Advanced Cost Accounting

M. Com. 3rd Semester

Course: MC-301

Lesson 1 to 20

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MC304 (a): ADVANCED COST ACCOUNTING (DSC)

Max. Marks 80

Internal Assessment 20

Note: There will be Ten (10) questions in all spreading into Five Units consisting of two questions from each unit. The candidate will require to attempt one question from each unit. Each question will carry Sixteen (16) marks

Course Objective: This course aims to provide students with the knowledge and analytical skills necessaryto use accounting cost information as a basis for formulating and evaluating corporate strategies.

Course Contents:

Unit I

Nature and Scope of Cost Accounting; Introduction, meaning of cost accounting, scope of cost accounting,objectives of cost accounting, advantages of cost accounting, financial accounting v/s. cost accounting, limitations of cost accounting, general principles of cost accounting, cost system characteristics of an idealcost system, installations of a cost system Cost Terms and Purposes; Cost in general, cost objectives, cost system, cost behaviour pattern, variable cost and fixed cost, shut down cost, average cost, total cost, productcost, period cost, product cost, fringe cost.

Unit II

Classification of Cost; Preparation of Statement of Cost, Collection of cost for Tenders or Quotations. Inventory Planning, Control and Costing: Techniques of Inventory Control; Level Setting, Economic Order Quantity, Just- in Time Inventory System, ABC Analysis, VED Analysis and Perpetual Inventory System,Methods of Valuing Material Issues.

Unit III

Accounting for Pay-Roll: Methods of Wage Payment and Incentive Plans. Overheads Allocation, Apportionment, Re-apportionment and Absorption.

Unit IV

Reconciliation of Cost and Financial Accounts; Need for Reconciliation, Reasons for disagreement between the profits disclosed by financial accounts and cost accounts.

Service or Operating Costing; Transport Costing, Hospital Costing, Hotel Costing and Power House Costing. Contract Costing; Recording of Cost value and profit of contract.

Unit V

Process Costing; Features of Process Costing, Application of Process Costing, Elements of ProductionCost, Process Losses, Inter-process Profits.

Standard Costing and Variance Analysis: Meaning of Standard Costing, Preliminaries to the cost ofStandard cost, Analysis of Material, Labour, Overheads and Sales Variance.

Course outcome: After learning of the course , the students will be able:

- To apply techniques of costing.
- To prepare statements of cost
- To suggest for elective costs of the firms.

References:

1. Jawahar Lal, Cost Accounting, Tata McGraw Hill Publishing Co., New Delhi.
2. M. N. Arora, Cost Accounting – Principles and Practice, Vikas Publishing House,New Delhi.
3. D. K. Mittal and Luv Mittal, Cost Accounting, Galgotia Publishing Co., New Delhi.
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5. B.M. Lall Nigam and I.C. Jain, Cost Accounting, Principles, Methods and Techniques, K.L. Malik &Sons Pvt. Ltd., Daryaganj, New Delhi.
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Lesson-1

Nature and Scope of Cost Accounting

Structure:

1.1 Learning Objectives

After studying this lesson, you should be able to:

- Know the origin of cost accounting.
- Understand the meaning of cost accounting and cost accountancy.
- Differentiate between Cost accounting and financial accounting.
- Know the various methods and techniques of costing
- Know the importance and advantages of cost accounting
- Understand the installation of Costing system

1.2 Introduction:

The importance of accounting information to the successful operation of a business has long been recognized. Accounting provides timely and accurate financial

information concerning the activities of an enterprise to a diverse group of people such as shareholders, managers, creditors, tax authorities, etc. On the basis of the purpose for which this information is used, accounting is divided into three parts- financial accounting, cost accounting and management accounting.

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.

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.

1.3 Evolution of Cost Accounting

In 1494 Luca Pacioli, an Italian found out the double entry system of accounting and later this system was developed in England and spread to all over the world.The purpose of Cost Accounting needs are served as a small branch of Financial Accounting except a few cases like Royal wallpaper manufactory in France (17^{th} Century), and some Iron Masters & Potters in England (18^{th} century). The period 1880 AD-1925 saw the development of complex product designs and the emergence of multi activity diversified corporations like Du Pont, General Motors etc. It was during this period that scientific management was developed which led the accountants to convert physical standards into Cost Standards, the latter being used for variance analysis and control. During the World War I and II the social importance of Cost Accounting grew with the growth of each country's defense expenditure. In the absence of competitive markets for most of the material required for war, the governments in several countries placed cost-plus contracts under which the price to be paid was cost of production plus an agreed rate of profit. The reliance on cost estimation by parties to defense contracts continued after World War II.

1.4 Meaning of Costing, Cost Accounting and Cost Accountancy

Costing: CIMA London defines Costing as "the techniques and processes of ascertaining costs." The technique in costing consists of the body of principles and rules for ascertaining the costs of products and services. The technique is dynamic and changes with the change of time. The process of costing is the day to day routine of ascertaining costs. Cost Accounting is the process of accounting for cost which begins with recording of income and expenditure and ends with the preparation of statistical data. It is the formal mechanism by means of which cost of products or services are ascertained and controlled. Cost Accounting provides

analysis and classification of expenditure as will enable the total cost of any particular unit of product/service to be ascertained with reasonable degree of accuracy and at the same time to disclose exactly how such total cost is constituted. Cost Accounting is a quantitative method that collects, classifies, summarizes and interprets information for product costing, operation planning and control and decision making.

Cost Accounting may be defined as "Accounting for costs classification and analysis of expenditure as will enable the total cost of any particular unit of production to be ascertained with reasonable degree of accuracy and at the same time to disclose exactly how such total cost is constituted". Thus Cost Accounting is classifying, recording an appropriate allocation of expenditure for the determination of the costs of pro ducts or services, and for the presentation of suitably arranged data for the purpose of control and guidance of management.

The I.C.M.A. London defines Cost Accounting as "the process of accounting for cost from the point at which expenditure incurred or committed to the establishment of its ultimate relationship with cost centers and cost units".

Cost Accountancy

Cost Accountancy is defined as '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.

The scope of Cost Accountancy is very wide and includes the following:-

(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.

1.5 Scope of Cost Accounting

The terms ‘costing’ and ‘cost accounting’ are many times used interchangeably. However, the scope of cost accounting is broader than that of costing. Following functional activities are included in the scope of cost accounting:

- ***Cost book-keeping-*** It involves maintaining complete record of all costs incurred from their incurrence to their charge to departments, products and services. Such recording is preferably done on the basis of double entry system.
- ***Cost system-***Systems and procedures are devised for proper accounting for costs.
- ***Cost ascertainment-*** Ascertaining cost of products, processes, jobs,services, etc., is the important function of cost accounting. Cost ascertainmentbecomes the basis of managerial decision making such as pricing, planning and control.
- ***Cost Analysis-*** It involves the process of finding out the causal factors of actual costs varying from the budgeted costs and fixation of responsibility for cost increases.
- ***Cost comparisons-***Cost accounting also includes comparisons between cost from alternative courses of action such as use of technology for production, cost of making different products and activities, and cost of same product/ service over a period of time.
- ***Cost Control-***Cost accounting is the utilization of cost information for exercising control. It involves a detailed examination of each cost in the light of benefit derived from the incurrence of the cost. Thus, we can state that cost is analyzed to know whether the current level of costs is satisfactory in the light of standards set in advance.
- ***Cost Reports-***Presentation of cost is the ultimate function of cost accounting. These reports are primarily for use by the management at different levels. Cost Reports form the basis for planning and control, performance appraisal and managerial decision making.

1.6 Objectives of Cost Accounting

There is a relationship among information needs of management, cost accounting objectives, and techniques and tools used for analysis in cost accounting. Cost accounting has the following main objectives to serve:

1) Determining selling price,
2) Controlling cost
3) Providing information for decision-making
4) Cost accounting helps in ascertaining the costing profit
5) Facilitating preparation of financial and other statements.

1) ***Determining selling price-***The objective of determining the cost of productsis of main importance in cost accounting. The total product cost and cost per unit of product are important in deciding selling price of product. Cost accounting provides information regarding the cost to make and sell product

or services. Other factors such as the quality of product, the condition of the market, the area of distribution, the quantity which can be supplied etc., are also to be given consideration by the management before deciding the selling price, but the cost of product plays a major role.

2) ***Controlling cost-***Cost accounting helps in attaining aim of controlling cost by using various techniques such as Budgetary Control, Standard costing, and inventory control. Each item of cost [viz. material, labour, and expense]is budgeted at the beginning of the period and actual expenses incurred are compared with the budget. This increases the efficiency of the enterprise.
3) ***Providing information for decision-making-***Cost accounting helps the management in providing information for managerial decisions for formulating operative policies.
4) ***Cost accounting helps in ascertaining the costing profit-***Cost accounting helps in ascertaining the costing profit or loss of any activity on an objective basis by matching cost with the revenue of the activity.
5) ***Facilitating preparation of financial and other statements-***Cost accounting helps to produce statements at short intervals as the management may require. The financial statements are prepared generally once a year or half year to meet the needs of the management. In order to operate the businessat high efficiency, it is essential for management to have a review of production, sales and operating results. Cost accounting provides daily, weekly or monthly statements of units produced, accumulated cost with analysis. Cost accounting system provides immediate information regarding stock of raw material; semi-finished and finished goods. This helps in preparation of financial statements.

1.7 Nature of Cost Accounting

Cost accounting is a special branch of knowledge. Though considered as a branch of financial accounts, cost accounting is one of the important special branches of knowledge, i.e., a discipline by itself. It is an organized body of knowledge consisting of its own concepts, principles and conventions.

(i) Cost accounting is science because it is a systematic body of knowledge having certain principles which a cost accountant should possess for proper discharge of his responsibilities. The principles of cost accounting can be learned by anybody and these principles can help in prediction of future. But costing is not a pure science as mathematics, physic, chemistry because the accuracy of costing varies as description of the application of these principles depends upon person to person. It is a subjective approach which matters more from case to case.

(ii) Cost accounting 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. Practice includes the continuous efforts of a cost accountant in the field of cost accountancy. Such efforts of a Cost Accountant

also include the presentation of information for the purpose of managerial decision making and keeping statistical records.

(iii) Cost accounting determines the cost of incomplete work or job in case if the work remains uncompleted. It is also provides measures for control and guidance for various levels of management i.e., top, middle and lower management.

(iv) Cost accounting is a profession. In recent years cost accounting has become one of the important professions which have become more challenging. This view is evident from two facts. First, the setting up of various professional bodies. Secondly, a large number of students have enrolled in various institutes to obtain costing degrees and memberships for earning their livelihood.

1.8 Importance of Cost Accounting

Cost accounting provides invaluable aid to management. It provides detailed costing information to the management to enable them to maintain effective control over stores and inventory, to increase efficiency of the organization and to check wastage and losses.

Cost accounting helps in periods of trade depression and trade competition. Inperiods of trade depression, the organization cannot afford to have wastages which pass unchecked. The management must know areas where economies may be sought, waste eliminated and efficiency increased. The organization must wage awar not only for its survival but also continued growth. The management shouldknow the actual cost of their products before embarking on any scheme of price reduction. Adequate system of costing facilitates this.

Cost accounting aids price fixation. Although the law of supply and demand determines the price of the product, cost to the producer does play an important role. The producer can take necessary guidance from his costing records in case he is in a position to fix or change the price charged.

Cost accounting helps in making estimates. Adequate costing records provide a reliable basis for making estimates and quoting tenders.

Cost accounting helps in channelizing production on right lines. Proper costing information makes it possible for the management to distinguish between profitable and non-profitable activities; profits can be maximized by concentrating on profitable operations and eliminating non-profitable ones.

Cost accounting provides data for periodical Profit and Loss Account. Adequate costing records provide the management with such data as may be necessary for preparation of Profit and Loss Account and Balance Sheet at such intervals as may be desired by the management.

Cost accounting helps in determining and enhancing efficiency. Losses due to wastage of materials, idle time of workers, poor supervision etc. will be disclosed if the various operations involved in the production are studied carefully. Efficiency can be measured, cost controlled and various steps can be taken to increase the efficiency.

Cost accounting helps in inventory control. Cost accounting furnishes control which management requires, in respect of stock of materials, work in progress and finished goods.Investors, banks and other money lending institutions have a stake in the success of the business concern are therefore benefitted immensely by the installation of an efficient system of costing. They can base their judgment about the profitability and future prospects of the enterprise on the costing records.

Employees have a vital interest in their employer's enterprise in which they are employed. They are benefited by a number of ways by the installation of an efficient system of costing. They are benefited, through continuous employment and higher remuneration by way of incentives, bonus plans; etc.

An efficient system of costing brings prosperity to the business enterprise which in turn brings prosperity to the business enterprise which in turn results in stepping upof the government revenue.

The overall economic development of a country takes place as a consequence of increase in efficiency of production. Control of costs, elimination of wastages and inefficiencies led to the progress of the industry and, in consequence of the nation as a whole.

Self-Assessment

State whether the following statements are true or false:

1. Financial accounting is concerned with the classification, accumulation, control and assignment of costs.
2. The cost accounting system is directly concerned with control of inventories, plant assets and funds expanded on functional activities.
3. The cost accounting system is independent of the financial accounts.

Fill in the blanks:

4. …… is the guidance and regulation by executive action of the costs of operating and undertaking.
5. The aim of …… is to highlight the shortcomings inherent in the cost accounting system.
6. …… process involves the preparation of a budget, comparison of budgeted and actual expenditure and income, planning and coordinating for control, etc.

1.9 Advantages of Cost Accounting

Cost accounting is very important for a commercial organization. It is also useful for any other organization. It helps management in different fields one of such fields is presentation of information in the most useful manner. Cost accounting is used to measure, analyze or estimate the costs. Cost accounting concerns itself with the

synthesis and analysis of costs. The Cost accounting system has the following advantages:-

1) Cost Accounting reveals areas where materials were used excessively, labour operated inefficiently and expenses incurred exorbitantly.
2) Cost Accounting suggests cost reduction programme. A continuous cost jointly with technical personnel seeking areas for effecting cost reduction brings beneficial results. A cost system reveals unprofitable activities, losses or inefficiencies occurring in any form such as wastage of man power, idletime and lost time.
3) 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.
4) Cost Accounts furnish suitable data and information to the management to serve as guides in making decisions involving financial considerations.
5) Cost Accounting is useful for price fixation purposes. Although sale price is generally related more with economic conditions prevailing in the market than to cost, the latter serves as a guide to test the adequacy of selling prices.
6) With the application of Standard Costing and Budgetary Control methods, the optimum level of efficiency is set.
7) 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, wagetribunals and boards, and labour and trade unions.
8) 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.
9) Introduction of a cost reduction programme combined with operations research and value analysis techniques leads to economy.
10) Marginal Costing is employed for suggesting courses of action to be taken. It is a useful tool for the management for making decisions.
11) Determination of cost centers or responsibility centers to meet the needs of a Cost Accounting system, ensures that the organizational structure of the concern has been pr operly laid responsibility can be properly defined and fixed on individuals.
12) Perpetual inventory system which includes a procedure for continuous stock taking is an essential feature of a cost system.

1.10 Limitations of Cost Accounting system

Like any other system of accounting, Cost Accountancy is not an exact science but an art which has developed through theories and accounting practices based on reasoning and commonsense. Many of the theories cannot be proved nor can they

be disproved. They grownup in course of time to become conventions and accepted principles of Cost Accounting. These principles are by no means static, they are changing from day to day and what is correct today may not hold true in the circumstances tomorrow. Large number of Conventions, Estimates and Flexible factors: No cost can be said to be exact as they incorporate a large number of conventions, estimations and flexible factors such as :- (i) Classification of costs into its elements. (ii) Materials issue pricing based on average or standard costs. (iii) Apportionment of overhead expenses and their allocation to cost units/centers. (iv) Arbitrary allocation of joint costs. (v) Division of overheads into fixed and variable. Cost Accounting lacks the uniform procedures and formats in preparing the cost information of a product/ service. Keeping in view this limitation, all Cost Accounting results can be taken as mere estimates.

It is expensive because analysis, allocation and absorption of overheads require considerable amount of additional work. The results shown by cost accounts differ from those shown by financial accounts. Preparation of reconciliation statements frequently is necessary to verify their accuracy. This leads to unnecessary increase in workload.It is unnecessary because it involves duplication of work. Some industrial units are functioning efficiently without any costing system. Costing system itself does not control costs. If the management is alert and efficient, it can control cost without the help of the cost accounting. Therefore it is unnecessary.

1.11 Cost Accounting vs. Financial Accounting

Financial Accounting is primarily concerned with the preparation of financial statements, which summaries the results of operations for selected period of time and shows the financial position of the company at particular dates. In other words Financial Accounting reports on the resources available (Balance Sheet) and what has been accomplished with these resources (Profit and Loss Account). Financial Accounting is mainly concerned with requirements of creditors, shareholders, government, prospective investors and persons outside the management. Financial Accounting is mostly concerned with external reporting. Cost Accounting, as the name implies, is primarily concerned with determination of cost of something, which may be a product, service, a process or an operation according to costing objective ofmanagement. A Cost Accountant is primarily charged with the responsibility of providing cost data for whatever purposes they may be required for.

Table 1.1 Financial Accounting vs. Cost Accounting

Financial Accounting	Cost Accounting

Financial accounting provides the information about the business in a general wayi.e. Profit and Loss Account, Balance Sheet of the business to owners and other outside partners.	Cost accounting provides information to the management for proper planning, operation, control and decision making.
Financial accounting classifies records and analyses the transactions in a subjective manner, i.e. according to the nature of expense.	Cost accountingrecords the expenditurein an objective manner, i.e. according to the purpose for which the costs are incurred.
Financial accounting lays emphasis on recording aspect without attaching any importance to control.	Cost accounting provides a detailed system of control for materials, labour and overhead costs with the help of standard costing and budgetary control.
Financial accounting reports operating results and financial position usually at the end of the year.	Cost accounting gives information through cost reports to management as and when desired.
Financial Accounts are accounts of the whole business. They are independent in nature.	Cost Accounting is only a part of the financial accounts and discloses profit or loss of each product, job or service.
Financial Accounts records all the commercial transactions of the business and include all expenses i.e. Manufacturing, Office, Selling etc.	Cost Accounting relates to transactions connected with Manufacturing of goods and services, means expenses which enter into production.
Financial Accounts are concerned with external transactions i.e. transactions between business concern and thirdparty.	Cost Accounts are concerned withinternal transactions, which do not involve any cash payment or receipt.
Only transactions which can be measured in monetary terms are recorded.	Non-Monetary information likes No of Units / Hours etc. are used.
Stocks are valued at Cost or Market price whichever is lower.	Stocks are valued at Cost only.

1.12 Limitations of Financial Accounting/Need of Cost Accounting

- No clear idea of operating efficiency: Sometimes profits in an organization may be less or more because of inflation or trade depression and not due to efficiency or inefficiency. But financial accounting does not give a clear reason for profit or loss.
- Weakness not spotted out by collective results: Financial Accounting shows the net result of an organization. When the profit and loss account of an organization, shows less profit or a loss, it does not give the reason for it or it does not show where the weakness lies.
- In Financial Accounting, we get the total cost of production but it does not aid in determining prices of the products, services, production order and lines of products.
- No classification of expenses and accounts: In Financial Accounting, we don't get data relating to costs incurred by departments, processes separately or per unit cost of product lines, or cost incurred in various sales territories. Further expenses are not classified as direct or indirect, controllable and uncontrollable overheads and the value added in each process is not reported.
- No data for comparison and decision making: It does not supply useful data to management for comparison with previous period and for taking various financial decisions as introduction of new products, replacement of labour by machines, price in normal or special circumstances, producing a part in the factory or buying it from outside market, production of a product to be continued or given up, priority accorded to different products, investment to be made in new products or not etc.
- Financial Accounting does not help to control materials, supplies, and wages, labour and overhead costs.
- Does not provide standards to assess the performance: Financial Accounting does not help in developing standards to assess the performance of various persons or departments. It also does not help in checking that costs do not exceed a reasonable limit for a given quantum of work of the requisite quality.
- Financial Accounting records only the historical costs incurred. It does not provide day-to-day cost information to the management for making effectiveplans for the future.

1.13 Cost Accounting and Management Accounting

Management Accounting is primarily concerned with management. It involves application of appropriate techniques and concepts, which help management in establishing a plan for reasonable economic objective. It helps in making rational decisions for accomplishment of these objectives. Any workable concept or techniques whether it is drawn from Cost Accounting, Financial Accounting, Economics, Mathematics and Statistics, can be used in Management Accountancy. The data used in Management Accountancy should satisfy only one broad test. It should serve the purpose that it is intended for. A Management Accountant accumulates, summarizes and analysis the available data and presents it in relation

to specific problems, decisions and day-to-day task of management. A Management Accountant reviews all the decisions and analysis from management's point of view to determine how these decisions and analysis contribute to overall organizational objectives. A Management Accountant judges the relevance and adequacy of available data from management's point of view. The scope of Management Accounting is broader than the scope of Cost Accountancy. In Cost Accounting, primary emphasis is on cost and it deals with its collection analysis relevance interpretation and presentation for various problems of management. Management Accountancy utilizes the principles and practices of Financial Accounting and Cost Accounting in addition to other management techniques for efficient operations of a company. It widely uses different techniques from various branches of knowledge like Statistics, Mathematics, Economics, Laws and Psychology to assist the management in its task of maximizing profits or minimizing losses. The main thrust in Management Accountancy is towards determining policy and formulating plans to achieve desired objective of management. Management Accountancy makes corporate planning and strategy effective. From the above discussion we may conclude that the Cost Accounting and Management Accounting are interdependent, greatly related and inseparable.

1.14 Principles of Cost Accounting

The following may be considered as the General Principles of Cost Accounting:

1) A cost should be related to its causes-cost should be related as closely as possible to their causes so that cost will be shared only among the cost units that pass thorough the department of which the expenses are related.
2) A cost should be charged only after it has been incurred-while determining the cost of individual units those costs which have actually been incurred should be considered. For example, a cost unit should not be charged to the selling costs, while it is still in the factory. Selling costs can be charged with the products which are sold.
3) The convention of prudence should be ignored-usually accountants believe in historical costs and while determining cost, they always attach importance to historical cost. In Cost Accounting this convention must be ignored, otherwise, the management appraisal of the profitability of the projects may be vitiated.
4) Abnormal costs should be excluded from cost accounts-costs which are of abnormal nature (e.g. accident, negligence etc.) should be ignored while computing the cost; otherwise, it will distort costs figures and mislead management as to working results of their undertaking under normal conditions.
5) Past costs not to be charged to future period-costs which could not be recovered or charged in full during the concerned period should not be taken to a future period, for recovery. If past costs are included in the future period, they are likely to influence the future period and future results are likely to be distorted.

6) Principles of double entry should be applied wherever necessary-costing requires a greater use of cost sheets and cost statements for the purpose of cost ascertainment and cost control, but cost ledger and cost control accounts should be kept on double entry principle as far as possible.

1.15 Installation of costing system:

There cannot be a readymade costing system for every undertaking. In order to meet the special needs of a business, a costing system has to be specially devised to give it a blend of efficiency and economy. The cost accounting system depends upon the nature of business or industry and the product. Before a suitable system of cost accounting is installed it is necessary to undertake a preliminary investigation so as to know the feasibility of installing cost accounting system to such business activities. While introducing a system of cost accountingit should be borne in mind that cost accounting system must suit the business.

Factors to be considered before installing a cost accounting system:

The following are the main factors to be considered before installing a cost accounting system:

1. Nature of Business: The nature of business serves as the basis for designing the cost accounts in respect of simplicity, necessity and investment involved in installing cost accounting system.
2. Objective: The designer should consider what is the objective of costing system? Whether to fix selling prices or control cost or both.
3. Organizational Factors: The organizational factors to be considered before installing a costing system are: size and type of organization, the levels of management, delegation and responsibility, centralization and decentralization, departmentalization, availability of modern office equipments,and number of supervisory or managerial staff.
4. Technical Considerations: Technical considerations that influence the installation of cost accounts are size of factory, flow of production, existence of departments and laboratories, capacity of machines and equipments, cost control techniques, internal transport, etc.
5. Accounting Aspects: The factors to be considered in respect of accounting are: number of financial records, existing forms, registers used in business and number of copies required in business activities.
6. Fields of cost Control: The areas where cost control is to be exercised is to be identified so that each manager may take action relevant to his business activities. If material and labour control occupies significant area of control, it must be given top most priority for exercising control over materials and labour.
7. Methods of wage payment: Existing methods of wage payment should be studied.
8. Accuracy: The degree of accuracy desired should be determined.

9. Product: The nature of product should be considered to decide type of cost system. For example, if materials used are insignificant, an elaborate system of materials control will not be necessary.
10. Reporting: The cost accounting system to be installed must ensure frequency and promptitude in reporting cost data to the management. It must also to be pointed out that duplication of reporting is to be avoided. Further, only that information which is relevant for the management in a particular context alone should be reported.
11. Selling and Distribution: The chief factors to be considered with regard to distribution process are the warehousing facilities, internal and external transport, market survey and other relevant measures, terms and conditions of sale and procurement of orders from customers.
12. Uniformity: The practice of adopting uniform costing facilitates interfirm comparison among various firms belonging to the same industry of factory. Further, it also has the benefit of adopting common costing practice if a holding company has number of subsidiaries.

Practical Difficulties:

The important difficulties in the installation of a costing system are listed below:

1. Lack of support from management: Wherever costing system is installed, it is essential to seek the support of various departmental managers. Very often the managers show hostile attitude towards the costing system. Under such circumstances it is better to convince them about the utility of costing system for the business as a whole.
2. Resistance from accounting staff: Very often the existing accounting staff resists the installation of the cost accounting system on two grounds. Firstly, they feel that the new system of accounting might lead to excess work. Secondly, they are afraid of their job security. But this difficulty may be overcome by encouraging them about the usefulness of cost accounting as a supplement to financial accounts and the generation of more employment opportunities from the installation of cost accounting system
3. Non-cooperation of working and supervisory staff: Correct activity data which is supplied by supervisory staff and workers is necessary for a costing system. They may not cooperate and resist the additional paper work arising as a result of the introduction of the system. However, they may be required to provide necessary reports concerning their area of activity so as to enable functioning of cost accounting department efficiently.
4. Shortage of trained staff: In the initial stages, there may be shortage of trained costing staff. Today this problem is overcome, thanks to the establishment of the institute of cost and works accountant of India in our country which offers professional course in costing and also offers training facilities through various companies to the candidates undergoing the course. This problem can be overcome by paying attractive salaries to the staff.

1.16 Essential of a good costing system

The costing system should fit in the general organization of the business. Normallyno alternations in the organization should be made to facilitate costing system. However, unavoidable changes could be made in the set up to ensure effective costing system.

- All relevant technical aspects (such as nature and method of production, varieties of product) should be adequately studied for employing suitable cost control devises.
- The size lay out and organization of the factory should be adequately described for the benefit of those operating costing system.
- The procedure required to be followed for purchase; receipt, storage and issue of materials should be clearly laid down.
- The methods of wage payment and system of labour control should be specified.
- The norms for appointment and allocation of overhead should be specified.
- Forms and records of original entry should be suitably designed to ensure economy.
- The forms should be got printed. It should contain full instructions. Persons who use them should be adequately trained to ensure accuracy and relevance of the data written on the forms.
- An examiner should check and sign every entry in the forms.
- Responsibility for preparing and sending the cost reports to various levels of management at periodical intervals should be fixed and necessary instructions in this regard issued.
- Full co-operation from all concerned in the management should be enlisted. The resistance from the employees should be minimum.
- Cost of administering the costing system should be commensurate with the benefit available there from.
- Design the system suitably to enable exercising cost control effectively.

1.17 Methods of Costing

Several methods or types of costing have been designed to suit the needs ofindividual business conditions. There are two main methods of costing; Job Costing and Process Costing. All other costing methods are either variants of these two methods or techniques designed for particular purposes, for specific occasions and for specific conditions.

1. ***Job Costing-***This method is suitable for ascertaining cost of a job, a specific order or a batch of finished products. Here the cost unit is a job comprising a specific quantity manufactured as per an order. A job may be small or big. It may be as per a customer's order of for stock for eventual sale. Other variations of jobcosting are as follows:
   - *Contract Costing*-This method is used by contractors for construction of building bridges etc. Here the unit of cost is a contract. The period of this contract normally extends beyond the current financial years.

- *Batch Costing*-This method is applicable to manufacturers producing economic batches of components for subsequent assembling. Large engineering firms use this method. Here the costing is done for a batch of the components instead of a single component.
- *Multiple Costing*-This is used in large industries such as automobile, aero plane industries etc., Here the cost of components is calculated separately. Each component has a job sheet. Later, these are assembled to complete the cost of aero plane or other finished product.

2. ***Process Costing-***This method is used by industries manufacturing products by continuous processes. Cost is ascertained for a period by process or department. As distinct from job costing, time is given more importance here. Hence, this is also called period costing. Examples of the industries using process costing are chemical industries, paper making and refineries. Other variants of process costing are:
   - *Operation Costing*-Operation Costing is applied where the production passes through several operations successively before the final product is made. Wastages may occur in each operation. Operation costing is used in industries such as box making, shoe making, toy making industries. Here costunit is an operation around which costs are accumulated.
   - *Single or Output or Unit Costing*-This method is applied where the production is of continuous nature and the final product is only one or the different grades of same product. Examples of the industries applying this method are mining industry, quarries and steel production.
   - *Operation Costing*-This method is applied for ascertaining cost of service rendered. Examples of industries using this method are transport services,electricity and boiler house. In transport services, the unit of cost is a passenger Kilo-meter, or a Kilogram kilometer.

1.18 Techniques of Costing

In each of the costing methods, various techniques may be used to ascertain cost, depending on the management requirement. These techniques may be grouped as follows:

- ***Absorption costing-***It refers to the ascertainment of costs after they have been actually incurred. As per this system, fixed as well as variable costs are allotted to cost units and total overheads are absorbed by actual activity level. Absorption costing is termed as total costing, since total costs are ultimately allotted to cost units. It is also termed as historical or traditional costing. However, since costs are ascertained after they have been incurred, and substantial time-gap exists between occurrence of expenditure and reporting off cost information, it does not help to exercise cost control.
- ***Marginal costing-***It refers to a principle whereby variable costs are charged to cost units and the fixed costs attributable to the relevant period is written off in full against the contribution for that period. Contribution is the difference

between sales and variable or marginal cost of sales. Marginal costing is also known as direct or variable costing. It is a valuable aid to management in taking important policy decisions, such as product pricing, choosing product mix, decision to make or to buy, etc.

- ***Standard costing-*** It refers to the technique which uses standards for costs and revenues for the purpose of control through variance analysis. Standards are established for each cost element on a scientific basis for immediate future period, and actual are compared against the standard. Variances from standards are analyzed, reasons established and corrective action taken to stop recurrence of inefficient operation. Thus, standard costing is extremely helpful for cost control. Standard costing is normally used along with budgetary control, which refers to the establishment of budgets relating to responsibilities of executive to the requirements of a policy and the continuous comparison of actual with budgeted results, either to secure by individual action the objective of that policy or to provide a basis for its revision . Absorption costing system and marginal or direct costing system can be used in conjunction with standard costing system.
- ***Differential costing-***It is defined as a technique used in the preparation of information in which only costs and income differences between alternative courses of action are taken into consideration. It considers only the additional costs and additional revenues arising out of the decision regarding addition of a project. Similarly, incremental costing technique considers incremental costs and incremental revenue arising out of a decision to change the level of nature of activity.
- ***Uniform costing-***It refers to the use by several undertakings of the same costing system i.e. the same basic methods, principles and techniques. This is not a distinct method of costing. The system is applied by a number of units of the same undertaking or several undertakings within the same industry with a view to promote operating efficiency by comparing inter- unit or inter firm performance data. Trade associations and multinational companies often use this system.

Self-Assessment

State whether the following statements are true or false:

7. Cost accounting is a branch of financial accounting. (false)
8. Cost accounting is used in manufacturing and non- manufacturing undertakings.(True)
9. Main purpose of cost accounting is to maximize profit.(false)
10. Financial accounts deal with all the items of expenses, losses, income and gains in total but the cost accounts deal with items of cost alone.
11. Financial accounts cover a short period usually a week.

12. Cost accounting will generally present a better picture to the public whocannot understand the intricacies of the maintenance of accounting.

Self-Assessment

Fill in the blanks:

13. _____is the technique/process of ascertaining costs.
14. Cost accounting system involves detailed analysis of ……
15. In any costing system …… is the one which directly related tothe activity of the operations.
16. The system of.....must provide for accuracy.
17. A basis for …… is being provided by both the accountingsystems.
18. help management in determining future production policy.
19. Costing methods are process costing, job costing and ……

1.19 Summary

Cost Accounting is the process of accounting for costs from the point at which expenditure is incurred or committed to the establishment of its ultimate relationship with cost centre and cost units. Cost Accounting has the objectives of determining Product costs, facilitate planning and control of regular business activities and supply information for taking short term and long-term decisions. Cost Accounting is useful in different areas such as materials, labour, overheads, stock valuation etc. The principles of cost accounting can be learned by anybody and these principles can help in prediction of future. Cost accounting is an art also 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. There are two main methods of costing; Job Costing and Process Costing. In each of the costing methods, various techniques may be used to ascertain cost, depending on the management requirement. These techniques may be absorption costing, marginal costing, differential costing and standard costing. The costing system should fit in the generalorganization of the business.

1.20 Glossary:

Cost accounting: The accounting mechanism through which the costs of the products or services are ascertained and controlled.

Financial Accounting: The art of recording, classifying and summarizing in a significant manner and in terms of money transactions and events which are in part at least of a financial character and interpreting the results thereof.

Cost: Expense incurred at the either cost centre or service centre.

Costing: Costing defines as “the techniques and processes of ascertaining costs.”

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

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.

Cost Audit*:* Cost Audit is the verification of correctness of Cost Accounts and check on the adherence to the Cost Accounting plan.

1.21 Answers: Self Assessment

1. False	2. True	3. True	4. Cost control	5. Cost audit
6. Budgeting	7.false	8.True.	9. False	10. True
11. False	12. False	13. Costing	14. Cost	15. Prime cost
16. cost accounting		17. Comparison of expenditures		18. Cost data
19. batch costing				

1.22 Terminal questions:

1. Explain the limitations of financial accounting.
2. Define cost accounting. How cost accounting differ from financial accounting?
3. Discuss the objectives of cost accounting.
4. What are the main characteristics of an ideal cost accounting system?
5. Explain the importance of costing under present circumstances.
6. Explain the methods and techniques of cost accounting in detail.
7. “Cost accounting has become an essential tool of modern management”. Comment on this statement.

1.23 Suggested Readings:

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Lesson-2

COSTING TERMS AND CLASSIFICATION OF COST

Structure:

2.1 Learning Objectives

After studying this lesson, you should be able to:

- Know different type of cost and their utility.
- Understand the concept of cost unit and cost center.
- Explain steps in cost control process.

2.2 Introduction:

Cost accounting is concerned with the ascertainment of cost, cost control and analysis of costs for managerial decisions. That means, the entire discussion in this work is centered around one important term, viz., cost. It is therefore necessary to understand the meaning of the word Cost in the right perspective. This word has a variety of meanings depending upon the context in which it is used. A few example and their analysis is presented in the following paragraphs.

2.3 Cost

Cost in simple, words, means the total of all expenses. The dictionary meaning of cost is “a loss or sacrifice”, or “an amount paid or required in payment for a purchaseor for

the production or upkeep of something, often measured in terms of effort or time expended". Cost means the amount of expenses incurred on or attributable to some specific thing or activity. The amount of expenses may be actual or notional but incurred on specified thing or activity. The term cost is used in this very form. In reference to production/manufacturing of goods and services cost refers to sum total of the value of resources used like raw material and labour and expenses incurred in producing or manufacturing of given quantity. The term 'cost' can hardly be meaningful without using a suffix or a prefix. The cost is always ascertained with reference to some object, such as, material, labour, direct, indirect, fixed, variable, job, process, etc. Thus, each suffix or prefix implies certain attribute which will explain its nature and limitations. Cost is a measurement, in monetary terms, of the amount of resources used for the purpose of production of goods or rendering services.

According to Crowning shield cost represents, "an expenditure made to secure an economic benefit, generally resources that promise to produce revenue. The resources may have tangible substance (material) or they may take the form of labour and services".

According to Institute of cost and work accounts (ICWA) India, Cost is, "measurement in monetary terms of the amount of resources used for the purpose ofproduction of goods or rendering services".

Cost has been defined in terminology given by the Institute of Cost and Management Accountants as "the amount of expenditure incurred or attributed on a given thing". More simply, it can be defined as that cost which is given or scarified to obtain something. Thus, the cost of an article is its purchase or manufacturing price, i.e., it would consist of its direct material cost, direct labour cost, direct and indirect expenses allocated or apportioned to it.

2.4 Cost Unit

Cost unit is the unit of quantity of product, service of time (or combination of these) in relation to which costs may be ascertained or expressed. Cost Unit is a device for the purpose of breaking up or separating costs into smaller sub divisions attributable to products or services. Cost unit can be defined as a 'Unit of product or service in relation to which costs are ascertained'. Sometimes, a single order or contract constitutes a cost unit which is known as a job. A batch which consists of a group of identical items and maintains its identity through one or more stages or production may also be taken as a cost unit.

Table 2.1: Examples of Cost Units

Industry/ Product	Cost Unit
Automobile	Number of Vehicle
Cement	Ton

Chemicals	Kilograms/Liter/Ton
Gas	Cubic Meter
Power/Electricity	Kilowatt Hour
Transport	Ton-Kilometer, Passenger-Kilometer
Hospital	Patient Day
Hotel	Bed Night
Education	Student year

2.5 Cost Centre

The determination of suitable cost centres as well as analysis of cost under cost centres is very helpful for periodical comparison and control of cost. In order to obtain the cost of product or service, expenses should be suitably segregated to costcentre. CIMA defines a cost centre as “a location, a person, or an item of equipment (or a group of them) in or connected with an undertaking, in relation to which costs ascertained and used for the purpose of cost control”. Cost centres are of two types- Personal and Impersonal Cost Centre. A personal cost centre consists of person or group of persons. An impersonal cost centre consists of a location or item of equipment or group of equipment.

The manager of a cost centre is held responsible for control of cost of his cost centre. The selection of suitable cost centres or cost units for which costs are to be ascertained in an undertaking depends upon a number of factors such as organization of a factory, condition of incidence of cost, availability of information, requirements of costing and management policy regarding selecting a method from various choices. Cost centre may be production cost centres operating cost centres or process cost centres depending upon the situation and classification.

2.6 Profit Centre

A profit centre is a unit of a company that generates revenue in excess of its expenses. It is expected that, through the sale of goods or services, the unit will turn a profit. This is in contrast to a cost centre, which is a unit inside a company that generates expenses with no responsibility for creating revenue. The only expectation a cost centre has is to lower expenses whenever possible while staying with a specific budget that is determined at the corporate level.

Difference between Cost Centres and Profit Centres

- Cost centres are the smallest segment of activity or area of responsibility for which costs are accumulated or ascertained. Whereas profit centres are that segment of activity which is both responsible for Revenue and expenses and disclose profit of a particular segment of activity.
- Cost centres are created for accounting convenience, where as profit centres are created to delegate responsibility to individuals.
- A cost centres does not have target cost, but efforts are made to minimize cost.

But each profit centre has a profit target.

- There may be number of cost centres in a profit centre. All profit centres are cost centres but all cost centres are not profit centres.

2.7 Responsibility Centre

A responsibility centre in Cost Accounting denotes a segment of a business organization for the activities of which responsibility is assigned to a specific person. Thus a factory may be split into a number of centres and a supervisor is assigned with the responsibility of each centre.

2.8 Cost Object-

Cost object may be defined as anything for which a separate measurement of cost may be defined. A cost accountant may want to know the cost of a particular thing and such thing is called a cost object. A cost object includes a product, service, cost centre, activity, sub-activity, project, contract, customer or distribution channel, etc,.

2.9 Cost Control

Cost Control is defined as the regulation by executive action of the costs of operating an undertaking, particularly where such action is guided by Cost Accounting. Cost control involves the following steps and covers the various facets of themanagement:

1. **Planning-**is the first step in cost control is establishing plans / targets. The plan/target may be in the form of budgets, standards, estimates and even past actual may be expressed in physical as well as monetary terms.
2. **Communication-**The plan and the policy laid down by the management are made known to all those responsible for carrying them out.
3. **Motivation-**The plan is given effect to and performances starts. The performance is evaluated, costs are ascertained and information about results achieved are collected and reported. The fact that costs are being complied for measuring performances acts as a motivating force and makes individuals' endeavor to better their performances.
4. **Appraisal and Reporting-**The actual performance is compared with the predetermined plan and variances, i.e deviations from the plan are analyzed as to their causes. The variances are reported to the proper level of management.
5. **Decision Making-**The variances are reviewed and decisions taken. Corrective actions and remedial measures or revision of the target, as required, are taken.

Self Assessment

Fill in the blanks:

1. A .....refers to a part of a factory for which costs are accumulated separately.
2. A .....is a cost centre in which a specific process or a continuous process of operation is carried out.
3. The manufacturing and non-manufacturing costs are charged to …… cost centre.

4. _____ is concerned with the ascertainment of cost, cost control and analysis of costs for managerial decisions.

5. _____can be defined as a 'Unit of product or service in relation to which costs are ascertained'.

6. A_____cost centre consists of person or group of persons.

7. An_____cost centre consists of a location or item of equipment or group of equipment.

8. A_____is a unit of a company that generates revenue in excess of its expenses

9. A cost accountant may want to know the cost of a particular thing and such thing is called a_____.

10. _____ is defined as the regulation by executive action of the costs of operating an undertaking

2.10 Classification of Cost:

This section describes the process of grouping costs according to their common characteristics, such as nature of expense, function, variability, controllability and normality. The types of cost can be done on the basis of time, their relation with the product and accounting period. Costs are classified into following categories:

2.9.1 On the basis of Variability

Cost is grouped on the basis of their tendency to vary with the volume or output. According to this classification cost may be fixed, variable and semi-fixed/semi-variable.

1. **Fixed Cost-**Fixed costs tend to remain unaffected by the variation or change in the volume. This cost remains constant within a given period of time and range of activity in spite of fluctuations in production. Per unit fixed cost varies with the change in the volume of production. If the production increases fixed cost per unit decreases and as there is decrease in production, the fixed cost per unit increases. Rent and insurance of building, depreciation on plant and machinery are some examples of fixed costs.

Table: 2.2 Fixed Cost (Total and Per Unit)

Output (In units)	Total Fixed Cost	Fixed Cost per unit
0 (NIL)	5000	5000
50	5000	100
500	5000	50
1000	5000	5
2500	5000	2
5000	5000	1

Thus from the Table 2.2 it is clear that fixed cost per unit decreases as the total number of output units increase.

2. **Variable costs-** Variable cost tends to vary directly with volume of output, such as direct material, direct labour and direct expense. Variable costs are those cost which vary directly in proportion to change in volume of production/output. The cost which increases or decreases in the same proportion in which the units produced is termed as variable cost. Direct material, direct labour, direct expenses, variable overheads are some examples of variable cost. Variablecosts (per unit) remain same but total variable cost goes on fluctuating depending upon volume of production/level of activity.

Table: 2.3 Variable Cost (Total and Per Unit)

Output (In units)	Total Variable Cost	Variable Cost per unit
0 (NIL)	0	0
50	500	10
500	5000	10
1000	10000	10
2500	25000	10
5000	50000	10

Thus from the Table 2.3 it is clear that Variable costs (per unit) remain same but total variable cost goes on fluctuating depending upon volume of production/level ofactivity.

3. **Semi-fixed/semi-variable cost-**is partly fixed and partly variable, such as telephone expense, electricity charges, etc. A cost contains both fixed and variable component and which is thus partly affected by fluctuations in the level ofactivity. Semi-variable costs is that cost of which some part remains fixed at the given level of production and other part varies with the change in the volume of production but not in the same proportion of change in production. Semi-variable costs are segregated into fixed and variable cost by using the following formula:
   - **Semi-variable cost = Fixed Cost + Variable Cost**
   - **Variable cost per unit = Change in Cost/Change in Output**

Example- Suppose the cost of production of 1000 units is Rs 13000 and for 12500units is Rs 15000 then

Variable cost per unit = Change in Cost/Change in Output

Variable cost per unit = (15000-13000)/ (1250-1000)

Variable cost per unit = 2000/250

Variable cost per unit = Rs. 8

Verification

Variable Cost of 1000 units=1000*8= Rs. 8000

Fixed Cost= Total Cost- Variable Cost

Fixed Cost= 13000-8000= Rs. 5000

Alternatively

Variable Cost of 1250 units=1250*8= Rs. 10000

Fixed Cost= Total Cost- Variable Cost

Fixed Cost= 15000-10000= Rs. 5000

2.9.2 On the basis of Cost Inventory

In this category the cost can be grouped in Product cost and Period cost.

1. **Product costs**- Product costs are those cost which are charged and identified with the product and included in stock value. In other words, the costs that are the cost of manufacturing a product are called product cost. Product cost includes direct material, direct labour, direct expenses, and manufacturing overheads.
2. **Period costs-**Period costs are those costs which are not charged to products but are written off as expenses against revenue of the period during which these are incurred. They are not transferred as a part of value of stock to the next accounting year. They are charged against the revenue of the relevant period. Period costs include all fixed costs and total administration, selling and distribution costs.

