCycleCostAnalysis

Life Cycle assessment, the investigation and valuation of the environmental impacts of a given product or service caused or necessitated by its existence.Whole Life Cost, 'the total cost of ownership over the life of an asset', also commonly referred to as "cradle to grave" or "womb to tomb".

Types of Costs

- ***Acquisition costs–***These are incurred between the decision to proceed with the procurement and the entry of goods or services for operational use.
- ***Operational costs–***These are incurred during the operational life of the asset or service.
- ***End life costs–***These are associated with disposal, termination or replacement of the asset or service. Asset may have a resale value on disposal rather than additional cost.

Costs in Product Life Cycle Costing

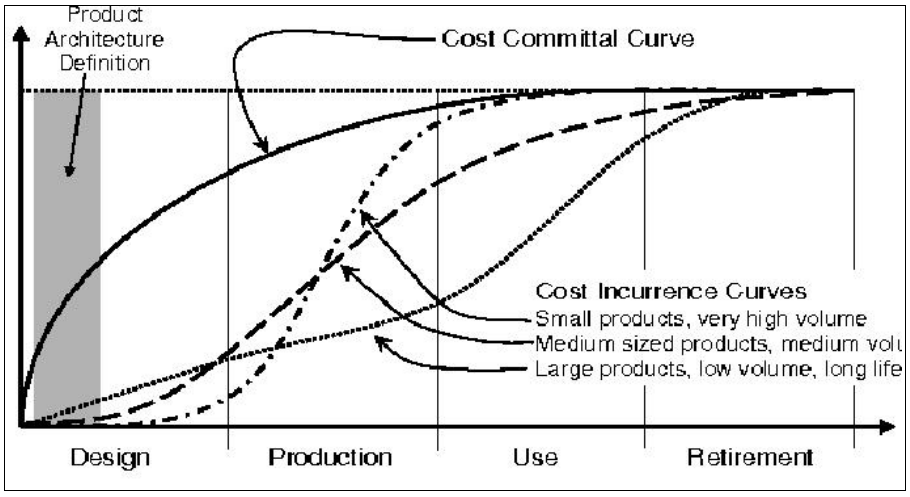

Fig 6: PLC Costs in Different Stages

PLC and Cost Control

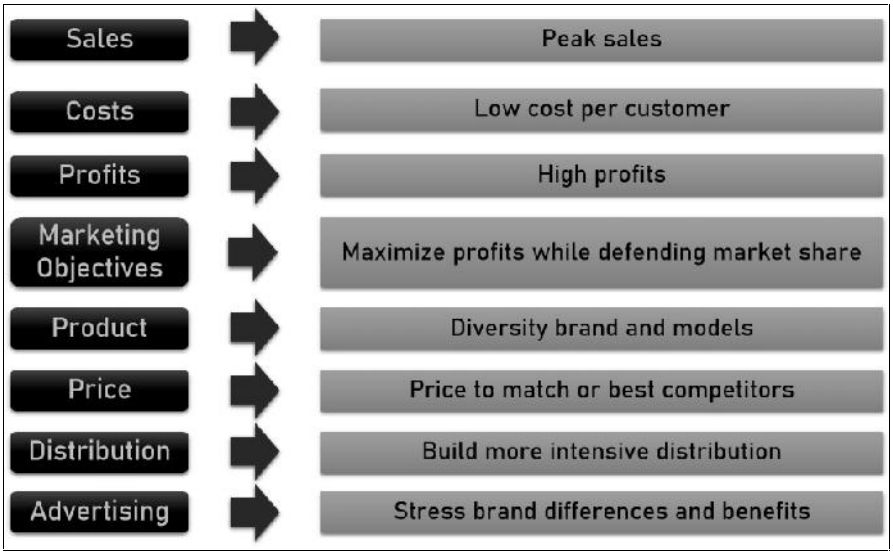

Fig 7: Cost Control in PLC

- **Introduction Stage**

This stage of the cycle could be the most expensive for a company launching a new product. The size of the market for the product is small, which means sales are low, although they will be increasing. On the other hand, cost of things like research and development, consumer testing and the marketing needed to launch the product can be very high, especially if it is a competitive sector.

- **Growth Stage**

This stage is typically characterized by a strong growth in sales and profits, because the company can start to benefit from economies of scale in production, the profit margins, as well as the overall amount of profit, will increase. This makes it possible for the businesses to invest more money in the promotional activity to maximise the potential of the growth stage.

- **Maturity Stage**

During the maturity stage, the product is established and the aim for the manufacturer is now to maintain the market share they have built up. This is probably the most competitive time for most products and businesses need to invest widely in any marketing they undertake. They also need to consider any product modifications or improvements to the production process which might give them a competitive advantage.

- **Decline Stage**

Eventually, the market for a product will start to shrink and this is what known as the decline stage. This shrinkage could be due to the market becoming saturated or because consumers are switching to a different type of product. While this decline may be inevitable, it may still be possible for companies to make some profit by switching to less expensive production methods and cheaper markets.

Cost Control

Cost control by management means a search for better and more economical ways of completing each operation. Cost control is simply the prevention of waste within the existing environment. This environment is made up of agreed operating methods for which standards have been developed.

12.8 EVC

Economic value to the customer is simply the purchase price that customers should be willing to pay for your product, given the price they are currently paying for the reference product and the added functionality and diminished costs provided by your product.

It's a measure of how much value an individual customer or customer segment, gets from using a company's products or services.

Task: What value do you get from using it in terms of productivity, connection to loved ones, enhanced relationships, increased knowledge, convenience, etc.?

Answer. That may be difficult to quantify (more on that below) but it's important for companies to try to understand because it affects how much you're willing to pay for their product (typically, the higher the EVC, the higher the price they can charge you) and how likely you are to continue to use it.

How do you calculate EVC?

It's not really a mathematical formula but stated as an equation it might look like this:

EVC = Tangible value the product provides + Intangible value the product provides

In order to understand how much value—both tangible and intangible—that you provide, you have to get a sense of what needs you're meeting or problem you're solving for the customer.

Kinds of needs for EVC/ Product

Consumers use products to fulfill many different kinds of needs. Let us illustrates four, using a Beer as an example:

- *Functional (or utilitarian) needs*. I buy a Sam Adams beer to quench my thirst.
- *Social needs*. I buy a Sam Adams beer to fit in with the people at my office holiday party.
- *Ego-expressive (or symbolic) need.* I buy a Sam Adams beer to make me look upscale and intelligent.
- *Recreational needs.* I buy a Sam Adams beer to have a prop to hold and something to fiddle with while I am at a bar.

How do CompaniesUse EVC?

Most companies use it to determine prices. If the EVC is higher than the price of the company charges, then consumers have an incentive to buy the product. It's appropriately priced. But if the EVC is lower, then they're likely to see the product as a waste of money. "Companies in that situation need to either lower the price or raise the EVC".

Example: Angiomax is a pharmaceutical product is produced by the Medicines Company. It's a blood-thinning drug used by surgical teams during angioplasties to reduce the likelihood of blood clots forming. In addition to that key benefit, Angiomax has potential negative outcomes as well, such as death, heart attack, need for a repeat angioplasty and major bleeding. By comparing the costs to the hospital of dealing with the negative outcomes to the positive benefits of using the drug, Medicines Co can decide which type of patient to target (it turns out that Angiomax has a very high EVC for high-risk patients) and a lower EVC for (low-risk ones) and how to price the drug to the hospitals.

"New product development teams also use EVC to make sure that they don't load up new products with unnecessary features and benefits that add variable costs but little value to the customer". Before designing a new product, the teams need to make sure they understand exactly what kind of value customers will get from specific features before they spend the money to bake them in.

The Common Mistakes Managers Make When Calculating EVC

There are two common mistakes:

- The first relates to the estimates that go into the calculation. It is far easier to measure the tangible value customers derive from a product, such as the productivity gains from better office lighting or gas savings from a higher efficiency vehicle, than it is to measure the intangible value. As a result, managers often overinflate or underestimate the numbers.
- The second mistake managers make in the calculation is failing to take into account switching costs. If a customer is currently using a competitor's product, even if they finds a product with a higher EVC, it may be hesitant to switch. These costs are real and often loom large in the minds of consumers. It's important that managers don't disregard or discount them.

Some managers believe that customers will understand the EVC of a product or service right away. But there's often a large difference between what the customer perceives to be the value and what the company believes the EVC to be. In fact, the perceived value is often times lower than the EVC because customers may be uninformed or they may not have done the math or they may be skeptical of the company's performance claims.

- Another mistake managers make is to assume that EVC is constant across different types of customers. Customers have varying needs and problems. If you calculate an average EVC across a group of heterogeneous customers, it may be missing critical differences. For example, there may be segments that are willing to pay more for the product because they have a greater need for it.

Calculating EVCs for each market segment allows managers to consider price customization strategies to deliver the right product at the right price to different customers based on how much value they will derive from it.

- The final mistake is treating EVC as fixed but it's not. One should constantly looking for ways to increase it, either through marketing or by adding new features and associated services, which improve the tangible value. EVC can also go down. When a company fails to add new features or otherwise keep up with competitors, its product can become less and less useful to its customers.

It's your job as a manager is to not only look for ways to improve the value but to guard against it falling.

