

**Centre for Distance & Online Education  
(CDOE)**

**Bachelor of Commerce**

**BCOM 401**

**COST ACCOUNTING**



**Guru Jambheshwar University of Science &  
Technology, HISAR-125001**



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<b>Subject:</b> Cost Accounting	
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<b>Cost Accounting: Nature, Scope, Methods and Techniques</b>	

**Structure**

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**1.0 Learning Objective**

After reading this lesson, you should be able to

- Explain the different types of accounting.
- Describe the meaning and nature of cost accounting.
- Differentiate between cost accounting and financial accounting, and cost accounting and management accounting.
- Highlight the importance of cost accounting.
- Discuss the methods and techniques of costing.



- Explain the practical difficulties in installing a costing system.

## 1.1 Introduction

It is imperative for business organization to strive for to reduce costs and enhance the quality of their goods or services so that the discerning customers can receive better intrinsic value for money. This focus has become essential in today's globally competitive business environment, and particularly in the context of emerging economics, where greater market access is a direct effect of the cost factor. There has always been a misconception for quite sometime that the quality and cost are inversely related. The business concerns will have to practice to optimize the quality for a given cost or minimize the cost for a given quality. This trade-off itself will have to be sensitized from situation to situation. In the current scenario, it becomes difficult in the industry to sustain and survive unless the costs are correctly accounted for, controlled and reduced so as to sustain and remain in the industry. Cost accounting facilitates distinction of costs into fixed and variable costs, which is helpful in determining prices in the periods of trade depression by selling the product even at price below the total cost. In addition, the costing information provides help in locality inefficiencies wastages etc. to exercise cost control and cost reduction programmes.

### 1.1.1 Meaning of Cost Accounting

Cost accountancy is a wide term. It means and includes the principles, conventions, techniques and systems which are employed in a business to plan and control the utilization of its resources.

*As per C.I.M.A. London,* It 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”

Cost accountancy is thus the science, art and practice of a cost accountant. It is a science in the sense that it is a body of systematic knowledge which a cost accountant should possess for the proper discharge of his duties and responsibilities. It is an art as it requires the ability and skill on the part of a cost accountant in applying the principles of cost accountancy to various managerial problems like price fixation, cost control, etc. Practice refers to constant efforts on the part of cost accountant in the field of cost accountancy. The theoretical knowledge alone would not enable a cost act, to deal with the



intricacies, he should have sufficient practical training. Cost accountancy includes several subjects. These are costing, cost accounting, cost accountancy, cost control and cost audit. These are described below:

- **Costing:** Costing refers to the process of cost finding. It is defined as “the technique and process of ascertaining costs”. It has also been defined as “the classifying, recording and appropriate allocation of expenditure for the determination of costs, the relation of these costs to sales value and the ascertainment of profitability. Thus costing consists of principles and rules which are used for determining: (a) the cost of manufacturing a product like chemicals, television, etc. and (b) the cost of providing a service, i.e., electricity, transport, etc.
- **Cost Accounting:** Cost accounting is a system by means of which costs of products or services are ascertained and controlled. It is defined as “the application of accounting and costing principles, methods and techniques in the ascertainment of costs and the analysis of savings and/or excesses as compared with previous experience or with standards”.
- Thus, whereas costing is simply cost finding, which can be carried out by means of memorandum statements, arithmetic process etc., and cost accounting denotes the formal accounting mechanism by means of which costs are ascertained. In simple words, costing means finding out the cost of something, and cost accounting means costing using double entry book keeping methods as a basis for ascertainment of costs. However, cost accounting and costing are often used interchangeably.
- **Cost Accountancy:** The term ‘Cost Accountancy’ includes Costing and Cost accounting. Its purposes are Cost-control and Profitability – ascertainment. It serves as an essential tool of the management for decision-making.
- **Cost Control:** Cost control is the function of keeping costs within prescribed limits. In other words, cost control is comparing actual costs to conform to planned costs. Amongst the various techniques used for cost control, the two most popular are budgetary control and standard costing.
- **Cost Audit:** Cost audit is the specific application of auditing principles and procedures in the fields of cost accounting. It is defined as the verification of cost accounts and a check on the adherence to the cost accounting plan. It has thus two functions - (a) to verify that the cost accounts have been correctly maintained and complied, and (b) to check that principles laid down have been properly



followed.

### 1.1.2 Nature of Cost Accounting

The nature of cost accounting can be brought out under the following headings:

- **Cost accounting is a branch of knowledge:** Though considered as a branch of financial accounts, cost accounting is one of the important branch of knowledge, i.e., a discipline by itself. It is an organised body of knowledge consisting of its own principles, concepts and conventions. These principles and rules vary from industry to industry.
- **Cost accounting is a science:** Cost accounting is a science as it is a body of systematic knowledge relating to not only cost accounting but relating to a wide variety of subjects such as law, office practice and procedure, data processing, production and material control, etc. It is necessary for a cost accountant to have intimate knowledge of all these field of study in order to carry on his day-to-day activities. But it is to be admitted that it is not a perfect science as in the case of natural science.
- **Cost accounting is an art:** Cost accounting is an art in the sense it requires the ability and skill on the part of cost accountant in applying the principles, methods and techniques of cost accountancy to various management problems. These problems include the ascertainment of cost, control of costs, ascertainment of profitability, etc.
- **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 such as the Institute of Cost accountant in India, ICMAI in USA and the institute of cost and management Accountants in UK. Such professional bodies both in developed and developing countries have increased the growing awareness of costing profession among the people. Secondly, a large number of students have enrolled in these institutes to obtain costing degrees and memberships for earning their livelihood.

### 1.1.3 Scope of Cost Accounting

- **Ascertainment of Cost:** Cost Accounting deals with the Ascertainment of cost. it gives a true and fair view of the actual cost involved in the different processes in the organization. Managers have detail information regarding cost and easily regulate the control as per the budget this helps in true ascertainment of the cost.



- **Provides a basis for future:** Cost Accounting collects detail information regarding the cost of different departments of the organization. The manager uses this collected information for predict the actual cost of future operations. This true ascertainment for better plans to achieve the goals.
- **Cost Control:** The cost account helps in the estimation of the actual cost. Managers can use this information in controlling the cost and ensure that all activities go to a predetermined budget manager can take necessary action to control whenever anything goes out of the budget.
- **Budgeting and Budgetary Control:** Cost accounting has an important role in deciding the budget it collects information regarding cost from different sources within the organization. This information is analysed by the manager to design the optimum budget. It is insured by the manager that all expenses go within the decided budget and if necessary action being taken to control the cost
- **Cost Audit:** Cost Accounting has an important role in performing the audit of different costs. An auditor can easily acquire all relevant information through the data acquired by cost accounting. It makes comparison and verification of various data easy an error can be deducted
- **Cost Comparison:** Cost accounting provides the data of actual expenditure and income. So we compare the actual cost with the standard cost. To find out the cause of difference and the corrective measures will be taken.
- **Decision Making:** Cost accounting provides all information to the manager for effective decision making. The manager analyzes the data acquired by cost accounting and formulate the plan and policies. It helps the manager in better understanding by depicting the true and fair picture of the organization. Manager can take a best suited decision as per the organization need to drive the maximum result.

#### 1.1.4 Objectives of Cost Accounting

- **Process of Accounting for Cost:** Cost accounting is a process of recording the income and expenditure of the organization. Objective of cost accounting is to find out the cost. Cost includes raw material cost, labour cost, fixed cost and other cost which is related to the production.
- **Records Income and Expenditure:** Cost Accounting records income and expenditure which is related to production. Cost accountant constantly track and analyze the per-unit cost of the product. So that the true and fair cost of production will find out.



- **Provides Statistical Data:** Cost Accounting provides statistical data for analysis and interpretation of cost in production. It helps in proper and efficient planning and also helps in the preparation of the budget.
- **Helps in Cost Control:** Cost Accounting helps in cost control. Cost control is a process of identifying and reducing business expenses. So the profit of the organization increases. Cost accounting compares actual cost with standard cost and finds out the problems. Then corrective measures are taken in steps.
- **Preparation of Budget:** Budget is the estimation of income and expenditure over a period of time. Cost accounting provides statistical data for the preparation of the budget and proper and efficient planning.
- **Comparison of Actual with Standard:** We make standard cost in budget and planning. But cost accounting provides the data and the correct information of the actual cost. So that we can compare actual cost with the standard cost.
- **Presentation of Correct Information:** Cost accountant regularly tracks and analyses the cost of the product. Cost Accounting provides the raw data. Data processing converts the raw data into information. Hence Cost Accounting is presented correctly.
- **Helps in Decision Making:** Cost Accounting helps managers to decide. It provides the information to management related to production. That helps to take decisions and plan for the future.

### 1.1.5 Functions of Cost Accounting

- **Ascertainment of Cost:** Cost ascertainment is an important function played by cost accounting. It records each and every element relating to production activity systematically like fixed and variable cost, direct and indirect cost. The data collected by cost accounting is analysed by managers in determining the true and actual cost of products. Nowadays businesses manufacture a wide and large range of products, in the absence of cost accounting, it becomes difficult for them to find out the real cost of their products.
- **Controlling Cost:** Cost accounting helps the organization in controlling its cost. Organization sets standards for their cost which are treated best for the achievement of goals and objectives. Cost accounting supplies detailed information related to the cost of each step of production. This





information collected is then compared with standards already set and if any deviation is found, necessary steps are taken. Therefore it helps in the detection of deviations in cost and time controlling them.

- **Aid to Management:** Cost accounting supports the managers in performing their duties. It supplies them all necessary and relevant data to the managers periodically that may be monthly, quarterly or half-yearly. Managers analyze the detailed cost information supplied by cost accounting and accordingly take decisions. They framed and implement policies in the organization as per the information collected. It helps them in taking strategic decisions and better management of organization affairs.
- **Setting up Selling Prices:** Fixing up the right selling price for its product is a challenging task for every business organization. Cost accounting helps in the ascertainment of the accurate cost of production of products. By adding the profit margin to the real cost company can easily fix the selling cost for its products. Businesses under cost accounting use different techniques like batch costing, job costing, service, and output costing for determining the selling price of its products.
- **Inventory Control:** Cost accounting helps in controlling the inventory by recording each item of inventory. It maintains complete records of all raw materials so that timely proper order for raw materials can be made. It avoids all situations like over-ordering and under-ordering of raw materials. Also, the complete record of finished goods is made so that accordingly production process can be regulated. It avoids wastages of resources and the occurrence of losses for the organization.
- **Measurement of Efficiency:** Cost accounting helps in measuring the efficiency of business operations. Managers can easily acquire information regarding production cost which can be analyzed to find out how efficiently a business is running. It helps in avoiding wastage of different resources of the organization through proper monitoring. It uses a standard cost method in measuring the efficiency of each process, product and department.
- **Discloses Profitable and Non-Profitable Activities:** Cost accounting gives clear details of each activity of business to managers that which one is profitable and which one not. It supplies all detailed information regarding the cost of each product of the business. Managers by comparing the



cost of the product with demand in the market can decide whether to continue its production or not. It, therefore, helps in determining profitable and non-profitable activities of business by managers.

### 1.1.6 Importance of Cost Accounting

- **Helps in Decision Making:** Cost accounting helps in decision making. It provides vital information necessary for decision making. For instance, cost accounting helps in deciding:
  - Whether to make a product buy a product?
  - Whether to accept or reject an export order?
  - How to utilize the scarce materials profitably?
- **Helps in fixing prices:** Cost accounting helps in fixing prices. It provides detailed cost data of each product (both on the aggregate and unit basis) which enables fixation of selling price. Cost accounting provides basis information for the preparation of tenders, estimates and quotations.
- **Formulation of future plans:** Cost accounting is not a post-mortem examination. It is a system of foresight. On the basis of past experience, it helps in the formulation of definite future plans in quantitative terms. Budgets are prepared and they give direction to the enterprise.
- **Avoidance of wastage:** Cost accounting reveals the sources of losses or inefficiencies such as spoilage, leakage, pilferage, inadequate utilization of plant etc. By appropriate control measures, these wastages can be avoided or minimized.
- **Highlights causes:** The exact cause of an increase or decrease in profit or loss can be found with the aid of cost accounting. For instance, it is possible for the management to know whether the profits have decreased due to an increase in labour cost or material cost or both.
- **Reward to efficiency:** Cost accounting introduces bonus plans and incentive wage systems to suit the needs of the organization. These plans and systems reward efficient workers and improve productivity as well improve the morale of the work -force.
- **Prevention of frauds:** Cost accounting envisages sound systems of inventory control, budgetary control and standard costing. Scope for manipulation and fraud is minimized.



- **Improvement in profitability:** Cost accounting reveals unprofitable products and activities. Management can drop those products and eliminate unprofitable activities. The resources released from unprofitable products can be used to improve the profitability of the business.
- **Preparation of final accounts:** Cost accounting provides for perpetual inventory system. It helps in the preparation of interim profit and loss account and balance sheet without physical stock verification.
- **Facilitates control:** Cost accounting includes effective tools such as inventory control, budgetary control and variance analysis. By adopting them, the management can notice the deviation from the plans. Remedial action can be taken quickly.

### 1.1.7 Limitations of Cost Accounting

In spite of the various advantages claimed by cost accounting, the discipline suffers from the following limitations:

- **Cost Accounting is costly to operate:** It involves heavy expenditure to operate. The benefits derived by operating the system are more than the cost.
- **Cost Accounting involves many forms and statements:** It involves usage of many forms and statements which leads to increase of paper work.
- **Costing may not be applicable in all types of Industries:** Existing methods of cost accounting may not be applicable in all types of industries. Cost accounting methods can be devised for all types of industries, and services.
- **It is based on Estimations:** Costing system relies on predetermined data and therefore it is not reliable. Costing system estimates costs scientifically based on past and present situations and with suitable modifications for the future. This leads to accurate cost figures based on which management can initiate decisions. But for the predetermined costs, cost accounting also becomes another 'Historical Accounting'.
- **It is not an exact science:** Like any other accounting system, it is not an exact science but an art that has developed through theories and practices.
- **Bias Judgments:** Many judgments are biased and depend on individual discretion.



- **Difference in opinion:** Different views are held by different cost accounts about the items to be included in cost.

## 1.2 Methods & Techniques of Costing

### 1.2.1 Methods of Costing

The basic principles of ascertaining costs are the same in every system of cost accounting. However, the methods of analyzing and presenting the cost may vary from industry to industry. The method to be used in collecting and presenting costs will depend upon the nature of production. Basically there are two methods of costing, namely Job costing and Process costing.

- **Job costing:** Job costing is used where production is not repetitive and is done against orders. The work is usually carried out within the factory. Each job is treated as a distinct unit, and related costs are recorded separately. This type of costing is suitable to printers, machine tool manufacturers, job foundries, furniture manufactures etc.
- **Batch costing:** Where the cost of a group of product is ascertained, it is called 'batch costing'. In this case a batch of similar products is treated as a job. Costs are collected according to batch order number and the total cost is divided by the numbers in a batch to find the unit cost of each product. Batch costing is generally followed in general engineering factories which produce components in convenient batches, biscuit factories, bakeries and pharmaceutical industries.
- **Contract costing:** A contract is a big job and, hence, takes a longer time to complete. For each individual contract, account is kept to record related expenses in a separate manner. It is usually followed by concerns involved in construction work e.g. building roads, bridge and buildings etc.
- **Process Costing:** Where an article has to undergo distinct processes before completion, it is often desirable to find out the cost of that article at each process. A separate account for each process is opened and all expenses are charged thereon. The cost of the product at each stage is, thus, accounted for. The output of one process becomes the input to the next process. Hence, the process cost per unit in different processes is added to find out the total cost per unit at the end. Process costing is often found in such industries as chemicals, oil, textiles, plastics, paints, rubber, food processors, flour, glass, cement, mining and meat packing. The following methods are used in process costing:



- **Output/Unit Costing:** This method is followed by concerns producing a single article or a few articles which are identical and capable of being expressed in simple, quantitative units. This is used in industries like mines, quarries, oil drilling, cement works, breweries, brick works etc. for example, a tone of coal in collieries, one thousand bricks in brick works etc. The object here is to find out the cost per unit of output and the cost of each item of such cost. A cost sheet is prepared for a definite period. The cost per unit is calculated by dividing the total expenditure incurred during a given period by the number of units produced during the same period.
- **Operating Costing:** This method is applicable where services are rendered rather than goods produced. The procedure is same as in the case of unit costing. The total expenses of the operation are divided by the units and cost per unit of service is arrived at. This is followed in transport undertakings, municipalities, hospitals, hotels etc.
- **Multiple Costing:** Some products are so complex that no single system of costing is applicable. Where a concern manufactures a number of components to be assembled into a complete article, no one method would be suitable, as each component differs from the other in respect of materials and the manufacturing process. In such cases, it is necessary to find out the cost of each component and also the final product by combining the various methods discussed above. This type of costing is followed to cost such products as radios, airplanes, cycles, watches, machine tools, refrigerators, electric motors etc.
- **Operating Costing:** In this method each operation at each stage of production or process is separately identified and costed. The procedure is somewhat similar to the one followed in process costing. Process costing involves the costing of large areas of activity whereas operation costing is confined to every minute operation of each process. This method is followed in industries with a continuous flow of work, producing articles of a standard nature, and which pass through several distinct operation sin a sequence to completion. Since this method provides for a minute analysis of cost, it ensures greater accuracy and better control of costs. The costs of each operation per unit and cost per unit up to each stage of operation can be calculated quite easily. This method is in force in industries where toys, leather and engineering goods are manufactured.
- **Departmental Costing:** When costs are ascertained department by department, such a method is called 'departmental costing'. Where the factory is divided into a number of departments, this method is



followed. The total cost of each department is ascertained and divided by the total units produced in that department in order to obtain the cost per unit. This method is followed by departmental stores, publishing houses etc.

### 1.2.2 Techniques of Costing

In addition to the different costing methods, various techniques are also used to find the costs. These techniques may be grouped under the following heads:

- **Historical Absorption Costing:** It is the ascertainment of costs after they have been incurred. It is defined as the practice of charging all costs, both variable and fixed, to operations, process or products. It is also known as traditional costing. Since costs are ascertained after they have been incurred, it does help in exercising control over costs. However, It is useful in submitting tenders, preparing job estimates etc.
- **Marginal Costing:** It refers to the ascertainment of costs by differentiating between fixed costs and variable costs. In this technique fixed costs are not treated as product costs. They are recovered from the contribution (the difference between sales and variable cost of sales). The marginal or variable cost of sales includes direct material, direct wages, direct expenses and variable overhead. This technique helps management in taking important policy decisions such as product pricing in times of competition, whether to make or not, selection of product mix etc.
- **Differential Costing:** Differential cost is the difference in total cost between alternatives-evaluated to assist decision making. This technique draws the curtain between variable costs and fixed costs. It takes into consideration fixed costs also (unlike marginal costing) for decision making under certain circumstances. This technique considers all the revenue and cost differences amongst the alternative courses, of action to assist management in arriving at an appropriate decision.
- **Standard Costing:** It refers to the ascertainment and use of standard costs and the measurement and analysis of variances. Standard cost is a predetermined cost which is computed in advance of production on the basis of a specification of all factors affecting costs. The standards are fixed for each element of cost. To find out variances, the standard costs are compared with actual costs. The variances are investigated later on and wherever necessary, rectification steps are initiated promptly. The technique helps in measuring the efficiency of operations from time to time.



### 1.3 Installing Costing System

The need and importance of the installation and the organisation of a good system of cost accounting are being increasingly realized presently all over the business versatility. The common experience of enthusiastic youths climbing the business – tree and falling mid-way without even collecting the leaves owes to the ignorance of the use installation and organisation of costing system, and to the infatuation that the profits could be earned without it. A good system is the key-point governing, the mechanism of an enterprise in the field of cost control, ascertainment of profitability, and managerial decision-making.

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

#### 1.3.1 Factors to be considered before Installation

When a Cost Accounting system is to be installed, the following points should be kept in mind:

- **Objectives:** What are the objectives which the management wants to achieve and what sort of information does it need for the achievement of its objectives? Information about costs meant for fixing prices would be quite different from that intended to reveal efficiencies or inefficiencies in operations or that required to make decisions on a rational basis.
- **Technical Details:** Technical operations of the concern and whether production is more important than selling or vice versa should be kept in mind. Obviously more attention must be paid to the more significant factor.
- **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.
- **Factors:** Factors that are or are not amenable to control should be considered. Attention has to be paid to controllable factors. For instance, if a particular method of packing is prescribed by law, it is no use trying to think of an alternative.
- **Type of Materials:** The type of materials available and the timing of their supplies together with the storage problem, should also be taken into consideration.



- **Type of Labour:** The type of labour which is required and the methods of their remuneration should also be kept in mind.
- **Management:** The character of management itself and the decision-making process should also be taken into account. Modern managements usually need detailed information. The information flows will have to be designed with reference to the sources and end uses of the information. For example, if decisions are taken by a person who refuses to divulge any information, the system must keep this in view.
- **Business Peculiarities:** Any peculiarities of the business, that there may be, must be kept in view. For instance, if purchases of particular item are to be made only from one particular source or firm, the costing system need not build an adequate purchase procedure; it should concentrate on the proper use of the concerned item.
- **Use of Financial Books:** The possibility of using financial books and procedures should also be kept in mind. As stated above, cost accounting is to be treated as an investment and, therefore, all existing useful procedures, books and records should be used. For example financial accounts need adequate record of purchases and wages. With a little change, these can be made to serve the needs of Cost Accounting also. As far as possible, cost records and financial books should be well coordinated, even fully integrated.
- **Choice of Unit:** The choice of the unit regarding which costs have to be obtained should also be considered. For example, in case of steel, costs are ascertained per ton of steel and in case of cotton textiles, the unit is kg of yarn or cloth. In case of motor transport the cost will be found per bus-kilometer or passenger-kilometer or sometimes ton-mile. These are known as units of cost and it is necessary to choose a proper unit—neither too big nor too small.
- **Full Discussion:** Above all, the system should be designed after a full and frank discussion with all those who will be involved.

### 1.3.2 Difficulties in installing a costing system

Apart from technical costing problems, a cost accountant is confronted with certain practical difficulties in installing a costing system. These are:

- **Lack of support of management:** In order to make the costing system a success, it must have the





whole-hearted support of every member of the management. Many a time, the costing system is introduced at the behest of the Managing Director or the Financial Director without the support of functional managers. They view the system as interference in their work and do not make use of the system.

- Before the system is installed, the cost accountant should ensure that the management is fully committed to the costing system. A sense of cost consciousness should be created in their minds by explaining them that the system is for their benefit. A cost manual should be prepared and distributed to them giving the details and functions of the system.
- **Resistance from the accounting staff:** The existing accounting staff may not welcome the new system. This may be because they look with suspicion at a system which is not known to them: The co-operation of the employees should be sought by convincing them that the system is needed to supplement the financial accounting system and that it is for the betterment of all.
- **Non-co-operation 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 co-operate and resist the additional paper work arising as a result of the introduction of the system. Such resistance generally arises out of ignorance. Proper education should be given to the staff regarding benefits of the system and the important roles they have to play to make it successful.
- **Shortage of Trained Staff:** In the initial stages, there may be shortage of trained costing staff. The staff should be properly trained so that costing department can run efficiently.

### 1.3.3 Steps to Overcome Practical Difficulties

To overcome the above difficulties, following steps are suggested:

- **Support from the Top Management:** Before the installation or operation of a costing system, there must be firm commitment to the system on the part of the top management. This will create cost consciousness and interest in cost improvement among technical, production and top management.
- **Utility of System to Existing Staff:** The existing accounting staff should be impressed about the need to supplement the existing financial accounting system. It will broaden the job of an accountant and will create new opportunities for the accounting staff.



- **Workers' Confidence for Cooperation:** The various employees must be properly educated regarding the benefits which can be obtained from such a system. Workers' confidence should be gained in the system to get their co-operation before steps are taken to put the system in practice.
- **Training of Existing Accounting Staff:** The existing staff working in the accounts department must be proper, trained in costing methods and techniques with the help of the Institute of Cost and Works Accountants of India, Calcutta.
- **Cost System According to Specific Requirements of the Concern:** The system should be installed and operated according to the requirements of a specific case, so that it may not entail heavy cost on the concern. It should avoid additional unnecessary work as far as possible. The system, when installed and operated, will provide many benefits to the concern as compared to the cost and prove beneficial to the concern.
- **Proper Supervision:** There should be proper supervision after installation and continuous efforts on the part of the cost accountant to make the system successful and to achieve the desired goal of cost ascertainment, cost presentation and cost control.

## 1.4 Cost Accounting vs. Financial Accounting vs. Management Accounting

### 1.4.1 Cost Accounting vs. Financial Accounting

Financial accounting, as pointed out previously, is concerned with recording, classifying and summarizing financial transactions pertaining to an accounting period. The basic objective is to provide a commentary to the shareholders and outside parties on the financial status of an enterprise in the form of a profit and loss account and balance sheet. The profit or loss of business operations is revealed through these statements year after year, observing the statutory requirements of the Companies Act, 1956.

Cost accounting, on the other hand, aims at providing prompt cost data for managerial planning, controlling and decision making. It offers a complete explanation as to how the scarce inputs are put to use in business. The sources of efficiency or inefficiency are revealed through periodic reports. The profit or loss relating to each job, department or product can also be found out easily. The following table tries to draw the curtain between financial accounting and cost accounting:



Basic of distinction	Financial Accounting	Cost Accounting
Statutory Requirements	These accounts have to be prepared according to the legal requirements of Companies Act and Income Tax Act	Maintenance of these accounts is voluntary except in certain industries where it has been made obligatory to keep cost records under the Companies Act.
Purpose	The main purpose of financial accounting is to prepare profit and loss account and balance sheet for reporting to owners and outside agencies i.e., external users	The main purpose of cost accounting is to provide detailed cost information to management i.e. internal users.
Analysis of cost and Profit	Financial accounts reveal the profit or loss of the business as a whole during a particular period. It does not show the figures of cost and profit for individual products, departments and processes, etc.	Cost accounts show the detailed Cost and Profit data for each product line, department, process etc.
Periodicity of Reporting	Profit and Loss Account and Balance Sheet and prepared periodically, usually on an annual basis.	Cost reporting is a continuous process and may be daily, weekly, monthly, etc.
Control aspect	It keep records of financial transaction and does not attach any importance to control aspect	It is used as a detailed system of controls. It takes the help of certain special techniques like standard costing and budgetary control.
Nature	It is concerned with historical records. The historical nature of	Cost accounting does not end with what has happened in the



	financial accounting can be easily understood in the context of the purpose for which it was designed.	past. It extends to plans and policies to improve performance in the future.
Nature of statements prepared	General purpose statements like profit and Loss Account and Balance sheet are prepared by it. That is to say that financial accounting must produce information that is used by many classes of people none of whom have explicitly defined information needs.	It generates special purpose statements and reports like Report of Loss of Materials, Idle Times Report Variance Report etc. Cost accounting identifies the user, discusses his problems and needs and provides tailored information.
Classification of Records Purpose	Financial accounting classifies records and analysis transactions in subjective manner i.e. according to nature of expenditure	Cost accounting records and classifies expenditure according to the purpose for which cost is incurred.

#### 1.4.2 Cost Accounting vs. Management Accounting

Cost accounting and management accounting are both internal to an organisation. Both have, more or less, the same objective of assisting management in its planning, decision making etc. It is not worthwhile to distinguish the two inter-related disciplines as two branches of accounting. Consider what experts opine in this regard.

“Management accounting is so broad and comprehensive that it includes both financial and cost accounting”. Dobson.

“Cost accounting is management accounting plus a small part of financial accounting”. C.T. Horngren.

It is because of the overlapping nature of the two in many areas, that everyone talks of cost and management accounting as a single discipline. However, some distinctions can be drawn as under:

#### Distinction between Cost Accounting and Management Accounting



Point of distinction	Cost Accounting	Management Accounting
Coverage	It deals with ascertainment, allocation, distribution and accounting aspects of costs	It is concerned with the impact and effect aspects of costs.
Position in the hierarchy	Cost accountant is generally placed at a lower level of hierarchy than a management accountant.	Management accountant assumes a superior level in the management hierarchy.
Approach	Narrow, as the focus is, primarily on cost data	Wider, as one may have to use certain economic and statistical data along with costing data to assist managerial decision making.
Emphasis	It lays emphasis on cost ascertainment and cost control.	It is used as a decision making technique.
Scope	The scope of most accounting is limited to important techniques like variable costing. Break-even analysis and standard costing.	It makes use of other techniques like funds flow, ratio analysis, cash flow etc. in addition to variable costing, break-even analysis and standard costing. This includes financial accounting, tax planning and tax accounting.
Focus	It focuses on short term planning. Sophisticated tools not employed for forecasting purposes.	It focuses on sort range and long range planning and uses sophisticated technique in the planning and control process.
Orientation	It deals with data supplied by financial accounting, orientation is	Futuristic in orientation, is more predictive in nature than



	not futuristic.	cost accounting.
Evolution	The evolution of cost accounting is mainly due to the limitations of financial accounting.	It draws heavily on cost data and other information derived from cost accounting. It is merely an extension of the managerial aspects of cost accounting.
Purpose	Its main purpose is to report current and prospective costs of product, service, department, job or process	Its main objective is to provide all accounting information relevant for use in formulation of policies, planning, controlling decision making etc. to ensure maximum profits.

## 1.5 Check Your Progress

- Basic objective of cost accounting.
  - Tax compliance.
  - Financial audit.
  - Cost ascertainment.
  - Profit analysis
- What item is not included in cost accounting?
  - Product costing
  - Profit sharing
  - Planning
  - Controlling
- According to CIMA, England, “the technique and process of ascertaining cost” is called
  - Costing
  - Cost Accounting
  - Cost Accountancy
  - Cost



4. The main function of cost accounting is \_\_\_\_\_ reporting
  - a) Internal
  - b) External
  - c) Government
  - d) Bank
5. The information provided by financial statements is \_\_\_\_\_ in nature.
  - a) Standard
  - b) Historical
  - c) Marginal
  - d) Uniform
6. The installation of a \_\_\_\_\_ system will create confidence in the minds of public about the fairness of the prices charged.
  - a) Costing
  - b) Financial accounting
  - c) Management accounting
  - d) Information

## **1.6 Summary**

The planned development of any business concern is possible if we collect and analyses the financial data in a systematic manner. It is possible only if a good system of accounting has been in use. Accounting has three branches namely financial accounting cost accounting and management accounting. The limitations of financial accounting have led to the development of cost accounting. Cost accounting primarily deals with collection, analysis of relevant cost data for interpretation and presentation for various problems of management. Cost accounting is much more detailed than financial accounting. Cost accounting system renders invaluable services to the management, employees, investors, consumers and the government. Different methods of costing are applied for ascertaining unit cost is different industries based on the nature of operation and unit of finished product involved. The different techniques of costing can be used for special purpose of control and policy in any business irrespective of the method of costing being used there.

## **1.7 Keywords**



- **Cost Accounting:** It deals with collection and analysis of relevant cost data for interpretation and presentation for managerial decision making.
- **Cost Accountancy:** It means that includes the principle, convention, techniques and systems which are employed in a business to plan and control the utilization of its resources.
- **Costing:** It is a process of cost finding.
- **Cost Control:** Cost control is the function of keeping costs within prescribed limits.
- **Cost Audit:** Cost audit is the specific application of auditing principles and procedures in the fields of cost accounting.
- **Job costing:** Job costing is used where production is not repetitive and is done against orders.
- **Historical Absorption Costing:** It is the ascertainment of costs after they have been incurred.

## 1.8 Self-Assessment Test

### Short Answer Questions:

- Q.1 Define Cost Accounting.
- Q.2 Write down difference between cost and financial accounting.
- Q.3 Difference between cost and management accounting.
- Q.4 What is job costing?
- Q.5 Write a short note on installing cost system.
- Q.6 Write short note on:
  - Cost Audit
  - Cost Control

### Long Answer Questions:

- Q.1 Distinguish between 'Costing' and 'Cost Accounting'. Discuss the objects of costing.
- Q.2 Define costing and discuss briefly its objectives and advantages.
- Q.3 State the differences between Financial Accounting, Cost Accounting and Management Accounting. Explain how financial accounts are inadequate to measure the performance of an industry.





- Q.4 What are the limitations of Financial Accounting? How far cost accounting has contributed in removing the defects of financial accounting?
- Q.5 “A good system of costing serves as a means of control over expenditure and helps to secure economy in manufacture”. Discuss.
- Q.6 What are the main benefits that may be expected from the installation of costing system in a manufacturing business?
- Q.7 “Costing system has become an essential tool in the hands of management” Comment.
- Q.8 It is said, “Cost accounting is a system of foresight and not postmortem examination; it turns losses into profits, speeds up activities and eliminates wastes”. Discuss in detail this statement.
- Q.9 Describe, in detail, the various methods of costing.

## 1.9 Answers to Check Your Progress

1(c), 2 (b), 3(a), 4 (a), 5(b), 6 (a)

## 1.10 References/ Suggested Readings

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<b>Subject:</b> Cost Accounting	
<b>Course Code:</b> BCOM 401	<b>Updated By:</b> Dr. Sanjeev Kumar Garg
<b>Lesson No.:</b> 2	
<b>Cost Concepts and Classifications</b>	

**Structure**

- 2.0 Learning Objective
- 2.1 Introduction
  - 2.1.1 Meaning of Cost
  - 2.1.2 Cost, Expenses and Losses
  - 2.1.3 Concepts of Cost
  - 2.1.4 Cost Centre and Cost Unit
- 2.2 Cost Classification
- 2.3 Elements of cost
- 2.4 Check Your Progress
- 2.5 Summary
- 2.6 Keywords
- 2.7 Self-Assessment Test
- 2.8 Answers to check your progress
- 2.9 References/ Suggested Readings

**2.0 Learning Objectives**

After reading this lesson, you should be able to

- Define the meaning of cost and differentiate it with expenses and losses.
- Make a classification of cost.



- Explain the different elements of cost.
- Prepare a cost sheet.

## 2.1 Introduction

The Oxford Dictionary meaning of cost in ‘price paid for something’ But in management terminology, it refers to expenditure and not to price. ‘Cost’ represents a sacrifice, a foregoing or a release of something of value. One of the main objects of cost accounting is to present the analysis of the total cost of production in such a manner as to provide the maximum information useful to the business. The analysis and classification of costs is basically made with reference to factors on which expenditure is incurred.

### 2.1.1 Meaning of Cost

The scope of term ‘cost’ is extremely broad and general. It is therefore, not easy to define or explain this term without leaving any doubt concerning its meaning. Cost accountants, economists and others develop the concept of cost according to their needs. This concept should, therefore, be studied in relation to its purpose and use. Some of the definitions of ‘cost’ are reproduced below:

- Cost is “the amount of expenditure (actual or notional) incurred on or attributable to a given thing”. (C.I.M.A. London).
- Cost is a foregoing, measured in monetary terms, incurred or potentially to be incurred to achieve a specific objective. (Committee on Cost Concepts and Standards of the American Accounting Association)
- Cost is “an exchange price, a foregoing, a sacrifice made to secure benefit”. (A tentative set of Broad Accounting Principles for Business Enterprises).

It is true that a cost must be understood in its relationship to the purposes which it is to serve. When the term ‘cost’ is used specifically it should be qualified with reference to the object costed by such descriptions as fixed cost, direct cost, labour cost, selling cost, marginal cost, standard cost, conversion cost, differential cost, out-of-pocket cost, imputed cost, prime cost, joint cost etc. All these terms have been explained in this lesson.

### 2.1.2 Cost, Expenses and Losses



It is important to distinguish costs, expenses and losses. But before that it is necessary to understand what an asset is. Normally a cost is viewed as an asset if it can be shown that it has future service potential that can be identified. For example, prepayment of insurance premium. Now as we have already understood a cost is the value of assets given up, or to be given up, to acquire other assets, i.e. cost is a sacrifice of resources.

Expenses are costs that are applicable to the current accounting period. Expenses in its broadest sense includes all expired costs, i.e. costs which do not have any potential future economic benefit. The term expense is the cost of services or benefits received, or resources consumed during an accounting period. The term "cost is not synonymous with expense". Expense means a decrease in owners' equity that arises from the operation of a business during a specified accounting period, whereas cost means any monetary sacrifice whether or not the sacrifice affects the owners' equity during a given accounting period. Example, cost of goods sold and selling and distribution expenses.

A loss is an unplanned cost expiration and for this reason is often included in the broad definition of expense. When assets are given up for nothing in return, the value of the assets given up becomes a loss. A more precise definition restricts the use of the term loss, stating that the cost expiration which does not benefit the revenue producing activities of a firm. Examples, unrecovered book value on the sale of fixed assets, the write-off goodwill, carelessly destroyed supplies etc.

### **2.1.3 Concepts of Cost**

Cost reflects a monetary measure of the resources given up to attain some objectives such as acquiring a good or service. Cost is a monetary measure of the amount of resources used for a cost object. So a cost object or objectives is an objective where cost is measured i.e. it is an activity or item for which a separate measurement of cost is desired. Broadly speaking cost is the amount measured by the current monetary value of economic resources given up or to be given up in obtaining goods and services. Economic resources may be given up by transferring cash or other property, issuing capital stock, performing services, or increasing liabilities. From the above definition, it will be clear that three ideas are included in the concept of cost.

First, the most basic notion is that cost measures the use of resources. The resources used in producing tangible goods or intangible services are physical quantities of material, hours of labour services and quantities of other services.



Second, cost measurement is expressed in monetary terms. Money provides a common denominator that permits the amount of resources, each measured according to its own scale (kilograms of materials, hours of labour) to be aggregated so that the total amount of resources used can be determined.

Third, cost measurement is always related to a purpose, that is, to a cost object. A cost object is an activity or resource for which a separate measurement of costs is desired. A cost object can be a thing, such as a product or asset, it can be the provision of a service, it can be segment, such as a department, a department, or other organizational unit, it can be the conduct of a programme or it can be the operation of an entity.

#### 2.1.4 Cost Centre and Cost Unit

Cost is ascertained by cost centres or cost units or by both. The terms are discussed below:

**Cost Centre:** A cost centre is “a location, person, or item of equipment or group of these for which costs may be ascertained and used for the purpose of control”. Thus, a cost centre refers to a section of the business to which costs can be charged. It may be a location (a department, a sales area), an item of equipment (a machine, a delivery van), a person (a salesman, a machine operator) or a group of these (two automatic machines operated by one workman). A cost centre is primarily of two types:

- Personal cost centre-which consists of a person or a group of persons.
- Impersonal cost centre- which consists of a location or an item of equipment or group of these.

From functional point of view, cost centres may be of the following two types:

- Production cost centre-those cost centres where actual production work takes place. Examples are melting shop, machine shop, welding shop, finishing shop, etc.
- Service cost centre- those cost centres which are ancillary to and render services to production cost centres. Examples of service cost centres are power house, tool room, stores department, repair shop, canteen, etc. Cost incurred in service cost centres are of indirect type.

Cost accountant sets up cost centres to enable him to ascertain the costs the needs to know. A



cost centre is charged with all the costs that relate to it, e.g. if a cost centre is a machine, it will be charged with the costs of power, light, depreciation and its share of rent etc. The purpose of ascertaining the cost of a cost centre is cost control. The person incharge of a cost centre is held responsible for the control of cost of that centre.

The number of cost centres and the size of each vary from one undertaking to another. It all depends upon the expenditure involved and requirements of the management of the purpose of cost control. A large number of cost centres tend to be expensive but having too few cost centres defeat the very purpose of control.

- **Cost Unit:** It has been seen above that cost centres help in ascertaining the costs by location, equipment or person. Cost unit is a step further which breaks up the cost into smaller sub divisions and helps in ascertaining the cost of saleable products or services.

A cost unit is a “unit of product, service or time in relation to which cost may be” ascertained or expressed”, (C.I.M.A. London). Cost units are the ‘things’ that the business is set up to provide of which cost is ascertained. For example, in a sugar mill, the cost per tonne of sugar may be ascertained, in a textile mill the cost per-meter of cloth may be ascertained. Thus a tonne of sugar and ‘meter’ of cloth are cost units. In short, cost unit is unit of measurement of cost.

All sorts of cost units are adopted, the criterion for adoption being the applicability of particular cost unit to the circumstances under consideration. Broadly, cost unit may be:

- **Units of production**, e.g. a meter of cloth, a ream of paper, a tone of steel, a meter of cable, etc. or
- **Units of service**, e.g. passenger miles, cinema seats, consulting hours etc. A few more examples of cost units in various Industries are given below:

Industry	Cost Unit
Bricks	1000 bricks
Cement	Ton
Chemicals	Ton, kilogram, liter, gallon, etc.
Carpets	Square foot



Pencils	Dozen or gross
Electricity	Kilowatt hour (KWH)
Transport	Passenger kilometer or tonne kilometre
Printing Press	Thousand copies
Cotton or jute	Bale
Timber	Cubic foot
Mines	Tonne
Hotel	Room per day
Shoes	Pair or dozen pairs

**Note :** The cost units and cost centres should be those which are readily understood and accepted by all concerned.

## 2.2 Cost Classification

Cost classification is the logical process of categorising the different costs involved in a business process according to their type, nature, frequency and other features to fulfil accounting objectives and facilitate economic analysis. Cost refers to the value sacrificed with the aim of gaining something in return. Every business process involves some cost. It is the basis of profit determination for an organisation. Knowing about the different expenses facilitate the procedure of cost accounting in an organization.

A particular cost can be allocated under multiple categories. For instance; salary paid to an employee is a labour cost as well as a fixed cost. Moreover, the different elements of cost classification are linked to each other in one or the other way.

There are various kinds of cost incurred in the production of goods or services, and these costs are categorised systematically. Some of the principal basis on which different costs can be allocated are as follows:

### Basis of Classification

- Cost Classification by Nature



- Cost Classification by Relation to Cost Centre
- Cost Classification by Functions
- Cost Classification by Behaviour
- Cost Classification by Management Decision Making
- Cost Classification by Production Process
- Cost Classification by Time

### 2.2.1 Cost Classification by Nature

The cost can be differentiated by its nature or the purpose for which it has occurred. It can be treated as an expense under this category and the expenses so incurred is divided as follows:

- **Material:** Material cost is the cost of the raw material and its related cost such as procurement cost, taxes, insurance, freight inwards, etc.
- **Labour:** Labour cost is the salary and wages paid to the employees, i.e. permanent, temporary or contractual employees working in an organisation. It also includes PF contribution, bonus, commission, incentives, allowances, overtime pay, etc.
- **Other Expenses:** All the other overheads excluding material and labour comes under this head. Some of these are packaging, promotion, job processing charges, etc.

### 2.2.2 Cost Classification by Relation to Cost Centre

Another basis of differentiating the costs is categorizing them by their allocation in the production process of goods or services. The points as mentioned earlier under the cost classification by nature are used under this category to further sub-categorise the elements of this category. To get a better understanding of it, let us read below:

- **Direct Cost:** Direct cost is the significant cost immediately associated with a production process. It can be seen as a prime cost for any business. It is sub-divided into direct material cost, direct labour cost and other direct expenses.
- **Indirect Cost:** Indirect cost is the cost which cannot be directly allocated to a particular process of production. It is a secondary cost and is majorly seen as of three types – indirect material cost, indirect labour cost and other indirect expenses.





### 2.2.3 Cost Classification by Functions:

The cost can also be classified by the business functions for which the resources have been used. There are five significant functions of a business which involves some expense and are essential to the organisation in their way. The cost involved in such business operations are explained below:

- **Production Cost:** Production cost comprises of all the direct and indirect costs incurred in the production of goods and services.
- **Administration cost:** This is general administrative cost and includes all expenditure incurred in formulating the policy, directing the organisation and controlling the operations of an undertaking, which is not directly related to production, selling and distribution, research and development activity or function.
- **Selling Cost:** The indirect costs incurred on the sales function of the goods and services like an advertisement, promotion, research, customer service, etc. are clubbed under selling cost.
- **Distribution Cost:** Distribution cost refers to the cost incurred for making the goods or services available to the customers. These are warehousing, delivery service, transportation, etc.
- **Research and Development Cost:** Research is essential to develop a new product or modify an existing one. The cost incurred on the research team, research implementation, findings, etc. comes under this category.

### 2.2.4 Cost Classification by Behaviour

The cost involved in any business process can be differentiated on the grounds of its volatility concerning the fluctuation in business activity in the short run. The following classification of cost by its behaviour will give a clear illustration of the above statement:

- **Variable cost:** The variable cost is a cost that tends to vary in accordance with level of activity within the relevant range and within a given period of time. The Prime product costs i.e., direct material, direct labour and direct expenses tend to vary in direct proportion to the level of activity. An increase in the volume means a proportionate increase in the total variable costs and a decrease in volume will lead to a proportionate decline in the total variable costs. There is a linear relationship between volume and variable costs. They are constant per unit.

Variable costs have an explicit physical relationship with a selected measure of activity and



exists an optimum cause and effect relationship between the input and output, Therefore variable costs are also known as engineered costs. All variable costs are not engineered costs. Some of the variable components which are termed as discretionary variable costs and such costs will vary with fluctuations in the levels of activity merely because of the policy of the management. The variable element of research and development or advertisement costs, which are discretionary by nature may increase with increased activity and management may decide to spend more in periods of increased activity.