2.9.3 On the basis of Controllability

This category divides the cost into two basic parts controllable cost anduncontrollable cost. *Controllable cost* can be influenced by the action of a specified member of an undertaking while *Uncontrollable cost* cannot be influenced by the action of a specified member of an undertaking.

2.9.4 On the basis of Normality

Costs can be divided into normal cost and abnormal cost. *Normal cost* refers to the cost, at a given level of output in the conditions in which that level of output is normally attained. *Abnormal cost* is a cost which is not normally incurred at a given level of output in the conditions in which that level of output is normally attained.

2.9.5 On the basis of Time

On the basis of time the costs may be classified into historical or actual cost and predetermined or future cost.

- *Historical cost* relates to the usual method of determining actual cost of operation based on actual expenses incurred during the period. Such evaluation of costs takes longer time, till the accounts are closed and finalized, and figures are ready for use in cost calculations.
- *Predetermined cost*-as the name signifies is prepared in advance before the actual operation starts on the basis of specifications and historical cost data of the earlier period and all factors affecting cost. Predetermined cost is the cost

determined in advance and may be either estimated or standard.

- *Estimated cost*-is prepared before accepting an order for submitting price quotation. It is also used for comparing actual performance.
- *Standard cost*-is scientifically predetermined cost of a product or service applicable during a specific period of immediate future under current or anticipated operating conditions. The method consists of setting standards for each elements of cost, comparing actual cost incurred with the standard cost, evaluating the variance from standard cost and finding reasons for such variance, so that remedial steps can be taken promptly to check inefficient performances.

2.9.6 On the basis of Relation with the Product

All costs are subdivided into direct and indirect costs. The concept of direct andindirect cost is of basic importance in costing. Costs which are easily and directlyallocated to products or units are termed as direct cost. Direct costs includeall traceable costs. In the process of manufacturing of a product, materials arepurchased, wages are paid to labour, and certain other expenses are also incurreddirectly. All these expenses are called as direct costs.Direct costs are those which are incurred for a particular cost unit and can beconveniently linked with that cost unit. Direct costs are also termed as ***product cost***.

The expenses incurred on those items which are not directly charged to a single product because they are incurred for many products are termed as indirect costs.Indirect costs are those which are incurred for a number of cost units and alsoinclude costs which though incurred for a particular cost unit are not linkedwith the cost unit. Since such costs are incurred over a period and the benefits mostly derived within the same period, they are also called ***period costs.***

2.9.7 Other Specific types of Costs

These types are developed on the principle of different cost for different purposes.

1. Opportunity cost- This cost is the value of a benefit sacrificed in favour of an alternative course of action. It is the measurable advantage foregone as a result of the rejection of best alternative uses of resources, whether of materials, labour or facilities. This cost does not involve any cash outlay and is computed only for the purpose of comparison in the context of managerial decisions.

1. **Imputed/ Notional cost-** This cost is a hypothetical cost taken into account in a particular situation to represent a benefit enjoyed by an entity in respect of which no actual expense is incurred.
2. **Out of Pocket cost-** This cost just the opposite of imputed cost. This is that portion of cost which represents actual cash outlay. Out-of-pocket cost is very much relevant in price fixation during trade depression or when a make or buy decision is to be made.
3. **Sunk cost-**It represents historical costs, incurred in the past and is irrevocable in a given situation. Hence, a sunk cost is not relevant to current decision making.
4. **Replacement cost-** This cost is the current market cost of replacing an asset or

a material.

5. **Avoidable cost-** Such costs are specifically incurred on an activity or sector of a business and can be identified with the activity and such costs would be avoided, if the activity or the sector of the business does not exist are avoidable costs.
6. **Unavoidable cost-**Such costs are common costs which are apportioned to a particular activity or a segment of a business are usually unavoidable cost,because total common costs cannot be avoided or even reduced even if that activity or sector does not exist.
7. **Relevant Costs and Irrelevant Costs-** The relevant costs for decision-making purposes are those costs, which are incurred as a result of the decision under consideration. The relevant costs are also referred to as the incremental costs. Costs that have been incurred already and costs that will be incurred in thefuture, regardless of the present decision are irrelevant costs as far as the currentdecision problem is concerned.

Self-Assessment

State whether the following statements are true or false:

11. All costs are controllable.
12. Variable cost per unit does not vary with the increase or decrease in the volume of output.
13. Depreciation is an out of pocket cost.
14. Fixed cost per unit remains fixed.
15. Abnormal cost is uncontrollable.

Self-check exercises:

16. Explain Sunk cost.
17. Differentiate between cost centre and profit centre.
18. What do you understand by opportunity cost ?

2.11 Summary

Cost is generally measured in monetary terms. Cost is the amount of expenditure (actual or notional) incurred on or attributable to, a specified thing or activity. Thus, material cost of a product will mean the expenses incurred in procuring, storing and using materials in the product. Similarly, labour cost will represent that part ofpayment made to the workmen for time spent on the product during its manufacture. The determination of suitable cost centres as well as analysis of cost under cost centres is very helpful for periodical comparison and control of cost. In order to obtain the cost of product or service, expenses should be suitably segregated to costcentre.

2.12 Glossary

Cost: Expense incurred at the either cost centre or service centre.

Cost Centre: The location at where the cost of the activity is ascertained.

Cost of Production: It is the combination of cost of manufacturing an article or a product and administrative cost.

Cost of Sales: It is the entire cost of a product.

Product Centre: It is the location at where the cost is ascertained through which

the product is passed through.

Profit Centre: It is responsibility centre not only for the cost and revenues but also for profits for the activity.

Cost Object: It may be defined as anything for which a separate measurement of cost may be desired, like a car, melting process in a steel mill, taxi service, etc.

Cost Unit: Cost unit is the unit of quantity of product, service of time (or combination of these) in relation to which costs may be ascertained or expressed.

Fixed Cost: A cost that remains constant within a given period of time and range of activity in spite of fluctuations in production.

2.13 Answers: Self-Assessment

1. Cost Centre	2. Process	3. Production	4. Cost accounting
5. Cost unit	6. Personal	.7. Impersonal	8. Profit centre
9. Cost object	10. Cost control	11. False	12. True
13. False	14. False	15. False	16 Refer to section 2.9.7
17 Refer to section 2.5		18. Refer to section 2.9.7	

2.14 Terminal questions

1. Define the term cost. Classify the cost into various categories.
2. Explain the fixed cost with suitable example.
3. Write a short note on i) cost centre and ii) cost unit.
4. Define cost control. What are the various steps in cost control process?
5. What is cost classification? Classify it in detail.
6. Briefly explain the different categories of costs based on controllability, normality and relevancy.

2.15 Suggested Readings:

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Lesson -3

Elements of Cost

Structure:

Learning Objectives

After studying this lesson, you should be able to:

- Know basic elements of cost, Material, Labour and Expenses.
- Understand the classification of overheads.
- Explain various components of cost.

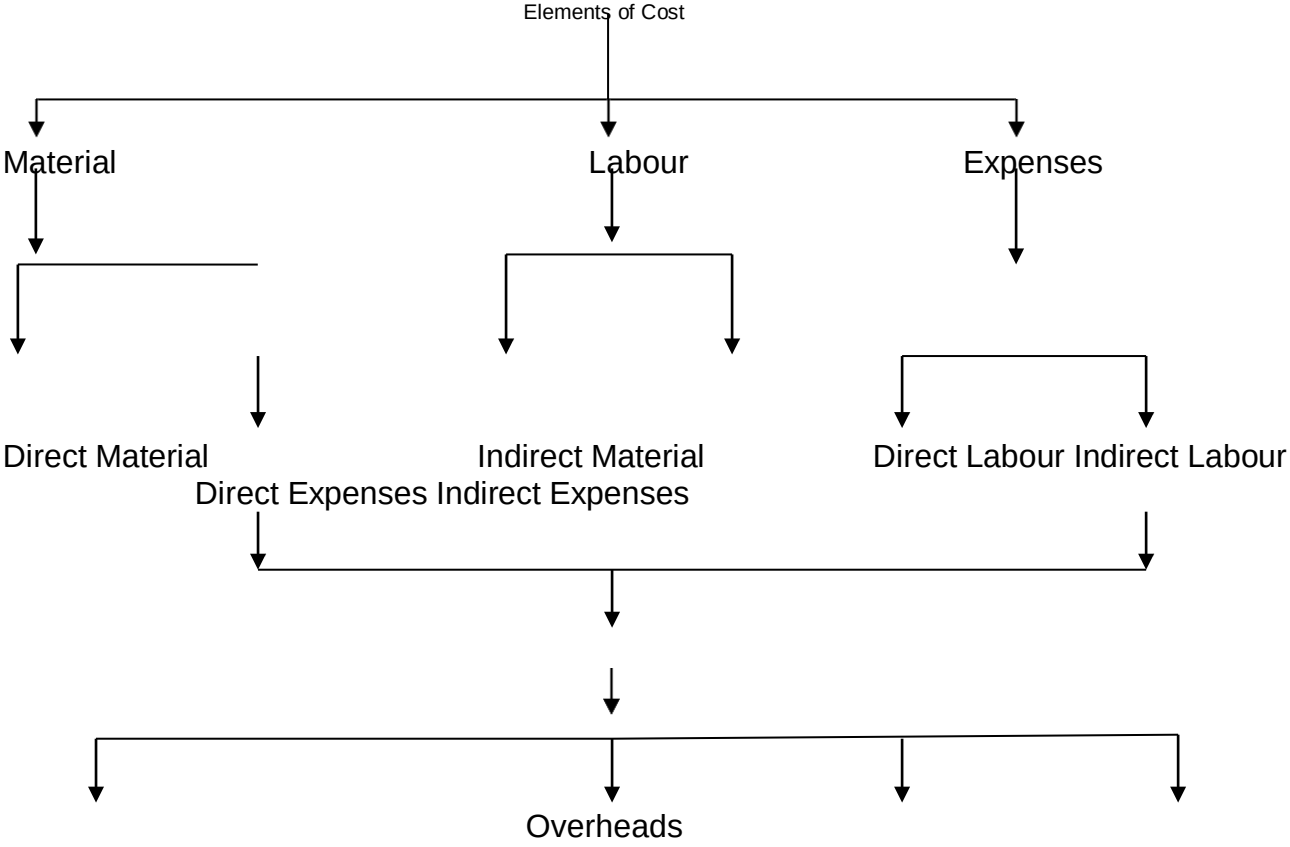
3.1 Introduction

Cost of production/manufacturing consists of various expenses incurred on production/manufacturing of goods or services. These are the elements of costwhich can be divided into three groups: Material, Labour and Expenses. A manufacturing organisation converts raw materials into finished products. For that it employs labour and provides other facilities. While compiling production cost, amount spent on all these are to be ascertained.

3.2 Elements of Cost

The elements of cost can be divided into three groups: Material, Labour and Expenses.

Figure:
Elements of Cost



Various Elements of Cost

3.2.1 Material- In order to produce or manufacture a product material is basic requirement like to manufacture shirts material cloth is required and to produce flour wheat is required. All material which becomes an integral part of finished product and which can be conveniently assigned to specific physical unit is termed as "Direct Material". It is also described as raw material, process material, prime material, production material, stores material, etc. The substance from which the product is made is known as material. It may be in a raw or manufactured state. Material is classified into two categories:

1. **Direct Material** is that material which can be easily identified and related with specific product, job, and process. Timber is a raw material for making furniture, cloth for making garments, sugarcane for making sugar, and Gold/ silver for making jewellery, etc. are some examples of direct material. Direct material cost can be defined as 'The Cost of material which can be attributed to a cost object in an

economically feasible way'. Direct materials are those materials which can be identified in the product and can be conveniently measured and directly charged to the product. Thus, these materials directly enter the product and form a part of the finished product. For example, timber in furniture making, cloth in dress making, bricks in building a house. The following are normally classified as direct materials:-

- All raw materials, like jute in the manufacture of gunny bags, pig iron in foundry and fruits in canning industry.
- Materials specifically purchased for a specific job, process or order, like glue for book binding, starch powder for dressing yarn.
- Parts or components purchased or produced, like batteries for transistor-radios.
- Primary packing materials like cartons, wrappings, card-board boxes, etc.

2. **Indirect Material-**Indirect Material is that material which cannot be easily and conveniently identified and related with a particular product, job, process, and activity. Consumable stores, oil and waste, printing and stationery etc., are some examples of indirect material. Indirect materials are used in the factory, the office, or the selling and distribution department. Indirect materials, is that material whose cost cannot be directly attributed to a particular cost object. Indirect materials 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 apportion to or absorbed by cost centres or cost units". In the words of C.I.MA., London, "indirect material cost is the material cost which cannot be allocated but which can be apportioned to or absorbed by cost centres or cost units''.

These are:

- 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., and
- Materials which due to their cost being small, are not considered worthwhile to be treated as direct materials.

3.2.2 Labour

Labour is the main factor of production. For conversion of raw material into finished goods, human resource is needed, and such human resource is termed as labour. Labour cost is the main element of cost in a product or service. Labour can be classified into two categories:

Direct Labour, and

Indirect labour

1. Direct labour- Direct **l**abour takes active and direct part in the production of a commodity. Direct labour is that labour which can be easily identified and related with specific product, job, process, and activity. Direct labour cost is easily traceable to specific products. Direct labour costs are specially and conveniently traceable to specific products. Direct labour varies directly with the volume of output. Direct labour

is also known as process labour, productive labour, operating labour, direct wages, manufacturing wages, etc. Cost of wages paid to carpenter for making furniture, cost of a tailor in producing readymade garments, cost of washer in dry leaning unit are some examples of direct labour. In the words of C.I.MA., London, “direct wages is that wages which can be allocated to cost centres or cost units.”

In simple words, it is that labour which can be conveniently identified or attributed wholly to a particular job, product or process or expended in converting raw materials into finished goods. Wages of such labour are known as direct wages. Thus it includes payment made to the following groups of labour:

- Labour engaged on the actual production of the product or in carrying out of an operation or process.
- Labour engaged in adding the manufacture by way of supervision, maintenance, tool setting, transportation of material etc.
- Inspectors, analysts etc., specially required for such production.

2. **Indirect labour-** Indirect labour is that labour which cannot be easily identified and related with specific product, job, process, and activity. The labour cost which cannot be directly attributed to a particular cost object. The wages of that labour which cannot be allocated but which can be apportioned to or absorbed by cost centres or cost units is known as Indirect Labour. In other words paid to labour which are employed other than on production constitute indirect labour costs. It includes all labour not directly engaged in converting raw material into finished product. It may or may not vary directly with the volume of output. In the words of C.I.M.A., London, “Wages which cannot be allocated but which can be apportioned or absorbed by cost centres or cost units is indirect wages. “Labour employed for the purpose of carrying out tasks incidental to goods or services provided is indirect labour. Indirect labour is used in the factory, the office, or the selling and distribution department. Wages of store-keepers, time-keepers, salary of works manager, salary of salesmen, etc., are all examples of indirect labour cost.

3.2.3 Expenses

All cost incurred in the production of finished goods other than material cost and labour cost are termed as expenses. Expenses are classified into two categories: Direct expenses, and Indirect expenses (An item of overheads)

1. **Direct expenses-** These are expenses which are directly, easily, and wholly allocated to specific cost centre or cost units. All direct cost other than direct material and direct labour are termed as direct expenses. Direct expenses are also termed as chargeable expenses. Direct expenses are expenses relating to manufacture of a product or rendering a service which can be identified or linked with the cost object other than direct material cost and direct employee cost**.** According to C.I.M.A., London, “Direct expenses means, expenses which can be allocated to cost centres or cost units. “Direct expenses include all expenditure other than direct material or direct labour that is specifically Some examples of the direct expenses are hire of special machinery, cost of special designs, moulds or patterns, feed paid to architects, surveyors and other consultants, inward

carriage and freight charges on special material, Cost of patents and royalties.

2. **Indirect Expenses-**These expenses cannot be directly, easily, and wholly allocated to specific cost centre or cost units. All indirect costs other than indirect material and indirect labour are termed as indirect expenses. In the words of C.I.M.A., London, "Indirect expenses are expenses which cannot be allocated but which can be apportioned to or absorbed by cost centres or cost unit" Indirect expenses are expenses which cannot be allocated but which can be apportioned to or absorbed by cost centres or cost units such as rent, insurance, municipal taxes, general manager salary and canteen and welfare expenses, power and fuel, cost of training new employee lighting and heating, telephone expenses, etc.,

   Indirect Expenses = Indirect cost – Indirect material – Indirect labour.

Indirect expenses are treated as part of overheads. Rent, rates and taxes of building, repair, insurance and depreciation on fixed assets, etc., are some examples of indirect expenses.

3.3 Overheads

Overheads comprise of indirect materials, indirect employee cost and indirect expenses which are not directly identifiable or allocable to a cost object. Overheads may defined as the aggregate of the cost of indirect material, indirect labour and such other expenses including services as cannot conveniently be charged directly to specific cost units. Thus overheads are all expenses other than direct expenses. In general terms, overheads comprise all expenses incurred for or in connection with, the general organization of the whole or part of the undertaking, i.e., the cost of operating supplies and services used by the undertaking and includes the maintenance of capital assets. The term overhead has a wider meaning than the term indirect expenses. Overheads include the cost of indirect material, indirect labour and indirect expenses. This is the aggregate sum of indirect material, indirect labour and indirect expenses.

Overhead = Indirect material + Indirect labour + Indirect expenses

3.4 Classification of Overheads

Overheads are classified into following three categories:

1. Factory/works/ Production Overheads
2. Office and Administrative Overheads
3. Selling and Distribution Overheads

1. Factory/works/ Production Overheads

All indirect costs incurred in the factory for production of goods are termed as factory/works overheads. Such costs are concerned with the running of the factory or plant. These include indirect material, indirect labour and indirect expenses incurred in the factory. Some examples are as follows:

Indirect Materials

- Grease, oil, lubricants, cotton waste etc.

- Small tools, brushes for sweeping, sundry supplies etc.
- Cost of threads, gum, nails, etc.
- Consumable stores
- Factory printing and stationery

Indirect Wages

- Salary of factory manager, foremen, supervisors, clerks etc.
- Salary of storekeeper
- Salary and fee of factory directors and technical directors
- Contribution to ESI, PF., Leave pay etc. of factory employee.

Indirect Expenses

- Rent of factory buildings and land
- Insurance of factory building, plant, and machinery
- Municipal taxes of factory building
- Depreciation of factory building, plant and machinery, and their repairs and maintenance charges
- Power and fuel used in factory
- Factory telephone expenses.

2. Office and Administrative Overheads

These expenses are related to the management and administration of the business. They are incurred for the direction and control of an undertaking. These represent the aggregate of the cost of indirect material, indirect labour, and indirect expenses incurred by the office and administration department of an organisation. Some examples are as follows: Office printing and stationery, Cost of brushes, dusters etc. for cleaning office building and equipment, Postage and stamps, Salary of office manager, clerks, and other employees, Salary of administrative directors, Salaries of legal adviser, Salaries of cost accountants and financial accountants, Salary of computer operator. Rent, insurance, rates and taxes of office building, Office lighting, heating and cleaning, Depreciation and repair of office building, furniture, and Equipment etc., Legal charges, Bank charges, Trade subscriptions, Telephone charges, Audit fee etc.

3. Selling and Distribution Overheads

Selling and distribution overheads are incurred for the marketing of a commodity, for securing order for the articles, dispatching goods sold or for making efforts to find and retain customers. These expenses represent the aggregate of indirect material, indirect labour, and indirect expenses incurred by the selling and distribution department of the organisation. These overheads have two aspects i) procuring orders ii) executing the order. Based upon this concept the selling and distributions are studied separately.

1) Selling overheads

Indirect costs incurred in relation to the procurement of sale orders are termed as selling overheads. Some of the examples of selling overheads are as follows:

Indirect Material

- Catalogues, price list
- Printing and stationery
- Postage and stamps

Indirect Wages

- Salaries of sales managers, clerks and other employees
- Salaries and commission of salesmen and technical representatives
- Fees of sales directors

Indirect Expenses

- Advertising
- Bad debts
- Rent and insurance of showroom
- Legal charges incurred for recovery of debts
- Travelling and entertainment expenses
- Expenses of sending samples
- Market research expenses.

2) Distribution Overheads

Indirect costs incurred in relation to the execution of the sales order is termed as distribution overheads. Some of the examples of distribution overheads are as follows:

Indirect Material

- Cost of packing material
- Oil, grease, spare parts etc. for maintaining delivery vans

Indirect Wages

- Salaries of godown employees
- Wages of drivers of delivery vans
- Wages of packers and dispatch staff.

Indirect Expenses

- Packing expenses
- Godown rent insurance, depreciation, and repair etc.
- Freight carriage outwards and other transport charges.
- Running expenses of delivery vans, repair, and depreciation.
- Insurance in transit etc.

3.5 Components of Total Cost

1. **Prime Cost-**Prime cost is the aggregate of Direct Material, Direct Labour and Direct Expenses. Generally it constitutes 50% to 80% of the total cost of the product, as such, as it is primary to the cost of the product and called Prime Cost. It consist costs of direct material, direct labour and direct expenses. It is also known as basic, first or flat cost.
   Prime Cost= Direct Material+ Direct Labour+ Direct Expenses
2. **Factory Cost/Works Cost-**It comprises of prime cost and in addition, works

or factory overheads which include costs of indirect labour and indirect expenses. This cost is also known as works cost, production or manufacturing cost.

Factory Cost/Works Cost= Prime Cost+ Factory Overheads

3. **Office Cost/ Total cost of Production-**If office and administration overheads are added to factory cost office cost is arrived at. This is also termed as administration cost or total cost of production.

   Office Cost/ Total cost of Production= Factory Cost/Works Cost+ Office and Administration Overheads

4. **Total Cost/ Cost of Sale-**Selling and distribution overheads are added to the total cost of production to get the cost of sales.

   Total Cost/Cost of Sale= Office Cost+ Selling and Distribution Overheads.

Self-Assessment

Fill in the blanks:

1. _____is the summation of Direct materials, direct labour and direct expenses
2. The factory overheads are nothing but the …… incurred at the factory site.
3. The total.....incurred in the factory could be derived by adding the both direct cost and indirect cost incurred during the factory process.
4. The .....is the combination of both the factory cost and administrative overheads.
5. The ..... is the blend of both, selling overheads and cost of production.
6. The cost of the …… is nothing but the direct materials cost of the product.
7. The treatment of the stock of..... should carried over in between the opening stock and closing stock and adjusted among them before the finding the cost of goods sold.
8. The …… are the expenses converting the raw materials into semi-finished goods which should be relatively considered for the treatment of the stock valuation rather than on the basis of prime cost.

Choose the appropriate answer:

9. Factory cost is the total of:
   (a) Direct and indirect costs
   (b) product and administrative costs
   (c) Cost of sales
   (d) Profit margin
10. Selling price is the summation of:
   (a) Direct and indirect cost
   (b) Product and administrative costs
   (c) Cost of sales and profit margin
   (d) Direct materials, direct labour and direct expenses

3.6 Summary

Cost of production/manufacturing consists of various expenses incurred on production/manufacturing of goods or services. These are the elements of costwhich can be divided into three groups: Material, Labour and Expenses. Overheads comprise of indirect materials, indirect employee cost and indirect expenses which are not directly identifiable or allocable to a cost object. Overheads may defined as the aggregate of the cost of indirect material, indirect labour and such other expenses including services as cannot conveniently be charged directly to specific cost units.

3.7 Glossary:

Cost of Production: It is the combination of cost of manufacturing an article or a product and administrative cost.

Cost of Sales: It is the entire cost of a product.

Direct Cost: Cost incurred which can be easily ascertained and measured for a product.

Factory Cost: It is the total cost incurred both direct and indirect at the work spot during the production of an article.

Prime Cost: Combination of all direct costs viz direct materials, direct labour and direct expenses.

Selling Price or Sales: The summation of cost of sales and profit margin.

3.8 Answers: Self-Assessment

1. prime cost	2. Indirect costs	3. Factory cost or works cost
4. Cost of production	5. Cost of sales	6. Raw materials
7. Finished goods	8. Indirect expenses	9. Direct and indirect costs

10. Cost of sales and profit margin

3.9 Terminal Questions

1. State the meaning of overheads and explain the classification of overheads.
2. Define components of cost.
3. List the main elements of cost.
4. Distinguish between direct cost and indirect cost.

3.10 Suggested Readings:

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Lesson-4
UNIT OR OUTPUT COSTING

Structure:

4.1 Learning Objectives

After studying this lesson, you should be able to understand:

- The accumulation and analysis of costs in various elements of cost.
- The concept of cost sheet.
- Ascertainment of cost per unit.

4.2 Introduction

Unit costing refers to the cost procedure, which is used in concerns where production is made at a large level and manufacture is continuous. The products manufactured are of homogenous nature and units are identical. From the point of view of cost analysis this method is very simple because total cost is divided by total number of unit produced. It is a form of process costing.

According to Harold J. Sheldon, “Single output or unit costing is a method of costing by the unit of production where manufacture is continuous and the units are identical or can be made by means of ratios”.

This method is used in concern where production activities operate continuously at a large level, units of identical type are manufactured or can be turned out in an identical manner on proportionate basis, can be measured in physical units conveniently and per unit cost of goods manufactured, total production cost and proportionate amount of every element of cost is to be ascertained. Unit costing method may be used in mining industry sugar industry, brick industry, cement industry, leather industry, milk industry, cotton industry, flour mill, paper industry, textile industry etc.

4.3 Characteristics of Unit or Output Costing

1. Unit costing is used in industries where production is on a large scale.
2. This method is used Industries where units of production are homogenous,

3. Cost per unit of production to be ascertained.
4. It is used in industries where production is continuous.
5. This method is used where units are physical and natural.
6. The cost units may be expressed in terms of weight, number, volume and time etc.

4.4 Objectives of Unit or Output Costing

1. To find out total cost and cost per unit.
2. To make analysis of expenses incurred on cost unit.
3. To make comparative study of any increase or decrease in any expense.
4. To find out percentage of each element of cost to total cost.
5. To find out selling price and profit.
6. To find out tender price.

4.5 Unit of Cost

Unit of Cost means unit of productions or service for which cost is to be incurred.

Table 4.1:

The Unit Cost in some of the Industries.

Industry	Unit
Tea Production	Per quintal
Steel Industry	Per ton
Liquor Production	Per bottle
Flour Production	Per quintal
Paper Production	Per ton or per kg.
Milk Production	Per liter
Sugar Production	Per quintal
Brick Production	Per 1000 bricks

4.6 Methods of Ascertaining Unit Cost

Total cost and cost per unit may be computed by following methods. The basic principles in preparation of all the three format of ascertaining cost are some.

1. Cost Sheet
2. Statement of Cost
3. Production Account

1. Cost Sheet

Cost sheet is a statement prepared to present the detailed costs of total output during a period. It provides information relating to cost per unit at different stages of total cost of production. The preparation of cost sheet is one of the important and primary functions of cost accounting. Cost sheet is not an account. There is a

prescribed form for preparation of cost sheet. A cost sheet is a statement of cost prepared for a given period of time in such a manner that it indicates various elements of cost as clearly as possible. The cost sheet is useful in ascertaining the total cost of production per unit, formulation of production plan, fixing up the selling price and minimizes the production cost. Sometimes standard cost data are providedto facilitate comparison with the actual cost increased. Cost sheet is an analytical statement of expenses relating to production of an article which informs regarding total cost, per unit cost and quantity of production. According to Wheldon, “Cost sheets are prepared for the use of management and consequently, they must include all the essential details which will assist the manager in checking the efficiency of production. In the words of C.I.M.A., London, “Cost sheet is a cost schedule or document which provides for the assembly of the estimated detailed cost in respect of a cost centre or cost unit”.

- **Key Elements before preparing Cost Sheet**

The preparation of the cost sheet requires understanding of the treatment of the following items:

  - ***Stock of raw materials-***The opening and closing stock of raw materials are to be adjusted with purchase of Raw materials in order to determine the value of raw materials consumed for the output produced.
  - ***Stock of work in process***-The value of stock of work in process is a part of Factory cost and therefore, it should be adjusted with factory overheads. Sale of scrap should be deducted from the factory overheads in order to determine the total factory cost.
  - ***Stock of finished goods***-Finished goods covers the products on which factory work has been completed. It is the cost of completed production. The opening and closing values of finished goods are to be adjusted with the total cost of production in order to arrive at cost of sales.

- **Expenses excluded from cost sheet**

The items of pure financial nature are excluded in cost sheet or statement of cost. These items are included only in financial accounts. Some of these expenses are an apportionment of profit.

Examples of these expenses are-

  - Dividend to shareholders
  - Income Tax
  - Interest on loan
  - Donations paid
  - Capital expenditure
  - Capital loss on sale of assets.
  - Commission to Partners / Managing Director
  - Discount on issue of shares/ debentures
  - Underwriting Commission.

Figure 4.1: Specimen of Cost Sheet (Layout only)

Particulars	Total Cost	Cost Per Unit
Direct Materials		
Raw Materials		
Opening stock Materials :		
Add: Purchases …..		
Add: Carriage / Freight Inward ----------		
Less: Closing stock ----------		
Cost of materials consumed		
Direct Labour		
Direct Expenses		
Prime cost		
Factory overheads		
Add: Work in Progress (Opening)		
Less: Work in Progress (Closing)		
Works /Factory cost		
Office and administrative expenses		
Cost of Production (of goods produced)		
Add: Op. Stock of finished goods		
Less closing of finished goods		
cost of production (of goods sold)		
Selling & Distribution expenses		
Cost of Sales		
Add. Profit (Loss)		
Sales		

2. Statement of Cost

Cost sheet and statement of cost are prepared in a same manner. When cost per unit of production is not necessary to calculate then a statement of cost is prepared to ascertain total cost and profit or loss on production.

- **Cost Sheet vs. Statement of Cost**
  - Total quantity, total cost and per unit cost is presented in cost sheet on the

other hand only total cost is presented in statement of cost.

- Normally profit is not shown is cost sheet while cost, selling price and profit is shown in statement of cost.
- Cost sheet is prepared to calculate actual cost of units produced in a period while statement of cost is prepared to estimate cost for a future period for determination of tender price.
- Cost Sheet is prepared only when production quantity is given while statement of cost is prepared when quantity of production has not been given.
- Comparative study of cost of two types of articles or two periods may be studied in cost sheet which it is not feasible in statement of cost.

3. Production account

Production account presents information of production cost in an analytical manner according to double entry system. Cost of production and profit can be computed in this ledger. It is prepared in two parts. Debit side of first part reveals cost of production under different headings after adjusting opening and closing stock of work-in-progress. Such cost of production is carried over to debit side of second part of production account. Opening stock of finished goods is shown in debit side while closing stock appears in credit side. Amount of sales is also shown in credit side thereafter amount of difference is computed. If the total of credit side is more than debit side the amount of difference will be recorded as profit or vice versa it will be loss. Separate Production Account will be prepared for two or more products.

Self-Assessment

Fill in the blanks:

1. Cost sheet is a statement which is prepared periodically to provide detailed cost of a cost unit or ……

2. Unit or output costing is one of the important objectives of ……

3. _____ is a unit of product, service or time in relation to which cost may be ascertained.

4. The cost of the raw materials is nothing but the_____cost of the product.

Choose the appropriate answer:

5. Production cost is the summation of:

(a) Direct and indirect costs

(b) product and administrative costs

(c) Cost of sales and profit margin

(d) Direct materials, direct labour and direct expenses

6.. The statement prepared for the computation of a product/service cost is known as: (a) Standard Costing

(b) Marginal Costing

(c) Prime Costing

(d) None of these

Exercise-1: Calculate the prime cost, factory cost, cost of production, cost of sales and profit form the following particulars:

	Rs		Rs
Direct materials	2,00,000	Office stationery	1,000
Direct wages	50,000	Telephone charges	250
Direct expenses	10,000	Postage and telegrams	500
Wages of foreman	5,000	Salesmen's' salaries	2,500
Electric power	1,000	Travelling expenses	1,000
Lighting: Factory	3,000	Repairs and renewal plant	7,000
Office	1,000	Office premises	1,000
Storekeeper's wages	2,000	Carriage outward	750
Oil and water	1,000	Transfer to reserves	1,000
Rent: Factory	10,000	Discount on shares written off	1,000
Office	5,000	Advertising	2,500
Depreciation plant	1,000	Warehouse charges	1,000
Offic e	2,500	Sales	3,79,000
Consumable store	5,000	Income tax	20,000
Managers' salary	10,000	Dividend	4,000
Directors' fees	2,500		

Solution:

Cost Statement/Cost Sheet

Particulars	Rs	Rs
Direct Materials	2,00,000	
Direct wages	50,000	
Direct expenses	10,000	
Prime Cost		2,60,000
Factory Overheads:		
Wages of foreman	5,000	
Electric power	1,000	
Lighting : Factory	3,000	
Storekeeper's wages	2,000	

Oil and water	1,000	
Rent: Factory	10,000	
Depreciation plant	1,000	
Consumable store	5,000	
Repairs and Renewal plant	7,000	35,000
Factory Cost		2,95,000
Administration Overheads:		
Rent Office	5,000	
Depreciation office	2,500	
Managers' salary	10,000	
Directors' fees	2,500	
Office stationery	1,000	
Telephone charges	250	
postage and telegrams	500	
Office premises	1,000	
Lighting: Office	1,000	23,750
Cost of production		3,18,750
Selling and distribution overheads:		
Carriage outward	750	
Salesmen's salaries	2,500	
Travelling expenses	1,000	
Advertising	2,500	
Warehouse charges	1,000	7,750
Cost of Sales		3,26,500
Profit		52,500
Sales		3,79,000

Exercise-2: Prepare the cost sheet to show total cost of production and cost per unit of goods manufactured by a company for the month of July, 2018. Also find out the cost of sales.

	Rs		Rs
Stock of Raw Materials 1.7.2018	3,000	Factory rent and rates	3,000
Raw Materials purchased	28,000	Office Rent	500
Stock of Raw Materials 31.7.2018	4,500	General Expenses	400
Manufacturing Wages	7,000	Discount on sales	300

Depreciation of plant	1,500	Advertisement exp. To be fully charged	600
Loss on sale of a part of plant	300	Income tax paid	2,000

The number of units produced during the month of Jly, 2018 was 3,000. The stock of finished goods was 200 and 400 units on 1.7.2018 and 31.7.2018 respectively. The total cost of units on hand on 1.7. 2018 was Rs. 2,800.All these have been sold during the month.

Solution:

Cost Sheet

Output 3000 units

Particulars		Total Cost	Cost per unit
Raw Materials Consumed			
Opening stock	3,000		
Add: Purchase	28,000		
Less: Closing Stock		26,500	8.83
	(4,500	7,000	2.33
)Direct Wages			
Prime Cost		33,500	
Factory Overheads:			
Depreciation	1,500		
Factory Rent	3,000	4,500	1.50
Factory cost		38,000	12,66
Office and Administrative Overheads:			
Office Rent	500		
General Expenses	400	900	0.30
Cost of Production		38,900	12.96

Statement of Cost of Sales

Cost of Production	38,900
Add: opening stock of finished goods	2,800
Cost of Goods Available for Sales	41,700
Less: Closing stock of finished goods(400x Rs. 12.96)	5,184

	Cost of Goods sold	36,516
Add: selling and distribution Overheads		
Discount on sales	300	
Advertisement Exps.	600	900
	Cost of Sales	37,416

4.7 Summary

Unit or output cost system is used in business where a standard production is turned out and it is desired to find the cost of a basis unit of production.Cost sheet is not an account. There is a prescribed form for preparation of cost sheet. A cost sheet is a statement of cost prepared for a given period of time in such a manner that it indicates various elements of cost as clearly as possible. The cost sheet is useful in ascertaining the total cost of production per unit, formulation of production plan, fixing up the selling price and minimizes the production cost.

4.8 Glossary:

Cost Sheet: It is a statement prepared for the computation of cost of a product/service.

Overhead: The aggregate of indirect material cost, indirect labour is termed as overheads.

Unit of Cost: Unit of Cost means unit of productions or service for which cost is to be incurred.

Total Cost: The sum of all costs attributable to the sales made.

Semi-variable cost: It is a cost which is fixed up to certain level of an activity. Later it fluctuates or varies in line with the level of production. It is known in other words as step cost.

Variable cost: It is a cost which varies in along with the level of an activity or production like material consumption and so on.

4.9 Answer: Self-Assessment

1. Cost centre 2. Cost Accounting 3. Cost Unit

4. Direct materials 5. Product and administrative costs

6. None of these

4.10 Terminal Questions:

1. Define Cost Sheet. List its advantages. What is the difference between Cost Sheet and Statement of Cost?
2. Define Unit or Output Costing. Discuss its characteristics. Give examples of industries where it is used.

3. Tabulate the elements of cost showing the usual items of expenditure pertaining to each.
4. What are the components of total cost? Draw a format of cost sheet.
5. 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. 2005. Also find the cost of sale and profit.

Particulars	Rs	Particulars	Rs
Stock of raw materials 1.1.2005	6,000	Factory rent and rates	
	6,000		
Raw materials procured	56,000	Office	
		rent1,000	
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	Rs 1,50,000		

4.11 Suggested Readings:

I.M. pandey, Financial Management, Vikas Publishing, New Delhi.

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Lesson -5
Material Control

Structure:

5.1 Learning Objectives

After studying this lesson, you should be able to:

- Know meaning of material and control.
- Know the main techniques of material control.
- Differentiate between centralized and decentralized purchasing.
- Understand the purchase procedure.
- Understand material control and store organization.

5.2 Introduction

In order to produce or manufacture a product material is basic requirement like to manufacture shirts material cloth is required and to produce flour wheat is required. Material is any substance that forms part of or composed of a finished product. i.e. material refers to the commodities supplied to an undertaking for the purpose of consumption in the process of manufacturing or of rendering service or for transformation into products. The term 'Stores' is often used synonymously with materials, however, stores has a wider meaning and it covers not only raw materials consumed or utilized in production but also such other items as sundry supplies, maintenance stores, fabricated parts, components, tools, jigs, other items, consumables, lubricants.....etc. Finished and partly finished products are also often included under the term 'Stores'. Materials are also known as Inventory. The term Materials / Inventory covers not only raw materials but also components, work-in-progress and finished goods and scrap also.

5.3 Meaning of material Control

Material control is a systematic control over the purchasing storing and using of material to minimizing the possible cost. In every manufacturing concern materials constitute an important factor of production.

Material or Inventory control may be defined as 'systematic control and regulation of purchase, storage and usage of materials in such a way so as to maintain an even flow of production, at the same time avoiding excessive investment in inventories. Efficient material control cuts out losses and wastes of materials that otherwise pass unnoticed.'

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 organisation.

5.4 Techniques of Material Control

The main techniques or the tools commonly applied to effect control over the material are following:

1. Determination of Stock Levels.
2. Economic Order Quantity or Reorder Quantity.
3. ABC Analysis.
4. VED Analysis
5. Stock Verification
6. Inventory Turnover Ratio.
7. Just in time inventory system.

1. Determination of Stock Levels

To avoid over-stocking and under-stocking each item of the inventory has the maximum levels, minimum levels and an order point.

- **Re-ordering Level**

Re-ordering level is that point of level of stock of a material where the storekeeper starts the process of initiating purchase requisition for fresh supplies of those materials. This level is fixed somewhere between the maximum and minimum levels in such a way that the difference of quantity of the material between the re-ordering level and minimum level will be sufficient to meet the requirements of production until the fresh supply of the materials is received. It is also known as 'Ordering level', 'Reorder point'. In other words, it is the level at which fresh order should be placed for replenishment of stock.

Re-ordering Level= Minimum Level + Consumption during the time required to get the fresh delivery

According to Wheldon, ***Re-ordering Level= Maximum Level x Minimum re-order period.***

Practical Examples

Practical Example 1 You are required to calculate the ordering level of material Z from the following particulars:

Minimum Limit 1,0000 units.

Maximum Limit 5,0000 units.

Daily requirement of material 2000 units.

Time required for fresh delivery 10 days.

Solution:

Ordering Level=Minimum limit + Consumption during the time required for fresh delivery

Ordering Level=10000units+ 2000 units x 10 days = 30000 units

Order for the purchase of material should be placed when the material in stock reaches 3,0000 units.

Practical Examples 2 Calculate the re-ordering level from the following information:

Maximum consumption = 250 units per day

Minimum consumption = 200 units per day

Re-order period = 10 to 12 days

Solution:

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

= 250 units x 12 days = 3000 units.

- **Minimum Level**

This represents a level which the stock will reach with fresh delivery of material provided the fresh delivery is made within the reorder period and usage remains normal during the period. Stock is normally not allowed to fall below this level. This is considered as buffer stock for use in emergency. If however stock level falls below minimum level it will be called Danger Level, when emergency measure should be taken to replenish stock. Otherwise, there will be stock-out situation, with consequential loss of production. Minimum level is, therefore, computed as reorder level *less* normal consumption during normal reorder period. Simply it is lowest figure of inventory balance, which must be maintained in hand at all times, so that there is no stoppage of production due to non-availability of inventory. It is also known as 'Buffer stock', 'Safety stock' 'minimum limit' or 'Minimum stock'.

Minimum level of inventory = Re-order level – (average rate of consumption x average time of inventory delivery)

- **Maximum level**

This represents stock level above which stock should not be allowed to rise. The main purpose of this level is to ensure that capital is not blocked up unnecessarily in stores.

The maximum stock level is computed as reorder level *plus* reorder quantity *minus* minimum consumption during reorder period. This level is a control indicator and if the stock exceeds this level, the consumption pattern and reorder period should be reviewed. The important considerations which should govern the fixation of maximum level for various inventory items are as follows:

- The fixation of maximum level of an inventory item requires information about its re-order level. The re-order level itself depends upon its maximum rate of consumption and maximum delivery period. It in fact is the product of maximum consumption of inventory item and its maximum delivery period.
- Knowledge about minimum consumption and minimum delivery period for each inventory item should also be known.
- The determination of maximum level also requires the figure of economic order quantity.
- Availability of funds, storage space, nature of items and their price per unit are also important for the fixation of maximum level.
- In the case of imported materials due to their irregular supply, the maximum level should be high.

The formula used for its calculation is as follows:

Maximum level of inventory = Re-order-level + Re-order quantity - (Minimum Consumption x Minimum re-order period)

- **Danger Level**

It is the level at which normal issues of the raw material inventory are stopped and emergency issues are only made. As and when the danger level is reached, the material has to be purchased at any price at which available.

The formula used for its calculation is as follows:

Danger level = Average Consumption x Lead time for emergency purchases
Practical Examples

Practical Example 3.Two components, X and Y are used as follows:

Normal usage 100 per week each

Maximum usage 150 per week each

Minimum usage 50 per week each

Re-order quantity X: 600; Y: 1000

Re-Order period X: 4 to 6 Weeks; Y: 2 to 4 weeks

Calculate for each component (a) Re-ordering level, (b) Minimum level,(C) Maximum level (d) Average Stock level.

Solution:

(a) Re-ordering level

Re- ordering level =Maximum usage per week x Maximum delivery period

Re-ordering level for component X= 150 units x 6 Weeks = 900 units

Re-ordering level for component Y = 15O units x 4 Weeks = 600 units

(b) Minimum level

Minimum Level=Re-order level – (Normal Usage x Average period)

Minimum level for component X = 900 units - 100 units x 5 weeks = 400 units

Minimum level for component Y = 600 units - 100 units x 3 weeks = 300 units

(c) Maximum level

Maximum Level=ROL + ROQ – (Min. Usage x Minimum period)

Maximum level for component X= (900 units + 600 units) – (50 units x 4weeks) = 1300 units

Maximum level for component Y= (600 units + 1000 units) – (50 units x 2 weeks) = 1500 units

(d) Average stock level

Average Stock Level=½ (Minimum + Maximum) Stock level

Average stock level or component X = ½ (400 units + 1300 units) = 850 units.

Average stock level for component Y= ½ (300 units + 1500 units) = 900 units.

2. Economic Order Quantity

The concept of Economic Order Quantity or EOQ has emerged out of this behaviour of carrying cost and ordering cost. EOQ is the quantity fixed at a point where total cost of ordering and the cost of carrying the inventory will be the minimum. The quantity of material to be ordered at one time is known as economic ordering quantity. This quantity is fixed in such a manner as to minimize the cost of ordering

and carrying the stock. Since the acquisition cost per unit of material is samewhatever is the quantity purchased, it is usually excluded when deciding the quantity of a material to be ordered at one time. The only costs to be taken care of are the ordering costs and carrying costs which vary with the quantity ordered.

Carrying Cost- It is the cost of holding the materials in the store and includes:

- Cost of storage space which could have been utilized for some other purpose.
- Cost of bins and racks
- Cost of maintaining the materials to avoid deterioration.
- Amount of interest payable on the amount of money locked up in the materials.
- Cost of spoilage in stores and handling.
- Transportation cost in relation to stock.
- Cost of obsolescence of materials due to change in the process or product.
- Insurance cost

- Clerical cost etc.

Ordering Cost-The cost which is associated with the purchasing or ordering of material. It includes costs of staff posted for ordering for goods, expenses incurred on transportation of goods purchased, in section cost of incoming material etc. It is the cost of placing orders for the purchase of materials and includes:

- Cost of staff posted in the purchasing department, inspection section and stores accounts department.
- Cost of stationary postage and telephone charges.