Other Inputs to Pricing Decisions

Factors to consider in pricing include Economic Value added to Customers (EVC), competitor's pricing, and government regulations.Marketers can also study the effect on their products using Economic Value for the Customer (EVC).EVC is based on the insight that a customer will buy a product only if its value to them outweighs the value of the closest alternative.The utility of a product depends on its value to the customer minus its price.Add the reference price and differentiation values together to get EVC

Adding Value for Customers

Louis Vuitton is known for quality, luxury custom-made handbags.It is the link between a society's material requirements and its economic patterns of response.It is an organizational function and a set of processes for creating, delivering and communicating value to customers.

On the qualitative side, value is the perceived gain composed of an individual's emotional, mental and physical condition plus various social, economic, cultural and environmental factors.Identify the major attributes and benefits, such as ease of use or improved social standing, that customers value for choosing a product.

The Development of Value-Driven Firms

For a long time, the sole purpose of a company, is to make profits, at least in the minds of CEOs who normally focus on short term returns.Some people focus on customer service, others on

customer experience, others on lifetime value for a customer, many companies believe that having a customer service department is all it takes to create customer value.A new practice called Total Customer Value Management (CVM) involves a total focus upon the customer.

Value-Based Pricing

Value-based pricing seeks to set prices primarily on the value perceived by customers rather than on the cost of the product or historical prices. The principal difficulty is that the willingness of the customer to pay a certain price differs between customers, between countries, even for the same customer in different settings, so that a true value-based pricing at all times is impossible.

Also, extreme focus on value-based pricing might leave customers with a feeling of being exploited which is not helpful for the companies in the long run. Value-based pricing focuses entirely on the customer as a determinant of the total price/value package.

12.9 Experience Curve

An experience curve is an economic term which means that the more a firm produces of a particular good or service, the more it gains in efficiency. Thus, the cost of production decreases in proportion to the volume of products produced.

Experience CurveGraph

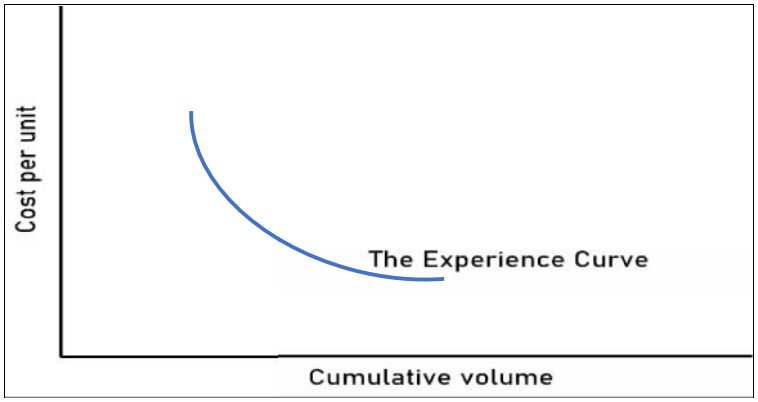

Fig 8: Experience Curve Graph

When representing an experience curve on a graph, the cost per unit of production is plotted on the Y-axis, while the cumulative production quantity is plotted on the X-axis. The unit cost of production includes the cost incurred by the company to add value to the product but excludes the cost of purchasing the materials. The curve shows that as the company increases its overall cumulative production quantity, the unit costs decline at a constant rate. The decline goes on without limit and is surprisingly consistent, even from one industry to another. In some cases, the absence of experience in some industries may be viewed as an outcome of mismanagement.

Implications of the Experience Curve

- A company that benefits from the effects of an experience curve enjoys several advantages over its competitors. As the business grows and lowers its unit production costs, it will gain a bigger market share over its rivals. It means that it will control a bigger portion of the market, increasing its profit potential. Since the company enjoys cost advantages over competitors due to the reduced cost of production, it can develop a penetrative pricing strategy by setting a low price to attract more customers to purchase its products. Other strategies used to increase market share include increasing investment in marketing, production capacity, hiring more sales personnel, etc.
- On the downside, the experience curve can sometimes come to an abrupt end when the competitors discover the strategy and replicate the cost reductions without making huge capital investments to gain experience. The experience curve can also come to an end when new technologies are introduced, and the company will need to create a new curve. It must

upgrade its processes by replacing the old experience curve with a new one that allows it to retain its competitive advantage.

Criticisms of the Experience Curve

- ***Complacency***

One of the criticisms of the experience curve is that it makes market leaders complacent with their achievements. By getting the benefits of experience curve effects, the companies become reluctant to continually innovate and lower the unit costs because of their experience. As a result, such companies become satisfied with their level of achievement. They begin resisting change, which may eliminate their cost benefits of the experience curve. Competitors that replicate the strategies and adopt the latest technologies will easily surpass the market leaders and achieve their own experience curve.

- ***Inability to measure its effects***

Another criticism of the experience curve is the inability to measure its effects. Most of the time, its effects are closely related to economies of scale, and it will be impossible to differentiate between the two. Economies of scale are the cost benefits gained due to an increased level of production, whereas experience curve effects are the cost benefits achieved through experience by performing repetitive tasks. Both concepts are intertwined, and it is difficult to differentiate between experience and increased level of production. It makes it difficult to measure the cost benefits of each function.

Summary

- Life cycle costing as its name implies, costs the cost object i.e. product, project, etc. over its projected life.
- Each product has a life cycle, which varies from few months to several years.
- Product cost, revenue and profit patterns tend to follow predictable courses through the product life cycle.
- Product life cycle costing involves tracing of costs and revenues of each product over several calendar periods throughout their entire life cycle.
- Product lifecycle management (PLM) is the process of managing the entire lifecycle of a product from its inception through the engineering, design, and manufacture, as well as the service and disposal of manufactured products.
- Life Cycle assessment, the investigation and valuation of the environmental impacts of a given product or service caused or necessitated by its existence.
- Cost control by management means a search for better and more economical ways of completing each operation.
- Economic value to the customer is simply the purchase price that customers should be willing to pay for your product, given the price they are currently paying for the reference product and the added functionality and diminished costs provided by your product.
- Value-based pricing seeks to set prices primarily on the value perceived by customers rather than on the cost of the product or historical prices.
- An experience curve is an economic term which means that the more a firm produces of a particular good or service, the more it gains in efficiency.

Keywords

- ***Market research:*** It means that market research will establish what product the customer wants, how much he is prepared to pay for it and how many he will buy.
- ***Prototype manufacture:*** From the drawings it will possible to manufacture a small number of the product.

- ***Tooling:*** Tooling up for production can mean building a production line costing several lakhs of rupees, building expensive jigs, buying special purpose machine tools or, in some other say, making a very large investment.
- ***Systems engineering (SE):***It focused on meeting all requirements, primarily meeting customer needs, and coordinating the systems design process by involving all relevant disciplines.
- M***anufacturing process management (MPM):*** It is a collection of technologies and methods used to define how products are to be manufactured.
- ***Acquisition costs:*** These are incurred between the decision to proceed with the procurement and the entry of goods or services for operational use.
- ***Operational costs:*** These are incurred during the operational life of the asset or service.
- ***End life costs:*** These are associated with disposal, termination or replacement of the asset or service. Asset may have a resale value on disposal rather than additional cost.
- ***EVC:*** Economic value to the customer is simply the purchase price that customers should be willing to pay for your product, given the price they are currently paying for the reference product and the added functionality and diminished costs provided by your product.

Self Assessment

1. The products have finite lives and pass through the cycles at _____ speeds.

A. Same

B. Increasing

C. Decreasing

D. Varying

2. _____ per unit varies as products move through their life cycles.

A. Profit

B. Research

C. Cost

D. None of above

3. _____ will establish the customer wants, how much to pay for it and how many will buy.

A. Accounting research

B. Market research

C. Customer research

D. All above

4. Profits starts declining near the _____of the growth phase.

A. Start

B. Development

C. Research

D. End

5. Each phase of product life cycle poses different _____ that give rise to different strategic actions.

A. Threats

B. Opportunities

C. Both a and b

D. None of above

6. Competition during growth stage is _____.

A. Very low

B. Low

C. Very High

D. High

7. _____ is a tool that assists management in tracking progress on new products.

A. Portfolio management

B. Product management

C. Project management

D. None of above

8. Product _____ is the process of creating a new product to be sold by a business to its customers.

A. Design

B. Research

C. Pattern

D. Technique

9. The final phase of the lifecycle involves managing _____ information.

A. Out service

B. Of service

C. On service

D. In service

10. _____ is recorded after the movement of goods and the actual movement of one product from one life cycle to another.

A. Revenues

B. Profits

C. Sales

D. Cost

11. The growth stage is high during_____.

A. Sales

B. Profit

C. Advertising

D. All above

12. _____ costs are incurred between the decision to proceed with the procurement and the entry of goods or services for operational use.

A. Acquisition

B. Operational

C. Procurement

D. Entry

13. Operational costs are incurred during the _____ life of the asset or service.

A. Infinite

B. Operational

C. Finite

D. Actual

14. Which stage of the cycle is the most expensive for a company?

A. Decline

B. Maturity

C. Growth

D. Introduction

15. _____ by management means a search for better and more economical ways of completing each operation.

A. Cost technique

B. Cost unit

C. Cost control

D. Cost centre

16. _____ to the customer is simply the purchase price that customers should be willing to pay for your product.

A. Addition value

B. Value added

C. Economies of value

D. Economic value

17. EVC = _____ value the product provides + _____value the product provides.

A. Tangible; Intangible

B. Direct; Indirect

C. Fixed; Variable

D. None of above

18. If the EVC is _____, than the price of the product that company charges, then consumers have an incentive to buy the product.