Output	Variable Cost Per Unit	Total Variable Cost
100	10	1,000
200	10	2,000
300	10	3,000
400	10	4,000
1,000	10	10,000
1,500	10	15,000

- Fixed cost:** A cost that is not immediately affected by changes in the cost driver. Activities that affect costs are often called cost driver. A fixed cost is that which tends to remain unchanged despite often wide changes in output or activity. On a per unit basis, a fixed cost varies inversely with changes in the level of activity. This means that the per unit fixed cost decreases with increase in the activity level, and increases with decrease in the activity level. The rent of buildings of an organization, supervisor's salaries, taxes on real estate, maintenance and repairs of buildings and grounds, depreciation (other than that computed under the units of production method), insurance are good examples of fixed costs. Fixed costs are sometimes termed as "capacity cost" because fixed costs are generally incurred to create facilities.

Output	Total Fixed Cost	Per Unit Fixed Cost
100	30,000	300
200	30,000	150
300	30000	100



400	30,000	75
1,000	30,000	30
1,500	30,000	20

- **Semi-variable cost or semi-fixed cost:** Many costs fall between these two extremes. They are called as semi-variable cost or semi- fixed costs. They are neither perfectly variable nor absolutely fixed in relation to changes in volume. They change in the same direction as volume but not in direct proportion thereto. An example is found in telephone charges. The rental element is a fixed cost whereas charges for call made are a variable cost. The distinction between fixed and variable cost is important in forecasting the effect of short- run changes in volume upon costs and profits. This distinction has also given rise to the concepts of Marginal Costing, Direct Costing, and Flexible Budgeting. Costs which have neither a linear or curvilinear relationship with output but they move in steps with fluctuations in activity levels. These are called stepped up costs. Basically these are fixed costs upto a certain level of activity specified but they change as soon as a new range is reached. Such costs are semi variable in the long-term but fixed in the short-term. Certain variable costs tend to vary during specific periods for reasons not related to fluctuations in activity level. For example, increased maintenance cost during periods of low production, increased costs on air-conditioning in summer. Costs which fluctuate with volume of production but after certain stage of production has reached the fluctuations in cost is disproportionate. It changes either at a retarded or accelerated rate.

### 2.2.5 Cost Classification by Management Decision Making

Cost is not just a price paid to generate some value, but it is also used as a tool by the management for decision making.

Managerial decisions are framed depending upon the following types of cost involved in carrying out of business:

- **Marginal Cost:** Marginal cost is the cost of producing an additional unit and its impact on the total cost of production.
- **Differential Cost:** When there is an increment or decrement in the cost of bulk production, the change in the cost of a single unit is also determined which is known as differential cost.



- **Opportunity Cost:** The value of one or more products given up to acquire the desired product or service is known as opportunity cost. For instance; while choosing green tea, a person has to give up the value he must have derived from coffee or regular tea.
- **Replacement Cost:** When machinery or any other asset becomes obsolete or involve high maintenance cost, and simultaneously a better asset is available in the market which can replace it, then the cost involved in such substitution is known as replacement cost. For example; a transportation company needs to replace its trucks from time to time to avoid excessive repairing expenses.
- **Sunk Cost:** The cost which has been born by the organisation in the past and cannot be recovered at any stage of the business process is termed as a sunk cost. Freight inwards paid at the time of buying machinery has to be written off at the time of selling it.
- **Normal Cost:** The routine cost associated with the manufacturing of goods or services under usual circumstances is called a normal cost. It includes all direct expenses such as salary, material, rent, etc.
- **Abnormal Cost:** The cost that arises suddenly and unknowingly under unfavourable situations is known as abnormal cost. For instance; workers go on strike, theft or robbery, fire in the premises, etc.
- **Avoidable Cost:** Such costs are under the control of management and can be prevented as per the organisational need. For example; an enterprise upgrades its technology by installing self-operative machines to avoid the labour charges it pays.
- **Unavoidable Cost:** The cost which is pre-determined and inevitable is called an unavoidable cost.

### 2.2.6 Cost Classification by Production Process

This basis of cost classification is significantly applicable in the manufacturing industries or factories where goods are produced. All production or manufacturing activities involve different types of costs. According to the nature of the production process, these costs can be classified as below:

- **Batch Cost:** The cost incurred while producing a whole lot comprising of identical products (batch) is known as batch cost. Each batch differs from the other, and the units lying under a batch are



identified by their batch number. Pharmaceuticals, automobiles, electronic products are some of the examples.

- **Process Cost:** The cost incurred on performing different operations in a streamlined production process is termed as a process cost. By dividing the total cost of a process with the number of units produced, we can derive the process cost of a single unit or product.
- **Operation Cost:** The cost involved in a particular business function contributing to the production process is known as operation cost. It helps in regulating the mechanism of business activities by monitoring the cost incurred on each business operation.
- **Operating Cost:** Operating cost refers to the day to day expenses incurred by an organisation to ensure uninterrupted functioning of the business is known as an operating cost.
- **Contract Cost:** The cost of entering into a contract with a buyer or seller by mutually agreeing to the terms and conditions so mentioned is called a contract cost. It includes a bidding contract, price escalation contract, tenders, etc.
- **Joint Cost:** The combined cost involved in the production of two or more useful products simultaneously is known as the joint cost. For example; the cost of processing milk to get cottage cheese and buttermilk.

### 2.2.7 Cost Classification by Time

The nature, importance and liability of a cost vary as per the time it takes place or has been assessed. A cost which is a priority today, may not be that important tomorrow or a cost which has been overlooked today, may be considered as a relevant cost tomorrow. Thus, depending upon the period a cost has occurred or assessed, it can be categorised under the following heads:

- **Historical Cost:** Any actual cost ascertained and evaluated after it has been incurred, is termed a historical cost. It can be committed either on the production of goods and services or asset acquisition.
- **Pre-determined Cost:** The cost which can be identified and calculated before the production of goods and services based on the cost factors and data is called a pre-determined cost. It can be either a standard cost or an estimated cost.



- **Standard Cost:** An actual cost which is pre-determined as per certain norms and guidelines to provide as a base for cost control, is termed as a standard cost.
- **Estimated Cost:** The cost of business operation presumed on the grounds of experience is known as an estimated cost. It is merely based on assumptions and therefore considered to be less accurate to determine the actual cost.

### 2.3 Elements of cost

Cost is made up of three elements i.e. Material, Labour and Expenses. Each of these can be direct or indirect. This is shown below:

<u>Direct</u>	<u>Indirect</u>	
Material	Material	Labour
	Labour	Expenses
	Expenses	

#### 2.3.1 Material

The substance from which the product is made is known as material. It may be in a raw or a manufactured state. It can be direct as well as indirect.

- **Direct material:** All material which becomes an integral part of the finished product and which can be conveniently assigned to specific physical units is termed as “Direct Material”. Following are some of the examples of direct material:
  - All material or components specifically purchased, produced or requisitioned from stores.
  - Primary packing material (e.g. carton, wrapping, cardboard, boxes etc.).
  - Purchased or partly produced components.

Direct material is also described as raw material, process material, prime material, production material, stores material, constructional material etc.

- **Indirect material:** All material which is used for purposes ancillary to the business and which cannot be conveniently assigned to specific physical units is termed as “indirect Material”. Consumable stores, oil and waste, printing stationery etc. are a few examples of indirect material.



Indirect material may be used in the factory, the office or the selling and distribution divisions.

### 2.3.2 Labour

For conversion of materials into finished goods, human effort is needed, such human effort is called labour. Labour can be direct as well as indirect.

- **Direct Labour:** Labour which takes an active and direct part in the production of a particular commodity is called direct labour. Direct labour costs are, therefore, specifically and conveniently traceable to specific products. Direct labour is also described as process labour, productive labour, operating labour, manufacturing labour, direct wages etc.
- **Indirect Labour:** Labour employed for the purpose of carrying out tasks incidental to goods or services provided, is indirect labour. Such labour does not alter the construction, composition or condition of the product. It cannot be practically traced to specific units of output. Wages of store-keepers, foremen, time-keepers, directors' fees, salaries of salesmen, etc. are all example of indirect labour costs. Indirect labour may relate to the factory, the office or the selling and, distribution divisions.

### 2.3.3 Expenses

Expenses may be direct or indirect.

- **Direct Expenses:** These are expenses which can be directly, conveniently and wholly allocated to specific cost centres or cost units. Examples of such expenses are: hire of some special machinery required for a particular contract, cost of defective work incurred in connection with a particular job or contract etc. Direct expenses are sometimes also described as "chargeable expenses".
- **Indirect Expenses:** These are expenses which cannot be directly, conveniently and wholly allocated to cost Centres of cost units.

### 2.3.4 Overheads

It is to be noted that the term overheads has a wider meaning than the term indirect expenses. Overheads include the cost of indirect material, indirect labour besides indirect expenses.

Indirect expenses may be classified in the following three categories:

- **Manufacturing (works, factory or production) Expenses:** Such indirect expenses which are incurred



in the factory and are concerned with the running of the factory or plant are known as manufacturing expenses. Expenses relating to production management and administration are included therein.

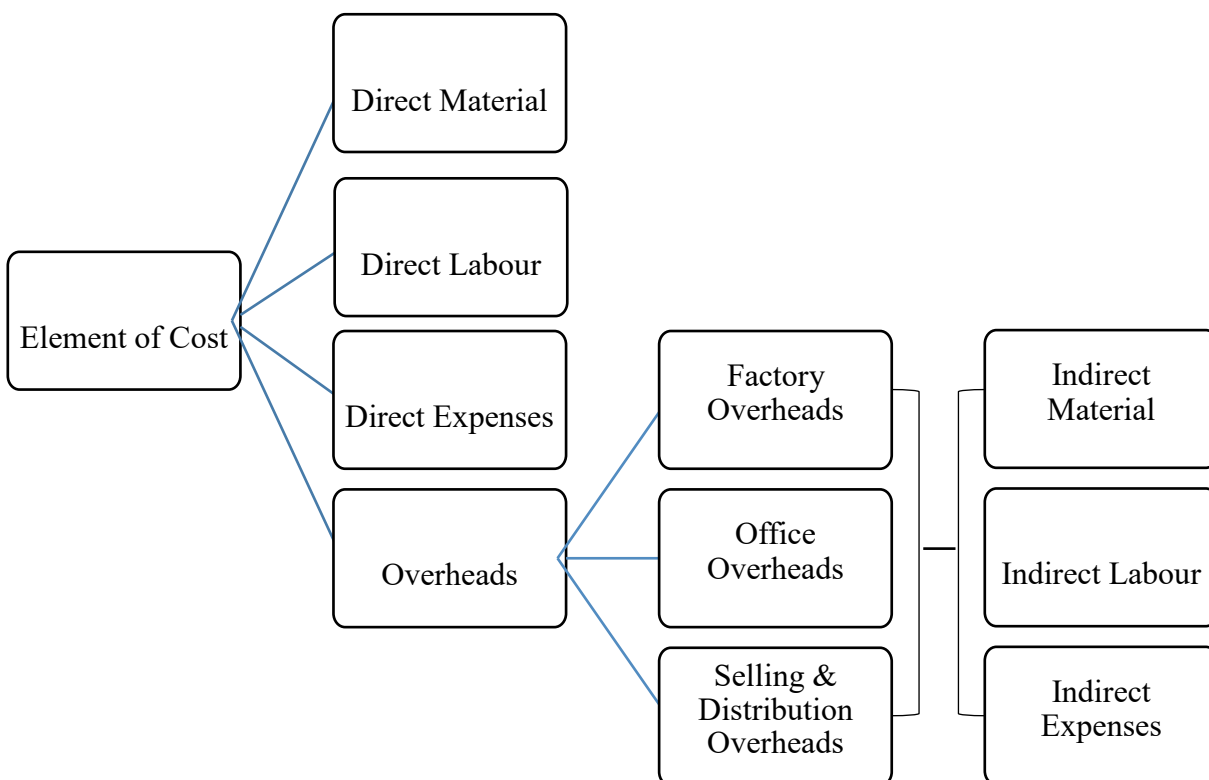
Following are a few items of such expenses:

Rent, rates and insurance of factory premises, power used in factory, depreciation of factory building, plant and machinery, etc.

- **Office and Administrative Expenses:** These expenses are not related to factory but they pertain to the management and administration of business. Such expenses are incurred on the direction and control of an undertaking.

Examples are: Office rent, lighting and heating, postage and telegrams, telephone and other charges; depreciation of office building, furniture and equipment, bank charges, legal charges, audit fee etc.

- **Selling and Distribution Expenses:** Expenses incurred for marketing of a commodity, for securing orders for the articles, dispatching goods sold, and for making efforts to find and retain customers, are called selling and distribution expenses. Examples are: Advertisement expenses, cost of preparing tenders, traveling expenses, bad debts, collection charges etc. The above classification of different elements of cost can be presented in the form of the following chart:







### 2.3.5 Cost Sheet

The components of cost explained above can be presented in the form of a statement. Such a statement of cost giving total cost, cost per unit along with different cost components of termed as a cost sheet.

#### Components of cost sheet

- **Prime Cost:** It consists of direct material, direct labour and direct expenses. It is also known as basic, first or flat cost.
- **Factory cost:** It comprises of prime cost and, in addition, works or factory overheads which include costs of indirect material, indirect labour, and indirect expenses of the factory. The cost is also known as works cost, production or manufacturing cost.
- **Office Cost:** If office and administrative overheads are added to factory cost, office cost is arrived at. This is also termed as administrative cost or the total cost of production.
- **Total Cost:** Selling and distribution overheads are added to the total cost of production to get the total cost or the cost of sales.

The computation of different cost components and preparation is a cost sheet can be understood with the following illustration:

#### Illustration 1

Calculate the Prime cost, Factory cost, Total cost of production and Cost of Sales from the following particulars:

Raw Materials consumed	---	20,000
	---	
Wages paid to laborers	-----	5,000
Directly chargeable expenses	-----	1,000
Oil & Waste	-----	100
Wages of Foremen	-----	1,000



Storekeepers' Wages	-----	500
Electric Power	-----	200
Lighting :		
Factory	500	
Office	200	700
Rent :		
Factory	2,000	
Office	1,000	3,000
Repairs & Renewals:		
Factory Plant	500	
Machinery	1,000	
Office Premises	200	1,700
Depreciation:		
Office Premises	500	
Plant & Machinery	200	700
Consumable Stores	-----	1,000
Manager's Salary	-----	2,000
Directors' Fees	-----	500
Office Printing & Stationery	-----	200
Telephone Charges	-----	50
Postage & Telegrams	-----	100
Salesmen's Commission & Salary	-----	500
Travelling Expenses	-----	200
Advertising	-----	500



Warehouse Charges	-----	200
Carriage Outward	-----	150

**Solution:****COST SHEET**

	Rs.		Rs.
Direct material: Raw material consumed		20,000	
Direct labour: Wages paid to laborers		5,000	
Direct expenses: Directly chargeable expenses		1,000	
<b>PRIME COST</b>		<b>26,000</b>	
<i>Add: Factory Overhead:</i>			
Indirect material: Consumable stores	1,000		
Oil and waste	100	1,100	
Indirect labour: Wages of foreman	1,000		
Storekeepers' wages	500	1,500	
Indirect expenses: Electric power	200		
Factory Lighting	500		
Factory rent	2,000		
Repairs & Renewals:			
Plant	500		
Machinery	1,000		
Depreciation			
Plant & machinery	200	4,400	<b>7,000</b>
<b>FACTORY OF WORKS COST</b>			<b>33,000</b>



Add: Office and administrative over heads:			
Indirect material: Office printing and stationery	200		
Indirect labour: Manager's salary	2,000		
Directors fees	500	2,500	
Indirect expenses: Office lighting	200		
Office rent	1,000		
Repairs and renewals			
Office premises	200		
Dep. On office premises	500		
Telephone charges	50		
Postage & telegrams	100	2,050	4,750
<b>TOTAL COST OF PRODUCTION</b>			<b>37,750</b>
Add: Selling & Distribution overheads:			
Indirect labour: Salesman's commission and salary	500		
Indirect expenses: Travelling expenses	200		
Advertising	500		
Warehouse charges	200		
Carriage outward	150	1,050	1,550
<b>COST OF SALES</b>			<b>39,300</b>

**Illustration 2**

The following figures have been extracted from the books of XYZ Ltd. for the year ending 31<sup>st</sup> March, 2020.

Rs.



Direct Material	70,000
Direct wages	75,000
Indirect wages	10,000
Other direct expenses	15,000
Factory rent and rates	500
Office rent and rates	500
Indirect materials	500
Depreciation of plant	1,500
Depreciation of office furniture	100
Managing Director's remuneration	12,000
General factory expenses	5,700
General office expenses	1,000
General selling expenses	1,000
Travelling expenses	1,100
Office salaries	4,500
Carriage outward	1,000
Advertisements	2,000
Sales	2,50,000

From the above figures, calculate the following:

- (a) Prime Cost
- (b) Works Cost
- (c) Cost of production
- (d) Cost of sales
- (e) Net profit

**Solution:**

XYZ LTD.

Cost Sheet for the year ending 31<sup>st</sup> March, 2020

Rs.

Direct material consumed		70,000
Direct wages		75,000
Direct expenses		15,000
<b>Prime Cost</b>		<b>1,60,000</b>
Factory overhead:		
Indirect wages	10,000	
Factory rent & rates	5,000	
Indirect materials	500	
Depreciation of plant	1,500	
General factory expenses	5,700	22,700
<b>Works Cost</b>		<b>1,82,700</b>
Office and Administration Overhead		
Office rent and rates	500	
Depreciation of office furniture	100	
Managing Director's remuneration	12,000	
Office salaries	4,500	
General office expenses	1,000	18,100
<b>Cost of Production</b>		<b>2,00,800</b>
Selling and distribution overhead:		
Travelling expenses	1,100	
General selling expenses	1,000	



Advertisements	2,000	
General Selling expenses	1,000	5,100
<b>Cost of Sales</b>		<b>2,05,900</b>
Profit		44,100
<b>Sales</b>		<b>2,50,000</b>

## 2.4 Check Your Progress

1. There was a loss in the factory due to a fire. This is a type of \_\_\_\_ cost
  - a) Normal cost
  - b) Direct cost
  - c) Abnormal cost
  - d) Fixed cost
2. “The amount of expenditure (actual or notional) incurred or attributable to a given thing” is
  - a) Expense
  - b) Revenue expenditure
  - c) Cost
  - d) Value
3. Expired cost is recorded in \_\_\_\_
  - a) Balance Sheet
  - b) Profit & Loss A/c
  - c) Cash flow statement
  - d) None of the above
4. \_\_\_\_ is a location, person or item of equipment (or group of these) for which costs may be ascertained and used for the purpose of control.
  - a) Cost centre
  - b) Revenue centre
  - c) Profit centre
  - d) Responsibility centre
5. Costs incurred in the past and has no effect on future decision making is called \_\_\_\_



- a) Opportunity cost
  - b) Imputed cost
  - c) Conversion cost
  - d) Sunk Cost
6. Costs which do not involve any cash outlay is called \_\_\_\_\_
- a) Out of stock cost
  - b) Conversion cost
  - c) Imputed cost
  - d) Discretionary cost
7. “The value of a benefit sacrificed in favour of an alternative course of action” is
- a) Sunk cost
  - b) Opportunity cost
  - c) Imputed cost
  - d) Notional cost
8. Cost incurred due to shortage of stock is known as \_\_\_\_\_
- a) Imputed cost
  - b) Urgent cost
  - c) Abnormal cost
  - d) Out of stock cost
9. Depreciation on machinery is an example of
- a) Imputed cost
  - b) Opportunity cost
  - c) Shut down cost
  - d) Discretionary cost

## 2.5 Summary

Classification is the process of grouping cost according to their common characteristics. It is a systematic placement of like items together according to their common features. There are various ways of classifying costs. A cost is composed of three elements namely material, labour and expense. Each of these elements may be direct or indirect. The calculation of cost of production at various states can be





shown by means of a statement called “Cost sheet”. It is an analytical presentation of the cost of the product in the form of a statement and shows the various elements and components of cost.

## 2.6 Keywords

- **Material Cost:** It is the cost of material of any nature used for the purpose of production of a product or service.
- **Period Cost:** It is a cost that tends to be unaffected by changes in the level of activity during the period of time.
- **Opportunity Cost:** It is the value of a benefit sacrificed or income foregone by rejecting best alternative use.
- **Expense:** It is an expired cost resulting from a productive usage of an asset.
- **Cost Unit:** A unit of product, service or time in relation to which cost may be ascertained or expressed.
- **Variable Cost:** These costs tend to vary in direct proportion to the volume of output.

## 2.7 Self-Assessment Test

### Short Answer Questions:

- Q.1 Comment on ‘Notional Costs’ and Imputed Costs’ mean the same thing.
- Q.2 Distinguish between ‘Product and period Cost’.
- Q.3 Write short notes on ‘Cost Centre’.
- Q.4 Distinguish between:
- Controllable costs and uncontrollable costs.
  - Variable cost and direct cost.
  - Cost control and profit control
  - Sunk cost and out of Pocket cost.
  - Job costing and process costing.

### Long Answer Questions:



- Q.1 Explain what is meant by 'Cost Centre'. What are the different types of cost centres? What purpose do cost centres serve?
- Q.2 What do you understand by Elements of Cost? Explain in detail.
- Q.3 "Costs may be classified in a variety of ways accord to their nature and the information needs of management". Explain and discuss this statement giving examples of classifications required for different purposes.

## 2.8 Answers to Check Your Progress

1(c), 2 (c), 3(b), 4 (a), 5(d), 6 (c), 7(b), 8(d), 9 (c)

## 2.9 References/ Suggested Readings

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<b>Subject:</b> Cost Accounting	
<b>Course Code:</b> BCOM 401	<b>Updated By:</b> Dr. Sanjeev Kumar Garg
<b>Lesson No.:</b> 3	
<b>Materials: Purchase and Issue Pricing</b>	

**Structure**

- 3.0 Learning Objectives
- 3.1 Introduction
  - 3.1.1 Meaning of Material
  - 3.1.2 Procedure of Purchasing and Receiving of Materials
- 3.2 Store Organisation and Control
- 3.3 Centralized and Decentralized Purchasing
- 3.4 Methods of Pricing Material Issued
- 3.5 Check Your Progress
- 3.6 Summary
- 3.7 Keywords
- 3.8 Self-Assessment Test
- 3.9 Answers to Check Your Progress
- 3.10 References/ Suggested Readings

**3.0 Learning Objectives**

After reading this lesson, you should be able to

- Define material control and explain its objectives.
- Describe the procedure of purchasing and receiving of materials.
- Explain the various inventory control techniques.

**3.1 Introduction**



Material is the most important element of cost. In most of the manufacturing concerns, 50 to 70 per cent of the total cost of a product is represented by the cost of material. Therefore, the efficiency of procurement of materials and pricing of issues definitely effect the profitability computations. Material refers to all commodities that are consumed in the process of manufacture. Direct materials are those whose consumption may be identified with specific production units and which usually become a part of the finished product. Indirect materials are those which cannot be conveniently identified with individual cost units.

### 3.1.1 Meaning of Material

The term ‘materials’ refer to the raw materials used for production, sub assemblies and fabricated parts. It may be defined as “anything that can be stored stocked or stockpiled”. The terms “materials” and “stores” are sometimes used interchangeably. However, both the terms differ. The term “stores” has wider meaning and includes not only the raw materials used in production but also other items held in stock in the store room, such as components, tools, patterns, maintenance materials, consumable stores etc. It also includes stock of finished goods and partly finished goods. ‘Consumable’ stores are items used in, production but do not become a part of the finished product, such as oil, grease, sand paper, soap, and other cleaning materials etc.

### 3.1.2 Procedure of Purchasing and Receiving of Materials

Purchasing procedure varies with different business firms, but all of them follow a general pattern in the purchases and receipt of materials and payment obligations. The important steps may be listed as follows:

- **Receiving and analyzing purchasing requisition:** Purchase requisitions start with the department or person who will be the ultimate user. In the material requirements planning environment, the planner releases a planned order authorising the purchasing department to go ahead and process a purchase order. The purchase requisition contains, at least, the following information:
  - Identity of originator, signed approval, and account to which cost is assigned.
  - Material specification.
  - Quantity and unit of measure.
  - Required delivery date and place.



- Any other supplementary information required.

<b>ABC CO. Ltd.</b> <b>PURCHASE REQUISITION</b>  No. 102 Cost Centre _____ Date _____ <b>Please Purchase for X Department/Work Order No. 301</b>				
Item No.	Material Code No.	Description of Articles	Quantity Required	Remarks
1	B.36	1½” Copier Nails	5 Kg.	Materials required by 16 <sup>th</sup> March, 2020

Requested by \_\_\_\_\_ Approved by \_\_\_\_\_ Checked by \_\_\_\_\_

For Use of Department Issuing this Requisition				For use of Purchase Department		
Item No	Quantity in Stock	Consumption per day/ month	Quantity Required	Purchase Order No.	Supplier	Delivery Date

- **Selecting suppliers:** Identifying and selecting suppliers are important responsibilities of the purchasing department. For routine items or those that have not been purchased in the past, a list of approved suppliers is kept. If the item has not been purchased before or there is no acceptable supplier on file, a search must be made. If the order is of small value or for standard items, a supplier can probably be found in a catalogue, trade journal, or directory.
- **Requesting quotations:** For major items, it is usually desirable to issue a request for quotation. This is a written inquiry that is sent to many suppliers to ensure that competitive and reliable quotations are received. It is not a sales order. After the suppliers have completed the quotations and



returned it to the buyer, the quotations are analysed for price, compliance to specification, terms and conditions of sale, delivery, and payment terms. For items where specifications can be accurately written, the choice is prob-ably made on price, delivery, and terms of sale. For items where specifications cannot be accurately written, the items quoted will vary. The quotations must be evaluated for technical factors and price. Usually both the issuing and purchasing departments are involved in the decision.

- **Determining the right price:** This is the responsibility of the purchasing department and is closely tied to the selection of suppliers. The purchasing department is also responsible for price negotiation and will try to obtain the best price from the supplier.
- **Issuing a purchasing order:** A purchase order is a legal offer to purchase. Once accepted by the supplier, it becomes legal contract for delivery of the goods according to the terms and conditions specified in the purchase agreement. The purchase order is prepared from the purchase requisition or the quotations and from any other additional information needed. A copy is sent to the supplier; copies are retained by purchasing and are also sent to other departments such as accounting, the originating department, and receiving.

<b>XYZ Ltd.</b>				Sl. No. :			
<b>PURCHASE ORDER</b>				Date:			
To				Purchase Order No. :			
_____				Supplier Quotation :			
_____				No. and Date :			
_____							
Please supply the following items on the terms and conditions mentioned below :							
Sl. No.	Description	Material	Size	Qty.	Price	Amount	Delivery
Terms of Delivery :				For XYZ Ltd. Terms of Payment :			
Special Conditions :				Purchase Manager			

- **Following-up and delivery:** The supplier is responsible for delivering the items ordered on time.



The purchasing department is responsible for ensuring that suppliers do deliver on time. If there is doubt that delivery dates can be met, purchasing must find out the problem in time and take corrective action.

This might involve expediting transportation, alternate sources of supply, working with the supplier to solve its problems, or rescheduling production. The purchasing department is also responsible for working with the supplier on any changes in delivery requirements. Demand for items changes with time, and it may be necessary to expedite certain items or push delivery back on some others. The buyer must keep the supplier informed of the true requirements so that the supplier is able to provide what is wanted and when.

- **Receiving and accepting goods:** When the goods are received, the receiving department inspects the goods to ensure that correct ones have been sent, are in the right quantity, and the bill of lading supplied by the carrier. The receiving department then accepts the goods and writes up a receiving report noting any variance. If further inspection is required, such as by quality control, the goods are sent to quality control or held there for inspection. If the goods are received damaged, the receiving department will advise the purchasing department and hold the goods for further action. Provided the goods are in order and require no further inspection, they will be sent to the originating department or to inventory.

<b>GOODS RECEIVED NOTE</b>						
Purchase Order No.....			Sl. No.....		Supplier's	
Name.....			Date.....		Purchase order	
No..... Date.....						
Sr. No.	Description	Material Code	Size	Qty.	Price Rs.	Amount Rs.
<div style="display: flex; justify-content: space-between;"> <div> Date of entry in Bin Card..... Stores ledger..... </div> <div>Stores Manager</div> </div>						



A copy of the receiving report is then sent to the purchasing department noting any variance or discrepancy from the purchase order. If the order is considered complete in all respects, the receiving department closes out its copy of the purchase order and advises the purchasing department accordingly. If it is not, the purchase order is held open awaiting completion. If the goods have also been inspected by the quality control department, they, too, will advise the purchasing department whether the goods have been accepted or not.

- **Passing supplier's invoice for payment:** When the supplier's invoice is received, there are three pieces of information that should agree – the purchase order, the receiving report, and the invoice. The items and the quantities should be the same on all; the prices, and extensions to prices, should be the same on the purchase order and the invoice.

## 3.2 Store Organisation and Control

### 3.2.1 Bin Card

A bin card indicates the level of each particular item of stock at any point of time. It is attached to the concerned bin, rack or place where the raw material is stored. It records all the receipts of a particular item of materials and its issues. It gives all the basic information relating to physical movements.

It is record of receipts, issue and balance of the quantity of an item of stock handled by a store. A specimen bin card is given in Fig. 3.7.

XYZ CO. LTD. BIN CARD							
Bin No. _____				Maximum Level _____			
Material Code No. _____				Minimum Level _____			
Material description _____				Re-order Level _____			
Location _____				Ordering quantity _____			
Stores Ledger Folio No _____				Unit _____			
Receipts			Issues			Balance	Remarks
Date	GR.N. No.	Qty.	Qty.	Date	Req.	Qty.	Qty.

### 3.2.2 Stores Ledger

Stores department will maintain a record called stores ledger in which a separate folio is kept for each





individual item of stock. It records not only the quantity details of stock movements but also record the rates and values of stock movements. With the information available in the stores ledger, it is easier to ascertain the value of any stock item at any point of time. The minimum, maximum and re-order levels of stock are also mentioned for taking action to replenish the stock position. A specimen stores ledger account is given below:

Form No.....										Folio No.....									
<b>XYZ CO. LTD.</b> <b>STORE LEDGER ACCOUNT</b>																			
Grade..... Unit..... Material..... Code No..... Location.....										Minimum Level..... Maximum Level..... Re-order Level.....									
Ordered			Reserved			Received			Issued			Balance			Checked		Re ma		

### 3.2.3 Stores Requisition Note

It is also called Materials Requisition Note. When Production or other departments requires material from the store is raises a requisition, which is an order on the stores for the material required for execution of the work order. This note is signed by the department incharge of the concerned department. It is a document which authorize the issue of a specified quantity of materials. It will include the cost centre of job number for which the requisition is being made. A specimen Stores Requisition Note is given in Fig. 3.5



<b>XYZ CO. LTD.</b> <b>STORES REQUISITION NOTE</b> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <span>No.....</span> <span>Date.....</span> </div> <div style="margin-top: 10px;">             To.....              Deliver the following material To.....              For ORDER No..... &amp; Dept.....           </div>						
Quantity	Unit	Description	Code No.	Office Use Only		Remarks
				Rate	Amount	
Sanctioned By  -----	Store Ledger Folio No.....  Bin No.....	Issued By  -----	Received By  -----	Cost Office Ref. No..... Priced By .....		

Any person who requires materials from the stores must submit Stores Requisition Note. The store keeper should only issue materials from stores against such a properly authorized requisition and this will be entered in the Bin card and Stores Ledger. A copy of the requisition will be sent to the Costing department for recording the cost or value of materials issued to the cost centre or job.

### 3.2.4 Material Return Note

If a material received from the stores is not of suitable quality or if there is surplus material remaining with the department, they are returned to stores with another called 'Material Return Note' evidencing return of material from Department to Stores. A copy of Material Return Note is sent to the Costing department for making necessary adjustments in accounts.



<b>XYZ CO. LTD.</b>					
<b>MATERIAL RETURN NOTE</b>					
From.....			No.....		
Dept.....			Date.....		
Job No.....					
Order No.....					
<i>Quantity</i>	<i>Description</i>	<i>Code No.</i>	<i>For Office Use</i>		<i>Remarks</i>
			<i>Rate</i>	<i>Amount</i>	
Authorised By .....	Returned By .....	Received By .....	Bin No..... Store Ledger A/c No..... .....		Cost Office Ref. No..... Priced by..... .....

### 3.2.5 Material Transfer Note

If materials are transferred from one department or job to another within the organisation, then material transfer note should be raised. It is record of the transfer of materials between stores, cost centres of cost units showing all data for making necessary accounting entries. A specimen of Material Transfer Note is given in Fig. 3.6.

<b>XYZ CO. LTD.</b>					
<b>MATERIAL TRANSFER NOTE</b>					
No.....			Date.....		
From:			To:		
Department .....			Department .....		
Job No.....			Job No.....		
Order No.....			Order No.....		
<i>Quantity</i>	<i>Description</i>	<i>Code No.</i>	<i>For Office Use</i>		<i>Remarks</i>
			<i>Rate</i>	<i>Amount</i>	



Authorised By .....	Returned By .....	Received By .....	Bin No..... Store Ledger A/c No..... .....	Cost Office Ref. No..... Priced by..... .....
------------------------	----------------------	----------------------	---	--

### 3.3 Centralized and Decentralized Purchasing

Organisation of the purchase function will vary according to particular conditions and ideas. Purchases may be centralized or decentralized.

In centralized purchasing, there is a separate purchasing department entrusted with the task of making all purchases of all types of materials. The head of this department is usually designated as Purchase Manager or Chief Buyer.

In decentralized purchasing, each branch or department makes its own purchases. If the branches of plants are located at different places, it may not be possible to centralize all purchases. In such cases, the decentralized purchasing can better meet the situation by making purchases in the local market by plant or branch managers.

#### Advantages of Centralized Purchasing

A centralized purchasing system is generally preferred because of the following advantages of it:

- Specialized and expert purchasing staff can be concentrated in one department.
- A firm policy can be initiated which may result in favorable terms of purchase, e.g., higher trade discount, easy terms of payment, etc.
- Standardization of quality of raw material is facilitated.
- Better control over purchasing is possible because reckless buying by various individuals is avoided. Keeping all records of purchase transactions at one place also helps in control.

#### Disadvantages of Centralized Purchasing

- The creation and maintenance of a special purchasing department leads to higher administration costs which small concerns may not be in a position to afford.
- Centralized purchasing is not suitable for plants or branches located at different places which are far apart.



### 3.4 Methods of Pricing Material Issued

The important methods followed pricing of issue of materials are discussed below :

#### 3.4.1 Actual Cost Method

Where materials are purchased specially for a specific job, actual cost of materials is charged to that job. -Such materials will normally be stored separately and issued only to that particular job.

#### 3.4.2 First in First out Method (FIFO)

Under this method materials are issued out of stock in the order in which they were first received into stock. It is assumed that the first material to come into stores will be the first material to be used. CIMA defines FIFO as “a method of pricing the issue of material using, the purchase price of the oldest unit in the stock”.

##### Advantages

- It is easy to understand and simple to price the issues.
- It is good store keeping practice which ensures that raw materials leave the stores in a chronological order based on their age.
- It is a straight forward method which involves less clerical cost than other methods of pricing.
- This method of inventory valuation is acceptable under standard accounting practice.
- It is consistent and realistic practice in valuation of inventory and finished stock.
- The inventory is valued at the most recent market prices and it is near to the valuation based on replacement cost.

##### Disadvantages

- There is no certainty that materials which have been in stock longest will be used, if they are mixed up with other materials purchased at a later date at different
- If the price of the materials purchased fluctuates considerably it involves more clerical work and there is possibility of errors.
- In a situation of rising prices, production cost is understated.
- In the inflationary market there is a tendency to underpricing of material issues and deflationary



market this is the tendency to overprice such issues.

- Usually, more than one price has to be adopted for a single issue of materials.
- It makes cost comparison difficult of different jobs when they are charged with varying price for the same materials.

This method is more suitable where the size of the raw materials is large and bulky and its price is high and can be easily identified in the stores separately. This method is useful when the frequency of material issues is less and the market price of the material is stable and steady.

### **Illustration: 1**

Received side of the store ledger account shows the following particulars:

March 1, 2020 Opening Balance 1,000 units @ Rs. 20 per unit

March 6, 2020 Received from Vendor 400 units @ Rs. 25 per unit

March 11, 2020 Received from Vendor 300 units @ Rs. 21 per unit

March 22, 2020 Received from Vendor 600 units @ Rs. 22 per unit

March 27, 2020 Received from Vendor 800 units @ Rs. 20 per unit

Issue of material were as follows:

March 5, 2020 400 units, March 10, 2020 800 units

March 15, 2020 200 units, March 20, 2020 200 units

March 28, 2020 400 units, March 30, 2020 500 units

### **Solution:**

Date	Receipts			Issued			Balance		
	Quantity	Rate	Amount	Quantity	Rate	Amount	Quantity	Rate	Amount
March 1	----	----	----	----	----	----	1,000	20	20,000
March 5	----	----	----	400	20	8,000	600	20	12,000
March 6	400	25	10,000	----	----	----	600	20	12,000



							400	25	10,000
March 10	----	----	----	600 200	20 25	12,000 5,000	200	25	5,000
March 11	300	21	6,300	----	----	----	200 300	25 21	5,000 6,300
March 15	----	----	----	200	25	5,000	300	21	6,300
March 20	----	----	----	200	21	4,200	100	21	2,100
March 22	600	22	13,200	----	----	----	100 600	21 22	2,100 13,200
March 27	800	20	16,000	----	----	----	100 600 800	21 22 20	2,100 13,200 16,000
March 28	----	----	----	100 300	21 22	2,100 6,600	300 800	22 20	6,600 16,000
March 30	----	----	----	300 200	22 20	6,600 4,000	600	20	12,000

### 3.4.3 Last in First out Method (LIFO)

Under this method most recent purchase will be the first to be issued. The issues are, priced out at the most recent batch received and continue to be charged until a new batch is arrived into stock. It is method of pricing the issue of material using the purchase price of the latest unit in the stock.

#### Advantages

- Stocks issued at more recent price represent the current market value based on the replacement



cost.

- It is simple to understand and easy to apply.
- Products cost will tend to be more realistic since material cost is charged at mere recent price.
- In times of rising prices, the pricing of issues will be at a more recent current market price.
- It minimize unrealized inventory gains and tends to show the conservative profit figure by valuation of inventory at value before price rise and provides a hedge against inflation.

### Disadvantages

- Valuation of inventory is not acceptable in preparation of financial accounts.
- It is an assumption of a cost flow pattern and is not intended to represent the true physical flow of materials from the stores.
- It renders cost comparison between jobs difficult.
- It involves more clerical work and sometimes valuation may go wrong.
- In times of inflation, valuation of inventory under this method will not represent the current market prices.

### Illustration: 2

Prepare store Ledger account on the basis of LIFO method from the following information.

March 1, 2020 Received from Vendor 2,000 units @ Rs. 10 per unit

March 10, 2020 Received from Vendor 1,000 units @ Rs. 12 per unit

March 15, 2020 Received from Vendor 4,000 units @ Rs. 14 per unit

March 22, 2020 Received from Vendor 2,000 units @ Rs. 16 per unit

Issue of material were as follows:

March 5, 2020 1,500 units, March 12, 2020 1,000 units

March 18, 2020 2,000 units, March 20, 2020 1,000 units

March 30, 2020 2,500 units

50 Kg. material purchased on 10th March were found to be defective and returned to vendor on 14th





March. 20 Kg. material were found to be surplus on checking on March 30 due to short weighting of material issued.

**Solution:**

Date	Receipts			Issued			Balance		
	Quantity	Rate	Amount	Quantity	Rate	Amount	Quantity	Rate	Amount
March 1	2,000	10	20,000	----	----	----	2,000	10	20,000
March 5	----	----	----	1,500	10	15,000	500	10	5,000
March 10	1,000	12	12,000	----	----	----	500 1,000	10 12	5,000 12,000
March 12	----	----	----	950 50	12 10	11,400 500	450 50 (damage)	10 12	4500 600
March 14	----	----	----	50 (return)	12	600	450	10	4,500
March 15	4,000	14	56,000	----	----	----	450 4,000	10 14	4,500 56,000
March 18	----	----	----	2,000	14	28,000	450 2,000	10 14	4,500 28,000
March 20	----	----	----	1,000	14	14,000	450 1,000	10 14	4,500 14,000
March 22	2,000	16	32,000	----	----	----	450 1,000 2,000	10 14 16	4,500 14,000 32,000

**3.4.4 Highest in First out Method (HIFO)**

Under this method the materials with highest prices are issued first, irrespective of the date upon which



they were purchased. The basic assumption is that in fluctuating and inflationary market, the cost of material are quickly absorbed into product cost to hedge against risk of inflation. This method is used when the material is in short supply and in execution of cost plus contracts. This method is not popular and not acceptable under standard accounting practices.

#### Advantages of HIFO:-

- Easy to calculate
- In case of price fluctuating this method is useful.

#### Disadvantages of HIFO:-

- The computations become complicated if too many receipts are there.
- Closing stock is not valued at market price.

#### Illustration: 3

Prepare store Ledger account on the basis of LIFO method from the following information.

March 1, 2020              Received from Vendor 4,500 units @ Rs. 22 per unit  
 March 5, 2020              Received from Vendor 5,000 units @ Rs. 21 per unit  
 March 12, 2020             Received from Vendor 3,500 units @ Rs. 24 per unit  
 March 20, 2020             Received from Vendor 3,000 units @ Rs. 22.50 per unit

Issue of material were as follows:

March 10, 2020            4,000 units;      March 15, 2020            2,000 units,  
 March 18, 2020            3,000 units;      March 25, 2020            3,500 units

#### Solution:

Date	Receipts			Issued			Balance		
	Quantity	Rate	Amount	Quantity	Rate	Amount	Quantity	Rate	Amount
March 01				----	----	----	4,500	22	99,000
March	5,000	21	100,500	----	----	----	4,500	22	99,000



05							5,000	21	100,500
March 10	----	----	----	4,000	22	88,000	500 5,000	22 21	11,000 100,500
March 12	3,500	24	84,000	----	----	----	500 5,000 3,500	22 21 24	11,000 100,500 84,000
March 15	----	----	----	2,000	24	48,000	500 5,000 1,500	22 21 24	11,000 100,500 36,000
March 18	----	----	----	1,500 500 1,000	24 22 21	36,000 11,000 21,000	4,000	21	84,000
March 20	3,000	22.50	67,500	----	----	----	4,000 3,000	21 22.50	84,000 67,500
March 25	----	----	----	3,000 500	22.50 21	67,500 10,500	3,500	21	73,500

### 3.4.5 Simple Average Cost Method

Under this method all the materials received are merged into existing stock of materials, their identity being lost. The simple average price is calculated without any regard to the quantities involved. The simple average cost is arrived at by adding the different prices paid during the period for the batches purchased by dividing the number of batches. For example, three batches of materials received at Rs. 10, Rs. 12 and Rs. 14 per unit respectively.

$$= (\text{Rs. } 10 + \text{Rs. } 12 + \text{Rs. } 14) / 3$$

$$= \text{Rs. } 36 / 3 = \text{Rs. } 12 \text{ per unit.}$$

This method is not popular because it takes into consideration the prices of different batches but not the quantities purchased in different batches. This method is use when prices do not fluctuate



very much and the stocks are small in value.

**Illustration: 4**

Prepare store Ledger account on the basis from the following information.

Dec.4, 2020 Received from Vendor 2,000 kg. @ Rs. 10 per kg.

Dec. 12, 2020 Received from Vendor 3,000 kg. @ Rs. 12 per kg.

Dec. 22, 2020 Received from Vendor 1,000 kg. @ Rs. 16 per kg.

Issue of material were as follows:

Dec. 06, 2020 1,000 kg. ; Dec. 20, 2020 2,000 kg.; Dec. 25, 2020 3,000 kg.

**Solution:**

Date	Receipts			Issued			Balance		
	Quantity	Rate	Amount	Quantity	Rate	Amount	Quantity	Rate	Amount
Dec. 04	2,000	10	20,000	----	----	----	2,000	10	20,000
Dec. 05	5,000	21	100,500	----	----	----	4,500	22	99,000
							5,000	21	100,500
Dec. 10	----	----	----	4,000	22	88,000	500	22	11,000
							5,000	21	100.500
Dec. 12	3,500	24	84,000	----	----	----	500	22	11,000
							5,000	21	100.500
							3,500	24	84,000
Dec. 15	----	----	----	2,000	24	48,000	500	22	11,000
							5,000	21	100.500
							1,500	24	36,000
Dec.	----	----	----	1,500	24	36,000	4,000	21	84,000



18				500	22	11,000			
				1,000	21	21,000			
Dec.							4,000	21	84,000
20	3,000	22.50	67,500	----	----	----	3,000	22.50	67,500
Dec.				3,000	22.50	67,500			
25	----	----	----	500	21	10,500	3,500	21	73,500

### 3.4.6 Weighted Average:

Under this method, issue of materials is priced at the average cost price of the materials in hand, a new average being computed whenever materials are received. In this method, total quantities and total costs are considered while computing the average price and not the total of rates divided by total number of rates as in simple average. The weighted average is calculated each time a purchase is made. The quantity bought is added to the stock in hand, and the revised balance is then divided into the new cash value of the stock. The effect of early price is thus eliminated. This method avoids fluctuations in price and reduces the number of calculations to be made, as each issue is charged at the same price until a fresh purchase necessitates the computation of a new average. It gives an acceptable figure for stock values.