The calculation of economic order of materiel to be purchased is subject to the following assumptions:

- Ordering cost per order and carrying cost per unit per annum are known and they are fixed.
- Anticipated usage of material in units is known.
- Cost per unit of the material is constant and is known as well.
- The quantity of material ordered is received immediately i.e. the lead time is zero.

$$EOQ = \sqrt{2AO}/C$$

EOQ = Economic Order Quantity

A = Annual Consumption of the material.

O = Order Cost per order.

C= Carrying cost per unit per annum.

Practical Examples

***Practical Example* 4: Find** out the economic ordering quantity (EOQ) from the following particulars.

Annual usage: 3000 units

Cost of material per unit: Rs. 10

Cost of Placing and receiving one order: Rs.30

Annual carrying cost of one unit: 10% of inventory value.

Solution

$$EOQ = \sqrt{2AO}/C$$

Where A = Annual usage of material i.e.3,000 units

O = Cost of placing one order i.e. Rs.30

C= Annual carrying cost of one unit i.e. Rs. 10 x 10/100= Rs.1

$$EOQ = \sqrt{2AO}/C$$

$$EOQ = \frac{\sqrt{2 * 3000 * 30}}{2}$$

$$EOQ = \sqrt{180000/2}$$

$$EOQ = 300\ units$$

***Practical Example* 5:** Calculate the Economic Order Quantity from the following information:

Consumption of materials per annum=10,000 kg

Order placing cost per order= Rs.50

Cost per kg of raw material= Rs. 2

Storage costs=8% on average inventory

$$EOQ = \sqrt{2AO}/C$$

A=10000 Kg

O=Rs. 50

Carrying Cost=Rs. 2*8/100= Rs. 4

$$EOQ = \frac{\sqrt{2 * 10000 * 50}}{4}$$

$$EOQ = 2500\ kg$$

3. ABC Analysis

The “ABC Analysis” is an analytical method of stock control which aims at concentrating efforts on those items where attention is needed most. It is based on the concept that a small number of the items in inventory may typically represent the bulk money value of the total materials used in production process, while a relatively large number of items may present a small portion of the money value of stores used resulting in a small number of items be subjected to greater degree of continuous control. Under this system, the materials stocked may be classified into a number of categories according to their importance, i.e., their value and frequency of replenishment during a period. The first category (we may call it group ‘A’ items) may consist of only a small percentage of total items handled but combined value may be a large portion of the total stock value. The second category, naming it as group ‘B’ items, may be relatively less important. In the third category, consisting of group ‘C’ items, all the remaining items of stock may be included which are quite large in number

but their value is not high.

The advantages of ABC analysis are:

- Closer and stricter control of those items which represent a major portion of total stock value is maintained.
- Investment in inventory can be regulated and funds can be utilized in the best possible manner. 'A' class items are ordered as and when need arises, so that the working capital can be utilized in a best possible way.
- With greater control over the inventories, savings in material cost will be realized.
- It helps in maintaining enough safety stock for 'C' category of items.
- Scientific and selective control helps in the maintenance of high stock turnover ratio.

4. VED Analysis

VED stands for Vital, Essential and Desirable- analysis is used primarily for control of spare parts. The spare parts can be classified in to three categories i.e. Vital,Essential and Desirable- keeping in view the criticality to production.

Vital-The spares, stock-out of which even for a short time will stop the production for quite some time, and where in the stock-out cost is very high are known as Vital spares. For a car Assembly Company, *Engine* is a vital part, without the engine the assembly activity will not be started.

Essential- The spares or material absence of which cannot be tolerated for more than few hours or a day and the cost of lost production is high and which is essential for production to continue are known as Essential items. For a car assembly company 'Tyres' is an essential item, without fixing the tyres the assembly of car will not be completed.

Desirable-The Desirable spares are those parts which are needed, but their absence for even a week or more also will not lead to stoppage of production. Some spares though small in value, may be vital for production, requires constant attention. Such spares may not pay attention if the organization adopts ABC analysis.

5. Stock Verification:

Verification in the form of counting, measurement or weighment of material and supplies held in the stores Department and its comparison with the stores records are necessary for the purpose of detecting discrepancies, if any. This, therefore, necessitates the maintenance of proper records reflecting the physical movement of stock s and their current balance, and thus is known as Perpetual Inventory. There are two alternative methods of stock verification. They are Periodic Stock Verification and Continuous Stock Verification.

Annual stock taking has certain inherent shortcomings e.g., all the items have to be covered in a given number of days, either the production dept. has to be shut down during these days to enable thorough checking of stock, or else the verification has to be of limited character. On the other hand, the system of continuous stocktaking

consists of counting and verifying the number of items daily throughout the year, so that during the year all the items of stores are covered three or four time. The stock verifiers are independent of stores and stores staff has no knowledge as to the particular items that are being checked on a particular date.

Perpetual Inventory System

The perpetual inventory system is intended as an aid to material control. It is a system of stock control followed by stores department. The system follows a method of recording stores by which information about each receipt, issue and currentbalance of stock is always available.

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."

According to Weldon, "Perpetual inventory system is a method of recordings stores balances after every receipt and issue, to facilitate regular checking and obviate closing down of work for stock-taking." 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.

Perpetual inventory system comprises:

1. Comparison of Bin Cards (quantitative perpetual inventory) and Stores Ledger Accounts (quantitative-cum-valued perpetual inventory),

2. Continuous Stock-Taking (Physical perpetual inventory)

Advantages

Advantages of perpetual Inventory System are as follows:

(i) Errors and frauds can be easily detected at an early date. It helps in preventing their occurrence.

(ii) The system exercises better control over all receipts and issues in such a manner so as to give a complete picture of both quantities and values of stock in hand at all times.

(iii) Under the system, records are made simultaneously in the bin cards and

Stores ledger accounts which act as a system of internal check for detection of errors as and when they are committed.

(iv) The investment in materials is kept at a minimum level as the actual stock is continuously compared with the maximum level and minimum level.

(v) Loss of stock due to shrinkage, evaporation, accident, fire, theft, etc. can be easily detected.

(vi) Due to continuous stock-taking, the storekeeper and stores accountant become more vigilant in their works and they maintain accurate and up-to-date records.

(vii) It is possible to prepare periodical profit and loss account and balance sheet without physical stock-taking being made.

(viii) Correct stock data is readily available for settlement of insurance claims.

6. Inventory Turnover Ratio

Inventory Turnover signifies a ratio of the value of materials consumed during agiven period to the average level of inventory held during that period. The ratio is worked out on the basis of the following formula:

Inventory Turnover Ratio = Value of material consumed during the period /

Value of average stock held during the period

The purpose of the above ratio is to ascertain the speed of movement of a particular item. A high ratio indicates that the item is moving fast with a minimum investment involved at any point of time. On the other hand a low ratio indicates the slow moving item. Thus Inventory Turnover Ratio may indicate slow moving dormant and obsolete stock highlighting the need for appropriate managerial actions.

Practical Examples

Practical Example 6: Compute the Inventory turnover ratio from the following:

Opening Stock =20,000

Closing Stock =32,000

Material Consumed =78,000

Solution

Inventory Turnover Ratio = Value of material consumed during the period /

Value of average stock held during the period

Average Stock = Opening Stock+ Closing Stock/2

Average Stock = 20000+32000/2

Average Stock = 26000

Inventory Turnover Ratio = 78000/13000

Inventory Turnover Ratio = 3

7. Just in time inventory system:

The term ‘just in Time inventory System’ means that inventories whether of raw-materials, work-in process or finished goods are received in time. In other words, raw-materials are received ‘just in time’ to go into production, manufactured parts are completed ‘just in time’ to be assembled into products and products are completed ‘just in time’ to be sent to customers.

In case of raw- materials, the term is used as ‘Just in time purchase’. This means the

raw materials are purchased just in time to proceed to the production process.
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. Due to frequent purchase of raw-materials the issue price is likely to be very close to the replacement price. As a result, the method of pricing to be followed for valuing material issues becomes insignificant because of using Just in Time Technique.
4. Defect rates are reduced, resulting in less waste and greater customer satisfaction.

Self Assessment

Fill in the blanks:

1. The basic purpose of inventory control is to maintain ……
2. Inventory control is generally exercised over raw materials and ……
3. The purchase department has to exercise utmost care to procure the quality materials at ……
4. In ABC analysis, A stands for_____materials.
5. the method of regular physical checking of materials throughout the year is known as_____.
6. _____is a method of recording stores balances after each receipt and issue to facilitate regular checking and obviate closing down for stock- taking.

Self-Assessment

Fill in the blanks:

7. In …… entry is normally be made after the transaction takes place.
8. Document prepared by the stores department is …… .
9. The .....is in the form of an agreement with the suppliers which binds both the purchaser and supplier.
10. is periodical or continuous.
11. …… represents a system of records maintained by the stores department.

5.5 Summary

Inventory control, therefore, aims at ensuring the availability of required qualitymaterial 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. 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. Purchasing is a specialized activity in a manufacturing concern because it has its bearing on every vital factor concerning the manufacture like quantity, quality, cost, efficiency, prompt delivery, and volume of production. Quality of finished product ultimately depends upon quality of raw materials used in it. High skill work can of course help in improving the quality of product but it cannot change the character of raw material, which is base for the end product. The basic objective of purchase policy

is to buy the required material in the right quantity from right source at the right time and price to obtain the maximum value for each rupee spend on material cost.Proper Storing of materials is of primary importance. It is not enough only to purchase material of the required quality. If the purchased material subsequently deteriorates in quality because of bad storage, the loss is even more than what might arise from purchase of bad quality materials.

5.6 Glossary:

ABC Analysis: A technique of selective inventory control according to which the goods are divided into A, B and C categories based on their share in total value of consumption/sale and the volume.

Economic Order Quantity: The quantity of goods to order at which total of procurement cost and inventory carrying cost is lowest.

Inventory Turnover Ratio: Ratio of cost of materials/goods consumed/sold to the average inventory of materials/goods held.

Order entry: It refers to those activities that are involved in collecting, checking and transmitting sales order information.

Periodical Review System: A system under which the time interval between two orders is fixed and the size of order is determined as per actual requirement.

Perpetual Review System: A system under which, when stock reaches the reorder level, a fresh order for a pre-fixed quantity is placed.

Reorder Level: It is the level of stock at which a fresh order is initiated.

Reorder Quantity: The quantity of goods for which an order is actually placed at a time.

5.7 Answers: Self-Assessment

1. Optimum level of inventory
2. Work in progress
3. Lower prices
4. Costliest
5. Continuous stock taking
6. Perpetual Inventory System
7. Stores Ledger Account
8. Bin Card
9. Purchase order
10. Stock verification
11. Perpetual inventory

5.8 Terminal Questions

1. What are the different steps followed by purchase department to fulfil the purchase needs of the organization?
2. Discuss in detail the various Purchase systems. What do you mean by Material control? Explain the objectives and essentials of effective material control.
3. Explain the various techniques of store control.
4. Discuss various techniques of Material control with suitable examples.
5. What do you mean by inventory control? State its objectives.
6. Explain the terms (a) Maximum Level. Minimum Level and Reorder Level of inventories. What are the main factors that are taken into account while fixing these levels?

7. Describe the concept of Economic Order Quantity and state how is it a cost optimization technique.

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Lesson -6
Inventory Control

Structure:

6.0 Learning Objectives

After studying this lesson, you should be able to:

- Differentiate between centralized and decentralized purchasing.
- Understand the purchase procedure.
- Understand material control and store organization.

6.1 Purchase of Material

Purchasing is a specialized activity in a manufacturing concern because it has its bearing on every vital factor concerning the manufacture like quantity, quality, cost, efficiency, prompt delivery, and volume of production. Quality of finished product ultimately depends upon quality of raw materials used in it. High skill work can of course help in improving the quality of product but it cannot change the character ofraw material, which is base for the end product. A traditional housewife is a pace setter when demand, price, consumption, source, money, management comes into pictures. The purchases can be

- Centralized
- Decentralized.

1. **Centralize Purchase System-**It means all the purchases are made at onecentral point or by one central department. In such a system all the departments, which requires materials, machines, supplies, components, tools etc. send their purchase request to the centralized purchasing department and this department takes care

of timely supply of required purchases. This system is useful in multiproduct, multiunit organization where centralized purchase of key raw materials, which may be common to all products or units, be a very economic proposition. Benefits of centralized purchasing are as under:

- *Price Reduction*-As materials are purchased in bulk, which means economical price due to lower rate of materials, trade discount, economical transport etc.
- *Better control*-Central purchase avoids duplication, overlapping so it helps in exercising effective control on material function.
- *Good Relations*-When material is acquired in bulk there may be more favourable terms with vendors due to reduced cost and trade discount.
- *Benefits of Specialisation*-The staff at central purchasing department becomes expert and specialized in purchase function, their expert knowledge and negotiation skills can help in reducing the cost of purchase to great extent.
- *Focused Policy*-Centralized purchasing helps in adopting uniform policies, practices which ultimately helps in reduction of prices at various levels.

Demerits of centralized stores are as under

- The transportation costs of the materials may increase because the movements of the stores may be for a greater distance since the storing is centralized.
- If the user departments are far away from the stores there may be delay in receipt of the stores by those departments.
- Breakdown of inter-departmental transport system may hold up the entire process, and similarly labour problem in the centralized stores may bring the entire concern to standstill.
- There is greater chance of losses through fire, burglary or some other unhappy incidents.
- It may not be safe to have some hazardous elements bunched together in the centralized stores.

2. **Decentralized Purchase System-**Under decentralized purchasing various department units are authorized or made responsible to take decision

   independently and directly. In a way the power to procure material are delegated to the concerned department or lower levels

The advantages of this system are: -

- *Good knowledge*-the department which buys the material better knows the requirements of his department.
- *Fast Communication*-It helps in reducing the lead-time due to speedy communication. The local decision making system on the spot will shorter the time of communication.
- *Effective control*-the department may have better liaison and the control on the local purchase officer.

No single system can be helpful in achieving the results, so partial centralization for high consumption value items and leaving the remaining to the unit level is desirable

to be adopted for better results for the company.

6.2 Purchase Procedure

The success of purchase executives depends a great deal on how well management is able to understand the purchase function. So the management should focus on production target or budget for the concern as a whole. This will help to simplify the work of purchase department. In general, the major functions of a purchase dept. may include:

1. Initiating the Purchase
2. Purchase Requisition
3. Deciding Important Factors
4. Studying the Market and Sources of Supply
5. Placing the Purchase Order
6. Follow Up
7. Receiving and Inspecting the Goods
8. Passing Invoices for Payment

1. Initiating the Purchase

The people who can initiate the purchase of material can be Store keeper, who has to keep his stores in place. Different department heads, who want to acquire such materials, which do not form part of the store list such materials, are not usually kept in the store rooms.

2. Purchase Requisition

A form known as purchase requisition is commonly used as a formal request to the Purchase department for procuring goods and services. The requisition enlists all those articles for which the stock balance has come down to ordering points. Generally purchase requisition is prepared in triplicate, the original copy is sent to purchase department, second to the store department and third copy is kept by department who is preparing the purchase requisition.

3. Deciding Important Factors

It includes deciding upon the following issues.

- What to Purchase?
- When to Purchase?
- How much to Purchase?

4. Studying the Market and Sources of Supply

After deciding quality, quantity, and the next step is to invite inquiries, tenders or quotations from the prospective suppliers in prescribed form with all-necessary details A Purchase Manager is also expected to keep pace with current and expected changes in Government import and industrial licensing policy, emergence of substitutes, He should also be able to predict trend of market and market prices, make a bargain on purchases.

5. Placing the Purchase Order/ Supply Order

Deciding on sources of supply, the purchase manager prepares a purchase order, which is request made by the purchaser to the supplier to deliver certain goods of requisite quality and quantity at the terms and conditions agreed between them. A purchase order gives complete details about quantity, quality, specification of goods, rates approved, place and date of delivery, mode of transport, terms of payment etc. Before placing the purchase executives or purchase manager needs to check the vendor rating which helps to decide on a reliable source who will give uninterrupted supply of material.

6. Follow Up

Follow up of purchase order in essential to keep pace with schedule of supply by the specified date so that production work should not be interrupted. The purchase manager needs to ensure that material should be supplied on agreed date.

7. Receiving and Inspecting the Goods

Generally, in large works a separate department known as receiving department receives the supplies and in small under takings, it is done by storekeeper. The delivery note/ advice note sent by supplier is handed over to receiving officials for checking goods with the advice notes.

8. Passing Invoices for Payment

The invoices received from the suppliers are passed on to the stores accountant who checks the invoice with the supplier's quotations, copy of the purchase order and goods received note.

6.4 Purchasing System

The basic objective of purchase policy is to buy the required material in the right quantity from right source at the right time and price to obtain the maximum value for each rupee spend on material cost. Large organizations usually have a written purchase policy, which clearly gives guidelines and direction to all those related.

Following are the different purchasing system:

1. **Cash Purchase-**In this system payments are made across the counter. Each department head is given some imprest amount and is authorized to purchase subject to a ceiling value per item. The major reason of purchase of such items is that, such items are required urgently.
2. **Tender System**-This system is generally adopted by government sector organizations; the main purpose is to procure materials at the most competitive rates and to eliminate the chances of undue favour to any supplier. Buying should be as impersonal as possible and should foster a spirit of competition. Private sector organizations adopt this method of purchase for items whose values are very high. Major disadvantage of this system is longer time for placing an order compared to other systems.

3. **Sub-Contracting-**This is most commonly used method of procuring manufactured components for few properly chosen items, if the buying organization feels that manufacturing cost will be higher compared to subcontracting cost. The decision to sub contract is based on factors such as capacity utilization, cost of manufacture, and availability of technology. Generally the sub-contractors are smaller establishments with specialists in the line.
4. **System Contract-**In this, the seller becomes the material planner for the buyer. It is long-term contract between the buyers and provides for the automatic replenishment. The system is designed to assist both the buyer and the seller. Regularly consumed low value items are system contracted. The buyer has to be careful in the choice of the contractor, because the agreement is of long duration.
5. **Stockless Purchase-**Zero stock buying is a system, which largely depends upon sound relations between buyer and seller. If the seller /vendor has clear idea about the requirements of the buyer he can hold the stock at a convenient location, from where the buyer can draw from the warehouse according to his needs.
6. **Blanket Order-**Blanket order is generally entered for row value (ABC) C-class items. It is useful for the purchase of those items, whose annual requirements cannot be effectively forecasted. The price can be agreed upon or can be the prevailing market prices at the time of supply. An example of blanket order can be to place an order for the annual supply of stationery items. The buyer can get quantity discount, as he is placing order for a longer period. The seller will have to concentrate more on services than on trying to convince the buyers.
7. **Forward Buying-**In this, the buyers commit to buy at a future date a contracted quality at contracted price, whatever may be the ruling market price then. He wants to protect the organization from any future shortage or due increases inprice. Forward buying helps buyers and sellers to ensure themselves against uncertainties arising from frequent changes in the supply and demand.
8. **Hedging-**The buyer tries to protect himself in the future by entering into two transactions, a purchase and a sale in two markets, whose prices move up and down together. But such perfect conditions do not exist in the market. So hedging is basically a tool for protecting against future losses due to difference in different markets.

6.5 Material or Inventory Control

Materials management is a function responsible for coordination of planning, sourcing, purchasing, moving, storing and controlling materials in an optimum manner so as to provide predetermined services to the customer at a minimum cost. More than fifty per cent of the total cost of the product or job is generally the cost of materials alone, in several industries. Therefore, a control of the cost of the materials is quite essential to meet the objectives of cost control and cost reduction. Material control is exercised beginning from the point the orders are prepared for being placed with suppliers, and ending at the point the materials are effectively utilized in productionor are disposed of otherwise. We have acquired a basic knowledge about thematerials procurement procedure in previous unit and in this unit we will be study about the material storage,

inventory record, inventory control and its various techniques. It is therefore desirable that every materials manager should try to apply proper materials planning, purchasing, handling, storing materials so as to achieve the desired objective of minimising materials procurement and stockholding costs. Material cost control involves the following activities, viz.

- Purchase and procurement
- Receipt and inspection
- Storage, Issue and consumption
- Stock control
- Valuation and accounting

6.6 Salient Features of Material Cost Control

- The quality and specification of materials shall commensurate with the requirements of the product, so that neither too expensive or superior nor cheap or inferior material shall be selected for use in product.
- The purchasing shall aim at minimum price to suppliers and timely procurement and shall avoid urgent purchases at higher cost.
- Storage of materials shall be such that there will be neither overstocking, and thereby blocking Capital, nor running out of stock and creating interruption in production process.
- Wastage and losses shall be avoided at every stage of operation i.e. from storing till usage in production.

6.7 Benefits of Material Control

- **It eliminates wastages in use of raw materials and supplies in course ofpurchase, storage handling and use.**
- Reduces the risk of fraud and theft.
- Ensures uninterrupted flow of materials of the right quality for use in production.
- Facilities preparation of accurate monthly financial statements required for various management information reports.
- Furnishes quickly and accurately the value of material and supplies used in various departments.
- Reduces to the minimum the capital locked up in inventories.
- Prevents production hold ups by supplying proper quantities at right time. And provides for accountability on the part of those who are responsible for exercising material management.

6.8 Material Storage

Proper Storing of materials is of primary importance. It is not enough only to purchase material of the required quality. If the purchased material subsequently deteriorates in quality because of bad storage, the loss is even more than what might arise from purchase of bad quality materials. Apart from preservation of quality, the store-keeper also must ensure safe custody of the material. It should be the function of storekeeper that the right quantity of materials always should be available in stock.

6.9 Duties of Store Keeper

- These can be briefly set out as follows:
- To exercise general control over all activities in stores department.
- To ensure safe keeping both as to quality and quantity of materials.
- To maintain proper records.
- To initiate purchase requisition for the replacement of stock of all regular stores items wherever to stock level of any item of store reaches the minimumlimit fixed in respect thereof.
- To initiate action for stoppage of further purchasing when the stock level reaches the maximum limit.
- To check and receive purchased materials forwarded by the receiving department and to arrange for the storage in appropriate places.
- To reserve a particular martial for a specific job when so required.
- To issue materials only in required quantities against authorized requisition notes/material lists.

6.10 Types of Store

1. ***Central or Main Store-*** The central stores are the most common of all and in practice, factories generally have only a central store under the control of one store keeper. Such a store is centrally situated and is easily accessible to all departments. If receipts and issues of different items of stores are not large, and the various departments are close to each other, one ventral store for all purposes is sufficient.
2. ***Sub-Store***-In big organizations, particularly in the case of collieries, tea gardeners, etc., where the work spots are distributed over a large area, sub-stores are created. A sub-store is in fact a branch of the central store. It is generally created to facilitate easy accessibility to the various work spots or consumption centres.
3. ***Departmental Store-*** Departmental stores are created normally to minimize the time spent on drawing from stores. For example, a week's supply may be drawn at one time and kept in a departmental store at a place marked for the purpose. Such stores, however, are essential where one or more production departments work in multiple shifts and the central store works for only one shift; also for the storage of work in progress and semi-finished components where these are large in number or in bulk.

6.11 Store Record

The record of stores may be maintained in three forms:

- Bin Cards
- Stock Control Cards
- Stores Ledger

The first two forms of accounts are records of quantities received, issued and those in balance, but the third one is an accounts of their cost also. Usually, the accounts

are kept in two forms, the quantitative in the store and quantitative-cum-financial in the cost department.

- ***Bin Cards and Stock Control Cards***-Both are essentially and mostly similar and contain quantitative records of stores. Stock cards contain further information's regarding stock on order. Bin cards are kept attached to the bins or receptacles or quite near there to so that these also assist in the identification of stock. The stock control cards, on other hand, are kept in cabinets or trays of loose binders.
- ***Store Ledger-***The stores ledger (also called as priced stores ledger) is maintained in the cost accounting department and contains the same information as in bin card with addition of rate and value of materials. Generally, stores ledger is maintained in a loose-leaf ledger form. The numberof ledger cards is the same as in case of bin cards, and the two sets are reconciled when physical inventory is taken. The sources of posting in bin cards and stores ledger are the same. Hence, there should not be any quantity difference between the two.

Self-assessment question

1. The purchase department has to exercise utmost care to procure the quality materials at ……
2. In ABC analysis, A stands for_____materials.
3. the method of regular physical checking of materials throughout the year is known as_____.

6.12 Summary

Purchasing is a specialized activity in a manufacturing concern because it has its bearing on every vital factor concerning the manufacture like quantity, quality, cost, efficiency, prompt delivery, and volume of production. Quality of finished product ultimately depends upon quality of raw materials used in it. High skill work can of course help in improving the quality of product but it cannot change the character of raw material, which is base for the end product. The basic objective of purchase policy is to buy the required material in the right quantity from right source at the right time and price to obtain the maximum value for each rupee spend on material cost.Proper Storing of materials is of primary importance. It is not enough only to purchase material of the required quality. If the purchased material subsequently deteriorates in quality because of bad storage, the loss is even more than what might arise from purchase of bad quality materials.

6.13 Glossary

Order entry: It refers to those activities that are involved in collecting, checking and transmitting sales order information.

Periodical Review System: A system under which the time interval between two orders is fixed and the size of order is determined as per actual requirement.

Perpetual Review System: A system under which, when stock reaches the reorder

level, a fresh order for a pre-fixed quantity is placed.

Reorder Level: It is the level of stock at which a fresh order is initiated.

Reorder Quantity: The quantity of goods for which an order is actually placed at a time.

6.14 Answer: Self-Assessment

See chapter 5 section 5.6 question number 3,4,5

6.15 Terminal Questions

See chapter 5 section 5.7

6.16 Suggested Readings

- I.M. Pandey, Financial Management, Vikas Publishing, New Delhi. Khan and Jain, Management Accounting.
- Prasanna Chandra, Financial Management - Theory and Practice, Tata McGraw Hill, New Delhi (1994).
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- Mittal. Maheshwari (2016) Cost Accounting, Principles and Practice, Shree Mahavir Book Depot, Publishers,
- Arora.M.N, Katyal.Priyanka.(2019),Cost Accounting, Vikas Publishing House Pvt. Ltd.

Lesson -7

Methods of Valuing Material Issues

Structure:

7.1 Learning Objectives

After studying this lesson, you should be able to:

- Understand issue of materials.
- Identify the methods of pricing of materials issue.

7.2 Material Issue Procedure

Issue of material must not be made except under properly authorized requisition slip; usually it is the foreman of a department who has the authority to draw materials from the store. Issue of material must be made on the basis of first in fist out, that is, out of the earliest lot on hand. If care is not exercised in this regard, quality of earliestlot of material may deteriorate for having been kept for a long period. Issue of material must not be made except under properly authorized requisition slip; usuallyit is therefore man of a department who has the authority to draw materials from the store.

7.2.1 Material Requisition Note (MRN)

This is an authorisation to the storekeeper to issue material duly signed by the authorised person of the receiving department. This is an acknowledgment of material received by the user department. It contains necessary details like job number, name of the department, description, code no., unit and quantity of the material requisitioned. Generally, the material requisition note is pre-numbered. It forms the basis of material accounting, and therefore, all columns should be filled in clearly and legibly for correct accounting of materials issued from stores to production, maintenance and other departments.

7.2.2 Material Transfer Note (MTN)

This document is used to record transfer of materials from one department or job to another. When excess material remains in one department, and another neighboring department need the same, it becomes easier and economical totransfer the material rather than receiving back in stores, and again issue them. However, the MTN should be prepared correctly to avoid incorrect accounting.

7.2.3 Bill of Material

It is also known as material specification list or simply material list. It is a schedule of standard quantities of materials required for any job or other unit of production. A comprehensive materials list should rigidly lay down the exact description and specification of all material required for a job or other unit of production and also required quantities so that if there is any deviation from the standard list, it can easily be detected. The materials list is prepared by the engineering or planning department in a standard form. The number of copies prepared varies according to the requirement of each business, but four is the minimum number. A copy of it is usually sent to each of the following department:

- To store department
- To cost account department
- To production control department
- To planning department

7.2.4 Return of Material

Sometimes, it is not possible before end to make any precise estimate of thematerial requirements or units of production. Besides, at times due to some technicalor other difficulty, it is not practicable to measure exactly the quantity of material required by a department. In either case, material may have to be issued from storesin bulk, often in excess of the actual quantity required. Where such a conditions exists, it is of the utmost important from the point of view of materials control that anysurplus material left over on the completion of a job should be promptly hand over to the storekeeper for safe and proper custody.

7.3 Pricing of Material Issued

Materials are issued from the store to the jobs or work orders as per the requirement. The price of the material always changes in accordance with the market conditions. So there is a need to know about the price at which the material should be issued. The important cost price methods of pricing of material issued are as follows:

1 First in First out (FIFO) Method
2 Last in First out (LIFO) Method
3 Average Price Method
4 Replacement Price Method
5 Highest-in-First-out (HIFO)
6 Next-in-First-out (NIFO)
7 Standard Price Method

1. First in First out (FIFO) Method

It is a method of pricing the issue of materials in the order in which they arepurchased. In other words the materials are issued in the order in which they arrivein the store. This method is considered suitable in times of falling price because the material cost charged to production will be high while the replacement cost ofmaterials will be low. In case of rising prices this method is not suitable. This method is considered suitable in times of failing price because the material cost charged to production will be high while the replacement cost of materials will be low. But in the case of rising prices, if these methods adopted, the charge to production will be low as compared to the replacement cost of materials (as in the current period) in future without having additional capital resources.

- **Advantages of FIFO**
  - It is simple and easy to operate.
  - In case of falling prices, this method gives better results.
  - Closing stocks represents the market prices. Material cost charged to production represents actual cost with which the cost of productionshouldhave been charged.
  - In the case of falling prices, the use of this method gives better results.
  - Closing stock of material will be represented very closely at current market price.
  - The old material is issued first. Thus, there remains no possibility of loss of material due to spoilage or obsolescence.
- **Disadvantages of FIFO**
  - If the prices fluctuate frequently, this method may lead to clerical errors.
  - In case of rising prices this method is not advisable.
  - The material costs charged to same job are likely to show different rates.

2. Last in First out (LIFO) Method

Under this method the prices of last received batch (lot) are used for pricing the issues, until it is exhausted and so on. During the inflationary period or period of rising prices, the use of LIFO would help to ensure the cost of production determinedapproximately on the above basis is approximately the current one. Under LIFO stocks would be valued at old prices, but not represent the current prices. This method is based on the assumption that the items of the last batch (lot) purchased are the first to be issued. Therefore, under this method the price of the last batch (lot)is used for pricing the issues, until it is exhausted, and soon. If however, the quantity of issue is more than the quantity of the latest lot than earlier (lot) and its price will also be taken into consideration.

- **Advantages of LIFO**
  - The cost of materials issued will be either nearer to and/or will reflect the current market price.

- In case of falling prices profit tends to rise due to lower material cost. In the case of falling prices profit tends to raise due to lower material cost, yet the finished products appear to be more competitive and are at market price.
- Over a period, the use of LIFO helps to level out the fluctuations in profits.
- In the period of inflation LIFO will tend to show the correct profit and thus avoid paying undue taxes to some extent.

- **Disadvantages of LIFO**
  - The computations become complicated if too many receipts are there.
  - Companies having JIT system will face this problem more.
  - In time of falling prices, there will be need for writing off stock value considerably to stick to the principle of stock valuation, i.e., the cost or the market price whichever is lower.
  - This method of valuation of material is not acceptable to the income tax authorities.
  - The closing stock is priced at a very old price which does not show the correct position of the business**.**

Example 1

The stock of material held on 1-4-2015 was 400 units @ 50 per unit. The following receipts and issues were recorded. You are required to prepare the Stores Ledger Account, showing how the values of issues would be calculated both through FIFO AND LIFO methods.

2-4-2015 Purchased 100 units @55 per unit

6-4-2015 Issued 300 units

10-4-2015 Purchased 600 units @ 60 per unit

13-4-2015 Issued 400 units

20-4-2015 Purchased 500 units @ 65 per unit.

25-4-2015 Issued 600 units

Solution

Stores Ledger Account under FIFO Method

DATE	RECEIPTS			ISSUE			BALANCE		
	Q	P	V	Q	P	V	Q	P	V
1-4-2015							400	50	20000
2-4-2015	100	55	5500	-	-	-	400] 100]	50 55	20000 5500
6-4-2015	-	-	-	300	50	15000	100]	50	5000

							100]	55	5500
10-4-2015	600	60	36000	-	-	-	100] 100] 600]	50 55 60	5000 5500 36000
13-4-2015	-	-	-	100] 100] 200]	50 55 60	5000 5500 12000	400	60	24000
20-42015	500	65	32500	-	-	-	400] 500]	60 65	24000 32500
25-4-2015	-	-	-	400] 200]	60 65	24000 13000	300	65	19500

Stores Ledger Account under LIFO Method

DATE	RECEIPTS			ISSUE			BALANCE		
	Q	P	V	Q	P	V	Q	P	V
1-4-2015							400	50	20000
2-4-2015	100	55	5500	-	-	-	400] 100]	50 55	20000 5500
6-4-2015	-	-	-	100] 200]	55 50	5500 10000	200	50	10000
10-4-2015	600	60	36000	-	-	-	200] 600]	50 60	10000 36000
13-4-2015	-	-	-	400	60	2400	200] 200]	50 60	10000 12000
20-42015	500	65	32500	-	-	-	200] 200] 500]	50 60 65	10000 12000 32500

25-4-2015	-	-	-	500] 100]	65 60	32500 6000	200 100	50 60	10000 6000

3. Average Price Method

(a)Simple Average Price 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.

Material Issue Price = Total of unit prices of each purchase / Total No of Units

This method is useful, when the materials are received in uniform lots of similar quantity and prices do not fluctuate considerably.

Advantages of simple average method are mentioned below:

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

(b) This method smoothens 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,

(c) As the issues are not priced at the actual costs, usually profit or loss will arise if this method is used

(b) Weighted Average Price Method- This method removes the limitation of Simple Average Method in that it also takes into account the quantities which are used as weights in order to find the issue price. This method uses total cost of material available for issue divided by the quantity available for issue.

Issue Price = Total Cost of Materials in stock / Total Quantity of Materials in stock

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.

Difference between Simple and Weighted Average Method:

Simple Moving Average: A simple moving average is calculated by adding all prices within the chosen time period, divided by that time period. This way, each datavalue has the same weight in the average result.

Weighted Moving Average: A weighted moving average puts more weight on recent data and less weight on older data. A weighted moving average is calculated by multiplying each data with a factor from day "1" till day "n" for the oldest to the most recent data; the result is divided by the total of all multiplying factors.

Example 2

Prepare a statement showing the pricing of issues, on the basis of (a) SimpleAverage and (b) Weighted Average methods from the following information pertaining to Material-P

2015 March	1	Purchased 100 units @ 10 each
March	2	Purchased 200 units @ 10.2 each.
March	5	Issued 250 units to Job X
March	7	Purchased 200 units @ 10.50 each
March	10	Purchased 300 units @ 10.80 each
March	13	Issued 200 units to Job Y
March	18	Issued 200 units to Job Z
March	20	Purchased 100 units @ 11 each
March	25	Issued 150 units to Job K

Solution

(a) Simple Average Method

DATE	RECEIPTS			ISSUE			BALANCE	
	Q	P	V	Q	P	V	Q	V
March 1	100	10	1000	-	-	-	100	1000

March 2	200	10.2	2040	-	-	-	300	30.40
March 5	-	-	-	250	10.10[1]	2525	50	515
March 7	200	10.5	2100	-	-	-	250	2615
March 10	300	10.8	3240	-	-	-	550	5855
March 13	-	-	-	200	10.50[2]	2100	350	3755
March 18	-	-	-	200	10.65[3]	2130	150	1625
March 20	100	11	1100	-	-	-	250	2715
March 25	-	-	-	150	10.90[4]	1635	100	1090

Working Notes:

1. Calculation of Price for Issue on March 5th

= 10 + 10.2 / 2 = 10.10

2. Calculation of Price for Issue on March 13th

= 10.2 + 10.5 + 10.8 / 3 = 10.5

3. Calculation of Price for Issue on March 18th

= 10.5 + 10.8 / 2 = 10.65

4. Calculation of Price for Issue on March 25th

= 10.8 + 11 / 2 = 10.90

(b) Weighted Average Methods

DATE	**RECEIPTS**			**ISSUE**			**BALANCE**	
	Q	P	V	Q	P	V	Q	V
March 1	100	10	1000	-	-	-	100	1000
March 2	200	10.2	2040	-	-	-	300	3040
March 5	-	-	-	250	10.13[1]	2533	50	507
March 7	200	10.5	2100	-	-	-	250	2607
March 10	300	10.8	3240	-	-	-	550	5847

March 13	-	-	-	200	10.63[2]	2126	350	3721
March 18	-	-	-	200	10.63[3]	2126	150	1595
March 20	100	11	1100	-	-	-	250	2695
March 25	-	-	-	150	10.78[4]	1617	100	1078

Working Notes:

1. Calculation of price for Issue on March 5th

= 3040/300 = 10.13

2. Calculation of price for Issue on March 13th

= 5847/550 = 10.63

3. Calculation of price for Issue on March 18th

= 3721/350 = 10.63

4. Calculation of price for Issue on March 25th

= 2695/250 = 10.78

4. 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. It is most suitable for business that buys large quantities of materials well in advance of requirements.

Advantages:

Following are the main advantages of this method:

(a) 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.

(b) The material cost is charged at the current market prices.

Disadvantages:

1. 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.
2. As issues are not prices at actual cost, it results in unrealized profit or loss.
3. The inventory valuation is not at current prices.

Example 3: From the following particulars, prepare a stores ledger account by Market price Method of issue of materials purchased.

Purchases:	May 2	1,000 units @ Rs. 1 per unit
	May 10	1,500 units @ Rs.1 per unit
Issues:	June 8	500 units @ Rs.1.10 per unit
	July 20	1,000 units @ Rs.1.25 per unit.

Solution:

Stores Ledger Account with the Help of Market Price Method

DATE	RECEIPTS			ISSUE			BALANCE		
	Q	P	V	Q	P	V	Q	P	V
May 2	1,000	1.00	1,000				1,000	1.00	1,000
May 10	1,500	1.00	1,500				2,500	1.00	2,500
June 8				500	1.10	550	2,000		1,950
July 20				1,000	1.25	1,250	1,000		7,00
	2,500		2,500	1,500		1,800	1,000		700

5. Highest-in-First-out (HIFO)

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 alwayspriced at higher prices and the closing stock is, therefore, valued at the lowest possible price.

6. Next-in-First-out (NIFO)

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. For 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.

7. Standard Price Method:

"Standard Price is predetermined price which is fixed for a definite period, such as a year. It is fixed on the basis of a specification of all the factors affecting that price". Firms which follow standard costing will record all the receipts and issues of materials at the standard price which will be fixed in advance. In this case, both the receipts and issues will cost at a standard rate. Hence it is a predetermined price.

Advantages:

The main advantages of this method are:

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

(b) It is simple and easy to work, and

(c) It is a tool for measuring the purchase efficiency.

Disadvantages:

This method suffers from the following disadvantages:

(a) The use of standard price for material issues results in material profit or loss, and
(b) This method deviates from the costing principle, in the sense that the issue is not valued at the cost price

Example 4: The purchases and issues of materials A in the month of March, 2018 is as follows:

March 2018,

3	purchase 800 units @ Rs. 20 per unit.
8	purchase 700 units @ Rs. 18 per unit.
9	Issue 600 units.
11	Issue 800 units.
17	purchase 800 units @ Rs.20 per unit.
25	purchase 500 units @ Rs. 25 per unit.
31	Issue 1,000 units.

The standard price of per unit of material is Rs. 20 fixed for the year 2018. Show the Stores Ledger Account with the help of standard price method for the month of March, 2018.

The closing stock of 400 units of Rs. 9,100 should be valued at the standard price of Rs. 20 per unit. Therefore, the value of the stock should be (400×20) = Rs 8,000. Material price variance = Actual price – Standard price or Rs 9,100 – Rs 8,000 =

Rs1, 100 (Adverse). This would be charged to costing P&L Account.

Solution:

Stores Ledger Account for the Month of March, 2018

DATE	RECEIPTS			ISSUE			BALANCE	
March 2018	Q	P	V	Q	P	V	Q	V
March 3	800	20	16,000				800	16,000
March 8	700	18	12,600				1,500	28,600
March 9				600	20	12,000	900	16,600
March 11				800	20	16,000	100	600
March 17	800	20	16,000				900	16,600
March 25	500	25	12,500				1,400	29,100
March 31	-	-	-	1,000	20	20,000	400	9,100

Self Assessment

Fill in the blanks:

1. The basic purpose of inventory control is to maintain optimum level of_____.
2. _____is based on the assumption that the units which are acquired first are issued first.
3. ._____uses the price of the last batch received for all issues until all units from this batch have been issued.
4. _____is the reverse of the FIFO method.
5. _____does not attach any importance to the quantity in each consignment.
6. Any number of issues can be priced at the ..... until the receipt of a new consignment which necessitates the calculation of issue price afresh.
7. …… involves considerable work of finding out the replacement price at the time of each issue.
8. _____is a master requisition of materials which lists all the materials required for a job.
9. In_____method of pricing, closing stock is valued at the oldest price paid.
10. shows the materials returned to the stores department.
11. _____is a document which initiates the purchase procedure.

7.4 Summary

Materials constitute a very significant proportion of total cost of finished product. More than fifty percent of the total cost of the product or job is generally the cost of materials alone, in several industries. Therefore, a control of the cost of the materialsis quite essential to meet the objectives of cost control and cost reduction.Materials are issued from the store to the jobs or work orders as per the requirement. Theprice of the material always changes in accordance with the market conditions. So there is a need to know about the price at which the material should be issued.

7.5 Glossary

Simple Average: Moving average that equals weight to price.
Standard Price: Constant price.
Stock Balance: Inventory of raw material, work in progress and finished goods.
Bill of Material: A specification of the nature and quantity of the materials and parts entering into a particular product.
Inventory: A schedule of items held at a particular point in time.
Scrap: The incidental material residue coming out of certain manufacturing operations having low recoverable value.
Spoilage: Goods damaged beyond rectification to be sold without further processing.

7.6 Answers: Self-Assessment

1. Inventory 2. FIFO method 3. FIFO
5. LIFO 9. Simple Average method 13. Same rate
15. Market Price 16. Bill of materials 17. Last in First out
18. Material Return Note 19. Purchase Requisition Note

7.7 Terminal Questions:

1. What do you understand by Maximum level, Minimum level and Reordering level?
2. Write a detailed note on various cost price methods of pricing of material.
3. Write short notes on the followings:
   (a) FIFO Method, (c) Simple Average Cost Method, and
   (b) LIFO Method, (d) Weighted Average Cost Method.
4. The receipt side of the Stores ledger account shows the following particulars:

   July 01 Opening balance 500 units @ Rs. 4 per unit.
   ” 05 Received 200 units @ Rs. 4.25 per unit.
   ” 12 Received 150 units @ Rs. 4.10 per unit.
   ” 20 Received 300 units @ Rs. 4.50 per unit.
   ” 25 Received 400 units @ Rs. 4.00 per unit.

   Issue of the materials are as follows:

   July 04 Issued 200 units.
   ” 10 Issued 400 units.

” 15 Issued 100 units.
” 19 Issued 100 units.
” 26 Issued 200 units.
” 30 Issued 250 units.

Write out Stores ledger account pricing the issues on the principle of FIFO and LIFO

7.8 Suggested Readings:

I.M. Pandey, Financial Management, Vikas Publishing, New Delhi.

S.N. Maheshwari, Management Accounting.

V.K. Goyal, Financial Accounting, Excel Books, New Delhi.

Nitin Balwani, Accounting & Finance for Managers, Excel Books, New Delhi.

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Mittal. Maheshwari (2016) Cost Accounting, Principles and Practice, Shree Mahavir Book Depot, Publishers,

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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.

Shah Paresh, Management Accounting, Oxford University Press, New Delhi, 2009.

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Lesson -8
LABOUR COST CONTROL

Structure:

8.1 Learning Objectives

After studying the lesson, you should be able to:

- Understand labour cost and its key aspects.
- Distinguish between direct labour and indirect labour.
- Understand the various methods to evaluate labour turnover.

8.2 Introduction

Labour cost is a second major element of cost. The control of labour cost and its accounting is very difficult as it deals with human element. Labour is the most perishable commodity and as such should be effectively utilized immediately. The role of labour in production cannot be overlooked in spite of the fact that machines are being used a vast scale these days. The efficiency of production department is based on the skill of workers. In the absence of skilled workers product cannot be manufactured. Workers convert raw materials into finished goods. Skilled worker helps in decreasing the cost of product besides increasing the quality and quantity of the production. It should be remembered that Labour is not like material as there is a human aspect involved in it. Therefore, there should be a comprehensive study of all related aspects of Labour Cost and then only computation and control over the same will be possible. Attention should also be paid to the productivity aspect. Low productivity results in higher Labour Cost per unit while higher productivity willreduce the Labour Cost per unit.