A. Lower

B. Higher

C. Same

D. None of above

19. It is far easier to measure the _____ value customers derive from a product.

A. Flexible

B. Fixed

C. Intangible

D. Tangible

20. An _____ is an economic term which means more a firm produces, the more it gains in efficiency.

A. Uniform curve

B. Economic curve

C. Experience curve

D. Efficiency curve

Answers for Self Assessment

1.	D	2.	A	3.	B	4.	D	5.	C
6.	D	7.	A	8.	A	9.	D	10.	C
11.	D	12.	A	13.	B	14.	D	15.	C
16.	D	17.	A	18.	B	19.	D	20.	C

Review Questions

1. Define Product Life Cycle and its phases in detail?
2. Explain various stages of product life cycle with help of an example?
3. What do you mean by Product Life Cycle Costing and its benefits to organizations?
4. What is PLM? Discuss kits primary areas used in business?
5. Discuss the process of product life cycle management in detail?
6. Discuss the pros and cons of Product life cycle ?
7. How an user can analyze the product life cycle cost as per various stages?
8. Relate the cost control and product life cycle with help of an example?
9. Define EVC? How the companies use EVC and what common mistakes managers make while using it?
10. Discuss experience curve and its implications?

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Unit 13: Activity-Based Costing

CONTENTS

Objectives

After studying this unit, you will be able to:

- discuss the problems of the traditional costing system.
- explain the activity-based costing system.
- compare traditional and activity-based costing.
- execute the five steps of activity-based costing to determine product costs.
- comment on the importance and use of activity-based costing in the complex business environment.

Introduction

The main objective of any costing system is to determine the cost of a product or service scientifically. For facilitating the calculation, costs are divided into direct and indirect. Direct costs are the costs that are traceable to the products/services offered. On the other hand, indirect costs, also called 'overheads,' are not traceable to the products/services. Hence these costs are first identified, classified, allocated, apportioned wherever allocation is not possible, reapportioned, and finally absorbed in the products/services. Charging the direct costs to the products is comparatively a simple procedure and can be done with remarkable accuracy. However, the indirect costs present problems in charging them to the products, and there is a possibility of distortion of costs though charging them is pretty logical. It is one of the limitations of the traditional costing system. For example, one of the methods of absorption of overheads is direct labor cost. This method is quite satisfactory when the overhead costs of indirect activities are a small percentage compared to the direct labor component in the actual making of products. However, the increased technology and automation have considerably reduced direct labor, so the indirect activities have assumed greater importance. Therefore, using direct labor to absorb the overheads can lead to distortions in the costs. Distortions in the costs resulting in incorrect cost calculations may lead to following wrong decisions.

- Errors in fixation of selling prices.
- Wrong decisions regarding deciding of product mix.
- Ignoring customer orientation.

- Missing of profitable opportunities.

To overcome the limitations of traditional costing systems, activity-based Costing has been introduced. Before we proceed to the other aspects of Activity-based Costing, let us see the limitations of the traditional costing system. A brief mention of the same has already been made in the above paragraph. Some more points are discussed below

13.1 Traditional Costing System

Traditional costing is a costing method used to allocate overhead costs based on a single cost driver according to the consumption of a volume of production resources. This single cost driver can be based on machine hours, labor hours, etc., and is used for all the different activities.

As per the traditional costing system, Material cost, labor cost, and overhead constitute the total cost of a product or service. Overheads are allocated to the products on volume-based measures, e.g., labor hours, machine hours, units produced.

Limitations of Traditional costing system

- Focuses upon product costing by tracing costs to the product and allocating costs through cost centers.
- Methods of Allocation are inadequate to prorate common costs.
- It can result in cost distortion, i.e., either under-costing of product or over-costing of product.

The traditional costing system's above limitations are overcome by the Activity-Based Costing (ABC) system.

13.2 Activity-Based Costing System (ABC): Concept

It refines a costing system by identifying individual activities as the fundamental cost objects. ABC systems identify activities in all functions of the value chain, calculate costs of individual activities, and assign costs to cost objects such as products and services based on the mix of activities needed to produce each product or service to help make strategic decisions.

Let's discuss how through the following case:

Case Study

Mr. John sold 100 Pizza and 100 burgers at his 'Fast food joint' in October. He purchased the pizza base for 20 per unit and Bun for 10 per unit. There is an electricity bill of 2,000 for October.

- What will be the cost of 100 pizzas and 100 burgers?

Solution:

As per the traditional costing system, the total cost will be calculated as follows:

Description	**Pizza (100 units) in ( )**	**Burger (100 units) in ( )**
Material cost	2,000	1,000
Electricity bill (2000 /200 units)*100 units	1,000	1,000
Total cost	**3,000**	**2,000**

Point of Discussion

- Is it fair to allocate electricity bills equally to Pizzas and Burgers based on the number of units produced?

Solution: No, it will distort the costing results as it has over-priced the burgers and underpriced the Pizzas. Let's check how?

Assume that 800 units of electricity are used to make 100 Pizzas and 200 units of electricity are used to make 100 burgers.

In such a case, it is the direct inference that the traditional costing system has distorted the costing results. Thus, it is activity-based costing (ABC) system that will provide a better alternative. Let's discuss how costing results are improved through an activity-based costing system.

As per the ABC system, Apportionment of Electricity Cost will be based on electricity units consumed for each product, and the total cost of 100 Pizzas and 100 Burgers will be calculated as follows:

Description	**Pizza (100 units) in ( )**	**Burger (100 units) in ( )**
Material cost	2,000	1,000
Electricity bill	(2000*800/1000) =1600	(2000*200/1000) =400
Total cost	**3,600**	**1,400**

Point of Discussion

- Is it a fair apportionment of electricity based on consumption of units by both products?

Solution: Definitely yes, as it has not resulted in cost distortion of Pizzas and Burgers. Neither of them is underpriced or overpriced.

Source: Author's Source

Activity-Based Costing System (ABC): Key terms

- **Activity**

An activity is an event, task, or unit of work with a specified purpose.

 *Examples*: Designing products, setting up machines, operating machines, and distributing products. More informally, activities are verbs; they are things that a firm does.

- **Cost Object**

A cost object is an item for which a cost is compiled.

 *Examples*: A product, product line, service, project, customer, distribution channel, or activity. Cost objects are used in activity-based costing analyses as the focal point of cost accumulations. A close review of cost objects is also helpful in managing costs throughout an organization.

- **Cost Driver**

A cost driver is any factor or activity with a direct cause and effect relationship with the resources consumed.

Examples

Business functions	Cost Drivers
Distribution	• Number of units distributed • Number of customers
Marketing	• Number of advertisements • Number of sales personnel • Sales revenue
Research and Development	• Number of research projects • Personnel hours on a project
Customer Service	• Number of service calls • Number of products serviced • Hours spent on servicing products
Design of products, services, and procedures	• Number of products in design • Number of parts per product • Number of engineering hours

13.3 Activity-Based Costing (ABC)

A costing methodology for more precisely allocating overhead costs by assigning them to activities.Once costs are assigned to activities, the costs can be assigned to the cost objects that use those activities. The system can be employed for the targeted reduction of overhead costs. ABC works best in complex environments, where there are many machines and products and tangled processes that are not easy to sort out. Conversely, it is of less use in a streamlined environment where production processes are abbreviated.

According to CIMA, "An approach to the costing and monitoring of activities involves tracing resource consumption and costing final outputs. Resources are assigned to activities and activities to cost objects based on consumption estimates. The latter utilize cost drivers to attach activity costs to outputs."

- **Activity-Based Costing (ABC): Rationale**

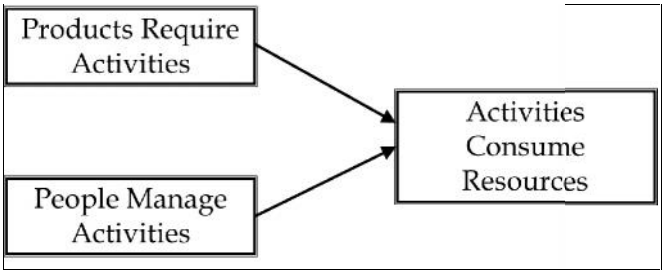

Fig 1: Rationale of ABC

Difference between Activity-Based Costing and Traditional Costing

Basis	Activity-Based Costing	Traditional Costing
Primary Focus	It uses multiple cost drivers for multiple activities.	It uses identical cost drivers for multiple activities.
Application	It is challenging to implement and requires time and effort.	It is straightforward to implement.
Scope	It covers product costs only.	It covers both products as well as period costs.
Management Use	The values can be used in external financial statements.	The values cannot be used in reports of external reporting.
Effectiveness of operations	It enhances management knowledge about activities related to the production process.	It does not provide the opportunity to identify any specific reasons for the cost incurred.