#### Advantages

- The method is logical and consistent as it absorbs cost while determining the average for pricing material issues.
- The changes in the prices of materials do not much affect the materials issues and stock.
- The method follows the concept of total stock and total valuation
- Both cost of materials issued and in stock tend to reflect actual costs.

#### Disadvantages

The weighted average method also the following disadvantages:

- Simplicity and conveniences are lost when there is too much change in the prices of materials.
- An average price is not based on actual price incurred, and therefore is not realistic. It follows only arithmetical convenience.

**Illustration:5**

Received side of the store ledger account shows the following particulars:

Dec.1, 2020 Received from Vendor 5,000 units @ Rs. 20 per unit

Dec. 10, 2020 Received from Vendor 2,000 units @ Rs. 30 per unit

Dec. 18, 2020 Received from Vendor 4,000 units @ Rs. 40 per unit

Dec. 27, 2020 Received from Vendor 3,000 units @ Rs. 50 per unit

Issue of material were as follows:

Dec. 1, 2020 4,000 units,

Dec. 15, 2020 1,000 units,

Dec. 22, 2020 2,000 units,

Dec. 31, 2020 3,000 units,

Dec. 29 Return 100 units issued on 15 th Dec., 20 units loss was revealed on Dec. 28 during stock valuation.

**Solution:**

Date	Receipts			Issued			Balance		
	Quantity	Rate	Amount	Quantity	Rate	Amount	Quantity	Amount	Rate
Dec. 01	5,000	20	1,00,00	4,000	20	80,000	1,000	20,000	20.00
Dec. 10	2,000	30	60,000	----	----	----	3,000	80,000	26.70
Dec. 15	----	----	----	1,000	26.70	26,700	2,000	53,300	26.70
Dec. 18	4,000	40	1,60,000	----	----	----	6,000	2,13,300	35.55
Dec. 22	----	----	----	2,000	35.55	71,100	4,000	1,42,200	35.55



Dec. 27	3,000	50	1,50,000	----	----	----	7,000	2,92,200	41.74
Dec. 28	----	----	----	20 (loss)	----	----	6,980	2,92,200	41.86
Dec. 29	100	26.70	2,670	----	----	----	7,080	2,94,870	41.65
Dec. 31	----	----	----	3,000	41.65	124,950	4,080	1,69,920	41.65

### 3.4.7 Standard Cost Method

Under this method, material issues are priced at a predetermined standard issue price. Any variance between the actual purchase price and standard issue price is written off to the profit and loss account. Standard cost is a predetermined cost set by the management prior to the actual material costs being known and the standard issue price is used for all issues to production and for valuation of closing stock. If initially the standard price is set carefully then it reduces all the clerical work and errors tremendously and the stock recording procedure is simplified. The realistic production cost comparisons can be made easier by eliminating fluctuations in cost due to material price variance. In a situation of fluctuating prices, this method is not suitable.

### 3.4.8 Replacement Cost Method (Market Price Method)

The replacement cost is a cost at which material identical to that is to be replaced could be practiced at the date of pricing material issues as distinct from the actual cost price at the date of purchase. The replacement price's the price of replacing the material at the time of issue of materials or on the date of valuation of closing stock. This method is not acceptable for standard accounting practice since it reflects a cost which has not really been paid. If stocks are held at replacement cost for balance sheet purposes when they have been bought at a lower price, an element of profit which has not yet been realised will be built into the profit and loss account.

### 3.4.9 An appraisal of Pricing Methods

We have examined in the previous pages the relative merits and demerits of different methods of materials issues. No single method can be appropriate under all circumstances. The choice of a method will depend upon the following factors:



- The nature of materials - e.g. if materials are to be kept for some time for maturing or seasoning, an inflated price will have to be charged.
- The management desire - e.g., if the management wants that the cost accounts should represent the current position and correspond with estimates and besides that they should disclose efficiency in buying, pricing materials issues at market price may be suitable.
- The nature and size of the business - a big business can bear heavy expenses, on clerical staff while a small business cannot. A method which will result in more clerical work cannot be recommended for a small business.
- Stability or otherwise of the price of materials. In case of fluctuating prices, weighted average method may be more suitable than any other method.
- Whether the cost accounts are maintained according to the standard costing system, if so, method of issuing materials on standard cost should be used.
- Whether business enters into long term contracts at a fixed price, if so, materials may be issued to contracts at a specific price fixed by the management in advance irrespective of the costs.

On the whole “periodic weighted average price method” gives satisfactory results. However, in case the concern is using standard costing, the standard cost method should be used.

### **3.5 Check Your Progress**

1. Out of the following, what is not the work of purchase department:
  - a) Receiving purchase requisition
  - b) Exploring the sources of material supply
  - c) Preparation and execution of purchase orders
  - d) Accounting for material received
2. Bin Card is a
  - a) Quantitative as well as value wise records of material received, issued and balance;
  - b) Quantitative record of material received, issued and balance
  - c) Value wise records of material received, issued and balance





- d) a record of labour attendance
- 3. Stores Ledger is a:
  - a) Quantitative as well as value wise records of material received, issued and balance;
  - b) Quantitative record of material received, issued and balance
  - c) Value wise records of material received, issued and balance
  - d) a record of labour attendance
- 4. Which one out of the following is not an inventory valuation method?
  - a) FIFO
  - b) LIFO
  - c) Weighted Average
  - d) EOQ
- 5. In case of rising prices (inflation), FIFO method will:
  - a) provide lowest value of closing stock and profit
  - b) provide highest value of closing stock and profit
  - c) provide highest value of closing stock but lowest value of profit
  - d) provide highest value of profit but lowest value of closing stock
- 6. In case of rising prices (inflation), LIFO will:
  - a) provide lowest value of closing stock and profit
  - b) provide highest value of closing stock and profit
  - c) provide highest value of closing stock but lowest value of profit
  - d) provide highest value of profit but lowest value of closing stock

### 3.6 Summary

No cost accounting system can become effective without proper and efficient control of materials. This is so because quite often material is the largest single element of cost and as such an efficient system of material control leads to a significant economy in the total cost. Material control, in



practice, is exercised through periodical reports and records relating to purchasing, receiving, inspecting and issuing of direct as well as indirect materials. Purchasing is the function of buying raw materials, general suppliers, tools, office stationary and other items. The essentials of efficient purchasing are right quantity, right quality, right time, right place, right source and delivery at the right place. Purchase function may be organized in two ways i.e. centralized purchasing and decentralized purchasing. Different methods can be used for the purpose of valuing or pricing of materials issued for production in a manufacturing concern. The actual method to be adopted in a manufacturing concern shall depend upon the nature of materials and the nature of business itself. In order to guard against under-stocking and over-stocking a number of inventory control techniques can be applied.

### 3.7 Keywords

- **Raw Materials:** It is the goods purchased for incorporation into product for sale.
- **Purchase Requisition:** It is an internal instruction to purchase department to purchase department to purchase department to purchase goods or services of specified quantity and description.
- **Material Return Note:** When the material is not of a suitable quality or surplus material, will be returned to supplier by preparing this note.
- **Bin Card:** is a document which records the quantity of material received by, issued to and remained in stores.
- **Stores Ledger:** is a quantitative as well as value wise records of material received, issued and balance.

### 3.8 Self-Assessment Test

#### Short Answer Questions:

Q.1 Write short note on:

- FIFO Method
- LIFO Method
- HIFO Method



Q.2 Write short notes on:

- Perpetual Inventory System
- Average Method of Pricing Material Issue
- Purchase requisition
- Bill of Materials and Stores Requisition Note
- Bin Card
- Materials Requisition Note and Material Transfer Note.

**Long Answer Questions:**

Q.1 Mention any six methods of pricing the issue of materials.

Q.2 Distinguish between:

- Perpetual Inventory System and Continuous Stock-taking.
- Bill of Materials and Material Requisition Note.

Q.3 Discuss the functions and advantages of a Centralized Purchase Department of a manufacturing concern.

Q.4 What are the various factors which influence the selection of a particular method of pricing the issues of materials from stores?

Q.5 Explain various methods of pricing of material issued.

Q.6 A manufacturer who has newly set up the factory used cost price as the basis for charging out materials to jobs. The receipts side of the stores ledger account shows the following particularly:

1 <sup>st</sup> March	500 units bought at Rs. 3.00 each
3 <sup>rd</sup> March	700 units bought at Rs. 3.10 each
5 <sup>th</sup> March	400 units bought at Rs. 3.20 each
11 <sup>th</sup> March	800 units bought at Rs. 3.10 each

Material issues on 4<sup>th</sup> March 300 units; 8<sup>th</sup> March 1,000 units; and on 13<sup>th</sup> March 200 units. At what price per article should each of these issues be charged under FIFO Method?

**[Ans. Closing Stock 900 units of Rs. 2,800].**



Q.7 A manufacturer who has newly set up the factory used cost price as the basis for charging out materials to jobs. The receipts side of the stores ledger account shows the following particularly:

1 <sup>st</sup> March	500 units bought at Rs. 3.00 each
3 <sup>rd</sup> March	700 units bought at Rs. 3.10 each
5 <sup>th</sup> March	400 units bought at Rs. 3.20 each
11 <sup>th</sup> March	800 units bought at Rs. 3.10 each

Material issues on 4<sup>th</sup> March 300 units; 8<sup>th</sup> March 1,000 units; and on 13<sup>th</sup> March 200 units. At what price per article should each of these issues be charged under LIFO Method?

[Ans. Closing Stock 900 units of Rs. 2,790].

Q.8 A manufacturer who has newly set up the factory used cost price as the basis for charging out materials to jobs. The receipts side of the stores ledger account shows the following particularly:

1 <sup>st</sup> March	500 units bought at Rs. 3.00 each
3 <sup>rd</sup> March	700 units bought at Rs. 3.10 each
5 <sup>th</sup> March	400 units bought at Rs. 3.20 each
11 <sup>th</sup> March	700 units bought at Rs. 3.10 each

Material issues on 4<sup>th</sup> March 300 units; 8<sup>th</sup> March 1,000 units; and on 13<sup>th</sup> March 200 units. At what price per article should each of these issues be charged under FIFO Method?

[Ans. Closing Stock 800 units of Rs. 2,480].

### 3.9 Answers to Check Your Progress

1(d), 2 (b), 3(a), 4 (d), 5(b), 6 (a)

### 3.10 References/ Suggested Readings

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<b>Course Code:</b> BCOM 401	<b>Author:</b> Dr. Sanjeev Kumar Garg
<b>Lesson No.:</b> 4	<b>Vetter:</b> Prof. Suresh Kumar Mittal
<b>Material Cost Control, Techniques and Treatment of Material losses</b>	

**Structure**

- 4.0 Learning Objectives
- 4.1 Introduction
  - 4.1.1 Meaning of Materials
  - 4.1.2 Meaning of Materials Control
  - 4.1.3 Objectives of Material Control
  - 4.1.4 Advantages of Material Control
- 4.2 Material Control Techniques
- 4.3 Types of Material Losses
- 4.4 Check Your Progress
- 4.5 Summary
- 4.6 Keywords
- 4.7 Self-Assessment Test
- 4.8 Answers to Check Your Progress
- 4.9 References/ Suggested Readings

**4.0 Learning Objectives**

After going through this lesson, the learner should be able to:

- Understand the meaning of material control and its objectives.
- Understand inventory control techniques



- Know different levels of material in stock and ordered quantity
- Know various types of material losses

## 4.1 Introduction

Materials form an important part of the cost of a product and, therefore, proper control over materials is necessary. No cost accounting system can become effective without proper and efficient control of materials. Materials control basically aims at efficient purchasing of materials, efficient storing and efficient use or consumption. Materials or inventory control may be defined as “systematic control and regulation of purchase, storage and usage of materials in such a way that maintain smooth flow of production and at the same time avoids excessive investments in inventories. Efficient material control cuts out losses and wastes of materials that otherwise pass unnoticed”.

### 4.1.1 Meaning of Materials

Materials constitutes major portion of the total cost of the product. Supplies are also used for the manufacture of a product. Both materials and supplies are collectively called as stores. The finished goods are termed as stock.

Commodities that are supplied to an undertaking to be utilized in the manufacturing process or to be transformed into products are called “Materials”. The terms materials and stores are sometimes used interchangeably, but they are not identical. Stores is a wider term and covers items like sundry supplies, maintenance stores, tools, equipment besides material consumed in production. The raw materials and supplies are easily convertible into cash. Hence, the management should exercise control over the materials and stores.

### 4.1.2 Meaning of Materials Control

Materials control refers to managerial activities relating to giving instructions or directions to ensure maintaining adequate quality and quantity of materials for uninterrupted production process with the objective of minimizing material cost per unit. Both materials control and inventory control are not one and the same.

Materials control is a wider term, which includes inventory control. Moreover, cost of production, planning of materials, purchase procedure, transportation and usage control are parts of materials control. Inventory control is confined to the techniques of maintaining stocks at desired levels



whether they are raw materials, work in progress or finished goods with the primary objective of minimizing the cost.

#### 4.1.3 Objectives of Material Control

- It eliminates the problem of understocking so that materials of the desired quality will be available when needed for efficient and interrupted production.
- Material will be purchased only when need exists. Hence, it avoids the chances of over-stocking.
- By purchasing materials at the most favorable prices, the purchase is able to make a valuable contribution to the reduction in cost.
- Materials are protected against loss by fire, theft, handling with the help of proper physical controls.
- Issues of materials are properly authorized and properly accounted for.
- Vouchers will be approved for payment only if the material has been received and is available for issue.
- Materials are, at all times, charged as the responsibility of some individual.

#### 4.1.4 Advantages of Material Control

The following benefits are available to the company if the company exercises proper control on the materials:

- Materials control eliminates wastage in use of raw materials and supplies in course of purchase, storage, handling and use.
- It ensures uninterrupted flow of right quality and quantity of materials to the production department.
- It reduces the risk of fraud and theft.
- It facilitates the preparation of various monthly financial statements.
- The valuation of materials is very easy.
- It requires minimum amount of capital to buy materials.
- It fixes the responsibility on the part of the employers who are handling the materials at the maximum.

### 4.2 Material Control Techniques

Material control models deal with the raw material inventory. The following are the models of





inventory control:

1.) ABC Analysis 2.) Determination of stock levels 3.) Economic Order Quantity (EOQ) Analysis 4.) Perpetual Inventory System 5.) Periodic Annual Inventory Control System 6.) VED Analysis.

#### 4.2.1 ABC Analysis

The concept of ABC Analysis was coined by Pareto, an Indian philosopher in the nineteenth century. It is a value based system of material control. In this technique materials are analysed according to their value so that costly and more valuable materials are given greater attention and care.

All items of materials are classified according to their value—high, medium and low values, which are known as A, B and C items respectively. ABC technique is some time called as “Always Better Control” method.

- **‘A’ Items:** These are high value items which may consist of only a small percentage of the total items handled. On account of their high cost, these materials should be under the tightest control and the responsibility of the most experienced personnel.
- **‘B’ Items:** These are medium value materials which should be under the normal control procedures.
- **‘C’ Items:** These are low value materials which may represent a very large number of items. These materials should be under the simple and economic methods of control.

The point of classifying stock into A, B and C categories is to ensure that material management focuses on ‘A’ item where tightest control should be installed. B items may be given less attention and C items least attention.

The ABC technique is a selective control which aims at concentrating efforts on those materials where attention is needed most. This is so because it is unwise to give equal attention to all items in stock. The items are listed and ranked in the order of their descending importance showing quantity and value of each item.

It is seen a very small percentage of the items say 15-20% accounts for 75-80% of the total items according to the monetary value. ABC analysis divides the total inventory list into three classes using the rupee volume. Item A consist of approximately to 15% of the total items, B item the next 35% and C consist the remaining 50% items. The numbers are just indicative and actual breakup will vary from situation to situation. The above categorization is represented in the Table given below:

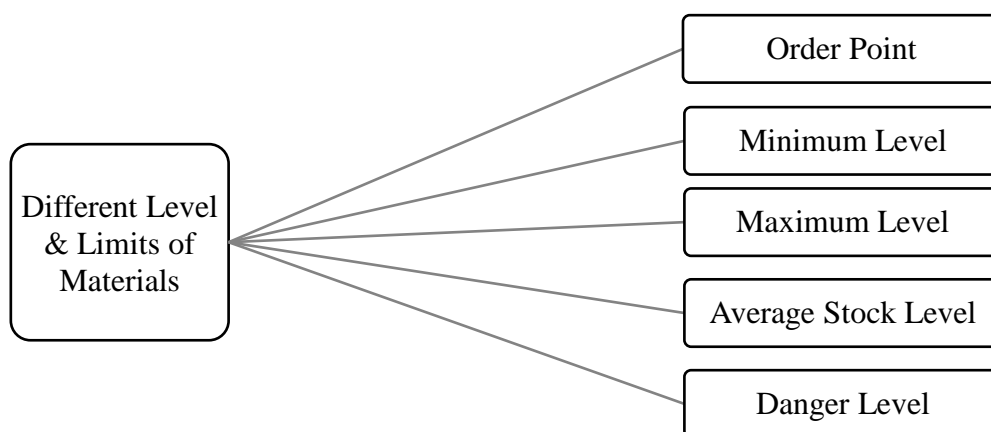


Category	% of items	% of value
A	15	80
B	35	15
C	50	5
<b>Total</b>	<b>100</b>	<b>100</b>

**Advantages of ABC Analysis:** The following are the main advantages of ABC Analysis:

- A strict control can be exercised on those items which represent large amount of capital invested.
- Investment in inventory is regulated and funds can be utilized in the best possible way.
- Storage cost also will be less as only the required quantity of materials alone are purchased.
- Quick purchase of materials can be ensured by concentrating on fewer items that are required at one time.
- It is based on the principle of control by exception which gives best results especially when resources and staff are less.
- It helps in maintaining enough safety stock for 'C' category items.
- Selective control helps in maintaining high stock turnover rate.

#### 4.2.2 Determination of Limits & Levels of Materials



#### Order Point

It is the point at which if stock of a particular material in store approaches, the storekeeper should initiate the purchase requisition for fresh supplies of that material. 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 the minimum level will be sufficient to meet the requirements of production upto the time the fresh supply of the material is received. Re-ordering level can be calculated by applying the following formula.

$$\text{Order Point} = \text{Maximum Rate of Usage} \times \text{Maximum Lead Time}$$

### Maximum Level

It represents the maximum quantity of an item of material which can be held in stock at any time. If the quantity exceeds maximum level limit then it will be termed as overstocking. A firm avoids overstocking because it will result in high material costs. Overstocking will lead to the requirement of more capital, more space for storing the materials, and more charges of losses from obsolescence. This stock is then used in the production process (in case of raw materials) or sold (in case of finished goods) and then re-ordered again at the reorder level which again fills up the stock to the 'maximum level'. This is an ongoing process.

$$\text{Maximum Level} = \text{Order Point} - (\text{Minimum Usage Rate} \times \text{Minimum Lead Time}) + \text{EOQ or Re-order Level}$$

### Minimum Level

This represents the minimum quantity of the material which must be maintained in hand at all times. The quantity is fixed so that production may not be held up due to shortage of the material. In fixing this level, the following factors are taken into consideration:

- Lead time i.e. time lag between indenting and receiving of the material. It is the time required to replenish (receive) the supply.
- Rate of consumption of the material during the lead time.

$$\text{Minimum Level} = \text{Order Point} - (\text{Average Usage Rate} \times \text{Average Lead Time})$$

### Average Stock Level

This level is calculated by the following formula:

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



### Danger Level

It is the level below which stocks should not fall in any case. If danger level approaches then immediate steps should take to replenish the stocks even if more cost is incurred in arranging the materials. Danger level can be determined with the following formula:

$$\text{Danger Level} = \text{Average Usage Rate} \times \text{Emergent Lead Time}$$

#### Illustration: 1

The average consumption of coal in a factory is 10 ton per day; Maximum consumption is 18 ton per day; Minimum level is 90 ton and Economic Order Quantity (EOQ) is 316 ton. It is estimated that the supply would take 8 to 10 days. Emergent supply time is 2 days. Find out different levels of inventory.

#### Solution:

$$\text{Minimum consumption per day} = (10 \times 2) - 18 = 2 \text{ ton}$$

$$\text{Average Lead Time} = (8+10)/2 = 9 \text{ days}$$

- Order Point or Order Level = (Maximum Rate of Usage  $\times$  Maximum Lead Time) = 18 ton  $\times$  10 days = 180 ton
- Minimum Level = Order Point – (Average Usage Rate  $\times$  Average Lead Time) = 180 ton – (10 ton  $\times$  9 days) = 90 ton
- Maximum Level = Order Point – (Minimum Usage Rate  $\times$  Minimum Lead Time) + EOQ or Re-order Level  

$$= 180 \text{ ton} - (2 \text{ ton} \times 8 \text{ days}) + 316 \text{ ton} = 480 \text{ ton}$$
- Average Stock Level = Minimum Level +  $\frac{1}{2}$  (E.O.Q. or Re-order Level) = 90 ton +  $\frac{1}{2} \times 316 \text{ ton} = 248 \text{ ton}$
- Danger Level = (Average Usage Rate  $\times$  Emergent Lead Time)  

$$= 10 \text{ ton} \times 2 \text{ days} = 20 \text{ ton}$$

#### Illustration: 2

The following example further illustrates the different stock level:

Maximum usage (units)	650 per day
Minimum usages (units)	300 per day



Normal usage (units)	500 per day
Economic order quantity (units)	75,000 Units
Recorder period - lead time	23 to 30 days
Minimum level (10 days at normal usage)	5,000 Units

**Solution:**

The different stock levels will be follows:

- Re-order level = (Normal usage x Normal lead time) + Minimum level  
$$= (500 \times 30) + 5,000 = 20,000 \text{ units}$$
$$= 20,000 \text{ units}$$
- Maximum level = Re-order level + EOQ – Minimum quantity used in re-order period  
$$= 20,000 + 75,000 (300 \times 25)$$
$$= 87,500 \text{ units}$$
- Average level = (Maximum + Minimum) / 2  
$$= (87,500 + 5,000) / 2$$
$$= 46,250 \text{ units}$$

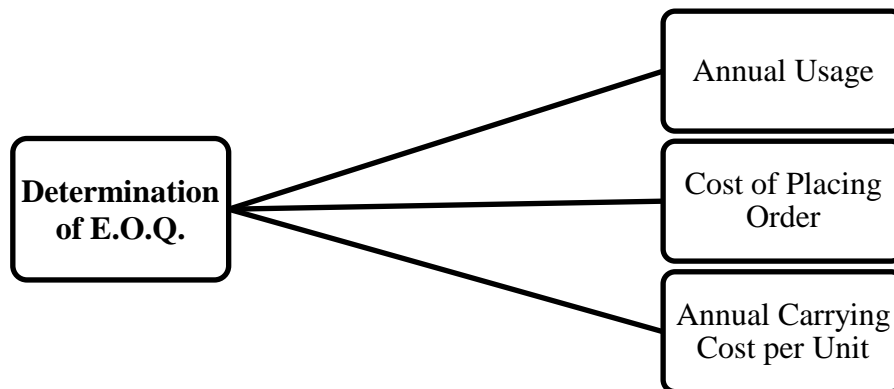
**4.2.3 Economic Order Quantity (E.O.Q.)**

Economic order quantity is a quantity of materials to be ordered which takes into account the optimum combination of:

- Bulk discounts from high volume purchases
- Usage rate
- Stock holding costs
- Storage capacity
- Order delivery time
- Cost of processing the order



It is an optimum size of either a normal outside purchase order or an internal production order that minimizes total annual holding and ordering costs of inventory. The major objective of managing inventory is to discover and maintain the optimum level of investment in inventory. The optimum level will be that quantity which minimizes the total costs associated with inventory.



**Ordering Cost or Set-up Cost:** Ordering Cost includes cost of paper work, postage involved in placing order. Order cost is of fixed nature and it is not influenced by the size of order. Costs of ordering stocks include the following

- Preparation of purchase order.
- Costs of receiving goods
- Documentation processing costs
- Transport costs
- Intermittent costs of cashing orders, rejecting faulty goods
- Additional costs of frequent or small quantity orders
- Where goods are manufactured internally, the set up and tooling costs associated with each production run

For example, if annual requirement is 10,000 units and cost per order is Rs. 50. If single order of 10,000 units is placed, total ordering cost will be Rs. 50. If order size is 2,000 units and no. of orders are 5 in a year then total ordering cost will be  $\text{Rs. } 50 \times 5 = \text{Rs. } 250$ . Ordering cost can be calculated with the help of following formula:

$$\text{Total Ordering Cost} = R/q_0 \times C_o$$

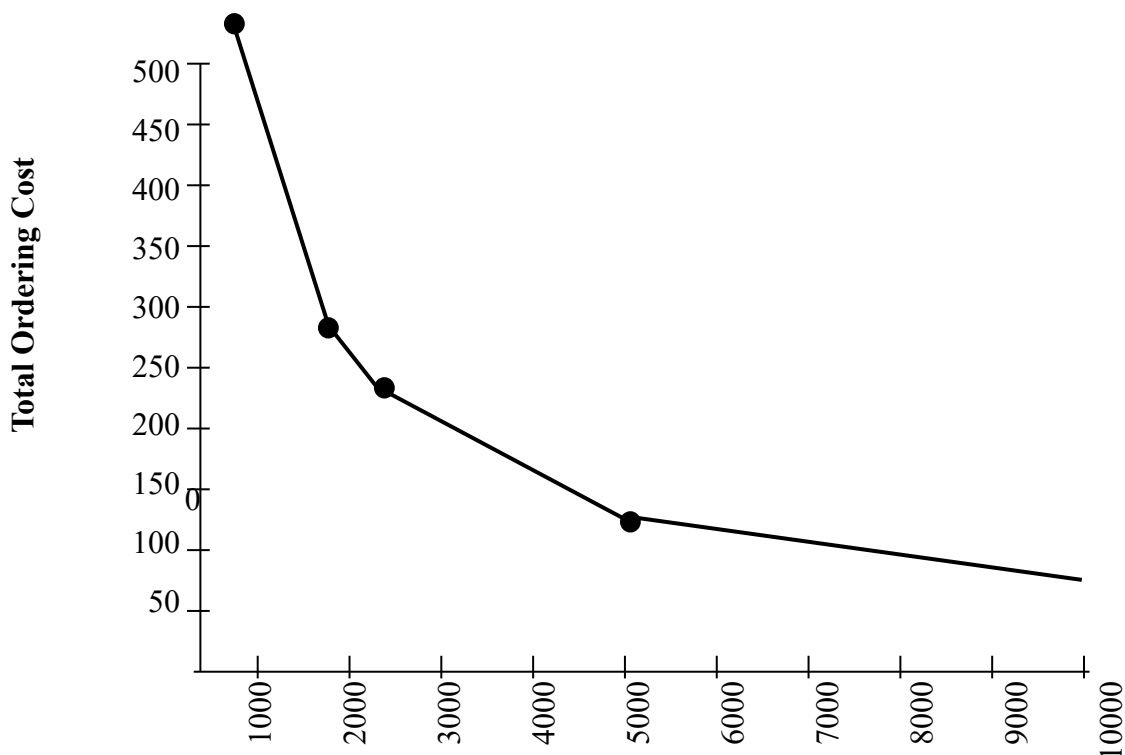
□ Where, R = Annual requirement of materials in units



□  $Q_o$  = Quantity per Order

□  $C_o$  = Cost per Order

Annual Requirement (R)	Order Size ( $q_o$ )	No. of Orders	Cost per Order	Total Ordering Cost
10,000	1,000	10	50	500
10,000	2,000	5	50	250
10,000	2,500	4	50	200
10,000	5,000	2	50	100
10,000	10,000	1	50	50



**Carrying Cost or Holding Cost:** Carrying Cost or Holding Cost or Storage Cost or Possession Cost represent the cost that is associated with physical storage of material from the date of its receipt to the date of its use or sale. This cost is expressed at a rate per unit or % of inventory value for a fixed time e.g. Rs. 5 per unit or 10% of inventory value. Sometimes, it may be expressed on joint basis as Rs. 5 per



unit + 5% of inventory value. Symbol of carrying cost is CH. Carrying cost can be calculated with the help of following formula:

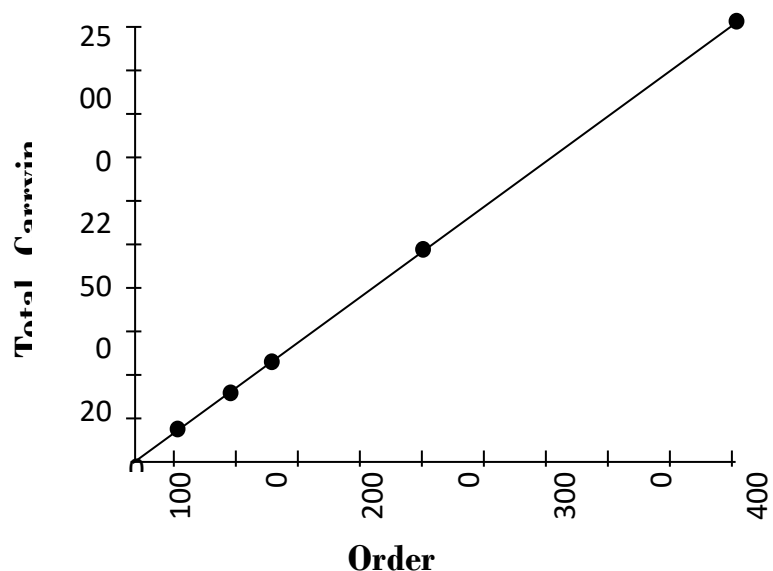
$$\text{Total Holding or Carrying Cost} = qo/2 \times CH$$

□  $qo$  = Size of Order

□  $CH$  = Holding Cost per unit per year

Carrying Cost includes following main items:

- Capital Cost
- Interest on capital use in inventory
- Opportunity Cost
- Cost of Storage of Handling
- Rent or Depreciation of building
- Clerical Cost
- Expenditure on personnel of Store
- Cost of insurance of godown or store
- Electricity expenses in store
- Cost of Obsolesce and Deterioration
- Loss of obsolescence
- Reduction in weight
- Pilferage etc.

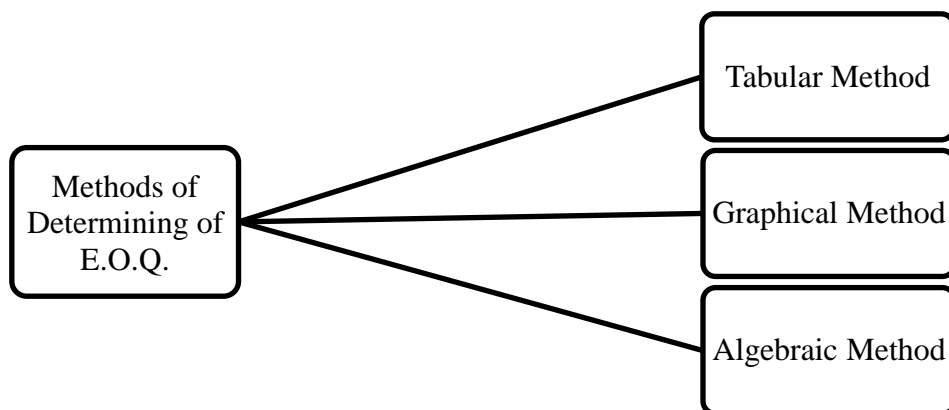






Annual Requirement ( R )	Order Size (qo)	Average Stock	Total Annual Holding Cost
10,000	1,000	500	2,500
10,000	2,000	1,000	5,000
10,000	2,500	1,250	6,250
10,000	5,000	2,500	12,500
10,000	10,000	5,000	25,000

**Methods of Determining EOQ:** Following are the methods of determining EOQ.



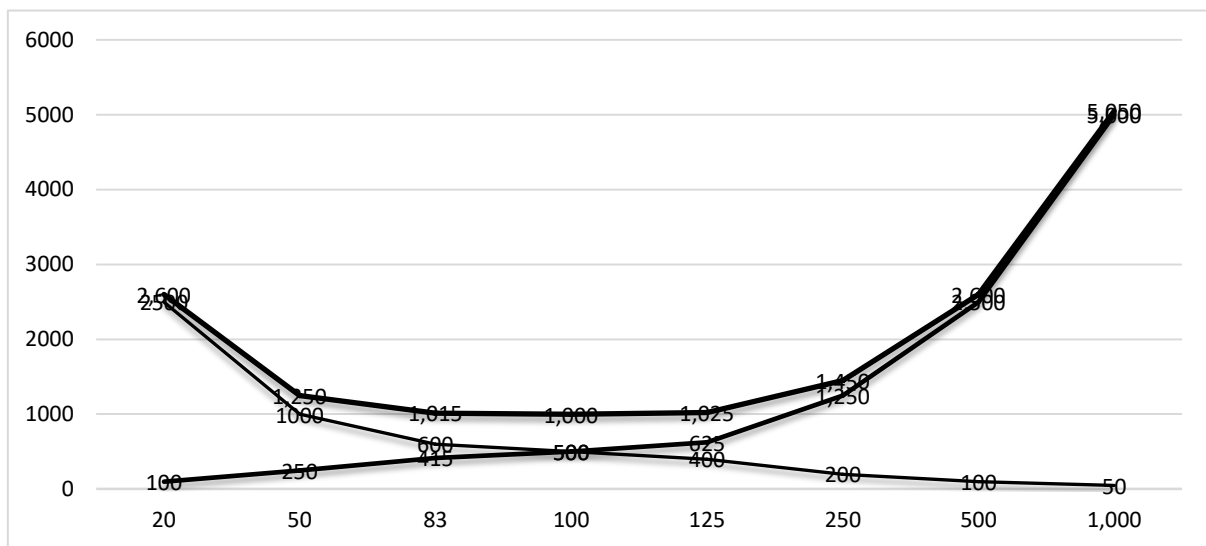
• **Tabulator Method:**

No of order per year	Order Size	Cost of placing order (Rs. 50 each)	Average Inventory (B/2)	Carrying Cost Rs. 10 per unit of D	Total Cost (C+E)
A	B	C	D	E	F
1	1,000	50	500	5,000	5,050



2	500	100	250	2,500	2,600
4	250	200	125	1,250	1,450
8	125	400	62.5	625	1,025
<b>10</b>	<b>100</b>	<b>500</b>	<b>50</b>	<b>500</b>	<b>1,000</b>
12	83	600	41.5	415	1,015
20	50	1000	25	250	1,250
50	20	2500	10	100	2,600

- Graphical Method:**



- Algebraic Method:** The costs of carrying the inventory and ordering costs change in the reverse order. The costs of placing the order decrease as the size of the order increase since with a bigger size of order, the number of the order will be lower. However, simultaneously the costs of carrying the inventory will go up because purchases have been made in large quantities. It may be possible to have a point which provides the lowest total cost and this point (ideal size) is known as the EOQ. The equilibrium can be determined mathematically as follows:

$$EOQ = \sqrt{\frac{2CO}{IC}}$$



Where	U	=	Annual usage in units
	O	=	Cost of placing an order
	I	=	Per cent cost of carrying inventory
	C	=	Cost per unit of material

**Illustration: 3**

Annual usage units	6,000
Cost of placing an order	Rs. 30
Carrying cost as a percent of inventory	20%
Cost per unit of material	Rs. 5
Determine E.O.Q.	

**Solution:**

Economic Order Quantity:

$$\begin{aligned}
 \text{EOQ} &= \sqrt{\frac{2CO}{IC}} = \sqrt{\frac{2 \times 60,000 \times 30}{5 \times 20\%}} \\
 &= \sqrt{3,60,000} \\
 &= 600 \text{ units}
 \end{aligned}$$

In the above illustration, the EOQ is 600 units. That is ten orders per year are needed. At the level of 600 units, the ordering costs and the carrying costs are equal and also the total cost is at minimum as it is clear from Table.

**Table showing Economic Order Quantity**

Annual usage	Orders per year	Units per order	Average inventory units)	Value per order (Rs.)	Average inventory amount (Rs.)	Order cost	Carrying cost (20%)	Total cost (Rs.)
<b>6,000 units</b>	1	6,000	3,000	30,000	15,000	30	3,000	3030
	2	3,000	1,500	15,000	7,500	60	1,500	1500



	3	2,000	1,000	10,000	5,000	90	1,000	1090
	4	1,500	750	7,500	3,750	120	750	870
	<b>5</b>	<b>1,200</b>	<b>600</b>	<b>6,000</b>	<b>3,000</b>	<b>150</b>	<b>600</b>	<b>750</b>
	6	1,000	500	5,000	2,500	180	500	680
	7	857	429	4,285	2,142	210	428	638
	8	750	375	3,750	1,875	240	376	616
	9	667	334	3,335	1,668	270	334	604
	10	600	300	3,000	1,500	300	300	60
	11	545	273	2,725	1,363	300	1:72	002
	12	500	250	2,500	1,250	360	250	610

Table shows that quantities of other orders resulting in more or less than ten orders per year are not as economical as they involve higher total costs.

#### **Illustration:4**

Annual consumption: 40,00,000 kg.

Cost of placing one order: Rs. 100

Cost of carrying one kg. of raw material for one year: Re. 0.50

Calculate the Economic Order Quantity (EOQ)

#### **Solution:**

$$\begin{aligned}
 &= \sqrt{\frac{2CO}{IC}} \\
 &= \sqrt{\frac{2 \times 40,00,000 \times 100}{0.50}} \\
 &= 40,000 \text{ Units}
 \end{aligned}$$

#### **4.2.4 Perpetual Inventory System:**



This is a system of stock control in which continuous record of receipt and issue of materials is maintained by the stores department. It shows the physical movement of stocks and their current balance.

A perpetual inventory system is usually supported by a programme of continuous stock-taking. In other words, perpetual inventory system means the system of records, whereas continuous stock-taking means the physical checking of actual stock with the records. Strictly speaking the perpetual inventory system means maintenance of such records (stock control cards, bin cards and the stores ledger) that will show the receipts, issue and balance of all items in stock at all times. But to ensure accuracy, the system must be supplemented by a system of continuous stock checking which ensures that physical stock agrees with the book figures. The system is essential for planning production and to see that production is not interrupted due to want of materials and stores.

The Chartered Institute of Management Accountants London defines the perpetual inventory system as, “a system of records maintained by the controlling department, which reflects the physical movements of stocks and their current balance.”

The Success of perpetual inventory system depends upon the following:

- Maintenance and up-to-date writing up of the following records – the store ledger or bin cards.
- Reconciling the quantity balances shown by store ledger and bin card.
- Checking the physical balance of a number of items every day sympathetically and by rotation.
- Explaining promptly the causes of discrepancies between physical balances and book figures.
- Making corrective entries where called for after noting the discrepancies.
- Removing the cause of the discrepancies.

**Advantages:**

The following are the advantages of the perpetual inventory system:

- It helps in avoiding the long and costly work of physical checking of all the stocks at the end of the year.
- It also avoids dislocation in production which arises in the case of periodic stock-taking at the end of the year.



- As stock figures are readily available at all times, the Profit and Loss Account and Balance Sheet can be easily prepared at interim periods.
- The system acts as moral check on the staff of the stores department to work honestly and to keep-up-to-date records.
- A system of internal check remains in operation all the time.
- Discrepancies are readily discovered and rectified. This gives an opportunity for preventing a recurrence in future.
- The system helps in keeping the stocks within the limits decided upon by the management so that excessive working capital is not sunk in the stock.
- A detailed and reliable check on stores is obtained.
- It makes available correct stock figures for claim to be lodged with the Insurance Company for loss on account of stock destroyed by fire.
- As the work of recording and continuous stock-taking is carried out systematically and without undue haste, the figures are more reliable.
- Planning of production can be done according to the availability of the material in the stores because the management is constantly kept informed of the stores position.
- It reveals the existence of surplus, dormant, obsolete and slow moving materials and hence remedial action can be taken.
- It helps in avoiding the under-stocking and over-stocking of materials and the dangers associated with them.

**Disadvantages:**

Besides the above advantages of perpetual inventory system, it suffers from the following limitations:

- The system is expensive and a small concern cannot afford to implement this system.
- The information about actual stock of a particular item on a particular day may not be available, only book figures above are available.

**4.2.5 Periodic/Annual Inventory Control System:**

Under this system, stock-taking is undertaken at the end of the accounting year. As the stock taking involves verifying the physical quantities of stores in hand, some firms temporarily suspend plant



operations when this is done. This is because it is rarely feasible to take stocks when production is going on. Thus, the annual stock-taking should be organised well in advance to minimize production holds up.

The following points are to be considered while conducting periodic stock verification:

- A person should be appointed to control the whole operation.
- While stock verification is going on, store room should not be opened for issues and receipts.
- All damaged, deteriorated or used items must be recorded separately.
- The stock-taking sheets must be under the control of one individual, consecutively numbered as issued to staff on duty as required.
- Materials received should be listed separately but still under inspection.
- Make each person responsible for a particular section.
- Show the method of check i.e. count, weight, measurement on the stock sheet for each item.
- The method of pricing should be known and if possible, it is desirable to enter all prices in terms of units of issue on the stock sheets in advance.
- In case of decentralised store systems, the materials in transit at the date of stock-taking must be taken into account.

**Limitations:** The following are the limitations of this system:

- It takes more time to verify the stock.
- Under this system the factory has to be closed during the period of stock verification which results in the loss of production time.
- Sometimes a complete check on materials may not be exercised often those materials which are not used go unnoticed.

#### 4.2.6 VED Analysis:

VED-vital, essential, desirable, analysis is used primarily for control of spare parts. The spare parts can be divided into three categories-vital, essential and desirable, keeping in view the criticality to production. The spares, the stocks out of which even for a short time will stop production for quite some time and where the cost of stock out is very high, are known as vital spares. The spares, the absence of



which cannot be tolerated for more than a few hours or a day and the cost of lost production is high and which are essential for the production to continue, are known as essential spares.

The desirable spares are those spares which are needed but their absence for even a week or so will not lead to stoppage of production. Some spares, though negligible in monetary value, may be vital for the production to continue and require constant attention. Such spares may not receive the attention they deserve, if they are maintained according to ABC analysis because their value of consumption is small. So, in their cases, VED analysis is made to get the effective results.

### 4.3 Types of Material Losses

The material requirements of production are issued on the basis of material requisitions. The output is obtained along with wastage, scrap, spoilages and defectives. The accurate cost of output can be computed after taking the losses into account.

Losses in the form of waste, scraps, spoilage and defectives are inherent and inevitable with any manufacturing activity. These losses can be controlled through adequate reporting and responsibility accounting. Standard for each type of loss is fixed. Actuals are compared and action is to be taken by the management to control the abnormal losses, based on the variances. The different types of material losses are discussed below:

#### 4.3.1 Waste

Waste is inherent in any manufacturing activity. Waste is a part of raw material lost in the process of production having no recoverable value. Waste occurs invisibly in the form of evaporation or shrinkage. It can be visible and solid also. Examples of visible wastes are gases, dust, valueless residue, etc. Sometimes disposal of waste entails additional expenditure. Example- atomic waste. Loss in the form of waste increases the cost of production.

- **Control of Waste:** A waste report is prepared periodically. The actual waste is compared with standard waste and remedial action is taken to control abnormal waste.
- **Accounting Treatment:** Waste has no value. The accounting treatment differs according to waste being normal or abnormal.
  - **Normal Waste:** This is the inherent waste while manufacturing. It is in the form of evaporation, deterioration etc. The total cost of normal waste is distributed among the good units of output.





- **Abnormal Waste:** The abnormal waste is transferred to costing profit and loss account to avoid fluctuation in production cost.

#### 4.3.2 Scrap

Scrap, is the residue from certain manufacturing activities usually having disposable value. It can also be the discarded materials which can fetch some income. Examples of scrap are outlined material from stamping operations, filings, Saw dust, short lengths from wood working operations, sprues and 'flash' from foundry and molding processes. Scrap may be sold or reused.

- **Control of Scrap:** Scrap is controlled by fixation of standards for scrap, fixation of department wise responsibilities for scrap, etc. Keeping up proper records of scrap and periodical reporting helps in control of scrap. Actual scrap is compared with standard scrap. Suitable action is taken for excessive actual scrap over standard scrap.
- **Sale Value of Scrap Credited to Profit and Loss A/c:** The sale value is credited to profit and loss account as other income. The cost of output is inclusive of scrap cost. This method of accounting treatment is adopted when the value is negligible.
- **The Sale Value Credited to Overhead or Material Cost:** The sale value is reduced with selling cost of scrap and the net sale value is deducted from factory overhead or from material cost. This method is adopted when several jobs are done simultaneously and it is not possible to segregate the scraps jobwise.
- **Crediting the Sale Value to the Job or Process in which Scrap Arises:** The sale value of scrap is credited to the job or process concerned from which the scrap has arisen. This method is followed when identification of scrap with specific jobs or processes is easy.

#### 4.3.3 Spoilage

Spoilage occurs when goods are damaged beyond rectification. Spoilage is disposed of without further processing. Spoilage cost is the cost upto the point of rejection less sale value. The method of sale of spoilage depends on the extent of spoilage. Some of the spoilage is sold as seconds if the extent of damage is less; rest may be sold as scrap or treated as waste.