8.3 Types of Labour

Labour is of two types (a) direct labour, (b) indirect labour. Direct Labour is that labour which is directly engaged in the production of goods or services and which can be conveniently allocated to the job, process or commodity or process. For example labour engaged in spinning department can be conveniently allocated to the spinning process. Indirect Labour is that labour which is not directly engaged in the production of goods and services but which indirectly helps the direct labour engaged in production. The examples of indirect labour are supervisors, sweepers, cleaners, time-keepers, watchmen etc. The cost of indirect labour cannot be conveniently allocated to a particular job, order, process or article.

Table 8.1 Distinction between Direct Labour and Indirect Labour

Point of Distinction	**Direct Labour**	**Indirect labour**
Identification	It can be really identified with a particular job or work order.	It cannot be directly identified with a particular job or work order.
Variability	It changes directly with the volume of output.	It may or may not change directly with the volume of output.
Treatment of cost	Direct labour cost is treated as part of Prime cost.	Indirect labour cost is treated as part ofoverhead

8.4 Importance of Labour Cost

Management is interested in the labour costs due to the following reasons.

- To use direct labour cost as a basis for increasing the efficiency of workers.
- To identify direct labour cost with products, orders, jobs or processes for ascertaining the cost of every product, order, or process.
- To use direct labour cost as a basis for absorption of overhead, if percentage of direct labour cost to overhead is to be used as a method of absorption of overhead.
- To determine indirect labour cost to be treated as overhead and
- To reduce the labour turnover.

So control of labour cost is an important objective of management and the realization of this objective depends upon the co-operation of every member of the supervisory force from the top executive to foremen.

Self-Assessment

Fill in the blanks:

1. _____is that labour which is directly engaged in the production ofgoods or services.
2. Direct labour cost is treated as part of_____.
3. _____is treated as part of overhead.

8.5 Labour Turnover

Labour Turnover of an organisation is change in the labour force during a specified period measured against a suitable index. The rate of Labour Turnover in an industry depends upon several factors such as, nature of the industry, its size, location and composition of the labour force. A controlled level of Labour Turnover is considered desirable because it helps the firm to adjust the size of its labour force in response to needs such as for seasonal changes or changes in technology. Labour turnover is the number of employees who leave the factory during a period in relation to the number of workers employed during the year due to resignation, new appointment, retrenchment, old age, ill health, pregnancy, death etc.

8.4.1 Reasons behind Labour Turnover

The causes giving rise to high labour turnover may be broadly classified under the following the heads:

1. **Personnel Causes**-Workers may leave employment purely on personal grounds like dislike for the job, locality or environments, domestic troubles and family responsibilities, Change of line for betterment, retirement due to oldage and ill health etc. In all such cases, personal factors count the most and employer can practically do nothing to help the situation.
2. **Unavoidable Causes-**In certain circumstances it becomes obligatory on the part of the management to ask some of the workers to leave. These circumstances may like retrenchment due to seasonal trade, shortage of any material and slack market for the product, etc.
3. **Avoidable Causes**-Under this head, may be grouped the causes which need the attention of the management most so that the turnover may be kept low by taking remedial measures. The reasons for which workers leave are unsuitability of job, low pay, unsatisfactory working conditions, unhappy relations with co-workers and unsatisfactory behaviour of superiors.

8.4.2 Effects of Labour Turnover

It results in an increase in the cost of production due to the following reasons:

(i) Cost of training for new workers,
(ii) Cost of replacing workers, i.e., cost of selection,
(iii) Newly employed workers are likely to mishandle of machines and equipments, and
(iv) Loss arising out of defective work and increased wastage in production process,

8.4.3 Cost of Labour Turnover

The cost of labour turnover can be divided under two broad categories:

(a) Preventive Costs: These are costs which are incurred by a firm to keep acontented labour force so as to prevent excessive labour turnover. The aim of these costs is to keep the workers satisfied so that they may not leave the industry. The costs may include:

(i) Cost of personnel administration,
(ii) Cost of medical services,
(iii) Cost of providing good working conditions,
(iv) Cost of welfare, e.g., provision for subsidized canteen, sports facilities, etc.
(v)Cost of gratuity and pension, etc.
(vi) A portion of high wages, bonuses, perquisites, etc.

(b) Replacement Costs: Labour turnover is associated with replacement. Replacement necessitates recruitment, training and absorption of new workers. Since, the new workers will take more time to do a job than a trained worker, there will be loss of output and more wastage. These costs are associated with replacement of workers and it includes:

(i) Cost of recruitment, training, induction, placement, etc.
(ii) Inefficiency of new workers,
(iii) Cost of scrap and defective products of production,
(iv) Loss of goodwill and hence high costs in terms of disadvantageous labour contracts,
(v) Cost of additional compensation payable arising out of frequent accidents,

Self-Assessment:

Fill in the blanks:

1. …… denotes the percentage change in the labour force of an organization.
2. Cost of labour turnover is treated as an …… and should not be charged direct to any work order.
3. …… is that time for which the employer pays, but from which he obtains no production.
4. …… represents the time wastage that cannot be avoided and, therefore, the employer must bear the labour cost of this time.
5. The …… includes the time wasted on account of the failure of the power supply.
6. The wages paid for abnormal idle time should be debited to costing ……
7. Labour turnover according to …… = Number of employees left during a period/Average number of employees during a period × 100

8.6 Summary

Labour cost is an important part of total cost of production. Therefore, there is a needfor effective control over labour cost. Various departments contribute to the efficient utilization of labour and adequate control over costs. Personnel department has to provide an efficient labour force. The engineering department maintains control over working conditions and production methods for each job and department or process by preparing plans and specifications. *Labour cost* is a significant element of cost especially in an

organization using more manual operations. It is the cost of human endeavor in the product and requires coordinated efforts for its control. The management objective of keeping labour cost as low as possible is achieved by balancing productivity with wages. Labour turnover is the rate of change of labour force in an organization during a specified period. Change in labour force takes placedue to separations and new appointments, and therefore, cannot be avoided totally. However, a high labour turnover ratio adds to high cost and low productivity. It shall therefore be kept at as minimum level as possible by analyzing the causes andinitiating remedial measures to control it.

8.7 Glossary:

Abnormal Idle Time: It is that time wastage which can be avoided if proper precautions are taken.

Differential Piece Rate: Under this scheme earnings vary at different stages in the range of output, sometimes proportionally more, sometimes less, or sometimes in proportion to output, designed to reward efficient workers with the further object of encouraging less efficient workers or a trainee to improve.

Idle Time: Idle time is that time for which the employer pays, but from which he obtains no production.

Labour Turnover: It denotes the percentage change in the labour force of an organization.

Normal Idle Time: This represents the time wastage that cannot be avoided and, therefore, the employer must bear the labour cost of this time.

8.8 Answers: Self-Assessment

1. Direct Labour
2. Prime cost
3. Indirect labour cost
4. Labour turnover
5. Overhead expense
6. Idle time
7. Normal idle time
8. Abnormal idle time
9. Profit & Loss Account
10. Separation method

8.9 Terminal Questions:

1. What is the importance of control of labour cost?
2. What is labour turnover? Describe the effect of high labour turnover on costs. Also mention the various methods of its measurement.
3. Write short notes on:
   a) Overtime.
   b) Idle time.
   c) Direct and Indirect labour.
4. Idle time is that time for which the employer pays, but from which he obtains no production. Discuss.

8.10 Suggested Readings:

I.M. Pandey, Financial Management, Vikas Publishing, New Delhi.

S.N. Maheshwari, Management Accounting.

V.K. Goyal, Financial Accounting, Excel Books, New Delhi.

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Arora.M.N, Katyal.Priyanka. (2019), Cost Accounting, Vikas Publishing House Pvt. Ltd.
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.
Shah Paresh, Management Accounting, Oxford University Press, New Delhi, 2009.

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Lesson 9
METHOD OF VALUATION LABOUR COST

Structure:

9.0 Learning Objectives

After studying the lesson, you should be able to:

- Understand the various methods to evaluate labour turnover.
- Labour Cost Control

9.1 METHODS TO CALCULATE LABOUR TURNOVER

It is essential for any organisation to measure the Labour Turnover. This is necessary for having an idea about the turnover in the organisation and also to compare the Labour Turnover of the previous period with the current one. The following methods are available for measurement of the Labour Turnover:

1. Separation Rate Method
2. Replacement Rate Method
3. Flux Rate Method

1. Separation Rate Method

In this method, instead of taking the number of employees added, number of employees left during the period is taken into consideration. The method of computation is as follows.

Labour Turnover = {Number of separations/Average number of workers during the period*} ×100

****The average number of workers = {No. of Workers at the beginning of period +No. of Workers at the end of period}/ 2***

2. Replacement Method

In this method neither the additions nor the separations are taken into consideration. The number of employees replaced is taken into consideration for computing the Labour turnover.

Labour Turnover = (Number of replacements/Average number of workers during the period*) ×100

****The average number of workers = {No. of Workers at the beginning of period +No. of Workers at the end of period}/ 2***

3. Flux Method

Under this method Labour Turnover is computed by taking into consideration the additions as well as separations. The turnover can also be computed by taking replacements and separations also. Computation is done as per the following method.

Labour Turnover = ½ [Number of additions + Number of separations] /Average number of workers during the period X100

Example 1

Calculate Labour turnover rates by Separation, Replacement and Flux method from the following information for the month of March, 2015.

No. of Workers on 1-3-2015= 950

No. of Workers on 31-3-2015= 1050

No. of Workers left the factory in March=10

No. of Workers discharged in March=30

Workers recruited in the month (including 120 for Expansion) 140

Solution

1. Separation Method

Labour Turnover = {Number of separations/Average number of workers during the period*} ×100

*The average number of workers = {No. of Workers at the beginning of period +No. of Workers at the end of period}/ 2

Labour Turnover = {[10+30]/1000} ×100

Labour Turnover = {40/1000} ×100

Labour Turnover = 4%

2. Replacement Method

Labour Turnover = (Number of replacements/Average number of workers during the period) ×100*

**The average number of workers = {No. of Workers at the beginning of period +No. of Workers at the end of period}/ 2*

Labour Turnover = {[140-120]/1000} X 100

Labour Turnover = {20/1000} X 100

Labour Turnover = 2%

3. Flux Method

Labour Turnover = ½ [Number of additions + Number of separations] /Average number of workers during the period X100

Labour Turnover = [½(40+ 20) / 1000] ×100

Labour Turnover = [30/1000] X 100

Labour Turnover = 3%

Working Notes
Average number of workers= {Opening number of workers + Closing number of workers} / 2 = {1900 +2100}/2 =2000
Average number of workers= [950+1050]/2
Average number of workers= 1000

Example 2

Labour force at the beginning of the month is 1900 and at the end of the month March 2100. During the month, 25 people left while 40 persons were discharged.280 workers were engaged out of which only 30 were appointed in the vacancy created by the number of workers separated and the rest on account of expansion scheme. Calculate the Labour Turnover by Replacement and Flux methods.

Solution

1. Replacement Method

Labour Turnover = (Number of replacements/Average number of workers during the period) ×100*

**The average number of workers = {No. of Workers at the beginning of period +No. of Workers at the end of period}/ 2*

Labour Turnover =30/2000 X 100 = 1.5%

2. Flux Method

Labour Turnover = ½ [Number of additions + Number of separations] /Average number of workers during the period X100

Labour Turnover = [½(280 + 65) / 2000] ×100 = 173/2000 X 100 = 8.63%

Working Notes
Average number of workers={Opening number of workers + Closing number of workers} / 2 = {1900 +2100}/2 =2000

9.2 Labour Cost Control

Labour is an essential element of the process of production, and it also plays a vital role in producing a product. In large organisation or concerns, labour is controlled by following five departments:

1. Personnel Department
2. Work Study and Engineering Department
3. Time-keeping Department
4. Payroll Department
5. Cost Accounting Department

1. Personnel Department-All the activities of selection, appointment and placement of workers are performed by this department. The personnel manager must have the knowledge of current labour laws and labour conditions in the industry, labour policies of the company, production programme and several problems of the workers. With the help of this information the manager is able to provide appropriate candidate to the industry and manager can remove all theproblems which are persists in the industry in favour of labour. The personnelmanager records all these information of workers into a card which is called workers history card.

2. Work Study and Engineering Department-Work study department, helps in establishing control over working conditions. This department also control over productive methods for each job and each department. The main functions of this department are as follows:

- Time Study-Time study determines standard time for an operation by direct time. It takes place with the help of stop watches to fix standard time for the job/operations. While fling standard time necessary time for rest is also added. Time study is very useful in standard costing. It serves the purposes like preparation of pay rolls in case of time-paid workers, meeting the statutory requirements, ensuring discipline in attendance, recording of each worker's time and overhead distribution.
- Motion Study-Motion study is related with the determination of standardised methods for performing several jobs. When a worker is required to perform operations at work during which his body is moving such as movement at hands, eyes and neck. With the help of this study such movements can be minimized by proper arrangement of light, place of machines and height of chairs to reduce fatigue and tiredness.
- Job Analysis-Job analysis includes preparation of a description and classification of each job with a list of qualification needed by the workers. The main object of job analysis is to ascertain the relative worth of each job through objective evaluations.

- Merit rating is the qualitative and quantitative assessment of the worker's personality and performance. Merit rating is based on factors like quality of work, quantity of work, attendance, discipline and co-operations and job knowledge etc.

3. Time-keeping Department- Generally, time keeping department records each worker's time 'in' and 'out' of the factory and the time of each employee for each department. There are two methods of time-keeping; manual methods and the mechanical methods. Whichever method is used it should make a correct record of the time and the method should be cost effective and minimize the riskof fraud. The manual methods of time keeping are attendance register method, and metal disc method. The mechanical methods that are generally used for the recording of time of workers may be as time recording clocks and dial time records. This department maintains different cards which are as follows:

- Attendance Register Method: Under this method, an attendance register is kept at the entrance of the factory or organisation and the workers' attendance in and out of the factory gate or organisation gate is being noted. The noting down of arrival and departure time of the workers may be done by the workers themselves or by an employee appointed for this purpose. Thereafter, the entries are made to individual attendance records from the attendance register.
- Disc Method: This method is generally used in a small organization or factory which has limited financial resources. Under this method, metal discs bearing the numbers of the workers are placed on hooks on a board provided at the entrance of the department or organisation. While entering into thedepartment and factory, as the case may be, the workers remove their respective discs and place them in a box on empty tray provided nearby. Aftera short while of the scheduled time of the department or organisation or factory, the original box or tray is removed and a late box or tray is substituted. The late box or tray is also taken at the end of the maximum late time allowed by the personnel department. The time-keeper records the attendances in a register or book which is subsequently passed on to the payroll department for the payment of workers.
- Dial Time Recorders or Time Recording Clocks: The time recording clock is a mechanical device which automatically records the time of the workers. This method has been developed to obviate some of the difficulties experienced in case of manual methods and this method is useful when the number of workers is fairly large. There is a radial arm at the centre of the dial. When a worker enters into the factory or department, he is to press the radial arm afterplacing it at the appropriate hole. The time recorder will then automatically record the time on a roll of paper within the machine against the number of theworker. It may be noted that the sheet of paper in which the time is recorded provides a running account of the worker's time.

- Time Card: Under card time recorders method, a clock card is allotted to each worker in which his attendance is recorded. In this latest type of card time recorder, the worker is to insert his clock card into the machine; the time is then automatically stamped in the correct position. Late arrivals, early leavings, overtime, etc. are printed in red to attract attention. It enjoys all the advantages of the dial time recorders.
- Daily Time Sheet: Each worker is given a daily time sheet in which he records the particulars of his time spent on each job or work order. Daily Time Sheets are maintained in small works which do not go to the expense of a card time recorder. The worker completes the sheets everyday and hands it over to the foreman for signature. This acts as a check on the correctness since the foreman puts his signature daily.
- Weekly Time Sheet: These sheets record the same particulars for a week as the daily time sheets for a day. These sheets are an improvement over the daily time sheets. The main difference is that the worker enters all the particulars of work carried out for a complete week at the end of the week.
- Job Card: Under job card method a card is used for recording the time spent by workers on various jobs instead of sheets of paper. A job card is used to keep a close check on the time spent by an operator on each job which he does during the day. Usually, one card is issued to an operator by the supervisor at a time. When the operator starts the work, he records the time through the time recording clock on the card. The card is punched again when the work is finished or the operation is over. If the work or operation of the job is too long and the worker has to break off for meals or for personal needs, he should record out and in again to keep record of the time not spent on the job or operation. When the job or operation is finished, the card is deposited with the timekeeper and who sends it to the payroll department. When a job is completed, another job card is issued to the operator and he repeats the time-recording process.

4. **Payroll Department:** This department has to perform following functions:

   (i) To maintain record of job classification and wage rate of each and every employee,

   (ii) To verify and to summarize the time of each worker as shown on daily time cards,

   (iii) To calculate wages earned by each and every worker,

   (iv) To prepare payroll of every department,

   (v) To calculate wages and deductions for each employee,

   (vi) To disburse wages, and

   (vii) To devise a suitable internal check preparing and paying out wages.

5. Cost Accounting Department: This department perform the following functions:

(i) Documentation of wages Accounting,

(ii) Analysis of total labour cost, and

(iii) Treatment of idle time ,Overtime, leave pay, etc,.

9.3 Summary

See chapter 8 section 8.5

9.4 Glossary

See chapter 8 section 8.6

9.5 Answer: Self-Assessment

See chapter 8 section 8.7

9.6 Terminal questions

See chapter 8 section 8.8

9.7 Suggested Readings

See chapter 8 section 8.9

Lesson -10

LABOUR COST: WAGES PAYMENT SYSTEMS

Structure:

10.1 Learning Objectives

After studying the lesson, you should be able to:

- Know the types of wages.
- Understand the methods of remuneration

10.2 Introduction

The remuneration of employees is a reward of services rendered by him. It is an agreement among employer and employee. For remuneration, B.K. Bharhas rightly point out that, "Remuneration is the reward for labour and services, whereas incentive is the stimulation of effort and effusiveness by offering monetary inducement or extra facilities." Wage system is one of the important components of Labour Cost Control. A system of wage payment, which takes care of both, i.e. providing guarantee of minimum wages as well as offering incentive to efficient workers helps to motivate the workers to a great extent. It should also be remembered that high wages do not necessarily mean high labour cost because it may be observed that due to high wages the productivity of workers is also high and hence the per unit cost of production is actually decreased. On the other hand, if low wages are paid, it may result in lower productivity and hence higher wages do not necessarily mean high cost.

10.3 Types of Wages

Wages may be of different types such as real wages, minimum wages, living wages, and fair wages. Their brief description is as follows:

(i) Real Wages: Real wages represent the actual exchange value of wage rates

or of earning. In the most common usage in which wage rates or earnings for different periods are compared, real wages reflect adjustment to changes in the price level.

(ii) Minimum Wages: The minimum wages must also provide for some measure of education and medical, requirements and other amenities. Minimum wages means that minimum amount which the labour or workers thinks necessary for the base sustenance of life but for the preservation of the efficiency of the worker.

(iii) Fair Wages: Fair wages is that wages which the labour gets for his work which is just near to minimum wages and living wages. Generally, current rate of wages, being paid in the organization are known as fair wages.

(iv) The Living Wages: The living wages, according to the committee on fair wages, represented the highest level of the wages and naturally it would include all amenities which a citizen living in a modern civilized societywas entitled to except when the economy of the country was sufficiently advanced and the employer was able to meet the expanding aspirations ofhis workers. After considering various observations made by Indian and foreign authorities, the committee observed that "the living wage should enable the male earner to provide for himself and his family not merely the bare essential of food, clothing and shelter but a measure of frugal comfortincluding education for the children, protection against ill-health, requirements of essential social needs and a measure of insurance against the more important misfortunes including old age".

10.4 Essential Features of a successful wage payment plan

- It should be based on scientific time and motion study to ensure a fair output and a fair remuneration.
- There should be a guaranteed minimum wages at a satisfactory level.
- The wages should be related to the effort put in by the employees. It should be fair to both the employees and employer.
- The scheme should be flexible to permit any necessary variations which may arise.
- There must be continuous flow of work.
- The scheme should aim at increasing the morale of the workers (i.e. minimizing absenteeism, late attendance, etc.) and reducing labour turnover.
- Suitable incentive to the workers will be provided.
- The operating and administrative cost of the scheme be kept at a minimum.

10.5 Methods of Remuneration or Wage Payment

Wages are paid either on time basis or on output basis. When employees are paidas per hours worked irrespective of the quantum of output produced, the system is called time-rate. When payment is made on the basis of production or output only, it is called piece-rate. A combination of both time-rate and piece-rate is also used. So there are several methods of wage payment. These are differing from each organization to

another organization. There are three basic methods of wage payment or remuneration, i.e.:

1. Time Rate Method,
2. Piece Rate Method, and
3. Individual Bonus Plans

10.4.1 Time Rate Method

Time Rate Method is very popular method of payment of wages. Under this method, the payment is made on the basis of time devoted by worker in the factory. It is an oldest form of wage payment. In this method wages is calculated as follows:

Total Wages = Hours Worked x Rate per Hour

Time Rate Method is used in the following situation:

- Where the work requires high skill and quality is more important than the quantity.
- Where the output/services is not quantifiable, i.e. where the output/services cannot be measured.
- Where the work done by one person is dependent upon other person, in other words where an individual worker has no control over the work.
- Where the speed of production is governed by time in process or speed of a machine.
- Where the workers are learners or inexperienced.
- Where continuous supervision is not possible.

Advantages of Time Rate Method

- Easy to understand and operate.
- Easy to calculate, and hence, less clerical work involved.
- Easier to negotiate rate with the employees and the unions.

Disadvantages of Time Rate Method

- No incentive to increase the output.
- No distinction between slow, inefficient, fast and efficient workers.
- Fails to attract better workers.
- Cost per unit is not known in advance.

10.4.2 Piece Rate Method

Piece Rate Method is also called as payment by results where the workers are paid as per the production achieved by them. Thus if a worker produces higher output, he can earn higher wages. Under the piece rate system of wage payment the workers receive a flat rate of wages either for time worked or for units manufactured**.** Basically in this method, wages is paid on the basis of units produced by the workers. The rate of payment is determined by production department. Under this method, wages of workers is calculated by following formula:

Total Wages = No. of Units Produced x Rate Per Unit

Types of Piece Rate Method

Following are the main types of piece rate method:

(i) **Straight Piece Rate Method**: Under this system, payment is made on the basis of a fixed amount per unit or number of units produced without regard totime taken.

The wages are to be calculated from the following formula:

Wages = Number of units × Rate per unit

(ii) **Taylor Differential Piece Rate Method**: In the Taylor differential method, piece rates were determined by time and motion study. Day wages were not guaranteed.

There were two rates: very low piece rate and high piece rate. Thus, the system was designed to:

- Reward the efficient workers by setting a high piece rate for high level production, and
- Discourage below-average workers by providing no guaranteed wages and setting low piece rate for low level production.

(iii) **Piece Graduated Time Rate**: Under this method, workers are paid minimum wages on the basis of time rates. A piece rate method with graduated time rate may include any one of the following:

Guaranteed wages according to time rate plus a piece rate payment for units above a required minimum,

Piece rate with a fixed dearness allowance or cost of living bonus, and

If earning on the basis of piece rate is less than the guaranteed minimum wages, the workers will be paid on the basis of time rate.

(iv) **Merrick Multiple Piece Rate Method**: Merrick afterwards modified the Taylor's differential piece rate method. Under this method, the punitive lower rate is not imposed for performance below standard. On the other hand, performance above a certain level is rewarded by more than one higher differential rate. Thus, this method rewards the efficient workers and encourages the less efficient workers to increase their output by not penalizing them for performance. This method also does not guarantee day wages.

Advantages of Piece Rate Method

- As the workers are paid on the basis of the results, i.e., for each unit produced, job performed or number of operations completed, there is a tendency on their part to increase their production so that they may earn morewages.
- The increased production thus achieved results in the reduction of overhead expenses per unit of production even through total overheads may increase. The increase in overheads will be relatively small as compared to the increase in turnover.

- The wages being paid on the basis of production, the management know the labour cost per unit or per job.
- The workers are rewarded for their efficiency because the inefficient workers will not get as much as the efficient workers.
- The workers are very careful in handling their tools and machinery, etc., because on the proper maintenance of these depends their higher efficiency and in turn, their higher wages.
- This method is very simple to operate.

Disadvantages of Piece Rate Method

- It is not easy to determine the piece work rate on an equitable basis. When a rate has been fixed and later on it is found to be too high, it is very difficult to reduce it as its reduction will cause dissatisfaction and friction among the workers.
- As the labour cost per unit remains the same, the employees do not gain as a result of increase in productivity except to some extent in the form of reduction in overheads. As such if the overhead expenses per unit are relatively small, the advantage to the employer will not be significant.
- Sometimes quantity may increase at the cost of quality. For the reason, a strict inspection has to be maintained in the form of quality control. This will result into additional expenditure.
- Materials may be used in excessive quantities and may be handed carelessly on account of the workers' efforts to achieve high output.

Example 1

Calculate total weekly wages paid to Mr. Neeraj Gupta according to Time Rate Method from the following information:

Standard Hours even to him 80 Hours Per week

Actual Hours worked 60 Hours Per week

Rate per Hour Rs. 40

Solution

The total weekly wages paid to Mr. Neeraj Gupta according to Time Rate Method will be calculated as follows

Total Wages = Hours Worked x Rate per Hour

Total Wages = 60 x Rs. 40 = Rs. 2400

Example 2

From the following information, calculate total wages by piece rate method and time rate method.

Standard Hours=60

Actual Hours Worked=50

No. of Unit Produced=500

Rate per Hour=Rs. 20

Rate per unit produced=Rs. 5

Solution

The total wages paid to workers is calculated as follows:

Time Rate Method

Total Wages = Hours Worked x Rate Per Hour

Total Wages =50 x20

Total Wages =Rs. 1000

Piece Rate Method

Total Wages = No. of Units Produced x Rate Per Unit

Total Wages =500 x5

Total Wages =Rs. 2500

Example 3: From the following particulars, calculate the earnings of workers X and Y and also comment on the labor cost.

Standard time allowed: 20 units per hour

Normal time rate: Rs.30 per hour

Differential to be applied:

80% of piece rate when below standard

120% of piece rate at or above standard

In a particular day of 8 hours, X produces 140 units while Y produces 165 units

Solution:

Standard production per day is 20 units × 8 hours = 160 units

Worker X produces 140 units which means he is below standard and will get wages @ 80% of the normal piece rate.

X's earnings:

Normal piece rate = Rs. 30 per hour/20 units = Rs. 1.5 per unit

80% of the normal piece rate = Rs. 1.20 per unit

Earnings = Rs.1.20 × 140 units = Rs. 168

Labor cost per unit = Rs. 168/140 units = Rs. 1.20

Y's Earnings: Y has produced more than the standard production of 160 units and hence he will get wages @ 120% of normal piece rate. His earnings will be as shown below.

Normal piece rate = Rs. 30 per hour/20 units = Rs. 1.50 per unit

120% of normal piece rate = Rs.1.80 per unit

Earnings = Rs. 1.80 × 165 units = Rs. 297

Labor cost per unit = Rs.1.80

Comment: Labor cost increases from Rs. 1.20 per unit to Rs.1.80 per unit. Taylor's system is resisted on this ground as well as on the ground that it is very harsh on the workers.

10.4.3 Individual Bonus Plans

Generally, incentive may be deemed as an extra payment paid by employer to worker/employees for his additional efficiency. The main object of an incentive plan is to induce a worker to produce more to earn higher wages.The bonus to be paid to the workers is computed on the basis of savings in the hours, i.e. the difference between the time allowed and time taken. The time allowed is the standard time, which is fixed by conducting a time and motion study by the work-study engineers. While fixing the standard time, due allowance is given for physical and mental fatigueas well as for normal idle time. The actual time taken is compared with this standard time and bonus is payable to the worker if the time taken is less than the standard time.Incentive plans increase the efficiency and capacity of workers. Some importantincentive plans are as follows:

1. Halsey Premium Plan
2. Halsey Weir Plan
3. Rowan Premium Plan
4. Emerson's Efficiency Plan
5. Merric's Plan
6. Group Bonus Plan

1. Halsey Premium Plan

This plan was introduced by F.A. Halsey, an American engineer. In this plan, bonus is paid on the basis of time saved. Standard time is fixed for a job and if the actual time taken is less than the same, the worker becomes eligible for bonus. The total wages is paid to him as normal wages (Actual time x Rate per hour) plus a bonus on the basis of time saved by him on production. The rate of bonus may be 30 per cent to 70 percent of wages for time saved by workers. But, in the absence of any Information the rate of bonus may be taken at 50 percent. According to this plan, time saved can be calculated as follows:

Therefore, the total wages of worker in this plan can be calculated as follows:

Total Wages = (Actual Hour worked X Rate per Hour) + (Time saved X Rate per hour X 50/100)

Time saved = Standard Time - Actual Time i.e. .TS = ST - AT

Example 4

Calculate the amount of total wages under Halsey Premium Plan from the following information:

Standard Time=11 hours

Actual hour worked=10 hours

Wages Rate per hour =Rs. 15

Solution

Total Wages = (Actual Hour worked X Rate per Hour) + (Time saved X Rate per hour X 50/100)

Time saved = Standard Time - Actual Time i.e. .TS = ST - AT

Total wages= (10 x 15) + [(11-10) x 15 x 50/100]

Total wages= = 150 + 7.5

Total wages= Rs. 157.50

2. Halsey Weir Plan

There is only one difference as compared to the Halsey Premium Plan and that is instead of 50% bonus for the time saved, it is 30% of the time saved. Accordingly the formula for this method is modified as follows.

Total Wages = (Actual Hour worked X Rate per Hour) + (Time saved X Rate per hour X 30/100)

Time saved = Standard Time - Actual Time i.e. .TS = ST – AT

Example 5

Calculate the amount of total wages under Halsey Weir Plan from the following information:

Standard Time=12 hours

Actual hour worked=9 hours

Wages Rate per hour =Rs. 20

Solution

Total Wages = (Actual Hour worked X Rate per Hour) + (Time saved X Rate per hour X 30/100)

Time saved = Standard Time - Actual Time i.e. .TS = ST - AT

Total wages= (9 x 20) + [(12-9) x 20 x 30/100]

Total wages= = 180 + 18

Total wages= Rs. 198

3. Rowan Premium Plan

This premium bonus plan was introduced by Mr. James Rowan. It is similar to that of Halsey Plan in respect of time saved, but bonus hours are calculated as the proportion of the time taken which the time saved bears to the time allowed and they are paid for at time rate.

Total Wages= (Actual Time taken x Rate per hour) + [(Actual Time taken/Standard Time) x (Time Saved x rate per hour)]

Total wages = (AT x R) + (AT / ST x TS x R)

Example 6

Calculate the amount of total wages on the basis of Rowan Premium Plan from the following information:

Standard Output in 11 hours=120 units

Actual Output in 10 hours=132 units

Wages Rate per hour =Rs.15

Solution

Total Wages= {(Actual Time taken x Rate per hour) + [(Actual Time taken/Standard Time) x (Time Saved x rate per hour)]}

Total wages = (AT x R) + (AT / ST x TS x R)

Total wages = (10 x15) + (10/11 x 1 x 15)

Total wages =150+ 13.63

Total wages = Rs. 163.63

4. Emerson's Efficiency Plan

In Emerson's Efficiency Plan minimum wages is guaranteed but, bonus is paid on the efficiency of workers. There are several slabs for efficient workers. The standard output is fixed at 100% efficiency. If the worker uses less than 100% efficiency,bonus is not paid to him. The bonus slabs in this plan is as follows:

Efficiency of Worker	Bonus
Below 66.67% or 66 2/3%	No Bonus of actual wages
66.67% to 100%	20% Bonus
Above 100%	20% Bonus + 1% bonus for each increase of 1% in efficiency

Example 7

Calculate the amount of bonus and total wages under Emerson Efficiency Plan with the help of following information:

Standard Output in 10 Hours=240 units

Actual Output in 10 hours=264 units

Wages Rate=Rs. 10 per hour

Solution

At first, the efficiency of worker is calculated:

Efficiency of worker= (Actual Output/ Standard Output) x 100

Efficiency of worker= (264/240) x 100

Efficiency of worker=110%

Amount of Bonus= up to 100% efficiency= 20% + 1% bonus for each increase of 1% in efficiency i.e. 10%

Amount of Bonus=20%+10%

Amount of Bonus=30%

Total Wages=Wages for Actual time +Bonus for Efficiency

Total Wages=Wages for Actual time +Bonus for Efficiency

Total Wages=AT x AR + 30% (AT x AR)

Total Wages = 10 x 15 + 30/100 x 150

Total Wages = 150 + 30/100 x 150

Total Wages = 150 + 45

Total Wages = Rs. 195

5. Merric's Plan

Merric's Plan is an updated form of Taylor's plan. Taylor's plan gives two rates while Merric's Plan gives three rates.

Level of Efficiency	Price Rate
Up to 83.33%	Ordinary Piece Rate
83.33% to 100%	110% of Piece Rate
Above 100%	120% of Piece Rate

6. Group Bonus Plan

Group bonus refers to bonus paid for the collective efforts made by group of workers. Under a group bonus scheme, bonus is paid to a team of employees working together. The plans described above are all individual bonus plans. Many times output of individuals cannot be measured. Similarly, the output of individual is dependent on the performance of the group. In such cases, rather than implementingindividual bonus

systems, group bonus system is implemented. The total amount of bonus, which is determined according to productivity, can then be shared equally or in agreed proportion between the group members. The main objects of group bonus system are as follows:-

- Creation of team spirit.
- Elimination of excessive waste of materials and time.
- Recognition of group efforts.
- Improving productivity.

There are five schemes of group bonus plan -

a) Priestman's Production Bonus
b) Cost Efficiency Bonus
c) Town Gain Sharing Plan
d) Budgeted Expenses Bonus
e) Waste Reduction Bonus

Self-Assessment

Fill in the blanks:

1. Workers who are appointed on day- to-day basis and are not on the payroll sheet are called_____workers.
2. The term‘ real wages’ refers to the_____of money wages
3. _____is that wages which the labour gets for his work.
4. The is usually fixed with the help of work study.
5. In the Taylor differential method, piece rates were determined by_____.
6. According to fair …… the minimum wages must also provide for some measure of education and medical, requirements and other amenities.
7. In India, the basic wage rates normally remain ……
8. Under …… method, the efficiency of workers has a tendency to increase.
9. Under Straight Piece rate method …… for each job is ascertained first.
10. Payroll sheet is prepared by the_____department.

10.6 Summary

Labour cost plays an important role in total cost. It is based on efficiency and experience of workers. Many times, labour cost forming 60 per cent to 70 per cent part of total cost. The remuneration payable to direct labour is known as directwages and the labour which acts as ancillary to the direct labour which is used in completing the production. The main object of an incentive plan is to induce a workerto produce more to earn higher wages. The bonus to be paid to the workers is computed on the basis of savings in the hours, i.e. the difference between the time allowed and time taken.

10.7 Glossary:

Real Wages: The term ‘real wages’ refers to the purchasing power of money wages.

Differential Rate: An amount added or deducted from base rate.

Group Bonus: It refers to bonus paid for the collective efforts made by group of workers.

Minimum wages: Minimum wages means that minimum amount which the labour or workers thinks necessary for the base sustenance of life but for the preservation of the efficiency of the worker.

Living Wages: A wage enough to maintain a normal standard of living.

Nominal Wages: Average wage.

Payroll Statement: Statement disclosing the details of the employees.

10.8 Answer: Self-Assessment

1. Casual
2. Purchasing power
3. Fair wages
4. Piece rate
5. Time and motion study
6. Wage committee
7. Fixed
8. Merrik multiple piece rate
9. Standard time
10. Payroll

10.9 Terminal Questions

1. What do you understand by 'payment by results'? Explain three different types of payment by results commonly in use.
2. Discuss different individual bonus plans with suitable examples.
3. Describe the methods of remunerating labour. State the merits and demerits of each method.
4. Discuss the advantages and disadvantages of the piece rate method of payment of wages.
5. The following particulars are available for a job:
   Normal time rate : Rs. 4 per hour
   High task (standard) unit per week: 60
   In a 45 hours week, the production of workers was as follows:

workers	A	B	C	D	E
Units Production	45	50	60	66	72

   Calculate the earnings of the workers under (a) Piece rate, (b) Taylor method, (a) Merric method.

10.10 Suggested Readings:

V.K. Goyal, Financial Accounting, Excel Books, New Delhi.
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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. Shah Paresh, Management Accounting, Oxford University press,New Delhi, 2009

Lesson-11

OVERHEADS: CLASSIFICATION, COLLECTIONAND CODIFICATION

Structure:

11.1 Learning Objectives:

After studying this lesson, you should be able to:

- Understand the meaning of overheads.
- Classify the overheads into different categories.
- Know the importance of collection and codification of overheads.

11.2 Introduction:

An overhead is the amount which is not identified with any product. The name overhead might have come due to the reason of over and above the normal heads of expenditure. It is the aggregate of indirect material, indirect labour and indirect expenditure. The generic term used to denote indirect material, indirect labour and indirect expenses. Thus overheads forms a class of cost that cannot be allocated or absorbed but can only be apportioned to cost units. Overhead is the cost of material, labour and expenses which cannot be economically identified to any one cost unit, but they constitute an essential element of cost as they are incurred for producing a commodity or making it ready for sale. Overhead costs are also termed as 'indirect cost' or 'supplementary cost' or 'non-productive cost' or on cost etc.

11.3 Meaning and Definition

The term overhead has a wider meaning than the term indirect expenses. Overhead includes the cost of indirect material, indirect labour, and indirect expense. This isthe aggregate sum of indirect material, indirect labour and indirect expense.

Overhead = Indirect material + indirect labour + indirect expenses

Definition of overheads: 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.

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

CIMA defines overhead cost as "The total cost of indirect material, indirect labour and indirect expenses.

Thus overhead cost is, therefore, a group of expenses, which are not identifiable with the cost unit, but are incurred generally for the manufacturing and selling activities of the organization and can be apportioned to and absorbed by the cost units. So any expenditure over and above prime cost is known as overhead. It is also called 'burden', 'supplementary costs', 'on costs', 'indirect expenses'.

11.4 Classification of Overheads

The process of grouping the overheads according to their common characteristics is known as classification of overheads. It provides the manager with information that enables them to manage the business effectively. According to CIMA classification is "the arrangement of items in logical groups having regard to their nature (subjective) or the purpose to be fulfilled (objective classification)" It is the process of arrangement of items into groups according to their degree of similarity. The overheads can be classified on the basis of:

1. According to Nature
2. According to Normality
3. According to Controllability
4. According to Variability
5. According to Function

1. According to Nature

1) **Indirect Material-**Materials which cannot be identified with the given product unit of cost centre is called as indirect materials. A material is that cost which cannot be directly attributed to a particular cost object. For example, lubricants used in a machine is an indirect material, similarly thread used to stitch clothes is also indirect material. Small nuts and bolts are also examples of indirect materials.
2) **Indirect Labour-**Indirect labour cost is the employee cost, which cannot be directly attributed to a particular cost object. Wages and salaries paid to

indirect workers, i.e. workers who are not directly engaged on the production are examples of indirect wages**.**

3) **Indirect Expenses-**Indirect Expenses are expenses, which cannot be directly attributed to a particular cost object. Expenses such as rent and taxes, printing and stationery, power, insurance, electricity, marketing and selling expenses etc. are the examples of indirect expenses.

2. According to Normality

1) **Normal Overheads-**Such overheads are expected to be incurred in attaining a given output and are unavoidable in nature. They are included in production cost.
2) **Abnormal Overheads-**These are not expected to be incurred in attaining a given output. These arise due to some abnormal reasons e.g. cost of abnormal idle time. They are charged to costing profit and loss account.

3. According to Controllability

1) **Controllable overheads:** Indirect costs which can be controlled by executive action at the point of their incurrence. Normally variable overheads are controllable overheads.
2) **Uncontrollable overheads:** Indirect costs, which cannot be controlled by executive action at the point of their incurrence. Normally fixed overheads come under this category.

4. According to Variability

1) **Fixed Overheads-**Indirect costs which tend to remain unaffected by changes in the volume of production or sale are known as fixed overheads. Factory rent, rates, insurance, staff salary etc. are fixed in nature irrespective of the level of capacity utilized or units produced. It must be noted that fixed costsare not absolutely fixed for all times. If there is a change in the capacity of production or sale these costs also tend to change. Since the amount of this type of cost is fixed over a period of time, fixed cost per unit decreases as production increases and per unit fixed cost increases as production decreases. These overheads are also termed as shut down overheads or period cost.
2) **Variable Overheads-** Indirect costs which vary in direct proportion to changes in the volume of production or sale are known as variable overheads. Since the amount varies in relation to volume, the cost per unit tends to remain constant. For example, fuel and power, packing charges freight, selling commission etc.
3) **Semi Variable Overheads-**Some overhead costs tend to vary with changesin output or sales but not in direct proportion to the change. They are neither perfectly variable nor absolutely fixed in relation to changes in volume. These costs remain constant over a relatively short range of variation in output and

then change to a new level with an increase or decrease in the volume of activity. These costs are partly fixed and partly variable.

The necessity for classification of cost into fixed and variable arises from the following considerations:

- Cost control -One of the main objectives of cost accounting is cost control, which is achieved by classifying costs into fixed and variable. Fixed costs are mostly in the nature of policy cost or discretionary cost arising out of the decisions to create facilities, and are, therefore, not controllable at the lower level of management. Variable cost, on the other hand is controllable at the shop floor level. Hence, a classification of cost into fixed and variable helps to fix responsibility for cost control at the appropriate level of management.
- Decision making-Management needs to know the effect of changes in the levels of activity. Cost information will be of no use, unless fixed and variable costs are segregated.
- Marginal costing and Break-even analysis- Marginal costing techniques are based on the separation of fixed and variable costs, which is essential for the cost-volume profit relationship and the preparation of Break-even charts and profit graphs.
- Flexible budget-Budgets are prepared for different activity levels to make comparison between actual and budget meaningful. Flexible budget cannot be established without segregation of costs into fixed and variable ones.

Example 1

The cost of producing 3000 units is as follows:

Material=Rs. 36000, wages=Rs. 24000, overhead charges (fixed and variable) =Rs. 10000.

The company produces 8000 units and sells at Rs. 25 each and earns a profit of Rs. 20000. Find out the amount of fixed and variable overheads.

Solution

Calculation of total overheads for producing 8000 units

Selling price 8000×25 =	200000
Less profit =	20,000
Total Cost=	180000
Less Material=36000/3000×8000= Less Labour=24000/3000×8000=	96000 64000
Total Overheads	20000

Variable overhead per unit=	Change in Overheads/Change in Output
Variable overhead per unit=	20000-10000/8000-3000
Variable overhead per unit=	10000/5000
Variable overhead per unit=	Rs. 2 per unit
Variable overhead for producing 3000 unit=	3000×2=6000
Fixed Overheads=	10000-6000
Fixed Overheads=	Rs. 4000

5. According to Function

1) **Factory Overhead-**is the total indirect costs associated with manufacturing activities, the sequence of which begins with the procurement of materials and ends with the primary packing of the product. Examples are as follows: indirect materials such as lubricants, cotton waste, and other factory supplies, direct materials of small individual value, repair parts, wages of indirect workers, supervisory salaries, salaries and wages relating to service cost centers, canteen and other welfare expenses, factory rent, rates, lighting and heating, power and fuel, depreciation of factory building, depreciation of plant and machinery and other equipment's, expenses connected with the administration of factory.
2) **Office or Administration Overhead-**is the total costs of formulating the policy, directing the organization and controlling the operations of an undertaking which is not directly related to production, selling, distribution, research or development activity or function. Examples of such expenses are as follows:
    - Office supplies, printing and stationery, salaries to office staff, directors remuneration.
    - Office rent and rates, office lighting, heating and air conditioning, postage, telephone &
    - Courier service, depreciation, repair and maintenance of office building, and equipment.
    - Furniture and office machines, audit fees, legal charges, bank charges and interest.
3) **Selling and Distribution Overhead-**refers to those expenses which are associated with the marketing and selling activities. For example:
    - Salaries, commission of salesmen and selling agents, etc.
    - Travelling expenses, sales office expenses

- Advertisement and publicity
- Market research
- Bad debts
- Brokerage

Distribution overhead relates to total indirect cost associated with the distribution of finished products, beginning with the primary packed product available for dispatch and ending with making reconditioned returnable empty container, if any, available for reuse. Examples are:

- Secondary packing materials.
- Packing charges.
- Salaries and wages of distribution staff.
- Carriage and freight outwards.
- Warehousing charges, insurance.

11.3.1 Benefits of Overhead Classification

- The proper classification of overheads is very important for accounting, apportionment and absorption of overheads cost.
- Overhead classification helps in preparation of budgets like flexible production and current budget etc.
- Accurate classification of overheads into variable, semi variable and fixed helps in cost control.

11.5 Collection of Overheads

Overheads collection is the process of recording each item of cost in the records maintained for the purpose of ascertainment of cost of each cost centre or unit. The following are the source documents for collection of overheads:

- Stores Requisition-Indirect material.
- Wages Sheet-Indirect labour
- Cash Book- Indirect material, Indirect labour and Indirect Expenses
- Purchase Orders and Invoices-Indirect material, Indirect labour and Indirect Expenses
- Journal Entries- Indirect material, Indirect labour and Indirect Expenses
- Other Registers and Records

Collection of overheads is very important for the purpose of overhead accounting. It is necessary to identify the indirect expenses and the above mentioned source documents are used for this. Proper collection of overhead expenses will help to understand accurately the total overhead expenses.