Difference between ABC and Traditional Costing in detail:

- ***Primary Focus:*** The primary focus of traditional costing is the apportionment of overhead costs to the activities of production. Irrespective of the specific allocation of resources, traditional costing sets a single metric for every activity involved in the production and allocates costs based on the consumption of that metric. Although activity-based costing is also used for cost allocation, it adopts a different approach. Under activity-based costing, appropriate cost drivers are determined for every activity, and the cost is then allocated according to these cost drivers.
- ***Application:*** The traditional costing method is easy to implement as a single cost driver is set for all activities, and overheads are divided into fixed and variable overheads. Activity-based costing is challenging to implement because choosing a suitable basis for absorption and absorbing overheads on that same basis is a complicated and time-consuming exercise. Additionally, in some cases, it becomes difficult to determine a reasonable basis for allocating an activity.
- ***Scope:*** Traditional costing can only be used for the absorption of manufacturing overheads. Still, activity-based costing can effectively allocate manufacturing and non-manufacturing overheads like selling, administration, etc. It is because activity-based costing considers the actual center of cost for the period cost and then allocates it.
- ***Management use:*** The figures extracted by traditional costings can be included in the cost figure of the statement of profit or loss because it only inculcates product costs. Still, activity-based costing can only be used for management purposes. The main reason is that activity-based costing is based on the user's subjectivity, and two users may not find a cost metric suitable for the same activity. However, activity-based costing can be actively used by managing a company to make better cost pools and allocate costs more accurately.
- ***Effectiveness of operations:*** Activity-based costing improves business processes in the long term as the company's management needs to investigate deeply into production activities and related costs. This highlights the reasons for certain costs being incurred, which can ultimately help control and manage these costs. Traditional costing does not compel management to look for different cost centers, so it becomes difficult for management to gather incremental data about production activities.

Case Study:

Bira Co. manufactures fizzy drinks and plans the production of 20,000 drinks for July. The direct labor hours estimated for July are 900, direct machine hours are 600, and the estimated overheads are $6,000. These overheads can be segregated into three

categories;$1,000 for direct supervision for 350 machine hours, $3,500 for logistics for 540 direct labor hours, and $1,500 for 30 production set-ups.

Required: Calculate overhead rates per traditional costing system and activity-based costing system and infer the differences.

Solution:

As per the Traditional costing system

The cost driver to produce drinks would be based on a single activity level, labor hours, or machine hours by applying traditional costing.

So,

Predetermined overhead rate (labor hours)

= $6,000/900 = $6.7 per direct labor hour

Predetermined overhead rate (machine hours)

= $6,000/600 = $10 per machine hour

Therefore,

For every labor hour spent, a cost of $6.7, or for every machine hour spent, a cost of $10 would be added to the cost of a drink.

As per activity-based costing system:

If we apply activity-based costing, this technique will segregate and identify the most suitable cost driver for the incurred overheads:

Activity	Cost Driver
Direct Supervision	350 Machine Hours
Logistics	540 Labour Hours
Production Setups	30 Setups

Thus,

Predetermined overhead rate (direct supervision)

= $1,000/350 = $2.9/hour

Predetermined overhead rate (logistics)

= $3,500/540 = $6.5/hour

Predetermined overhead rate (production set-ups)

= $1,500/30 = $50/hour

So, the overheads will be allocated at a rate of $2.9 per machine hour spent, $6.5 per labor hour, and $50 per production set up.

https://quizlet.com/573253831/cost-accounting-exam-1-flash-cards/

Pre Requisities of Activity-Based Costing

- ***Formation of Cost Pools-***It is another name given to a cost centre and, therefore, an activity cost centre may also be termed as an activity cost pool.

- ***Identification of Activities-***The number of activities in production may differ from product to product and organisation to organisation. The number of activities in the organisation should neither be too large or too small. An activity may be a very small activity but it should justify the cost incurred for it. An activity may be a single activity or combination of several activities. Cost-benefit analysis of each and every activity may be undertaken to judge the worthiness of activity.
- ***Identification of Cost Object-***Cost pool means grouping of total cost for each major activity. It simply means allocation and apportionment of various costs to a particular activity or group of activities. For example, total cost of placing orders may be grouped under ordering cost.
- ***Determination of Cost drivers-***Cost drivers are that activities which determine the cost. These activities result in occurrence of Overhead cost. Thus, cost driver is a factor or an event which results in consequential change in the total cost of the object.

What is a cost pool?

Activity cost pools are groups of individual costs influenced by the same cost drivers, which control the amount of costs incurred. It represents a group of various cost items. It consists of costs that have the exact cause and effect relationship—for example, machine set-up.

What is Activity-based Management?

Activity-based Management is a tool of management that involves analyzing and costing activities to improve efficiency and effectiveness. Though it is closely related to Activity-based Costing, it still differs from its primary goal. The activity-based Costing focuses on activities with the object of measuring the cost of products/services. It tries to compute the cost as accurately as possible. On the other hand, activity-based Management focuses on managing the activities themselves. In activity-based Costing, resources are traced to the activities to compute the costs, while in activity-based Management, resources are traced to activities for evaluation of the activities themselves. In other words, efforts are made to improve the activities further. Thus, activity-based Management is a set of actions that management can take, based on information from an activity-based costing system, to increase/improve profitability.

13.4 Steps Involved in Activity Based Costing

- **Step 1. Identify activities required to manufacture products.**

The organization needs to undertake an in-depth analysis of the operating processes of each responsibility centre. Each process might consist of one or more activities required to produce an output.

- **Step 2. Determination of Overhead Cost Drivers.**

It involves tracing costs to cost objects to determine why the cost occurred. Costs can be categorized in three ways:

i. Direct – costs that can be traced directly to one output. For example, the wood and paint that it takes to make a chair.

ii. Indirect – costs that cannot be allocated to an individual output, that is, they benefit two or more outputs, but not all outputs—for example, maintenance costs or storage costs.

iii. General/administration – costs that cannot be associated with any product or service. These costs are likely to remain unchanged, whatever output is produced—for example, salaries of administration staff, security costs, or depreciation.

- **Step 3. Allocation of overhead cost to cost pools.**

Relate the overheads to the activities, both support and primary, that cause them. It creates 'cost pools' or 'cost buckets.' It will be done using resource cost drivers that reflect causality.

- **Step 4. Calculate a predetermined overhead rate for each activity.**

Calculate activity cost driver rates for each activity, just as an overhead absorption rate would be calculated in the traditional system.

Determination of Cost under ABC

Let's take a small case to understand the steps mentioned above and determine overhead cost accordingly:

Case Study

Assume that a company manufactures circuits and management decides to install an ABC system. Management decides that all overhead costs only have three cost drivers –

- Direct labor hours
- Machine hours
- Number of purchase orders

The management provided further following overhead costs incurred to manufacture circuits.

General Ledger	
Payment of Payroll taxes	1,000
Machine maintenance	500
Purchasing Dept. labor paid	4,000
Fringe benefits	2,000
Purchasing Dept. Supplies	250
Equipment depreciation	750
Electricity bill paid	1,250
Unemployment insurance	1,500
Total	11,250

Let's implement the ABC system and calculate overhead rates and cost accordingly.

Solution:

Step 1: Identification of main activities

Activities	
Payment of Payroll taxes	₹ 1,000
Machine maintenance	₹ 500
Purchasing Dept. labor paid	₹ 4,000
Fringe benefits	₹ 2,000
Purchasing Dept. Supplies	₹ 250
Equipment depreciation	₹ 750
Electricity bill paid	₹ 1,250
Unemployment insurance	₹ 1,500

Total overheads = ₹ 11,250

Step-2: Determination of Overhead Cost Drivers

Management decides that all overhead costs only have three cost drivers—

- Direct labor hours
- Machine hours
- Number of purchase orders

Base	Product A	Product B	Total
Direct labor hours	400	600	1,000
Machine hours	100	150	250
Purchase orders	50	50	100

Step-3: Allocation of overhead cost to cost pools

a) Direct Labour

Payroll Taxes	1,000
Fringe Benefits	2,000
Unemployment insurance	1,500
Total	4,500

b) Machine Hours

Machine Maintenance	500
Equipment depreciation	750
Electricity	1,250
Total	2,500

c) Number of Purchase orders

Purchasing Dept. Labor	4,000
Purchasing Dept. Supplies	250
Total	4,250

Step-4: Allocation of cost as per activity cost driver rate

Base	Product A ( )	Product B ( )
Direct labor hours (400:600)	(4500*400/1000) =1800	(4500*600/1000) =2700
Machine hours(100:150)	(2500*100/250) =1000	(2500*150/250) =1500
Purchase orders(50:50)	(4250*50/100) =2125	(4250*50/100) =2125
Total	4925	6325

The actual overhead allocated was 4,925 + 6,325 = 11,250 overhead applied.

Now, Let's see what if we had allocated the overhead in this company using traditional cost accounting allocation.

Let's assume the base is direct labor hours

- What would be the amount allocated to each product?

The total amount of overhead is 11,250. Total direct labor hours are 1,000 and it is used for allocation purpose.

Allocating overhead using direct labor hours only under traditional costing:

Product A: 11,250 x 400 hours / 1000 hours = 4,500

Product B: 11,250 x 600 hours / 1000 hours = 6,750

Total overhead applied 4500 + 6750 = 11,250

Let's compare the overheads cost allocation as per traditional and activating based costing as follows:

	Product A	**Product B**	**Total**
Traditional Method	4,500	6,750	11,250
Activity Based Costing	4,925	6,325	11,250
Difference	- 425	425	-0-

Point of Discussion from above comparison.

- Which costing system is more accurate or Why?

Source: Author's Source

13.5 Pros and Cons of Activity Based Costing

Pros of ABC system

- It is a more realistic product cost- based on a cause-and-effect relationship.