- **Control of Spoilage:** Spoilage is controlled through proper reporting about the extent of spoilage. Standards are fixed as a percentage on production. Actual spoilage is compared with standard and



variance is recorded. If the actual spoilage is more than the standard, suitable action is suggested to control it.

- **Accounting Treatment of Spoilage:** Accounting treatment depends on whether the spoilage is normal or abnormal. Normal spoilage is borne by good units of output since it is inherent with production and it happens even under efficient conditions. Abnormal spoilage is avoidable under efficient conditions. The cost of abnormal spoilage is charged to profit and loss account.

#### 4.3.4 Defectives

It is a part of production which can be rectified and made into good units with additional cost. The defective work occurs due to raw materials of inferior quality, bad planning and poor workmanship. Defective units are rectified with additional cost of material, labour and overheads and sold as 'first quality' or 'seconds'.

- **Control of Defectives:** As in the case of other losses, defectives are controlled by accurate and periodical reports. Standards are fixed for defectives. Actual defective work is compared with standards. If actuals are more than the standards remedial action is taken to control it.
- **Accounting Treatment of Defectives:** The accounting treatment depends on the extent of defectives production. If it is normal being inherent with production, it is identified with specific jobs. The cost of rectification is charged to specific jobs. If the cost is not traced with a job, the cost of rectification is treated as factory overhead. If the defective work is out of abnormal circumstances the cost of rectification is transferred to profit and loss account.

#### 4.3.5 Obsolete, Slow Moving and Dormant Stocks

These items are part of inventory. They need suitable and timely action on the part of the management to avoid occurrence of loss in due course and to prevent locking up of working capital.

- **Obsolete Stocks:** These stocks in the inventory which have been lying unused due to change in product process and design or method of manufacturing. They are generally out of date.
- **Slow Moving Materials:** They are items in stock used at long intervals and thus lying idle for long periods.
- **Dormant Stocks:** They are items in stock not at all in use for a significant period of time.



The store keeper should highlight such items in his periodical reports so that the management may try- (a) to dispose off at any price or (b) clear them out to save space in the stores (c) exercise caution in future purchase of such items of materials.

#### 4.4 Check Your Progress

1. Calculate re-order level where Safety stock: 1000 units; Consumption per week: 500 units; It takes 12 weeks to reach material from the date of ordering.
  - a) 1,000 units
  - b) 6,000 units
  - c) 3,000 units
  - d) 7,000 units
2. From the following information, calculate the extra cost of material by following EOQ. Annual consumption: = 45,000 units; Ordering cost per order: = Rs. 10; Carrying cost per unit per annum: = Rs. 10; Purchase price per unit = Rs. 50; Re-order quantity at present = 45,000 units; There is discount of 10% per unit in case of purchase of 45,000 units in bulk.
  - a) No saving
  - b) Rs. 2,00,000
  - c) Rs. 2,22,010
  - d) Rs. 2,990
3. Calculate Re-order level if consumption per week: 100-200 units, Delivery period: 14-28 days
  - a) 5,600 units
  - b) 800 units
  - c) 1,400 units
  - d) 200 units
4. Calculate EOQ (approx.) where Annual Consumption: 24000 units; Ordering cost: Rs. 10 per order; Purchase price: Rs. 100 per unit; Carrying cost: 5%.
  - a) 310
  - b) 400
  - c) 290
  - d) 300



5. Economic order quantity is that quantity at which cost of holding and carrying inventory is:
  - a) Maximum and equal
  - b) Minimum and equal
  - c) It can be maximum or minimum depending upon case to case.
  - d) Minimum and unequal
6. ABC analysis is an inventory control technique in which:
  - a) Inventory levels are maintained
  - b) Inventory is classified into A, B and C category with A being the highest quantity, lowest value.
  - c) Inventory is classified into A, B and C Category with A being the lowest quantity, highest value
  - d) Either b or c.
7. Re-order level is calculated as:
  - a) Maximum consumption x Maximum re-order period
  - b) Minimum consumption x Minimum re-order period
  - c)  $\frac{1}{2}$  of (Minimum + Maximum consumption)
  - d) Maximum level - Minimum level

## 4.5 Summary

Inventory is a common term which is usually used for raw materials, work-in-progress, finished goods stocked in the store and the components. No cost accounting system can become effective without proper and efficient control of materials. This is so because quite often material is the largest single element of cost and as such an efficient system of material control leads to a significant economy in the total cost. Material control, in practice, is exercised through periodical reports and records relating to purchasing, receiving, inspecting and issuing of direct as well as indirect materials. Purchasing is the function of buying raw materials, general suppliers, tools, office stationary and other items. The essentials of efficient purchasing are right quantity, right quality, right time, right place, right source and delivery at the right place. Purchase function may be organized in two ways i.e. centralized purchasing and decentralized purchasing. Different methods can be used for the purpose of valuing or pricing of materials issued for production in a manufacturing concern. The actual method to be adopted in a manufacturing concern shall depend upon the nature of materials and the nature of business itself. In



order to guard against under-stocking and over-stocking a number of inventory control techniques can be applied.

#### 4.6 Keywords

- **Economic Order Quantity:** It is the optimum size of the order for a particular item of inventory at that point the ordering costs and carrying costs of inventory are minimized.
- **Maximum Level:** It is the upper limit of stock above which the stock should not be allowed to exceed under normal circumstances.
- **Waste:** It is a part of raw material lost in the process of production having no recoverable value.
- **Defectives:** It is a part of production which can be rectified and made into good units with additional cost.
- **Scrap:** It is the residue from certain manufacturing activities usually having disposable value.
- **Dormant Stocks:** They are items in stock not at all in use for a significant period of time.

#### 4.7 Self-Assessment Test

##### Short Answer Questions:

- Q.1 Difference between Ordering and Carrying Cost.
- Q.2 What is the concept of Economic Order Quantity?
- Q.3 What are the various types of wastage?
- Q.4 Difference between waste and scrape.
- Q.5 Short note on ABC Analysis

##### Long Answer Questions:

- Q.1 Describe the meaning, objectives and the basic principles of material control system.
- Q.2 What is Reordering Level? Explain its relationships with Maximum and Minimum Stock Levels. What are the factors to be considered in fixing reordering level and quantity? Under what circumstances would you recommend revision of levels?
- Q.3 In materials management, what do you understand by (i) Maximum Level, (ii) Minimum Level and (iii) Ordering Level?



- Q.4 What are the important requirements of a system of material control?
- Q.5 Distinguish between wastes and scrap in the manufacturing process. Explain their treatment in cost accounts.
- Q.6 Explain the distinction between waste, scrap, defectives and spoilage. How wastage is treated in cost accounting?
- Q.7 The annual demand for a product is 6,400 units. The unit cost is Rs.6 and inventory carrying cost is 25% per annum. If the cost of one procurement is Rs. 75 determine:
- a) Economic order quantity
  - b) No. of orders per year
  - c) Time between two consecutive orders.

[Ans. (a) 40,000 units; (b) 8 orders; (c) 1.5 months]

- Q.8 Write short notes on:
- a) ABC analysis
  - b) Economic Order Quantity
  - c) Perpetual Inventory System
  - d) Reordering level

- Q.9 The following information is available in respect of material of No.30

Re-order quantity	1,500 units
Re-order period	4 to 6 weeks
Maximum consumption	400 units per week
Normal consumption	300 units per week
Minimum consumption	250 units per week

- a) Re-order levels;
- b) Minimum level;
- c) Maximum level; and



d) Average Stock level

[Ans. (a) 2,400 units; (b) 900 units; (c) 2,900 units; (d) 1,900 units]

#### 4.8 Answers to Check Your Progress

1(d), 2 (d), 3(b), 4 (a), 5(b), 6 (c), 7(a)

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**Subject:** Cost Accounting**Course Code:** BCOM 401**Updated By:** Dr. Sanjeev Kumar Garg**Lesson No.:** 5**Labour Cost Control Procedure: Labour Turnover, Idle Time and Overtime****Structure**

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**5.0 Learning Objectives**

After reading this lesson, you should be able to

- Explain the departments in the organization that deal with labour.
- Describe the methods of labor remuneration.
- Discuss the methods of measurement of labour turnover and causes of labour turnover.





## 5.1 Introduction

The second major element of cost in most of the manufacturing undertakings is labour cost. Proper accounting and control of labour cost, therefore, constitutes one of the most important problems of management. In controlling labour cost, the problem is complicated by the human element. This is so because labour consists of a lot of different individuals, each with a different mental and physical capacity and each with a different personality. Proper control over labour cost involves the following:

Appropriate systems for recruitment and selection, training and placement of workers.

Satisfactory methods of labour remuneration.

Healthy working conditions consistent with legal requirements and competitive undertaking.

Method of assuring efficient labour performance.

### 5.1.1 Classification of Labour Cost

For the purpose of accounting, labour costs are classified into (i) Direct Labour cost and (ii) Indirect Labour cost.

**Direct Labour Cost:** The labour cost incurred on the employees who are engaged directly in making the product, their work can be identified clearly in the process of converting the raw materials into finished product is called direct labour cost. For example, wages paid to the workers engaged in machining department, fabrication department, assembling department etc.

**Indirect Labour Cost:** The indirect employees are not directly associated with the conversion process but assist in the process by way of supervision, maintenance, transportation of materials, material handling etc. Their work benefits all the items being produced and cannot be specifically identified with the individual products. Hence, the indirect labour cost should be treated as production overhead. These costs will be accumulated and apportioned to different cost centres on equitable basis and absorbed into product cost by applying the overhead absorption rates.

### 5.1.2 Labour Cost Composition

The composition of labour cost are as follows:

**Monetary Payments**

Basic wage or salary

Dearness allowance

Production or profit bonus

Employers contribution to Provident Fund

Employees' State Insurance (ESI)

Gratuity

Pension

Holiday Pay

Any other allowance such as Medical Allowance, Leave Travel Allowance etc.

**Non-Monetary Payments**

Medical and health facilities

Canteen subsidised meals

Education facility to children of employees

Recreation facilities

**5.2 Organisation for Accounting and Control of Labour Cost**

The following departments/functions contribute to the efficient utilization of labour and adequate control over labour costs.

Personnel Department

Engineering Department

Time-keeping Department

Payroll Department

Cost Accounting Department

**5.2.1 Personnel Department**

The main function of the personnel department is to provide an efficient labour force. The personnel



manager/director with the help of department Heads is responsible for the execution of the policies formulated by board of directors regarding employment, discharge; classification of employees, wages and wage systems. Hire of employees may be for replacement or for expansion. Replacement hiring starts when a departmental or a foreman sends an employee requisition to the personnel department.

The hiring of employees for expansion requires authorization by top management. The personnel department in cooperation with department heads concerned, plans the expansion requirements and agrees upon promotions and Promotional transfers to be made, upon the number and kind of workers to be hired, and upon the dates at which new recruits will report for work. Recruitment, interviewing, testing, physical examination, induction procedures, and assignment to jobs are carried out by the personnel department.

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The personnel department prepares an Employee's Record Card on engaging a new worker. This will show full personal details of the employees, particulars of previous employment, medical category and wage rate normally, spaces are also provided for subsequent recording of transfers and promotions wage rate revisions, details of attendance, merit and conduct reports, sickness and accidents and the date and reason for leaving.

### **5.2.2 Engineering Department**

This department prepares plans and specifications of jobs, makes jobs analysis, conducts time and motion studies, makes provision for safe working conditions and supervises production activities.

#### **Work Study:**

Work study is the study of job, methods and equipment to ensure that the best way to do the job has been followed by a worker. The successful operation of incentive wage schemes depends on .making proper



work study. Work study consists of two complementary techniques or methods: (i) methods study, and (ii) work measurement.

**Method Study:** Method study ensures efficient and maximum use of resources like material, labour, plant facilities, it improve the production methods by reducing/ eliminating the work content and unnecessary methods; and it attains the maximum production which is good for the firm as well as the workers. The following stages are involved in methods study:

First of all, work for the purpose of methods study should be selected. Generally, methods study is done in jobs which involve complex and costly operations.

After selecting a particular job or work, details about the work should be gathered, such as purpose, location, sequence, relationship with the other work, methods of working, operators and facilities, etc.

After studying the relevant details of a work, an improved method should be developed for effectiveness, efficiency and operational simplicity. Unnecessary operations, activities should be avoided. An improved method might change the location and sequence of work, production methods and layout.

The method so developed should be used for the job or work for which it has been designed.

Follow-up is necessary to enquire as to whether the improved method is being implemented in practice and to find out deviations, if any.

**Work Measurement:** Work measurement aims at determining the effective time required to perform the work. The ineffective, wasteful or avoidable time is separated from effective required time to complete the work. The effective time so established in work measurement can be used for the purposes such as:

Incentive wage schemes which require time taken for completing a work;

improving utilization of men, machines and materials;

setting labour standards; and

achieving the objectives of cost control and cost reduction.

The following stages are involved in work measurement:

Selection of the work.

Measuring the actual time taken in the work done.



The total time so established for a job should be adjusted for fatigue, time taken in setting the tools, idleness involved in the work itself, etc.

### 5.2.3 Time-Keeping Department

The first step in accounting for labour cost is to prepare an accurate record of the time spent by each employee. Time keeping in labour costing and control is important because of the following reasons:

It accumulates the total number of hours worked by each employee so that his earnings can be calculated.

Absence of a time-keeping arrangement will create frustration among those employees who are punctual or bound by the attendance rules.

Certain benefits like pension and gratuity, leave with pay, provident fund, salary, promotion are linked with continuity of service of employees. Attendance records, in this regard, can be helpful and useful to employees.

Overhead costs being indirect costs are apportioned to different products on some equitable basis. Time keeping is necessary if apportionment is to be done on the basis of Labour hours.

TIME OR CLOCK CARD						
Worker's No..... Name ..... Dept.....				Card No..... Week ending .....		
Day	Morning		Afternoon		Overtime	
	In	Out	In	Out	In	Out
Monday	8:00	12:00	1:00	5:00	6:00	8:00
Tuesday	8:00	12:00	1:00	5:00		
Wednesday	8:00	12:00	1:00	5:00		
Thursday	8:00	12:00	1:00	5:00		
Friday	8:00	12:00	1:00	5:00		
Saturday	8:00	12:00	1:00	5:00		
				Hours	Rate Per Hour	Amount
Ordinary				44	10.00	440.00



Overtime	2	20.00	40.00
Total			
Deductions:			
Welfare Fund			
Fine		10.00	
Insurance		5.00	15.00
Net Amount Payable			465.00

### 5.2.4 Methods of Recording Attendance time

The most common form of attendance record is the clock card on which the employee punches the time at which he comes in and leaves the factory. Each week, a new card is prepared for each employee on the payroll. At the end of the week, the cards are collected and transferred to the payroll department for calculation of gross earnings.

#### Daily Time Sheets:

Each worker records the time spent by him on the work during the day for which sheet is provided to each worker. Since time is recorded on a daily basis, accuracy is built upon the time sheets. However, daily time sheets are generally not used. This could be used for maintenance and repairmen who have to do different jobs in different departments.

DAILY TIME REPORT								
Name (Worker) .....					Date.....			
Clock /Ticket No.....					Week No.....			
Cost Centre /Dept./Machine No.....								
Work Order No.		Description	Work Done	Time		Hours	For Cost Office	
Direct	Indirect			Started	Finished		Rate	Amount
Total Hrs:		Ordinary.....	Signed .....		Certified .....			
		Overtime .....	(Worker)		(Foreman)			

Clock cards provide a record of the total hours, employees were available on jobs. However, this



card does reveal as to how employees spend their time which is an important question to be solved before entries can be made in the cost records. This information is supplied by time tickets or daily labour summaries on which time keepers record the daily activities of direct labour: time spent on specific orders, time spent on indirect labour operations such as machine maintenance, or idle time waiting for reassignment or machine set-up.

### Weekly Time Sheets:

A sheet is given to each worker to record time on a weekly basis. However, weekly time sheets should be filled up without much delay or on each day failing which some inaccuracies are bound to occur on the time sheets.

<b>WEEKLEY TIME SHEET</b>										
Name (Worker) .....					Date.....					
Clock /Ticket No.....					Week ending.....					
Cost Centre /Dept./.....										
Job No.	Description	Days of the Week						Total Hours	For Cost Office	
		Mon.	Tue.	Wed.	Thu.	Fri.	Sat.		Rate	Amount
Total Hrs:		Ordinary.....		Signed .....		Certified .....				
		Overtime .....		(Worker)		(Foreman)				

### Job Card:

A job card or job ticket is maintained for every job. When a worker takes up a job, a job card (with or without details of the work to be done) bearing number of the job is given to him. He shall record in it the time of taking up and finishing the job. In most cases this is done by mechanical aids. As soon as a job is completed the worker is given job card of another job to be done by him. In case the job is suspended or the worker does not get another job soon after the completion of a job, he should contact the time-keeper so that appropriate booking of waiting time may be made on the 'Idle time card'.

A job card, thus, performs two functions.

It authorizes a worker to carry out the operations detailed thereon.

It enables the correct allocation of wages to jobs, operations or processes.

A proforma of Job Card is given below:



<b>JOB CARD</b>						
Date .....						
Work Order No.....			No .....			
Name of Worker .....			Job/ Operation No .....			
Clock No .....			Department .....			
Drawing No.....			Machine No.....			
Description of Job/ Operation	Time Started	Time Finished	Hours	For Cost Office		Remarks
				Rate	Amount	
Standard Hours..... Actual Time ..... Quantity of Output ..... Standard ..... Actual ..... Passed for ..... Rejected ..... Net ..... <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;">             Worker's Signature .....           </div> <div style="width: 45%;">             Foreman Signature .....           </div> </div>						

### 5.2.5 Payroll Department

Preparation of the payroll from clock cards, job or time tickets, or time sheets is done by the pay roll department. The payroll department (tabulation) is an intermediate function between the time-keeping (accumulation) and the cost accounting (analysis) department. The following are the functions of the payroll department:

1. To compute employee wages.
2. To prepare departmental payroll summaries.
3. To maintain individual employee payroll records.
4. To calculate payroll taxes, deductions and other related payroll liabilities.
5. Compilation of labour statistics for management.





The responsibilities of the payroll department regarding labour costs are:

1. To maintain a record of the job classification, department and wage rate for each employee.
2. To verify and to summarize the time of each worker as shown on the daily time cards.
3. To compute the wages earned by each worker.
4. To compute the payroll deductions under the Acts.

### 5.2.6 Cost Accounting Department

The cost accounting department collects and analyses all costs relating to labour. For this purpose it makes use of clock cards, job cards, daily or weekly time sheets, payroll sheets, etc.

The cost accounting department is also responsible for presenting clear and well designed report on labour. Each report should furnish information in the most practical manner. Such reports relate to normal and abnormal idle time, overtime, department labour costs, variances from budgeted labour costs, etc. Special reports may be prepared to inform the management of the effectiveness of labour policies and steps to be taken for proper control of labour costs.

## 5.3 Labour Turnover

In all business organisations, it is a common feature that some workers leave the employment and new work is join in place of those leaving. This change in work force is known as labour turnover. Labour turnover is thus defined as the rate of change in the composition of the labour force in the organisation. Labour turnover varies greatly between different trade and industries. For example, where part time and seasonal labour is employed, the rate will be higher.

### 5.3.1 Measurement of Labour Turnover

To facilitate comparisons between different periods and different undertakings, labour turnover may be expressed in a rate. There are three alternative methods by which this rate is computed. Once a particular method is used it should be consistently followed for comparative analysis. The methods are:

#### Separation method:

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



$$\text{Labour Turnover} = \frac{\text{No. of workers left during a period}}{\text{Average No. of workers during the period}} \times 100$$

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

Multiplication by 100 in the above formula indicates rate in percentage.

### Replacement method:

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

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

If new workers are engaged for expansion programme or any other such purpose, they are not considered for this computation.

### Flux method:

This shows the total change in the composition of labour force due to separations and additions of workers. The formula is:

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

### Illustration 4.4:

S.S.B. Co. supplies you the following information:

No. of workers on 1 April 2020	400
No. of workers on 30 April 2020	500
No. of worker resigned	35
No. of workers discharged	10
No. of replacements (New workers joined)	40

Calculate labour turnover rate

**Solution:**

Average No. of workers =  $(400 + 500) / 2 = 450$

No. of workers left =  $35 + 10 = 45$

Separation Rate =  $(45 / 450) \times 100 = 10\%$

Replacement Rate =  $(45 / 450) \times 100 = 8.8\%$

Flux Rate =  $(45 + 40) / 450 \times 100 = 18.8\%$

**5.3.2 Causes of labour Turnover**

Labour turnover reports should be prepared regularly to be placed before the management, giving a breakdown of the causes as to why the workers left. The causes may be classified in two broad categories:

(i) Avoidable causes; (ii) Unavoidable causes.

**Avoided causes.** These include:

Low wages and allowances.

Unhappy relations with co-workers and supervisors.

Unsatisfactory working conditions.

Lack of medical facilities, transport facilities etc.

**Unavoidable causes.** These include:

Personal dislike for job or environments.

Death or retirement.

Illness or accident.

Discharge on disciplinary grounds.

**5.3.3 Effect of Labour Turnover**

A certain amount of labour turnover will always take place. To a limited extent this may be welcome particularly at the lower management level that it creates vacancies for internal promotions and maintains the morals high for the young and the ambitious. Moreover, new workers bring new ideas and methods of doing work from other concerns.



Labour turnover is expensive. It should, therefore, be minimised because it results in increased cost of production for reasons stated below.

#### **5.3.4 Reduction and Control of Labour Turnover**

The following steps may be taken in this regard:

Devising a suitable and satisfactory wage policy.

Providing working conditions conducive to health and efficiency.

Impartial and sympathetic attitude of personnel management.

Encouraging labour participation in management.

Introducing an effective grievance procedure.

Strengthening the welfare measures.

#### **5.3.5 Labour Overtime**

Overtime work represents the work done beyond normal working hours. For overtime work, a worker is paid at a higher rate than the normal time rate. Usually it is double the normal rate. The additional amount expended on overtime work is known as overtime premium.

##### **Overtime Premium**

Overtime premium is paid to the workers for the extra time worked than the normal working hours specified in the Factories Act, 1948 or work agreement with the union. The extra time is paid at a higher rate than the normal time rate, for example, if a worker works beyond 8 hours in a day or 48 hours in a week, he is paid with double the wages for the extra time worked.

The overtime wages consists of two elements:

- (i) Normal wages for extra time, and
- (ii) Additional wages paid for the overtime worked.

##### **Accounting Treatment of Overtime Premium:**

Overtime hours at the normal rate are treated as direct labour cost and charged to production on the same basis as time worked during normal hours but the premium paid during the overtime period is not



a direct charge against production but is recovered as production overhead through overhead recovery rate.

Where the overtime is worked on a specific job to meet the time schedules or to carry out specific rush orders for which extra price is recovered, then the entire labour cost can be charged as direct labour cost to that job.

If overtime wages paid due to negligence or delay of worker of a particular department, it may be charged to the concerned department.

If the overtime premium is paid due to abnormal causes, it should be charged to Costing Profit and Loss Account.

**Control of Overtime Premium:**

To control the overtime premium, the following may be given due consideration:

Careful production planning and scheduling.

Analysis of reasons for overtime working.

Frequency of overtime working in each department.

If it is due to shortage of labour, steps may be taken to recruit more workers.

If overtime working is due to limiting machine hours available in the production departments, purchase extra machines, working extra shift, sub-contracting etc. may be considered.

Appropriate authority should sanction for overtime working.

Maintenance of proper records for overtime working and payments made for it will help in control of overtime.

Only in urgencies and real necessities the overtime workers may be engaged otherwise the practice of overtime working should be discouraged.

**Disadvantages of Overtime Working:**

The drawbacks due to overtime working are as follows:

The overtime working increases the fatigue and reduces the efficiency of the workers causing low productivity and higher production cost.



The workers will try to avoid work during normal time and prefers to work overtime for extra earnings.

If overtime working frequently allowed, it becomes a practice of working and workers may desist for any steps to control overtime.

It increases the administrative overhead costs.

Due to overtime working, it may not be possible for carry maintenance work of the plant and machinery and it may lead to sudden major breakdown of plant and machinery causing stoppage of production.

The continuous overtime working may lead to health hazards to workers and it may increase the accident rate at work place.

The uneven distribution of overtime working among the workers may cause discontent in other workers.

It increases the rate of depreciation of plant and machinery.

**Illustration 4.5:** In a factory Ram and Sham produce the same product using the same input of same material and at the same normal wage rate. Bonus is paid to both of them in the form of normal time wage rate adjusted by the proportion which time-saved bears to the standard time for the completion of the product. The time allotted to the product is fifty hours. Ram takes thirty hours and Sham takes forth hours to produce the product. The Factory Cost of the product for Ram is Rs. 3,100 and for Sham Rs. 3,280. The Factory Overhead Rate is Rs. 12 per man hour.

Calculate (i) Normal Wage Rate; (ii) Cost of material used for the product; and (iii) the input of material if the unit material cost is Rs. 16.

### Solution

Let x be the cost of material and y be the normal rate of wages per hour

FACTORY COST OF WORKMAN RAM	
Material	x
Wages	30y
Bonus ( $30y \times 20/50$ )	12y
Factory Overheads	360
Factory Cost	$x + 42 y + \text{Rs. } 360$
FACTORY COST OF WORKMAN SHYAM	



Material	x
Wages	40y
Bonus (40y × 10/50)	8y
Factory Overheads	480
Factory Cost	x + 48y + Rs. 480

The following two equations can be made

$$x + 42y + 360 = \text{Rs. } 3,100$$

$$x + 48y + 480 = \text{Rs. } \dots$$

On subtracting equation (i) from equation (ii)

$$6y = 180$$

$$\text{or } 6y = 180$$

$$y = 60/6 = 10$$

On substituting the value of y in equation (i)

$$x + 420 + 360 = 3,100$$

$$\text{or } x = 3,100 - 780$$

$$\text{or } x = 2,320$$

Thus:

Normal Wage Rate is Rs. 10 per hour

Cost of material used for the product is Rs. 2,320

Input of material is  $2,320/16 = 145$  units.

### 5.3.6 Labour Idle Time

If workers are paid on the basis of time, some difference may arise between the time for which they are paid on the basis of time and the actual time they spend on production. The difference is called Idle Time, i.e., the employer pays but, in return, derives no benefit. In short, it explains the time for which wages are paid but produce no output or workers remain idle.



Idle Time = Total Time spent by a worker – Actual Time spent on production.

Causes of Idle Time: There are three causes,

**Administrative Causes:** These are:

Appointing skilled workers in anticipation of future growths.

Unwilling to discharge skilled workers during depressions.

**Production-related Causes:** These are:

Breakdown of Plant/Machinery.

Waiting for work/raw materials/machines.

Lack/inadequate of power facility.

Waiting for instruction from superiors/supervisors.

**Economic Causes:** These are:

Cyclical fluctuations for which demand of the product reduces.

Demand for seasonal product decrease during off-season.

General recession in economy.

Fall in demand as a result of strike/lock-out, etc.

### **Types of Idle Time**

#### **Normal Idle Time:**

Normal idle time is unavoidable loss of labour hours arising out of usual course of business. It includes:

Tea break, lunch break or time lost from factory gate to actual place of work;

Time lost during the period between finishing of one job starting of another one;

Setting the machines/tools or implements;

Time lost for overcoming fatigue.

To some extent some of the above idle time may be controlled. Cost of normal idle time should be charged to factory overheads. But if it is found that a particular department is responsible for such loss, the cost of idle time should be charged to that particular department.





Cost of normal idle time should be charged to cost of production simply by inflating the hourly rate of wages, e.g. if idle time is considered as 10% of total labour hours and wages are paid for 8 hours Rs. 288, Cost of labour p.h. in that case will be =  $\text{Rs. } 288 / 7.2 \text{ hrs} = \text{Rs. } 40 \text{ per hour}$ .

### **Abnormal Idle Time**

Abnormal Idle Time is that time the wastage of which can be avoided if adequate precautions are taken. Some of them are:

Breakdown of machinery;

Power failure;

Non-availability of materials;

Strikes and lockout;

Fire, Flood and other hazards;

Bottlenecks in production;

Stoppage of work as a result of bad policy decisions by the management;

Excessive time taken to rectify the defects;

Excessive automation, etc.

### **Treatment of Abnormal Idle Time:**

Abnormal Idle Time can be treated in the following two methods:

**Costing Profit and Loss Account Method:** Cost of abnormal idle time should be transferred or debited to Costing Profit and Loss Account. Under this method, cost of abnormal idle time is not treated as a cost but the same is treated as a loss to the firm.

**Overhead Method:** Under this method, abnormal idle time is a part of factory overhead. Thus, cost of idle time should be apportioned among the different departments to have an idea about the same which is very helpful to the management to take adequate remedial measures.

### **Control of Idle Time:**

Idle time can be controlled thus:



There must be planned production and proper supervisions, so that idle time will be reduced to a minimum level.

Jobs in hand should be planned in such a manner that the workers do not have to wait for the work.

Instructions and drawing must be clear so that the workers are not confused or have to wait for clarifications.

Proper inspection and maintenance of the power plant must be made to avoid frequent power failure.

Timely supply of materials, proper maintenance of plant and machinery, adequate power supply will no doubt reduce the abnormal idle time.

## **5.4 Check Your Progress**

1. Fringe benefits are
  - a) Related to labour productivity
  - b) indirect forms of employee compensation
  - c) contract labour costs
  - d) monetary benefits
2. The difference between attendance time and work time is known as \_\_\_\_\_.
  - a) Idle time
  - b) Overtime
  - c) Standard time
  - d) Time taken
3. A document used for time keeping
  - a) Job card
  - b) Time card
  - c) Daily time sheet
  - d) All of these
4. Which among the following is an example of normal idle time?
  - a) Time lost due to shortage of materials
  - b) Time lost due to power failure



- c) Time lost due to waiting for instructions
  - d) Time taken for machine set up
5. Cost of abnormal idle time is transferred to \_\_\_\_\_
- a) Costing P&L a/c
  - b) Cost of production
  - c) Factory OH
  - d) None of the above
6. Labour turnover is measured by
- a) Replacement method
  - b) Separation method
  - c) Flux method
  - d) All of the above

## 5.5 Summary

Control over labour costs requires proper employment and efficient utilization of labour force. In a large industrial organization, control over labour cost is exercised by the personnel department, engineering department, time-keeping department, pay roll department and cost accounting department. The success of an industrial concern depends to a large extent upon the efficiency of labour is considerably affected by the amount of remuneration paid to it. Therefore, the importance of the method of wage payment must never be under-estimated. In addition to the basis methods of labour remuneration, there are a number of incentives plans to induce workers to work hard so as to produce more and earn more. Labour turnover is the rate of workers left or discharged during a given period to the average number of workers employed in the organization during that period. There are number of causes of labour turnover. There are three principal methods of measurement of labour turnover.

## 5.6 Keywords

**Methods Study:** It is conducted to evolve a better alternative of working by observing the different methods of performing the job.

**Job Evaluation:** It is the procedure designed to rank jobs and to measure the worth of a job for compensation purposes.



**Time Keeping:** It is the recording of attendance of a worker when he comes and leaves the factory.

**Labour Turnover:** It is the movement of people into and out of the organization.

**Time Study:** It involves the determination of standard time for an operation by direct time measurement.

## 5.7 Self-Assessment Test

### Short Answer Questions:

- Q.1 Describe briefly Direct and indirect labour
- Q.2 What is daily time sheet?
- Q.3 What is job card?
- Q.4 What do you mean by labour turnover?
- Q.5 What is idle time?

### Long Answer Questions:

- Q.1 Describe the various methods of recording time.
- Q.2 What do you understand by Time and Motion Study? Explain how Standard Time is set under Time Study? State how time and motion study is useful to management.
- Q.3 How would you measure Labour Turnover? What are the avoidable causes and its effects?
- Q.4 Explain the purpose of time keeping and time booking and state what are the detailed records normally maintained under each? Do you feel any need for reconciliation of these two? What is the benefit you expect, if such reconciliation is arrived out?

## 5.8 Answers to Check Your Progress

1(b), 2 (a), 3(b), 4 (d), 5(a), 6 (d)

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<b>Lesson No.:</b> 6	<b>Vetter:</b> Prof. Suresh Kumar Mittal
<b>Labour Cost: Methods of Wage Payment</b>	

**Structure**

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- 6.1 Introduction
  - 6.1.1 Meaning of Wages
  - 6.1.2 Essential features of Ideal Wage System
- 6.2 System of Wage Payment
- 6.3 Incentive Schemes
- 6.4 Check Your Progress
- 6.5 Summary
- 6.6 Keywords
- 6.7 Self-Assessment Test
- 6.8 Answers to Check Your Progress
- 6.9 References/ Suggested Readings

**6.0 Learning Objectives**

After reading this lesson, you should be able to

- Know the meaning of wages
- Understand the features of an ideal wage system
- Explain different wage payment methods

**6.1 Introduction**



Wage is monetary compensation paid by an employer to an employee in exchange for work done. Payment may be calculated as a fixed amount for each task completed or at an hourly or daily rate, or based on an easily measured quantity of work done. Wages are part of the expenses that are involved in running a business. Payment by wage contrasts with salaried work, in which the employer pays an arranged amount at steady intervals (such as a week or month) regardless of hours worked, with commission which conditions pay on individual performance, and with compensation based on the performance of the company as a whole. Waged employees may also receive tips or gratuity paid directly by clients and employee benefits which are non-monetary forms of compensation. Since wage labour is the predominant form of work, the term “wage” sometimes refers to all forms (or all monetary forms) of employee compensation.

### 6.1.1 Meaning of Wages

In economics, the price paid to labour for its contribution to the process of production is called wages. Labour is an important factor of production. If there is no labour to work, all other factors, be it land or capital, will remain idle.

*Thus, Karl Marx termed labour as the “creator of all value”.*

However, labour alone cannot produce as most of the production is the result of joint efforts of different factors of production. Therefore, the share of the produce paid to labour for its production activity is called wage.

#### Definitions:

- *According to Benham, “A wage may be defined as the sum of money paid under contract by an employer to worker for services rendered.”*
- *According to A.H. Hansen, “Wages is the payment to labour for its assistance to production.”*
- *According to Mc Connell, ‘Wage rate is the price paid for the use of labour.’*
- *According to J.R. Turner, “A wage is price, it is the price paid by the employer to the worker on account of labour performed.”*

### 6.1.2 Essential features of ideal wage system



Wages are the biggest incentive for employees to perform their jobs sincerely and error free. Several wage systems have been devised for fulfilling the requirements of both employees and employers.

Thus, the wage system should be planned carefully. A system that reduces the labour cost per unit while increasing the output and giving a fair return to workers will be the most suitable one. The aim of the wage system should be the introduction of a fair wage. A good wage system should possess the following characteristics:

- **Simplicity:** The wage system should be easy to understand and simple to operate. A complex system may lead to strikes and agitations and may be a hindrance to a harmonious employer-employee relationship.
- **Fair to Employer and Employee:** The system should be satisfactory from the point of view of both employer and employees.
- **Guaranteed minimum wage:** The system should guarantee a minimum wage to every worker irrespective of the work done by them.
- **Incentive to work:** Adequate incentives should be provided to the workers to work hard with great care. Efficient workers should be able to earn more wages as compared to the inefficient workers.
- **Quality output:** The system should encourage the workers not only to increase the quantity of output but also to improve the quality of output.
- **Certainty:** There shouldn't be any ambiguity in the wage distribution.
- **Conformity with local and national labour laws:** The system should conform with various labour laws and regulations both local and national.
- **Minimization of labour turnover:** The system should minimize labor turnover, absenteeism and late attendance.
- **Adjustment to price changes:** The system should invariably contain provision for automatic rise in wages as cost of living index increases.
- **Flexibility:** The system should incorporate flexibility to adjust with changing circumstances of the business.





## 6.2 System of Wage Payment

The system of wage payment are as follows:

- Time Rate System
- Piece Rate System
- Taylor's Differential Piece Rate System
- Merrick's Differential Piece Rate System

### 6.2.1 Time Rate System

Time Rate System is otherwise called as Time Work, Day Work, Day Wages and Day Rate. It is the oldest method of remuneration. The time rate system is that system of wage payment in which the workers are paid on the basis of time spent by them in the factory. Under this system, the workers and employees are paid wages on the basis of the time they have worked rather than the volume of output they have produced. The wage rate is fixed on hourly, daily weekly, fortnightly or monthly on the basis of the nature of work. The time is the prevalent rate of the industry or area. The rate may either be a fixed one or there may be a progressive scale of pay that starts at minimum and rises up to a maximum, in various stages by way of increments.

#### Time Rate System Formula

This time rate system calculation is based on the working hours of the employee that is the amount of time spent on the work along with the amount of work delivered within the specific period of time. And the actual formula that helps to calculate the total amount by using this time rate system formula is

$$\text{Wages} = \text{Total hours worked} \times \text{Wages rate per hour.}$$

#### **Illustration: 1**

An employee works for Rs. 20 an hour and he spends a total of around 400 Hours in a month of 30 days at work. What would be his salary?

#### **Solution:**

Calculation under time rate system.

$$\text{Total hours worked} = 400 \text{ Hours, Wage per hour} = \text{Rs. } 20$$

$$\text{Wages} = \text{Total hours worked} \times \text{Wages rate per hour.}$$



$$\text{Wages} = 400 \times 20 = \text{Rs. } 8000.$$

### Features of Time Wage Payment Methods

- Very popular and easy form of payment.
- Helpful in the payroll function
- All the calculations are quite simple
- There will be no irregularity or uncertainty regarding income or wages
- Can concentrate more on the work as the income will be regular

### Suitability of Time Wage Payment Methods

- When the output or result cannot be assessed or measured
- The work may get delayed depending upon the industry you are working for.
- When the quality of work is given preference
- When workers having an idea regarding the output quantity
- When employees are freshers and are in training period for the respected job.
- When trying to reduce the risk of errors or accidents depending upon the work speed

### Advantages of Time Rate System

There are several advantages and disadvantages of the time rate systems, and these advantages and disadvantages create differentiation for the purpose of the company benefits.

- **Simple formulation:** The calculation and nature of the time rate system are very easy and simple to understand. It is one of the methods that can be understood by all the employers of the company. Its measurement and the calculation of this wage system provide the actual picture about the overall time rate system. Therefore, as it is mentioned earlier, it is easy and simple to understand and formulate in the company.
- **Easy access:** The time rate system is very easy to access and that is because of its brief and clear detailed information. The details collected and maintained through time rate system are very economical. In other words, it is one of the simple methods of understanding the total wages of the employees of the company. It makes records maintenance, affordable and clear. Therefore, it is one of the economic methods of calculating wages under time rate systems.



- **Production quality:** As per the information provided by different sources of the production unit, the company performs better with these time rate systems. Eventually, the production quality will increase and the employer monitors all the production units without any mistakes. Therefore, because of this time rate system, the quality of production gets improved and it favours the overall development of the company.
- **Fixed wage:** Even when it comes to a salary expense calculation, the company earns better profits because of its fixed rate of price. The time rate systems incorporate fixed-wage systems because of which the company using it confirms a fixed rate of price per day. And this fixed rate per price helps to increase the profits of the company as it's only a small amount of profit returns.
- **Improves equality among employees:** Because of the time rate system, the employees of the company may feel equal within themselves. Most of the time several companies face a certain kind of union problems and if the company incorporates these time rate system policy, then the possibility of inequality issue will be considerably less among the employees of the company. Therefore, all the employees of the company experience equality among them.

### Disadvantages of Time Rate System

- **It ignores efficiency:** As per the formulation of this time rate system, the actual focus of this time rate system is on the part of the production where the employee works according to the specific number of time and production.

Most importantly the work delivered by the employees will be based on their total daily production output. And it is obvious that it completely ignores the efficiency of its employees, because of which deserving employee feels unappreciated for their work.

- **Loss of skilled workers:** As explained above, the company works according to the specific production rate and it totally ignores the efficiency of its employees and because of that, the employees of the company decide to leave the company. This is one of the disadvantages of this time rate system. Therefore, the company suffers a loss of their skilled workers because of the time rate system methods of wage calculations.
- **Inefficiency:** The workers and the employees of the company eventually understand that the company expects a certain level of production from them not the quality of work from them. This kind of ignorance creates inefficiency among the employees of the company. Therefore, all the



employees of the company decide to work as per their specific production expectation and they try to not bring efficiency in their work because their efficiency will not reward them for their excellent work delivery.

- **Conflicts of thinking:** Most of the time the company incorporates some kind of rules and regulations in the company without consulting their employees of the company. And when it comes to the wage system and salary system, then the employees of the company will definitely have some conflicts of thinking. This conflict of thinking creates a communication difference between the employees and the employers of the company which is not at all good for the company development.
- **Cost of production:** As the company prefers its employees to provide a specified number of productions and the employees of the company meet their daily production unit, then there is a possibility that the company might increase the production output. This increment in production output leads to the increment of cost of production. Therefore, this can affect the company effectively because of this time rate system of the wage calculations.
- **Increased supervision cost:** When it comes to the cost of supervision the company may end up being in trouble because of these time rate systems. Therefore, the company needs to cut back its supervision cost so that they can regain the position of the company. And to make that happen, the company needs to cut back from the time rate systems so that they can reduce the cost of supervision eventually.

### 6.2.2 Piece Rate System

The piece rate system is that system of wage payment in which the workers are paid on the basis of the units of output produced. Piece rate system does not consider the time spent by the workers. Piece rate system is the method of remunerating the workers according to the number of unit produced or job completed. It is also known as payment by result or output. Piece rate system pays wages at a fixed piece rate for each unit of output produced. The total wages earned by a worker is calculated by using the following formula.

Total Wages Earned= Total units of outputs produced x Wage rate per unit of output.

OR

Total Wages Earned= Output x Piece Rate



*(Piece-rate pay is also sometimes referred to as Payment by Results System).*

### **Suitability of Piece rate pay system Methods**

Here are a few cases where the piece rate system methods can be successfully applied.

- When the type of work is repetitive in nature
- When the quantity of output can be assessed
- When goods quality needs to be measured
- Workers are paid reasonable rates.
- When a fair and acceptable piece rate is fixed
- To create discipline among workers time cards are introduced
- Rates need to be adjusted depending on the price level changes
- Sufficient sources are present for production increase

### **Types of Piece Rate Pay System**

There are mainly 2 types of piece-rate system. They are:-

- **Straight piece rate system:** This is the type of wage system where the wages are paid to the workers based on the output or result of work done.
- **Differential piece rate system:** This is a type of wage system where the wages are paid to the workers after the completion of work. High piece rate is offered to workers who completed the work within the given time and low piece rate for those who exceeded the given time for the task.

### **Advantages of Piece Rate Pay System**

- **Increases the efficiency of all the employees:** One of the biggest and major advantages of this piece-rate pay system is that it helps to increase the efficiency of the employees keeping them busy all the time. They are well aware of the fact that them getting paid or not is dependent on their own work output. If they fail to work efficiently and quickly then that is going to bring about their own downfall. Having such efficient workers in the company not only ensures that the work is done quickly but it also ensures that the company rises from strength to strength slowly making its way to the top.
- **They do not constantly require any kind of micromanagement:** In the time rate system, the workers need to have constant supervision, because if not then they will try to drag out the task for



as long as possible so that they can get as much money as possible. Why would they try to finish the task off faster when they can get more money for doing nothing at all?

Tactics like this are often employed by the workers, where they take the employers for a ride. In this piece-rate plan system, very often the workers take it upon themselves to do the task as fast as they can and they have their own sense of responsibility.

- **It is very easy to calculate the dues of the worker:** As mentioned above, the simple formula which is applied to calculate the earnings of the workers makes things rather simple for everyone concerned. In the time rate system, keeping a track for the number of hours of work done by each employee becomes a very difficult task indeed and most often there is no proof or accountability.

In this system, everything is very clear and transparent, since if the task is done, then the finished product will serve as proof. The few calculations involved means that there is less scope for error as well as mistakes.

- **Workers do not end up wasting any time:** In this age, time is of the essence and time means money. If the workers take their own sweet time completing the task at hand then the only one who is going to suffer is the company. The company will suffer on two fronts, firstly they will have to keep paying the employees more and more money because they are taking so much time with the work and secondly, because they will not have any products to sell since the employees are working so slowly.

A major advantage of a system like this is that the employees are seldom idle and they are always busy and working as hard as they can to get good results.

- **They are encouraged to think of better working methods:** Owing to the fact that the workers know that the more output they produce, the better things will be for them and it is for this reason that the employees always have their head in the game and are trying to think of new and innovative ways of increasing their output.

Doing things in this way has a dual benefit firstly it increases the amount of money which the employees are able to make and secondly, it increases the profits which the company is able to make. If everyone thinks of innovative ways to get jobs done then the company is bound to make a huge mark for itself.



- **The number of products produced is much higher:** Another major advantage of this kind of system is that the number of products produced is very high and since the number of products produced is so high, the cost of production becomes lower for the company.

In the other systems, chances are the cost becomes so high because the workers take so much of time to complete even one product. So even if the demand is high, the supply is limited. Here the demand and supply are both high allowing the company to reap maximum benefits and keep all the customers happy and satisfied.

- **The workers set deadlines for themselves:** Finally, rather than the bosses setting deadlines for the workers, the workers set their own deadlines and sometimes even finish the task before the stipulated time. Everything is dependent on them, including the money which they make so that is why they take their job very seriously and even work from home when they think that they are running short of time.