11.6 Codification of Overheads

Codification means collecting similar overhead cost items under one heading. Each item of overhead is properly analyzed and written under its head. A code number is allotted to it which is known as standing order number. It may consist number or latter or a combination of both. This also helps in adopting mechanized system of

accounting. It is always advisable to codify the overhead expenses. Codificationhelps in easy identification of different items of overheads. There are numerous items of overheads and a code number to each one will facilitate identification of these items easily. Codification can be done by allotting numerical codes or alphabetical codes or a combination of both. Whatever system is followed, it should be remembered that the system is simple for understanding and easy to implement without any unnecessary complications.

Table 10.1: Codification of Overheads

Cost Centre Codes	Department Name
1100	Turning department
1200	Grinding Department
1300	Components manufacturing
1400	Assembly
2100	Maintenance
2200	Quality control
2300	Stores

The logic in giving the codes is simple. All codes starting with 1 are production departments, all codes starting with 2 are factory related services and all codes starting with 3 are general services. This coding helps collection of costs on functional basis and also to identify an item of expense directly to a department or cost centre.

11.5.1 Objectives of Codification

- To collect the overheads of similar nature into one group.
- To help in planning and control of cost of products.
- To make the accounting system more economical and useful through reducing the number of the ledger and accounts.
- To accumulate overheads systematically.

11.5.2 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:

(i) 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

(ii) 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

M 1 = Maintenance to Factory Building

M 2 = Maintenance to power House

M 3 = Maintenance to Officer Building

M 4 = Maintenance to Warehouse Building

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

Code	particulars
100101	Depreciation on plant
100102	Depreciation on Building
200101	Salary to Factory Manager
200102	Salary to Managerial

Self-Assessment

Fill in the blanks:

1. The total cost is divided into……,Factory Cost and Administrative Cost.
2. …… are those indirect costs which cannot be directly related to any product, job or process, because they cannot be directly attached to production activities.

3. Overhead comprises ……., indirect labour and indirect expenses.

4. Variable expenses change in the same proportion in which …… changes.

5.expenses are partly fixed and partly variable.

6. The..... depends upon the type and size of the business.

7. …… is also known as factory overhead, works overhead or manufacturing overhead.

8. …… is the expenditure incurred in promoting sales and retaining customers

9. Variable costs change in the same ratio in which the …… changes.

10.is a technique and method of intelligently describing in numbers or letters or a combination of overheads.

11.7 Summary

All indirect costs are collectively termed as overheads. It is total of all indirectmaterial, indirect labour and indirect expenses. They constitute an important component of total cost of a product, a job or a process. Overhead costs have to be incurred for production although they are not directly measurable, observed relatedto specific activity or unit of production. In order to have a proper accounting and control, careful classification of overheads is necessary. Collection of overheads is very important for the purpose of overhead accounting. It is necessary to identify the indirect expenses and the above mentioned source documents are used for this. Proper collection of overhead expenses will help to understand accurately the total overhead expenses. It is also advisable to codify the overhead expenses. Codification helps in easy identification of different items of overheads. There are numerous items of overheads and a code number to each one will facilitate identification of these items easily.

11.8 Glossary:

Overheads: 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.

Factory Overhead-is the total indirect costs associated with manufacturing activities.

Controllable overheads: Overheads which can be controlled by executive action at the point of their incurrence.

Normal Overheads-Such overheads are expected to be incurred in attaining a given output.

Fixed Expenses: Expenses that are not affected by changes in output or sales such as rent, salaries, etc.

Variable Expenses: expenses that change in the same proportion in which output (or sales) changes for example, power consumed, indirect materials, insurance in transit, carriage outwards, etc.

Semi-variable Expenses: Expenses that change in the same proportion to which output (or sales) changes but not in the same ratio. Depreciation is not doubled if output is doubled it may be 50% more. Semi-variable expenses are partly fixed and partly variable.

Office or Administration Overhead-They represent the cost of formulating the policy, directing the organization and controlling the operations of an undertaking which is not directly related to production, selling, distribution, research or development activity or function.

Selling Overhead- The cost incurred in promoting sales and retaining the customers.

11.9 Answers: Self-Assessment

1. Prime Cost 2. Overheads 3. Indirect material

4. Output (or sales) 5. Semi-variable 6. Overhead classification

7. Manufacturing overheads 8. Selling overheads 9. Output

10. Coding

11.10 Terminal questions

1. Explain the classification of overheads according to variability, controllability, normalcy and functions.
2. Write a note on i) Collection of overheads, ii) Codification of overheads.

11.11 Suggested Readings

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LESSON -12

FACTORY OVERHEADS: ALLOCATION, APPORTIONMENTAND ABSORPTION

Structure:

12.1 Learning Objectives

After studying this lesson, you should be able to:

- Understand the meaning of allocation, apportionment and absorption.
- Use the different methods of absorbing factory overheads.
- Treat under--absorption and over-absorption of overheads.

12.2 Introduction

Overhead is the aggregate of indirect material, indirect labour and indirect expenses. It refers to any cost which is not directly attributable to a cost unit. The term ‘indirect’ means that which cannot be allocated, but which can be apportioned to or absorbed by cost centers or cost units. Cost related to a cost center or cost unit may bedivided into two i.e. Direct and Indirect cost. The Indirect cost is the overhead cost and is the total of indirect material cost, indirect labour cost, indirect expenses. After the collection, classification and codification of overheads, the next step is allocation and apportionment of overheads into the product units.

12.3 Allocation of Overheads

Allocation is the process of identification of overheads with cost centers. Expenses

which cannot be identified with product or cost unit can be allocated to a specific cost centre, if latter can be identified. For example, wages to indirect workers depreciation and insurance of plant and machinery, fuel oil for boilers, etc. are instances of expenses which can be directly allocated to the cost centres. However, indirect expenses, such as rent, rates, electricity, telephone charges, factory manager's salary, etc. incurred for the entire factory cannot be allocated to any particular cost centers, but requires being apportioned to more than one cost centres on some suitable basis for benefits received.

CIMA defines Cost Allocation as, 'the charging of discrete, identifiable items of cost to cost centres or cost units'. In simple words complete distribution of an item of overhead to the departments or products on logical or equitable basis is called allocation.

12.2.1 The Overhead Allocation Process

Proper overheads allocation is of great importance as wrong allocation can distort income determination, asset valuation and performance evaluation. The overhead allocation process is as follows:

- Accumulating overheads on the basis of departments or products.
- Identifying the cost objectives of the allocated costs
- Selecting the method of relating costs so accumulated to the cost objectives.

12.4 Apportionment of Overheads

Cost apportionment is the allotment of proportions of items to cost centers. Wherever possible, the overheads are to be allocated. Certain items of overheads cannot be clearly allocated to any particular department or cost centre. In fact, these are combined expenses or overheads. Distribution of these combined overheads to various departments is known as apportionment of overheads. This is an indirect process to proportionate the amount of overhead on some equitable basis. This is also called as primary distribution of overheads, because in this distribution all the overhead cost should be allocated or apportioned to the production and service departments. In simple words, distribution of various items of overheads in portionsto the departments or products on logical or equitable basis is called apportionment.

12.3.1 Principles of Apportionment of Overheads

1. Services Rendered

The principle followed in this method is quite simple. A production department which receives maximum services from service departments should be charged with the largest share of the overheads. Accordingly, the overheads of service departments are charged to the production departments.

2. Ability to Pay

This method suggests that a large share of service department's overhead costs should be assigned to those producing departments whose product contributes the

most to the income of the business firm. However the practical difficulty in this method is that, it is difficult to decide the most paying department and hence difficult to operate.

3. Analysis Method

This method is used where a suitable base is difficult to find or it would be too costly to select a method which is considered suitable. For example, the postage cost could be apportioned on a survey of postage used during a year.

4. Efficiency Method

Under this method, the apportionment of expenses is made on the basis of production targets. If the target is exceeded, the unit cost reduces indicating a more than average efficiency. If the target is not achieved, the unit cost goes up, disclosingthere by, the inefficiency of the department

Table 10.1 Primary Apportionment of Overheads

Item of Overhead	Basis of Apportionment
Factory Rent	Floor Area
Insurance on Building, Machinery, Welfare Department Expenses	Insurable Value, Cost of Machinery, Number of Employees
Electric Light	Light points or Floor Area
Power Expenses	Horsepower of the Machinery
Depreciation	Plant Value
Advertisement	Sales Value

The above list is not exhaustive and depending upon peculiarities of the organization, it could be extended.

12.3.2 Advantages of Apportionment of Overheads

- Apportionment of overheads helps in control of overhead cost.
- Apportionment of overheads helps in calculating cost of production of the goods or services provided.
- It also helps in finding out under or over-absorption of overheads which helps in taking necessary remedial measures in case of need arises.
- Apportionment of overheads helps in calculating cost of work in progress.

12.3.3 Allocation vs. Apportionment

The distinction between Allocation and Apportionment can be studied in following points:

1) Allocation deals with the whole items of cost and apportionment deals with

proportion of items of cost.

2) Allocation is direct process of departmentalization of overheads, whereas apportionment needs a suitable basis for sub-division of the cost.
3) Whether a particular item of expense can be allocated or apportioned does not depends on the nature of expense, but depends on the relation with the cost centre or cost unit to which it is to be charged.

Examples1

The New XXX company is divided into four departments: A, B & C (Producing Departments,) and D is a service departments. The actual costs for a period are as follows:

Rent	1000	Repair to Plant	600
Supervision	1500	Fire Insurance (Stock)	500
Depreciation on Plant	450	Power	900
Light	120	Employer's Liability to Insurance	150

The following information is available in respect of the departments;

	A	B	C	D
Area (sq.mt.)	1,500	1,100	900	500
No. of Employees	20	15	10	5
Total Wages (Rs)	6,000	4,000	3,000	2,000
Value of Plant (Rs)	24,000	18,000	12,000	6,000
Value of Stock (Rs)	15,000	9,000	6,000	-
HP of Plant	24	18	12	6

You are required to apportion the costs to the various departments on the most equitable basis.

Solution

Overhead Distribution

Item	Basis of Apportionment	Total Amount	Production Department	Service Department

			A	B	C	D
Rent	Floor Area	1000	375	275	225	125
Supervision	No. of Employees	1500	600	450	300	150
Depreciation on Plant	Plant Value	450	180	135	90	45
Light	Floor Area	120	45	33	27	15
Repair to Plant	Plant Value	600	240	180	120	60
Fire Insurance(Stock)	Stock Value	500	250	150	100	-
Power	HP of Plant	900	360	270	180	90
Employer's Liability to Insurance	No. of Employees	150	60	45	30	15
	Total	5,220	2,110	1,538	1,072	500

12.5 Factory Overheads

Factory overheads include all expenses which arise in connection with manufacturing operations but cannot be directly identified with particular products or jobs. It starts with supply of materials and ends with primary packing of the product.

Factory overhead is also called as 'manufacturing overhead' or 'production overhead', or 'factory on cost' or 'works overhead'. Following are the examples of factory overheads:

- Rent rates and insurance of factory building.
- Depreciation and repairs of plant and machinery.
- Depreciation and repairs of factory building.
- Store keeping expenses, cost of consumable stores.
- Wages of indirect labour, normal idle time etc.
- Salary of works manager, foreman.
- Power used by machines.

- Drawing office expenses.

12.6 Absorption of Factory Overheads

The next important step is ‘Absorption’ of Overheads. CIMA defines absorption as, ‘the process of absorbing all overhead costs allocated or apportioned over a particular cost center or production department by the units produced.’ In simple words, absorption means charging equitable share of overhead expenses to the products. Overhead absorption is also known as levy or recovery of overheads. As the overhead expenses are indirect expenses, the absorption is to be made on somesuitable basis.

The Institute of Cost and Management Accountants (UK) defines overhead absorption as “The allotment of overheads to cost units.”

12.7 Methods of Absorption of Factory Overheads

An absorption rate is determined to charge overheads costs to the products or jobs. This rate can be determined using any one of the following methods:

1. Direct Material Cost Method.
2. Direct Labour Cost Method.
3. Prime Cost Method.
4. Machine Hour Rate Method.
5. Combined Rate Method
6. Production Unit Method

1. Direct Material Cost Method

Under this method the overhead rate is expressed as a percentage of direct material cost. Arithmetically the operation may be expressed as follows:

Percentage of direct material cost = [Budgeted or actual factory overhead/ Budgeted or actual material cost] x 100

Advantages of Direct Material Cost Method

- This method is simple to understand and easily applicable.
- This method is useful if material plays a major part.
- It produces fairly accurate results if the prices and grades of materials do not fluctuate widely from time to time and where output is uniform.

Disadvantages of Direct Material Cost Method

This method is not very much appropriate due to following disadvantages:

- This is a very unrealistic assumption that overheads are based on cost of material consumed.
- It ignores the time factor.
- If articles made of more expensive material are over charged with a high portion of factory overheads, sales prices will also tend to be high, which will lead to loss of market.
- The quality of labour and the way machines are used by them constitute most of the factory overhead, but in this method we ignore their effect.

- If different types of materials are used in different jobs at the same time, this will charge different value of overheads which is not appropriate.

Example 2

The budgeted overhead of XYZ Ltd. Is of Rs. 200000 and the budgeted direct material cost is Rs. 500000. Calculate the amount to be charged to Factory Overheadsif a job consumes Rs. 10000 worth of material.

Solution

Percentage of direct material cost = [Budgeted or actual factory overhead/ Budgetedor actual material cost] x 100

Percentage of direct material cost = [200000/500000] x 100

Percentage of direct material cost = 40% of Material

Amount to be charged to Factory Overheads=10000 x40%

Amount to be charged to Factory Overheads=Rs. 4000

2. Direct Labour Cost Method

This method is used in those organizations where labor is a dominant factor in the total cost. Under this method, the following formula is used forcalculating the overhead absorption rate.

Overhead Absorption Rate=Budgeted or Actual Overheads/ Direct Labor Cost X 100

This method is also simple to understand and easy to operate. However, it ignores the time taken by each worker for completion of the job. Similarly it ignores the work performed by machine where a labor is a mere attendant.

Advantages of Direct Labour Cost Method

- It is simple to understand and easy to apply and popular also.
- This method is useful where labour cost is an important part of total cost units.
- Labour rates are more stable than material prices, so it gives constant results.

Disadvantages of Direct Labour Cost Method

- Under this method, wages paid would be more for skilled labour and relatively less for unskilled workers. But the time taken to complete such jobs may be relatively less than those which involve employment of unskilled labour. Thus, applying this method may give improper results.
- This method ignores the significance of all other factors in production, sometimes use of machine gives rise to certain overheads like power, deprecation, oil etc.

Example 3

The budgeted overhead of XYZ Ltd. Is of Rs. 200000 and the budgeted labour paid is Rs. 400000. Calculate the amount to be charged to Factory Overheads if a job consumes Rs. 100000 worth of material and 50000 worth of Labour cost.

Solution

Overhead Absorption Rate=Budgeted or Actual Overheads/ Direct Labor Cost X 100

Overhead Absorption Rate= [200000/400000] x 100

Overhead Absorption Rate== 50% of Direct Labour

Amount to be charged to Factory Overheads=50000 x50%

Amount to be charged to Factory Overheads=Rs. 25000

3. Prime Cost Method

This method is an improvement over the first two methods. Under this method, the Prime Cost is taken as the base for calculating the percentage of absorption of overheads by using the following formula.

Absorption Rate= [Budgeted or actual factory overhead/Budgeted or actual prime cost] X 100

Prime Cost = Direct Material + Direct Labour + Direct expenses.

This method is simple to understand and easy to apply but this method suffers from the disadvantages of both the above mentioned methods. So this method is used in rare cases.

Example 4

The budgeted overhead of XYZ Ltd. Is of Rs. 200000 and the budgeted Prime cost is Rs. 1000000. Calculate the amount to be charged to Factory Overheads if a job consumes Rs. 100000 worth of material and 50000 worth of Labour cost and 10000 as direct expenses.

Solution

Absorption Rate=[Budgeted or actual factory overhead/Budgeted or actual prime cost] X 100

Prime Cost = Direct Material + Direct Labour + Direct expenses.

Absorption Rate= [200000/1000000] x 100

Absorption Rate= 20% of Prime cost

Prime Cost = Direct Material + Direct Labour + Direct expenses.

Prime Cost = 100000+50000+1000

Prime Cost =160000

Amount to be charged to Factory Overheads=160000 x20%

Amount to be charged to Factory Overheads=Rs. 32000

4. Machine Hour Rate Method

Where machines are more dominant than labor, machine hour rate method is used. CIMA defines machine hour rate as an “Actual or predetermined rate of cost

apportionment or overhead absorption, which is calculated by dividing the cost to be apportioned or absorbed by the number of hours for which a Machine or machines are operated or expected to be operated.Machine Hour Rateis calculated as follows:

Machine Hour Rate=Budgeted or Actual Factory Overhead/Budgeted or Actual Machine Hours

Steps required calculating the Machine Hour Rate

- Each machine or group of machine should be treated as a cost centre.
- The estimated overhead expenses for the period should be determined for each machine or group of machines.
- Overheads relating to a machine are divided into two parts i.e., fixed or standing charges and variable or machine expenses.
- Standing charges are estimated for a period for every machine and the amount so estimated is divided by the total number of normal working hoursof the machine during that period in order to calculate an hourly rate for fixed charges. For machine expenses, an hourly rate is calculated for each item of expenses separately by dividing the expenses by the normal working hours.
- Total of standing charges and machines expenses rates will give the ordinary machine hour rate.

Basis of apportionment in Machine Hour Rate Method:

- Rent and Rates- Floor area occupied by each machine.
- Heating and Lighting- The number of points used plus cost of special lighting or heating for any individual machine, alternatively according to floor area occupied by each machine.
- Supervision-estimated time devoted by the supervisory staff to each machine.
- Lubricating Oil and Consumable Stores – On the basis of past experience.
- Insurance – Insurable value of each machine
- Miscellaneous Expenses – Equitable basis depending upon facts.

Example 5

1) Calculate the Machine Hour Rate from the following:

Cost of the Machine= Rs. 100000

Installation Charges= Rs. 10000

Scrap Value= Rs. 5000

Life of Machine= 10 years

Estimated working hours per year=2200 hours

Rent and Rates for the shop per month= Rs. 250

Supervisor’s salary= Rs. 700

General lighting for the shop per month= Rs. 300

Rate of Power per 100 units= Rs 50

Power consumption per hour is 10 units. Machine occupies 1/4th area of shop. Thesupervisor is spending 1/5th of his time to this machine.

Solution

Computation of Machine Hour Rate

Particular	Per Annum	Per Hour
Standing Charges		
Rent=250 x12 x1/4=	750	
Supervisor's Salary=700 x12 x1/5	1680	
General Lighting=300 x12 x1/4	900	
Total	3330	
Standing Charges per hour= 3330/2200 hrs.		1.51
Variable Charges		
Depreciation=[100000+10000-5000]/10=10500/2200		4.77
Power(10 x50)/100		5.00
Machine Hour Rate		**11.28**

5. Combined Rate Method

Where both manual and machine operations are involved two separate rates may be computed. It will require apportionment of overheads between machine centers and other general sections of factory.

6. Production Unit Method

Rate per Unit=Budgeted or Actual No. of Units Produced/ Budgeted or Actual Factory Overhead

This method is simple and if the company makes only one product, this method can be used.

Self-Assessment

Fill in the blanks:

1. _____is the allotment of whole items of overheads to cost units or cost centres.
2. _____is the allotment of proportion of items of cost to cost centres

or cost units.

3. The rate per unit is obtained by dividing the overheads by the number of ……

4.is the cost of running a machine per hour.

5. Under ..... method, the percentage of factory expenses to material is calculated on the basis of past records and the factory expenses in the current year.

6.is computed by dividing the budgeted overhead expenses by the budgeted base.

7.is the combination of machine hour rate and direct labour rate.

12.8 Over and Under Absorption of Overheads

If the actual overhead is more than the overhead absorbed, then this excess is termed as under absorption as this portion remains uncharged to production. On the other hand if the overhead absorbed is more than the actual overhead, this difference is called as 'over absorption' as the amount charged to production has notbeen incurred.

Under or over absorption of overheads may arise due to the following reasons:

- The overhead absorption rate may have wrongly been computed.
- The seasonal fluctuations in the overhead costs in some industries.
- Unforeseen changes in the capacity of production. Unexpected change in the volume of output.

Treatment of under or over absorption:

- Use of Supplementary Rate-the difference is considerable then supplementary rate is calculated.
- Transfer to Costing Profit and Loss Account- if difference is due to abnormal reasons which are beyond the control of management, then such amount should be transferred to Costing Profit and Loss Account.
- Transfer to Overhead Suspense Account-if the difference is seasonal (for which it is possible that by the end of the accounting period it will wipe out) then it should be transferred to overhead suspense or adjustment account.

Self-Assessment

8.The extent of idle capacity is indicated by ……

9. Under/Over absorption arises only when overheads absorption is based on _____rates.

10. When actual overheads are less than absorbed overheads, the difference between the two is called_____.

12.9 Summary

Certain items of overheads can be clearly identifiable to the related job or cost unit e.g. repairs and maintenance incurred for specific department, indirect wage or other expenses for particular department etc. Allotment of such items to specific department is known as allocation. Thus, charging the whole amount of particular expense to particular department or cost centre is called as allocation of overheads. Proper overheads allocation is of great importance as wrong allocation can distort income determination, asset valuation and performance evaluation.Apportionment of Overheads refers to the distribution of common items of cost to two or more cost centers on some appropriate basis. When overheads are incurred for the factory as a whole and benefit two or more cost centers, it is necessary to apportion them to different departments that receive benefits from such overhead costs.The choice of one or the other method depends on the actual circumstances of the individual case. In respect of departments or operations, in which machines predominate and the operators perform a relatively a passive part, the machine hour rate is more appropriate.

12.10 Glossary:

Allocation: The allotment of whole items of cost to cost centres or cost unit.

Apportionment: The allotment of proportion of items of cost to cost centres or costunit.

Absorption: Absorption' of Overheads is the process of absorbing all overhead costs allocated or apportioned over a particular cost center or production department by the units produced.

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

Direct Wages: wages from the primary form of employment.

Over Absorption of Overheads: The overheads are over absorbed if the actual overheads incurred are less than the overheads absorbed.

Predetermined Rate: Preset or planned rate.

Standard Cost: factory cost to be accounted for the year.

Under Absorption of Overheads: The overheads are under absorbed if the actual overheads incurred are more than the overheads absorbed.

Machine Hour Rate: The overhead cost for operating the machine for an hour.

12.11 Answers: Self-Assessment:

1. Allocation	2.Apportionment	3. Units produced
4. Machine hour rate	5. Percentage on direct material cost	
6. Predetermined overhead rate	7. Dual hour rate	8. Under absorption
9. Predetermined	10. Over-absorption	

12.12 Terminal Questions:

1. What do you mean by classification, allocation, apportionment and absorption of overheads?
2. Write a note on i) Over-absorption of overheads, ii) Under-absorption of overheads.
3. What do you mean by Machine Hour Rate? How it is calculated? Give the suitability of method where it is applied.

12.13 Suggested Readings:

V.K. Goyal, Financial Accounting, Excel Books, New Delhi.
Nitin Balwani, Accounting & Finance for Managers, Excel Books, New Delhi.
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LESSON-13

STANDARD COSTING

Structure

13.1 Learning Objectives:

After studying the lesson, you shall be able to understand: -

(1) The concept of standard cost and standard costing.
(2) The type of standards.
(3) Establishment of standard costing.
(4) Advantages and Disadvantages of standard costing.
(5) Understand the concept of different cost and sales variance
(6) Compute the different types of variances.
(7) Understand precautious is use of standard costing.

13.2 Introduction

Standard costing is an essential part of overall planning and control system in any organization. As you know, planning is looking ahead while control is looking back and, as such, both are inseparable. Control means conformance to plans. In other words, it involves the process of ensuring the accomplishment of plans. The process of control entails *(i)* the setting up of “yardsticks” or standards of performance, *(ii)* comparison of actual performance with the standard, and *(iii)* taking corrective action to set right the

deviations; if any. Thus, control involves not only die action needed to implement, the designation of responsibility centres for carrying out actualperformance, but also the measurement of the actual performance in comparison with the specified plan or standards, the communication of results to the responsibility centres, and initiation of appropriate reactions. Such a control is achievedthrough standard costing. Standard costs are, therefore, regarded as the building blocks of abudgeting and feedback as the building blocks of a budgeting and feedback' system forplanning and control of performance.

There is another aspect of control based on standard costing that needs a little elaboration before the venture to define and explain the concept of standard cost. That relates to *effectiveness* and *efficiency.* Managers in any business organization make two major types of decisions in the planning and controlling of costs ; (i) *price* decisions, and (ii) *quantity* decisions. That is, material and human resources are supposed to be obtained at the lowest possible price consistent with quality and other long term objectives. These resources are *inputs;* they should be used efficiently and effectively to produce the maximum possible good *output;* It is here that distinctions between effectiveness and efficiency are frequently *very* helpful in discussing and controlling through standard costing *Effectiveness* is the accomplishment of a desired objective. *Efficiency* is an optimum relationship between input and output. Both will have to be ensured.

Thus there are two major questions about performance that a standard costing system will have to answer : *(i)* Is the performance effective? and *(ii)* Is it efficient " The first question (teals with attaining a revenue or volume target. The second question basically emphasises input-output relationship; that is given a particular level of revenue of volume (output), did the manager control his inputs as desired ?

Standard costing coupled with variance analysis is one of the basic managerial tools that seeks to provide and answer to the above questions; we shall be discussing the concept of standard costing and variance analysis in the present and the next lessons.

13.3 Nature and Meaning of Standard Cost

Standard cost accounting, simply known as standard costing, is an essential part of a control system. In a essential part of a control system, in a standard costing system, according to the *Institute of cost and Works Accountants (ICWA) London,* Standard costs are prepared and need to clarify the final results of a business, particularly by measurement of the variations of actual costs from standard costs and the analysis of the causes of variations for the purpose of maintaining efficiency by executive action."

Standard costs are carefully predetermined costs; they are target costs, costs that should be attained. These are computed in advance of production on the basis of specification of fill the factors affecting costs. As such, standard costs may be distinguished from *historical costs* which are computed at or after the completion of production of goods to that cost figures have value only from a historical point of view. These historical cost figures, if properly analysed, may be meaningful for future decision-making, but they cannot be used to measure and control performance,

because the inefficiencies and errors in production are not brought out until after the damage has been done. Thus with a view to detecting waste and inefficiencies in time and at their sources, cost analyais requires the use of *predetermined cost estimates* made on national, &id scientific basis. Such predetermined costs, used for performance, measurement and control, to ensure effectiveness and efficiency, are known as 'Standard Costs.'

I.C.W.A (London) defines standard cost as an estimated cost prepared in advance of production or supply, correlating a technical specification of materials and labour to the prices and wages rates estimated for a selected period of time, with, an addition of the apportionment of overhead expenses estimated for the said period within a prescribed set of working conditions." The predetermined standards, embodied in a standard cost system are those for productive output and cost elements like materials, labour and overhead, (indirect expenses). It may be emphasised that standard costs are not mere averages. These are set with due care after careful observation and analysis of production activities as well as the internal and external constraints in the past and' the present, as also these expected to prevail in thefuture period for which standards are being set, 'Standard Costing' combines in itself
(a) the ascertainment and use of Standard Costs, and (b) the measurement and analysis of variances.

Standard costing is defined by ICMA, London terminology as, "the preparation and use of standard costs, their comparison with actual costs and the analysis of variances to their causes and points of incidence." Wheldon defines standard costing as, "a method of ascertaining the cost whereby statistics are prepared to show (a) standard cost, (b) the actual cost and (c) the difference between these costs which istermed the variance."

According to J. Batty, "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 line of product manufactured of service applied."

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."

13.4 Salient Features of Standard Costing:

The salient features of standard costing are as follows:

(i) Ascertainment and use of Standard Costs :
(ii) Measurement of actual costs;
(iii) Comparison of standard costs and actual costs to develop variance; and
(iv) Analysis of variances and taking the appropriate action whenever necessary.

Standard Costs, thus help to build budgets, gauge performance, obtain product costs, and save book keeping costs. A set of standards outlines how a task shouldbe accomplished and how much it should variances. The variances are then investigated

to identify the underlying causes for the variations so as to detect inefficiencies and to discover better ways of adhering to standards, of altering standards in the light of changed conditions, or of accomplishing objectives more efficiently and effectively.

13.5 Advantages of Standard Costing :

It is apparent from the foregoing discussion that there are a number of advantages of standard costing. Some of these are enumerated below:

1. It eliminates the weakness of historical cost system.

2. It highlights the variances, the differences between the actual performance and the planned performance (standards) tor speedy control.

3. It helps in the formulation of production and. price policies in advance, so as to eliminate the effect of fluctuating volume and to avoid any cost increase due to waste and efficiency.

4. It serves a basis of incentive schemes and, if properly becomes a strong motivational force for employees to achieve more effective results.

5. It facilitates faste reporting of operating data through performance reports and ensures prompt corrective action.

6. It saves cost in the long-run and increases efficiency by keeping a check on waste and unwanted costs.

7. It facilitates prompt measurement of performance by providing a common denominator, “yardstick”, or standard as a ready basis for comparison.

8. It is instrumental in bringing about improvement in production method and efficiency by a continuous detailed study of all ‘manufacturing, administrative, selling and distribution functions, which is a pre-condition for standard setting.

9. It also serves as the basis of stock valuation.

10. It helps to apply the principle of “management by exception” by pointing out the exceptions (major variances) where management should direct its attention.

11. It will help prompt preparation of profit and loss account for short periods, say, a week, a fortnight, a mouth, etc. so as to apprise management of the trends of business.

12. It promotes cost consciousness among the employees and managers by emphasizing the performance measurement in terms of cost variations.

13.6 Disadvantages or Limitations of Standard Costing

The following are its disadvantages or limitations:

(i) Ascertainment of standards requires high degree of technical skill and is, therefore, costly.

(ii) Standard costing is applied for planning and controlling manufacturing costs. Thus, it cannot be applied in a service organisation or industry,

(iii) 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,

(iv) Standard costing is not suitable for all types of business organisation, and

(v) There may be an increase in the non-productive activities, e.g., measuring work, compiling forms, reporting of variances etc.

13.7 Determination of Standard Costs:

Setting up a standard costing system in an organisation, the following preliminary steps should be carefully considered:

1. Establishment of Cost Centre,

2. Classification and Codification of Accounts,

3. Types of Standards, and

4. Setting the Standards.

1. ***Establishment of Cost Centre:*** The standard-setting and budget-setting process in an organization should be primarily the responsibility of the line personnel directly involved. As such, it is necessary that the business unit be so organized that department are properly designated and lines of authority clearly defined. Establishment of *cost centres* is quite helpful in this regard. I.C.W.A. (London) defines a cost centre as "a location, person or item of equipment (or group of these) for which costs may be ascertained and used the purposes of cost control," Here no doubt should be left as to the person-responsible for each cost centre, in many instances, functional departments will form natural cost centres, but it is possible thatthere might be number of cost centres in a department.

2. ***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

3. Type of Standards

Standard may be classified on the basis of the Source from which they are derived. The basic question here is: how demanding should standards be? Should they

express perfection and ideal, or should they allow' for the various factors that prevent perfect or ideal performance? In view of the above facts, the bases of the derivation of standards may be different. A variety of names have been coined for different kinds of standards, and they are often classified as:

(i) *Basic Standard:* The terminology of ICMA defines basic standard as "A standard established for use over a long period from which a current standard can be developed." Basic standard is standard established for use over a long period from which a current standard can be developed. The main disadvantage of basic standard is that because it has remained unaltered over a long period of time, it may be out of date. The main advantage is in showing the changes in trend of price of product and efficiency from year to year.

(ii) *Current Standard:* According to ICMA, it is "A standard which is established for use over a short period of time and is related to current conditions." Current standardis a standard established for use over a short period of time, related to current conditions. The problem with this type of standard is that it does not try to improve oncurrent levels of efficiency.

(iii) *Ideal Standard:* The terminology of ICMA defines ideal standard as, "A standard which can be attained under most favourable conditions. No provision is made, for example, for shrinkage, spoilage or machine breakdowns. Users believe that the resulting unfavourable variances will remind management of the need for improvement in all phases of operations. Ideal standards are not widely used in practice because they may influence employee motivation adversely." Ideal conditions are seldom found to prevail. Consequently, if actual outcome is comparedwith a standard based on this concept, it would give rise to large adverse variances. This would have an adverse effect on the motivation, productivity and satisfaction of the employees. Generally, it is not used in practice as the information generated by astandard costing system using this standard has no practical utility.

(iv) *Attainable Standard:* Attainable standard is a standard which can be attained if a standard unit of work is carried out efficiently, on a machine properly utilised or material properly used. Allowances are made for normal shrinkage, waste and machine breakdowns. The standard represents future performance and objectives which are reasonable attainable. Besides having a desirable motivational impact on employees, attainable standards serve other purposes, e.g., inventory valuation, cash budgeting and budgeting departmental performance. If correctly set attainable standards are the best type of standard to use, since they provide employees with a realistic target. Attainable standards have the greatest motivational impact on the workforce.

Apart from the above-mentioned types of standards, standards may also be classifiedin terms of the mode of their expression. That is, standards may represent a physicalevent, or a quantitative (financial) description of that event. The' former is known as *Physical Standard* and the latter *price standard. Physical standards* are the foundation of standard costing and usually represent reliable engineering or physicalestimates which are expressed in terms of volume like tons and litres, or minutes or hours of work. The multiplication of physical standards by appropriate

price (or rate) factors results in price standards. Price standards enable all standards in a companyto be expressed in a common denominator, viz., unit of money, and facilitate the establishment of standard costs for control purposes.

4. ***Setting the Standards:*** With a view to avoiding confusion, responsibility for setting standards be given to a specific person into a committee, because thesuccess of a system of standard costing depends upon the reliability of standards. Again, the relative lightness of the standard should be the result of face-to-face discussion between the manger and his immediate superior or the budget committee. What types of standards is going to be used must also be decided before setting the standards.

The number of persons who should be concerned with standard-setting will differ from company to company, depending upon the size and nature of the business. Often, in a fairly large undertaking, the following may be included.

1. **Production Controller/Manager**: - for details of production requirements in terms of materials, labour, overheads.
2. **Purchase Manger —** for schedules of prices and details of market price trends.
3. **Personnel Managers—** for schedules of rates of pay of labour and forecast of possible changes in these rates.
4. **Time and Motion Study Engineer: —** for calculation of standard times for various operations involved in the production process.
5. **Sales Manager: —** for providing the data of expected sales and selling and distribution expenses.
6. **Cost Accountant: —** for the provision of all necessary cost figures; also for coordinating the activities of the committee.

Other functional heads, if any, may also be involved.

The job of the accounting or Controller's Department is;

(a) to price the physical standards—that is, to express the physical standards in the tom of rupee and paisa ; and
(b) to report operating performance in comparison with standards.

13.8 Setting up of Standard Costs:

Finally, standards should be set to each element of cost separately. These have been briefly described below:

(A) Direct Material

Standard direct material cost to each product should be established. This will involve —

(1) determination of standard quantity of materials, and
(2) determination of standard price per unit of materials.

In ascertaining standard quantity to material, material specifications, yield factors and normal loss factors should be takes into consideration, Sometimes, test runs may be necessary to determine the standard quantity. The production Engineer will help the Cost Accountant to determine the standard quantity for each kind of materials.

The next step is to fix standard price of materials. This will be done by the Cost Accountant in collaboration with the Purchasing Manager. The rates of materials should be standardized after considering:-

(a) price of materials in stock;
(b) materials already contracted for;
(c) future trends of prices;
(d) discounts to he received, if any, etc.

(B) Direct Labour Cost

Determination of standard direct labour cost will involve determination of—

(i) standard time, and
(ii) standard rate.

Standard time should be fixed for each grade of labour and for each operation involved. This is generally done in conjunction with the work- study engineer. Method study and time study techniques are to be employed in fixing standard performance of labour.

Standard rates of pay for each grade of workers. are then to be determined. Any expected increase in the rates should be considered in the assessment. The Personnel Manager will help the accountant in determining standard rates. If overtime work is essential, extra payment for overtime may be included in the wage rates.

(C) ***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 standard overhead cost.

Overheads are divided into fixed, variable and semi-variable. Standard overheadrate is determined for these on the basis of past records and future trend of prices. It is calculated for a unit or for an hour.

i) Variable overhead

Variable overhead has been defined as ‘a-cost which tends to vary directly with volume of output.' Therefore, it is necessary to calculate standard variable overhead per unit or per hour so that per unit - cost can be multiplied by budgeted production during the period. Standard unit cost shall be ascertained after due regard to past records and future trends of prices.

$$\text{Standard Variable Overhead Rate} = \frac{\text{Standard variable overhead for the budget period}}{\text{---------------------------------------}}$$

Budgeted production units or budgeted hours for the budgeted period

ii) Fixed Overhead

Fixed overhead trends to be unaffected by variations in volume of output. It is, therefore, necessary to determine:

(i) total fixed overhead for the period, and
(ii) budgeted production in units of standard hours for the period-

Then it is possible to estimate the standard fixed overhead cost per unit or per hour by dividing total fixed overheads by budgeted total production or standards hours, as the case may be.

$$\text{Standard Fixed Overhead Rate} = \frac{\text{Standard overheads for the budget period}}{\text{Budgeted production units or budgeted hours for the budgeted period}}$$

13.9 Budgets and Standards Costs

Both standard costing and budgeting have the common objective of improving managerial control by establishing pre-determined targets and measuring the actual performance in terms thereof for control purposes. Both the systems are 'forward looking'. As such, if the standards are 'currently attainable there is no conceptual difference. However, technically speaking, two basic difference may be Identified.

Firstly, the term *standard cost,* as it is most widely used, is a unit concept; that is, it is calculated and expressed in terms of cost per unit. For example, the standard asst of material pa unit is, say, Rs. 5. The term *budgeted* cost, as it is most widely used, is a total concept; that is, the budgeted cost of material is Rs. 5,000/- if 1,000 units are to be produced at a standard cost of Rs. 5/- pa unit

Secondly, budgetary control is often concerned with comparison of estimated and actual results of department or company while standard casting reflects to the comparison of estimated and actual costs of manufacturing a product of rendering a service.

This could be put in another way. In practice, direct materials and direct labour are said to be controlled with the help of *standard casts,* whereas all other costs are usually said to be controlled with the help of *department overhead budgets.* Both are,however, complimentary and good companies use both the systems.

13.10 Standard Hour

Production is generally expressed in physical units such as tons, pounds gallons, numbers etc. But when different types of products are manufactured in a factory it is difficult, and sometimes impossible, to express ail the products in one common unit For example, in coke oven factory both coke and gas arc produced. Coke is generally measured in tons while gas in cu. ft. It is difficult to express these two heterogeneous products in one common measure— either in tons or in cu. ft. But

they can be, expressed in standard hours. A standard hour is a hypothetical hour which measured amount of work that should be performed in one hour.

Exercise 1:

Durgapur Ltd. produces two products—Coke and Gas. Production per hours was estimated to be 10 tons of coke and 10,000 cu. ft of gas. During a month 10,000 tons of coke and 5,00,000 cu. ft of gas were production. Express the production in standard hours.

Solution

Statement of Production

for the month of

Product	Production	Standard Production Per Hour	Production Expressed in Standard Hours
Coke	10,000 tons	10 tons	1,000
Gas	5, 00,000 cu. ft.	10,000 cu. ft.	50
			1050

Self-Assessment

Fill in the blanks:

1. ……. denotes a predetermined rate or amount against which actual performance in activity is compared as a measure to evaluate.
2. Standard cost is a predetermined cost and refers to that amount which ought to be …….
3. Standard costing is applied for …… and controlling manufacturing costs.
4. ……. 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.”
5. ……. standard is a standard established for use over a short period of time, related to current conditions.
6. Ideal Standard is a standard which can be attained under most ……. conditions.

7. …… standard is a standard which can be attained if a standard unit of work is carried out efficiently, on a machine properly utilised or material properly used.

8. The standard .....is a convenient measure of production.

13.11 ANALYSIS OF VARIANCES

The most important managerial use of standard costs is the analysis of variances. Variances may be defined as the difference between the 'actual' and 'standard' or 'budget' costs while the 'variance analysis' is the proms of analyzing variances by subdividing the total variance in such a way that management can assign responsibility for off standard performance. This requires an understanding of the principal determinants of results achieved as variance analysis is nothing more than the isolating of determinants which were not incorporated into the standard.

It is difficult to fix the meaning aid responsibility for variances due to the fact that the cumulative effect of productive operation at one stage in the processing of the product is materially influenced by all preceding and related stages. Moreover, as it is not only impossible to identify each of these variables in the determination of the standard, the identification of each of Urn individual reason for deviations from the standard alter the completion of 'vests is also equally impossible.

The analysis of variance among companies ranges from very simple to very complex, one depending on such factors as the manufacturing processes, nature of standard cost system, the disposition of management' or the degree of sophistication of the Controller or Chief Cost Accountant. Some systems provide for a single total variance only while others may analyse variance by a dozen different causes. The sole consideration for determining the extent of variance analysis is the use that management has of information yielded by suds analysis which should continue to be extended as long as figures are useful to management in making decision, and it should stop at the point where further breakdown of the variance provides an useful additional information to management.

The preconditions for working out variances are : (i) the existence of standard costs, and (ii) availability of actual costs along with information about the underlying factors. In evaluating and investigating a variance to determine the underlying causes, the following possibilities should be considered:

1. That the variation Is not significant-both favourable and unfavourable variances be investigated to assess their significance.

2. That the variation was due to reporting errors-both the budget objective and the actual data supplied by accounts department be appraised to be sure that toe are no clerical errors.

3. That the variance was due to specific managerial decisions *e.g.* decision to raise salary, a special advertising project, etc.

4. That many variances are explainable in terms of the effect of un-controllable fetters that are identifiable.

5. That these variations tor which to precise underlying causes are not shown should be of primary ‘ concern should *be* carefully investigated.

The comparison will give an overall measure of overspending or saving in costs. Each cause is separated and to variances named after it A variants which leads to an increase in profit is termed as favourable denoted by (F) or (Cr); that which results in lower profit will .be adverse or unfavourable and denoted by (A) or (Dr.)

13.12 Classification and Computation of Variances— Variances indicate the .extent to which a desired "level of performance as defined by management has been attained. They may be segregated by department by cost and by elements of cost ***e.g.,*** price and quantity. Different variances are used in different industries. Variances can be found out with respect to all the elements of cost, i.e., direct material, direct labour and overheads. For understanding of the classification and computation of variances, variances are classified into the following:

1. Material Variances,

2. Labour Variances,

3. Overhead Variances, and

4. Sales Variances.

1. Material Variances

In case of materials, the following may be the variances:

(i) Material Cost Variance,

(ii) Material Price Variance,

(iii) Material Usage or Quantity Variance,

(iv) Material Mix Variance, and

(v) Material Sub-Uses or Yield Variance

The following figure shows the division and subdivision of material variances:

(i) ***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

OR Material Cost Variance = Material price variance + Material usage or quantity variance

OR Material Cost Variance = Material price variance + Material mix variance + Material yield variance

OR Material Cost Variance = Standard cost of actual output – Actual cost

OR Material Cost Variance = (Standard quantity for actual output × Standard price) –

(Actual quantity × Actual price)

OR 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 the other hand, if the actual cost is more than the standard cost, the variance will be adverse or be unfavourable.

Example 2.

Standard price of material is Rs, 20 per Kg. and Standard usage (or consumption) = ,1000 kg. of material

Per unit of output	5 Kg. of material
Actual price of material	Rs. 24/-per kg.
Actual production	200 units
Actual quantity consumed	900 Kgs. of material

Material cost variance = Standard cost-Actual cost

or (Rs. 20 x 1000 Kgs.) - (Rs. 24 x 900 Kgs.)

or 20,000 21,600

or Rs. 1600 unfavourable.

(ii) **Material Price Variance**: It has been defined as 'that portion of the directmaterial cost variance which is due to the standard price specified and actual price paid. It is calculated as :

Actual units used x difference between the standard and the actual Price Paid.

MPV= AQ (SP—AP)

A favourable variance arises if the actual price is less than standard price and vice-versa.

Example—3

Using the data given in example 2, price variance will he calculated 'as follows :

Material Price Variance = 900 kgs.' (Rs. 20 – Rs. 24)

= 900 x 4= Rs.3600 unfavourable

Material Price Variance has been designed for the comparison of effectiveness of purchasing from the point of view of management and is measured by comparing the amount paid for a certain quantity of materials against the amount that would have been paid had materials purchased been available at standard price.

(iii) **'Total usage or quantity variance:** When the price variance has been taken out, all units used are reduced to the standard cost. It is necessary now to see the efficiency aspect, namely, how many units should have been consumed (according to the standard) and how many have been actually consumed. The difference shows the usage (or materials efficiency) variance. This variance would disclose of efficiency or inefficiency of the production departments it is responsible for using the materials. It is calculated as:

Standard unit cost (Standard quantity for Actual Output-Actual quantity)

SC (SQ-AQ)

The variance will be called favourable if the standard quantity is more than actual quantity and vice-versa.