- It helps in making better pricing decisions and making better pricing policies by supplying accurate cost information.
- It is a relatively more realistic approach as overhead allocation is done on a logical basis.
- It assists in better control of costs as it focuses on controlling unit cost rather than just total cost.
- It provides greater cost efficiency as it helps to identify non-value-added activities which facilitate cost reduction.
- It is very much helpful for an organization with multiple products.
- It highlights problem areas that require the attention of the management.

Cons of ABC system

Though this system is quite adequate, it suffers from some limitations. These limitations are given below:

- Activity-based costing is a complex system and requires a lot of records and tedious calculations.
- For small organizations, a traditional cost accounting system may be more beneficial than Activity-based Costing due to the simplicity of operation of the former.
- Sometimes it isn't easy to attribute costs to single activities as some costs support several activities.
- There is a need for trained professionals who are limited in number.
- This system will be successful if there is total support from the top management.
- A substantial investment of time and money is required for the implementation of this system.
- It is relatively expensive to use.
- It is a time-consuming system.
- Some arbitrary allocations may continue in the activity-based costing system as well.

Summary

- The main objective of any costing system is to determine the cost of a product or service scientifically.
- For facilitating the calculation, costs are divided into direct and indirect. Direct costs are the costs that are traceable to the products/services offered. On the other hand, indirect costs, also called 'overheads,' are not traceable to the products/services.
- To overcome the limitations of traditional costing systems, activity-based costing has been introduced.
- Activity-based Costing is cost attribution to cost units based on the benefit received from indirect activities, e.g., ordering, setting up, assuring quality.
- It is very much valuable for the organization with multiple products.
- Activity-based budgeting is different from traditional budgeting in the sense that it provides a strong link between the objectives of the organization and the objectives of a particular activity
- The limitations of the ABC system are that it is very costly and cannot be applied to all companies.
- The ABC system as a costing tool to manage costs at the activity level is known as Activity-Based Cost Management (ABM).

- ABM is a discipline that focuses on the efficient and effective management of activities as the route to continuously improving the value received by customers. It utilizes cost information gathered through ABC.

Keywords

- ***Activity:*** Activity refers to an event that incurs cost.
- ***Activity-based costing:*** It is a technique that involves the identification of cost with each cost-driving activity and making it the basis for apportionment of costs over different cost objects/products/jobs/customers or services.
- ***Activity-based Management:*** It is a tool of management that involves analyzing and costing activities to improve efficiency and effectiveness.
- ***Cost Driver:*** It is a factor that causes a change in the cost of an activity. There are two categories of cost drivers.
- ***Resource cost driver:*** it is a measure of the quantity of resources consumed by an activity. It is used to assign the cost of a resource to an activity or cost pool.
- ***Activity cost driver:*** It measures the frequency and intensity of demand placed on activities by cost objects. It is used to assign activity costs to cost objects.
- ***Cost Object:*** It is an item for which cost measurement is required—for example, a product, a service, or a customer.
- ***Cost Pool:*** It represents a group of various cost items. It consists of costs that have the same cause and effect relationship—for example, machine set-up.

Self-Assessment

1. Activity-based costing is _____.

A. Uses a plant-wide overhead rate to assign overhead
B. Is not expensive to implement
C. Typically allocates overhead costs to the products based on consumed activities
D. Uses multiple activity rates

2. A/An ……. is any factor or activity with a direct cause and effect relationship with the resources consumed.

A. Cost Driver
B. Cost unit
C. Cost Activity
D. Cost Pool

3. A "project" will be treated as following as per Activity Based Costing system.

A. Cost Driver
B. Cost Object
C. Cost Activity
D. Cost Pool

4. ITC has the total purchase requisition cost of Tobacco worth 3,00,000. It is one of the critical 'activities' while producing "Gold Flake," its oldest Cigarette brand. Identify which of the following will serve as the most appropriate 'cost driver' for this activity?

A. Number of machines set-ups
B. Number of times orders placed
C. Direct labor hours
D. Number of customers served

5. Which of the following characteristics would indicate that a company would benefit from switching to activity-based costing?

A. Only one homogenous product is produced continuously
B. The existing cost system is reliable and predictable
C. Overhead costs are high and increasing with no apparent reason
D. The costs of implementing ABC outweigh the benefits

6. Which of the following is a limitation of activity-based costing?

A. Each significant activity accumulates costs
B. A variety of activity measures are used
C. All costs in an activity cost pool pertain to a single activity
D. Activity-based costing relies on the assumption that the cost in each cost pool is strictly proportional to its cost measure

7. Ola Cabs has built its business on one basic principle: "Providing best customer care service" to its customers. Thus, it invests 11 lakhs on average basis each year to provide instant customer care services to its customers. Identify which of the following will act as the most appropriate 'cost driver' for this activity?

A. Number of Service Calls
B. Number of Research Projects
C. Number of Advertisements
D. Sales revenue

8. ……. refers to an event that incurs cost.

A. Cost Driver
B. Cost Pool
C. Activity
D. Cost Object

9. …… represents a group of various individual cost items. It consists of costs that have the same cause-effect relationship.

A. Cost Driver
B. Cost Pool
C. Activity
D. Cost Object

10. The following is/are the pre-requisites of implementing an activity-based costing system.

A. Identification of Activities
B. Identification of Cost Object
C. Determination of Cost drivers
D. All of above

11. Identify which of the following will act as the most appropriate 'cost driver' for the "Design of Product" activity?

A. Personnel Hours on a Project
B. Number of parts per product
C. Hours spent on servicing products
D. Number of customers

12. Identify which of the following will act as the most appropriate 'cost driver' for the "Distribution" activity?

A. Personnel Hours on a Project
B. Number of parts per product
C. Hours spent on servicing products
D. Number of customers

13. Identify which of the following will act as the most appropriate 'cost driver' for the "Research and Development" activity?

A. Personnel Hours on a Project
B. Number of parts per product
C. Hours spent on servicing products
D. Number of customers

14. Identify which of the following will act as the most appropriate 'cost driver' for the "Customer Care" activity?

A. Personnel Hours on a Project
B. Number of parts per product
C. Hours spent on servicing products
D. Number of customers

15. Amul has gained the top-of-the-mind positioning because it is the first brand that comes to mind when talking of Ice cream, milk, cheese, butter, or any other milk-based products. It invests a reasonably good amount in the marketing and positioning of its brand and products each year. Identify which of the following will act as the most appropriate 'cost driver' for its marketing activities?

A. Number of Service Calls
B. Number of Research Projects
C. Number of Advertisements
D. Sales revenue

Answers for Self Assessment

1.	C	2.	A	3.	B	4.	B	5.	C
6.	D	7.	A	8.	C	9.	B	10.	D
11.	B	12.	D	13.	A	14.	C	15.	C

Review Questions

1. What is activity-based costing? Why is it needed?
2. Discuss the steps in applying activity-based costing in a manufacturing company.
3. Differentiate between traditional costing and activity-based costing.
4. Discuss the limitations of the traditional costing system.
5. Give the pre-requisites of the activity-based costing system.
6. What are the benefits of activity-based costing?
7. Enumerate the limitations of activity-based costing.
8. Discuss cost pool and cost driver?
9. What is disctinguish between ABC and ABM?
10. Why the companies prefer to adopt ABC instead of Traditional costing?

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Unit 14: Uniform Cost and Inter-Firm Comparison

CONTENTS

Objectives

After studying this unit, you will be able to:

- appreciate the role of uniform costing in real world.
- cognize various considerations for applying uniform costing.
- compare the significance of inter firm comparison for companies.

Introduction

Uniform Costing is not a separate costing method. In fact, uniform costing is defined as the use of the same costing ideas and/or techniques by a group of companies. The primary concept behind uniform costing is that different companies in the same industry should use the same costing method and use the same concepts and practises universally for better cost comparison and the common good.The ideas and procedures for compiling, analysing, allocating, and absorption of overheads vary from one company to the next in the same industry; nevertheless, if everyone follows a standard or uniform pattern, it aids in cost control and reduction. As a result, each industry's member unit must use a consistent way of costing.

It is a method of assessing the effectiveness, efficiency, expenses, and profits of businesses in a given industry. It is the voluntary exchange of information/data about costs, pricing, profits, productivity, and general efficiency among firms involved in comparable types of activities with the goal of improving efficiency and identifying flaws. When uniform costing is used, such a comparison will be available.An inter-firm comparison reveals the efficiency of production and sales, the appropriateness of profits, organisational weaknesses, and so on, and so requires prompt appropriate action from the firm's management. Inter-firm comparisons may allow management to question the standards it has established for itself and to improve them in light of new knowledge received from more efficient units. A comparison like this might be done in the electrical sector, printing companies, cotton spinning companies, pharmaceuticals, cycle manufacturing, and so on.

14.1 Uniform Costing

Uniform costing is described as "the adoption of the same costing approach and techniques by several undertakings." In other words, it is a costing methodology or process in which different firms in a field or industry use a similar costing system to create cost data that is as comparable as possible.

The CIMA, London has defined uniform costing as 'the use by several undertakings of the same costing principles and/or practices.' It simply denotes a situation in which a number of a undertakings or units of an undertaking use the same costing principles.