### Disadvantages of Piece Rate Pay System

- **Workers pay much more attention to quantity and not quality:** As it is often said, there are two sides to every story, so even if there are a number of advantages of the system, there are also disadvantages. The major disadvantage of this kind of piece-rate pay is that the workers try too hard to finish the task at hand, that the quality of work suffers.

In the attempt of trying to make more money, they often cut corners and even give up incomplete work hoping that this will go undetected. Things like this greatly affect the reputation and name of the company concerned.

- **Planning for the future becomes rather tough:** As mentioned above, the workers often decide on their own deadline and they complete the work when they can, it is for this very reason that there is no uniformity in the work output and it becomes quite a challenging task to plan for the future of the company or to even make out a proper schedule of production.
- **Finding and fixing on a reasonable piece cost is a rather tough task:** Another big disadvantage of this system is that the workers and employers find it very tough to fix a reasonable cost for the finished product.

Narrowing down on one figure which both parties will be happy with is quite a challenging and even time-consuming task which requires hours of talking, convincing and negotiations.



- **It puts immense pressure on all the employees:** In such a system the workers try their best to make as many products as possible. In the attempt of trying to make more and more money, they often end up overworking themselves. Doing too much work without taking any breaks is bound to take a toll on the health of these workers. As a result, they might come in for serious problems like stress, heart trouble or even high blood pressure.
- **Sometimes even more supervision is required:** As mentioned above, an advantage of the system is that the workers work independently and don't need micromanaging. But sometimes in the attempt of trying to work quicker, the workers give up bad quality work and even use inferior quality products. By this, the finished products require even more scrutiny and most often many products get rejected because they are not fit to be sold to the customers.

### 6.2.3 Taylor's Differential Piece Rate System

Taylor's Differential Piece-Rate System was introduced by F.W. Taylor, who believed that the workers should be paid on the basis of their degree of efficiencies. Under this method, with the help of Time and Motion Study, the standard time for the completion of a job is fixed on the basis of which the performance of the workers is evaluated.

Taylor proceeded on the assumption that through time and motion study it is possible to fix a standard time for doing a particular task. To encourage the workers to complete the work within the standard time, Taylor advocated two piece rates, so that if a worker performs the work within or less than the standard time, he is paid a higher piece rate, and if he does not complete the work within the standard time, he is given a lower piece rate.

#### **Illustration: 2**

There are two piece-rates, one who reach the standard output or exceeds it, is paid 120 percent of the piece rate. While the one who fails to reach the standard level of output, is paid 80 percent of the piece-rate. The minimum wages of the worker are not guaranteed.

#### **Solution:**

- Standard Output = 200 units
- Rate per unit = Rs.10
- Case (1): Output = 220 units





- Earnings =  $220 \times (120/200) \times 10 = \text{Rs. } 132$
- Case (2): Output = 180 units
- Earnings =  $180 \times (80/200) \times 10 = \text{Rs. } 72$
- It is clear from the above example that the worker is paid a higher rate (Rs. 132) for high production (220 units) and low rate (Rs. 72) for low production (180 units).

### Features of Taylor's differential piece rate system

- The system is based on piece rates.
- The standard output for unit of time is pre-determined on the basis of time and motion study.
- There are two piece rates, one lower and another higher. Those who reach the standard or exceed it, get wages at higher piece rate (e.g. 120% of piece rate) and those who fail to reach it, get wages at a lower piece rate (e.g. 80% of piece rate).
- Minimum wages for the workers are not guaranteed.

### Advantages of Taylor's differential piece rate system

- It makes a distinction between efficient and inefficient workers. Lazy and inefficient workers are penalised, while efficient workers are rewarded.
- The basis of this system is scientific. It is based on proper work study.
- It helps in spotting and eliminating inefficient workers.

### Disadvantages of Taylor's differential piece rate system

- A worker missing the standard even by narrow margin is penalised heavily.
- It is more mechanical and less humane.
- Trade unions oppose this plan.
- It may lead to discontentment among workers.

### 6.2.4 Merrick's Differential Piece Rate System

The worker is paid the straight price rate up to 83% of the standard output, 10 % above the normal rate for producing between 83% – 100% and 20% above the normal rate for producing more than 100% of the standard output. Here also, the minimum wages of the worker are not guaranteed.

### Advantages of Merrick Differential Piece Rate System



- This plan is liberal for the efficient workers. The workers producing more, get their wages at increasing rates.
- There is no sudden rise in the wages at one point.
- It has all merits of Taylor's Differential plan.

### **Disadvantages of Merrick Differential Piece Rate System**

- The system does not guarantee minimum wages for the workers.
- There is wide gap in slabs. All workers producing 1% to 83% of the standard output are considered as sub-standard workers and are paid at the same piece rate.
- A worker missing the standard even by narrow margin is penalised heavily.
- It is more mechanical and less humane.
- Trade unions oppose this plan.
- It may lead to discontentment among workers.

### **Illustration: 3**

Standard Output = 200 units; Piece-rate = Rs. 10

Case (1): Output = 160 units; Case (2): Output = 180 units; Case (3): Output = 220 units

### **Solution:**

Case (1): Output = 160 units

- Efficiency =  $160/200 \times 100 = 80\%$
- Since the efficiency is less than 83%, the worker is paid only the basic rate, i.e. Rs. 10. Thus, earnings will be Rs. 800 ( $80 \times 10$ ).

Case (2): Output = 180 units

- Efficiency =  $180/200 \times 100 = 90\%$
- As the efficiency is more than 83% but less than 100 percent, 10% above the normal rate is paid to the worker. Thus,
- Earnings =  $90 \times 110/100 \times 10 = \text{Rs. } 990$

Case (3): Output = 220 units

- Efficiency =  $220/200 \times 100 = 110\%$



- As the efficiency is 110%, 20% above the normal rate is paid to the worker. Thus,
- $\text{Earnings} = 110 \times 120/100 \times 10 = \text{Rs. } 1330$

### 6.3 Incentive Schemes

Wage incentive refers to performance linked compensation paid to improve motivation and productivity. It is the monetary inducements offered to employees to make them perform beyond the acceptance standards. Incentive schemes for payment of wages are as follows:

- Halsey Premium (Bonus) Plan
- Rowan Premium Scheme
- Comparison Halsey & Rowan Plan
- Gantt Task and Bonus System
- Emerson Efficiency Plan
- Bedaux Plan
- Haynes Plan

#### 6.3.1 Halsey Premium (Bonus) Plan

This plan was introduced by F.A. Halsey in 1981. It is a simple combination of time and piece rate system. Both employer and employee get the benefit of time saved by the employee. Therefore, this method is also called 'Split Bonus Plan'. Following are the features of this plan:

- Workers are paid at a rate per hour for the actual time taken by them.
- A standard time is set for each piece of work, job or operation.
- If a worker takes standard time or more than standard time to complete his work, he is paid wages for the actual time taken by him at the time rate. In other words, under this method time wages are guaranteed.
- If a worker takes less than standard time, he is paid a bonus equal to 50% of the time saved at the time rate fixed. Thus, under this system, total earnings of a worker are equal to wages for the actual time taken by him plus a bonus.

**Advantages of this plan are as follows:**

- It is easy to understand and easy to work.



- Under this system efficiency is not penalised.
- It records efficiency so it is more profitable for efficient workers.
- As bonus is given only for the time saved, incentive is given to workers to save time.
- The saving in time results in reduction in labour cost per unit and fixed overhead cost per unit.
- This scheme is beneficial for both employer and employee.

**Disadvantages of this plan are as follows:**

- Extra efficiency of a worker is not fully rewarded.
- Fixation of standard time is really a difficult task.
- If standard time is not correctly fixed, there may be disputes between the employer and the employee.
- Workers do not like the employer to share the benefit of time saved by them.
- Under this method the quality of the product is deteriorated.

**The formula for calculating bonus and total earnings is as follows:**

- Bonus = 50% of [Time saved  $\times$  Time rate]
- Total Earnings = Time rate  $\times$  Time taken + 50% of [Time Saved  $\times$  Time rate]

**Illustration: 4**

Standard Time 8 Hours; Standard output fixed = 12 units.

Normal piece rate is C5 per hour; Premium 50%

Calculate the wage payment for the day if the output is 15 units, 12 units, 10 units, 8 units.

**Solution:**

Unit Produced	Time Wage for 8 Hours (Rs.)	Premium (Rs.)	Day Wages (Rs.)	Cost Per Unit (Rs.)
a) 08	40	----	40.00	5.00
b) 10	40	----	40.00	4.00
c) 12	40	----	40.00	3.33
d) 15	40	5.00	45.00	3.00



In option d 3 units produced more than standard. As per 12 units in 8 hours, 3 units production time is 2 hours. Wage for 2 hours is Rs.10, and 50% premium is Rs. 5.

### 6.3.2 Rowan Premium Scheme

This plan is also similar to Halsey Plan except in the calculation of bonus. The main features of Rowan Plan are as follows:

- Wages are paid on time basis for the actual time worked by the workers.
- A standard time is determined for each piece of work.
- If a worker completes his work in standard time or in more than the standard time, he is paid wages for the time actually taken by him.
- If a worker completes his work in less than the standard time, he is entitled to a bonus.
- Bonus is that proportion of wages of actual time taken which the time saved bears to the standard time.

#### Advantages of Rowan Plan are as follows:

- Like Halsey plan, it provides guaranteed minimum wage to workers. That means, inefficiency is not penalised.
- It provides quarter incentive (bonus) than Halsey plan up to 50% of the time saved.
- It protects the employer against loose rate setting, i.e., against errors in the setting up of standards.
- The gain arising from the time saved by the worker is shared by both employer and employee.
- It results in reduction in labour, cost per unit.
- It contributes to reduction in fixed overheads cost per unit.
- It acts as a check on over-earnings.

#### Disadvantages of Rowan Plan are as follows:

- This system cannot be easily understood by the workers.
- This method of incentive wage payment is not easy to operate.
- This system encourages inaccuracies in rate fixing.
- The incentive given to workers, under this method, is low at higher levels of efficiency. That means the incentive given to a more efficient worker is very low.



- The sharing of the gain arising from the time saved by both the employer and the workers, provided for under this method is resented by the workers.

Its formula is:

- Bonus = (Time Saved/Time allowed) × Time taken × Time rate
- Earnings = (Time taken × Rate) + Bonus

OR

$$= (\text{Time taken} \times \text{Hourly rate}) + \frac{\text{Time saved}}{\text{Standard time}} \times \text{Time taken} \times \text{Hourly rate}$$

### **Illustration: 5**

Standard Time 8 Hours; Standard Hour Rate = Rs. 5 per hour;

Calculate the wage payment for the day if he completed his work in 6 hours.

### **Solution:**

- Total Wages = (Time taken × Rate) + [(Time Saved/Time allowed) × Time taken × Time rate]
- Total Wages = (6 × 5.00) + [(2/8) × 6 × 5] = 30.00 + 7.50 = Rs. 37.50

### **6.3.3 Comparison between Halsey & Rowan Plan**

- Halsey scheme is simple to understand and execute, whereas Rowan plan is difficult to understand and execute.
- Under the Halsey scheme, the gains arising from the time saved is shared by employer and employees equally but under Rowan scheme it not shared equally.
- Under Halsey plan, bonus is given for 50% of the time saved at the hourly rate. But under the Rowan plan, bonus is given for that portion of the time taken which time saved bears to the standard time at the hourly rate.
- Under the Halsey plan, bonus increases steadily with rise in efficiency. But under the Rowan plan, bonus increases rapidly up to a saving of 50% of the standard time and thereafter it decreases.
- When the work is completed less than half of the standard time, Halsey plan provides more bonus than Rowan plan. On the other hand, when the work is completed in more than 50% of standard time, Rowan plan provides more bonus than Halsey plan.



- The labour cost per unit under the Rowan plan is more than that under the Halsey plan upto a saving of 50% of the standard time. But beyond 50% of the saving of the standard time, the labour cost per unit under the Halsey plan is more than that under the Rowan plan.

**Illustration: 6**

Standard unit produced in one hour = 10 units; Standard time per day = 8 hours;

Wages = Rs. 5 per hour; Total output in day is = 100 units in 8 hours; Bonus = 40% of time saved

**Solution:**

Time saved =  $20\text{units}/10\text{units in one hour} = 2\text{ hours}$

**Wages as per Halsey**

- $= (\text{Time taken} \times \text{Rate}) + \% \text{ of premium } (\text{Time saved} \times \text{Hourly Rate})$
- Total Wages =  $(8 \times 5.00) + 40\% (2 \times 5) = 40.00 + 4.00 = \text{Rs. } 44.00$

**Wages as per Rowan**

- $= (\text{Time taken} \times \text{Rate}) + [(\text{Time Saved}/\text{Time allowed}) \times \text{Time taken} \times \text{Time rate}]$
- Total Wages =  $(8 \times 5.00) + [(2/8) \times 8 \times 5] = 40.00 + 10.00 = \text{Rs. } 50.00$

**6.3.4 Gantt Task and Bonus System**

H.L. Gantt, an associate of Taylor, devised this scheme on the basis of Taylor's plan. Under this scheme, fixed time rates are guaranteed. Output standards and time. Standards are established for the performance of each job. Workers completing the standard job within the standard time or a shorter time receive wages for the standard time plus a bonus! The bonus is a percentage, varying from 20 to 50, of the wage for the standard time. When a worker fails to turn out the required quantity of products, he simply gets his time rate without any bonus.

**Illustration: 7**

Standard Rate: Rs. 2 per hour; Standard hours for the job 10 hours; Bonus is 20% of standard time.

- Worker had done the work in 12 hours.
- Worker had done the work in 10 hours.
- Worker had done the work in 8 hours.

**Solution:**

First worker shall obtain at the rate of Rs. 2 per hour the wages for the work for 12 hours that is, Rs. 24. Second worker shall acquire the wages for 10 hours at the rate of Rs. 2 per hours that is Rs. 20 plus 20% of 10 hours that is for 2 hours @ 2 or Rs. 4, so in aggregate 24. We can state that he shall be compensated for 12 hours. The 3rd worker who does the work in 8 hours shall obtain the wages for 10 hours because it is the standard time set for the job plus 20% of 10 hours. So, his compensation shall be  $10 \times \text{Rs. } 2 + 2 \times \text{Rs. } 2$  that is,  $\text{Rs. } 20 + 4 = \text{Rs. } 24$  per hour. So, with the reduction of time spent on the job, the salary per hour increases and therefore, the total earnings per day go on rising. So, this system is also termed as Progressive Rate system. So, it is a system of time-rate for sub-standard workers and piece-rate for above standard and standard workers.

**Advantages of Gantt Task and Bonus System**

- It is simple and easily understood.
- It guarantees day wages and also provides incentive to efficient workmen.
- The employer derives the benefit of decreasing it with higher output.

**Disdvantages of Gantt Task and Bonus System**

- If the minimum wages are kept high due to union pressure, there will not be much incentive for better performance.
- Labour cost is high for low production and also upto standard output because of guaranteed day wages and bonus.
- The scheme is preferred by the totally inefficient workers as well as by the most efficient workers. Reasonably efficient workers cut a sorry figure.

**6.3.5 Emerson's Efficiency Plan**

This plan has been named after Harrington Emerson; the innovator of this plan. Under Emerson Plan, the standard time for the completion of a task is fixed against which the actual performance of the workers is measured. The worker's efficiency can be determined by dividing the time taken by the standard time.





In Emerson Plan, the worker is paid only the time rate for the efficiency up to 67%. At 100% efficiency, the worker is paid time wages, plus a bonus of 20% on the wages earned. The worker is paid one percent additional bonus for each additional one percent efficiency added after the standard.

**Illustration: 8**

Standard output in 10 Hours = 200 units; Rate per unit = Rs. 2

Case (1): Output in 10 Hours = 100 units; Case (2): Output in 10 Hours = 200 units; Case (3): Output in 10 Hours = 260 units

**Solution:**

Case (1): Output in 10 Hours = 100 units

- Efficiency = 50% ( $100/200 \times 100$ )
- As efficiency is below 67% the worker is entitled to only time wage, thus, Earnings =  $10 \times 2 = \text{Rs. } 20$ .

Case (2): Output in 10 Hours = 200 units

- Efficiency = 100% ( $200/200 \times 100$ )
- As the efficiency is 100%, then the worker is paid time wages, plus a bonus of 20% on wages earned. Thus,
- Earnings:
- Time Wages =  $10 \times 2 = \text{Rs. } 20$
- Bonus =  $20/100 \times 20 = \text{Rs. } 4$
- Total earnings = Rs. 24

Case (3): Output in 10 Hours = 260 units

- Efficiency = 130% ( $260/200 \times 100$ )
- For 100% efficiency, the worker will get a bonus of 20% on wages earned, plus one percent additional bonus for every one percent increase in efficiency, i.e. 30%. Thus, the total bonus of 50% of time wage is paid to the worker.
- Earnings:
- Time wages =  $10 \times 2 = \text{Rs. } 20$



- $\text{Bonus} = 50/100 \times 20 = \text{Rs. } 10$
- $\text{Total Earnings} = \text{Rs. } 30$

#### **Advantages of Emerson's Efficiency Plan**

- Beginners are encouraged to work hard under this plan.
- Proper attention is paid to different kinds of workers.
- It is easy to understand the Emerson's Plan.
- It possesses rational determination of efficiency.
- The calculation of efficiency is logical.
- This plan can be applied to individual tasks as well as group tasks.

#### **Disadvantages of Emerson's Efficiency Plan**

- Labour cost is increased due to payment of bonus on low level of production.
- There is low rate of bonus in the beginning.
- It is a complicated plan as far as calculation is concerned.
- It requires a lot of clerical work.
- Under this plan, management may be tempted to fix a very high level of standard output.

#### **6.3.6 Bedaux Plan**

Under this plan, standard time of each job is determined in minutes known as Bedaux points or B's. One B unit represents the amount of work which an average worker can do under ordinary conditions in one minute. The standard time, is determined by work study and each job is assigned the number of B's. Under this system, the worker receives his daily or hourly rate plus (+) 75% of the points saved, multiplied by one sixtieth of his hourly rate. The remaining balance of 25% is paid to supervisors and indirect workers. Thus –

$$\text{Earnings} = (\text{Hours worked} \times \text{Hourly rate}) + \text{Bonus}$$

#### **Advantages of Bedaux Plan**

- It guarantees minimum wage to all workers.
- Output of workers is measured in terms of common unit known as B's.
- As the benefit of 25% of time saved is given to supervisors and indirect workers, Bedaux plan may



be extended to the department as a whole including indirect workers.

### Disadvantages of Bedaux Plan

- Detailed calculation of 'B' units increases of clerical works. This system is thus comparatively costly.
- This system is generally not preferred by workers because they do not get the full benefit of the time saved by them.

### Illustration: 9

Standard Time 8 Hours; Standard output fixed = 12 units.

Normal piece rate is C5 per hour; Bonus = 75%

Calculate the wage payment for the day if the output is 8 units, 10 units, 12 units, 15 units.

### Solution:

1 Hour = 60 B

Total B in 8 Hours = 60 B × 8 = 480 B

B units per unit of output = 480/12 = 40B per unit

Unit Produced	'B' Units	'B' above standard	Time/ Hour	Rate per hour (Rs.)	Day wages (Rs.)	Bonus (Rs.) 75%	Total Wages (C)	Cost Per Unit (Rs.)
8	320	----	8	5.00	40.00	----	40.00	5.00
10	400	----	8	5.00	40.00	----	40.00	4.00
12	480	----	8	5.00	40.00	----	40.00	3.33
15	600	120	8	5.00	40.00	7.50	47.50	3.17

- 12 units produced in 8 hours
- Thus  $12/8 = 1.5$  units in one hour
- Extra 3 units produced in 2 hours



- Wages for 2 hours is = Rs. 10
- Bonus is 75% of Rs. 10 = Rs. 7.50

### 6.3.7 Haynes Plan

This system is similar to the Bedaux plan following are the difference between Haynes and Bedaux plan.

- Standard minute known as 'Maint', instead of 'B'.
- Bonus is only 50% as compared to 75% in Bedaux plan. The remaining balance of 10% is paid to supervisors and 40% is retained by the employers. Thus –
- Earnings = (Hours worked x Hourly rate) + Bonus

## 6.4 Check Your Progress

1. A satisfactory system of wage payment should
  - a) Deprive the employer of a fair margin of profit
  - b) Guarantee a minimum living wage
  - c) Provide non-financial incentives
  - d) None of the above
2. Time wage system
  - a) Benefits the less efficient workers
  - b) Increase cost of production
  - c) Satisfies trade unions
  - d) Pays bonus
3. When time saved is more than 50% of time allowed, Halsey plan allows
  - a) More wages than Rowan plan
  - b) Equal wages as compared to Rowan plan
  - c) Less wages than Rowan plan
  - d) None of the above
4. In which of the following plans, time wages are not guaranteed?
  - a) Halsey
  - b) Rowan
  - c) Taylor



- d) Gantt
5. Standard time for a job is 8 hours and actual time taken is 6 hours. What is the total wages payable under Halsey plan if wage rate is Rs. 10 per hour?
- a) Rs. 90  
b) Rs. 80  
c) Rs. 70  
d) Rs. 60
6. Time rate and piece rate are combined in
- a) Halsey plan  
b) Emerson's plan  
c) Gantt system  
d) Taylor's system
7. \_\_\_\_\_ system of wage payment is suitable when quality is of prime importance
- a) Time wage  
b) Piece rate  
c) Differential piece rate  
d) None of the above
8. According to Merrick's multiple piece rate system, the piece rate applicable to a worker with an efficiency of 100 % or above is \_\_\_\_\_ of normal piece rate
- a) 100%  
b) 110%  
c) 120%  
d) 150%

## 6.5 Summary

Wages is monetary compensation paid by an employer to an employee in exchange for work done. Payment may be calculated as a fixed amount for each task completed or at an hourly or daily rate, or based on an easily measured quantity of work done. Wages are part of the expenses that are involved in running a business. Waged employees may also receive tips or gratuity paid directly by clients and employee benefits which are non-monetary forms of compensation. A Wage Payment System is a



method used to calculate the wages of workers in the organization. It includes different types of wage payment system methods according to company's requirements like Time basis, per product or piece basis, Incentive basis etc. It varies upon the types and nature of business.

## 6.6 Keywords

- **Wages:** It is monetary compensation paid by an employer to an employee in exchange for work done.
- **Wage Payment System:** It is a method used to calculate the wages of workers in the organization.
- **Time Rate System:** It is that system of wage payment in which the workers are paid on the basis of time spent by them in the factory
- **Piece Rate System:** It is that system of wage payment in which the workers are paid on the basis of the units of output produced.
- **Incentive Schemes:** It refers to performance linked compensation paid to improve motivation and productivity.

## 6.7 Self-Assessment Test

### Short Answer Questions:

- Q.1 Discuss advantages and disadvantages of Time rate payment method.
- Q.2 Explain Halsey Premium Plan.
- Q.3 Explain Taylor and Merrick Differential piece rate system.

### Long Answer Questions:

- Q.1 What are essential features of a good wage payment system?
- Q.2 What do you mean by an incentive plan? Explain these plan in brief.
- Q.3 What do you mean by piece and time rate system of payment of wages? Discuss their advantages and disadvantages.
- Q.4 Discuss any four incentive plan with their merits and demerits.
- Q.5 Explain Halsey and Rowan incentive plans. Also compare these both Halsey and Rowen plan.
- Q. 6 A worker X is allowed 60 hours' time for completion of the job and the hourly rate is Rs. 4. The



actual time taken by the worker is 40 hours. Calculate the wages of worker A. Under Halsey Plan.

**(Answer Rs. 200)**

Q. 7 The three workers Govind, Ram and Shyam produced 80, 100 and 120 pieces of a product 'X' on a particular day in June 2000 in a factory. The time allowed for 10 units of product X is 1 hour and their hourly rate is Rs. 4. Calculate for each of these three workers the following:

Earnings for the day, and Effective Rate Earnings per hour Under (a) Straight piece-rate (b) Halsey Premium Bonus (50% sharing) and (c) Rowan Premium Bonus-methods of Labour Remuneration.

**(Answer: Computation of earnings per day)**

Straight Piece Rate: Govind Rs. = 32; Ram = Rs. 40; Shyam = Rs. 48

Halsey Premium Bonus: Govind Rs. = 32; Ram = Rs. 36; Shyam = Rs. 40

Rowan Premium Bonus: Govind Rs. = 32; Ram = Rs. 38.40; Shyam = Rs. 42.68

**Computation of effective rate of earnings per hour (Earnings/ Hours)**

Straight Piece rate	Govind	Ram	Shyam
Halsey Premium Bonus	4.00	5.00	6.00
Rowan Premium Bonus	4.00	4.50	5.00

## 6.8 Answers to Check Your Progress

1(b), 2 (a), 3(a), 4 (c), 5(c), 6 (c), 7 (a), 8 (c)

## 6.9 References/ Suggested Readings

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<b>Subject:</b> Cost Accounting	
<b>Course Code:</b> BCOM 401	<b>Updated By:</b> Dr. Sanjeev Kumar Garg
<b>Lesson No.:</b> 7	
<b>Accounting of Overheads: Classification and Treatment</b>	

**Structure**

- 7.0 Learning Objectives
- 7.1 Introduction
  - 7.1.1 Meaning of Overheads
  - 7.1.2 Distinction between Direct Expenses and Overhead:
  - 7.1.3 Importance of Classification of Overheads
- 7.2 Classifications of Overheads
- 7.3 Treatment of Different Overheads Items
- 7.4 Items Excluded from Cost Accounts
- 7.5 Check Your Progress
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**7.0 Learning Objectives**

After reading this lesson, you should be able to

- Meaning of overhead and their classification
- Importance of classification of overhead
- Describe the treatment of special items of overheads in cost accounts.



## 7.1 Introduction

The indirect portion of the total cost constitutes the overhead cost. It comprises those costs which the cost accountant is either unable or unwilling to allocate to particular cost units. Accounting and control of overhead is more complex than that of other elements of cost, i.e., direct material and direct labour. This is so because overheads by definitions are indirect costs which cannot be conveniently allocated to cost units. Hence, there arises the knotty problem of apportioning these indirect costs to cost centres and cost units.

### 7.1.1 Meaning of Overheads

Overheads are the indirect costs which cannot be allocated to any specific job or process because they are not capable of being identified with any specific job or process. Overheads include cost of indirect material, indirect labour, indirect expenses which cannot be conveniently charged to any Job, Process, Cost unit etc. For example, costs like rent, rates, administration and supervision, depreciation, maintenance, selling and distribution expenses, cleaning materials etc. cannot be directly attributed to cost units produced. The costing treatment of overheads deals with methods whereby these indirect expenses can be related to cost units.

- *CIIMA defines Overheads Cost as “the total cost of indirect materials, indirect labour and indirect expenses”.*

Overheads is the cost of materials, labour and expenses which cannot be economically unidentified with specific saleable cost unit. The direct expenses refers to expenses that are specifically incurred and charged for specific or particular job, process, service, cost unit or cost centre. These expenses are also called chargeable expenses. The sum of direct material, direct labour and direct expenses is called prime cost. Sometimes, if the direct expenses are negligible or small amount, it will be treated as overhead.

### 7.1.2 Distinction between Direct Expenses and Overhead

Direct expenses are directly allocable to a job, process, service, cost unit or cost centre. It is not possible to allocate the overheads to jobs etc. and only through apportionment and absorption, it can be charged to different jobs, process, services, cost units or cost centres. An expense is whether a direct expense or overhead depend on the extent of departmentalisation and specific circumstances of a particular



expense.

For example, a machine is hired for general purpose, the hire charges are treated as overhead. But if that machine is hired or used for specific job, then the hire charges will be direct charge to that particular job.

Another example is that, power consumption is normally treated as direct expense if it is consumed for single plant or machinery. But if number of machines consume the power, then power will be treated as overhead and will be apportioned to the different machine centres on some equitable basis, which have used power.

### 7.1.3 Importance of Classification of Overheads

Following are the importance of classification of overheads:

- **Profit Planning:** The Primary objective of doing any business is to earn profits. Hence, it is very important to make profit planning. Profit planning is concerned with taking a series of decisions and selecting amongst the various alternatives available. Thus, it is very important to study the behaviour of costs and profits in relation to change in the volume of output.
- **Preparation of budgets:** This classification helps in the preparation of budgets. For instance, when flexible budgets are prepared for different levels of activity, the fixed cost remains constant at all levels of activity, whereas variable cost varies according to the actual level of output.
- **Decision-making:** As most problems of decision-making relate to changes in volume, this classification acquires a special importance in managerial decision-making. This is so because fixed and variable costs behave in different ways when volume of output changes.
- **Control of costs:** From control point of view, cost may be controllable or uncontrollable. The fixed costs are mostly uncontrollable and if, at all, any control can be exercised, it can be done by the top management. Variable costs, on the other hand, are mostly controllable. For example, rent of building (fixed) is not easily controllable but cost of materials (variable) may be controlled by purchasing in economic lots, seasonal purchasing, etc. Classifying costs into fixed and variable, therefore, helps in the effective control of costs by pointing out where management should concentrate to control costs.
- **Marginal costing and break-even analysis:** This technique is totally depend on segregation of cost into fixed and variable.



- **Absorption of overhead:** By classifying cost into fixed and variable, separate rates of absorption of overhead may be used for fixed and variable overheads. The under-over absorption arising out of two types of overheads are different in nature and need different managerial action. For example, under-absorption of fixed overhead means the existence of surplus or idle capacity so that suitable steps may be taken to effectively utilize idle capacity.
- **Other uses:** In addition to points stated above, fixed-variable cost classification is useful in many other areas. For example, while planning capital expenditure, effect of the proposed project on total fixed and variable costs should be studied. Moreover, differential and comparative cost analysis are based on this classification.

## 7.2 Classifications of Overheads

The overheads can be classified under the following heads:-

1. Element 2. Behaviour 3. Function 4. Control 5. Nature

### 7.2.1 Element-Wise Classification

This method of classification follows the definition of overheads. In this method, overheads are divided into three elements, viz. indirect materials, indirect labour and indirect expenses.

- **Indirect Materials:** They are a part of material cost that cannot be allocated to a particular job or production but is absorbed by the cost centres or cost units indirectly. Some examples are—fuel, lubricating oil, stores consumed for repair and maintenance, cotton waste, etc.
- **Indirect Labour:** This includes such types of wages that cannot be allocated, but can only be apportioned to cost centres or cost units. Some examples are—wages for maintenance workers, salary of storekeeper and foreman, overtime and night shift bonus, employer's contribution to funds, holiday pay, leave pay, etc.
- **Indirect Expenses:** The expenses that cannot be allocated directly but can only be apportioned to or absorbed by cost centres or cost units are known as indirect expenses. The common examples are—rent, insurance, taxes, telephone expenses, canteen and welfare expenses, lighting and heating, depreciation, etc.

It should be noted that this method of classification is usually followed for classifying factory overheads but not overheads in general.



### 7.2.2 Behaviour-Wise Classification

This classification is made on the basis of behaviour or nature of the overhead costs. The nature of expenses is such that some change with the level of activity of an enterprise, while others remain constant. Thus, behaviour-wise overhead costs could be classified into fixed, variable and semi-variable overheads.

- **Fixed Overheads:** These are expenses that remain unchanged in total for a given period despite fluctuations in volume of production. Examples are—rent and rates, managerial salaries, building depreciation, postage, stationery, legal expenses, etc.
- **Variable Overheads:** They represent those costs that vary in direct proportion to the volume of output. Examples are—fuel, power, commission paid to selling agents, indirect materials (supplies), indirect labour, etc.
- **Semi-Variable or Semi-Fixed Overheads:** There are certain expenses that neither fall in the category of fixed costs nor variable costs. Such expenses are known as semi-variable or semi-fixed overheads. They remain fixed at certain levels of output, while they vary at other levels but not in proportion to the output. For example, in telephone charges, the rental element is a fixed cost whereas charges for calls made are variable costs.

### 7.2.3 Function-Wise Classification

It refers to the classification of overhead costs with reference to the various major activity divisions of a concern. The main groups of overhead on the basis of functions are:

- **Factory Overhead:** Factory overhead refers to all expenses other than direct material costs, direct wages and direct expenses incurred in a factory in connection with manufacturing operations. Examples of factory overhead are – Rent of factory building, municipal taxes and insurance of factory building, depreciation of factory building, depreciation and insurance of factory plant and machinery, repairs and maintenance of factory buildings and machinery, salary of factory manager and other factory staff, factory power and lighting, cost of small tools, consumable stores, lubricating oil, cotton waste, salary of store-keeper, expenses of store-keeping, fuel, gas, water, drawing office salaries, factory stationery, cost of idle time, overtime wages (if not treated as direct cost), telephone charges of factory, cost of training of new workers, labour welfare expenses etc.



- **Administration Overhead:** Administration overhead refers to all expenses relating to the direction, control and administration (not connected directly with production, sales or distribution) of an undertaking. Examples of administration overhead are – General management salaries, salaries of general office staff, office rent, depreciation of office building, rates and insurance of office building, office lighting and air-conditioning, depreciation of office furniture and office machinery, repairs and maintenance of office building, office furniture and office machinery, audit fees, legal charges, office stationery, telephone charges of office, bank charges, directors' fees, counting office salaries etc.
- **Selling Overhead:** Selling overhead refers to all costs of seeking to create and stimulate demand or of securing orders. Examples of selling overhead are – Sales office expenses, advertisement, salary of sales manager, salaries of other selling staff, commission on sales, travelling expenses, expenses of travelling agents, cost of price lists, catalogues and samples, bad debts, rent of show-room, depreciation of show-room, rates and insurance of show-room, lighting and cleaning of show-room, expenses of branch establishments, expenses of sales and publicity department, cost of training to salesmen, postal expenses relating to sales, legal expenses for recovery of bad debts, cost of entertainment of customers, market research expenses, cost of preparation of tenders etc.
- **Distribution Overhead:** Distribution overhead refers to all expenses incurred from the time the product is finished in the factory till its delivery to ultimate customers or consumers. Examples of distribution overhead are – Rent of warehouse, depreciation of warehouse, insurance, rates and lighting of warehouse, depreciation, running and maintenance of delivery vans, salary of van men, carriage on sales, packing materials and packing charges, cost of after-sales service, salary of warehouse- keeper, and the like.

#### 7.2.4 Control-Wise Classification

Cost can either be:

- **Controllable Cost:** It is that portion of the cost which can be controlled by an efficient management. For example, idle time, wastage, etc.
- **Non-controllable Cost:** It is that portion of the cost which cannot be controlled by the management. For example, duty or tax imposed by the Government or price hike by authority.

#### 7.2.5 Nature-Wise Classification



Nature-wise, overheads can be:

- **Normal Overheads:** These are the expenses which are expected to be incurred in producing a given output. They cannot be avoided. They are included in production cost.
- **Abnormal Overheads:** These are the expenses which are not expected to occur in producing a given output. For example, abnormal idle time, abnormal wastage, etc. These expenses are transferred to costing P&L A/c.

### 7.3 Treatment of Different Overheads Items

- **Interest on Capital:** There is a difference of opinion as to whether interest on capital employed in manufacture should be treated as an item of cost. The following arguments are given in support of treating interest as an item of cost:
  - Interest is the reward of capital just as wages are the reward of labour. Profit, in the true sense, cannot be computed without considering interest.
  - The comparison of operations, different processes, etc. without due consideration of the interest factor may lead to unreliable conclusions.
  - Interest considers time factors as it is computed on the basis of time and time is regarded as an important factor in production.
  - The inclusion of interest is of particular importance where articles of different values are produced and the capital invested in each product line differs considerably.
  - The cost of carrying inventory cannot be determined without giving due recognition to the interest on capital employed in it.

The following arguments are against including interest in the cost accounts:

- Cost accounting considers only actual expenditures and can include only interest paid.
- The interest factor is in no way connected with cost of manufacture. Whatever may be the method of raising finances - owned capital loans, debentures, etc. does not affect manufacturing cost. It only affects the profits of the period.
- Inclusion of interest in product costing will inflate the values of inventory and work-in-process and therefore will tend to increase the profit unreasonably.
- Interest is calculated on capital and the term “capital” has many concepts such as total capital



employed in business, equity capital and borrowed capital both.

- A reliable and correct rate of interest is difficult to determine and is likely to be influenced by naked fluctuations.
- The cost accounting and product costing systems get complicated unnecessarily by inclusion of interest on capital and financial statements also become misleading.

There is one point upon which opinion is not divided. If interest is to be considered at all, it must not be confined merely to such interest as may actually have been paid by the business: Therefore, if it is decided to exclude interest from the cost accounts, interest which has been paid, must also be ignored.

Of late, cost accounts in India tend to agree that interest on capital or funds borrowed from outside and paid or to be paid in cash should be included in product cost. This has been supported on the grounds that it implies cash outflow and affects the operating results of a business firm. The Bureau of Industrial Cost and Price in India includes actual interest on borrowed funds as an element of cost in cost price studies. However, the Bureau does not consider the notional type of interest on owned capital as an element of cost.

- **Depreciation:** Depreciation is the decrease in the value of all fixed assets due to use and/or lapse of time. All fixed assets except land lose their value with their use and passage of time. The several factors that contribute in varying degrees to this decline in utility are wear and tear, lapse of time, obsolescence, etc. Accordingly, the cost of such assets is allocated to the periods, in which services are received from the assets, by a process called depreciation. In cost accounts, depreciation is charged to the cost accounts on the following grounds:
  - Depreciation represents a charge for usage of the capital resources.
  - The amount invested in the asset has to be recovered from the costs over a number of year's equivalent to the life of the assets.
- **Rent or a Charge in Lieu of Rent:** When rent is paid, this is obviously a cost to be taken into account as production, administration or selling and distribution overhead, depending upon the use to which the building is put to. In many cases, however, the premises are owned by the business and no rent is payable. In such cases, a charge in lieu of rent should be made in cost accounts so that the true cost may be ascertained.





The annual value of premises, as assessed for rating purposes, is normally a satisfactory amount to charge in lieu of rent. If premises are owned by some concerns and rented by others in the same industry, the costs will vary if no rent for owned premises is charged in the cost accounts.

- **Material handling expenses:** These expenses are incurred while unloading the raw materials received from supplier, storing the raw materials handling the raw materials to work place, handling of work- in-progress, storage of finished goods etc. It also includes costs incurred for weighing salaries of personnel involved in material handling, wear and tear of weighing equipment.

These costs are apportioned on the basis of physical quantities of different materials and goods handled in the factory. The stores overhead costs are apportioned to raw materials and finished goods as a percentage of issue rates. Other handling expenses are recovered through overhead recovery rates.

- **Stores Overhead:** The stores department in an organisation perform the function like receipt of material and stores items purchased, storing and issue of materials and stores items to different departments. The stores is considered as a separate cost centre and the store expenditure like rent of store, salaries and wages of stores personnel, freight, carriage inwards, insurance etc., are collected separately for the stores and will be apportioned to other cost centres. The following bases are used in apportionment of stores overhead.
  - Number of stores requisitions
  - Value of material requisitioned
  - Standard predetermined stores overhead absorption rate
- **Carriage Inward:** This is directly concerned with the purchase of materials and is generally included in the cost of materials purchased, thereby treating it as a direct cost. Alternatively, it may be treated as an item of factory overhead.
- **Drawing and Design Office Costs:** If drawings or designs are prepared for specific jobs, these costs may be treated as direct expenses. But, if drawings are to be enclosed with sales tenders, it may be treated as selling overheads. Where drawing and designing office is used as service department, its costs should be apportioned to production departments on the basis of technical



estimates of services rendered or on any other suitable basis, like number of drawings made, man hours worked, etc.

- **Erection and dismantling of Plant and Machinery:** The cost incurred on erection of Plant and Machinery is capitalized and treated forming part of capital cost and depreciation is recovered on the total cost. If the plant and machinery is required to be shifted to different locations, the costs incurred in layout and shifting is treated as precaution overhead. When such costs are substantial, it may spread over a period of time as different revenue expenditures.

If the asset is replaced, before its useful economic life, with a new machine, the written down value of the asset less the scrap value plus the cost on dismantling is treated as capital loss and charged to Profit and Loss Account. However, the erection cost of new machine is capitalized. If expenses of dismantling and re-erection are incurred due to faulty planning or due to abnormal factors, then such expenses are charged to Costing Profit and Loss Account.

- **Royalties and patent fees:** The royalties and patent fees are payable for the use of technology, skills, brand, intellectual property rights etc. made in the form of periodical rent or based on the number of units produced or sold. If it is based on sales, the expenditure is charged to selling overhead. If it is fixed periodical rent, it is treated as production overhead. If it is payable on number of units produced, the expenditure is treated as a direct expenses or chargeable expenses and is forming part of the prime cost of the product.
- **Training Costs:** The training costs are incurred for training the workers, apprentices, office, administrative and selling staff. The training expenditure incurred for training the workers, apprentices and other production staff is treated as production overhead. The expenses incurred for training the sales staff is treated as selling overhead.

If there is any in house training college or centre, cost of running the entire college is apportioned to the cost centres based on the number of personnel trained on the basis of wages and salaries paid etc.

- **Major repairs to equipment to prolong its useful life:** The major repairs, if it prolong the useful life of an asset, the costs incurred on it is to be added to the existing value of assets and periodical depreciation is charged on the overall cost the asset.

If the repair charges are occurred for upkeep and maintenance of the machinery and if it



does not prolong the life of the asset, these expenses are treated as production overhead and is charged to the respective cost centre as repairs and maintenance and recovered from the current period product. If the amount incurred is substantial, it is treated as deferred revenue expenditure carried forward to the subsequent accounting periods for write off.

- **Advertisement:** Advertisement cost incurred for promoting sales is a selling overhead. When advertisement is for individual products it should be allocated to products concerned. On the other hand, when a common advertisement is for more than one product or when it is of general nature which is meant to promote the sales of all the products of the company, the cost should be apportioned on the basis of sales value of products or any other suitable basis.

Sometimes heavy advertisement expenditure is incurred in the initial years on introducing a product line, the benefit of which is derived over a number of future years. Such costs should be deferred over two or three future years during which benefit is likely to be derived. In case advertisement is of permanent nature, such costs should be capitalised and its depreciation charged to selling overhead. Certain advertisement do not form part of the sales promotion programme, e.g., advertisement for staff recruitment, inviting tenders, notice of legal proceedings, etc. These are not selling overheads and thus should be charged to the department concerned.

- **Fringe Benefits:** The benefits which are provided to the workers in addition to their wages, salaries and other allowances are known as fringe benefits. These can be monetary as well as non-monetary. List of such benefits is given below:
  - Dearness Allowance
  - Night shift Allowance
  - Sick leave pay
  - Annual Bonus
  - Provident Fund
  - Employees state Insurance
  - Gratuity, Pension
  - Holiday pay
  - Maternity leave pay, etc.

Fringe Benefits (Group) Nonmonetary:



- Free housing
- Medical care
- Educational facilities
- Subsidised conveyance
- Subsidised canteen facilities, etc.

These costs should be charged to the unit of production on appropriate basis. Another way is to treat all these expenses as overheads and allocate them.

As regards expenditure on non-monetary benefits, it should be aggregated and allocated or apportioned over departments on the basis of quantum of benefits received.

- **Bonus Payable to Employees:** Under the payment of Bonus Act 1965, it is obligatory to pay a minimum bonus of 8 1/3% to employees irrespective of Profit or Loss in the organisation. Such a minimum amount of bonus may be either treated as an overhead or alternatively bonus payable to direct workers may be included in their wages and their wages rate is inflated to cover the amount of bonus. Any bonus paid over and above the minimum amount of bonus should be treated as an Appropriation of Profit and thus transferred to costing Profit and Loss Account of the period.

Some cost accountant prefers to treat the entire amount of bonus as overhead and apportion it to various departments on the basis of wages bill of each department.

- **Packing expenses:** The packing is classified into (i) Primary Packing and (ii) Secondary packing. The primary packing is done when the material is packed in tins, bottles, jars, etc., without which a product cannot be sold. For example, jam is packed in bottles baby food packed in tin, beverages in bottles etc. The costs incurred on primary packing materials is treated as part of direct material cost.

If the packing is made to facilitate the transportation and distribution of the finished product, it is called secondary packing and the cost incurred for this is treated as distribution overhead. Sometimes, cost is incurred on packing the product to make it more attractive to the customers to increase sales. This cost is treated as advertisement cost and is included in selling overhead.

- **Transport Cost:** The classification of transport costs and their treatment in cost accounts is



given below:

- The costs incurred to bring the materials to the production site is included in cost of materials.
- The costs incurred for bringing the plant and machinery, equipment etc., is added to the capital cost of respective asset and depreciation is recovered.
- The cost of dispatch of finished goods is treated as distribution overhead.
- The costs incurred for internal movements within work are initially charged to specific cost centres and thereafter apportioned to different production and service centres on the basis of services rendered.
- **Insurance Cost:** The treatment of insurances cost is categorised into the following:
  - Insurance premium on storage-cum erection a commissioning is capitalized to the asset value.
  - Premium on transit of materials is included in cost of materials.
  - Premium on transit of finished products is treated as distribution overhead.
  - Premium on loss of profit policy due to fire and break down of machinery is treated as production overhead.
  - Premium on miscellaneous policies like vehicles, burglary, accident etc. are treated as administration overhead.
  - Premium on raw materials and stores is treated as production overhead.
  - Premium on warehouse and finished stock is treated as distribution overhead.
- **Directors Fees and Salaries:** Usually, this is considered as a part of administration overhead. Where separate directors are appointed for different functions like production, sales, etc. such costs should be allocated to the respective functional overheads. When there are no separate directors for different functions, directors remuneration may be apportioned to production, administration, and selling and distribution on the basis of time devoted by the directors.
- **Set-Up Costs:** When a specific job is completed, machines may require setting up with a different set of tools for taking up the next job. The cost of setting up time is, therefore, normally charged to that particular job for which preparation is being made. But when setting up is frequent and cost abnormally high, the situation demands proper measurement and control of set-up costs. In such cases, it may be preferable to treat such cost as production overhead for booking against all jobs equitably.