Example-4

Using the data given in example-2, Total usage variance will be calculated as thus;

Total usage variance = Rs. 20 (1000 Kgs. 900 Kgs.)

= 20 x 100 = Rs. 2000 favourable

Classification of Total Usage Variance: Where more than one type of material is used for producing the finished products. Total usage variance may be further sub-divided into, 'Material Mix Variance' and either 'Material Yield Variance' or Material Revised Usage Variance

(iv) ***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.

This variance arises only when two types of materials are required to be consumed to produce a commodity. This can be computed as below:

(a) When actual weight of mix and standard weight of mix are the same:

Material Mix Variance = Standard rate (Standard quantity – Actual quantity)

If the standard is revised due to shortage of a particular type of material, the material

mix variance is calculated as follows:

Material Mix Variance = Standard rate (Revised standard quantity – Actual quantity)

OR MMV = SR (RSQ – AQ)

$$\text{Revised Standard Quantity} = \frac{\text{Total weight of actual mix}}{\text{Total weight of standard mix}} \times \text{Standard quantity}$$

(b) When the actual weight of mix and standard weight of mix differ from each other:

Material Mix Variance =

$$\left\{ \frac{\text{Total weight of actual mix}}{\text{Total weight of standard mix}} \times \text{Revised standard cost of standard mix} \right\} - \text{Standard cost of actual mix}$$

If actual quantity is lower than RSQ, the variance will be favourable, otherwise, it is adverse.

(v) ***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.

If there is no difference between standard quantity and revised standard quantity, there will be no revised usage variance. Revised usage and sub-usage variance will be calculated for each item of material used in the mix separately.

Material Sub-Usage or Revised Usage Variance = Standard price (Standard quantity for actual output – Revised standard quantity)

OR 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. Yield variance is also known as scrap variance or waste variance.

(a) When actual mix and standard mix are the same:

Material Yield Variance = Standard yield rate (Standard yield – Actual yield)

OR Material Yield Variance = Standard revised rate (Actual loss – Standard loss)

$$\text{Here, Standard Yield Rate} = \frac{\text{Standard cost of standard mix}}{\text{---------}}$$

Net standard output

Net Standard Output = Gross output – Standard loss

(b) When the actual mix and the standard mix differ from each other:

Material Yield Variance = Standard rate (Actual standard yield – Revised standard yield)

$$\text{Here, Standard Rate} = \frac{\text{Standard cost of revised standard mix}}{\text{Net standard output}}$$

In case, actual yield is more than the standard yield, the material yield variance is favourable and, if the actual yield is less than the standard yield, the material yield variance is adverse or unfavourable.

Exercise 5:

The standard material required manufacturing one unit of product A is 10 Kg. and the standard price per Kg. of material is ` 2.50. The cost accounts records, however, reveal that 11,500 Kg. Of materials costing ` 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

$$\text{Actual price of material per Kg.} = \frac{27,600}{11,500} = \text{Rs. } 2.40$$

(i) Material Cost Variance:

MCV = 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)

(ii) Material Price Variance:

MPV = Actual quantity (Standard price – Actual price)

= 11,500 Kg. (Rs. 2.50 – Rs. 2.40)

= 11,500 × 0.10

= Rs.1, 150 (Favourable)

(iii) Material Usage Variance:

MUV = Standard price (Standard quantity – Actual quantity)

= Rs. 2.50 (10,000 Kg. – 11,500 Kg.)

= Rs.2.50 × 1,500

= Rs.3,750 (Adverse)

Verification:

Material cost variance = Material price variance + Material usage variance

Rs. 2,600 (Adverse) = Rs.1, 150 (Fav.) + Rs.3, 750 (Adverse)

Rs. 2,600 (Adverse) = Rs. 2,600 (Adverse)

2. Labour Variances

The labour variances can be computed and analysed in the same way as material variances have been carried out. Labour variances can be analysed in the following way:

(i) Labour Cost Variance,

(ii) Labour Rate Variance,

(iii) Labour Efficiency or Time Variance,

(iv) Labour Mix Variance,

(v) Labour Idle Time Variance,

(vi) Revised efficiency Variance, and

(vi) Labour Yield Variance.

(1) Labour Cost Variance: This variance is also known as Direct wages variance. The difference between the direct wages is calculated according to the standard specified for the activity achieved and actual direct wages paid. It thus represents total deviation of actual labour cost from the standard labour cost.

It is calculated as follows:

Labour Cost Variance = Standard cost of labour – Actual cost of labour

LCV = (Standard time × Standard rate) – (Actual time × Actual rate)

OR LCV = (ST × SR) – (AT × AR)

If the standard cost is higher, the variance is favourable and vice-versa.

Example 6 :

Data relating to job is as thus:

Standard rate of wages per hour	Rs. 5
Standard hours	200
Actual Rate of wages per hour	Rs 8
Actual hours	150

Labour cost variance = (Rs. 5 x 200 hrs) — (Rs.8 x 150 hrs.)

= 1000 - 1200

= 200 unfavourable

Like the Material cost variance, labour cost variance comprises two basic Variance — (i) Rate variance, and (ii) Total Efficiency variance.

(ii) Labour *Rate Variance:* It represents that portion of labour cost variance which is due to the difference between the standard rate of pay specified and the actual rate paid. Thus variance is calculated in the same manner as Material price variance.

Actual Hours or Actual time X (Standard Rate—Actual Rate)

Or LRV = AH or AT X (SR—AR)

If the standard rate is higher, the variance is favourable and vice-versa.

Labour rate variance may arise due to any one of the following reasons:

(a) Payment at a rate higher or lower than the standard rate,

(b) Change in the method of payment of remuneration,

(c) Grades of employees changed, and

(d) Inclusion of new workmen.

Example 7.

Using the data given in example 6:

Rate variance = 150 (5—8)

= 450 (unfavourable)

(iii) Total Efficiency Variance (or Labour Time Variance) *:* This constitutes that portion of Labour cost variance which is due to the difference between labour hours specified in the standard for the activity achieved (i.e. for actual output) and the actual labour hours paid for. This is comparable with Material Total Usage Variance.

Standard Rate (Standard hours for actual output — Actual hours)

or SR (SH-AH)

If the standard hours are more, the variance is favourable and vice-versa.

Example 8 :

Using the facts stated in Example 6:

Total Efficiency variance = Rs. 5 (200-150)

= 250 favourable

Classification of Total Efficiency Variance:

(i) Where abnormal idle time occurs. Total Efficiency valance can be divided into two sub-variances,
   (a) Ideal Time Variance
   (b) Revised Efficiency Variance

(ii) In cases where the composition of the standard gang and actual gang differs and abnormal idle time has been paid for, Total Efficiency Variance may be divided into three sub-variances :
   (a) Idle Time Variance
   (b) Mix Variance
   (c) Revised Efficiency Variance

(iv) *Labour Mix Variance (or Gang Competition Variance) :* Sometime the composition of Actual Gang of Labour may differ from that of standard Gang due to shortage of a particular grade of Labour or some other reason. Labour Mix variance is calculated to show to the top management how much of the Total Efficiency Variance is due to the change in composition of labour force. This variance corresponds to Material Mix Variance and is equal to :

Standard rate (Revised Standard hours -- Actual hours). If Revised Standard hours are more, variance is favourable and vice versa.

OR LMV = SR (RST – AT)

$$\text{Revised Standard Time} = \frac{\text{Total actual time}}{\text{Total standard time}} \times \text{Standard time}$$

(v) Labour *Idle Time Variance:* The standard cost of actual hours and employee remains idle due to abnormal circumstances like strikes, lock-out, power failure etc., is idle-time variance. Even though standards are set carefully as far as possible, idle time must be shown separately and not concealed in the Efficiency Variance); otherwise employees may be blamed for inefficiency when the time loss may have been beyond their control—a breakdown of power supply, for example. The variants Is always adverse and necessitates investigation to discover the cause of abnormal idle time. It is calculated as follows:

Labour Idle Time Variance = Abnormal idle time × Standard rate per hour

OR LITV = IT × SR

This variance is always unfavourable,

(vi) ***Revised efficiency Variance:*** It is represented by the residue of total Efficiency variance left after segregating there from both Labour Mix Variance and Idle time variance, if any. It highlights the variance in labour cost due to actual hours being more or less than the number of hours according to standard specified for actual output. It is equal to:

Standard Rate (Standard hours—Revised standard hours)

If the standard hours are more than revised standard hours, variance would be favourable and vice-versa.

(vii) ***Labour Yield Variance:*** Just like the Material Yield variance, some accountants prefer to calculate Labour Yield variance also. This variance reveals the effect on labour cost of actual yield or output being more or less than the yield or output expected (according to the standard specified) by use of actual hours, it is a variance of output but numerically is equal to Revised Efficiency variance (i.e., after segregating Mix variance and Idle Time variance from Total Efficiency variance). If the actual yield is more, the variance is called favourable and vice-versa. It can be computed according to either of the following formulae:

Labour Yield Variance —

(i) Standard Labour cost of Standard Gang Hour (Standard Yield expressed in Standard Gang Hours-Actual Yield expressed in Standard Gang Hours).

(ii) Standard Labour cost per unit of output (standard yield in units of output-Actual. Yield in units of output).

Labour Revision Variance: Sometime wage have to be revised subsequent to the setting of the original standard on account of an Award or Agreement with trade unions. If the management wants the effect of revision of wage rate to be shown; a separate Revision Variance may be calculated by the following formula.

WAGE REVISION VARIANCE

Standard Labour cost of Actual Production at original Standard Rate.

Standard Labour cost of Actual Production at Revised Standard Rate.

This variance is usually unfavourable because Revised Standard Wage Rate is ordinarily higher than the original Standard Wage Rate.

3. Overhead Variances

As is known very well, overhead expenses include indirect material cost, indirect labour cost and other indirect expenses. These expenses pertain to all the three

major functions of the company. Overhead variances therefore relate to production overhead expenses, administrative overhead expenses, selling and distribution overhead expenses. It may be noted here that these expenses include both variable and fixed elements. For the purpose of computing overhead variances, overhead expenses are classified into variable and fixed overhead expenses on the basis of their behaviour to the levels of activity.

1) Overhead Cost Variance

Overhead cost variance can be defined as the difference between the standard cost of overhead allowed for the actual output and the actual cost of overhead incurred for the actual output achieved. Overhead cost variance may be either 'under absorption of overheads' or 'over absorption of overheads'. The formula used for calculating overhead cost variance is as follows:

Overhead Cost Variance = (Actual output × Standard overhead rate per hour) – Actual overhead cost

OR OCV = (Standard hours for actual output × Standard overhead rate per hour) – (Actual overhead cost)

Overhead variances are divided into two broad categories:

1. Variable Overhead Variance, and

2. Fixed Overhead Variance.

(1) Variable Overhead Variance

The variable overhead variance is a total or aggregate variance and does not tell us much about the causes of variance. It is the difference between the standard variable overhead allowed for actual production and the actual variable overhead incurred. The method of computation is as follows:

Variable Overhead Variance = (Standard variable overhead rate × Actual production) – (Actual variable overhead)

OR VOV = (Standard variable overhead) – Actual variable overhead

The variable overhead variance may be classified into the following types for the purpose of planning and control:

(a) Variable Overhead Expenditure Variance, and

(b) Variable Overhead Efficiency Variance.

(a) *Variable Overhead Expenditure Variance:* Variable overhead expenditure variance is the difference between the standard variable overhead rate and the actual variable overhead rate duly multiplied by actual hours. It highlights the cost

incidence of the difference between the expenditure allowed and the actual expenditure incurred.

Variable overhead expenditure variance represents efficiency in the use of services or excess costs. An unfavourable variance indicates excessive use of services or increase in the cost of services. On the other hand, a favourable variance denotes use of services in an economical manner or savings in costs incurred. It is calculatedas under:

Variable Overhead Expenditure Variance = (Standard variable overhead rate per hour × Actual hours worked) – (Actual variable overheads)

OR VOEV = (Recovered variable overheads) – (Actual variableoverheads)

(b) *Variable Overhead Efficiency Variance:* The variable overhead efficiency variance is calculated by taking the difference in standard output and actual output multiplied by the standard variable overhead rate. The variable overhead efficiency variance is calculated as under:

Variable Overhead Efficiency Variance = (Standard variable overhead rate × Standard quantity) – (Actual quantity)

OR Variable Overhead Efficiency Variance = (Standard time for actual production × Standard variable overhead rate per hour) – (Actual hours worked × Standard variable overhead rate per hour)

OR Variable Overhead Efficiency Variance = Standard rate × (Standard quantity – Actual quantity)

2. ***Fixed Overhead Variance:*** Fixed overhead variance is that portion of total overhead cost variance which is due to the difference between the standard costs of fixed overhead allowed for the actual output achieved and the actual fixed overhead cost incurred.

The method of computation is shown as:

Fixed Overhead Variance = (Standard fixed overhead rate × Actual output) – (Actual fixed overheads)

OR FOV = Actual output × (Fixed overhead rate – Actual fixedoverheads)

The fixed overhead variance may be classified into the following types:

(i) Fixed Overhead Expenditure Variance, and

(ii) Fixed Overhead Volume Variance.

(a) Fixed Overhead Efficiency Variance,

(b) Fixed Overhead Capacity Variance, and

(c) Fixed Overhead Calendar Variance.

(i) *Fixed Overhead Expenditure Variance:* This variance is also called budget variance,

obtained by comparing the total fixed overhead cost actually incurred against the budgeted fixed overhead cost.

Fixed Overhead Expenditure Variance = Budgeted fixed overheads – Actual fixed overheads

(ii) *Fixed Overhead Volume Variance:* The volume variance is computed by taking the difference between overhead absorbed on actual output and those on budgeted output. It is calculated as under:

Fixed Overhead Volume Variance = (Actual output × Standard rate) – (Budgeted fixed overheads)

OR FOVV = Standard rate × (Actual output – Standard output)

OR FOVV = Standard rate per hour (Standard hours produced – Budgeted hours)

(a) **Fixed Overhead Efficiency Variance:** The efficiency variance arises due to the difference between budgeted efficiency to production and the actual efficiency is achieved. It is calculated as under:

Fixed Overhead Efficiency Variance = Standard rate per hour × (Actual hours worked – Standard hours for actual output)

OR FOEV = Standard rate × (Actual output in units – Standard output in units)

(b) **Fixed Overhead Capacity Variance:** The capacity variance represents the part of volume variance which arises due to working at higher or lower capacity than standard capacity. It is calculated as under:

Fixed Overhead Capacity Variance = Standard rate × (Budgeted quantity – Standard quantity)

OR FOCV = Standard rate × (Revised budgeted quantity – Standard quantity)

OR FOCV = Standard rate × (Revised budgeted hours – Budgeted hours)

(c) **Fixed Overhead Calendar Variance:** The calendar variance arise due to the volume variance which is due to the difference between the number of working days anticipated in the budget period and the actual working days in the period to which the budget is applied. It is calculated as:

Fixed Overhead Calendar Variance = Standard fixed overhead rate × (Budgeted quantity – Revised budgeted quantity)

OR = (Standard No. of working days – Actual No. of working days

$$X \quad \frac{\text{Total fixed overheads in the budget period}}{\text{Std. No. of days in the budget period}}$$

OR = Standard rate per hour or per day × Excess or deficit hours or days worked

Verification:

Overhead Variance = Variable overhead variance + Fixed overhead variance

Variable Overhead Variance = Expenditure variance + Volume variance

Fixed Overhead Variance = Expenditure variance + Volume variance

Fixed Overhead Volume Variance = Efficiency variance + Capacity variance + Calendar variance

Exercise 9:

From the following data, calculate overhead variances:

Materials handling	Rs. 8,325
Idle time	Rs. 850
Re-work	Rs. 825
Overtime premium	Rs 250
Supplies	Rs. 4,000
	Total Rs. 14,250
Fixed overhead items: (Actual)	
Supervision	Rs. 1,700
Depreciation on plant	Rs. 2,000
Depreciation on equipment	Rs. 5,000
Rates	Rs. 1,150
Insurance	Rs. 350
	Total Rs.10, 200

Normal capacity 10,000 standard hours, budgeted rate Rs. 1.70 per standard hour for variable overhead and Rs.1 per standard hour for fixed overhead. Actual level: 8,000 standard hours.

Solution:

Variable and Fixed Overhead Variances:

(a) Variable Overhead Cost Variance:

VOCV = (Recovered variable overheads – Actual variable overheads)

VOCV = (8,000 × 1.70) – 14,250

= 13,600 – 14,250

= Rs. 650 (A)

(b) Fixed Overhead Cost Variance:

FOCV = (Recovered fixed overheads – Actual fixed overheads)

= (8,000 × 1) – 10,200

= Rs. 2,200 (A)

(c) Fixed Overhead Expenditure Variance:

FOEV = (Budgeted fixed overheads – Actual fixed overheads)

= (10,000 × 1) – 10,200

= Rs. 200 (A)

(d) Fixed Overhead Volume Variance:

FOVV = (Recovered fixed overheads – Budgeted fixed overheads)

= 8,000 – 10,000

= Rs. 2,000 (A)

Self-Assessment:

Fill in the blanks:

9. Cost variance (Standard Cost —

10. Material Price Variance = AQ (SP—

11. The standard cost multiplied by the difference between the standard and the actual number of units used is known as ..... variance.

12. Mix variance is always a part of the variance.

13. Labour cost variance = Std. Cost - ( )

14. The deviation between the budgeted expenditure and actual expenditure is known as .....Variance.

15 Rate Variance is the difference between the standard and the actual direct labour rate per hour for the total hours worked.

16 variance is the difference between the standard cost of actual production and the actual cost of materials used.

4. **SALES VARIANCES**

Though the discussion on standard costing was sought to be limited to costs alone to make a comprehensive study of the calculation of variance, a comparison of budgeted sales and actual sales is also made.

If an organization is manufacturing and selling different types of articles of different values, the management would be interested in knowing the result of comparison of actual sales with the budgeted sales. If the actual differs it would be interested in knowing specifically the reason for the difference.

The reasons may be (i) The price, (ii) The quantity : (iii) The mix. The calculations of the variances are similar to those tor materials. Sales variances may be calculated according to any of the following two methods:

a) Turnover or value method

b) Margin or Profit method

1) Sales Variances on Turnover Basis: The following methods are used on turnover basis:

a) Total Sales Value Variance (SVV): Sales value variance is the difference between the Actual value of Actual Sales Quantity and the Budgeted Value of Budgeted Sales Quantity.

SUV = Actual value of Actual Sales Quantity minus the Budgeted Value of Budgeted Sales Quantity.

Or = (Actual Sales Quantity x Actual Selling Price) – (Budgeted Sales Quantity x Budgeted Selling Price)

Or = (AQ x AP) – (BQ x BP)

b) Sales Price Variance (SPV): It is that portion of the Sales Value Variance which arises due to the difference between the Actual Selling Price and the Budgeted Selling Price.

SPV = (Actual Quantity x Actual Price) – (Actual Quantity x Budgeted Price)

Or = (AP –BP) x AQ

c) Sales Volume Variance (SVV): It is that portion of the Sales Value Variance which arises due to the difference the Actual Sales quantity Soldand the Budgeted Sales Quantity Specified.

SVV = (Actual quantity – Budgeted Quantity) x Budgeted Price

Or = (AQ – BQ) x BP

d) Sales Mix Variance (SMV): It is that portion of the Sales Volume Variance which arises due to the difference between Actual and Budgeted Composition of products sold.

SMV = Budgeted Value of Actual Sales Quantity – Budgeted Value of Revised Sales Quantity

Or = (AQ x BP) – (RQ x BP)

Or = (AQ – RQ) x BP

e) Sales Sub Volume Variance (SSVV) or Sales Quantity Variance: It is that portion of the Sales Volume Variance which arises due to the difference between Total Actual Sales Quantity of all products and Total Budgeted Sales Quantity of all products.

SSVV = (Total Actual Sales Quantity – Total Budgeted Sales Quantity) x Average Budgeted Price

Or = (Total AQ – Total BQ) x ABP

$$\text{Note; ABP} = \frac{\text{Total (BQ x BP)}}{\text{Total BQ}}$$

2) Sales Variance on Margin Basis: The purpose of measuring the variances on Margin basis is to identify the effect of changes in sale quantity and selling prices on the profits of the company. The following methods are used on margin basis:

a) Total Sales Margin Variance (SMV): It is the difference between the Actual Margin of Actual Sales Quantity and the Budgeted Margin of Budgeted Sales Quantity.

SMV = Actual Margin of Actual Sales Quantity --- the Budgeted Margin of Budgeted Sales Quantity

Or = (Actual Sales Quantity x Actual Margin) ---(Budgeted Sales Quantity x Budgeted Margin)

Note;

BM = Budgeted Selling Price -----Standard Cost

AM = Actual Selling Price----- Standard Cost

b) Sales Margin Price Variance: It is that portion of the Total Sales Margin Variance which arises due to the difference between the Actual Margin and Budgeted Margin.

SMPV = (Actual Margin – Budgeted Margin) x Actual Quantity

Or = (AM – BM) x AQ

c) Sales Margin Volume Variance: It is that portion of the Total Sales Margin Variance which arises due to the difference between Actual Sales Quantity and Budgeted Sales Quantity specified.

SMVV = (Actual Quantity – Budgeted Quantity) x Budgeted Margin

Or = (AQ – BQ) x BM

d) Sales Margin Mix Variance: It is that portion of the Sales Margin Volume Variance which arises due to the difference between Actual and Budgeted Composition of products sold.

SMMV = Budgeted Margin of Actual sales Quantity ***minus*** Budgeted Margin of Revised Sales Quantity

Or = (AQ x BM) – (RQ x BM)

Or = (AQ – RQ) x BM

e) Sales Margin Sub- Volume Variance/ Sales Quantity Variance: It is that portion of the Sales Margin Volume Variance which arises due to the difference between Total Actual Sales Quantity of all products and TotalBudgeted Sales Quantity of all products.

SMSVV = (Total Actual Sales Quantity – Total Budgeted Sales Quantity) x Average Budgeted Margin Per Unit

Or = (Total AQ – Total BQ) x ABM

Note:

$$ABM = \frac{\text{Total (BQ x BM)}}{\text{Total BQ}}$$

13.13 Precautions in Use of Standard Costing:

Ordinarily, the various variances that are worked out in standard costing may be relied upon to indicate the state of affairs and remedial action may be taken. For example, materials usage variance, if adverse, will indicate inefficiency in the use of material, therefore, steps may be taken to remedy the situation and to pull up the foreman concerned. However, a degree of caution is necessary in coming to a conclusion on the basis of variances. Sometimes, they do not reveal the real situation with our further inquiry. The following precautions may therefore be necessary:

(i) If the factors that existed when standard were formed have changed, it would be better to revise the standards realistically and then only compare them with actual performance. Suppose materials of a better quality are now available; this will call for revision of the materials standard. If a process has under change, the labour standard will need revision.

(ii) The real cause of the situation should be ascertained for example, it is quite possible that extra time is being spent because repairs and maintenance work is not up to the mark.

(iii) Price variance should not always be dismissed as beyond one's control.Could not the purpose be made at a different point of time? Could not a substitute material be purchased? Stocks kept for a long time involve (extra expense in the form of interest :) how is this to be treated? Such question should not be ignored.

(iv) The emphasis should be on removing cause that leads to wastage or loss; for this it is necessary that workers and staff members should frankly state what has happened. If the emphasis is on punishment, such frankness will by missing, if punishment is not the Idea, the real cause will come to light and then proper remedial action should be possible.

Self-Assessment:

Fill in the blanks:

17. Sales Price Variance arises due to the difference between the_____and the Budgeted Selling Price.

18. Sales Margin Volume Variance arises due to the difference between Actual Sales Quantity and_____specified.

19. _____is the quantity of output, or an amount of work, performed in one hour.

20. Sales Margin Price Variance arises due to the difference between the _____and Budgeted Margin.

13.14 Summary

To sum up, predetermined standard costing, as opposed to historical asset accounting provides a framework for measuring performance, building budgets, facilitating product costing, helping in the process of pricing and book—keeping economy, Moreover, it helps in effecting conformance to plans by ensuring both efficiency and effectiveness. That is why standard costing is widely used today as aneffective tools for managerial planning and control.

Analysis of variances is the most important use of standard costing. Variances may be defined as the difference between actual and standard costs while the variance analysis is the process of analysis variances by subdividing the total variance. In this way we can identify the causes and the departments to be held responsible for different variances and draft appropriate variance reports for the management.

13.15 Glossary:

***Standard*:** It refers to an indicator which is used to evaluate performance, quality etc.

Standard Cost: It is a predetermined cost. It is a determination in advance of production, of what should be the cost.

Standard Costing: It 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 line of product manufactured of service applied.

Basic Standard: A standard established for use over a long period from which a current standard can be developed.

Current Standard: A standard which is established for use over a short period of time and is related to current conditions.

***Ideal Standard*:** A standard which can be attained 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 Hour: It is the quantity of output, or an amount of work, performed in one hour.

Variance: The difference between the actual and the standard is called variance.

13.16 Answer: Self-Assessment

1. Standard	2. Incurred	3. Planning
4. Cost centre	5. Current	6. Favourable
7. Attainable	8. Hour	9.Actual Cost
10. AP	11.Material usage	12.Total usage
13. Actual Cost	14. Expenditure variance.	15. Labour
16. Material cost	17. Actual Selling Price	
18.Budgeted Sales Quantity	19. Standard Hour	20. Actual Margin

13.17 Terminal Questions:

1) Define ‘standard cost’ and ‘standard costing’. In what type of industries, standard costing is employed? State the advantages of standard costing.
2) Describe the process of determining standard costs.
3) State the various classifications of variances. How are these variances computed?
4) Differentiate between material and overhead variances.
5) Explain the following terms:
   (i) Variance

(ii) Variance analysis
(iii) Calendar variance
(iv) Revised Efficiency variance

13.18 Suggested Reading

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7. S.N. Maheshwari, Accounting for Management, Vikas Publishing House Pvt. Ltd. New Delhi

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Lesson-14

Reconciliation of Cost and Financial Accounting

Structure:

14.1 Learning Objectives:

After studying the lesson, you should be able to:

- Understand the meaning and need of reconciliation of cost and financial accounts.
- Explain the reasons for difference in profit or loss as per cost and financial accounts
- Know the method of preparing a reconciliation statement or a memorandum reconciliation account

14.2 Introduction:

When cost accounts and financial accounts are maintained in two different sets of books, there will be prepared two profit and loss accounts - one for costing books and the other for financial books. The profit or loss shown by costing books may not agree with that shown by financial books. Such a system is termed as, 'Non-Integral System' whereas under the integral system of accounting, there are no separate cost and financial accounts. Consequently, the problem of reconciliation does not arise under the integral system.

However, where two sets of accounting systems, namely, financial accounting and cost accounting are being maintained, the profit shown by the two sets of accounts may not agree with each other. Although both deal with the same basic transactions

like purchases, consumption of materials, wages and other expenses, the difference of purpose leads to a difference in approach in a collection, analysis and presentation of data to meet the objective of the individual system.

14.3 Reconciliation of Cost Accounts and Financial Accounts

Reconciliation of Cost and Financial Accounts is process to find all the reasons behind disagreement in profit which is calculated as per cost accounts and as per financial accounts. There are lots of items which are shown in the profit and loss account only when we make it as per financial accounting rules. There are lots of items which are shown in costing profit andloss account only when we calculate profit as per cost accounting.

Suppose, we have taken the profit or loss as per financial accounts, we adjust it as per cost accounts. In the end of adjustments, we see same profit as per cost accounts. If we have taken profit as per cost account, we have to adjust items as per financial accounts. For this purpose, we make reconciliation Statement.

14.4 Need for Reconciliation: In Non-integral system where separate sets of books are maintained for costing and financial transactions, the profit shown by one set of books may not agree with that of the other set of books because these two sets of books may follow different accounting principles and policies. Hence, the need for reconciliation of cost and financial accounts arises due to the following reasons:

(a) It reveals the reasons for difference in profit or loss between cost and financial accounts.

(b) It ensures that no income or expenditure item has been omitted to record and there is no under- or over-recovery of overheads.

(c) Reconciliation helps in formulation of various policies regarding overheads, depreciation and valuation of stock,

(d) It helps in checking the arithmetical accuracy of both the sets of accounts.

(e) It ensures the reliability of cost accounts in order to correct ascertainment of cost of production.

(f) It promotes co-ordination and co-operation between cost and financial accounting departments in order to generate correct and reliable accounting data.

(g) Reconciliation helps the management in exercising a more effective internal control.

Self-Assessment

Fill in the blanks:

1. Need for reconciliation arises due to the reasons for the …… in the profit or loss in cost and financial accounts.

2. Reconciliation helps in formulation of various policies regarding overheads, depreciation and..... of stock.

14.5 Reasons for disagreement in Profits

The difference in the profitability of cost and financial records may be due to the following reasons.

1. Inclusion of certain items in the financial accounts but not in cost accounts:

The following items of income and expenditure are normally included in financial accounts and not in cost accounts. Their inclusion in cost accounts might lead to unwise managerial decisions. These items are:

• Purely financial income:

a. interest received on bank deposits,
b. interest and dividend on investments,
c. rent receivables,
d. transfer fee received,
e. profit on the sale of assets etc.
f. income tax refund

• Purely financial charges:

a. losses due to scraping of machinery,
b. losses on the sale of investments and fixed assets,
c. interest paid on the bank loans, mortgages, debentures etc.,
d. expenses of company's transfer office,
e. Damages payable at law
f. Amount writing off, goodwill, discount on debenture, preliminary expenses,

• Appropriation of profit:

The appropriation of profit is again a matter which concerns only financial accounts.

a. Income tax
b. Dividend distribution tax
c. transfer to reserve,

2. Items included in cost accounts only: There are certain items which are included in cost accounts but not in financial accounts. They are:

a. Charges in lieu of rent where premises are owned,
b. interest on capital employed in production but upon which no interest is actually paid,
c. Notional salaries,
d. Depreciation on fully depreciated assets still in use.

3. Under/Over absorption of overhead expenses: In cost accounts, overheads are absorbed at predetermined rates which are based on past data. In the financial accounts the actual amount incurred is taken into account. There arise a difference between the actual expenses and the predetermined overheads charged to product or

job.

If overheads are not fully recovered, which means that the amount of overheads absorbed in cost accounts is less than the actual amount, the shortfall is called as under recovery or under absorption. If overhead expenses recovered in cost accounts are more than that of the actually incurred, it is called over absorption. Thus, both the over and under recovery may cause the difference in the profits of both the records.

4. Different basis of stock valuation: In cost accounts, the stock of finished goods is valued at cost by FIFO, LIFO, average rate, etc. But, in financial accounts stocks are valued either at cost or market price, whichever is less.

The valuation of work-in-progress may also lead to variation. In financial books only prime cost may be taken into account for this purpose whereas in cost accounts, it may be valued at prime cost plus factory overhead.

5. Different charges for depreciation: The rates and methods of charging depreciation may be different in two sets of accounts. The financial accounts may follow straight line or diminishing balance method, etc., whereas in cost accounts machine hour rate, production unit method, etc., may be adopted.

Self Assessment

State whether the following statements are true or false:

3. Work-in-progress is valued either at the stage of prime cost, works cost or cost of production.

4. If overheads are not fully absorbed, i.e. the amount in cost accounts is less than the actual amount, the shortfall is called over-absorption.

5. If overhead expenses in cost accounts are more than the actual, it is called under-absorption.

6. Under Integral type of accounting cost accounts and financial accounts are integrated into one set of books and only one profit and loss account is prepared, the problem of reconciliation does not arise.

14.6 Summary:

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 costingbooks and second for financial books. The profit or losses shown by the costaccounts 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. The need for reconciliation arises due to the reasons for the difference in the profit or loss in cost and financial accounts. The cost and financial accounts are reconciled by preparing a Reconciliation Statement or a Memorandum Reconciliation Account. Reconciliation statement is a popular and important method of cost accounts and financial accounts. Memorandum Reconciliation Account is presented in debit and credit form but it is not a part of double entry system of book- keeping. So it is kept as

a memorandum account only.

14.7 Glossary:

Cost Accounting: Its purpose and objective is internal reporting to management.

Cost Ledger: The principle ledger in cost accounting which contains all nominal accounts and all control accounts for the subsidiary ledgers

Financial Accounting: The purpose and objective of financial accounting is external reporting mainly to owners, creditors, tax authorities, government and investors.

Integral Accounts: Under this type of accounting cost accounts and financial accounts are integrated into one set of books and only one profit and loss account is prepared, the problem of reconciliation does not arise.

Under absorption of Overheads: The short-fall in recovery of overheads.

Memorandum Reconciliation Account: This account is presented in debit and credit form but it is not a part of double entry system of book-keeping. So it is kept asa memorandum account only.

Non-integral System of Accounting: It is the system of accounting in which separate ledgers are maintained in cost and financial accounts by accountants.

Reconciliation: Reconciliation is a process whereby profits revealed by two sets of books are tallied after ascertaining the reasons for disagreement of the two profits.

Reconciliation Statement: Reconciliation statement is a popular and important method of cost accounts and financial accounts.

14.8 Answers: Self-Assessment

1. difference	2. valuation	3. True
4. False	5. False	6. True
7. Integral Accounting,	8. Non-integral Accounting,	9. principal,
10. subsidiary,	11. Profit/loss as per costing records,	12 Non-agreement of profit/loss as per two sets of books
13. Inefficiencies	14. Memorandum	15. double entry
16. external		

14.9 TERMINAL QUESTIONS:

1. Explain the need for reconciliation of' cost and financial accounts.
2. What is the purpose of preparing reconciliation statement?
3. State briefly the causes of difference between profits shown by Financial Accounts and the profits shown by Cost Accounts.
4. Explain the reconciliation procedure.

5. What is the purpose of reconciliation cost and financial accounts? Indicate the possible sources of difference between them.
6. State the steps involved in the preparation of reconciliation statement.
7. From the following figures prepare a Reconciliation Statement.

	Rs.
Net Profit as per financial records	1, 28,755
Net profit as per costing records	1, 72,400
Works Overheads under-recovered in costing;	3,120
Administrative Overheads recovered in excess in costing	1,700
Depreciation charged in financial records	11,200
Depreciation recovered in costing	12,500
Interest received but not included in costing	8,000
Obsolescence Loss charged in financial records	5,700
Income Tax provided in financial records	40,300
Bank Interest credited in financial books	750
Stores Adjustments credited in financial books	6,750

14.10 Suggested Readings:

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LESSON 15

METHOD OR PROCEDURE OF RECONCILIATION

Structure:

15.0 Learning Objectives:

After studying the lesson, you should be able to:

- Know the method of preparing a reconciliation statement or a memorandum reconciliation account

15.1 METHOD OR PROCEDURE OF RECONCILIATION

A Reconciliation Statement or a Memorandum Reconciliation Account should be drawn up for reconciling profits shown by the two sets of books. Results shown by any sets of books may be taken as the base and necessary adjustment should be made to arrive at the results shown by the other set of books. The technique of preparing a Reconciliation Statement as well as a Memorandum Reconciliation account is discussed below:

15.2 Reconciliation Statement:

When there is a difference between the profits disclosed by cost accounts and financial accounts, the following steps shall be taken to prepare a Reconciliation Statement:

1. Ascertain the various reasons of disagreement between the profits disclosed by two sets of books of accounts.

2. If profit as per cost accounts (or loss as per financial accounts) are taken as the base:

Add the following Items:

(i) Items of income included in financial accounts but not in cost accounts.

(ii) Items of expenditures (as interest on capital, rent on owned premises, etc.)

included in cost accounts but not in financial accounts.

(iii) Amounts by which items of expenditure have been shown in excess in cost accounts as compared to the corresponding entries in financial accounts.

(iv) Amounts by which items of income have been shown in excess in financial accounts as compared to the corresponding entries in cost accounts

(v) Over-absorption of overheads in cost accounts.

(vi) The amount by which closing stock of inventory is under-valued in cost accounts.

(vii) The amount by which the opening stock of inventory is over-valued in cost accounts.

Deduct the following items:

(i) Items of income included in cost accounts but not in financial accounts

(ii) Items of expenditure included in financial accounts but not in cost accounts.

(iii) Amounts by which item of income have been shown in excess in cost accounts over the corresponding entries in financial accounts.

(iv) Amounts by which items of expenditure have been shown in excess in financial accounts over the corresponding entries in' cost accounts.

(v) Under absorption of overheads in cost accounts.

(vi) The amount by which closing stock of inventory is over-valued in cost accounts.

(vii) The amount by which the opening stock of inventory is under -valued in cost accounts.

3. After making all the above additions and deductions, the resulting figure will be profit as per financial accounts.

Performa Reconciliation Statement For the year ending.....

Particulars	Amount Rs.(+)	Amount Rs.(-)
fit as per Cost Accounts		...
Add:		
i. Expenses over-charged in cost account	...	
ii. Income not included in cost account	...	
iii. Over-valuation of opening stock in cost account	...	
	...	
iv. Under-valuation of closing stock in cost account	...	
v. Expenses recorded in cost account but not charged in financial account	...	
vi. Income recorded in financial books but not recorded in cost books	...	
vii. Items credited in financial books but not recorded in cost books	...	
viii. Depreciation over-charged in cost account		...
		...
Less:	...	
i. Expenses under-charged in cost account	...	
ii. Expenses not charged in cost account	...	
iii. Under-valuation of opening stock in cost account	...	
	...	
iv. Over-valuation of closing stock in cost account	...	
	...	
v. Expenses not recorded in cost books but recorded in financial books		
vi. Items debited in financial books but not recorded in cost books		...

Profit as per Financial Accounts		

15.3 Memorandum Reconciliation Accounts:

The reconciliation of profits shown by the two sets of books can also be presented in the form of a ledger account called 'Memorandum Reconciliation Account'. This method is simple. The amounts which are to be added to profits shall be shown on its credit side while the amounts to be deducted from profits shall be shown on its debit side. In this case also, you can take either profit/loss as per cost accounts as the base or profit/loss as per financial accounts as the base.

Memorandum Reconciliation Account As on.....

Particulars	Amount Rs.	Particulars	Amount Rs.
To Expenses not recorded in cost accounts	.....	By Profits as per cost accounts	.....
To Overheads under-absorbed in cost accounts	.....	By Incomes not recorded in cost accounts	
To Under-valuation of opening stock in cost accounts		By Expenses not recorded in profit and loss account	.....
To Over-valuation of closing stock in cost accounts	.....	By Overheads over-absorbed in cost accounts	
To Profits as per profit and loss accounts	.....	By Over-valuation of opening stock in cost accounts	.....
	.....	By Under-valuation of closing stock in cost accounts	.....
	-----		-----

Self-Assessment

Fill in the blanks:

1. Reconciliation facilitates location of areas of ……

2. The cost and financial accounts are reconciled by preparing a Reconciliation Statement or a..... Reconciliation Account.

3. Memorandum Reconciliation Account is presented in debit and credit form but it is not a part of ..... system of book-keeping.

4. The purpose and objective of financial accounting is..... reporting mainly to owners, creditors, tax authorities, government and investors.

Illustration 1 The net profit of a manufacturing company appeared at Rs. 60,500 as

per financial records for the year ended 31st March, 2018. The cost accounts, however, showed a net profit of, Rs. 1, 19,400 for the same period. A detailed comparison of the figures contained in both sets of books revealed the following factors responsible for their disagreement:

Directors' fees not charged in cost accounts	7.500
Works overheads under recovered in costs	1,500
Loss due to Obsolescence charged in financial accounts	3,500
Administrative overheads over-recovered in costs	1,800
Depreciation charged in financial accounts	10,000
Depreciation recovered in costs	12,000
Income Tax provided in financial accounts	54,500
Interest on Investments not included in costs	5,000
Transfer Fees credited in financial accounts	2,500
Fine paid not included in costs	1,200
Discount on issue of debentures written off, in financial accounts	2,000

Prepare a Reconciliation Statement showing reconciliation of profit between the two sets of books.

Solution:

Reconciliation Statement

Particulars	Amount Rs. (+)	Amount Rs. (-)
Net Profit as per Cost Accounts	1,19,400	
Directors' Fees not charged in costs		7,500
Works Overheads under-recovered in costs		1,500
Loss due to Obsolescence not charged in costs		3,500
Administrative Overheads over-recovered in costs		
Depreciation overcharged in costs (12,000 - 10,000)	1,800	
Income Tax provided in financial accounts	2,000	54,500
Interest on Investments not included in costs		
Transfer Fees credited in financial accounts	5,000	
	2500	
Fines paid not included in costs		1,200
Discount on Issue of Debentures not shown in costs		2000
	1,30,700	70,200
Net Profit as per Financial accounts	60500	

Alternatively:

Reconciliation Statement

Particulars	Amount Rs. (+)	Amount Rs. (-)
Net Profit as per Financial Accounts	60500	
Directors' Fees not charged in costs	7,500	
Works Overheads under-recovered in costs	1,500	
Loss due to Obsolescence not charged in costs	3,500	
Administrative Overheads over-recovered in costs		1,800
Depreciation overcharged in costs (12,000 - 10,000)		2,000
Income Tax provided in financial accounts	54,500	
Interest on Investments not included in costs		5,000

Transfer Fees credited in financial accounts		2500
Fines paid not included in costs	1,200	
Discount on Issue of Debentures not shown in costs	2000	
	1,30,700	70,200
Net Profit as per Cost accounts	1,19,400	

Based on data given in Illustration 1, the Memorandum Reconciliation Account shall be prepared as follows:

Memorandum Reconciliation Account

Dr. **Cr**

Particulars	Amount Rs.	Particulars	Amount Rs.

To Directors' Fees not charged in costs	7,500	By Net Profit as per Cost Accounts	1,19,400
To Works Overheads under-recovered in costs	1,500	By Administrative Overheads over-recovered in costs	1,800
To Loss due to Obsolescence not charged in costs	3,500	By Depreciation overcharged in costs (12,000 - 10,000)	2,000
To Income Tax provided in financial accounts	54,500	By Interest on Investments not included in costs	5,000
To Fines paid not included in costs	1,200	By Transfer Fees credited in financial accounts	2,500
To Discount on Issue of Debentures not shown in costs	2,000		
To Net Profit as per Financial accounts	60,500		
	1,30,700		1,30,700

Alternatively

Memorandum Reconciliation Account

Dr. **Cr**

Particulars	Amount Rs.	Particulars	Amount Rs.

To Administrative Overheads over-recovered in costs	1,800	By Net Profit as per Financial Accounts	60,500
To Depreciation overcharged in costs (12,000 - 10,000)	2,000	By Directors' Fees not charged in costs	7,500
To Interest on Investments not included in costs	5,000	By Works Overheads under-recovered in costs	1,500
To Transfer Fees credited in financial accounts	2,500	By Loss due to Obsolescence not charged in costs	3,500
To Net Profit as per Cost accounts	1,19,400	By Income Tax provided in financial accounts	54,500
		By Fines paid not included in costs	1,200
		By Discount on Issue of Debentures not shown in costs	2,000
	1,30,700		1,30,700

15.5 Summary

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. The need for reconciliation arises due to the reasons for the difference in the profit or loss in cost and financial accounts. The cost and financial accounts are reconciled by preparing a Reconciliation Statement or a Memorandum Reconciliation Account. Reconciliation statement is a popular and important method of cost accounts and financial accounts. Memorandum Reconciliation Account is presented in debit and credit form but it is not a part of double entry system of book- keeping. So it is kept as a memorandum account only.

15.6 Glossary

Under absorption of Overheads: The short-fall in recovery of overheads.

Memorandum Reconciliation Account: This account is presented in debit and credit form but it is not a part of double entry system of book-keeping. So it is kept asa

memorandum account only.

Non-integral System of Accounting: It is the system of accounting in which separate ledgers are maintained in cost and financial accounts by accountants.

Reconciliation: Reconciliation is a process whereby profits revealed by two sets of books are tallied after ascertaining the reasons for disagreement of the two profits.

Reconciliation Statement: Reconciliation statement is a popular and important method of cost accounts and financial accounts.

15.7 Answers: self-Assessment

See chapter 14 section 14.7

15.8 Terminal questions

See chapter 14 section 14.8

15.9 Suggested Readings:

- Mittal. Maheshwari (2016) Cost Accounting, Principles and Practice, Shree Mahavir Book Depot, Publishers,
- Tulsian.P.C. (2015) Cost Accounting, S. Chand & Company PVT.LTD.
- Bhar. K. B. (2008) Cost Accounting, Methods & Problem, Academic Publishers.Lal, Jawahar & Srivastava, Seema (2009) Cost Accounting, 4th Edition, Tata McGraw Hill ducation.
- Nigam, Lal B. M. & Jain I. C. (2001) Cost Accounting: An Introduction, PHI Learning Pvt. Ltd.
- Thakur. S. K, (2009). Cost Accounting: Theory and Practice, Excel Books.

Lesson-16

Operating Costing or Service Costing

STRUCTURE

16.0 Learning Objectives:

After studying the lesson, you will be able to:

- Understand what is operating costing?
- Understand the meaning, nature and users of service costing;
- Understand Transport costing.
- Understand powerhouse costing and hotel costing;
- Describe the hospital costing with objectives.

16.1 Introduction: An analysis of industrial sector from the view point of output reveals two broad categories of industries. They are (1) the industries which are engaged in the manufacture and sale of goods, and (2) the industries which are engaged in generating and rendering services. Adequate importance has not been given to second categories of industries. However, with the increase in the important role of the service sector in the national economy, the topic has assumed importance. Service costing is that part of operation costing which is used in all organizations that provide services instead of producing of goods.