Requisites for Successful Installation of a Uniform Costing System

There are some pre requisites for successful installation of Uniform Cost System. Let us discuss:

- There should be understanding, mutual trust and cooperation among the participating units.
- There should be free exchange of ideas and methods.
- There should be no rivalry or jealousy amongst the participating members.
- The bigger units should be prepared to share their experience with smaller units so that the latter may improve their know-how and performance.
- There should be uniformity of interest and the participating members should realize the significance and use of uniform methods.
- There should be no sense of competitiveness among the member units.
- Member units should put aside their differences and work toward an unified costing scheme.
- A standard costing plan and a uniform cost manual, both of which contain cost accounting plans, should be implemented. It's akin to a budget guide. It acts as a guide for participants in order to ensure that the costing system, principles, and procedures are all consistent.
- If the central organisation recommends the Straight Line Approach for computing annual depreciation on buildings, and this method is utilised by all participating enterprises, the method of determining annual depreciation on buildings is considered to be uniform, and
- There is uniformity in the process of determining the amount of annual depreciation on machinery if all participating enterprises adopt the Reducing Balance Method to compute it.

14.2 Need of Uniform Costing

- Uniform accounting does not have to be used in all sorts of businesses. Those businesses that want to put in a proper costing system should do so. Because there is no one-size-fits-all costing methodology that can be used to all types of projects, each one develops its own way.
- As a result, costing methodologies differ from one concern to the next. In fact, even within the same industry, the cost-accumulation technique used by different types of businesses can differ.
- However, under unusual circumstances, two companies may use the same costing approach. They might also adhere to the same guidelines and practises. However, as Dobson points out, the resemblance could be the consequence of chance rather than intent.

Example: One issue is adopting a uniform rate of overhead absorption while another is implementing departmental rates. As a result, the expenses of the two businesses fluctuate artificially and become incomparable. As a result, it is impossible to compare the costs of numerous businesses in the same industry, or even different businesses in similar industries.

- Individual ventures' product costs within an industry differ only as a function of the costing methods and ideas used. Different techniques of appraising material issues may result in cost discrepancies..

- Wage disparities can also be caused by wage payment procedures and incentive systems. Cost discrepancies can also be caused by different methods of charging overhead and absorption rates.
- Various pricing structures of different undertakings for the same product will result in different pricing if the cost basis is used to establish the selling price. In such a setting, a company's competitive power is what allows it to survive in the long run. From the standpoint of customers, proprietors, creditors, and the country as a whole, a scenario like this is unfavourable.
- The requirement for uniform costing arises in this setting. Uniform costing aims to standardise cost accounting methods and principles by requiring many businesses to use the same costing methods, principles, and procedures. As a result of this uniformity, it is possible to compare costs and set a selling price.

14.3 Objectives of Uniform Costing

Uniform Costing is adopted to achieve certain objectives,that are used by organizations to get better results:

- To provide a basis for cost comparison between different undertakings in the same industry.
- To help trade associations in regulating production capacity and deciding on pricing policy.
- To provide government with information for fixation and regulation of prices.
- To ensure that product prices are not arbitrarily fixed but on reliable cost data.
- To give the government and other regulatory organisations with accurate cost information in order to fix product pricing.
- To create consistency in costing methods and procedures so that legitimate cost comparisons may be made between different divisions of an industry or within the same company.
- To allow each unit to assess its own efficiency against industry standards and remove inefficiencies.
- As a foundation for competitive but non-destructive bidding.
- To improve labour and machine performance, as well as production methods and techniques;
- To assist trade associations in regulating production capacity and formulating pricing policies; and
- To serve as a foundation for government subsidies or grants that require similar costing systems to ensure equitable distribution.
- Comparing production costs across multiple units in the same industry helps to introduce uniformity to the cost of production.
- The establishment of a standard sale price is crucial.
- For the undertakings, better and standardised systems are provided.
- Inter-firm comparison allows for even more cost control and reduction.
- This method ensures that customers receive a fair price and that producers profit.
- Eliminating unhealthy competition among different units is a significant step forward.
- The members are encouraged to share their thoughts and technological knowledge.Determination of a common policy for the units is possible.
- The stability in demand for the products is maintained.

Major Situations Where Uniform Costing Can be Introduced

Uniform costing may be introduced in the following two situations:

(a) Where a number of units producing the same type of article or rendering the same type of service are under the same management; and

(b) Where different firms are members of a trade association.

14.4 Uniform Costing – Extent of Uniformity

It is impossible to remark on the uniformity of these two elements because there is no information regarding how the direct material cost and direct labour cost were determined. Because it is difficult to say that the companies have adopted Uniform Costing practises and procedures with respect to these two major parts without knowing the method used to price the material concerns, the treatment of material loss, idle time cost, overtime premium, and so on.

There is no uniformity in the method used to absorb production overhead expenses as the companies used different bases for absorbing the same. Like, ABC company used direct wages, MNQ the prime cost and XYZ the sales revenue as the base for the recovery of production overhead expenses.

In terms of operating expenses (i.e., administrative, selling and distribution overhead expenses), there is consistency in the recovery of these costs because all three organisations absorbed them as a percentage of sales income.

Considerations to Achieve Uniformity

Method of cost, whether process or job cost to be adopted.	The techniques, whether marginal, standard costing etc., to be employed.
Uniformity in cost unit, for comparison.	Uniformity in cost unit or cost center to which costs are calculated and analysed.
Uniformity in various elements of cost.	Items to be included or excluded from costs.
Depreciation rate of fixed assets to be applied	Method of treatment on interest on capital, notional rent etc.
Basis of distribution of service department to production departments.	Treatment of defective work, spoilage, waste, scrap, over-time, fringe benefit etc.
The system of material control.	Uniformity with regard to under- or over-absorbed overheads.
Method of valuation of work-in-progress and stock.	System of accounting, whether integral or non-integral.
Method of remuneration to labour.	Treatment of research and development cost.

14.5 Activities in Uniform Cost Plan

The term 'Uniform Cost Plan' covers activities such as cost accounting system, format for reports, analysis of cost data, etc. Some of the activities which may be carried on partially or completely are as follows:

- Publication of pages, lectures, or debates of significant cost issues in trade journals.
- Publication of instructional books relating to cost-finding objectives.
- Research on specific costing issues in the industry in order to build sound principles.
- Counseling activities linked to the establishment or operation of a cost accounting system.
- Developing estimating formulae or quick methods for establishing a pricing basis.
- Creating and promoting a uniform cost programme.
- Cost studies with the purpose of identifying the average or representative cost of items, functions, or activities for the benefit of members' general knowledge.

- Cost data should be collected and disseminated on a regular basis as part of a reporting plan.
- Complete cost data analysis and interpretation to reveal trends, operational flaws, and so on.

Application of Uniform Costing (Scope)

- ***Common Control and Management:*** Uniform costing may be applied when number of units or firm producing similar goods and services are under a common control or controlled by the same group of management.
- ***Trade Associations:*** Firms or units that are affiliated with a trade association may use uniform costing. Different companies could create an organisation to embrace a common costing approach and practise.

Accounting for Uniform Costs

- ***Historical Costing -*** On a historical costing basis, trade associations can keep records of costs of products manufactured by different enterprises. Summaries can be prepared on a regular basis and distributed to all members for cost comparisons and other purposes.
- ***Standard Costing –*** The member-firms can also compute uniform costs by using a standard costing methodology. In this situation, the costs will be properly calculated ahead of time. The real results can then be easily compared to the concerned' own standards. For cost-control objectives, the variances can be discovered.

Main Reasons for Variations in Cost Structure in Uniform Costing

- ***Difference in Size:*** A large scale company employs staff and managers at a fat salary. The managers look after their specialised functions only. However, in a small-scale company, Managing Director or Manager may look after sales, purchases as well as production functions. As such the overheads would be comparatively lower in a small-scale undertaking.
- ***Difference due to Wage Structure:*** Wage structures of the two companies may differ. For example, an attendant in a multinational company is getting about Rs.2500 p.m. whereas the salary of an attendant in an Indian company is only Rs.500 assuming productivity achieved in both the cases is same. The divergencies in pay structure would result in wide variation in employees' cost and overheads.
- ***Difference in the Plant Size:*** In a large sized plant, operating at optimum capacity; conversion costs will be least whereas in a plant with a lower capacity, the conversion cost will be high, this results in the wide deviation m cost profile in these cases.
- ***Difference in Degree of Mechanisation:*** In a less modernised plant, labour will be predominant while in a most modernised plant, depreciation will be high. The degree of mechanisation will affect the cost structure.
- ***Difference in the Method of Production***: When a product can be manufactured by employing more than one method, the cost of manufacture will definitely vary. For example, Ampicillin can be produced from intermediate state i.e., 6-APA or from basic stage, i.e., Pencillin G first crystal. In both the cases cost of production will vary considerably.
- ***Difference in Costing Principles and Procedures:*** The costing principles and procedures employed by different units may differ. As much there will be difference in costs.

Requirements of Good Uniform Costing System

Whether cost data are required for one product or all the products produced in a factory. Costing techniques to be used, i.e.,historical, standard or marginal.

- Definitions of various elements of costs such as, direct material; direct labor; cost of direct services; factory overheads; administrative overheads and selling overheads.
- Items which are extraneous to costs such as bad debts, donations, etc., and to be excluded from cost.