- **Market Research and Development Costs:** Due to certain special features of research and development costs, different accounting treatments for such expenditure are required for different circumstances. Therefore, there is no general agreement regarding the treatment of such costs in cost accounts. The following are the various methods of treating these costs in cost accounts:
  - As Revenue Expenditure: This method is usually used when such amount is not very heavy. In such a situation, research and development costs are treated as general overhead and apportioned and absorbed accordingly.
  - As Deferred Revenue Expenditure: When benefits of research and development are to be derived over a period of two or three years, it is usually treated as deferred revenue expenditure and recovered over a period of two or three years.
  - Transfer to Costing Profit and Loss Account: The research and development costs are written off to Profit and Loss Account of the period in which expenditure is incurred. This method is particularly suitable when research and development proves unsuccessful and does not produce any tangible results.
- **Bad Debts:** When the company allow credit to its customers as part of its selling policy, some credit sale may turn bad due to default by the customers internationally or otherwise. As a safe guard, a part of such default amount is treated as bad debt is recovered as a selling overhead and absorbed in product cost. If the bad debt is abnormal in nature, the abnormal portion in excess of the standard normal portion should be excluded from cost accounts and transferred to Costing Profit and Loss Account.
- **After Sales Service:** Some engineering companies offer free after sales service during specified guarantee period. This cost is also a part of the selling overhead. This includes free repairs and sometimes free replacement of parts and components. In addition to cost of materials, salaries, wages and travelling expenses of service staff are also included in this cost. Each such case is analysed and investigated and expenditure on after sales service is treated accordingly.

For example – while servicing cost is treated as selling overhead; free replacement of any defective component part may be charged to production department. However, cost of major repairs and replacement of exceptional nature should be either treated as a deferred charge or written off to the costing Profit and Loss Account.



## 7.4 Items Excluded from Cost Accounts

The following items which are included in the financial accounts of a manufacturing concern, shall not be included in cost accounts since they are not related to cost of production:

### 7.4.1 Items of Appropriation

- Income tax paid and legal expenses incurred in connection with the assessment of income tax.
- Transfer to reserves.
- Dividends on shares paid by a company.
- Amount written off — goodwill, preliminary expenses, underwriting commission, discount allowed on shares or debentures.
- Bonus paid to the employees based on profits.

### 7.4.2 Pure Finance Items

- Interest and dividends received on investments.
- Rent received.
- Bad debts
- Underwriting Commission
- Share transfer fees
- Profit or loss on sale of investments, fixed assets etc.
- Expenses on raising capital.
- Cash discount allowed or received.

### 7.4.3 Other items

- Cost of abnormal idle time.
- Cost of abnormal wastage of materials.
- Exceptional bad debts.
- Secret Reserve
- Abnormal saving.
- Penalties and fines paid for the infringement of Govt. rules and regulations.

## 7.5 Check Your Progress



1. Primary packing is part of
  - a) Prime cost
  - b) Factory Overheads
  - c) Selling Overheads
  - d) Distribution Overheads
2. Bad debts is an example of
  - a) Factory Overheads
  - b) Administration Overheads
  - c) Selling Overheads
  - d) Distribution Overheads
3. Cost of fringe benefits to factory workers is charged to
  - a) Direct labour
  - b) Factory Overheads
  - c) Work in progress
  - d) Administration Overheads
4. Departmentalisation of overhead is
  - a) Secondary distribution
  - b) Primary distribution
  - c) Absorption
  - d) Allocation
5. Which among the following is excluded from cost accounts?
  - a) Interest on own capital
  - b) Depreciation on fully depreciated asset still in use
  - c) Rent on own building
  - d) Income tax
6. Rent receivable is \_\_\_\_\_
  - a) Purely financial charge
  - b) Purely financial income
  - c) Notional charge
  - d) None of these





7. Transfer fees received is \_\_\_\_\_

- a) Purely financial charge
- b) Notional charge
- c) Purely costing income
- d) Purely financial income

## 7.6 Summary

The total of all indirect costs (i.e. indirect material cost, indirect labour cost and indirect expenses) is termed as overhead. Overhead may be classified according to functions, elements, nature, control, and behavior. Treatment of different overheads items means what are different types of cost and how they are allocated on the basis of their nature in cost or financial account for example royalty paid use of patent process is manufacturing overhead, and royalty paid to sell the product are selling overhead. There are also various expenses which are exclusively part of financial account not cost account such as dividends, preliminary expenses, share transfer fees, bad debts, donation, reserves etc. Classification of overheads helps in profit planning, budget preparation, decision making, and cost controlling.

## 7.7 Keywords

- **Overheads:** Overheads are the indirect costs which cannot be allocated to any specific job or process because they are not capable of being identified with any specific job or process.
- **Indirect Expenses:** Expenses that cannot be allocated directly but can only be apportioned to or absorbed by cost centres or cost units are known as indirect expenses.
- **Factory Overhead:** Those expenses which are incurred in a factory in connection with manufacturing operations.
- **Interest on Capital:** It is the imputed cost of funds employed in the manufacturing process.
- **Set-Up Costs:** When a specific job is completed, machines may require setting up with a different set of tools for taking up the next job.

## 7.8 Self-Assessment Test

### Short Answer Questions:

Q.1 Explain the meaning of overheads.



Q.2 Distinction between Direct Expenses and Overhead.

Q.3 Element-Wise Classification of overheads.

Q.4 Behaviour-Wise Classification of overheads.

Q.5 Function Wise Classification of overheads.

### Long Answer Questions:

Q.1 What are overheads? How they are classified?

Q.2 What is the meaning of the term “overhead”? Explain fixed, variable and semi-variable overhead.

Q.3 What do you understand by classification of overhead expenses? Explain fully.

Q.4 How do you deal with the following in cost accounts:

- a) Advertising
- b) Research and development cost
- c) Bad debts
- d) Rent of factory buildings

Q.5 What are the arguments for and against inclusion of interest of capital in Cost Accounts?

### 7.9 Answers to Check Your Progress

1(a), 2 (c), 3(b), 4 (b), 5(d), 6 (b), 7 (d)

### 7.10 References/ Suggested Readings

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<b>Subject:</b> Cost Accounting	
<b>Course Code:</b> BCOM 401	<b>Updated By:</b> Dr. Sanjeev Kumar Garg
<b>Lesson No.:</b> 8	
<b>Unit Costing</b>	

**Structure**

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**8.0 Learning Objectives**

After reading this lesson, you should be able to



- Define single costing and explain the features as well as objectives of single costing.
- Explain the treatment of stocks in the cost sheet
- Method of the preparation of Production Account.

## 8.1 Introduction

Cost ascertainment is the basic function of cost accounting. Cost is ascertained on total as well as per unit basis. The management needs complete and reliable information- about the cost of production for a number of purposes. This information is used for production planning, fixation of selling prices, making decisions about product mix and a host of other important managerial decisions. Cost ascertainment requires collection and analysis of data relating to expenses, measurement of the production of different products at different stages of manufacture and linking UP of production with expenses. A number of methods have emerged for the ascertainment of the cost of production due to the use of varying procedures for the measurement of production, collection of costs and linking up of costs with production. Important methods used for the calculation of the cost of production are as follows:

- Single costing;
- Job costing;
- Contract costing; and
- Process Costing

The method to be used for the ascertainment of the cost of production differs from industry to industry and even from one firm to another within the same industry. The method for cost ascertainment is selected by giving due consideration to the nature of product, collection of costs, measurement of production and the nature of the manufacturing process.

### 8.1.1 Concept of Unit/Single Costing

Single costing method of the ascertainment of the cost of production is suitable for those industries in which manufacturing is continuous and units of output are identical.

- According to J.R. Batliboi, “Single or output cost system is used in businesses where a standard product is turned out and it is desired to find out the cost of a basic unit of production.”

Thus single costing is adopted for cost ascertainment in those manufacturing organisations which



are engaged in producing only one type of product or two or more products of the same kind but of varying grades or qualities. This method is used in industries like mines, quarries, oil drilling; breweries, cement works, brick works, .sugar mills, steel manufacture and aluminum products etc. In all those industries where single costing is used, there is a standard or natural unit of cost e.g. a tonne of coal in collieries, one thousand bricks in brick works, a quintal of sugar in sugar industry, a tonne of cement in cement industry etc. In single costing, cost of production is usually ascertained by preparing a cost sheet or a cost statement.

### **8.1.2 Industries Use Unit Costing**

The following are the characteristics features of the industries where the single costing method is used:

- Production is on a large scale and is continuous.
- The units of production are identical and homogeneous.
- The cost units are physical and natural and -capable of being expressed in a convenient unit of measurement.
- In most cases, the unit of measure is also the cost unit, viz., one unit (in the case of T.V., radio, camera), 1,000 units (in the case of bricks), one gross (in the case of pencils, slates, bolts and nuts), one litre (in the case of paints), one tonne (in the case of coal, cement and steel), one bale (in the case of cotton), etc.

### **8.1.3 Objectives of Unit Costing**

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

- To determine the total cost of production during a particular period.
- To ascertain per unit cost of production by dividing the total cost of production by the number of units produced.
- To estimate per unit cost of production for the future and facilitate production planning.
- To help in the preparation of tenders and fixation of selling prices.
- To facilitate comparison of the cost of production of two accounting period.

### **8.1.4 Cost Accumulation under Single Costing**



Under this method, costs are accumulated and analyzed under various elements such as material, labour, and overhead. The total of each element is divided by the total number of units/quantity produced to arrive at per unit cost. Since only one product is generally produced, the method does not require detailed cost records.

- **Cost of Material Consumed:** The cost of materials consumed is accumulated from stores records. The following formula can help in the determination of cost of material consumed:

Cost of material Consumed = Value of opening Stock of raw material + Purchase value of raw material - Closing Value of stock of raw material.

The cost of direct materials is included in prime cost and cost of indirect material in works overhead. If certain expenses have been incurred while purchasing material, they will be added to the cost of material. Normal stores procedures are adopted to maintain smooth and continuous supply of material and to prevent under or overstocking of materials.

- **Labour Cost:** The cost of direct labour is ascertained from the wage bill. For proper control and accounting of labour cost, the arrival and departure time of workers is recorded and the pay roll is prepared on the basis of such records.
- **Overhead cost:** All overhead costs are analyzed under the heads of manufacturing, administrative, selling and distribution overheads. Manufacturing overheads are added to prime cost to ascertain works cost or production cost. Administration, selling and distribution overheads are added to production cost to determine the total cost. These overhead costs are generally charged on the basis of pre-determined overhead rates based on estimates.

### 8.1.5 Cost Presentation

All costs incurred or expected to be incurred during a given period are presented in the following forms:

- Cost Sheet
- Production Account.

In both these forms, the basic principles of costing are the same. Further their objective is also the same i.e. the determination of per unit cost of production.



## 8.2 Cost Sheet

Cost Sheet is a statement which is prepared to show the total as well as per unit cost of production for a specific period. The cost sheet is a periodical statement of cost designed to show in detail the various elements of cost of goods produced like prime cost, factory cost, cost of production and total cost. Comparative figures of the previous period may also be shown in the cost sheet so that assessment can be made about the progress of the business. Cost sheet serves the following purposes:

- It reveals the total cost and unit cost of production.
- It provides the breakup of total cost i.e. different element of cost.
- It shows a comparative study of the cost of current period with that of the corresponding previous period.
- It acts as a guide to management in fixation to selling prices and quotation of tenders

**Cost Sheet for the period.....**

**No. of Units produced.....**

Previous Period		Particulars	Current Period	
Total Cost (Rs.)	Cost Per Unit (Rs.)		Total Cost (Rs.)	Cost Per Unit (Rs.)
		Direct Materials		
		Direct Labour		
		Direct (or Chargeable) Expenses		
		<b>Prime Cost</b>		
		Works Overheads		
		<b>Works Cost</b>		
		Office and Administrative Overheads		
		<b>Cost of Production</b>		
		Selling and Distribution Overhead		
		<b>Total Cost or Cost of Sales</b>		
		Profit or Loss		
		<b>Sales</b>		

### 9.2.1 Treatment of Stocks in the Cost Sheet





Special care has to be given to the treatment of opening and closing stocks in the cost sheet. Stocks may be of the following three types:

- Stocks of raw materials
- Stocks of work-in-progress
- Stocks of finished goods.

• **Stocks of raw material**

In order to calculate the cost of raw materials consumed during the period, the cost of the opening stocks of raw materials is added to the cost of raw materials purchased and the cost of the closing stock of raw materials is subtracted. For example, the cost of raw-materials purchased during a particular period is Rs. 20,000 and the opening and closing stocks of raw materials appear at Rs. 10,000 and Rs. 8,000 respectively, the cost of raw materials consumed will be Rs. 22,000 as computed below:

	<b>Rs.</b>
Opening stocks of materials	10,000
<u>Add:</u> Purchases	20,000
	30,000
<u>Less:</u> Closing stocks of raw materials	8,000
<b>Raw Material Consumed</b>	<b>22,000</b>

• **Stocks of work-in-progress**

Stocks of work-in-progress or semi-finished goods consist of those goods which require further processing before they can be sold. In the cost sheet, opening stocks of work-in-progress is added in prime cost along with factory overhead and closing stock of work-in-progress is subtracted there from. In this way, the costs of the opening and closing stocks of work-in-progress are adjusted to compute the factory cost. Suppose, the prime cost, factory overheads, opening work-in-progress and closing work-in-progress of a work order are Rs. 1,24,000, Rs. 40,000, Rs. 20,000 and Rs. 25,000 respectively. The factory cost of the work order will be computed as follows:



	Rs.
Prime Cost	1,24,000
<u>Add</u> :Factory overheads	
<u>Add</u> : Opening stock work-in-progress	40,000
	20,000
	1,84,000
<u>Less</u> : Closing stocks of work-in-progress	25,000
<b>Works or Factory Cost</b>	<b>1,59,000</b>

The valuation of work-in-progress should be done on a uniform basis from time to time. Some accountants value work-in-progress at prime cost and some other value it at factory cost. The stage of adjustment of the value of work-in-progress under the above two methods will be as shown below:

- When work-in-progress is valued at prime cost

	Rs.
Direct material	10,000
Direct labour	
Direct expenses	7,500
	1,000
	18,500
Add: Opening work-in-progress	2,500
	21,000
<u>Less</u> : Closing stocks of work-in-progress	1,500
<b>Prime Cost</b>	<b>19,500</b>

- When work-in-progress is valued at factory cost:

	Rs.
Direct material	10,000
Direct labour	
Direct expenses	7,500
	1,000



	<b>Prime Cost</b>	18,500
Factory Overheads		9,250
		27,750
Add: Opening work-in-progress		2,500
		30,250
<u>Less:</u> Closing stocks of work-in-progress		1,500
	<b>Factory Cost</b>	<b>28,750</b>

It may be noted that administration cost is not included in the cost of work-in-progress.

#### • Stocks in Finished Goods

The stocks of finished goods are adjusted for computing the cost of goods sold in the cost sheet. The opening stock of finished goods is added to the cost of production and the closing stock of finished goods is subtracted therefrom. The resultant figure is known as the cost of goods sold. Suppose the cost of production, opening stock of finished goods and closing stock of finished goods for a particular period are Rs. 200,000, Rs. 50,000 and Rs. 40,000 respectively. The cost of goods sold for the period will be computed as follows:

	<b>Rs.</b>
Cost of Production	2,00,000
<u>Add:</u> Opening Stock	50,000
	2,50,000
<u>Less:</u> Closing Stocks	40,000
<b>Cost of Goods Sold</b>	<b>2,10,000</b>

The treatment of the above three types of stocks is illustrated in the following specimen cost sheet:

**Cost sheet for the period.....**

**Production..... Units**

<b>Particulars</b>	<b>Total Cost (Rs.)</b>	<b>Cost Per Ton (Rs.)</b>



Opening stock of Raw Materials		
Add: Purchases		
Add: Expenses on purchase		
Less: Closing stock of Raw Materials		
Cost of material consumed		
Direct wages		
Direct expenses		
<b>Prime Cost</b>		
Add: Factory overhead		
Add: Opening stock of work-in-progress		
Less: Closing stock of work-in-progress		
Factory or Works cost		
Add: Administrative over head		
<b>Cost of Production</b>		
Add: Opening stock of finished goods		
Less: Closing stock of finished goods		
<b>Cost of Goods Sold</b>		
Add: Selling and distribution overhead		
<b>Cost of Sales</b>		
<b>Profit (or Loss)</b>		
<b>Sales</b>		

Illustration: 1

Nikhil Manufacturing Company submits the following information on March 31, 2021.

	Rs.
Sales for the year	2,75,000
Inventories at the beginning of the year:	
Finished goods	7,000
Work-in-progress	4,000



Inventories at the end of the year:	
Work-in-progress	6,000
Finished goods	8,000
Purchase of materials for the year	1,10,000
Raw Materials inventory:	
At the beginning of the Year	3,000
At the end of the Year	4,000
Direct Labour	65,000
Factory overhead was 60% of the direct labour cost	
Other expenses for the year:	
Selling expenses 10% of sales	
Administrative expenses 5% of sales	

Required Prepare Cost sheet

Solution:

### Nikhil Manufacturing Company

#### Cost Sheet

For the year ending March 31, 2021

Particulars	Total Cost (Rs.)
Raw material consumed:	
Opening stock	3,000
Add: Purchases	<u>1,10,000</u>
	1,13,000
Less: Closing stock of Raw Materials	<u>4,000</u>
Cost of material consumed	1,09,000
Direct wages	<u>65,000</u>
<b>Prime Cost</b>	1,74,000
Add: Factory overhead @ 60% of direct labour cost	<u>39,000</u>



	<b>Factory or Works cost</b>	2,13,000
Add: Opening stock of work-in-progress	4,000	
Less: Closing stock of work-in-progress	<u>(6,000)</u>	<u>(2,000)</u>
	<b>Cost of Production</b>	2,11,000
Add: Opening stock of finished goods	7,000	
Less: Closing stock of finished goods	<u>(8,000)</u>	<u>(1,000)</u>
Add: Administrative overhead @ 5% of sales		<u>13,750</u>
	<b>Cost of Goods Sold</b>	2,23,750
Add: Selling overhead @ 10% of sales		<u>27,500</u>
	<b>Cost of Sales</b>	2,51,250
	Profit (Balancing figure)	<u>23,750</u>
	<b>Sales</b>	2,75,000

### 9.2.2 Treatment of Scrap

Scrap is the incidental residual from certain types of manufacturing process usually of small amount and low value, recoverable without further processing. Examples of scrap are trimmings, turnings or boring from metals or timber on which operations are performed. Any amount realized from the sale of scrap is deducted from the factory overheads or factory cost.

### 9.2.3 Treatment of By-Products

Some by-products arise from manufacturing process. The realizable value of by-product is deducted from the factory overheads or factory costs.

### 8.2.4 Treatment of Defective Products

Defective product can be rectified at an extra expenses. If it is caused by normal reasons, it can be included in factory costs. If it is caused by abnormal reasons, it can be transferred to costing profit and loss account or to a separate Defective Account.

### Illustration: 2

The following figures are collected from the books of an iron foundry after the close of the year.



	Rs.
Purchase of materials for the year	50,000
Raw Materials inventory:	
At the beginning of the Year	7,000
At the end of the Year	5,000
Direct Labour	10,000

Works overhead: 50% on the direct wages; Stores overhead on materials: 10% on the cost of materials.

10% of the casting was rejected, being not up to the specifications, and a sum of Rs. 400 was realized on sale as scrap. 10% of the finished castings were found to be defective in manufacture and were rectified by expenditure of additional works overhead charges to extent of 20% on proportionate direct wages. The total gross output during the year was 1,000 tons.

Solution:

**Cost Sheet for the year ended.....**

Particulars	Total Cost (Rs.)
Raw material consumed:	
Opening stock	7,000
Add: Purchases	<u>50,000</u>
	57,000
Less: Closing stock of Raw Materials	<u>5,000</u>
Cost of material consumed	52,000
Direct wages	<u>10,000</u>
<b>Prime Cost</b>	62,000
Add: Factory overhead @ 50% of direct labour cost	5,000
Stores overhead (10% on cost of materials)	<u>5,200</u>
<b>Factory or Works cost</b>	72,200
Less: Sale of scrap (100 tons castings)	<u>(400)</u>
<b>Cost of finished Castings: 900 tons</b>	71,800



Additional works overhead:	
On 10% of finished castings = 90 tons $(90 \times 10,000 / 1,000 \times 20/100)$	180
<b>Total cost of Saleable castings</b>	<b>71,980</b>

**Illustration: 3**

Ramesh Limited submits the following information:

	Rs.
Opening stock of finished goods	9,7
Closing stock of finished goods	50
Raw material purchased	11,
Direct wages	100
Factory expenses	35,250
Selling expenses	18,
Officer overhead	450
Sales	2,7
Sale of scrap	50
Carriage on materials purchased	2,4
	50
	1,8
	50
	7,5
	0,000
	250
	850

Prepare a statement of cost showing (a) Prime cost, (b) Works cost, (c) Cost of production, (d) Cost of sales, and (e) also show by what percentage the average selling price should be increased in order to double the net profit.

**Solution:**





Particulars		Total Cost (Rs.)
Raw material purchased	35,250	
Add: Closing stock of Raw Materials	<u>850</u>	36,100
Direct Wages		<u>18,450</u>
<b>Prime Cost</b>		54,550
Add: Factory overhead		<u>2,750</u>
		57,300
Less: Sale of scrap (100 tons castings)		<u>(250)</u>
		57,050
	<b>Works Cost</b>	
Add: Office overhead		<u>1,850</u>
		58,900
	<b>Cost of Production</b>	
Add: Opening stock of finished goods	9,750	
Less: Closing stock of finished goods	<u>(11,100)</u>	<u>(1,350)</u>
		57,550
	<b>Cost of Goods Sold</b>	
Add: Selling overhead		<u>2,450</u>
		60,000
	<b>Cost of Sales</b>	
	Profit	<u>15,000</u>
	<b>Sales</b>	75,000

- Present profit Rs. 15,000
- Desired profit  $15000 \times 2 = \text{Rs. } 30,000$
- Additional Profit as a % of selling price  $15,000 / 75000 \times 200 = 20\%$
- Thus the selling price should be increased by 20% to double the net profit.

### 9.3 Price and Quotations and Estimated Cost Sheet

Quite often the management has to quote prices of its goods in advance or has to submit tenders for goods to be supplied. For this purpose, an estimated cost sheet has to be prepared. In this cost sheet, cost of direct materials, direct wages and various types of overhead are predetermined on the basis of past costs taking into account the present conditions and also the anticipated changes in the future price



level. Direct material cost is generally estimated per unit taking into account the estimated prices likely to prevail in future. Direct wages can be known from the previous year's records after making due allowance for any increase in the wage rates. Similarly overheads are estimated on the basis of cost incurred in the past and likely changes in the future.

In drawing tenders or quotations, the estimation of the cost of production is an essential point. Estimation is different from costing. Costing means ascertainment of actual cost of an article which has already been produced, whereas estimation means guess calculations, in advance, of the probable cost of unit to be manufactured in future. The estimation of the job is prepared in the form of a cost sheet. When drawing the tender, the expected changes in the element of cost may be looked upon. Overestimation will invite losses. Therefore, it needs great care in drawing an estimated cost sheet.

#### **Illustration: 4**

A company manufactured and sold 1,000 radios during a year. Prepare a statement of cost showing different elements of cost per unit from the summarized Trading and Profit and Loss Account set out below:

#### **Trading and Profit and Loss Account**

Particulars	Rs.	Particulars	Rs.
To Materials	80,000	By Sales	4,00,000
To Direct wages	1,20,000		
To Works on cost	50,000		
To Gross Profit	1,50,00		
	400,000		4,00,000
To Salaries	60,000	By Gross profit	1,50,000
To Rent and rates	10,000		
To Selling expenses	30,000		
To General expenses	20,000		
To Net profit	30,000		

Using the above information, prepare a statement of estimate for the next year, if:

- Output and sales will be 1,200 radios.



- Price of materials will rise by 20% and wage rate by 5%.
- Works on cost will rise in proportion to the combined cost of materials and wages.
- A profit of 10% on the selling price is expected.
- Selling cost per unit and others expenses will remain unchanged.

**Solution:****Cost Sheet**

(1,000 radios)

	<b>Total (Rs.)</b>	<b>Per Unit (Rs.)</b>
Materials	80,000	80.00
Direct Wages	1,20,000	1,20.00
<b>Prime Cost</b>	<b>2,00,000</b>	<b>200.00</b>
Works on cost	50,000	50.00
<b>Works Cost</b>	<b>2,50,000</b>	<b>250.00</b>
Office administration:		
Salaries	60,000	
Rent and rates	10,000	
Gen. expenses	20,000	90.00
<b>Cost of Production</b>	<b>3,40,000</b>	<b>340.00</b>
Selling expenses	30,000	30.00
<b>Total Cost</b>	<b>3,70,000</b>	<b>370.00</b>
Profit	30,000	30.00
Sales	4,00,000	400.00

**Cost Estimation for 1,200 Radios**

	<b>Per Unit (Rs.)</b>	<b>Per Unit Rs.</b>	<b>Total Rs.</b>
Materials	80.00		
<u>Add 20% increase</u>	<u>16.00</u>	96.00	1,15,200



Direct wages	120.00		
<u>Add 5% increase</u>	<u>6.00</u>	<u>126.00</u>	<u>1,51,200</u>
<b>Prime Cost</b>		<b>222.00</b>	<b>2,66,400</b>
Works on cost 25% on Prime Cost		<u>55.50</u>	<u>66,600</u>
<b>Works Cost</b>		277.50	3,33,000
Salaries, tent & Gen. expenses		<u>75.00</u>	<u>90,000</u>
<b>Cost of Production</b>		<b>352.50</b>	<b>4,23,000</b>
Selling expense		30.00	36,000
Total Cost		382.50	4,59,000
Profit 10% on selling price		42.50	51,000
Selling Price		425.00	5,10,000

#### 8.4 Production Account

For the purpose of ascertainment of costs, cost information can also be presented in the form of a production account. It is usually prepared to ascertain the cost of production and sales. Production account is prepared in the form of a ledger account so as to show the cost of production, loss of output, sale of scrap etc. There is no definite form of production account. It can be prepared according to the specific requirements of the firm. However, in majority of the cases, production account consists of four distinct parts: the first part gives the prime cost, the second part shows the cost of production, the third part gives gross profit and the fourth part shows net profit.

##### Illustration: 5

Pardeep Engineering Works Ltd. is engaged in the manufacture of automobile spare parts. The particulars about its costs and sales for the year ended 31st December, 2013 are as follows:

		Rs.
Raw materials purchased		1,05,600
Direct wages		84,000
Direct expenses		2,400
Indirect wages		4,400
Factory expenses		40,000



Depreciation of plant and machinery		5,600
Salesman's salaries		10,400
Advertising		5,600
Carriage outward		4,000
Office rent, rates, etc.		4,000
Sundry office expenses		10,400
Sales		3,37,600
	<b><u>Stock on</u></b>	<b>01.04.2020      31.03.2021</b>
Raw materials	1,20,000	1,46,400
Work-in-progress	44,800	56,000
Finished Goods	86,400	49,600

From the above information, you are required to prepare a production account showing all the details of costs and their break up and the amount of gross profit and net profit.

**Solution:**

**Production Account for the year ended 31<sup>st</sup> March, 2021**

Particulars	Rs.	Particulars	Rs.
To Materials consumed:		By Prime Cost c/d	1,65,600
Opening stock      1,20,000			
<u>Add: Purchases</u> <u>1,05,600</u>			
2,25,600			
<u>Less: Closing stock</u> <u>1,46,400</u>	79,200		
To Direct wages	84,000		
To Direct expenses	2,400		
	1,65,600		1,65,600
To Prime Cost b/d	1,65,600	By Closing stock WIP	56,000
To Work-in progress (opening)	44,800	By Cost of goods	
To Factory overheads		manufactured (Balancing	2,04,400
Indirect wages      4,400		figure)	
Factory wages      40,000			



Depreciation of plant	<u>5,600</u>	50,000		
		2,60,400		2,60,400
To Opening stock of finished goods		86,400	By Closing stock of finished goods	49,600
To Cost of goods manufactured		2,04,400	By Sales	3,37,600
To Gross Profit c/d		96,400		
		3,87,200		3,87,200
To Sundry office expenses		10,400	By Gross Profit b/d	96,400
To Office Rent rates etc.		4,000		
To Salesman's salaries		10,400		
To Advertising		5,600		
To Carriage outward		4,000		
To Net Profit		62,000		
		96,400		96,400

**Illustration: 6**

The following are the balances of the Impersonal Ledger of a colliery relating to revenue at the end of the year:

	Rs.
Wages paid for coal production	5,80,000
Coal for colliery consumption	45,000
Timber used in coal production	64,000
Ropes used in coal production	12,000
Stores used in coal production	76,000
Royalties paid	42,000
General charges	70,000
Salaries	36,000
Coal Sold (Including colliery) 1,12,000 tons	8,84,000
Wages paid for coke making	50,000
Stores used for coke making	37,000



Salaries for coke making	8,000
Coke sold (43,500 tons)	5,40,000

The stock of coal at the beginning of the year amounted to 7,000 tons valued at Rs. 5 per tonne and at the end of the year 15,000 tons valued at the same rate. The stock of coke at the beginning of the year amounted to 2,000 tons valued at Rs. 10 per tonne and at the end of the year 500 tons valued at the same rate.

The total production of the colliery was 1,85,000 tons of coal and 42,000 tons of coke; 65,000 tons of coal being used for coke-making. Prepare Separate Production Accounts for coal and coke .showing the cost of each item of expense per tonne of coal and coke respectively, taking coal used for coke making at cost price.

**Solution:**

**Coal Production Account**

*(Output 1,85,000 tons)*

Particulars	Per Ton Rs.	Total Rs.	Particulars	Per Ton Rs.	Total Rs.
To Wages paid	3.14	5,80,000	By cost of production of 1,85,000 tons c/d	5.00	9,25,000
To Coal for colliery Consumption	0.24	45,000			
To Timber used	0.35	64,000			
To Ropes used	0.06	12,000			
To Stores used	0.41	76,000			
To Royalties paid	0.23	42,000			
To General charges	0.38	70,000			
To Salaries	0.19	36,000			
	5.00	9,25,000		5.00	9,25,000
To Opening Stock (7000 tons)	5.00	35,000	By Sales (1,12,000 tons)		8,84,000



To Cost of production of 1,85,000 tons during the year	5.00	9,25,000	By Coke Production A/c (65,000 tons)	5.00	3,25,000
To Profit on Coal production		3,24,000	By Closing Stock (15,000 tons)	5.00	75,000
		12,84,000			12,84,000

**Coke Production Account**

*(Output 42,000 tons)*

Particulars	Per Ton Rs.	Total Rs.	Particulars	Per Ton Rs.	Total Rs.
To Coal used (65,000 tons at Rs. 5 per tone)	7.74	3,25,000	By cost of production of 42,000 tons of Coke c/d	10.00	4,20,000
To Wages paid	1.19	50,000			
To Stores used	0.88	37,000			
To Salaries	0.19	8,000			
	10.00	4,20,000		10.00	4,20,000
To Opening Stock (2,000 tons)	10.00	20,000	By sales of 43,500 Tones		5,40,000
To Cost of production of 42,000 tons of Coke b/d	10.00	4,20,000	By Closing stock 500 tons	10	5,000
To Profit on coke Production		1,05,000			
		5,45,000			5,45,000

**8.5 Check Your Progress**

1. Calculate the prime cost from the following information: Direct material purchased: Rs. 1,00,000; Direct material consumed: Rs. 90,000; Direct labour: Rs. 60,000; Direct expenses: Rs. 20,000;





Manufacturing overheads: Rs. 30,000

- a) Rs. 1,80,000
  - b) Rs. 2,00,000
  - c) Rs. 1,70,000
  - d) Rs. 2,10,000
2. Total cost of a product: Rs. 10,000; Profit: 25% on Selling Price Profit is:
- a) Rs. 2,500
  - b) Rs. 3,000
  - c) Rs. 3,333
  - d) Rs. 2,000
3. Net Works cost: Rs. 2,00,000; Office & Administration Overheads: Rs. 1,00,000; Opening stock of WIP: Rs. 10,000; Closing Stock of WIP: Rs. 20,000; Closing stock of finished goods: Rs. 30,000; Selling overheads: Rs. 10,000. There was no opening stock of finished goods. Calculate cost of sales.
- a) Rs. 2,70,000
  - b) Rs. 2,80,000
  - c) Rs. 3,00,000
  - d) Rs. 3,20,000
4. Calculate value of closing stock from the following: Opening stock of finished goods (500 units): Rs. 2,000; Cost of production (10000 units) : Rs. 50,000; Closing stock (1000 units):?
- a) Rs. 4,000
  - b) Rs. 4,500
  - c) Rs. 5,000
  - d) Rs. 6,000
5. If Direct Material = 12,000; Direct Labor = 8000 and other Direct Cost = 2000 then what will be the Prime Cost?



- a) 12000
- b) 14000
- c) 20000
- d) 22000

## 8.6 Summary

Single costing is applied to ascertain the total and per unit cost of a standard product turned out in a manufacturing concern. In order to ascertain cost of products, a cost sheet is prepared periodically. Especially case has to be given to the treatment of opening and closing stocks in the cost sheet. The analysis of cost presented in the form of an account is called as 'Production Account'. The form of Production Account differs from industry to industry.

## 8.7 Keywords

- **Cost Sheet:** It is a document which provides for the assembly of the detailed cost of a cost centre or cost unit.
- **Single costing:** It is applied to ascertain total and pr unit cost of a standard product turned out in a manufacturing concern.
- **Production Account:** When information shown in a cost sheet is presented in the form of T-shape account, it is known as Production Account.
- **Scrap:** It is unavoidable residue material arising in certain types of manufacturing processes.

## 8.8 Self-Assessment Test

- Q.1 What is single costing? In what industries is it used?
- Q.2 Describe the role of the cost accountant in determining the quotation price for a tender.
- Q.3 Define the objects of cost sheet. Give a specimen of cost sheet indicating clearly the headings and important items supplying imaginary figures.
- Q.4 Write short notes on:
  - Tender price
  - Work-in-progress



- Production Account.

Q.5 The accounts of ABC Ltd. show for 2020:

Materials Rs. 3,50,000; Labour Rs. 2,70,000; Factory Overheads Rs 81,000 and Administration Overheads Rs 56,080. What price should the company quote for a refrigerator? It is estimated that Rs 1,000 in material and Rs 700 in labour will be required for one refrigerator. Absorb factory overheads on the basis of labour and administration overheads on the basis of works cost. A profit of  $12\frac{1}{2}\%$  on selling price is required.

**(Answer: Rs. 2,357.49)**

Q.6 Following are the particulars for the production of 2,000 sewing machines of XYZ Ltd., for the year 2020:

Cost of Materials Rs. 1,60,000; Wages Rs. 2,40,000; Manufacturing Expenses Rs. 1,00,000; Salaries Rs. 1,20,000; Rent, Rates and Insurance Rs. 20,000; Selling Expenses Rs. 60,000; General Expenses Rs. 40,000 and Sales Rs. 8,00,000.

The company plans to manufacture 3,000 sewing machines during 2012. You are required to submit a statement showing the price at which machines would be sold so as to show a profit of 10% on selling price.

Following additional information is supplied to you:

- Price of material is expected to rise by 20%
- Wages rates are expected to show an increase of 5%.
- Manufacturing expenses will rise in proportion to the combined cost of materials and wages
- Selling expenses per unit will remain the same,
- Other expenses will remain unaffected by the rise in output.

**Answer: Sales: 12,25,000; Per unit Selling Price : 408.33**

Q.7 In respect of a factory the following figures have been obtained for the year 2011:

Cost of material Rs. 6,00,000; Direct wages Rs. 5,00,000; Factory overheads Rs. 3,00,000; Administrative overheads Rs. 3,36,000; Selling overheads Rs. 2,24,000 ; Distribution overheads Rs. 1,40,000 and Profit Rs. 4,20,000.



A work order has been executed in 2012 and the following expenses have been incurred: Materials Rs. 8,000 and wages Rs. 5,000.

Assuming that in 2012 the rate of factory overheads has increased by 20%, distribution overheads have gone down by 10% and selling and administration overheads have each gone up by 12½%, at what price should the product be sold so as to earn the same rate of profit on the selling price as in 2011?

Factory overhead is based on direct wages while all other overheads are based on factory cost.

**Answer: Sales: 25,20,000; Estimated Per unit Selling Price : 30,677**

Q.8 From the following particulars of Rosa Ram Ltd. for three months ending 31st March, 2012 prepare:

- Cost sheet for the period giving various costs, and
- Profit and Loss Account for the quarter showing profit per barrel.

Wages Rs. 12,000, Coal and Oil RS. 11,200, Cooperage, Corks and Shives RS. 4,000, Malt Rs.40,000, Hops RS. 10,800, Beer Duty Rs.2,80,000, Water RS. 1,000, Rent and Taxes RS. 6,000, By product RS. 3,600, Sugar RS. 14,000, Preservatives RS. 1,600, Other Materials RS. 1,200, Repairs RS. 1,800, Depreciation RS. 1,200, Administration Expenses RS. 24,000, Selling and Distribution Expenses RS. 30,000.

Opening stock of beer RS. 40,500 (300 barrels), Closing stock of beer Rs. 67,500 (500 barrels) Beer Sales RS. 4,98,00Q (2,800 barrels). Beer brewed during the period 3,000 barrels.

**Answer: Cost of production: 4,05,200; Per unit: 135.06; Profit : 89,800**

## 8.9 Answers to Check Your Progress

1(c), 2 (c), 3(b), 4 (c), 5(d)

## 8.10 References/ Suggested Readings

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<b>Course Code:</b> BCOM 401	<b>Author:</b> Dr. Sanjeev Kumar Garg
<b>Lesson No.:</b> 09	<b>Vetter:</b> Prof. Suresh Kumar Mittal
<b>Job Costing and Contract Costing</b>	

**Structure**

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- 9.1 Introduction
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- 9.3 Contract Costing
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- 9.6 Keywords
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- 9.8 Answers to Check Your Progress
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**9.0 Learning Objectives**

After going through this lesson, you should be able to:

- Know the concept, objectives, advantages, disadvantages, and procedure of Job Costing.
- Know the concept, features of Contract Costing.



- Understand the preparation of Contract Account, calculation of profit on Contract Account.

## 9.1 Introduction

All types of manufacturing concerns can broadly be classified into two categories: (a) Mass production concerns and (b) Special order concerns. In mass production, firms manufacture uniform types of products. Since production is of standard products, it is on a mass scale and on a continuous basis. No customer orders or specifications are required for production. Examples of mass production concerns are textile mills, chemical plants, paper manufacturing, tyre rubber companies etc. On the other hand, special order concerns manufacture products in clearly distinguishable lots in accordance with special orders and individual specifications. Examples of specific order concerns are printing press, construction of buildings, bridges, roads, ship building etc.

## 9.2 Job Costing

Job costing or Job Order Costing also called specific order costing is a method of costing which is used when work is undertaken as per the customer's special requirement (tailor-made). It is distinct from Contract Costing in the sense that each job is of a comparatively short duration. The job may be carried out within the factory/workshop or on the premises of the customer, depending on the nature of Job.

The main features of Job Order Costing are that in this method of cost ascertainment, costs of materials, labour and overhead are accumulated for each job and profit or loss on it is determined. When an enquiry is received from the customer, costs expected to be incurred on the job are estimated, and on the basis of this estimate, a price is quoted to the customer. When the job has been completed, the actual costs can be compared with the estimated costs (or standard costs if a system of standard costing is in vogue). This serves as a tool of cost control.

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

### 9.2.1 Characteristic of Job Costing

The characteristic of Job Costing are:

- Job Costing is adopted by manufacturing concerns as well as non-manufacturing concerns.



- Those concerns which follow job costing method produce goods not for stock but against specific orders from customers.
- Job Costing is adopted in concern where the work done is analysed into different jobs, each job being considered a separate unit of cost.
- A separate account is opened for each Job to which all expenses incurred on that Job, from the date of commencement till the date of completion are debited. This will enable the concern to know the cost of each Job.
- Under Job Costing, the cost of each Job is ascertained after the completion of the job.
- As each job is different from other jobs, each job needs separate treatment under job costing.
- By comparing the actual cost of each job against the price charged for each job, the profit or loss made on each job is ascertained.
- Under this method, the cost of each job and the profit or loss made on each job undertaken is found out separately.
- Under this method, production is intermittent and not continuous.
- The industries need not incur selling and distribution expenses as the customers themselves come to place orders and collect the goods after production.

### **9.2.2 Objectives of Job Costing**

Job Costing serves the following objectives:

- It helps in finding out the cost of production of every order and thus helps in ascertaining profit or loss made out on its execution. The management can judge the profitability of each job and decide its future course of action.
- It helps management in making more accurate estimates about the costs of similar jobs to be executed in future on the basis of past records. The management can conveniently and accurately determine and quote prices for orders of a similar nature which are in prospect.
- It enables management to control operational inefficiency by comparing actual costs with the estimated ones.

### **9.2.3 Advantages of Job Costing**

Job costing has the following advantages:





- It is helpful to ascertain the cost as well as the profit or loss on each job separately.
- It helps the management to know about the profitability of the jobs.
- It is best suited for cost plus contract.
- It provides detailed analysis of the elements of cost which is quite useful for the preparation of cost estimates and quotations.
- Under this method of costing, spoilage and defective jobs can be easily identified and responsibility for the same can be fixed on specific departments or individuals.
- The data of the job costing are quite helpful in the preparation of future budgets.
- The cost data relating to completed jobs is helpful to the management to know the trend of material, labour and overhead costs and to control the future job costs.

#### 9.2.4. Disadvantages of Job Costing

Job costing is not free from defects. It suffers from following limitations:

- It involves more clerical work for cost collection. Further, it involves more supervision which add to cost and make it costly.
- Under this method of costing, costs are required to be collected for a large number of small jobs. So the chances of errors in cost collection are more in Job Costing.
- Job costing, being historical in nature, cannot be of much help for cost control unless it is combined with estimated or standard costing.

#### 9.2.5 Applications of Job Costing

Job Costing is employed in the following cases

- Where the production is against the order of the customer or jobs are executed for different customers according to their specifications.
- Where each job needs special treatment and no two orders are necessarily alike.
- Where there is no uniformity in the flow of production from one department to another.
- Where the work-in-progress differs from period to period on the basis of the number of jobs in hand.

Job costing is applicable to printing, furniture, hardware, ship-building, heavy machinery, foundry general engineering works, machine tools, interior decoration, repairs and other similar work.

#### 9.2.6 Procedure of Job Costing



The procedure that is commonly applicable to a normal sale transaction equally applies in case of job costing. This is explained under the following steps:

- **Receiving an Enquiry:** Before placing an order with the manufacturer, usually the customer will enquire about the price, quality to be maintained, the duration within which the order is to be executed and other specifications of the job.
- **Estimation of the Price of the Job:** The cost accountant estimate the cost of job after considering the various elements of cost and keeping in mind the specification of customer. This is based on the cost of execution of similar job in the previous year and considering the possible changes in the various elements of the cost. The estimated cost of the job is then informed to the prospective customer.
- **Receiving of Order:** The customer will then place the order if he is satisfied with the quotation price and other terms of executing the job. The production control department receives the order and it will give a number for every order thus received which is known as job order number. The job is known by this number until it is completed.
- **Preparation of Production Order:** A production order is prepared by the production control department is sent to the concerned persons such as the employees to enable them to carry out the job, to the store-keeper to facilitate him to stock all the required materials, to cost accountant to enable him to prepare Job Cost Sheet in order to ascertain the profit on every job completed. The production order consists of the following particulars:

Production Order			
Name of Customer.....		Job No.....	Date of
Commencement.....		Date.....	
Date of Completion		Bill of Material	No..... Special
instructions.....		Drawing attached yes/No	
<b>Quantity</b>	<b>Description</b>	<b>Machines to be used</b>	<b>Tools required</b>
			(Sign).....
			Production Authorized by:
			Head of Production Control Dept.



- **Job Cost Sheet** Job cost sheet is the most important document used in the Job Costing system. A separate Cost Sheet or card is maintained for each job in which all expenses regarding materials, labour and overheads are recorded directly from costing records. Job Cost Sheets are not prepared for specific periods but they are made out for each job regardless of the time taken for its completion. However, material, labour and overhead Costs are posted periodically to the relevant Cost Sheet.