16.2 Meaning of Operating or Service Costing:

Operating costing is a method of costing used to ascertain the cost of generating and rendering services such as transport, hospitals, canteen, electricity, gas, etc. The costs incurred to generate and render this type of service are called operating costing. Operating costing is also known as service costing.

According to CIMA London, Operating 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.

Service costing involves the method of determination of the cost of services. At the

end of specified periods, collection of operating costs takes place and the aggregate of these costs is duly divided by the quantity of services provided in the period. This gives the cost per unit.

16.3 Features of Operating Costing:

The basic features of operating costing are as follows:

a) Services are standardized.
b) Investment in fixed assets is high and in working capital is low.
c) Operating costing method is related to provide various types of services to customers,
d) In operating costing, standing or fixed, maintenance and running charges are calculated,
e) Major portion of the total cost is fixed cost. Hence, the cost per unit of service rendered is affected by the economies and scale of operations.

16.4 Applications of Operating Costing:

Service or Operating Costing is used both by service organizations and by departments within organizations rendering services to other departments. Operating costing is applied in those undertakings which are engaged in providing services rather than manufacturing of tangible products. It is generally applied in:

- Road transport companies
- Railways
- Airways
- Shipping companies
- Electricity companies
- Water supply companies
- Gas supply companies
- Hospitals
- Cinemas
- Canteens and hotels
- Computer centres
- School and colleges
- Local authority
- Power house in a factory.

Self-Assessment

Fill in the blanks:

1. Service costing involves the method of determination of the cost of ……

2..... is also called ‘Operating Costing’.

3. Service organizations do not produce .....goods.

4. …… services departments within organizations render

services to the production department and also to other departments.

16.5 Determination of Unit of Cost:

The selection of a suitable cost unit (unit of service) is very important. The cost units may be of the following two types:

(1) **Simple cost unit**: A few examples are given below:

Undertakings	Cost Unit
Transport	Per kilometer or per mile
Municipality	Per kilometer of road maintained
Canteen	Per meal or per dish
Water supply	per 1,000 litres

(2) **Composite cost unit:** In service undertakings, 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 1km. Other examples are:

Undertakings	Cost Unit
Transport	Per-passenger-km or per tonne km
Hospital	Per bed per day
Hotel	Per room per day
Cinema	per seat per show
Electricity	per kilometer hour(kwh)

16.6 Classification of cost:

Operating costs are classified and accumulated under the following three heads:

1) Fixed or Standing Charges: These are expenses which are more or less fixed in nature. For example, in case transport service, 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 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 in nature and include expenditure on repairs and maintenance, spares and accessories, tyres and tubes, telephone charges, etc.
2) Running or Operating Charges: These are variable cost and variable in nature. 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 are running or operating charges.

16.7 Transport Costing

The transport costing is a type of service costing which is used for cost ascertainment in those undertakings which provide transport services. It refers to the determination of the cost per unit of service i.e., cost of per passenger – kilometre and the cost of per tone – kilometre.

Suppose the following information is given:

Number of trucks	30 of 3 tons each
Number of km. run per day	100 km.
Effective days in a month	20
Wastage on loading capacity	10%
Percentage of trucks laid for maintenance	5%

Now, number of effective km. = 30 × 3 × 100 × 20 × 90/100 × 95/100 = 1, 53,900 km.

If the total cost of running these 30 trucks in month comes to Rs 8,00,000, the cost of per ton per km. =Rs 8,00,000 ÷ 1,53000 = Rs 5.198

Objectives: The following are main objectives of transport costing:

(i) To ascertain the operating cost of running a vehicle per kilometre.
(ii) Collection and analysis of cost for cost control,
(iii) To fix the rates of carriage of goods or passengers on the basis of operating costs
(iv) Comparison of the cost of running and semi-variable of different vehicles,
(v) To decide whether to own a vehicle or to hire a vehicle,
(vi) Cost comparisons and analysis for decision-making, and
(vii) To help to apportion the cost of transport between different departments.

Determination of Number of Cost Units

The cost unit in passenger transport is usually a passenger kilometre and in goods transport it is a tonne-kilometre. The calculation of the total number of cost units is calculated below:

Illustration1: From the following particulars, find out total passenger kilometre per day and per month.

Distance: 50 kilometres

A vehicle makes three trips round daily carrying 40 passengers and working every day.

Solution: Total km per day =No. of vehicles x No. of days x Trips x 2(ROUND) x Km in a trip.

Total km per day=1x1x3x2x50= 300

Total passengers km per day= 300 x 40= 12,000

Total passengers km per month= 12,000 x 30= 3,60,000

Absolute tonne-km and Commercial tonne-km

In transport costing, composite cost units may be computed in two ways-

a) Absolute tonne-km, and b) commercial tonne-km

In absolute tonne-km, cost units between each two stations is calculated separately in tonne-km 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

km by average load quantity.

Illustration2: A truck starts with a load of 10 tonnes of goods from station D. It unloads 4 tonnes at station E and rest of the goods at station F. It reaches back directly to station D after getting reloaded with 8 tonnes of goods at station F. The distance between to E, E to F and then from F to D are 40 km,60 km and 80 km, respectively. Compute absolute tonne-km and commercial tonne-km.

Solution:

Absolute tonne-km = (40 km x 10 tonnes) + (60 km x 6 tonnes) + (80 km x 8 tonnes)
=400+360+640 = **1400 tonne-km**

Commercial tonne-km = average load x Total km
= {10+6+8}÷3 tonnes x 180 km
= 8 tonnes x180km = **1440 tonne-km**

Log Sheet:

A daily log sheet or log book is maintained for each vehicle to record details of each trips, running time, capacity, distance covered, cost of petrol/diesel, lubricants, loading and unloading time etc. This sheet is completed by the driver and is handed over to the manager. The logbook also contains records relating to repair expenses incurred during journeys performed. A specimen of daily log sheet is given below:

Daily Log Sheet

Vehicle No.: …… **Date ……**
License No.: …… **Driver**
Registration No. …… **Departure Time……**
Route: …… **Arrival Time ……**

Particulars of Trips

Trip No.	From	To	Goods or Packages		Distance km	Time			Remarks
			Out	Collection en-route		Out	In	Hrs. taken	

Fig: Daily log sheet

Statement of Operating Cost: The cost data of a transport are presented periodically, say monthly or quarterly, in the form of a cost sheet or statement of cost. A specimen of statement of operating cost is given below:

Name of the concern_____

Operating Cost Sheet for the month of ……
Vehicle No.: …… Capacity: ……

Particulars of Expenses	Total Rs.	Cost of per km
A)Standing Charges or Fixed Costs:		
Garage Rent		
Insurance Premium		
Interest on Capital		
Depreciation		
Rates and Taxes		
Drivers Wages		
License Fee		
General Supervision		
Total		
B)Maintenance Cost or Semi-variable Charges:		
Tyres and Tubes		
Repairs		
Servicing and Cleaning		
Garage Staff Salary		
Total		

C)Running or Operating Charges : Petrol or Diesel Engine Oil and Grease Salary to Running Staff' Depreciation Insurance on Transit Goods Total		
(D) Total Operating Cost (A + B + C) (E) Total Ton-Kilometre (F) Operating Cost per ton-km.		

Illustration 3: ABC Transport Company which keeps a fleet of lorries, show the following information:

Kilometres run for 2018 Rs.1,50,000

Wages for the month of March Rs. 10,000

Petrol, Oil expenses for March Rs. 20,000

Cost of vehicle Rs. 5, 00,000

Depreciation @ 20% on cost of vehicle —

Repairs and maintenance for the month of March Rs. 30,000

Garage rent for the month of March Rs. 5,000

Licence, insurance for the year Rs. 30,000

Prepare a statement for March, 2018 showing the operating cost per running km.

Solution:

Operating Cost Sheet for ABC Transport Company

Period: March, 2018 Kilometres Run: 1,

50,000

Particulars of Expenses	Total Rs.
A)Standing Charges or Fixed Costs:	
Depreciation @ 20% p.a. (5,00,000 × 20 × 1) ÷ (100 × 12)	8,333
Wages for the month of March	10,000
Garage rent for the month of March	5,000
Licence (30,000 ÷ 12	25,00
Total	25,833
(B) Variable Charges :	
Petrol, Oil expenses	20,000
Repairs and maintenance	30,000
Total	50,000
(C) Total Opening Cost (A + B)	75,833
(D) Cost per running kilometre (75,833/1,50,000 = 0.505)	0.505

Self-Assessment

State whether the following statements are true or false:

5. Running charges are expenses which are more or less fixed nature.
6. Maintenance or semi-variable charges are semi-variable or semi-fixed in nature.
7. Fixed or standing charges are expenses which are incurred on the actual running of the vehicle.

Fill in the blanks:

8. The …… costing refers to the determination of the cost per unit of service i.e., cost of per passenger – kilometre and the cost of per tone – kilometre.
9. A daily log sheet or log book is maintained for each vehicle to record details of each …….

16.8 Hospital Costing

Hospital Costing may relate to ascertaining the cost of medical services rendered by a hospital or Nursing home or dispensary.

Objectives of Hospital Costing

The main objectives of hospital costing are:

1. To ascertain the operating cost of running a hospital.
2. To calculate cost of per patient per day,
3. Inter comparison between two or more hospitals or nursing homes,
4. Analysis of cost of hospital or nursing home for decision-making, and
5. Collection of cost data for cost control.

Hospital Costing Procedure:

Hospital costing procedure involves the following practical steps:

Step1; Select the cost unit as follows:

a) Per patient per day
b) Per bed per day

Step2: Calculate the total patient days for a particular period

Effective Patient Days= No. of Beds x Occupancy rate x No. of Days

Step 3: Calculate total fixed costs for a particular period

Step4: Calculate fixed costs per patient days

$$\text{Fixed costs per patient day} = \frac{\text{Total costs as(per step 3)}}{\text{Total No. of patient days (as per step2)}}$$

Step 5: Calculate Total Variable Costs

Step 6: Calculate Variable costs per patient day

$$\text{Variable costs per patient day} = \frac{\text{Total variable costs(as per step5)}}{\text{Total No. of patient days (as per step 2)}}$$

Step 7: Calculate Operating cost per patient day as follows:

a) Fixed costs per patient day	XXXX
b) Variable costs per patient day	XXXX
c) Operating Cost per patient day	XXXX

Format of Hospital Operating cost Sheet:

Operating Cost Sheet

Particulars	Total Rs.	Per Room day

A. Fixed Costs (or Standing charges:		
1. Staff salaries (Permanent Doctors, Supervisors, Nurses, Ward boys, etc.)	----------	----------
2. Room attendant's wages	----------	----------
3. Lighting, heating and power	----------	----------
4. Repairs and maintenance	----------	----------
5. Rent	----------	----------
6. License fees	----------	----------
7. General administration expenses	----------	----------
8. Depreciation on Hospital Building & Furniture	----------	----------
	----------	----------
Total(A)	----------	----------
B. Variable Costs:		
1. Cost of Free Food Supply	----------	----------
2. Cost of Toilet and Bathroom supplies	----------	----------
3. Laundry cost of Bed Sheets and Towels	----------	----------
Total (B)	----------	----------
Operating Cost (A+B)	----------	----------

Illustration 4: Shimla Hospital runs an intensive medical care unit. For this purpose, it has hired a building at a rent of ` 30,000 p.m. with the understanding that it would bear the repairs and maintenance charges also. The unit consists of 25 beds and 5 more beds can be comfortably accommodated when the occasion demands. The permanent staffs attached to the intensive medical care unit are as follows:

Doctor's fee	Rs. 6,000 p.m.
Salary to 4 Supervisors	Rs. 800 p.m. each
Salary to 6 Nurses	Rs. 500 p.m. each
Salary to 4 Ward boys	Rs.300 p.m.

The unit is open for patients all the 365 days, scrutiny of accounts reveals that only for 120 days in the year, the unit has the full capacity of 25 patients per day and for another

80 days, it has on an average 20 beds only occupied per day in the year.But, there are occasions when the beds are full in the year. Extra beds are hired at a charge of Rs. 4 per day-per bed and this does not come to more than 5 beds extra above the normal capacity on any day. The total hire charge for the extra beds incurred for the whole year amounts to Rs. 5,000.

The other expenses for the year are as follows:

Repairs	Rs. 16,000
Medicines	Rs. 50,000
Food to patients	Rs. 65,000
Expenses on Oxygen, X-ray	Rs. 65,000
Expense of generator	Rs. 24,000
Laundry charges	Rs. 41,600
Administration expenses	Rs. 50,000

If the unit recovers an overall amount of Rs. 200 per day on an average from each patient, what is the profit per patient day made by the unit?

Solution:

Statement of Cost and Profit for Shimla Hospital

Particulars	Amount Rs.
(A)Earnings:	
Income received (5,850 × 200)	11,70,000
Total	11,70,000

(B) Fixed Charges:	88,800
Staff salaries : (4 × 800) + (6 × 500) + (4 × 300) × 12	3,60,000
Rent (30,000 × 12)	16,000
Repairs	50,000
Administration expenses	65,000
Cost of Oxygen, X-ray	5,79,800
Total	65,000
	24,000
(C) Variable Costs:	41,600
Food to patients	50,000
Expenses of generator	72,000
Laundry charge	
Medicines	
Doctor's Fee (6,000 × 12)	2,57,600
Hire Charges for Extra Beds 5,000	8,37,400
Total	3,32,600
(D) Total Cost of Hospital (B+C)	
(E) Profit (A - D) i.e. 11,70,000–8,37,4000	59.00
(F) Profit per patient day = 3,32,600 5,850 = 56.854 or Rs.59 (approx.)	

Working note:

Calculation of Total Patient Days:

25 Beds × 120 days	= 3,000
20 Beds × 80 days	= 1,600
Extra bed days = Rs. 5,000 ÷ 4	= 1,250
Total Patient Days	5,850

16.9 Power House Costing:

Power House Costing is a method of ascertaining the cost of generating electricity by a power house. Power house operating cost statement may be prepared after accumulating data about the costs of producing the steam and the costs of generating the electricity.

The generation of electricity requires the use of fuel oil or steam. Where steam is used for the purpose of generating electricity, it is possible to compute the cost of electricity generated by aggregating the steam production costs with other related costs of electricity generation.

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.

Objectives:

The objectives of power house costing are as follows:

1. To ascertain the operating cost of generating electricity.
2. To fix the rates of electricity to be charged to various departments using electricity.
3. To compare the cost of generating electricity with that of using alternative mode of generating electricity.

Format of Power House Operating Cost Sheet:

Following are two specimens of statement of cost for power house costing:

Statement of Operating Cost for Electricity generation for the month of ……

Steam Produced: _____

Units of Electricity Generated: ____Steam Used for Generation: .....

Particulars of Expenditure	Total Cost Rs.	Cost per unit Rs.
(A)Cost of Steam Generation: Coal Labour Water Fixed overhead Repairs and maintenance		

Supervision charges		
Total Cost of steam generation/Total production		
Less: Used in heating		
Cost of Steam Used for Electricity Generator		
Total		
(B) Cost of Electricity Generation:		
Cost of steam used		
Wages		
Depreciation		
Stores		
Supervision		
Repairs and Maintenance		
Total		
(C) Total Operating Cost (A+B)		
(D) Cost of per unit = Total Operating Cost ÷ Total Units Generated		

Operating Cost Sheet for Electricity Generation

Units of Electricity Generated: ……

Particulars of Expenditure	Total Cost Rs.	Cost per unit Rs.
(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		

Illustration 5: From the following data pertaining to the year 2015-16 prepare a cost sheet showing the cost of electricity generated per KWh by National Thermal Power Station.

Total units generated	20, 00,000 KWh
	Rs.
Operating labour	1, 00,000
Repairs & maintenance	1, 00,000
Lubricants, spares and stores	80,000
Plant supervision	60,000
Administration overheads	40,000

Coal consumed per KWh for the year is 2.5 Kg. @ Rs. 0.02 per kg. Depreciation charges @ 5% on capital cost of Rs. 4, 00,000.

Solution:

Operating Cost Sheet for Electricity Generation

Units of Electricity Generated: 20,00,000 KWh

Particulars of Expenditure	Per annum Rs.	Per k.w.h. Rs.

(A) Fixed Charges :		
Depreciation (5% of Rs. 4, 00,000 p.a.)	20,000	
Plant Supervision	60,000	
Administration overhead	40,000	
Total fixed cost	1,20,000	0.06
(B) Variable Cost :	1,00,000	0.05
Coal Cost (refer to working note)	1,00,000	0.05
Operating labour	80,000	0.04
Lubricants, spares and stores	1,00,000	0.05
Repairs and maintenance	3,80,000	0.19
Total variable cost	5,00,000	0.25
(C) Total Operating Cost (A+B)		
(D) Cost of per unit = Total Operating Cost ÷ Total Units Generated (500,000 ÷ 20,00,000)	0.25 paise	

Working Note: Coal Cost = 20, 00,000 KWh x 2.5 kg x 0.02 per kg = Rs 1, 00,000

Illustration6:

Find out the cost per unit of electricity generated in the power house located in the Vimal Engineering Works for the month of November, 2018 with reference to the following data extracted from the account books of the eagle engineering works. The operating cost sheet should be drawn up in the appropriate from:

Fuel: Coal 1,200 tons @ Rs.11 per ton.

Coke 500 tons @ Rs. 15 per ton.

Handling charges of the fuel 50 p. per ton

Ash removal charges – 160 tons @ 25 p. per ton

Cost of water pumped from the river – 160 thousand gallons @ 37.5 paise per thousand gallons

Lubricating oil – 50 gallons @ Rs 4 per gallon

(a) Sale of ash: 280 tons @ 25 p. per ton.

(b) Cost of steam supplied to the manufacturing shops: 30,000 lb @ Rs.10 per 1,000 lb.

Salaries and operating staff in the power house:

1 Foreman @ Rs.400 per month
2 Astt. Foremen @ Rs. 125 per month.
4 Mechanics @ Rs.75 per month
1 Coolie @ Rs. 2.50 per day for 30 days

Depreciation	Capital Cost	Rate of Depreciation
Boiler	Rs.20, 000	6%
Generator and other Electrical Equipments	Rs. 1, 20,000	4%
Building	Rs. 12,000	1%

25% of monthly total technical supervision charges amounting to Rs.3, 940.
Total gross units generated: 97,000 units
Loss during the month due to leakage in course of generation and due to defective equipments = 1,000 units.

Solution:

Operating Cost Sheet of Vimal Engineering Works for the Month of November, 2018

Units Generated: 97,000

Particulars of Expenses	Amount Rs.
Fuel :	
Coal : 1,200 tons @ ` 11 per ton	13,200
Coke : 500 tons @ ` 15 per ton	7,500
Handling Charges of the fuel : @ 50 Paise per ton (1,200 + 500 x 0.50)	8,50
Ash removal charges : 160 tons @ 25 Paise per ton (160 × 0.25)	40
Cost of Water Pumped : (1,60,000 × 0.375 ÷ 1,000)	60
Lubricating oil : 50 gallons @ ` 4 per ton (50 × 4)	200
Depreciation on :	
Boiler : (20,000 × 6 ÷ 100 = 1,200 × 1 ÷ 12)	

Building (12,000 × 1 ÷ 100 = 120 × 1 ÷ 12)	100
	10
Less: Credit on account of :	21,960
(a) Sale of Ash: 280 tons @ 25 Paise per ton (280 × 0.25)	
70.00	
(b) Steam to manufacturing shops :	
(30,000 lbs ÷ ` 10 per 1,000 lb.)	
300.00	370
------	21,590

Cost of Steam produced : Salaries and wages of operating staff	
1 Foreman @ Rs.400 p.m.	
400	
2 Asst. Foreman (2 × 125)	
250	
4 Mechanics (4 × 75)	1,025
300	985
1 Coolie @ Rs. 2.50 per day for 30 days (2.50 × 20)	400
75	
---	24,000

Technical supervision charges : (3,940 × 25 ÷ 100)	
Depreciation on Generator and other Electrical equipment	
(1,20,000 × 4 ÷ 100 = 4,800 × 1 ÷ 12)	
Total Cost of Electricity Generated	

Units generated : (Gross) 97,000 Less : Leakage units 1,000 --- Net Units Generated 96,000 Cost of per unit of electricity : (24,000 / 96,000 = Rs. 0.25)	0.25 paise

16.10 Hotel Costing

Hotel costing is a method of ascertaining the cost of providing services by a hotel. Hotel services include boarding and lodging. For providing rooms and accommodations, hotels have to calculate cost per room-per day.

Objectives of Hotel Costing:

The main objectives of hotel costing are:

(i) To ascertain cost per unit.
(ii) To fix the room rent per day on the basis of operating costs.
(iii) To make Inter firm comparisons.
(iv) To analyze the cost of hotel for decision-making.

Format of Hotel Operating Cost Sheet:

Operating cost sheet of_____hotel for the year_____

Particulars	Amount Rs.
(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	

Self-Assessment

Fill in the blanks:

10. A statement of .....is prepared to find out the cost of per unit.
11 .....services include boarding and lodging.
12. Costing of …… may relate to ascertaining the cost of medical services rendering by a Nursing home or dispensary belonging to an industry or organization.
13. Power House Costing is a method of ascertaining the cost of generating electricity by a_____house.

14. The generation of electricity requires the use of_____or steam.

16.11 Summary:

Operating costing method of cost ascertainment is used in those undertakings which are engaged in providing services, such as road transport undertakings, shipping companies' electricity companies, hospitals, hotels and cinema etc. The cost of providing a service is termed as operating cost. The cost unit may be a simple cost unit, like per kilometer or per mile in transport companies, per kilowatt in power house costing, per room per day in hostel costing and per patient per day in hospital costing or it may be composite cost unit like per passenger-km or per tonne-km in transport companies, per kilowatt hour in power house costing, per bed per day in hotel costing and hospital costing. The costs are classified into standing or fixed charges, maintenance charges and running or variable charges.

16.12 Glossary:

Operating Cost: Cost of producing a service

Operating Costing: A costing method used for computation of cost of a unit of service. It is also termed as service costing.

Hospital Costing: It is related to ascertaining the cost of medical services rendered by a nursing home or dispensary belonging to an industry or organization.

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 department and also to other departments.

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.

Service Costing: The Terminology of CIMA defines Service Costing as the cost of specific services and functions, e.g., maintenance, personnel, canteen, etc.

Transport Costing: Refers to the determination of the cost per unit of service i.e., cost of per passenger – kilometre and the cost of per tone – kilometre.

16.13 Answers: Self-Assessment

1. Services	2. Service costing	3. Tangible
4. Internal	5. False	6. True
7. False	8. Transport	9. Trip
10. Cost	11. Hotel	12. Hospital
13. power	14.fuel oil	

16.14 Terminal 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. Define hospital costing. Explain various objectives of hospital costing.

16.15 Suggested Readings:

Mittal. Maheshwari (2016) Cost Accounting, Principles and Practice,Shree Mahavir Book Depot, Publishers,

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Lesson -17

JOB AND BATCH COSTING

Structure:

17.1 Learning Objectives

After studying this lesson, you should be able to:

- Understand the meaning of Job Costing.
- Know the special characteristics of Job Costing.
- Understand Job Order Cost Accounting.

17.2 Introduction

Job costing is the basic costing method applicable to those industries where the work consist of separate contracts, jobs, or batches, each of which is authorized by a specific order or contract. The most important feature is that each job or order can be identified at each stage of production and therefore, costs which can be directly identified with a job or order is charged to that job or order. Job costing is a method of costing which is applied to determine the cost of specific job of production generally manufactured according to customer's specification. All the jobs are not similar. They do not pass through the same manufacturing process. Each job requires different amount of materials and labour and different levels of skills.

Therefore, the cost of each job differs from other. The cost is recorded separately for each job. Each job or batch is regarded as a cost unit from the view point of accumulation. For example, printing jobs, automobile repairs.

17.3 Meaning and Definition of Job Costing

According to ICMA London, "job costing is that form of specific order costing which applies where work is undertaken to customer's specific requirements and each order is of comparatively of short duration."

Kohler in his 'Dictionary for Accounts' 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".

From the above definition, it is clear that 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.

17.4 Characteristics of Job Costing

In the case of a job, work is usually carried out within the factory or workshop. Sometimes, a job is accomplished even in the customer's premises. This method of costing is applicable to ship building, printing, engineering, machine tools,readymade garments, shoes, hats, furniture, musical instruments, interior decorations etc.

1. It is a specific order costing. A job is carried out or a product is produced is produced to meet the specific c requirements of the order.
2. Job costing enables a business to ascertain the cost of a job on the basis of which quotation for the job may be given.
3. Each job has its own characteristics, depending up on the special order placed by the customer.
4. Each job is treated as a cost unit.
5. A separate job cost sheet is made out for each job on the basis of distinguishing numbers.
6. A separate work in progress ledger is maintained for each job.
7. The duration of the job is normally a short period.
8. Profit or loss is determined for each job independently of others.

17.5 Objectives of Job Costing

- To find out the cost of production for each job.
- To find out the efficiency or inefficiency in execution of jobs carried out.
- To calculate accurate cost of production for each job.

17.6 Merits of Job Costing

1. Job Costing helps to distinguish profitable jobs from unprofitable jobs.

2. Job Costing helps to identify defective work and spoilage with a department or person
3. Selling price of special orders can easily be fixed.
4. Job Costing helps to prepare estimates of cost for submitting quotations and tender for similar jobs
5. It helps to control future cost. Accurate information is available regarding the cost of the job completed and the profits generated from the same.
6. Proper records are maintained regarding the material, labor and overheads so that a costing system is built up
7. Useful cost data is generated from the point of view of management for proper control and analysis.
8. Performance analysis with other jobs is possible by comparing the data of various jobs. However it should be remembered that each job completed may be different from the other.
9. If standard costing system is in use, the actual cost of job can be compared with the standard to find out any deviation between the two.
10. Some jobs are priced on the basis of cost plus basis. In such cases, a profit margin is added in the cost of the job. In such situation, a customer will be willing to pay the price if the cost data is reliable. Job costing helps in maintaining this reliability and the data made available becomes credible.

17.7 Demerits of Job Costing

1. It is said that it is too time consuming and requires detailed record keeping. This makes the method more expensive.
2. Record keeping for different jobs may prove complicated.
3. Inefficiencies of the organization may be charged to a job though it may not be responsible for the same.

In spite of the above limitations, it can be said that job costing is an extremely useful method for computation of the cost of a job. The limitation of time consuming can be removed by computerization and this can also reduce the complexity of the record keeping.

17.8 Procedure of Job Costing

The Procedure for job order costing system may be summarized as follows:-

1. Receiving an enquiry from the customer regarding price, quality etc.
2. Make an estimation of the price of the job after considering the cost incurred for the execution of similar job in the previous year
3. Receiving an order, if the customer is satisfied with the quotation price and other terms of execution.
4. If the job is accepted, a production order is made by the Planning department.
5. The costs are collected and recorded for each job under separate production order Number, and a Job Cost Sheet is maintained for that purpose.
6. On completion of job, a completion report is sent to costing department.

17.9 Job Order Cost Accounting:

In job order cost accounting a job cost sheet is prepared on receipt of an order. A specific number is allotted to each job put into production. General information in respect of the job is recorded at the top of the job sheet. Appropriate inputs are recorded in the job cost sheet regarding direct materials, labour and overheads.

Additional information such as labour-hours, machine hours, quantity and quality of materials used are also recorded for the purpose of planning controlling cost and evaluating performance. Finally the profit or loss on the job can be easily determined. The job cost sheet also provides for the comparison of the actual cost with the estimated costs.

17.10 Recording of Different Costs in Job Costing

The objective of job costing is to ascertain the cost of a job that is produced as per the requirements of the customers. Various costs are recorded in the followingmanner.

- Direct Material Costs-Material used during the production process of a job and identified with the job is the direct material. Direct material cost is identifiable with the job and is charged directly. The source document for ascertaining this cost is the material requisition slip from which the quantity of material consumed can be worked out.
- Direct Labor Cost**-**This cost is also identifiable with a particular job and can be worked out with the help of 'Job Time Tickets' which is a record of time spent by a worker on a particular job.
- Direct Expenses-Direct expenses are chargeable directly to the concerned job. The invoices or any other document can be marked with the number ofjob and thus the amount of direct expenses can be ascertained.
- Overheads-This is really a challenging task as the overheads are all indirect expenses incurred for the job. Because of their nature, overheads cannot be identifying with the job and so they are apportioned to a particular job on some suitable basis.

17.11 Preparation of Job Cost Sheet

A separate job cost sheet is prepared for every job undertaken. This is to facilitate the calculation of cost of the job separately. The job cost sheet is prepared to show in detail the cost components or elements of the total cost of executing a job. Jobcost 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:

XYZ Company Limited

Job Cost Sheet

Job No. :	Quantity : .....
Job Description :	Date of Completion : .....
Name of the Customer :	Date of Commencement : .....
Particulars of Job :	Production Order No. : .....

Material Cost				Labour Cost				Overheads			
Date	Dept.	MR No.	Amt. Rs.	Date	Dept.	Time Ticket No.	Amt. Rs.	Date	Deptt.	Rate Rs.	Amt Rs

Example1:

The following information is given from cost record of a factory for Job No. 1720

Direct material= Rs. 4010

Wages:

Department A: 60 hours @Rs 4 per hour

Department B: 40 hours @Rs 3 per hour

Department C: 20 Hours @ Rs. 5 per hour

The variable overheads are as follows:

Department A: Rs. 2500 for 2500 hours

Department B: Rs 1500 for 750 hours

Department C: Rs 1000 for 250 hours

Fixed expenses estimated at Rs. 10000 for 5000 working hours. Calculate the cost for Job No. 1720. And the price for the job to give a profit of 25% on the selling price.

Solution:

Job Cost Sheet (Job No. 1720)

Particular		**Amount (Rs)**
Material		4010
Wages		
Department A=60 x4=240		
Department B=40 x3=120		
Department C=20 x5=100		460
Prime Cost=Material + Wages		**4470**
Overheads-Variable		

Department A=60 x1=60		
Department B=40 x2=80		
Department C=20 x4=80		220
Fixed Overheads= 120 x2=		240
		4930
Profit (25% on Selling price i.e. 33.3 % on Cost)		1642
Selling Price		**6572**

Working Notes:

1. Calculation of Variable Overhead Rate

Variable Overhead Rate= Variable Overheads/ Direct Labour Hours

Department A= [2500/2500] = Rs. 1

Department B= [1500/750] = Rs. 2

Department C= [1000/250]= Rs 4

2. Calculation of Fixed Overhead Rate

Fixed Overhead Rate=Fixed Expenses/Working Hours

Fixed Overhead Rate=10000/5000

Fixed Overhead Rate=Rs. 2

Working Hours=60+40+20=120

Total Fixed Overheads=120x2=240

17.12 Batch Costing

Batch costing is a modified form of job costing. Under this method, the cost of a batch or group of products is ascertained. The unit of cost is a batch or group of identical products, instead of a single job, order or contract. The method is applicableto general engineering industries which produce components in convenient economical batches for subsequent assembly or manufacture on mass scale, comparatively small items of products 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.

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

This method is used where small parts of considerable number are produced, such as industries producing machinery parts, machine tools, etc. 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,

17.13 Determination of economic order quantity: Since in batch costing, production is done in batches and each batch consists of a number of units, the determination of optimum quantity to constitute an economical batch is all the more important. Such a quantity can be fixed on the basis of formulae and principles applicable to economic ordering quantity of materials. 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.

Different formulas are developed to determine the economic batch quantity. One such formula is given below:

$$EBQ = \sqrt{\frac{2AS}{C}}$$

Where, EBQ = Economic batch quantity

A = No. of units to be produced in a year

S = Set up cost per batch

C = Carrying cost per unit of production

Where rate of interest and cost of production per unit is given, the following formula is applicable:

$$EBQ = \sqrt{\frac{2AS}{I \times C}}$$

Where, EBQ = Economic batch quantity

A = No. of units to be produced in a year

S = Set up cost per batch

I = Interest rate per year

C = Cost of manufacture per unit

Example 2:

Compute the economic batch quantity for a company using batch costing with the following information:

Annual demand for the component	2,400 units
Set-up cost per batch	Rs. 100
Manufacturing Cost per unit	Rs. 200
Carrying cost per unit of production	6 % p.a.

Solution:

$$\text{Economic Batch Quantity} = \sqrt{\frac{2AS}{C}}$$

$$= \sqrt{\frac{2 \times 2400 \times 100}{6\% \text{ of } 200}}$$

EBQ = 200 units

Self Assessment

Fill in the blanks:

1. _____is a method of costing applied in industries where production is measured in terms of completed jobs.
2. The cost accountant estimates the cost of job after considering the various _____and keeping in mind the specification of customer.
3. _____may have to be purchased or requisitioned from the stores.
4. _____is used where small parts of considerable number are produced.
5. The concept of economic batch quantity is an example of the law of _____
6. Batch is a variation of_____.
7. Job costing helps the management to know about the_____of the jobs.
8 The cost accountant_____the cost of job after considering the various elements of cost.
9. On completion of a job, the production department sends a completion report of

job to the_____.

17.14 Summary:

In job costing the cost of each job is ascertained separately which is suitable in all cases where work is undertaken on receiving a customer's order. Like a printing press, motor work shop etc. Batch Costing is considered as the extension of job costing. It represents a number of small orders passed through the factory in batch. Each batch here is treated as a separate unit of cost. The size of the batch should not be either too small or too large. On the basis of a trade-off between large size and small size, an appropriate size of the batch should be decided. This batch size is known as Economic Batch Quantity that is similar to the concept of Economic Order Quantity.

17.15 Glossary:

Batch: A group of similar articles which maintains its identity throughout one or more stages of production and constitute a cost unit.

Batch Costing: A form of specific order costing involving attribution of costs to batches.

Economic batch quantity: optimal batch quantity.

Job costing: Method of costing applicable to specified jobs or production particularly made to customers' specification.

Production cost: combined costs of raw material and labour 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.

17.16 Answers: Self Assessment

1. Job costing	2. Elements of cost	3. Materials
4. Batch Costing	5. Increasing returns.	6. Job costing
7. Profitability	8. Estimates	9. Costing department.

17.17 Terminal Questions:

1. Define Job Order Costing. Explain its characteristics and accounting procedure.
2. How the different costs are recorded in job costing?
3. Discuss the importance of job costing.
4. What is meant by Economic Batch Quantity? How is it computed?
5. What is batch costing? How does it differ from job costing? Explain.
6. Briefly explain the purpose of job costing and the procedure for ascertaining the job costs.

17.18 Suggested Readings:

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Lesson -18

CONTRACT COSTING

Structure:

18.1 Learning Objectives

After studying the lesson, you should be able to:

- Understand the meaning of contract costing.
- Know the recording procedure of contract costs.
- Understand the special terms in contract costing.

18.2 Introduction

Contract Costing is the form of specific order costing which applies where work is undertaken to customer's special requirements and each order is of long duration. It is a special type of job costing where the unit of cost is a single contract. Contract cost is the cost of contract with some terms and conditions between contractee and contractor. This method is used in undertakings, carrying out, building orconstructional contracts like constructional engineering concerns, civil engineering contractors. The cost unit here is a contract, which may continue over more than onefinancial year.

18.3 Meaning and Definition of Contract Costing:

The official CIMA terminology defines contract costing as “A form of specific order costing in which costs are attributed to individual contracts.” In other words, “contract costing is the technique of ascertaining cost of a contract.”

From the above definitions, it is clear that 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.

18.2.1 Characteristics of Contract Costing

1. The work is done at a site which is generally away from the contractor’s premises.
2. The contract takes more than a single accounting period.
3. Most of the expenses are chargeable directly to the contracts.
4. Each contract is distinct and dissimilar from other contracts.
5. Each contract itself a cost unit.
6. Work is executed at customer’s site.
7. The existence of sub contract.
8. Most of the expenses incurred upon the contracts are direct.
9. Cost control is very difficult in contract costing.

18.2.2 Terminology

- Contract -A contract is a legally enforceable agreement. It is an agreement between contractor and contractee which contains the terms and conditions in relation to a job.
- Contractor-The person who undertakes to do the job is a contractor.
- Contractee-The person for whom the job is being done is the contractee.
- Contract Price-It is the amount agreed to be paid by the contractor as consideration for the job to be done.

18.4 Distinction between job costing and contract costing:

Main points of distinction between contract costing and job costing are as follows:

(i) Contract is big in size whereas a job is small in size.

(ii) Contract work is done at site whereas jobs are usually carried out in factory premises.

(iii) A contract takes more time to complete in comparison to a job which takes less time to complete.

(iv) 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.

(v) Under contract costing, the price is paid in various instalments depending upon the progress of work. In job costing, the selling price of a job is paid after completing the job in full.

(vi) In contract costing, the cost computation is simple while in the job costing it is complex because of the overheads.

(vii) 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.

18.5 Types of contracts

1. **Fixed price contracts**-In such types of contracts both the parties (contractor and contractee) agree to a fixed contract price.
2. **Cost plus contract**-this type of contract is generally adopted when the probable cost of contract cannot be ascertained in advance with reasonable accuracy. In this type of contract, the contractor receives his total cost plus a profit, which may be a percentage of cost. These types of contracts give protection to the contractor against fluctuations in profits as he is guaranteed about his profits irrespective of the actual costs.
3. **Target- price contracts-**In such cases; the contractor receives an agreedsum of profit over his predetermined costs. In addition, a figure is agreed as the target figure and if actual costs are below this target, the contractor is eligible for bonus for the savings.
4. **Escalation Clause-**In order to protect the contractor from the rise in the price, an escalation clause may be inserted in the contract. As per this clause, the contract price is increased proportionately if there is a rise in input costs like material, labor or overheads. The condition that may be laid down is that the contractor will have to produce a proof regarding the rise in the price.

18.6 Contract Account

A contract account is a nominal account in nature. It is prepared to find out the cost of contract and to know profit or loss made on the contract. A contractor may undertake a number of contracts at a time. For each contract a separate account is opened. In the contract account all direct cost such as material, labour and other direct expenses incurred during an accounting period are debited and the indirect expenses are apportioned on an equitable basis. The differences between the two sides are known as Notional profit or notional loss.

15.5.1 Special Terms in Contract Account

1. **Work in Progress-**It is the unfinished contract at the end of the accounting period and it includes amount of work certified and amount of work uncertified. Work in progress is an asset, shown in the balance sheet by deducting there from any advance received from the contractee.

2. **Work certified-**The sales value of work completed as certified by the architect is known as 'work certified'. In the case of contracts of long duration, the amount payable by the customer to the contractor is based on the sales value of work done as certified by the architect. At the end of the financial year, the total sales value of work done and certified by the architect is credited to the contract account.
3. **Work Uncertified-**It means work which has been carried out by the contractor but has not been certified by the architect. Sometimes, work which is complete remains uncertified at the end of the financial year. The reasons for the same may be i) work not sufficient enough to be certified or ii) work hasnot reached the stipulated stage to qualify for certification. It is always valued at cost and credited to the contract account.
4. **Retention money-**Regardless of the amount of work certified, the contractoris paid a specified percentage of the same and the balance is held or retained by the contractee. This is because of the fact that the contractee has to safe guard himself against any contingency arising from the non-fulfillment of the terms of the contract by the contractor. The unpaid balance of work certifiedor the amount held back or retained by the contractee is known as 'retention money'.
5. **Sub contract-**Sometimes the contractor enters into contracts with another contractor to give a portion of work undertaken by him. In such cases the work performed by the subcontractor s forms a direct charge to the contract concerned. Sub contract cost will be shown on the debit side of the contract account.
6. **Escalation clause**-This is clause which is provided in the contract to cover up any increase in the price of the contract due to increase in the prices of raw material or labour or in the utilization of any other factors of production. If material and labour utilization exceeds a particular limit, the customer agrees to bear the additional cost occasioned by excessive utilization. Here, the contractor has to satisfy the customer that excessive utilization is not the result of decreased efficiency.

CONTRACT ACCOUNT

(Specimen of contract commenced and completed during the year)

To Material		By Material return to store	
To Wages including o/s wages		By Plant sold	
To Plant Purchased		By P/L A/C-Loss on sale of Plant	
To Direct Expenses		By Material at site	
To Indirect Expenses		By Plant at site after depreciation	

To O/S Expenses		By Contractee A/C	
To Cost of Sub-Contracts		------Contract Price	
To Notional Profit (Balance)		------Cost of extra work	
To P&L Account (Balance) in case of profit		By P&L Account (Balance) in case of loss	
	-------		-------

CONTRACT ACCOUNT

(Specimen of contract not completed during the year)

To Material		By Work in Progress	
To Labour		----------Work Certified	
To Plant		----------Work Uncertified	
To Overheads		By Material Return	
To Cost of Sub-Contracts		By Plant at site after depreciation	
To Notional Profit (Balance)		Less- Depreciation	
	-------		-------
To P&L Account		By Notional Profit b/d	
To WIP Account (Reserve Profit)			
	-------		-------

18.7 Recording of Contract Costs

A contract usually takes several years to get it completed. If the profit on such contracts is recorded only after their completion, then wide fluctuations may be notedin the profit figures of contractors from year to year. To avoid these fluctuations in thereported profits and to reflect the revenue in the accounting period during which the activity is undertaken, the profit in respect of each contract in progress is transferred to the profit and loss account of the year by calculating the notional profit. The portion of notional profit to be transferred to the profit and loss account depends on the stage of completion of a contract.

1. **Material Cost-**Materials are normally purchased and delivery obtained at the site. All materials supplied from the stores or purchased directly for the contract are debited to the concerned contract account. Any loss or profit arising there from sale of material is transferred to the Profit and Loss Account. Any theft or destruction of material by fire represents a loss and as such, the same is also transferred to the Profit and Loss Account.
2. **Labour Cost-**Labour actually employed on the site of the contract is regarded as direct (irrespective of the nature of the task performed) and the wages paid to them are charged to the concerned contract directly or on the basis of a wage analysis sheet.
3. **Direct Expenses-** Direct expenses are directly charged to the concerned contract.
4. **Indirect Expenses-** Indirect expenses (such as expenses of engineers, surveyors, supervisors etc.) may be distributed over several contracts as a percentage of cost of materials, or wages paid or of the prime cost. If however,the contracts are big, the labour hour method may be used for the distribution of expenses.
5. **Plant and Machinery**-The value of the plant in a contract may be either debited to contract account and the written down value thereof at the end of the year entered on the credit side for closing the contract account, or only a charge (depreciation) for use of the plant may be debited to the contract account.
6. **Sub-Contract-**Sub-contract costs are also debited to the Contract Account.
7. **Extra Work-**The extra work amount payable by the contractee should be added to the contract price. If extra work is substantial, it is better to treat it as aseparate contract. If it is not substantial, expenses incurred should be debited to the contract account as “Cost of Extra work”.
8. **Cost of Work Certified-**All building contractors received payments periodically known as “running payment” on the basis of the architect’s or surveyor’s certificates. Normally payments are not equal to the value of the work certified; a small percentage of the amount due is retained as security for any defective work which may be discovered later within the guarantee period.

Cost of work certified=Cost of work to date-(Cost of work uncertified Material in hand + Plant at site)

The amount retained is called retention money. The full value of the work certified should be credited to the Contract Account and debited to the account of the contract. Since the cash received from him will be less, the balance in his account will be shown as an asset in the balance sheet.

9. **Cost of Work Uncertified-**Cost of Work Certified represents the cost of the work which has been carried out by the contractor but has not been certified by the contractor’s architect. It is always shown at cost price. The cost of uncertified work may be ascertained as follows:

	In Rs.
Total cost to date=	Xxx
Less: Cost of work certified=	Xxx
Material in hand=	Xxx
Plant at site=	Xxx
Cost of work Uncertified=	**Xxx**

10. **Retention Money-**A contractor does not receive full payment of the work certified by the surveyor. Contractor retains some amount (say 10% to 20%) to be paid, after sometime, when it is ensured that there is no fault in the work carried out by contractor. If any deficiency or defect is noticed in the work, it is to be rectified by the contractor before the release of the retention money. Retention money provides a safeguard against the risk of loss due to faulty workmanship.
11. **Cash Received-**It is ascertained by deducting the retention money from the value of work certified.

Cash received =Value of work certified - Retention money

12. **Work in Progress-**At the end of the accounting period an incomplete contractwill appear as an asset in the balance sheet. The work in progress includes the following:

	In Rs.
Cost of work Certified	Xxx
Cost of work uncertified	Xxx
Profit taken credit for	Xxx
Total	xxx
Less : Account received from the Contractee	xxx
Work in Progress	**xxx**

The value of work in progress is the balance on the contractaccount which is carried down to the following accounting period.

13. **Notional Profit-**Notional Profit represents the difference between the value of work certified and cost of work certified. It is determined:

Notional profit = Value of work certified - (Cost of work to date - Cost of work not yet certified)

14. **Estimated Profit-** Estimated Profit is the excess of the contract price over the estimated total cost of the contract.

18.8 Profits on Incomplete Contract

In the case of a small contract extending over the financial period, profit or loss on the same may be ascertained by crediting it with the contract price due by the contractee. This procedure cannot be adopted in the case of contracts extending beyond the accounting period, and taking a long time for completion. If there is any profit upon the incomplete contract, it cannot be taken as actual profit. The profit upon the incomplete contract is called notional profit.