- Production centres, cost centres, etc., to be used for analysis and comparison of costs.
- Classification of production and service departments.
- Methods to be used for by-product and joint product pricing and their treatment in cost accounts.
- Method of treatment of spoilage, defectives, etc., in costs.
- Treatment of research and development in costs and methods of allocation of research and development to each cost centre/cost unit.
- Treatment of handling and storage costs of raw materials.
- Method of pricing of materials used such as FIFO, LIFO, Simple average, weighted average, etc.
- Methods of payment of remuneration.
- Treatment of items like interest on own capital, rent of premises owned, etc.
- Method of working out depreciation, i.e., whether straight-line method or written down value method to be used.
- The method of apportionment of service departments costs to production departments.
- Treatment of under/over-absorbed overhead, e.g., applying supplementary rate or write off to profit and loss account.
- System of classification and codification of cost accounts.
- Method of valuation of work-in-progress.
- The method of presentation of data and reporting to management.
- Any other data which may be necessary in a particular case.

Points to be Considered While Implementing Uniform Costing

- The costing method to be followed (e.g., process costing, unit costing or job costing etc.).
- The costing technique to be followed (e.g., marginal costing, standard costing etc.).
- The unit of cost for the purpose of ascertainment and control of costs (e.g., kg., lb., ton, etc.).
- The definition of different elements of cost (e.g., direct material, direct labour, chargeable expenses, overheads etc.).
- The production centres, cost centres to be used for analysis and comparison of costs.
- The classification of production as well as service departments.
- Treatment of defective work, spoilage, waste, scrap, overtime wages, fringe benefits etc.
- Treatment of research and development costs.
- Uniformity in respect of pricing material issues, payment of remuneration, treatment of controversial items (e.g., interest on capital, rent on own buildings etc.),
- Finally, the method of presentation of data and reporting to management.

Types of Undertaking Where Uniform Costing Can be Applied

- ***Manufacturing identical products–*** Those undertakings which manufacture identical products can use uniform costing system. The nature of the business is the same, therefore it does not present much of difficulty.
- ***Carrying similar operations–*** Where different industries carry out similar type of service or facility, uniform costing may be applied. For example, service industries like rail or road transport; gas or electricity companies etc. may adopt such a system.
- ***Members of the same trade association–***A number of concerns engaged in the same industry (may not be manufacturing goods of identical type) bound together through a trade

association or otherwise may like to have a uniform costing pattern so as to enable them in having a study of the cost pyramid and getting fixed reasonable prices for their products.

Matters Where Uniformity is Required

- ***Method of costing*** – Whether job or process or unit costing is to be employed, uniformity should be achieved in this regard.
- ***Technique of costing*** – Whether standard or marginal or absorption costing technique is to be adopted, should be determined in common.
- ***Pricing of materials*** – Materials issued to production are to be priced according to FIFO, LIFO or Average or any/other method, should be standardised.
- ***Remunerating labor*** – Payment of wages will be according to time rate or piece rate and whether any incentive scheme will be in operation or not. In the event of such a scheme, a common plan should be introduced in all the concerns as far as possible.
- ***Apportioning overheads*** – Overheads are to be apportioned to different departments. Common bases for apportionment should be used.
- ***Absorbing overheads*** – Absorption of factory, office or selling overheads on a common pattern is essential. If one firm is charging factory overhead based on a percentage of direct materials, while other on direct labor, the third on prime cost, it would render comparisons of cost false or useless.
- ***Collection and classification of overheads*** – The overheads are to be collected and classified. The method should be uniform so that confusions are not created.
- ***Charging of service departments overheads*** – The apportionment of overheads of service departments further to producing departments, also creates problems. Uniformity in method should be tried to be obtained in this regard.
- ***Division of costs*** – Costs are to be divided into different elements. Such division should be common.
- ***Standard terminology*** – The costing concepts should be defined clearly. There should not be any misconception regarding the meaning of terms commonly used.
- ***Classification of accounts*** – Materials, labour and expenses are to be classified as direct and indirect. The accounting treatment should be similar.
- ***Codification of accounts*** – Common code numbers can be assigned in different firms for similar items. It makes the data accumulation work easier.
- ***Items to be excluded*** – Items to be included in cost accounts and items to be excluded therefrom should be specified in beginning and there should be uniformity in treatment of such items.
- ***Treatment of overhead items*** – Following points are concerned:

✓ *Depreciation* – Which method of depreciation is to be used? What shall be the rate of depreciation?

✓ *Interest on capital* – Whether it is to be treated as a part of cost? Whether interest is to be charged on owned and/or borrowed funds?

✓ *Research and development costs* – Whether such costs are to be included and if at all on what basis?

✓ *Losses, wastages and scrap* – How such costs are to be calculated and treated?

✓ *Idle time and overtime* – How such costs are to be computed and accounted for in the costing books?

✓ *Rent charge* – Whether national rent is to be charged for owned building?

- ***Classification into fixed and variable overheads*** – The overheads are to be classified according to the nature of their variability. The basis for apportioning semi-variable overheads should also be common for all the member-units.

- ***Cost control*** – Material, labour and overhead costs are to be controlled. The method of accounting should be common so that control can be exercised on a uniform basis.
- ***Presentation of information and reporting*** – The form of statements and reports should be standardized so that management can compare the results of different organizations.
- ***Other matters*** – Miscellaneous matters e.g., treatment of by-products, provision for services etc., should be settled. In individual circumstances it may be necessary to consider such aspects.

14.6 Advantages and Disadvantages of Uniform Costing

Advantages of Uniform Costing

- ***Preparation of consolidated statement*** – All the firms can present their results to the association and the association can prepare consolidated statements without delay.
- ***Cost comparison*** – Uniform cost accounting data can easily be compared.
- ***Easy transfer of staff*** – Staff may be transferred, lent or borrowed easily.
- ***Easy training of staff*** – Staff at upper as well as lower levels can easily be trained in common routines.
- ***Easy transfer of equipment's*** – Office equipment's can also be transferred easily from one firm to another if required.
- ***Salary scales*** – Salary scales can be standardised.
- ***Standardization of routines*** – Office routines regarding filing etc., are standardized.
- ***Reduction in costs*** – Printing costs can be reduced.
- ***Saving in capital*** – Investment of capital in fixed assets is reduced on account of easy inter-transfer of equipment's and other facilities among member-firms.

Disadvantages of Uniform Costing

- ***Common principles and procedures*** – Uniform costing requires laying down of uniform principles and procedures. Since the individual circumstances of each concern varies to a great extent, bringing uniformity in procedures, practices, etc. poses serious problems.
- ***Lack of trust and confidence*** – The member units particularly when independently managed, may not have the feeling of mutual trust and confidence. Thus, the system may not operate successfully.
- ***Non-disclosure of technical or cost information*** – The member-concerns usually do not provide total information regarding costs and technical procedures. Thus, the system may not prove to be a success.
- ***Rigidity*** – Flexibility of approach is difficult to be maintained. The common prices fixed may not meet the requirements of all and sundry.
- ***Monopoly*** – Member-units may fix up monopoly prices and thus exploit the consumers. Thus, in a bid to avoid cut-throat competition, cut-throat prices from the point of view of consumers may be charged.
- ***High cost*** – A comparatively small concern may find the system expensive since the system to be adopted by all member-units has to be uniform irrespective of their size.
- ***Distortion of costs*** – Costs computed under uniform costing system may not be representative of all concerns. Thus, the costs may be distorted and may not give a correct picture in specified cases.

14.7 Inter-Firm Comparison

The inter-firm comparison is a management technique which makes it possible for an organization to compare its performance with that of others in the same activity. It involves a comparison of performances, efficiencies, costs and profits of various firms in the industry.

Inter-firm comparison implies comparison of the results of different firms inter se so that efficiencies or inefficiencies are located and profitability may be judged. Thus, inter-firm comparison is a yardstick of performance evaluation and cost-benefit analysis.

The accumulated data regarding costs, prices, profits etc. of different concerns are put in the form of consolidated statements and are made available to all the member- units so that they can make a comparative assessment of their achievements and weaknesses with those of others

Objectives

The objective of inter-firm comparison is:

- ***Improvement in efficiency*** – Each member-unit can try to improve its efficiency when on comparison with other member-firms it comes to know about its weak points.
- ***Effecting economy*** – The weaknesses or ineconomies are located and economy may be effected by eliminating them.
- ***Maximizing profits*** – The adequacy of profits may be measured and action can be taken to improve profitability position.

Essential Requisites of Inter-Firm Comparison System

- ***Information Needed:***

The type of information and the extent to which information is required to be collected for inter-firm comparison has to be determined. As a matter of fact much depends on the needs of management and the purpose of comparison. Though no standard list of such information required can be given, the required can be the general matters on which the information may be collected.

Costs and cost structure	Consumption and wastage of raw materials
Machine efficiency and machine utilisation	Labour efficiency and labour utilisation
Inventory levels	Capital employed and Return on capital employed
Liquidity of the organisation	Reserves and appropriations of profits
Accounts receivable and accounts payable	Production methods and technical aspects

- ***Centre for Inter-Firm Comparison:***

A central body should be created to collect and analyse data received from members of the scheme of inter-firm comparison. It will perform the functions as data collection from member units; dissemination of results of study to them; undertaking activities of research and development for the benefit of member units, individually and collectively; organisation of training programmes; and publication of relevant information through magazines or newsletters etc., so that Information becomes known to all concerned immediately.

- ***Membership:***

The firms should seek membership of the above central body, otherwise the very purpose of its setting up shall be defeated. The centre can make inter-firm comparisons also, only when firms participate. It does not matter whether firms are of different sizes. But the mutual responsibility — responsibility of providing information on the part of member unit on one hand and responsibility

of carrying out the above-mentioned tasks entrusted ,on the other, must be fulfilled for the success of the system.