<b>Job Cost Sheet</b>											
Customer.....				Job No.. .....				Date .....			
Commencement.....				Date of completion.....							
Material Cost			Labour Cost				Factory Overhead (Absorbed)				
Date	Material Req. No.	Amount Rs.	Date	Hours	Rate Rs.	Amt. Rs.	Date	Hours	Rate Rs.	Amt. Rs.	
<b>Total</b>			<b>Total</b>				<b>Total</b>				
Profit/Loss			Cost Summary								
Rs.			Rs.								
Price Quoted .....			Material								
Less: Cost .....			Labour								
-----			Factory Overhead								
Profit or Loss .....			Administrator Overhead								
-----			Selling Overhead								
			Total Cost								

- **Completion Report:** A completion report is sent to the costing department after the completion of job. The actual cost recorded in the Job Cost Sheet is compared with the estimated cost. It will reveal the efficiency or inefficiency in operation. It is a guide to the future course of action.
- **Profit or Loss:** Profit or loss on each job can be determined by comparing the actual cost with the price obtained.

### Illustration 1

A work order for 100 units of a commodity has to pass through four different machines of which the machine hour rates are: Machine P – Rs. 1.25, Machine Q – Rs. 2.50, Machine R – Rs. 3 and Machine S



– Rs. 2.25 Following expenses have been incurred on the work order – Materials Rs. 8,000 and Wages Rs. 500.

Machine - P has been engaged for 200 hours. Machine - Q for 160 hours, Machine - R for 240 hours and Machine - S for 132 hours.

After the work order has been completed, materials worth Rs. 400 are found to be surplus and are returned to stores.

Office overhead used to be 40% of works costs, but on account of all-round rise in the cost of administration, distribution and sale, there has been a 50% rise in the office overhead expenditure.

Moreover, it is known that 10% of production will have to be scrapped as not being upto the specification and the sale proceeds of the scrapped output will be only 5% of the cost of sale.

If the manufacturer wants to make a profit of 20% on the total cost of the work order, find out the selling price of a unit of commodity ready for sale.

**Solution:**

Particulars	Rs.	Rs.
Materials used (Rs. 8,000 – Rs.400)		7,600
Direct Wages		500
<b>Prime Cost</b>		<b>8,100</b>
Works Overhead at machine hour rate:		
Machine - P For 200 hours @ Rs. 1.25 per hour	250	
Machine - Q For 160 hours. @ Rs. 2.50 per hour	400	
Machine - R For 240 hours. @ Rs. 3 per hour	720	
Machine - S For 132 hours. @ Rs. 2.25 per hour	297	1,667
<b>Works Cost</b>		<b>9,767</b>
<u>Add:</u> Administration Overhead at 60% of works cost		5,860
		15,627
<u>Less:</u> Sale proceeds of Scrap (5% of 10% of Rs. 15,627)		78



Total Cost of the work order		15,549
Profit at 20% of total Cost		3,110
Selling Price of 100 units		18,659
Selling Price of a unit		186.59

Note: It was known before that 10% of production will have to be scrapped, therefore, inputs must have been made taking this factor into consideration. No other adjustment is necessary except deducting the value of scrap from the cost of production.

### 9.3 Contract Costing

Contract or Terminal Costing is a variant of Job Costing and for this reason both Contract and Job costing methods are based on the same costing principles. The difference between these two is that in Job Costing a job is relatively small, whereas in Contract Costing contract is big. It has been well said that “a job is a small contract and contract is a big job”. In contract costing, each contract is a cost unit. As the cost unit in contract costing is relatively large, it takes a considerable length of time to complete and it may continue over more than one year. Moreover, whereas job work is done in factory premises, contract work is done at site, away from the premises of the business. Contract Costing is employed in business undertakings engaged in building construction, road construction, bridge construction and other civil engineering works.

The cost unit in Contract Costing is the contract itself. In Contract Costing a separate account is kept for each contract. Since a greater part of the work is carried out at the contract site itself, all the expenditures incurred on the contract including telephone installed at site, power used at site, site vehicles, transportation etc., can be charged directly to the contract. Head Office expenses and the overheads relating to central stores, are, however, apportioned among the various contracts on some equitable basis, such as percentage of materials, wages, prime cost or a percentage of total contract cost depending on the circumstances. In the case of contract costing, direct costs account for a very high proportion of the total cost of contract whereas indirect costs constitute only a small proportion of it. One of the significant features of Contract Costing is difficulty in cost control. Because of the scale and the size of the contract and the site, there are frequently major problems of cost control concerning material usage and losses, pilferages, labour supervision and utilization, damage to and loss of plant and tools, etc.



### 9.3.1 Features of Contract Costing:

The contracts for which Contract Costing is applied will have the following features:

- Contracts are undertaken to special requirements of the customers.
- Duration of contracts are relatively for a long period.
- Contract work is done on the sites unlike manufacturing under a roof.
- Contract work mainly consists of construction activities.

### 9.3.2 Preparation of Contract Account

Particulars	Amount	Particulars	Amount
To Materials :	-----	By Materials :	
Direct Material Purchased	-----	Return to supplier	-----
Issued from store		Return to store	-----
Transferred from other contract	-----	Transferred to other contract	-----
Wages		Sold At site or at hand	-----
Add: Outstanding wages	-----		-----
To Direct Expenses	-----	By Plant:	-----
Indirect Expenses	-----	Return to store	-----
		Transferred to other contract	-----
To Plant:		Sold At site or at hand	-----
Cost of specific plant	-----		
To Depreciation on plant	-----		
	-----	By P&L a/c	-----
To P&L a/c (Profit on sale)	-----	Loss on sale of material or plant	
Sub-contract Cost		Plant or material lost, destroyed, stolen	-----
Cost of extra work done	-----	Contractee (if contract complete)	
Statement of P&L (if contract complete) (bal. fig.)	-----	By Statement of P&L (if contract complete)	-----
<b>OR</b>			



To Work-in-Progress A/c: (balancing figure) (if work certified is less than $\frac{1}{4}$ of contract price)		<i>OR</i>  <i>(in case of incomplete contract)</i>	
<i>OR</i> To Balance c/d (if work certified is more than $\frac{1}{4}$ of contract price)			-----
	-----	By Work-in-Progress A/c: Work Certified Work Uncertified	-----
To Statement of Profit & Loss (Profit & Loss to credited at the end of year) Work-in-Progress A/c (Profit kept as reserve)		By Balance b/d	
	-----		-----

### 9.3.3 Explanation of Various Items shown in Debit side of Contract Account

The contractor maintains a ledger in which a separate account for each contract is opened. The contract ledger is so ruled as to give maximum information. Certain special aspects of contract costing and treatment of some important items of expenses in contract account is discussed below

- Materials:** All materials purchased directly for the contract or supplied from the stores are debited to the concerned contract account. Any profit or loss arising from the sale of material, or materials stolen or destroyed by fire, will be transferred to the profit and loss account. Normal waste of materials is charged to the contract by inflating the rates of materials. If any stores items are used for manufacturing tools, the cost of such stores items is charged to the work expenses account. If the contractee has supplied some materials without affecting the contract price, only a note is given about it and no accounting entries are made in the contract account.



- **Labour or Wages** All labour employed at the contract's site should be regarded as direct labour and charged direct to the contract concerned. Where possible, separate wages sheets should be prepared for each contract. If this is not possible, a Wages Analysis Sheet should be prepared wherein should be entered the particulars of, the daily or weekly time sheet. The total of each column should be posted to the debit side of the appropriate contract. Wages accrued or outstanding at the end of the period should appear on the debit side of the Contract Account.
- **Direct Expenses:** All expenses other than material and wages are charged to individual contract as and when incurred.
- **Indirect Expenses:** There are certain expenses (such as engineers, surveyors, supervisors, etc. engaged on various contracts) which cannot be directly charged to contracts. Such expense may be distributed on several contracts on some suitable basis as a percentile of material or labour.
- **Plant and Machinery** When some plant and machinery is used for a contract, the following methods are generally in use for charging the contract
  - The book value of plant and machinery issued is debited to the contract account concerned and the Plant Account is credited. When the plant is returned, the depreciated value is credited to the Contract Account and debited to the Plant Account. This method is generally used when plant and machinery is required for a long period or it is to be exhausted upon the contract.
  - Total depreciation during a period in respect of each plant or each group of plants is determined and the contract account concerned is debited with its share of depreciation on the basis of the period for which the plant was in use.
  - When the plant and machinery is used for a short time, say a few hours, an 'Upkeep Account' may be maintained which is debited with the cost of repairs and maintenance, depreciation, obsolescence etc. A hire rate sufficient to cover the upkeep of the plant is then determined and the contract is charged at this rate.
- **Cost of Extra Work** Sometimes additional work upon the work originally contracted for is required by the contractee. If the additional work is quite significant, it should be treated as a separate contract and a separate account should be opened for it. If it is not significant, expenses incurred upon extra work should be debited to the contract account as 'Cost of extra work' and the extra amount which the contractee has agreed to pay should be added to the contract price.





- **Sub-Contracts Cost:** Many times, work of a specialized character such as special flooring, grilling etc. is entrusted to other contractors (sub- contractors) by the main contractor. The cost of such sub-contracts is taken as a direct charge against the contract for which the work has been done and is debited to the concerned contract account.

#### 9.3.4 Explanation of items shown in Credit side of Contract Account

- **Materials:** In credit side following items related to material is shown:
  - Material return to supplier
  - Material return to store
  - Material transferred to other contract
  - Material at site
  - Sale of Material
  - Loss of material due to destroy, theft, fire or other reason

Particulars	Amount	Particulars	Amount
To Material from store		By Material returned to supplier	
To Material purchased		By Material transferred to other contract	
To Material transferred from other contract		By Material returned to store	
To Profit and Loss A/c (Profit on sale of material)		By Profit and Loss A/c	
		• Material Stolen	
		• Material loss by fire	
		• Material theft	
		By Material Sold	
		By Material at site	

#### Illustration:2

Material purchased Rs. 1,00,000; Opening material Rs. 20,000; Material at site Rs. 30,000; Material costing Rs. 10,000 was sold for Rs. 12,000; Material costing Rs. 5,000 was sold for Rs. 3,000; Material costing Rs. 4,000 lost by fire. Show the treatment of the material using both the methods.

#### Solution:



## Contract Account

Particulars	Rs.	Particulars	Rs.
To Opening material	20,000	By Material at site	30,000
To Material purchased	1,00,000	By Material sold	12,000
To P & L a/c (profit on sales of material)	2,000	By Material sold	3,000
		By P & L a/c (loss on sales of material)	2,000
		By P & L a/c (material lost by fire)	4,000

- **Work Certified:** It is generally agreed between the contractor and the contractee that 'on accounts' payment will be made by the contractee at stages of progress in the work. An architect or a surveyor is appointed by the contractee to certify the extent of the work completed. He issues a certificate from time to time to the effect stating how much work has been completed and the amount of money due to the contractor in terms of the contract deed. The contractor credits the 'on account' payment received from the contractee in his account. On completion of the contract, the contractee's account will be debited with the contract price for receiving the final payment.
- **Work uncertified:** Work uncertified (or work not yet certified) represents the cost of the work which has been carried out by the contractor but has not been certified by the contractee's architect.
- **Cash Received:** Cash received is ascertained by deducting the retention money from the value of work certified, i.e.  $\text{Cash received} = \text{Value of work certified} - \text{Retention money}$ .
- **Cost of work certified:** The cost of work certified represents the total expenditure incurred on the contract to date, less cost of work uncertified, materials in hand, plant at site, etc. Thus  $\text{Cost of work} = \text{Cost of work certified} - (\text{Cost of work uncertified to date} + \text{materials in hand} + \text{Plant at site})$
- **Work-in-progress:** Incomplete contracts are referred to as work-in-progress. This should be shown on the assets side of the Balance Sheet under the heading work-in- progress. Work-in progress represents the net expenditure incurred on the contract. The net expenditure on a contract is arrived at by adding the various expenses debited to the contract account, less materials in hand, returned, lost or stolen etc., the value of plant in hand, returned, lost or destroyed, etc. From the viewpoint of



the contractor, work-in-progress represents the net expenditure incurred on the contract, irrespective of whether any cash for it has been received or not. While showing the work-in-progress in the balance sheet, any notional profit held back (profit in reserve) and cash received are deducted.

Alternatively, the work-in-progress account can be prepared by debiting to this account, the amount of work certified and work uncertified and crediting it with the profit in reserve i.e. the portion of the profit not transferred to the profit and loss account. The difference between the debit and credit is work-in-progress. While showing it in the balance sheet, all cash received on account of such uncompleted contracts is to be shown as a deduction. The value of plant and materials in hand may be shown separately in the balance sheet under the heading plant at site and materials at site, along with work-in-progress.

### **Illustration: 3**

The following information is available

Value of work certified	5,00,000
Cost of work to date	4,00,000
Cost of work not yet certified	1,00,000
Material in hand and plant at site	Nil
Calculate notional profit	

### **Solution:**

Value of work certified		5,00,000
Less: Cost of work certified		
Cost of work to date	4,00,000	
Less: Cost of work not yet certified	-1,00,00	3,00,000
Notional profit		2,00,000

However, if in any year the cost of work certified exceeds the value of work certified, the resultant figure will represent the notional loss.

### **9.3.5 Calculation of Profit/loss on incomplete Contracts**

A contract usually extends over a number of years. If the profit on such contracts is recorded only after their completion, wide fluctuations may be noted in the profit figures from year to year, as there may be



a year in which no contract is completed and another year in which a number of contracts are completed. To avoid wide fluctuations in the reported profits and to reflect the revenue in the accounting period during which the activity is undertaken, and also to comply with the matching principle, the profit in respect of each contract in progress is transferred to the profit and loss accounting the year by calculating the notional profit. However, prudence requires that the total notional profit should not be transferred to the profit and loss account but the total notional loss should be written off to the profit and loss account of the year. The withholding of a portion of the notional profit may be regarded as a provision for future unforeseen expenses and contingencies. The portion of notional profit to be transferred to the profit and loss account depends on the stage of completion of the contract. It is always preferable to determine the stage of completion of a contract with reference only to the certified work. For this purpose, as far as possible, uncertified work should not be considered.

To determine the profit, all the incomplete contracts are classified into the following four categories. The transfer of profit to the profit and loss account in each of the above cases is done as under:-

- **Contract less than 25% complete** No profit should be taken into account if the contract has just started or is less than 1/4th complete.
- **Contract between 25% and 50% complete (i.e. it is 1/4 or more complete but less than 1/2)** One-third of the notional profit, reduced in the ratio of cash received to work certified, may be transferred to the profit and loss account. Thus the amount of profit to be transferred to be profit and loss account may be determined by using the following formula.
  - $\frac{1}{3} \times \text{Notional profit} \times \frac{\text{Cash received}}{\text{work certified}}$
- **Contract between 50% and 90% complete (i.e. it is 50% or more complete but less than 90%)** In this, case, two-thirds of the notional profit, reduced by the proportion of cash received to work certified may be transferred to the profit and loss account. In this case, the formula will be
  - $\frac{2}{3} \times \text{Notional Profit} \times \frac{\text{Cash received}}{\text{work certified}}$
- **Contract nearing completion** When 90% or more of the work has been done in a contract the contract is considered to be nearing completion. In the case of such contracts, the amount of notional profit to be transferred to the profit and loss account may be determined by taking into account the estimated profit on such contracts. In that case, the estimated profit is ascertained by deducting the aggregate of costs to date and further expenditure to be incurred to complete the



contract from the contract price. An amount equivalent to a proportion of this estimated total profit from the notional profit is credited to the profit and loss account and balance is kept in reserve.

This proportion is ascertained by anyone of the following formulas

- Estimated Profit x work certified / contract price
- Estimated profit x work certified/ contract price x cash received / work certified
- Estimated Profit x work certified / Contract price
- Estimated Profit x Cost of work to date / Estimated total cost x Cash received/work certified
- In the absence of specific instructions, it is preferable to use formula estimated further expenditure is not given, the amount of profit to be transferred to the profit and loss account may be ascertained on the basis of notional profit by using the following formula:
  - Notional Profit x work certified / Contract price
- **Notional Profit:** Notional profit represents the difference between the value of work certified and cost of work certified. It is determined in the following manner:
- **Estimated Profit:** Estimated profit represents the excess of the contract price over the estimated total cost of the contract.

Thus, Estimated profit = Contract price - Estimated total cost

Estimated total cost is determined by adding the cost to be incurred to complete the contract to the cost incurred to date on a contract. Thus,

Estimated cost = Cost incurred to date + Cost to be incurred complete the contract

- **Retention Money:** The contractee generally does not make full payment of the work certified by the surveyor. He retains some amount, (say 10% to 20% of the amount due) to be paid within a reasonable period when it is ensured that there is no fault in the work done. The amount held back is called retention money. If any defect or deficiency is noticed in the work, it is to be certified before the release of the retention money. Retention money provides a safeguard against the risk of loss due to faulty workmanship.
- **Estimation Clause:** This clause is often provided in contracts to cover any likely changes in the price of utilization of materials and labour. Thus a contractor is entitled to suitably enhance the contract price if the cost rise beyond a given percentage. The object of this clause is to safeguard the interest of the contractor against unfavorable changes in cost. .The escalation clause is of



particular importance where prices of material and labour are anticipated to increase or where quantity of material and labour time cannot be accurately estimated. Just as an escalation clause safeguards the interest of the contractor by upward revision of the contract price, a de-escalation clause may be inserted to look after the interest of the contractee by providing for down beyond an agreed level.

#### **Illustration 4**

The total contract price of a contract is Rs. 20,00,000. On 31st march 2020, the value of work certified was Rs. 15,00,000 and the total cost incurred was Rs. 11,00,000. The value of work uncertified was Rs. 50,000. The cash received was Rs. 10,00,000. You are required to determine the amount of the profit to be taken to the P & L a/c and to the work in progress account (reserve).

#### **Solution:**

#### **Contract Account**

for the year ending 31st March 2020

Particulars	Rs.	Particulars	Rs.
To Cost incurred	11,00,000	By Work in progress:	
To Balance c/d	4,50,000	Work certified 15,00,000	
		Work not certified <u>50,000</u>	15,50,000
	15,50,000		15,50,000
To P & L account	2,00,000	By notional profit b/d	4,50,000
To work in progress a/c (Bal. figure)	2,50,000		
	4,50,000		4,50,000

- Note – 1: Percentage of the work certified to the contract price is 75% i.e. (Rs. 15,00,000 / Rs. 20,00,000) × 100. Because the value of work certified is equal to or more than ½ of the contract price but less than 90% of the contract price so profit (which is to be transferred to the P & L a/c) shall be calculated using the following formula:

$$\begin{aligned} \text{Profit \& Loss A/c} &= \text{Notional Profit} \times \frac{2}{3} \times \text{Cash Received} / \text{Work Certified} \\ &= 4,50,000 \times \frac{2}{3} \times 10,00,000 / 15,00,000 = \text{Rs. } 2,00,000 \end{aligned}$$



Amount which is to be transferred to the work in progress account:

= Notional Profit – Amount transferred to the P & L a/c

= Rs. 4,50,000 – Rs. 2,00,000 = Rs. 2,50,000

### **Illustration: 5**

The contract price is Rs. 20,00,000. On 31st March 2020, 90% of the work had been completed and certified by the architects. The costs incurred up to 31st March, 2018 on this project amounted to Rs. 16,00,000. It was estimated that another 80,000 would have to be incurred further to complete the project. The contractee paid 75% of the value of the work certified. Work not certified is Rs. 1,00,000. Find out the profit to be taken to profit and loss account.

### **Solution:**

#### **Contract Account**

for the year ending 31st March 2020

Particulars	Rs.	Particulars	Rs.
To Cost incurred	16,00,000	By Work in progress:	
To Balance c/d	3,00,000	Work certified 18,00,000	
		Work not certified <u>1,00,000</u>	19,00,000
	19,00,000		19,00,000
To P & L account	2,16,000	By notional profit b/d	3,00,000
To work in progress a/c (Bal. figure)	84,000		
	3,00,000		3,00,000

In this question it's clearly stated that the 90% of the work has been completed and certified, so the contract is near completion. So first of all estimate the profit as follows:

Estimated Profit = Contract Price – Estimated Cost

= Rs. 20,00,000 – (Rs. 16,00,000 already incurred + Rs. 80,000 to be incurred)

= Rs. 3,20,000

Profit & Loss A/c = Estimated Profit × Cash Received / Work Certified



$$= 3,20,000 \times 13,50,000 / 20,00,000 = \text{Rs. } 2,16,000$$

Amount which is to be transferred to the work in progress account:

$$= \text{Estimated Profit} - \text{Amount transferred to the P \& L a/c}$$

$$= \text{Rs. } 3,20,000 - \text{Rs. } 2,16,000 = \text{Rs. } 84,000$$

### **Illustration: 6**

ABC Construction Limited has undertaken the construction of a bridge over the river Yamuna for a municipal corporation. The value of the contract is Rs. 12,50,000 subject to a retention of 20% until one year after the certified completion of the contract, and final approval of the corporation's engineer. The following are the details as shown in the books on 30th June 2020:

○ Labour on site	Rs. 4,05,000
○ Material direct to site less returns	Rs. 4,20,000
○ Material received from stores	Rs. 81,200
○ Hire and use of plant – plant upkeep account	Rs. 12,100
○ Direct expenses	Rs. 23,000
○ General overheads allocated to the contract	Rs. 37,100
○ Material in hand on 30th June 2000	Rs. 6,300
○ Wages accrued/outstanding on 30th June 2000	Rs. 7,800
○ Direct expenses accrued/outstanding on 30th June 2000	Rs. 1,600
○ Work not yet certified by the Corporation Engineer	Rs. 16,500
○ Amount certified by the Corporation Engineer	Rs. 11,00,000
○ Cash received on account	Rs. 8,80,000

Prepare (a) Contract account; (b) Contractee's account; and (c) how the relevant items would appear in the Balance Sheet.

### **Solution:**

#### **Contract Account**

**For the Year Ending June 30, 2020**





Particulars	Rs.	Particulars	Rs.
To Material direct to site less returns	4,20,000	By material in hand	6,300
To Material received from store	81,200	By work in progress:	
To Labour on site 4,05,000	4,12,800	Work certified 11,00,000	
Add: Outstanding <u>7,800</u>		Work not certified <u>16,500</u>	11,16,500
To Hire and use of plant – plant upkeep account	12,100		
To direct expenses 23,000	24,600		
Add: Outstanding <u>1,600</u>	37,100		
To General overhead in Contract	1,35,000		
To Notional Profit c/d			
	11,22,800		11,22,800
To Profit & Loss A/c	72,000	By National Profit b/d	1,35,000
To work-in-progress A/c	63,000		
	1,35,000		1,35,000

**Work-in-Progress A/c**

To Contract No. 87 A/c		By Contract No. 87 A/c	18,200
Work Certified 3,75,000		By Balance c/d	3,82,300
Work Uncertified <u>25,500</u>	4,00,500		
	4,00,500		4,00,500

**Contractee Account**

Particulars	Amount	Particulars	Amount
To Balance c/d	8,80,000	By Cash	8,80,000
	8,80,000		8,80,000

**Work-in-Progress A/c**



Particulars	Amount	Particulars	Amount
To Contract Account		By Contract A/c	63,000
Work Certified		By Balance c/d	10,53,500
11,00,000	11,16,500		
Work Uncertified			
<u>16,500</u>			
	11,16,500		11,16,500

**Balance Sheet***(as on 30 June 2020)*

Liabilities	Amount	Assets	Amount
Wages accrued	7,800	Work in-Progress	
Direct expenses accrued	1,600	Work Certified	11,00,000
Profit and loss a/c	72,000	Work uncertified	<u>16,500</u>
			11,16,500
		<u>Less</u> Reserve	<u>63,000</u>
			10,53,500
		<u>Less</u> Cash Received	<u>8,80,000</u>
		Materials in hand	1,73,500
			6,300

- The percentage of the work certified to the contract price is 88% and the credit side of the contract side is more than the debit side so notional profit is there.
- Percentage of the work certified to the contract price is 58% i.e. Rs. 11,00,000 / Rs. 12,50,000 × 100. Because the value of work certified is equal to or more than ½ of the contract price but less than 90% of the contract price so profit (which is to be transferred to the P & L a/c) shall be calculated using the following formula:

Profit & Loss A/c = Estimated Profit × Cash Received / Work Certified

= 1,35,000 × 23 × 8,80,000 / 11,00,000 or 1,35,000 × 23 × 80% = Rs. 72,000

Note – 3: Amount which is to be transferred to the work in progress account:

= Notional Profit – Amount transferred to the P & L a/c



$$= \text{Rs. } 1,35,000 - \text{Rs. } 72,000 = \text{Rs. } 63,000$$

### **Illustration: 7**

The following is the summary of the entries in a contract ledger as on 31st December 2020 in respect of Contract No. 87 which has a contract price of Rs. 5,00,000.

○ Materials purchased directly	1,75,000
○ Materials supplied from stores	35,000
○ Wages	90,000
○ Direct Expenses	35,000
○ Establishment Charges	40,000
○ Plant	1,71,000
○ Scrap sold	1,00,000

The other information as follows

- Accruals on 31st December 2012 were; wages Rs. 500 and direct expenses Rs. 6,000.
- The cost of work uncertified was Rs. 25,500.
- Rs. 10,000 worth of plant and Rs. 15,000 worth of materials were destroyed by fire.
- Rs. 20,000 worth of plant was sold for Rs. 15,000 and materials costing Rs 25,000 were sold for Rs. 30,000.
- Depreciation on plant upto 31st December 2012 was Rs. 50,000 (f) Materials at site Rs. 25,000
- Cash received from contractee was Rs. 3,00,000 being 80% of work certified.

Show the Contract Account and Work-in-Progress Account. Also, show the same in the Balance Sheet.

### **Solution**

#### **Contact No. 87 A/c**

**For the Year Ending on December 31<sup>st</sup>, 2020**

Particulars	Rs.	Particulars	Rs.
To Material Purchased	1,75,000	By sales of scrap	10,000
To Material from stores	35,000	By Profit & Loss A/c	
To Wages	90,000	• Loss of Plant	10,000
• <u>Add</u> outstanding	<u>4,500</u>		25,000
	94,500		



To Direct Expenses	35,000		• Loss of Material <u>15,000</u>	
• <u>Add</u> outstanding	<u>6,000</u>	41,000	By Cash	45,000
To Establishment charges		40,000	• Sale of Plant 15,000	
To Plant		1,71,000	• Sale of Material	5,000
To Profits & Loss A/c (Profit on sale of materials)		5,000	<u>30,000</u>	25,000
To Notional Profit c/d		39,000	By Profit & Loss A/c ( <i>Loss on sale of plant</i> )	4,00,500
			By Materials at Site	
			By work-in-progress	
			• Work certified	
			3,75,000	
			• Work uncertified	
			<u>25,500</u>	
		6,00,500		6,00,500
To Profit & Loss A/c ( $\frac{2}{3} \times 39,000 \times 80\%$ )		20,800	By National Profit b/d	39,000
To work-in-progress A/c		18,200		
		39,000		39,000

**Work-in-Progress A/c**

To Contract No. 87 A/c		By Contract No. 87 A/c	18,200
Work Certified	3,75,000	By Balance c/d	3,82,300
Work Uncertified	25,500		
	4,00,500		
	4,00,500		4,00,500

**Balance Sheet as on 31<sup>st</sup> December 2020**

		Work in-Progress	
		Work Certified	3,75,000



		Work uncertified	<u>25,500</u>	
			4,00,500	
		<u>Less</u> Reserve	<u>18,200</u>	
			3,82,300	
		<u>Less</u> Cash Received	<u>3,00,000</u>	82,300
		Plant at Site		91,000
		Materials at Site		25,000

*Working Note: Calculation on Written Down Value of Plant*

- Plant at cost Rs. 1,71,000 – Plant Lost Rs. 10,000 – Plant Sold Rs. 20,000 – Depreciation Rs. 50,000 = Written Down Value of Plant Rs. 91,000.

## 9.4 Check Your Progress

1. \_\_\_\_\_ system is best suited for undertaking job works.
  - a) Process costing
  - b) Job costing
  - c) Contract costing
  - d) Batch costing
2. Specific order costing wherein work is carried out in accordance with the customer's special requirement
  - a) Process costing
  - b) Job costing
  - c) Contract costing
  - d) Batch costing
3. \_\_\_\_\_ clause in the contract agreement safeguard the interests of both contractor and contractee.
  - e) Escalation
  - f) Contract
  - g) Order



- h) Sub-contract
- 4. Part of work which is approved by surveyor or engineer is known as:-
  - e) Work certified
  - f) Work in Progress
  - g) Work Uncertified
  - h) Contract Price
- 5. If the value of work certified is less than  $1/4$ th of contract price, than how much profit is transferred to Profit and Loss A/c.
  - e) Full Profit
  - f) No Profit
  - g) Half Profit
  - h) One third Profit
- 6. The unpaid balance of work certified or the amount held back or retained by the contracted is known as:
  - e) Advance Money
  - f) Uncertified Work
  - g) Retention Money
  - h) Cash Received

## 9.5 Summary

Job costing is a form of specific order costing which applies where work is undertaken to customers' special requirements and each order is of comparatively short duration. The various steps in the Job Costing are Job Number, production order, job cost sheet, completion report and profit or loss. Batch Costing is concerned with the ascertainment of the cost of a group of identical products manufactured. In industries, where Batch Costing is employed, an important point is the determination of the optimum quantity in a batch at which cost per unit is minimum. Contract costing is a method of costing which is applied in a business where separate contracts of non-repetitive nature are undertaken. In order to reduce the element of risk by market fluctuations, an escalation clause may be included in the contract.

## 9.6 Keywords



- **Job Costing:** It is a form of specific order costing which is applied where work is undertaken to the specific requirements of the customers.
- **Batch costing:** It is used when a quantity of similar and identical products are manufactured together as one job.
- **Contract Cost:** It is the aggregate costs relative to a single contract designated as a cost unit.
- **Cost Plus Contract:** A clause which is provided for payment of allowable actual costs plus an agreed amount to cover the profit as incentive.
- **Notional Profit:** It is the difference between the value of work-in-progress certified and the cost of work-in-progress certified.

## 9.7 Self-Assessment Test

### Short Answer Questions:

- Q.1 What is Job Costing?
- Q.2 What is Contract Costing?
- Q.3 How does profit on incomplete contract is calculated?
- Q.4 What is escalation clause?
- Q.5 What do you mean by retention money?

### Long Answer Questions:

- Q.1 What do you understand by Job Costing? What are the main features of this method? Give a proforma Cost Sheet under such a system.
- Q.2 Explain the nature and use of batch costing. Describe the concept of the economical batch with the help of a suitable example.
- Q.3 There are two methods of charging the contract cost account for the use of pant. Describe two methods and state which method is preferable and why.
- Q.4 What is cost plus contract? Discuss this from the point of view of (a) the manufacturer and (b) the buyer.
- Q.5 Is it necessary to calculate profit on incomplete contracts? If yes, under what circumstances would you recommend calculation of profit on such contracts?



Q.6 Contract price is Rs. 50,000.  $\frac{3}{4}$ th of the work has been approved by the contractee. The costs incurred so far for contract A are Rs. 25,000. It is estimated that Rs. 5,000 will be required further to complete the contract. The contractee pays 80% of the work certified by him. Calculate the figure of profit which you consider reasonable to be taken to the credit of the profit and loss account.

(Answer: Rs. 12,000)

Q.7 XYZ Construction Limited took a contract in 2012 for road construction. The contract price was Rs. 10,00,000 and it is estimated that the cost of completion would be Rs. 9,20,000. At the end of 2012, the company has received Rs. 3,60,000 representing 90% of work certified. Work not yet certified was Rs. 10,000. Expenditure incurred on the contract during 2012 was as follows:

Materials Rs. 50,000; Labour Rs. 3,00,000; Plant Rs. 20,000; Materials costing Rs. 5,000 were damaged and had to be disposed off for Rs. 1,000. Plant is considered as having depreciated by 25%.

Prepare Contract Account for the year ending 2012 in the books of XYZ Construction Limited. Also show all possible figures that can reasonably be credited to Profit and Loss Account in respect of the contract.

(Answer: Contract A/c Rs. 4,30,000; Profit and Loss A/c Rs. 12,000)

Q.8 A contractor has undertaken a construction work at a price of Rs. 5,00,000 and begun the execution of work on 1st January, 2016. The following are the particulars of the contract up to 31st December, 2016.

▪ Machinery	Rs. 30,000
▪ Overheads	Rs. 8,252
▪ Materials	Rs. 1,70,698
▪ Materials returned	Rs. 1,098
▪ Wages	Rs. 1,48,750
▪ Work certified	Rs. 3,90,000
▪ Direct expenses	Rs. 6,334
▪ Cash received	Rs. 3,60,000





▪ Uncertified work	Rs. 9,000
▪ Materials on 31.12.2016	Rs. 3,766
▪ Wages outstanding	Rs. 5,380
▪ Value of plant on 31.12. 2016	Rs. 22,000

It was decided that the profit made on the contract in the year should be arrived at by deducting the cost of work certified from the total value of the architects certificate, that 1/3 of the profit so arrived at should be regarded as a provision against contingencies and that such provision should be increased by taking to the credit of Profit and Loss Account only such portion of the 2/3rd profit, as the cash received to the work certified.

(Answer: Contract A/c Rs. 4,25,864; Profit and Loss A/c Rs. 34,738)

## 9.8 Answers to Check Your Progress

1(b), 2 (c), 3(a), 4 (a), 5(b), 6 (c)

## 9.9 References/ Suggested Readings

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<b>Subject:</b> Cost Accounting	
<b>Course Code:</b> BCOM 401	<b>Author:</b> Dr. Sanjeev Kumar Garg
<b>Lesson No.:</b> 10	<b>Vetter:</b> Prof. Suresh Kumar Mittal
<b>Process Costing</b>	

**Structure**

- 10.0 Learning Objectives
- 10.1 Introduction
- 10.2 Different Forms of Process Costing
- 10.3 Check Your Progress
- 10.4 Summary
- 10.5 Keywords
- 10.6 Self-Assessment Test
- 10.7 Answers to Check Your Progress
- 10.8 References/ Suggested Readings

**10.0 Learning Objectives**

After going through this lesson, you should be able to:

- Know the meaning of Process Costing and its characteristics.
- Understand the advantages, disadvantages of Process Costing and industries where it is used.
- Know the different forms of Process Costing, normal wastage, abnormal wastage, abnormal gain and their accounting treatment.

**10.1 Introduction**

Process Costing is a method of costing used to ascertain the cost of production of each process, operation or stage of manufacturing where processes are carried out on having one or more of the



features such as product of one process becomes the material of another process or operation, simultaneous production at one or more process of different products, with or without by product, and where, during one or more processes or operations of a series, the products or materials are not distinguishable from one another, as for instance, when finished products differ finally only in shape or form.

### 10.1.1 Meaning of Process Costing

Process Costing is a method of costing used to ascertain the costs of each process or operation or stage of manufacture. Process Costing is useful or found to be most suitable for industries engaged in continuous manufacture of products in bulk in which the units of products are uniform and cannot be differentiated. It may be adopted in organizations producing a single commodity in bulk, or a group of products of different types. It is suitable for the following industries: chemical works, sugar mills, oil refining, textiles, breweries, rubber and tanning works, bottling companies, packing, mining, gas manufacturing, electric supply undertakings, food processing and fruit canning, etc.

- **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.”*

### 10.1.2 Features of Process Costing

- Production is done having a continuous flow of products having a continuous flow of identical products except where plant and machinery is shut down for repairs etc.
- Clearly defined process cost centres and the accumulation of all costs by the cost centres.
- The maintenance of accurate records of units and part units produced and cost incurred by each process.
- The finished product of one process becomes the raw material of the next process or operation and so on until the final product is obtained.
- Avoidable and unavoidable losses usually arise at different stages of manufacture for various reasons.



- In order to obtain accurate average costs, it is necessary to measure the production at various stages of manufacturing as all the input units may not be converted into finished goods.
- Different products with or without by-products are simultaneously produced at one or more stages or processes of manufacture. The valuation of by-products and apportionment of joint cost before joint of separation is an important aspect of this method of costing.
- Output is uniform and all units are exactly identical during one or more processes. So the cost per unit of production can be ascertained only by averaging the expenditure incurred during a particular period.

### 10.1.3 Advantages of Process Costing

- Process costing helps determination of cost in each process and of the final product at short intervals. If overhead rates are predetermined, unit costs can be computed very promptly even at weekly or monthly.
- The average cost can be easily determined when the methods of production are standardized. Price quotations can be submitted more promptly with standardization of processes.
- It involves less clerical work and cost than Job Costing. Cost finding is simpler and less expensive.
- Allocation of expenses can be easily made and the costs in each process accurately determined.
- Use of standard costing system is very effective in Process Costing.
- The performance analysis and managerial control is facilitated to a greater extent because of the availability of cost data in the form of prompt and accurate cost reports.

### 10.1.4 Limitations of Process Costing

- Process Costing is based on historical cost. The available cost information may not be useful for future managerial decision-making.
- Unfinished units (work in process) at the end of the period are expressed in equivalent production units which introduces subjective element in scientific cost determination.
- The whole concept of Process Costing system is based on average costs. Average costs do not always reflect the true costs. If there is an error in cost determination in one process, it will affect the cost estimation in subsequent processes as well as the cost of work in process and finished products.



- When two or more products are produced in the same process, the joint costs are prorated to the various products using some weightage say in terms of points. Giving weightage in terms of points is a subjective decision, which will give rise to approximate costs and cannot be taken as fully reliable. Absence of scientific base makes the process costing inadequate for managerial purposes.
- Process Costing system presumes that production activity of a factory is divided according to processes. A process is an organizational entity or section of a firm, in which specific and repetitive work is done. Thus a process becomes a practical unit for purpose of supervision of production and often it is an unsatisfactory unit for cost accounting purposes.

#### 10.1.5 Industries where Process Costing used

- Metallurgical industries (like steel and aluminum);
- Chemical industries (like plastics and drugs);
- Food processing industries (like cheese, chocolates, etc.) and
- Any other industry where there is continuous output involving two or more processes.

#### 10.1.6 Difference between Job Costing and Process Costing

	<b>Job Costing</b>	<b>Process Costing</b>
1.	The form of specific order costing which applies where the work is undertaken to customer's special requirements.	That form of costing which applies where standardised goods are produced and production is in continuous flow, the products being homogeneous.
2.	The job is the cost unit and costs are collected for each job.	Costs are collected by process or department on time basis and divided by output for a period to get an average cost per unit.
3.	Losses are generally not segregated.	Normal losses are carefully predetermined and abnormal losses are segregated.
4.	Overheads are allocated and apportioned to cost centres then absorbed by jobs, in proportion to the time taken.	Units pass through the same processes. Overheads are apportioned to processes on some suitable basis, sometimes, pre-



		determined rates may be used.
5.	Joint products / By-products do not usually arise in jobbing work.	Joint products/By-products do arise and joint cost apportionment is necessary.
6.	Standard costing is generally not suitable for jobbing work.	The standardised nature of products and processing methods lends itself to the adoption of standard costing.
7.	Work-in-progress valuation is specific and is obtained from analysis of outstanding jobs.	For WIP valuation operating costs have to be spread over fully complete output and partially complete products using the concept of equivalent units.
8.	Each job is separate and independent of others. Costs are computed when a job is complete.	Products lose their individual identity as they are manufactured in a continuous flow. Costs are calculated at the end of cost period.
9.	There are usually no transfers from one job to another unless there is a surplus work or excess production.	Transfer of costs from one process to another is made, as the product moves from one process to another.
10.	There may or may not be work-in-progress at the beginning or end of the accounting period.	There is always some work-in-process at the beginning as well as at the end of the accounting period.
11.	Proper control is comparatively difficult as each product unit is different and the production is not continuous.	Proper control is comparatively easier, as the production is standardised and is more stable.
12.	It requires more forms and details.	It requires few forms and less details.

#### 10.1.7 Fundamental principles of Process Costing:

- Cost of materials, wages and overhead expenses are collected for each process or operation in a period.
- Adequate records in respect of output and scrap of each process or operation during the period is maintained.



- The cost per finished output of each process is obtained by dividing the total cost incurred during a period by the number of units produced during the period after taking into consideration the losses and amount realised from sale of scrap.
- The finished product along with its cost is transferred from one process to the next process just like raw materials of that process.

### 10.1.8 Procedure of Preparation of Process Accounts

- Each process is separately identified. 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 (Rupees).
- All the expenses are debited in the respective process account.
- Wastage, sale of scrap, By-Products etc are reentered on the credit side of the 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 in every process are converted in terms of completed units.
- Following is the format of Process Account:

Particulars	Cost Per ton	Total Cost	Particulars	Cost Per ton	Total Cost
To Material To Labour To Direct Expenses To Indirect Expenses To Abnormal Gain			By Wastage, Scrape By Normal Loss By Abnormal Loss By By-Product By Transferred to other process or Finished Stock A/c		



## 10.2 Different Forms of Process Costing

Process Account can be prepared in the various forms like:

- Simple Process Account
- Loss in weight due to evaporation or scrap etc.
- Sale of manufactured product during process.
- Valuation of opening and closing stock.
- Normal Loss
- Abnormal Loss
- Abnormal Effectiveness
- Joint and by-products
- Transfer of product by adding profit to next process.

### 10.2.1 Simple Process Account

#### **Illustration: 1**

A product passes through three process, Process A, Process B, Process C, to completion. The production was 2,000 tons. The cost was as follows:

	Process A (Rs.)	Process B (Rs.)	Process C (Rs.)
1) Material	6,000	3,000	3,000
2) Labour	3,000	6,000	10,000
3) Direct Expenses	3,000	9,000	12,000
4) Indirect Expenses	1,000	2,000	4,000

Prepare process accounts on the basis of above information.

#### **Solution:**

Process A  
(Production 2,000 tons)





Particulars	Cost Per ton	Total Cost (Rs.)	Particulars	Cost Per ton	Total Cost (Rs.)
To Material	3.00	6,000	By Transferred Process B	6.50	13,000
To Labour	1.50	3,000			
To Direct Expenses	1.50	3,000			
To Indirect Expenses	0.50	1,000			
	6.50	13,000		6.50	13,000

## Process B

Particulars	Cost Per ton	Total Cost (Rs.)	Particulars	Cost Per ton	Total Cost (Rs.)
To Process A	6.50	13,000	By Transferred Process C	16.50	33,000
To Material	1.50	3,000			
To Labour	3.00	6,000			
To Direct Expenses	4.50	9,000			
To Indirect Expenses	1.00	2,000			
	16.50	33,000		16.50	33,000

## Process C

Particulars	Cost Per ton	Total Cost (Rs.)	Particulars	Cost Per ton	Total Cost (Rs.)



To Process B	16.50	33,000	By Transferred to Finished	31.00	62,000
To Material	1.50	3,000	Stock		
To Labour	5.00	10,000			
To Direct Expenses	6.00	12,000			
To Indirect Expenses	2.00	4,000			
	31.00	62,000		31.00	62,000

### 10.2.2 Loss of weight and Sale of Scrap

#### Illustration:2

A product passes through two process, Process A, Process B to completion. In process A there is loss of 3% in Process A; and Process B. The 10% of input in each process is scrap, which realises Rs. 100 per ton in Process A, and Rs. 200 per ton in Process B. Prepare process account. The other information was as follows:

	Process A (Rs.)	Process B (Rs.)
1) Material	2,000 tons	1,260 tons
2) Cost per ton	300	200
3) Direct Labour	50,000	40,000
4) Indirect Expenses	10,000	6,000

#### Solution:

#### Process A

Particulars	Units	Total Cost (Rs.)	Particulars	Units	Total Cost (Rs.)
To Material	2,000	6,00,000	By Loss in weight 3%	60	.....
To Direct Labour		50,000	By Sale of Scrap 10% of		
To Manufacturing			2000	200	20,000



Expenses		10,000	By Process B (2000 – 60 – 200)	1,740	6,40,000
	2,000	6,60,000		2,000	6,60,000

## Process B

Particulars	Units	Total Cost (Rs.)	Particulars	Units	Total Cost (Rs.)
To Process A	1,740	6,40,000	By Loss in weight 3%	90	.....
To Material	1,260	2,52,000	By Sale of Scrap 10% of 3,000	300	60,000
To Direct Labour		40,000	By Finished Stock A/c (3,000 – 90 – 300)	2,610	8,78,000
To Manufacturing Expenses		6,000			
	3,000	9,38,000		3,000	9,38,000

**10.2.3 Sale of manufactured product during Process****Illustration:3**

A product passes through two process, Process A, Process B to completion. In process A there is loss of 3% in Process A; and Process B. The 10% of input in each process is scrap, which realises Rs. 100 per ton in Process A, and Rs. 200 per ton in Process B. 1/3 part of Process A and 1/4 part of Process B sold and remaining passes to next process. The other information was as follows:

	Process A (Rs.)	Process B (Rs.)
1) Material	2,000 tons	1,240 tons
2) Cost per ton	Rs. 300	Rs. 200
3) Direct Labour	50,000	40,000
4) Indirect Expenses	10,000	6,000



5) Sale Price per unit	Rs. 400 per ton	Rs. 500 per ton
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**Solution:**

Process A

Particulars	Units	Total Cost (Rs.)	Particulars	Units	Total Cost (Rs.)
To Material	2,000	6,00,000	By Loss in weight 3%	60	.....
To Direct Labour		50,000	By Sale of Scrap 10% of 2000	200	20,000
To Manufacturing Expenses		10,000	By Sale of Product (1/3 of 1,740)	580	2,32,000
To P&L A/c (Profit on sale)		18,667	By Process B (2/3 of 1,740)	1,160	4,26,667
	2,000	6,78,667		2,000	6,78,667

Process B

Particulars	Units	Total Cost (Rs.)	Particulars	Units	Total Cost (Rs.)
To Process A	1,160	4,26,667	By Loss in weight 3%	72	.....
To Material	1,240	2,48,000	By Sale of Scrap 10% of 2,400	240	48,000
To Direct Labour		40,000	By Sale of Product (1/4 of 2,088)	522	2,61,000
To Manufacturing Expenses		6,000	By Finished Stock A/c (3/4)		
To P&L A/c (Profit)					



on sale)		92,833	of 2,088)	1,566	5,04,500
	2,400	8,13,500		2,400	8,13,500

#### 10.2.4 Valuation of Opening and Closing stock

##### Illustration:4

A product passes through three process, Process X, Process Y, and Process Z to completion. The other information was as follows:

	<b>Process X</b> (Rs.)	<b>Process Y</b> (Rs.)	<b>Process Z</b> (Rs.)
1) Material	20,000	15,000	35,000
2) Direct Labour	15,000	17,000	15,500
3) Indirect Expenses	5,000	8,000	20,000
4) Production in units	40,000	42,500	49,000
5) Opening Stock from proceeding Process		6,000	12,000
6) Closing Stock from proceeding Process		1,000	4,000

(Note: Both opening and closing stock units are from preceding process).