For the purpose of determining the amount of profit to be transferred to profit and loss account and making provision for future contingencies, the following guidelines may be kept in mind.

A. When the work has not reasonably advanced (1/4 or less than ¼) - No profit should be taken to the credit of P/L account in the case of contracts which have just commenced and a small portion of the work is complete.

B. Where the work is complete more than ¼ but less than ½ of contract price: In this case1/3 of the notional profit as reduced by the percentage of cash received may be credited to profit and loss account. The usual formula is

Notional profit x1/3 x Cash received/ Work certified

The balance of notional profit shall be kept as reserve till the completion.

C. If the contract completed is more than 1/2 but less than 90%: Here 2/3rd of the notional profit should be taken to profit and loss account.

Notional profit x2/3 x Cash received/ Work certified

The balance of notional profit shall be transferred to work in progress as reserve. It is to be noted that in order to find out how much portion of contract is completed, work certified should be compared with contract price.

D. If the contract is nearing completion-Here, estimated profit may be ascertained by deducting the total cost of contract to date plus estimated additional expenses to complete the contract, from the contract price. It is calculated by using thefollowing formula:

Estimated profit x Cash received/Contract price

Where,

Estimated Profit = Contract price – Total estimated cost

Total Estimated Cost = Costs incurred upto date + Estimated costs for completion of contract.

Self-Assessment

Fill in the blanks:

1._____ pertains to construction while the _____is confined to production.

2. Contract costing is the technique of ascertaining_____of a contract.

3._____is similar to job costing.

4. Most of the costs of a contract can be allocated_____to the contract.

5. Contract Costing pertains to_____while the job costing is confined to production.

6. Work of specialised character, for which facilities are not internally available, is offered to a_____.

7. If the work certified is less then_____of the contract, no profit should be transferred to profit and loss account.

8. The preparation of contract account is the essence of_____.

9._____is a modified method of contract costing.

10._____is the difference between the value of work-in-progress certified and the cost of work-in-progress certified

Example1:

ABC Co. Ltd. undertook a contract at a price of Rs. 1000000. The work started 1st April 2014. Prepare a Contract Account for the year ended 31st March 2015, from the following particulars.

Materials issued to site= Rs. 85000

Labour on site=Rs. 75000

Plant installed at site=Rs. 15,000

Sundry Direct Expenses= Rs. 3,000

Establishment charges allotted to contract= Rs. 4,000

Materials returned to stores= Rs. 500

Work certified by architect= Rs. 200000

Cost of work not certified= Rs. 5000

Materials on hand on 31-3-2015= Rs. 2,000

Wages due on 31-3-2015= Rs. 10000

Value of plant on 31-3-2015= Rs. 12000

Cash received 180000

Solution:

CONTRACT ACCOUNT

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Material	85000	By Contractee A/C (Work Certified)	200000
To Wage+ O/S (75000+10000)	85000	By Material Return to Store	5000
To Deprecation on Plant(15000-12000)	3000	By Work in Progress	
To Sundry Expenses	3000	Work Uncertified-5000	
To Establishment Charges	4000	Material in Hand-2000	7000
To Balance c/d	32000		
	212000		**212000**

Working Note: Since the contract has been completed less than 25%no profit will be taken to Profit & Loss Account. Hence, the balance of contract account will be taken as work in progress

Example 2:

XYZ ltd. Made following expenditure on a contract for Rs. 600000

Material	=120000
Wages	=164000
Plant	=20000
Overheads	=8600
Cash received on account of the contract	= Rs. 240000
Work certified	=80%.
The Value of material in hand	= Rs.10000.

The plant has undergone 20% depreciation. Prepare Contract Account.

CONTRACT ACCOUNT

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Material	120000	By Contractee A/C (Work Certified=240000 x100/80)	300000
To Wage	164000		
To Plant	20000	By Material in Hand	10000
To Overheads	8600	By Plant at Site(20000-4000)	16000
To Notional Profit	13400		
	326000		**326000**
To P/L A/C(13400 x2/3 x240000/300000	7147	By Notional Profit b/d	13400
To Balance c/d	6253		
	13400		**13400**

18.9 Summary

Contract Costing is the form of specific order costing which applies where work is undertaken to customer's special requirements and each order is of long duration. It is a special type of job costing where the unit of cost is a single contract. Contract itself is the cost centre and it is executed under the specifications of a customer. Contract costing is suitable for the firms which are engaged in the work of construction of bridges, roads, buildings etc. contract usually takes several years to get it completed. If the profit on such contracts is recorded only after their completion, then wide fluctuations may be noted in the profit figures of contractors from year to year. To avoid these fluctuations in the reported profits and to reflect therevenue in the accounting period during which the activity is undertaken, the profit in respect of each contract in progress is transferred to the profit and loss account of the year by calculating the notional profit.

18.10 Glossary:

Contract Costing: That form of specific order costing which applies where

work is undertaken as per customers' special requirements and each order is of long duration.

Cost Plus Contract: A contract where the contractee agrees to pay to the contractor the cost price (usually the prime cost) for the work done on the contract plus an agreed percentage thereof by way of overhead cost and profit.

Work Certified: Work approved by the contractee or his nominee on a specific date.

Work Uncertified: Work which has not been so far approved by the contractee or his nominee.

Escalation Clause: A provision in a contract for adjustment of prices quoted and accepted, in the event of specified contingencies.

18.11 Answers: Self Assessment

1. Contract costing, job costing	2. Cost	3. Contract costing
4. Direct	5. Construction	6. Sub-contractor.
7. ¼th	8. Contract costing	9. Cost-plus Contract

10. Notional profit

18.12 Terminal Questions:

1. Define Contract Costing. Explain its basic characteristics in detail.
2. Discuss the various types of contracts.
3. What are the different methods of calculating profit on an incomplete contract? Give examples.
4. How work in progress is valued in the case of uncompleted contracts?
5. How does contract costing differ from job costing?

18.13 Suggested Readings:

I.M. Pandey, Financial Management, Vikas Publishing, New Delhi.

Khan and Jain, Management Accounting.

Prasanna Chandra, Financial Management - Theory and Practice, Tata McGraw Hill, New Delhi (1994).

R.L. Gupta and Radhaswamy, Advanced Accountancy.

S. Bhatt, Financial Management, Excel Books, New Delhi.

S.N. Maheshwari, Management Accounting.

V.K. Goyal, Financial Accounting, Excel Books, New Delhi.

Tulsian.P.C.(2015) Cost Accounting, S. Chand & Company PVT.LTD.

Mittal. Maheshwari (2016) Cost Accounting, Principles and Practice, Shree Mahavir Book Depot, Publishers,

Arora.M.N, Katyal.Priyanka.(2019),Cost Accounting, Vikas Publishing House Pvt.t

LESSON -19

Process Costing- I

Structure:

19.0 Learning Objectives:

After studying the lesson, you should be able to:

- Characteristics of process costing
- Steps in process costing
- Feature of process costing

19.1 Introduction

Process costing is the method of costing applied in the industries engaged in continuous or mass production. Process costing is a method of costing used to ascertain the cost of a product at each process or stage of manufacturing. When the production process is such that goods are produced from a sequence of continuous or repetitive operations or processes, the cost incurred during a period is considered as Process Cost. The process cost per unit is derived by dividing the process cost by number of units produced in the process during the period. Process Costing is employed in industries where a continuous process of manufacturing is carried out. Costs are ascertained for a specified period of time by departments or process. Chemical industries, refineries, gas and electricity generating concerns may be quoted as examples of undertakings that employ process costing.

19.2 Meaning and Definition of Process Costing

Process costing is an 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. According to ICMA terminology, “Process Costing is that form of operation costing which applies where standardized goods are produced”. Process costing is also called as “Average Costing” or “Continuous Costing”. 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”.

19.3 Feature of process costing

Process costing is a cost accounting method used in manufacturing industries to allocate production costs to products or processes. It is particularly useful when a company produces large quantities of identical or similar products through a continuous or repetitive production process. Here are some key features of process costing:

1. **Continuous Production:** Process costing is most suitable for industries with continuous or mass production, where products are manufactured in large quantities over a long period of time. Examples include food processing, chemical manufacturing, and automobile assembly.

2. **Homogeneous Products:** The products produced in a process costing system are typically identical or very similar. This makes it easier to allocate costs evenly across units.

3. **Multiple Production Processes:** The production process is divided into different stages or departments, often referred to as cost centers. Each cost center is responsible for a specific stage of production, and costs are tracked separately for each.

4. **Accumulation of Costs:** Costs, including direct materials, direct labor, and manufacturing overhead, are accumulated for each cost center. These costs are then allocated to the products based on the number of units or some other appropriate measure.

5. **Equivalent Units:** To account for partially completed units in various stages of production, equivalent units are calculated. This helps in allocating costs to both completed and partially completed units.

6. **Uniform Costing**: Process costing assumes that the cost per unit remains relatively constant throughout the production process. This simplifies cost allocation because all units are treated as having the same cost structure.

7. **Periodic Reporting:** Process costing systems often provide periodic reports to track the costs associated with each production process or department. This helps management make informed decisions and control costs.

8. **FIFO or Weighted Average Method:** Two common methods used to allocate costs in process costing are the first-in-first-out (FIFO) method and the weighted average method. FIFO assumes that the oldest units are completed first, while the weighted average method takes an average cost of all units.

9. **Work-in-Process Inventory**: Process costing involves maintaining work-in-process (WIP) inventory accounts for each cost center to track the value of partially completed units at various stages of production.

10. **Cost Flow:** Costs flow through the production process from one cost center to another until they are finally assigned to the finished products. This is typically done using cost allocation methods.

11. **Cost Control:** Process costing allows for effective cost control and monitoring of each cost center's performance, making it easier to identify areas for improvement and cost reduction.

12. **Compliance**: Process costing is often used in industries where there is a requirement for cost allocation that complies with accounting standards and regulations.

Overall, process costing is a valuable tool for industries with continuous production processes and homogeneous products, as it helps in tracking and allocating production costs efficiently. It provides useful insights into cost management and pricing decisions.

19.4 Steps in process costing

Process costing is a systematic approach to allocate production costs to products or processes in industries where continuous or mass production is common. Here are the general steps involved in the process costing method:

1. **Identify the Cost Centers:**
   - Identify and define the various production stages or departments within your manufacturing process. These are often referred to as cost centers.

2. **Accumulate Costs:**
   - Accumulate all relevant production costs within each cost center. These costs typically include direct materials, direct labor, and manufacturing overhead.

3. **Calculate Equivalent Units:**
   - Determine the equivalent units of production for each cost center. Equivalent units account for both completed units and partially completed units in work-in-process (WIP) inventory at the end of a period. This is usually done separately for materials and conversion costs (labor and overhead).

4. **Determine the Cost per Equivalent Unit:**
   - Calculate the cost per equivalent unit for each cost center by dividing the total cost incurred in that cost center by the equivalent units produced.

5. **Allocate Costs:**
   - Allocate the costs accumulated in each cost center to the units produced. This is typically done using either the first-in-first-out (FIFO) method or the weighted average method. The choice of method depends on the specific accounting practices of the organization.

6. **Compute Total Costs:**

- Calculate the total cost for each unit by adding up the costs allocated from all cost centers.

7. **Prepare Financial Statements:**
   - Prepare the cost of goods manufactured (COGM) statement, which outlines the total manufacturing costs incurred during the period. This statement includes the cost of beginning WIP inventory, additional manufacturing costs, and the cost of ending WIP inventory.
   - Prepare the cost of goods sold (COGS) statement, which shows the cost of goods transferred from WIP inventory to the finished goods inventory.

8. **Reconcile Ending Inventory:**
   - Reconcile the ending WIP inventory for each cost center to ensure that it is correctly valued and reflects the cost of units that are partially completed at the end of the period.

9. **Record Journal Entries:**
   - Record appropriate journal entries to reflect the allocation of costs from cost centers to finished goods inventory and the subsequent sale of finished goods.

10. **Report and Analyze:**
    - Generate periodic reports that provide information on the cost and performance of each cost center. These reports help management make informed decisions and control costs.

11. **Continuous Monitoring:**
    - Continuously monitor the production process and update cost information as needed. Adjustments may be necessary if there are significant changes in production methods, costs, or inventory levels.

12. **Compliance and Audit:**
    - Ensure that the process costing system complies with accounting standards and regulations. It should also be audited periodically to verify the accuracy of cost allocations.

These steps provide a framework for implementing a process costing system. The specific details and nuances of the process may vary depending on the industry, company practices, and accounting software used.

19.5 Characteristics of process costing

Process costing is a cost accounting method used in industries where products are produced through a continuous or repetitive production process. It has several characteristic features that distinguish it from other costing methods. Here are the key characteristics of process costing:

1. **Homogeneous Products:** Process costing is used when a company produces products that are virtually identical or very similar. This means that the end products in each production batch are indistinguishable from one another.

2. **Continuous Production:** It is best suited for industries with continuous or mass production processes, where products are manufactured over extended periods, often

24/7, without significant changes in the production process.

3. **Multiple Cost Centers:** The production process is divided into various cost centers or departments. Each cost center represents a distinct stage of production where specific tasks are performed. Costs are accumulated and allocated to these cost centers.

4. **Uniform Production Costs:** Process costing assumes that the cost per unit of production remains relatively stable throughout the production process. This simplifies cost allocation because all units are considered to have the same cost structure.

5. **Accumulation of Costs:** Costs, including direct materials, direct labor, and manufacturing overhead, are accumulated separately for each cost center or department. This enables accurate tracking of expenses at each production stage.

6. **Equivalent Units:** To account for partially completed units in various stages of production, equivalent units are calculated. These units represent the work that is partially completed and help in allocating costs correctly.

7. **Cost Allocation Methods**: Process costing typically uses either the first-in-first-out (FIFO) method or the weighted average method to allocate costs from one cost center to another and ultimately to the finished products.

8. **Work-in-Process (WIP) Inventory:** Each cost center maintains a WIP inventory account to track the value of partially completed units at different stages of production. This inventory is essential for accurate cost calculations.

9. **Periodic Reporting:** Regular reports are generated to track the costs incurred in each cost center, including the cost of materials, labor, overhead, and the status of WIP inventory. These reports help management make informed decisions and control costs.

10. **Cost Control:** Process costing allows for effective cost control by monitoring the performance of each cost center. This helps identify areas where cost reduction efforts may be needed.

11. **Compliance:** Industries using process costing often do so because it complies with accounting standards and regulations, making it a reliable and accepted method for cost allocation.

12. **Specific Industries:** Process costing is commonly used in industries such as chemical manufacturing, food processing, textiles, oil refining, and electronics manufacturing, where continuous production and uniform products are prevalent.

Overall, process costing is a valuable tool for industries where products are produced through repetitive and continuous processes. It provides a structured approach to allocate costs accurately and helps companies manage their production costs effectively.

19.6 Industries where process costing is frequently employed

Process costing is a cost accounting method that is commonly used in industries where products are produced through continuous or repetitive processes, and where the products are typically homogenous or identical. Here are some industries where process costing is

frequently employed:

1. **Chemical Manufacturing:** Chemical companies often use process costing because they produce large quantities of chemicals through continuous and standardized processes.

2. **Food Processing:** The food industry, including companies that produce items like beverages, canned goods, and packaged foods, utilizes process costing to allocate costs across various production stages.

3. **Textile Manufacturing:** Textile companies engage in continuous production of fabrics and textiles, making process costing an ideal method for tracking costs.

4. **Oil Refining:** In the petroleum industry, crude oil is processed through various stages to produce a range of petroleum products like gasoline, diesel, and jet fuel. Process costing is used to allocate costs in this complex production process.

5. **Electronics Manufacturing:** Companies that produce electronic components and devices often employ process costing to track costs during the manufacturing of circuit boards, chips, and other electronic components.

6. **Cement Manufacturing:** Cement production involves multiple steps, from extracting raw materials to manufacturing the final product. Process costing helps track costs through these stages.

7. **Paper and Pulp Manufacturing:** The paper and pulp industry uses process costing for the production of paper and paper-related products.

8. **Pharmaceutical Manufacturing**: Pharmaceuticals are often produced through a series of chemical processes, and process costing is used to allocate costs in this industry.

9. **Rubber and Plastic Manufacturing**: Companies that produce rubber and plastic products, such as tires, containers, and packaging materials, frequently utilize process costing.

10. **Steel and Metal Manufacturing:** Steel mills and metal foundries employ process costing to allocate costs across different production stages in the manufacturing of metal products.

11. **Mining and Extraction:** In industries like mining, where raw materials are extracted and processed through multiple stages before reaching the final product, process costing helps in tracking the costs involved.

12. **Utilities and Energy Production:** Some utility companies, such as those involved in electricity or gas generation, use process costing to allocate costs associated with energy production.

13. **Automotive Manufacturing**: While some aspects of automotive manufacturing may use job costing, overall production often involves repetitive processes where process costing can be applied.

14. **Glass Manufacturing:** Glass products, such as bottles, windows, and containers, are produced through continuous processes that lend themselves well to process costing.

These industries tend to produce products with consistent quality and characteristics and involve multiple stages or departments in their production processes. Process costing helps these industries accurately allocate and manage production costs, ensuring that the cost per unit is calculated correctly.

19.7 Advantages and disadvantages of process costing

Process costing is a cost accounting method that has its own set of advantages and disadvantages. Understanding these can help organizations decide whether process costing is the appropriate costing system for their specific needs. Here are some of the key advantages and disadvantages of process costing:

Advantages of Process Costing:

1. **Accurate Cost Allocation:** Process costing allows for the accurate allocation of production costs to specific production processes or departments, making it easier to determine the cost per unit produced.

2. **Suits Continuous Production:** It is well-suited for industries with continuous or mass production where products are manufactured in large quantities over extended periods, ensuring consistent cost allocation.

3. **Cost Control:** By tracking costs at each production stage, process costing enables better cost control and management. It helps identify cost overruns or inefficiencies within specific processes.

4. **Financial Reporting:** Process costing provides timely and accurate information for financial reporting, helping management make informed decisions about pricing, production, and resource allocation.

5. **Compliance:** It often complies with accounting standards and regulatory requirements, making it a suitable method for industries with strict reporting obligations.

6. **Inventory Valuation:** Process costing facilitates the accurate valuation of work-in-process (WIP) inventory at various production stages, helping determine the value of partially completed units.

7. **Simple Calculation:** The cost per unit calculation is relatively straightforward, as it assumes uniform production costs throughout the process.

8. **Production Efficiency:** Process costing encourages continuous improvement and efficiency within each cost center or production stage.

Disadvantages of Process Costing:

1. **Uniformity Assumption:** The assumption of uniform production costs can lead to inaccuracies if actual costs fluctuate significantly during the production process.

2. **Complex Allocation:** In some industries with intricate production processes, allocating costs accurately to each cost center or department can be challenging.

3. **Difficulty in Traceability:** It may be difficult to trace specific costs to individual units, which is essential for analyzing the profitability of each product.

4. **Inefficiency Identification:** While process costing helps identify inefficiencies within cost centers, it may not pinpoint the exact source of inefficiencies or allow for a granular analysis of specific processes.

5. **Limited Cost Detail:** It may not provide detailed cost information about individual products or batches, which can be crucial for pricing decisions or product-specific cost analysis.

6. **Resource Allocation:** Process costing may not provide insights into optimizing the allocation of resources among different products or processes within the same department.

7. **Overhead Allocation Challenges:** Allocating overhead costs accurately can be challenging, as some overhead costs may not be directly attributable to specific production processes.

8. **Complexity of Implementation:** In industries with highly variable production processes or where products have significant differences, implementing process costing may be complex and time-consuming.

Ultimately, the suitability of process costing depends on the specific needs and characteristics of the industry and organization. While it offers advantages in terms of cost allocation and control, it may not be the best fit for all situations, especially when detailed product-level cost information is required. Organizations should carefully consider their requirements and the nature of their production processes before choosing a costing method.

19.8 Summary

see chapter 20 section 20.10

19.9 Glossary

see chapter 20 section 20.11

19.10Answers: self-Assessment

see chapter 20 section 20.12

19.11Terminal questions

see chapter 20 section 20.13

19.12 Suggested readings

see chapter 20 section 20.14

Lesson-20

Process Costing- II

Structure:

20.1 Learning Objectives

After studying this lesson, you should be able to:

- Define process costing and prepare process cost accounts.
- To understand the nature and application of Process Costing.
- Understand the accounting treatment required for normal losses abnormal losses and abnormal gains.

20.2 Introduction

Process costing is the method of costing applied in the industries engaged in continuous or mass production. Process costing is a method of costing used to ascertain the cost of a product at each process or stage of manufacturing. When the production process is such that goods are produced from a sequence of continuous or repetitive operations or processes, the cost incurred during a period is considered as Process Cost. The process cost per unit is derived by dividing the process cost by number of units produced in the process during the period. Process Costing is employed in industries where a continuous process of manufacturing is carried out. Costs are ascertained for a specified period of time by departments or process. Chemical industries, refineries, gas and electricity generating concerns may be quoted as examples of undertakings that employ process costing.

- only average costs
- Process costs are only historical.

20.3 Principles of Process Costing

17 Production activity should be divided into different processes or departments.
18 A separate account is opened for each process.
19 Both direct and indirect costs are collected for each process.
20 The quantity of output and costs are recorded in the respective process accounts.
21 The cost per unit is determined by dividing the total cost at the end of each process by the number of output of each process.
22 Normal loss and abnormal loss are credited in the process account
23 The accumulated cost of each process is transferred to subsequent process along with output. The output of the last process along with cost is transferred tothe finished goods account.
24 In case of by-products and joint products their share in joint cost should be estimated and credited to the min process.
25 When there is work in progress at the end of the period the computation of inventory is made in terms of complete units.

20.4 Process Costing Procedure

- In process costing each process is separately identified and separate process account is opened for each process along with 'Particulars Column', two columns are provided on both sides of the process account-units (quantity) and amount (Rs.).
- Then all the expenses are debited in the respective process account. Wastage, sale of scrap, by-products etc. are reordered on the credit side ofthe process account.
- The difference between debit and credit side shows the cost of production and output of that particular process which is transferred to the next process.
- The cost per unit in every process is calculated by dividing the net cost by the output.
- The output of last process is transferred to the Finished Stock Account. Incomplete units at the end of the each period on every process are converted in terms of completed units.

PROCESS ACCOUNT

(A Specimen)

Particulars	Units	Rs.	Particulars	Units	Rs.
To Direct Materials			By Loss in weight		
To Direct Wages			(Normal Loss)		
To Direct Expenses			By Sale of Scrap		
To Indirect expenses			By Next Process Account (Transfer)		
To Other Expenses (if any)					
		------		-------	

20.5 Differences between Process Costing and Job Costing:

The main differences between process costing and job costing are as follows:

(i) In process costing production is a continuous flow and the products are standardized. In job costing, production is carried on by specific order.

(ii) Processes are related to each other. Products also lose their individual entity. Various jobs are separate and independent.

(iii) In process costing, costs are calculated at the end of period under each process. In job costing, costs are calculated when a job is completed or finished.

(iv) In process costing, transfer from one process to another is an usual feature. In job costing, there is normally no transfer from one job to another. It will be only when there is surplus or excess production.

(v) Cost are compiled on time basis: for production, for a given accounting period, for each process. Costs are determined by Jobs or batches of products.

(vi) In process costing, production is homogeneous, stable and controllable. In job costing, each product unit is different and therefore more managerial attention is needed for proper control.

(vii) The unit cost of a process, which is computed by dividing the total cost for the period into the output of the process during that period, is an average cost for the period. In job costing, unit cost of a job is calculated by dividing the total cost by units produced in the lot or batch in the period.

(viii) Production in process costing is continuous and therefore there is normally work-in-progress at beginning and closing. In job costing, there may not be opening or closing work-in-progress in an accounting period.

20.6 Important aspects in Process Accounts

1) **Materials-**Materials and supplies which are required for each process are drawn against material requisitions from stores. Each process for which the above drawn materials will be used should be debited with the cost of materials consumed on the basis of the information received from the Cost Accounting department. The finished product of first process generally become the raw materials of second process; under such a situation the account of second process, be debited with the cost of transfer from the first process and the cost of any additional material required under this second process.
2) **Labour-**Each process account should be debited with the labour cost orwages paid to labour for carrying out the processing activities. Sometimes the wages paid are apportioned over the different processes after selecting appropriate basis.
3) **Direct Expenses-**Each process account should be debited with direct expenses like depreciation, repairs, maintenance, insurance etc. associated with it.
4) **Overheads Related to Production-**Expenses like rent, power expenses, lighting bills, gas and water bills etc. are known as production overheads. These expenses cannot be allocated to a process. The suitable way-out to recover them is to apportion them over different processes by using suitable basis. Usually, these expenses are estimated in advance and the processes debited with these expenses on a pre-determined basis.

Example 1: A product passes through three processes, process A, process B and process C to completion. During the month of March, 2007, 1,000 units were produced and the following was the expenses:

	Process A (Rs.)	process B (Rs.)	process C(Rs.)
Materials	2,000	3,000	2,000
Labour	5,000	4,000	3,000
Direct expenses	800	900	1,000

Indirect expenses amounted at all to 6,000. These are to be allocated on the basis of direct wages. Raw materials worth Rs. 6,000 were issued to process A. prepare process cost accounts showing cost per article produced.

Solution:

Process Account A
(Output: 1,000 units)

Particulars	Cost per unit (Rs)	Total (Rs.)	Particulars	Cost per unit (Rs)	Total (Rs.)
To Raw materials	6.00	6,000	By Transfer to process B a/c	16.30	16,300
" Materials "	2.00	2,000			
Direct wages	5.00	5,000			
" Direct expenses	0.80	800			

“ Indirect expenses	2.50	2,500			
	16.30	16,300		16.30	16,300

Process Account B

Particulars	Cost per unit (Rs)	Total (Rs.)	Particulars	Cost per unit (Rs)	Total (Rs.)
To Transfer from process A a/c	16.30	16,300	By Transfer to process C a/c	26.20	26,200
“ Materials	3.00	3,000			
“ Direct wages	4.00	4,000			
“ Direct expenses	0.90	900			
“ Indirect expenses	2.00	2000			
	26.20	26,200		26.20	26,200

Process Account C

Particulars	Cost per unit (Rs)	Total (Rs.)	Particulars	Cost per unit (Rs)	Total (Rs.)
To Transfer from process B a/c	26.20	26,200	By Transfer to Finished Stock a/c	33.70	33,700
“ Materials	2.00	2,000			
“ Direct wages	3.00	3,000			
“ Direct expenses	1.00	1000			
“ Indirect expenses	1.50	1,500			

	33.70	33,700		33.70	33,700

Self-Assessment

Fill in the blanks:

1. Industries which are engaged in the manufacture of products which involve continuous operation or process are known as ……
2. …… represents the portion of a basic raw material lost in processing, having no recovery value.
3. In process costing production is a continuous flow and the products are ……
4. In ……, each product unit is different and therefore more managerial attention is needed for proper control.
5. …… as discarded material which has same recovery value and which is usually either disposed of without further treatment.
6. In process costing .....is homogeneous, stable and controllable.
7. In job costing, there may not be..... in an accounting period.

20.7 Treatment of Normal Loss, Abnormal Loss and Abnormal Gain

Process loss is defined as the loss of material arising during the course of a processing operation and is equal to the difference between the input quantity of the material and its output.

There are two types of material losses:

1. Normal Process Loss

Normal loss is a loss, which is inevitable in any process. Normal Process Loss is defined as the loss of material which is inherent in the nature of work. Such a loss can be reasonably anticipated from the nature of the material, nature of operation,the experience and technical data. It is unavoidable because of nature of the material or the process. For example if the input is 100, the output may be 95 if the normal loss is anticipated as 5%.

Treatment in Cost Accounts

The cost of normal process loss in practice is absorbed by good units produced under the process. The amount realized by the sale of normal process loss units should be credited to the process account.

2. Abnormal Process Loss

If the actual output is less than the normal output [Normal output = Input-Normal Loss], the difference between the two is the abnormal loss. Abnormal Process Lossis defined as the loss in excess of the pre-determined loss (Normal process loss). This type of loss may occur due to the carelessness of workers, a bad plant designor operation, Sabotage etc. Such a loss cannot obviously be estimated in advance. But

it can be kept under control by taking suitable measures. In the example given above, the normal output is 95 which is 100- 5% of 100as the normal loss. If the actual output is 93 units then 2 units will be abnormal loss.

Treatment in Cost Accounts

The cost of an abnormal process loss unit is equal to the cost of a good unit. The total cost of abnormal process loss is credited to the process account from which it arises. Cost of abnormal process loss is not treated as a part of the cost of the product. In fact, the total cost of abnormal process loss is debited to costing profit and loss account.

3. Abnormal Gain

Sometimes, the actual production exceeds the expected figures. If the actual output is more than the normal output, the difference between the two is abnormal gains. Thus abnormal gain is the difference between actual and expected loss and actual and expected production. I n the example given above, the normal output is 95 which is 100- 5% of 100as the normal loss. If the actual output is 97 units then 2 units will be abnormal gain.

Treatment in Cost Accounts

The process account under which abnormal gain arises is debited with the abnormal gain and credited to abnormal gain account which will be closed by transferring to the Costing Profit and loss account. The cost of abnormal gain is computed on the basis of normal production.

Example1:

Calculate the cost of the finished articles if a product passes through three processes. The output of each process is treated as the raw material of the next process to which it is transferred and output of the third process is transferred to finished stock.

	1st Process(In Rs.)	2nd Process(In Rs.)	3rd Process(In Rs.)
Material issued	40000	20000	10000
Labour	6000	4000	1000
Manufacturing overhead	10000	10000	15000

10000 units have been issued to the 1st process and after processing, the output of each process is as under:

	Output	Normal Loss

Process No. 1	9750 units	2%
Process No. 2	9400 units	5%
Process No. 3	8000 units	10%

No stock of materials or of work-in-progress was left at the end.

Solution

PROCESS No. 1 ACCOUNT

Particulars	Units	Rs.	Particulars	Units	Rs.
To Materials	10000	40000	By Normal Wastage	200	-
To Labour		6000	By Abnormal Wastage(Cost p. u.)	50	286
To Overheads		10000	By Process No. 2 (Transfer of completed units)	9750	55714
	10000	**56000**		**10000**	**56000**

Working Notes

The cost of the abnormal wastage

Normal Output = 10000 units-200 units = 9,800 units

Cost per unit of normal output = Rs. 56000 + 9800 units = Rs. 5714

Cost of 50 units = Rs. 5714 x 50 = Rs. 286

PROCESS No. 2 ACCOUNT

Particulars	Units	Rs.	Particulars	Units	Rs.

To Process No.1	9750	55714	By Normal Wastage(5% of9,750)	488	-
To Materials		20000	By Process No. 3 (Transfer of completed units)	9400	91051
To Labour		4000			
To Overheads		10000			
To Abnormal Gain@9.686	138	1337			
	9888	**91051**		**9888**	**91051**

Working Notes

The cost per unit is obtained by dividing Rs. 89714 by 9262 units, i.e., 9750 units less488 units.

PROCESS No. 3 ACCOUNT

Particulars	Units	Rs.	Particulars	Units	Rs.
To Process No.2	9400	91051	By Normal Wastage	940	-
To Materials		10000	By Abnormal Wastage@13.836	460	6364
To Labour		1000	By Finished Stock	8000	110687
To Overheads		15000			
To Abnormal Gain@9.686	138	1337			
	9400	**117051**		**9400**	**117051**

Working Notes

The cost of the abnormal wastage

Normal Output = 9,400 units-940 units = 8,460 units

Cost per unit of normal output = Rs. 117051 ÷ 8,460 units = Rs. 13,836

Cost of 460 units is = Rs. 6,364

20.8 Oil Refinery Processes

Oil refineries have normally three processes:

(a) Crushing Process: In this 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 thisprocess 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.

Example: In an Industry, the output passes through three processes to completion i.e., Crushing, Refining and Finishing. The details are given below for the month of March, 2018:

	Crushing (Rs.)	Refining (Rs.)	Finishing (Rs.)
Wages	15,000	12,000	10,000
Power	6,000	5,000	3,000
Steam	2,000	1,000	500
Other expenses	3,000	2,000	500

Copra purchased 3,000 kg costing Rs.3, 00,000. Crude oil produced 2,500 kg,refined oil 1,800 kg, and finishing oil 1,760 kg. 500 kg crude oil was sold at cost plus 20% in Crushing process. Copra residue 300 kg sold for Rs.10,000 and sacks sold for Rs.1,000. Wastage of 100 kg of Refining process sold for Rs. 800. Casks cost Rs.3, 000. Oil stored in casks sold for Rs.200 per kg. Prepare necessary accounts of process.

Solution:

Crushing Process Account

Particulars	Kg	Amou nt	Particulars	Kg.	Amou nt

		(Rs.)			(Rs.)
To Copra purchased “ Wages “ Power “ Steam “ Other expenses “ Profit and Loss a/c (Profit on crude oil sold)	3,000	3,00,000 15,000 6,000 2,000 3,000 12,600	By Loss in weight “ Copra residue sold“ Sacks sold “ Crude oil sold (Cost Rs. 63,000 Plus 20% Profit 12,600) [(3,15,000 / 2,500) x 500] “ Refining Process a/c (cost per kg Rs. 126)	200 300 500 2,000	- 10,000 1,000 75,600 2,52,000
	3,000	3,38,600		3,000	3,38,600

Refining Process Account

Particulars	Kg	Amount (Rs.)	Particulars	Kg.	Amount (Rs.)
To Crushing process a/c (Output recd. @Rs.126)	2,000	2,52,000	By Loss in weight	100	
			“ Wastage sold	100	800
“ Wages		12,000	“ Finishing process a/c (Output transferred, cost per kg Rs.105.67)	1,800	2,71,200
“ Power		5,000			
“ Steam		1,000			

“ Other expenses		2,000			
	2,000	2,72,200		2,000	2,72,200

Finishing Process Account

Particulars	Kg	Amount (Rs.)	Particulars	Kg.	Amount (Rs.)
To Refinishing Process a/c (Refinished oil) “ Wages “ Power “ Steam “ Other expenses	1,800	2,71,200 10,000 3,000 500 500	By Loss in weight “ Finished stock a/c (Cost per kg Rs. 162.67)	40 1,760	2,85,200
	1,800	2,85,200		1,800	2,85,200
To Finished process(Refined oil) “ Cost of casks	1,760	2,85,200	By Total Cost of casksfinished oil c/d (Cost per kg Rs. 163.75)	1,760	2,88,200
		3,000			
	1,760	2,88,200		1,760	2,88,200
To Cost of casks finished	1,760	2,88,200	By sales @ Rs.200 per	1,760	3,52,000

oil (per kg Rs. 163.75) “ Profit and Loss a/c (Profit per kg Rs. 36.25)		63,800	kg.		
	1,760	3,52,000		1,760	3,52,000

Self-Assessment

Fill in the blanks:

8. …… represents the portion of a basic raw material lost in processing, having no recovery value

9. In process type of industry, wastage may have lower ……

10. In the case of normal wastage, all..... incurred are charged to the good units of output.

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

12. Oil obtained from refining process is ……

13. The product of a factory passes through …… processes of manufacture.

20.9 Joint Products and By-Products

Joint products-Joint products represent “two or more products separated in thecourse of the same processing operation usually requiring further processing, each product being in such proportion that no single product can be designated as a majorproduct”. In other words, two or more products of equal importance, produced, simultaneously from the same process, with each having a significant relative sale value are known as joint products. For example, in the oil industry, gasoline, fuel oil, lubricants, paraffin, coal tar, asphalt and kerosene are all produced from crude petroleum. These are known as joint products.

By-Products- These are defined as “products recovered from material discarded in a main process, or from the production of some major products, where the material value is to be considered at the time of severance from the main product.” Thus by- products emerge as a result of processing operation of another product or they are produced from the scrap or waste of materials of a process. In short a by-product isa secondary or subsidiary product which emanates as a result of manufacture of the main product. The point at which they are separated from the main product or products is known as split-off point. The expenses of processing are joint till the split-off point. Examples of by-products are molasses in the manufacture of sugar, tar, ammonia and benzene obtained on carbonization of coal and glycerin obtained in the manufacture of soap.

20.10 Inter Process Profit

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.

The main advantages of such a method are that each process will then reveal profit or loss and hence the efficiency or inefficiency at any stage will be immediately known and underlined. 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 competes with the market price, and
- To make each process stand on its own efficiency and economies.

If the market price is 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. Therefore, it is necessary to find out how much profit is included in the stock of each process and then to create a proper reserve for it by debiting the Profit and Loss account.

Example: A product passes through two processes A and B. Output of process A is passed to Process B at cost plus 25 per cent profit and finished output is similarly transferred to Finished Stock Account at cost plus 25 per cent profit. There was no partly finished work in either process on 30th June, on which date the following further information's was available:

	Process A (Rs.)	Process B (Rs.)
Materials consumed	2,000	6,000
Direct labour	3,000	4,000
Closing stock (30th June)	1,000	3,000

Out of the finished stocks, a portion remained at hand valued at Rs.5,000 and the balance was sold for Rs.20,000. Ignoring the question of overheads and assuming there were no opening stocks; prepare the Process and Finished stock accounts.

Solution:

Process Account A

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)

To Materials " Direct labour " Profit & Loss account (25% on Rs. 4,000)	2,000 3,000 1,000	By Transfer to process B a/c" Closing stock	5,000 1,000
	6,000		6,000

Process Account B

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Transferred from process A a/c To Materials " Direct labour " Profit & Loss account (25% on Rs. 12,000)	5,000 6,000 4,000 3,000	By Transfer to Finished stock a/c " Closing stock	15,000 3,000
	18,000		18,000

Finished Stock Account

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Transferred from process B a/c" Profit & Loss account	15,000 10,,000	By Sales " Closing stock	20,000 5,000
	25,000		25,000

20.11 Work- In- Progress (Equivalent Production)

Process costing mainly deals with 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.

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.
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. For example, 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:

After work-in-progress has been converted into equivalent completed units, the following steps are taken to evaluate it

: (1) Find out equivalent production after taking into account of the process losses, degree of completion of opening and/or closing stock.

(2) Find out net process cost according to elements of costs i.e. material, labour and overheads.

(3) Ascertain cost per unit of equivalent production of each element of cost separately by dividing each element of costs by respective equivalent production units.

(4) Evaluate the cost of output finished and transferred work in progress.

The total cost per unit of equivalent units will be equal to the total cost divided by effective units and cost of work-in-progress will be equal to the equivalent units of work-in-progress multiply by the cost per unit of effective production. In short the following from steps an involved.

Step 1 – prepare statement of Equivalent production

Step 2 – prepare statement of cost per Equivalent unit

Step 3 – prepare of Evaluation

Step 4 – prepare process account

The problem on equivalent production may be divided into following groups.

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

II. when there is only closing stock of 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 only opening as well as closing work-in-progress with process losses

Methods of valuation of work-in-progress:

(a) FIFO Method: The FIFO method of costing is based on the assumption of that the opening work-in-progress units are the first to be completed. Equivalent production of opening work-in-progress can be calculated as follows: Equivalent Production = Units of Opening WIP x Percentage of work needed to finish the units

(b) Average Cost Method: This method is useful when price fluctuate from period to period. The closing valuation of work-in-progress in the old period is added to the cost of new period and an average rate obtained. In calculating the equivalent production opening units will not be shown separately as units of work-in-progress but included in the units completed and transferred.

(c) Weighted Average Cost Method: In this method no distinction is made between completed units from opening inventory and completed units from new production. All units finished during the current accounting period are treated as if they were started and finished during that period. The weighted average cost per unit is determined by dividing the total cost (opening work-in-progress cost + current cost) by equivalent production.

(d) LIFO Method: In LIFO method the assumption is that the units entering into the process is the last one first to be completed. The cost of opening work-in-progress is charged to the closing work-in-progress and thus the closing work-in-progress appears cost of opening work-in-progress. The completed units are at their current cost.

Example: From the following information's find out (i) Equivalent Production, (ii)Cost per unit of Equivalent production, and (iii) prepare process A Account. Assume there is no opening work-in-progress and process loss.

Input	1,900 units
Output	1,500 units
Closing work-in-progress	400 units

Items	degree of completion	Process costs of the current

	of closing WIP in %	period (Rs.)
Materials	80	3,640
Direct labour	70	5,340
Overheads	70	3,560

Solution:

Statement of Equivalent Production

Input		Output		Equivalent Production					
Items	Units	Items	Units	Materials		Labour		Overheads	
				%	Units	%	Units	%	Units
Units Introduced	1,900	Units completed	1,500	100	1,500	100	1,500	100	1,500
		Work-in progress	400	80	320	70	280	70	280
	1,900		1,900		1,820		1,780		1,780

Statement of Cost

Element of Cost or Items	Cost Rs.	Equivalent Production (units)	Cost per unit Rs.
Materials	3,640	1,820	2.00
Direct labour	5,340	1,780	3.00
Overheads	3,560	1,780	2.00

Statement of Evaluation (Cost of per unit)

Production	Element of Cost	Equivalent Production (units)	Cost per unit	Cost Rs.	Total Rs.
Finished	Materials	1,500	2	3,000	
	Direct labour	1,500	3	4,500	10,500
	Overheads	1,500	2	3,000	
Work-in-progress	Materials	320	2	640	
	Direct labour	280	3	840	2,040
	Overheads	280	2	560	

Process Account

Items	Units	Amount(Rs)	Items	Units	Amount(Rs)
To Materials	1,900	3,640	By Finished stock a/c	1,500	10,500
To Direct labour		5,340		400	2,040
To Overheads		3,560	By Work-in-progress		
	1,900	12,540		1,900	12,540

Self-Assessment

Fill in the blanks:

14_____is the simplest method.

15. The basic problem in respect of joint products is that of apportioning the__.

16. The work-in-progress is inspected and an estimate is made of the_____, usually on a percentage basis.

17. Under average method the average process cost is obtained by adding the opening work in-progress and the current cost and dividing the total by_____.

18. The .....are split in the ratio of selling price of individual products.

19 .....are relatively considered less important.

20. The sale proceeds of by-products may be …… to the account of main product and thus it can be …… from the cost of production of main product.

21. If the market price be higher than cost, a process account will reveal ……

22. …… represents the production of a process in terms of completed units.

20.12 Summary

Process Costing is a method of costing used to ascertain the cost of a product which may passes through various processes before completion. This method is used by industries manufacturing products by continuous processes. Cost is ascertained for a period by process or department. As distinct from job costing, time is given more importance here. Hence, this is also called period costing. The cost of normalprocess loss is absorbed by good units produced under the process. The amount realized by the sale of normal process loss units should be credited to the process account. The total cost of abnormal process loss is credited to the process account from which it arises; the total cost of abnormal process loss is debited to costing profit and loss account. The process account under which abnormal gain arises is debited with the abnormal gain and credited to abnormal gain account which will be closed by transferring to the costing profit and loss account.

20.13 Glossary:

By- Product: A product which is secondary to the main product and obtained during the course of manufacture of recognized main product.

Common Cost: The cost of facilities of services which are common to more than one activity.

Equivalent Units: Notional whole units representing uncompleted work.

Joint Products: Two or more products separated in the course of processing, each having a sufficiently high saleable value to merit recognition as a main product.

Process Costing: It is a method that applies cost to alike products that are usually mass produced in continuous fashion through series of production steps or processes

Market Price: Price of a commodity in the market.

Physical Unit: A unit of measurement.

Oil Refinery: Refinery for petroleum.

Abnormal Gain: Gain out of abnormal effective usage.

Scrap: A small piece or amount left over**.**

20.14 Answers: Self Assessment

1. Process industries	2. Wastage	3. Standardized.
4. Job costing	5. Scrap	6. Production
7. Opening or closing work-in-progress value.	8. Wastage	9. Reusable
10. Production expenses	11. Credit side	12. Debited
13. Three	14. Average Unit cost	15. joint cost
16. Degree of completion	17. Total equivalent units	18. Joint costs
19. By-products	20. Credited, deducted	21. Profit

22. Equivalent production

20.15 Terminal Questions:

1. Define Process Costing. Explain its special characteristics in detail.
2. What do you mean by Normal Loss, Abnormal Loss and Abnormal Gain? How these are treated in cost accounting?
3. Distinguish between process Costing and Job Costing.
4. What is the difference between normal and abnormal loss?
5. Define joint products, by-products and give example of each.
6. What is the concept of Equivalent production? Explain in detail.
7. What do you mean by inter-process profit?

20.16 Suggested Readings:

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Mittal. Maheshwari (2016) Cost Accounting, Principles and Practice, Shree Mahavir Book Depot, Publishers,
Arora.M.N, Katyal.Priyanka.(2019),Cost Accounting, Vikas Publishing House Pvt. Ltd.

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Assignments

Attempt any four assignments. Assignments are compulsory.

1. “Cost accounting has become an essential tool of modern management”. Comment on this statement.
2. Define Cost Sheet. List its advantages. What is the difference between Cost Sheet and Statement of Cost?
3. Write a detailed note on various cost price methods of pricing of material.
4. What is labour turnover? Describe the methods of remunerating labour. State the merits and demerits of each method.
5. Define ‘standard cost’ and ‘standard costing’. State the various classifications of variances
6. What is the purpose of preparing reconciliation statement? State the steps involved in the preparation of reconciliation statement.
7. What do you mean by operating costing? What are the objectives of transport costing? Explain.
8. What do you mean by inter-process profit? Distinguish between process Costing and Job Costing.