- ***Method of Collection and Presentation of Information:***

The time by which and the form in which the information has to be submitted by the member units are required to be determined. The various statistical techniques can be used for collection of data, its editing, classification, presentation, drawing conclusions and making interpretations. Ratio analysis may be adopted for measuring profitability, efficiency and productivity etc. The various important management ratios used for inter-firm comparison can be put in the form of the "Pyramid structure".

14.8 Benefits and Limitations of Inter-firm Comparison

Benefits of Inter Firm Comparison

- ***Reveals weaknesses and strengths:*** Inter-firm comparison spotlights weaknesses or strengths of a business in relation to others in the industry.
- ***Creates cost consciousness:*** A sense of cost consciousness develops in the member units which results in a tendency to control and reduce costs by the optimum utilization of resources.
- ***Services of specialized agencies:*** Specialized knowledge and experience of the central organization are available.
- ***Benefits industry as a whole:*** Benefits like elimination of destructive and unfair competition, increased productivity, etc., are available to the industry as a whole.
- ***Maintains secrecy***: The participating firms are known by code numbers and the data is presented in the form of ratios. This helps in maintaining secrecy for all the firms.
- ***Stability:*** Inter-firm comparison removes disparities and brings stability in the cost structure and presentation of information.
- ***Cost control:*** Inter-firm comparison helps management to control the costs; efforts are made to reduce them if they exceed in the firm in comparison to the other firms.
- ***Productivity:*** Productivity is improved when the spheres of weaknesses or un-economies are located.
- ***Proper reporting:*** Efficient reporting system is developed and information is presented in standardised forms.
- ***Fair competition:*** Firms try to avoid unfair competition. Harmonisation and synchronisation of activities take place.

Limitations of Inter-firm Comparison

- ***Misleading conclusions*** – If the data are not properly collected the results arrived at would be misleading. Decisions cannot be based on such conclusions.
- ***Unreliable information*** – Information supplied by members may not be reliable. They may feel hesitant in disclosing the correct information about costs.
- ***Unscientific system*** – In case the cost accounting system adopted by a concern is not suitable and adequate, the costing data supplied shall not be reliable.
- ***Improper handling*** – The association which manages the comparison scheme should have qualities of effective leadership without which the scheme cannot be a success.
- ***Timely-co-operation and co-ordination*** – The cooperation of all the participants for submission of cost data and their coordination is a must, otherwise the inter-firm comparison scheme cannot be implemented with effective results.

Measures to Overcome Limitations

- Adequate education and propaganda through articles in journals, lectures, seminars and personal discussions.
- Installation of a system which ensures perfect secrecy.
- Introduction of a meaningful and scientific cost system.

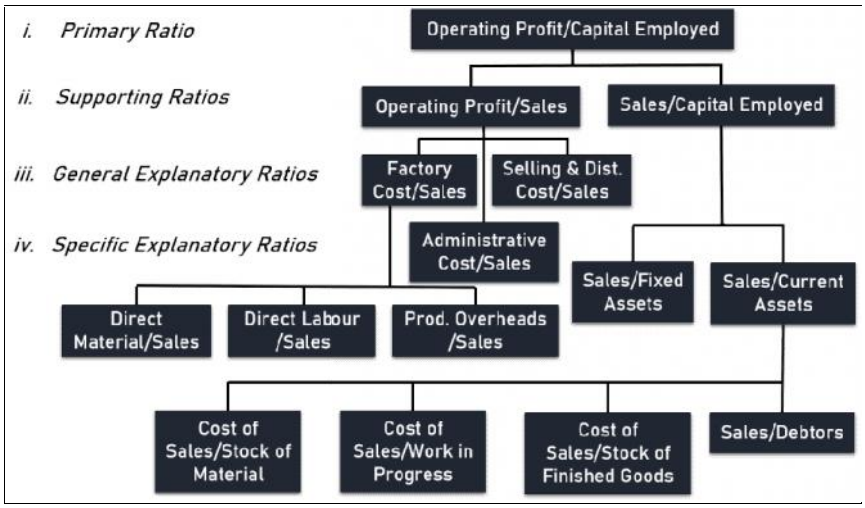
14.9 Method or Approach for Inter-Firm Comparison

Firms wishing to obtain the benefits of inter-firm comparison have to approach the central body or apex body constituted for IFC. A fee may be charged for carrying out comparisons. The method of approach adopted by the central body will be governed by the type of industry or trade and the problems and circumstances present.

- Firms which are to participate in an inter-firm comparison must submit their data to the central body. These figures are compiled based on uniform definitions of terms, procedures, methods and accounting periods.
- After all necessary steps have been taken to ensure that the participating firms can benefit from the comparison, a number of ratios are compiled. These ratios are shown in a summary form distinguishing, ratios for the group of firm participating in the inter-firm comparison and ratios for a single firm. Each firm is given a report compiled along these lines.
- The ratios for the group and the ratios for the single firm are compared one by one.
- Once any significant deviation from the norm (average return on capital employed) is established, the possible reasons for this deviation may be located by examining other ratios.

14.10 Ratios of Inter-Firm Comparison

There are primary, supporting, general explanatory and specific explanatory ratios, which are considered for inter firm comparson.



Summary

- The basic idea behind uniform costing is that the different concerns in an industry should adopt a common method of costing and apply uniformly the same principles and techniques for better cost comparison and common good.
- Uniform costing can be defined as the 'use by several undertakings of the same costing principle and practices.

- Product costs of individual undertakings within an industry vary purely as a result of the costing methods and principles adopted.
- The term 'Uniform Cost Plan' covers activities such as cost accounting system, format for reports, analysis of cost data, etc.
- Materials issued to production are to be priced according to FIFO, LIFO or Average or any/other method, should be standardised.
- The inter-firm comparison is a management technique which makes it possible for anorganization to compare its performance with that of others in the same activity.
- Firms which are to participate in an inter-firm comparison must submit their data to the central body.

Keywords

- ***UniformCosting -*** It is the use by several undertakings of the same costing principles and/or practices.
- ***Historical Costing –*** Records of costs of products manufactured by different firms can be kept by the trade associations on a historical costing basis.
- ***Standard Costing –*** Uniform costs can also be computed by the member-firms by adoption of standard costing system.
- ***Codification of Accounts*** – Common code numbers can be assigned in different firms for similar items.
- ***Inter-Firm Comparison -*** It is a management technique which makes it possible for an organization to compare its performance with that of others in the same activity.

Self Assessment

1. _____ is the use by several undertakings of the same costing principle and practices.

A. Kaizen costing

B. Just in time

C. Life cycle costing

D. Uniform costing

2. Uriform costing is a situation in which a number of a undertakings or units of an undertaking use the _____ costing principles.

A. Same

B. Different

C. Alternative

D. None of above

3. Uniform costing helps in _____.

A. Cost comparison

B. Price fixation

C. Price regulation

D. All above

4. Uniform Cost Plan covers activities such as _____.

A. Cost accounting system

B. Format for reports

C. Analysis of cost data

D. All above

5. Uniform costing helps different firms of a industry apply similar costing system, so as to produce cost data which have maximum _____.

A. Commoness

B. Control

C. Competitiveness

D. Comparability

6. Control and management while applying uniform costing should be _____.

A. Complicated

B. Comprehensive

C. Complex

D. Common

7. In historical costing, summaries can be prepared _____ and presented.

A. Periodically

B. Manually

C. Mechanically

D. None of above

8. In _____actual results then can easily be compared with the standards adopted by the concerns.

A. Uniform costing

B. Activity based costing

C. Kaizen costing

D. Standard costing

9. Difference in_____ is/ are the reasons for Variations in Cost Structure in Uniform Costing.

A. Size

B. Wages

C. Plant

D. All above

10. Uniform costing helps in_____of staff.

A. Transfer

B. Training

C. Both A and B

D. None of above

11. The _____ is a management technique which makes it possible for an organization to compare its performance with that of others in the same activity.

A. Uniform costing

B. Activity based costing

C. Intra firm comparison

D. Inter firm comparison

12. Inter firm comparison involves a comparison of performances, efficiencies, costs and profits of various firms in the industry.

A. Performances

B. Effciencies

C. Cost and Profits

D. All above

13. Inter-firm comparison is a yardstick of performance evaluation and _____.

A. Sales analysis

B. Revenue analysis

C. Profit analysis

D. Cost benefit analysis

14. Inter firm comparison helps in _____.

A. Improving efficiency

B. Effecting economy

C. Maximising profits

D. All above

15. _____ratios are used for measuring inter firm comparison.

A. Primary

B. Supporting

C. General

D. All above

Answers for Self Assessment

1.	D	2.	A	3.	D	4.	D	5.	D
6.	D	7.	A	8.	D	9.	D	10.	C
11	D	12.	D	13.	D	14.	D	15.	D

Review Questions

1. What do you mean by Uniform Costing? Discuss its pre requisities for successful installation?
2. Explain the objectives of Uniform Costing?
3. What is the extent of uniformity and major situations where it can be used?
4. List out the activities organizations can perform with uniform costing?
5. Discuss the main reasons for variations in cost structure in uniform costing?
6. Explain the requirements of good uniform costing system? Also discuss the matters where uniformity is required?
7. Discuss the pros and cons of unifrom costing system?
8. Explain the concept Inter Firm Comparison? What are the essential requisites of Inter-Firm Comparison System?
9. Critically explain the benefits of inter firm comparison?
10. Which primary and supporting ratios can be used for computing inter firm comparison?

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