##### Solution:

##### Process X

<b>Particulars</b>	<b>Units</b>	<b>Total Cost (Rs.)</b>	<b>Particulars</b>	<b>Units</b>	<b>Total Cost (Rs.)</b>
To Material	40,000	20,000	By Transferred Process Y	40,000	40,000
To Direct Labour		15,000	@ Re.1 per units		
To Indirect Expenses		5,000			



	40,000	40,000		40,000	40,000
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## Process Y

Particulars	Units	Total Cost (Rs.)	Particulars	Units	Total Cost (Rs.)
To Opening Stock	6,000	6,000	By Wastage	2,500	.....
To Process X	40,000	40,000	By Transferred Process Z @ Rs. 2 per unit	42,500	85,000
To Material		15,000	By Closing Stock @ Re.1 p.u.	1,000	1,000
To Direct Labour		17,000			
To Indirect Expenses		8,000			
	46,000	86,000		46,000	86,000

## Process Z

Particulars	Units	Total Cost (Rs.)	Particulars	Units	Total Cost (Rs.)
To Opening Stock	12,000	24,000	By Wastage	1,500	.....
To Process Y	42,500	85,000	By Production @ Rs. 3.50 per unit	49,000	1,71,500
To Material		35,000	By Closing Stock @ Rs. 2 p.u.	4,000	8,000
To Direct Labour		15,500			
To Indirect Expenses		20,000			
	54,500	1,79,500		54,500	1,79,500

- Wastage & its treatment

The wastage may be of two types:

- Normal Wastage



- Abnormal Wastage

### 10.2.5 Normal wastage and its treatment

**Normal Wastage:** Normal wastage occurs in production due to unavoidable reasons such as evaporation, shrinkage, breakage, spoilage etc. Standard of normal wastage is fixed on the basis of past performances.

Normal wastage reduces the quantity of output, and this loss is charged from the production. Cost per unit of output goes up to the extent. Any amount received from sale of wastage is credited in process account.

- Normal wastage having no realisable value

#### Illustration:5

Input of Material 2,000 units and Normal wastage is 10% of input. Other Costs are as follows:

	Amount (Rs.)
Material (2000 units)	8,000
Labour	5,000
Direct Expenses	4,000
Indirect Expenses	1,000

#### Solution:

#### Process A

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Material	2,000	8,000	By Normal wastage (10%)	200	-----
To Labour		5,000	By Transferred Process B	1,800	18,000
To Direct Expenses		4,000			
To Indirect Expenses		1,000			
	2,000	18,000		2,000	18,000



- **Normal wastage having some realisable value**

### **Illustration:6**

Input of Material 2,000 units and Normal wastage is 10% of input. Normal wastage sold at a price of Rs. 4.50 per unit.

### **Solution:**

#### Process A

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Material	2,000	8,000	By Normal wastage (10%)		
To Labour		5,000	By Transferred Process B	200	900
To Direct Expenses		4,000			
To Indirect Expenses		1,000		1,800	17,100
	2,000	18,000		2,000	18,000

### **10.2.6 Abnormal Wastage & Its Treatment**

**Abnormal Wastage:** Abnormal wastage is one which is excess of normal wastage due to abnormal causes such as defective material, machine problem, fire, machine breakdown, carelessness of manpower, natural calamity etc.

#### Accounting Treatment

- Loss due to abnormal wastage is not charges in production account.
- It is transferred to Profit & Loss A/c.
- Abnormal wastage A/c debited and Process A/c credited with the cost of abnormal wastage.
- If any amount realise from sale of abnormal wastage is credited in process account.
- Balance is transferred in Profit & Loss A/c.

### **Illustration:7**

Input of Material 2,000 units and Normal wastage is 10% of input. Normal Loss sold at a price of Rs. 4.50 per unit. Output of Process A was 1,740 units. Other Cost are as follows:





	Amount (Rs.)
Material (2000 units)	8,000
Labour	6,000
Direct Expenses	4,000

**Solution**

## Process Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Material	2,000	8,000	By Normal wastage (10%)	200	900
To Labour		6,000	By Balance b/d (Normal cost of Normal output)	1,800	17,100
To Other Expenses		4,000			
	2,000	18,000		2,000	18,000
By Balance b/d (Normal cost of Normal output)	1,800	17,100	By Abnormal wastage	60	570
			By Process B	1,740	16,530
	1,800	17,100		1,800	17,100

$$\text{Abnormal Wastage} = (\text{Rs. } 17,100 / 1800 \text{ units}) = \text{Rs. } 9.50 \text{ p.u.} \times 60 \text{ units} = \text{Rs. } 570$$

## Normal Wastage Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process A/c	200	900	By Cash A/c (Sale)	200	900
	200	900		200	900



## Abnormal Wastage Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process A/c	60	570	By Cash A/c (Sale)	60	270
			By Profit & Loss A/c		300
	60	570		60	570

**10.2.7 Abnormal Effectiveness and Treatment**

Normal wastage is based on estimate. Actual wastage may be more or less than estimated wastage. If it is more it is known as 'ABNORMAL WASTAGE', if less it is known as 'ABNORMAL EFFECTIVENESS or GAIN'. Calculation of abnormal effectiveness is similar to calculation of abnormal wastage. Abnormal effectiveness is shown in debit side of process account.

**Illustration:8**

Input of Material 2,000 units and Normal wastage is 10% of input. Normal Loss sold at a price of Rs. 4.50 per unit. Output of Process A was 1,840 units. Other Cost are as follows:

	Amount (Rs.)
Material (2000 units)	8,000
Labour	6,000
Direct Expenses	4,000

**Solution:**

## Process Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Material	2,000	8,000	By Normal wastage (10%)	200	900
To Labour		6,000	By Balance b/d (Normal cost of Normal output)	1,800	17,100
To Other Expenses		4,000			



	2,000	18,000		2,000	18,000
By Balance b/d (Normal cost of Normal output)	1,800	17,100	By Process B	1,840	17,480
By Abnormal Effectiveness	40	380			
	1,800	17,480		1,800	17,480

Abnormal Effectiveness = (Rs. 17,100 / 1800 units) = Rs. 9.50 p.u. × 40 units = Rs. 380

#### Normal Wastage Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process Account	200	900	By Cash A/c (Sale)	160	720
			By Abnormal Effectiveness A/c	40	180
	200	900		200	900

#### Abnormal Effectiveness Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Normal Wastage A/c	40	180	By Process A/c	40	380
To Profit & Loss A/c		200			
	40	380		40	380

#### Illustration: 9

A product passes through three process, Process X, Process Y, Process Z, to completion. From the following information prepare process account. 20,000 units issued to Process X at a cost of Rs. 15,000.



	Process X (Rs.)	Process Y (Rs.)	Process Z (Rs.)
1) Material	7,000	3,000	4,000
2) Labour	4,500	6,000	10,000
3) Manufacturing Expenses	3,300	6,820	12,320
4) Normal Loss	2%	5%	10%
5) Scrap value of Loss	1 per kg.	2 per kg.	2 per kg.
6) Output of each product	19,000 kg	18,800 kg.	16,000 kg.

**Solution:**

Process X

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Units introduced	20,000	15,000	By Normal Wastage (2%)	400	400
To Material		7,000	By Balance c/d (Normal cost of Normal Output)		
To Direct Labour		4,500		19,600	29,400
To Manufacturing Expenses		3,300			
	20,000	29,800		20,000	29,800
To Balance b/d (Normal cost of Normal Output)	19,600	29,400	By Abnormal Wastage	600	900
			By Process Y	19,000	28,500
	19,600	29,400		19,600	29,400

- Abnormal Wastage = (Rs. 29,400 / 19,600 units) = Rs. 1.50 p.u. × 600 units = Rs. 900

Abnormal Wastage A/c

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)



To Process X	600	900	By Cash A/c (Sale)	600	600
			By Profit & Loss A/c		300
	600	900		600	900

Normal Wastage A/c

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process X	400	400	By Cash A/c (Sale)	400	400
	400	400		400	400

Process Y

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process X	19,000	29,400	By Normal Wastage (5%)	950	1,900
To Material		3,000	By Balance c/d (Normal cost of Normal Output)	18,050	43,320
To Direct Labour		6,000			
To Manufacturing Expenses		6,820			
	<b>19,000</b>	<b>45,220</b>		<b>19,000</b>	<b>45,220</b>
To Balance b/d (Normal cost of Normal Output)	18,050	43,320	By Process Z	18,800	45,120
To Abnormal Effectiveness	750	1,800			
	<b>18,800</b>	<b>45,120</b>		<b>18,800</b>	<b>45,120</b>

- Abnormal Effectiveness =  $(Rs. 43,320 / 18,050 \text{ units}) \times 750 \text{ units} = Rs. 1,800$



## Abnormal Effectiveness A/c

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Normal Wastage A/c	750	1,500	By Process Y	750	1800
To Profit & Loss A/c		300			
	750	1800		750	1800

## Normal Wastage A/c

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process Y	950	1,900	By Cash A/c (Sale)	200	400
			By Abnormal Effectiveness A/c	750	1,500
	950	1,900		950	1,900

## Process Z

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process Y	18,800	45,120	By Normal Wastage (10%)	1,880	3,760
To Material		4,000	By Balance c/d (Normal cost of Normal Output)	16,920	67,680
To Direct Labour		10,000			
To Manufacturing Expenses		12,320			
	18,800	71,440		18,800	71,440
To Balance b/d (Normal)	16,920	67,680	By Abnormal Wastage	920	3,680



cost of Normal Output)			By Finished Stock A/c	16,000	64,000
	16,920	67,680		16,920	67,680

Abnormal Wastage = (Rs. 67,680 / 16,920 units) = Rs. 4.00 × 920 units = Rs. 3,680

#### Abnormal Wastage A/c

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process Z	920	3,680	By Cash A/c (Sale)	920	1,840
			By Profit & Loss A/c		1,840
	920	3,680		920	3,680

#### Normal Wastage A/c

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process Z	1,880	3,760	By Cash A/c (Sale)	1,880	3,760
	1,880	3,760		1,880	3,760

### 10.2.8 Joint Product and By-product

#### Joint Product:

- In some industries, two or more than two products of equal importance and value are produced simultaneously in a process.
- These products are produced from same raw material, and have equal importance and equally acceptable by the customers.
- After the point of separation these product sometimes required further processing, sometimes not.
- For example in oil industry Petrol, Diesel, Gas are joint product of crude oil.

#### By-Product

- These products recovered from material discarded in main process or scrap of the main product.



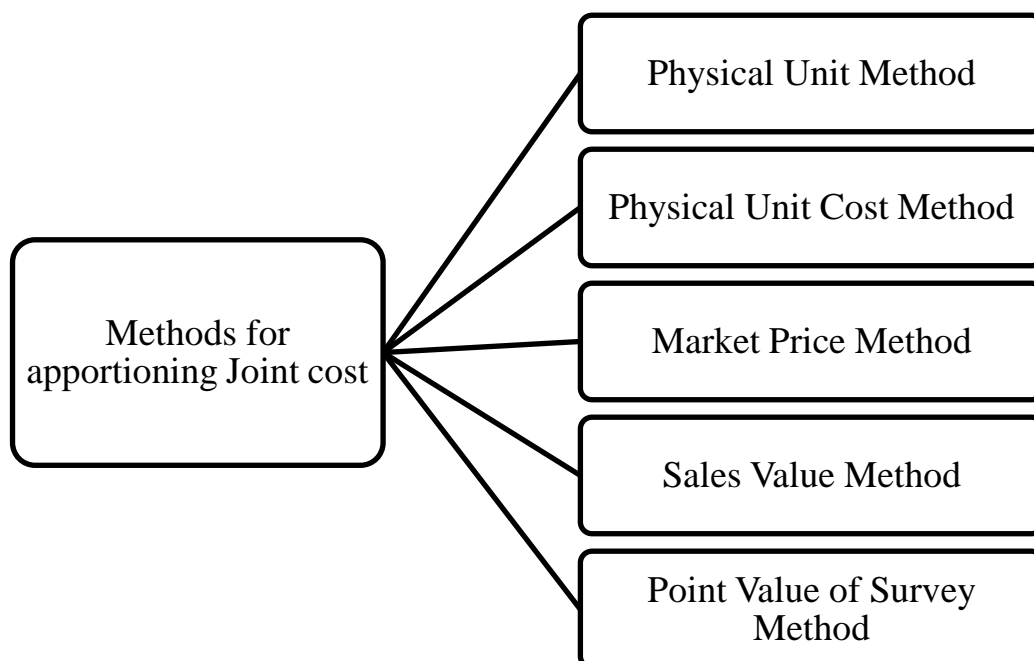
- Where one product (main product) is having high value compare to other products (by-products)
- For example Oil (main product), Cakes (by-product) having same raw material seeds. Small pieces of wood in furniture making.

### **Difference between Joint products and Co-products:**

Joint products are frequently confused with co-products. However, there is significant difference between the two, the former being indivisible and the latter divisible. Common costs are allocable among products or services performed because each of the products or services could have been obtained separately.

Therefore, any shared cost of obtaining them can be meaningfully allocated on the basis of relative usage of the common facilities. For example, the cost of fuel or power may be allocated to products based on production volumes and metered usage. Co-products do not always arise from the same operation or raw materials and the quantity of co-products is within the control of manufacturer. Thus different quantities of car, jeep and trucks can be produced in car manufacturing industry according to the need of the concern.

#### **10.2.9 Methods for apportioning Joint cost**







- **Physical Unit Method:** Under this system joint expenses are distributed among the products on the basis of physical units consumed by the product e.g. Product X consumes 40% material and Product Y consumed 60% material. Joint expenses between X and Y will be divided in the ratio of 4:6. This method is applicable when product produced is in the same unit.

### **Illustration:10**

Apportion joint cost between Joint products A, B, and C from the following data under physical unit method. The joint cost is Rs. 2,40,000.

Product	Raw Material used (in units)	Unit Produced
A	20,000	2,000
B	30,000	4,000
C	30,000	6,000
	80,000	12,000

### **Solution:**

Cost per unit of Raw material

$$= \text{Rs. } 2,40,000 / 80,000 = \text{Rs. } 3 \text{ per unit}$$

Product	Raw Material used (in units)	Cost per unit	Joint Cost Apportioned	Unit Produced	Cost Per Unit (Rs.)
A	20,000	Rs. 3	Rs. 60,000	2,000	30.00
B	30,000	Rs. 3	Rs. 90,000	4,000	22.50
C	30,000	Rs. 3	Rs. 90,000	6,000	15.00
	80,000		Rs. 2,40,000	12,000	

- **Physical Unit Cost Method:** Under this method total joint expenses divided by the total units produced for all the products and average cost per unit is calculated. This method is applicable where units are uniform and standardized.

### **Illustration: 11**



Product	Raw Material used (in units)	Unit Produced
A	20,000	2,000
B	30,000	4,000
C	30,000	6,000
	80,000	12,000

**Solution:**

Average Cost per unit

$$= \text{Rs. } 2,40,000 / 12,000 = \text{Rs. } 20 \text{ per unit}$$

Product	Unit Produced	Cost per unit	Joint Cost Apportioned
A	6,000	Rs. 20	Rs. 1,20,000
B	4,000	Rs. 20	Rs. 80,000
C	2,000	Rs. 20	Rs. 40,000
	6,000		Rs. 2,40,000

- **Market Price Method:** Under this method pre-separation cost is apportioned on the basis of market price of the product. If the price of X, Y and Z three joint product is C 400, C 300, C 200 respectively per unit, and joint cost is C 27,000 then separation costs would be C 12,000 for X; C 9,000 for Y ; and C 6,000 for Z.
- **Sale Value Method:** Under this method pre-separation cost is apportioned on the basis of total sale price of each product.

**Illustration: 12**

Apportion joint cost between Joint products A, B, and C from the following data on the basis of Sale Value Method. The joint cost is Rs. 1,20,000.

Product	Units Produced	Selling Price per Unit
---------	----------------	------------------------



A	4,000	10
B	6,000	20
C	2,000	40

**Solution:**

Product	Unit Produced	Selling Price per Unit (Rs.)	Total Sale Value (Rs.)	Apportioned Joint Cost (Ratio 1:3:2) (Rs.)	Cost per Unit (Rs.)
A	4,000	10	40,000	20,000	5
B	6,000	20	1,20,000	60,000	10
C	2,000	40	80,000	40,000	20
	12,000		2,40,000	1,20,000	

- **Point Value or Survey Method:** In this method weightage is given in terms of point-value to each product depending upon the factors contained in it, and joint costs is made on this basis of these point-value of each product. These factors may be quality of materials used, labour operations performed, time, direct charges, technical difficulties etc.

**Illustration: 13**

Apportion joint cost between Joint products A, B, and C from the following data on the basis of Point Value Method. The total joint cost is Rs. 20,000.

Product	Units Produced	Point Value
A	400	5
B	600	3
C	200	1

**Solution:**

Product	Unit Produced	Point Value	Total Value	Apportioned Joint	Cost per
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			(2×3)	Cost (Ratio 10:9:1) (Rs.)	Unit (Rs.)
A	400	5	2,000	<b>10,000</b>	<b>25</b>
B	600	3	1,800	<b>9,000</b>	<b>15</b>
C	200	1	200	<b>1,000</b>	<b>5</b>
	1,200		4,000	<b>20,000</b>	

### 10.3 Check Your Progress

- The process costing system is best suited for:
  - Industries where different types of products are manufactured
  - Industries where homogeneous products are manufactured on continuous basis
  - Service industries only
  - All of the above
- Which of the following System applies when standardized goods are produced under a series of inter-connected operations?
  - Job Order Costing
  - Process Costing
  - Standard Costing
  - All of the given options
- An abnormal gain in a process occurs in which of the following situations?
  - When actual losses are greater than the normal loss level.
  - When costs are reduced through increased machine speed.
  - When actual losses are less than the normal level.
  - When the process output is greater than planned.
- Among the following, which industry is suitable for using process costing?
  - Chemicals
  - Builders
  - Toys
  - None of these



5. Loss which is unavoidable on account of the nature of the material is called \_\_\_\_\_
- a) Uncontrolled
  - b) Normal
  - c) Abnormal
  - d) None of these
6. When the actual loss is more than the estimated loss, the difference between the two is considered to be \_\_\_\_\_
- a) Abnormal gain
  - b) Abnormal loss
  - c) Normal loss
  - d) Normal gain

#### 10.4 Summary

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. So it is a basic method to ascertain the cost at each stage of manufacturing. Separate accounts are maintained at each process to which expenditure incurred. At the end of each process the cost per unit is determined by dividing the total cost by the number of units produced at each stage. Hence, this costing is also called as “Average Costing” or “Continuous Costing”. Process Costing is used in the industries like manufacturing industries, chemical industries, mining works and public utility undertakings.

In several industries more than one product emerge from the manufacturing process. These products are sometimes produced intentionally while in some cases they emerge out of the main manufacturing process. Such products are termed as either joint products or by-products. Joint process costs occur before the split-off point and are sometimes called pre-separation costs or common costs. The joint costs need to be apportioned between the joint products at the split-off point to obtain the cost of each of the products in order to value closing inventory and cost of sales. The basis of apportionment of joint costs to products with help of sales value of production unit net realisable value. The costs incurred in the process are shared between the joint products alone. The by-products do not pick up a



share of the costs, like normal loss. The sales value of the by-product at the split-off point is treated as a reduction in costs instead of an income, again just the same as normal loss.

## 10.5 Keywords

- **Process Costing:** It is the method of costing applied in the industries engaged in continuous or mass production.
- **Normal Wastage:** Normal wastage occur in production due to unavoidable reason.
- **Abnormal Wastage:** Abnormal wastage is one which is excess of normal wastage due to abnormal causes.
- **Abnormal Gain:** Abnormal gain arise when actual wastage is less than estimated wastage.
- **Joint Product:** Joint products are two or more than two products of equal importance and value are produced simultaneously in a process.
- **By-product:** By-product are those products recovered from material discarded in main process or scrap of the main product.

## 10.6 Self-Assessment Test

### Short Answer Question

- Q.1 Explain Process Costing.
- Q.2 Differentiate between Process and Job costing.
- Q.3 What is Abnormal Loss?
- Q.4 What is Abnormal Effectiveness?
- Q.5 Explain the meaning of By Product and Joint Product.

### Long Answer Question

- Q.1 What do you mean by process costing? Describe their essential features and state where these can be usefully implemented.
- Q.2 Explain normal loss, abnormal loss, and abnormal effectiveness. How these three are treated in process account? Explain with example.
- Q.3 What do you mean by joint and by-product? Explain various methods of apportioning joint cost.



- Q.4 Product A requires three distinct processes and after the third process the product is transferred to finished stock. Prepare various process accounts from the following information.

	Total	X	Y	Z
Direct Materials	5,000	4,000	600	400
Direct Labour	4,000	1,500	1,600	900
Direct Expenses	800	500	300	
Production overheads	6,000			

Production overheads to be allocated to different processes on the basis of 150% of direct wages. Production during the period was 200 units. Assume there is no opening or closing stock.

**(Answer: Cost Per Unit: Process I: Rs. 41.25; II: Rs. 65.75; III: Rs. 79.00)**

- Q.5 The product of a company passes through three distinct processes to completion – A, B and C. from the past experience it is ascertained that losses incurred in each process as – A-2%, B-5% and C-10%.

In each case the percentage of loss is computed on the number of units entering the process concerned. The loss of each process possesses a scrap value. The loss of processes A and B sold at Rs.5 per 100 units and that of C, at Rs.20 per 100 units.

The output of each process passes immediately to the next process and the finished units are passed from process C into stock.

	Total	Process X	Process Y	Process Z
Materials consumed	12,000	6,000	4,000	2,000
Direct labour	17,000	8,000	6,000	3,000
Manufacturing expenses	3,500	1,000	1,000	1,500

- 20000 units have been issued to process A at a cost of Rs.10000. the output of each process are X-19500, Y- 18800 and Z - 16000. There is no work in progress in any process. Prepare process accounts. Calculations should be made to the nearest rupee.

**(Answer: Process X: Abnormal Loss 100 units, 19,500, Rs. 24,853; Process Y Abnormal Gain 275 units, 18,800, Rs. 36,336; Process Z 920 units, 16,000; Rs. 40,151.)**



**Q.6** A chemical process yields 60% of the material introduced as main Product - A and by Product B 15% by - Product - C 20% and 5% being the wastage. The ratio of absorption of Raw material and Labour in the process products is as follows:

- One unit of product C requires half the raw material required for one unit of product - B, one unit of product - A requires 1 ½ time the raw material required for product - B.
- Product A requires double the time needed for the production of one unit of B and one unit of C
- Product C requires half the time required for the production of one unit of product B
- Overheads are to be absorbed in the ratio of 6:1:1
- Cost Data: Input 1,000 units of cost Rs. 4,600
- Direct labour Rs.4,100; Overheads Rs. 6,000

Calculate cost of distribution between the above products.

**(Answer: A: 11,700; B: 1,650; C: 1,350)**

**Q.7** A factory engaged in the production of Chemical X and in the course of manufacture in a by-product-Y is produced which after a separate process has a commercial value. Following are the information for the month of March.

	Joint Expenses	Separate Expenses	
		X	Y
Materials (Rs.)	10,000	2,000	2,800
Labour (Rs.)	4,000	2,500	2,500
Overheads (Rs.)	2,500	1,400	1,000

The output for the month was 150 quintals of X and 50 quintals of Y. The selling price of product Y is Rs. 200 per quintal. The profit on product Y is  $33 \frac{1}{3}$  % on cost price. Prepare an Account to show the cost of X per quintal.

**(Answer: Y: 1,200; X: 15,300)**

## 10.7 Answers to Check Your Progress

1(b), 2(b), 3 (c), 4(a), 5 (b), 6 (b)





## 10.8 References/ Suggested Readings

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<b>Lesson No.:</b> 11	<b>Vetter:</b> Prof. Suresh Kumar Mittal
<b>Standard Costing</b>	

### Structure

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### 11.0 Learning Objectives

After going through this lesson, you should be able to:

- Know the meaning of Standard Costing, its characteristics, objective, advantages, and disadvantages.



- Differentiate between Standard Costing and Budgetary Control.
- Differentiate between Standard Cost and Estimated Cost.
- Differentiate between Standard Cost and Historical Cost
- Understand the classification of standards and applications of standard costing

## 11.1 Introduction

Standard Costing is a technique which uses standards for costs and revenues for the purpose of control through variance analysis. Standard is a predetermined measurable quantity set in defined conditions against which actual performance can be compared, usually for an element of work, operation or activity. Standard Costing involves the setting of predetermined cost estimates in order to provide a basis for comparison with actual costs. A Standard Cost is a planned cost for a unit of product or service rendered. Standard Costing is universally accepted as an effective instrument for cost control in industries. Although the terms budgeted costs and Standard Costs are sometimes used interchangeably, but budgeted costs normally describe the total planned costs for a number of products. Usually Budgetary Control is operated with a system of standard costing because both systems are interrelated but they are not interdependent. With the use of Standard Costing the organization achieves the objectives in a planned and systematic manner.

### 11.1.1 Meaning of Standard Costing

Standard Costing is the practice of substituting an expected cost for an actual cost in the accounting records. Subsequently, variances are recorded to show the difference between the expected and actual costs. Standard Costing involves the setting of standard costs for some or all activities within a company. The main reason for using standard costs is that there are a number of applications where it is too time-consuming to collect actual costs, so standard costs are used as a close approximation to actual costs.

Since Standard Costs are usually slightly different from actual costs, the cost accountant periodically calculates variances that break out differences caused by such factors as labor rate changes and the cost of materials. The cost accountant may periodically change the standard costs to bring them into closer alignment with actual costs.



- *According to ICMA, London, Standard Costing is “the preparation and use of standard costs, their comparison with actual cost and the analysis of variances to their causes and points of incidence”.*
- *According to Wheldon, “it is a method of ascertaining the costs whereby statistics are prepared to show; standard cost; actual cost; and difference between these costs which is termed the variance”.*
- *According to W. Bigg, “Standard Costing discloses the cost of deviations from standards and clarifies these as to their causes, so that management is immediately informed of the sphere of operations in which remedial action is necessary”.*

### 11.1.2 Characteristics of Standard Costing

The important characteristics of Standard Costing are as follows:

- **Determination of standard:** Determination of standard costs of various elements of costs such as standard cost of direct material, direct labor and various overheads.
- **Comparison of costs:** Comparison of standard costs and actual costs of production.
- **Finding Variance:** Finding differences (variances) between actual costs and standard costs. These variances may be favorable as well as unfavorable or adverse.
- **Finding reasons for variation:** Analyzing the variances to find the cause of variances.
- **Suggestions:** Remedial steps are suggested so that unfavorable variances may not be repeated in the future.
- **Reporting to Management:** Reporting these variances to top management for remedial action.

### 11.1.3 Objectives of Standard Costing

The objectives of Standard Costing for which it is implemented are:

- It helps to implement Budgetary Control system in operation;
- It helps to ascertain performance evaluation.
- It supplies the ways to utilise properly material, labour and also overhead which will be economic in character.
- It also helps to motivate the employees of a firm to improve their performance by setting up a ‘standard’.
- It also helps the management to supply necessary data relating to cost element to submit quotations or to fix up the selling price of a firm.



- It also helps the management to make proper valuations of inventory e.g. Work-in- progress, and finished products.
- It acts as a control device to the management.
- It also helps the management to take various corrective decisions such as fixation of price, make-or-buy decisions etc. which will be more beneficial to the firm.

#### 11.1.4 Advantages of Standard Costing

The following advantages may be derived from Standard Costing:

- **Cost consciousness** – Since standard costing system lays down targets before executives and workmen, it infuses cost consciousness among all.
- **Work motivation** – The standards provide incentive and motivation to work with greater effort and care for achieving the standard.
- **Comparison and analysis of data** – Standard Costing provides a stable and sound basis for comparison of actual data with standard costs according to different elements separately. It brings out clearly the impact of external factors and internal causes on the cost and performance of the concern. Thus, it indicates places where remedial action is necessary and how far improvement is possible in the long run.
- **Reduction of clerical work** – The clerical work associated with costing is usually reduced and yet much more useful information is made available to management.
- **Standards useful for budgets** – Standard Costing is an exercise in planning. The standards are useful for preparation of budgets also, since the capacity to anticipate about changing conditions is developed.
- **Regular checks** – The analysis of variances ensures that regular checks are made upon expenditure incurred. There is quick localisation of deviations from the pre-determined standards. Management concentrates on matters which are not proceeding according to plan on the basis of the “principle of exception”.
- **Greater accuracy** – The cost of new products can be estimated with greater accuracy.
- **Measurement of profits** – Concept absorption of fixed overheads and measurement of profits is possible.
- **Product standardisation** – Product, operations and processes can be standardised.



- **Better delegation of authority and responsibility** – The authority can be delegated and responsibilities fixed for each department or individual on the basis of off-standard performances. Thus, there is a general toning up of organisation of the concern.
- **Easier interpretation of reports** – The time taken to study management reports is reduced. Since all matters which need attention are clear prima facie, the interpretation becomes easier.
- **Better economy, efficiency and productivity** – Managerial review of costs is more effective as the operations are scrutinized carefully and inefficiencies are disclosed. Men, machines and materials are more effectively utilised and thus economies can be effected in business together with increased productivity.
- **Aids in product pricing** – Standard costs are an important aid in pricing the products of the concern.
- **Aids to inventory costing** – Inventories of raw materials, work-in-progress and finished goods may be carried at standard costs. The differences of actuals and standards may be taken to variance accounts.
- **Helpful in production planning** – Production policies may be determined in advance on the basis of standard cost of production. Profit planning can also be made accordingly.
- **Basis for job evaluation and wage fixation** – Once the standard costs have been compiled, which can be used as a basis for job evaluation, provision of incentive schemes of payment for employees etc.
- **Suitably deals with internal problems** – With due emphasis being given to likely price changes, standard costing is likely to be the most suitable system for dealing with internal problems arising from inflation, e.g., replacement of material stocks at increased prices.
- **Integration of accounts** – Integration of accounts is facilitated through standard costing so that reconciliation between cost accounts and financial accounts is eliminated.
- **Overall improvement** – When inefficiencies are eliminated, product improvement takes place. Improved methods of production may be employed. Thus, there is greater customer satisfaction.
- **Formulation of Pricing and Production Policies** – Standard Costing helps the management to formulate pricing and production policies on the basis of estimated costs to be incurred. Estimated production and its cost provide the base for pricing policy and profit planning.



- **Facilitates Delegation of Authority** – With standard costing, Delegation of Authority can be successfully implemented as top managers can delegate responsibility according to the standards fixed.
- **Facilitation of Principle of Management by Exception** – Standard Cost System works on the basis of principle of management by exception. Management needs to give concentration only on those areas where deviations occur, i.e., Actual performance is more or less than standards.
- **Optimum Use of Resources** – Standard Cost also helps in optimum use of resources. Different resources like raw material, plant and machinery and current assets are used according to the standards fixed in advance.
- **Uniform Valuation of Stock** – Under Standard Cost System, valuation of stock is done at standard cost. The variance account is opened for transferring the deviations between standards and actual performance which brings uniformity in valuation of stock.
- **Facilitate Co-ordination** – When standards are fixed, the performance of various departments e.g., production, sales, purchase etc., is considered. In this way, standard costing enables coordination among all departments.
- **Effective Cost Control** – Standard Costing is an effective tool in controlling cost because actual performance is compared with standards and in case of deviations, corrective action is taken.
- **Economy** – In standard costing, standards are fixed in advance. Once standards are fixed development of cost, most of the clerical work is reduced. Thus it is an economical method of costing and brings efficiency in production.
- **Motivates Employees** – When standards are fixed Incentive schemes to motivate employees can be introduced. Employees try to achieve the standards and they are remained different monetary and non-monetary incentives.

#### 11.1.5 Disadvantages of Standard Costing

The alleged disadvantages of Standard Costing are:

- **Difficulty in Fixing Standards:** Standards are difficult to set. If inaccurate standards are set, they can do more harm than good to the business. Tight standards act as disincentive to work and loose ones don't provide any incentive at all. If due care is taken and caution is exercised on the basis of



scientific studies, correct standards may be set. It is not that difficult. However, expert knowledge and skill is required for fixing standards.

- **Estimation of Price Difficult:** Precise estimation of likely prices of material or rates of labour poses a problem. However, use of sophisticated forecasting techniques can assist to a great extent.
- **Apprehension of Output Change:** If actual output varies, standard costs can't be realised. Again scientific techniques and market research largely solve the problem.
- **Out-Dated Standards:** Standards may become out of date very soon. Keeping standard costs up-to-date can be a major problem. It may not always be possible to change standards to keep pace with the frequent changes in the manufacturing conditions.

For solving this problem, an optimum period for keeping standards without revision should be selected. It would inspire confidence in the permanence of the measures and also avoid administrative inconvenience caused by continuous modification.

- **Not Suitable for Small Concerns:** In small concerns, production cannot be properly scheduled since frequent changes in production conditions take place. Therefore, standard costing may not be suitable for them. Detailed analysis may be meaningless and superfluous for them.

If an efficient system of production planning is established, the difficulty can be overcome and even small concerns can adopt standard costing system, though the advantages gained by them may not be that much as availed of by large concerns.

- **Costly for Non-Standard Product Industries:** Standard Costing may be found unsuitable and costly in the case of industries dealing with non-standard products and repair jobs which keep on changing in accordance with customers' specifications.

If some of the operations applied to different products are common and repetitive, standards may be fixed for such components or operations with advantage. The cost-benefit analysis should however be made before installing a standard costing system. If the costs exceed benefits, no system can be recommended for adoption, not to talk of standard costing system.

- **Explanation of Variances Difficult:** Due to play of random factors variances cannot sometimes be properly explained and at times it is difficult to make a distinction between controllable and non-controllable variances. A tuning up of the variance analysis system can obviate this difficulty.





- **Lack of Management's Enthusiasm:** If the management is reluctant about implementation of the system effectively, the success of the system will be in peril. By educating management about the likely advantages of the system, management can be made interested in effectively implementing the system.
- **Administrative Inconvenience:** Carefully planned and operated procedures, as required under this system in respect of recording of prices, time, quantities etc. might not have been adopted. However, any effective planning and control system must have a foundation on which to operate.
- **Resistance from Within:** The staff may take it as a threat to their freedom of action, feeling that they are being directed down to the last detail on how work should be performed. It also requires proper education of personnel of the organisation.
- **Badly Designed System:** If the Standard Costing system has not been properly designed, many problems are likely to crop up. Supposing, in a concern, material costs are of vital importance whereas undue emphasis has been laid down on labour costs, the system would not bring desired results.

#### 11.1.6 Difference between Standard Costing and Budgetary Control

Standard Costing and Budgetary Control both provide a powerful tool to the management for efficient performance of its functions. The systems of Budgetary Control and Standard Costing have the common objectives of controlling business operations by establishment of pre-determined targets, measuring the actual performances and comparing it with the targets, for the purpose of having better efficiency and of reducing costs. The two systems are said to be inter-related but they are not inter-dependent. The Budgetary Control system can function effectively even without the system of standard costing in operation but the vice versa is not true.

Usually, the two are used in conjunction with each other to have most fruitful results. Budgetary Control and Standard Costing differ in respect of the following:

Basis of Difference	Standard Costing	Budgetary Control
1. Basis	Standards are based on technical grounds, so they are planned costs.	Budgets are prepared on the basis of past data adjusted according to



		future trends.
2. Nature	Standards costing is intensive in nature as it analyzes the variance in detail.	Budgetary control is extensive in nature due to analysis of variance in total.
3. Protection	Standard cost is projection of cost accounts mainly for production.	Budgets are projection of financial accounts i.e., for incomes & expenditure.
4. Analysis of variance	Variance are analyzed in detail with their causes.	Variances are revealed in total through the accounts.
5. Interdependence	The implementation of Standard Costing requires the system of Budgetary Control.	Budgetary Control system can be implemented without Standard Costing.
6. Standardized	Standard costing requires standardization of products due to technical estimates.	It does not normally require standardization of products.
7. Application	Standard Costing cannot be applied in parts.	It can be applied in parts.
8. Forecasting	Standard Costing is limited to operating level only.	Budgetary Control emphasises the forecasting aspect of future operations,
9. Accounting Routine	Standard Costing can be incorporated in accounting routine.	Targets under budgetary control system can be incorporated in accounting system.
10. Total Concept	In standard costing, 'unit concept' is used.	In budgetary control "total concept" is used.

#### 11.1.7 Difference between Standard Cost and Estimated Cost

- **Objective:** Estimated Costs are intended to ascertain what the costs will be while Standard Cost aim at what costs should be.



- **Calculation:** Estimated costs are calculated on the basis of past performance being adjusted in the light of anticipated changes in the future. Standard costs, on the other hand, are ascertained on a scientific basis keeping in view certain conditions of efficiency.
- **Aid to Management:** Estimated costs are not helpful to management in accomplishing management functions as they are not scientifically predetermined costs. But standard costs involves operational analysis and evaluation and a comprehensive review of internal and external factors which become reliable yardsticks for product costing, product pricing, planning, and coordination and price control purposes.
- **Emphasis:** Estimated costs put emphasis on cost with which it is compared at the end of the accounting period. If the estimated costs are found higher or lower than actual costs, which are revised for the use in the next accounting year. In Standard Costing the emphasis is put on Standard Costs, i.e., what costs of material labour and overhead should be incurred if the factory is to be operated as a highly efficient unit. Under Standard Costing, actual costs are ascertained only to facilitate their comparison with Standard Costs.
- **Use:** The estimated costs are used only as a statistical data, whereas standard costs are used as a regular system from which variances are ascertained and the reasons for such variances are analysed and corrected measures are taken promptly.
- **Revision:** Estimated cost is adjusted to the actual cost and expected changes in the coming period. While Standard Cost is not generally revised unless it has been set incorrectly or it has become irrelevant to the changed situations. Thus, Standard Cost is free from frequent changes or modifications.
- **Barometer of Efficiency:** Estimated Cost—being only an expression of likely cost in the future—cannot be used to measure the efficiency or otherwise. But standard cost is used as a barometer of efficiency since it is compared with actual cost.

#### 11.1.8 Difference between Standard Cost and Historical Cost

The meaning of ‘Standard Cost’ will be more illuminating to us if a line of distinction is drawn between ‘Standard Cost’ and ‘Historical Cost’. The following are the points of distinction:



- **Recording:** Standard Cost is determined and recorded before actual performance while Historical Cost is related to the past transactions i.e. the financial transactions are recorded after the actual performance.
- **High Degree of Efficiency:** Standard Cost is an ideal cost which can be attained under normal conditions. But Historical Cost is actual and real cost i.e. it is related to past. On the other hand, Standard Cost is a predetermined cost related to future.
- **Evaluation of Efficiency:** Standard Cost serves as a measure of evaluation of efficiency since it helps the management to compare the Budgeted Cost with that of actual cost. Historical fails to provide any such technique.
- **Cost Control:** Standard Cost is very important for cost control but Historical Cost fails to provide any technique for cost control. Since it fails to make any comparison and fails to provide any yardstick for pointing out the possible causes for rises in cost. Standard Cost can be used as a yardstick for pointing out the centre of responsibility through the analysis of variations.
- **Planning and Control:** Historical cost has its own value and carries historical significance. The actual financial position of the concern is made known through it. But it has no practical significance. It is not helpful to the management for planning for variance purposes and control. But Standard Cost is considered to be an effective managerial tool of cost control and future planning.

### Essential Conditions for Effective Standard Costing

The following are the essential conditions for effective standard costing:

- The standard should be fixed in such a manner, so that managers and workers should rely on them.
- The standard costing should be in consistent with the technical process of production of enterprise.
- Variance analysis and its reporting should be quick.
- Management should take proper interest in Standard Costing.
- The technical process of operation should be susceptible to planning.
- The process costs of standards is more important, so that the sources of variances could be located easily.
- The recording process of standard costs should be easy and clear.
- The variance reports should be prepared in such a way that progress could be known at all levels of management.



- Standard costing is more suitable and useful in industries.

## 11.2 Classification of Standards

Standards have been classified in the following categories:

### 11.2.1 Based on Period of Operations

- **Current Standards:** Current standards are established giving specific regard to current conditions, in which standards are used. These standards provide definite goals for short periods, which employees can usually be expected to reach. They also appear to be fair bases with which the current performance is measured. Current standards are set at a level which is high yet attainable with reasonably diligent efforts and attention to the correct methods of doing the job. These standards may be effective for stimulating efficiency. Use of current standards which closely represent expected actual performance, is economical. Such attainable standards can be used in planning, budgeting and control processes. Where standards are not close to expected actual performance, they may be applicable for control purposes, but are not realistic for planning and budgeting use. These standards –
  - outline what cost should be under current conditions;
  - call for periodical review and frequent revisions;
  - require to be changed with changes in method of production and price level; and hold good for related accounting period.
- **Basic Standards:** These are referred to with different names, like static standard and fixed standard. When basic standard is used, no change is required other than a computation of the cost relationships between the basic period and the current period. This computation is used in adjusting the standard costs before making comparison with the actual costs. These standards can be used in industries, where routines and operations are well established and working conditions do not normally change for a long time. These standards may be good to spotlight trends, but they cannot form basis to gauge efficiency. These standards –
  - Establish for an unaltered use for a long period of time;
  - Allow consistent comparison with same base line;
  - May not stand in harmony with current conditions;
  - Do not specify level of efficiency required;



- Represent a special class of standards of a statistical nature;
- Are used in the same way as the statisticians use commodity price indices;
- Serve as a yardstick with which actual performance is compared; and are not revised unless the products or the manufacturing operations or processes are changed.
- **Normal Standards:** These standards are based on past averages adjusted to anticipated future changes. These standards are prepared for relatively longer period covering a trade cycle. Information of these standards, allowance is given to normal waste and scrap, normal fatigue and breaks, normal machine breakdown and maintenance and normal mis-takes in production. These standards represent the cost performance which should normally be attained.

While these standards are very likely attainable, difficult to compute, because of probable errors in predicting the extent and duration of cyclical effects. A good performance is more than an ordinary performance.

A standard should not be very high to cause frustration, but still it should be high enough to expect a reasonably diligent effort for its accomplishment. The normal standard may be good for long-term planning and decision making, but their utility in efficiency appraisal is limited.

### 11.2.2 Based on Tightness and Looseness

- **Ideal Standards:** Under these standards, attention is focused on perfection. These standards aim at absolutely minimum cost, which is attainable only in perfect operating conditions. These standards provide no scrap, no idle time, no rest period and no break-down. In the long run, it is impossible to attain these standards. Ideal standards have also been referred to as theoretical standards. These standards are rarely attained in practice. Where ideal standards are used, the accounts reveal unfavorable variances as regular feature. This results in a depressing feeling among the staff members. Ideal standards can also be used for a long time without change or adjustment. These standards can also be used as engineering standards in highly mechanised industry. After these standards are once set, they are rarely changed, unless radical changes are made in the product or in the manufacturing processes.
- **Expected or Attainable Standards:** It is a compromise between extremes of ideal standard and normal standard. In these standards, level of performance expected is higher than level of performance expected in normal standard. But this level is higher enough to expect reasonably



diligent effort for accomplishment. It is capable of fulfillment. These standards are very useful for cost control purposes. These standards –

- are set providing for operating inefficiencies, which are unavoidable;
- take into account prevailing conditions in the period for which standards are used;
- are very realistic in nature and provide best criterion for evaluation of performance;
- have got the maximum usage because they fulfil all the requirements of good standards, i.e. they are consistent, realistic, capable of attainment and provide incentive for improvement.

### 11.2.3 Steps for Setting of Standard

The following steps are used in establishing a standard costing system:

- **Establishing Cost Centres:** ‘A Cost Centre is a location, for which costs may be ascertained and used for the purpose of cost control.’ The determination of a suitable and appropriate cost centre is very useful for the control of costs.
- **Types of Standard Used:** It is very essential to ascertain the type of standard used in setting up of the standards. The following types of standard may be used:
  - Basic Standard – This standard is fixed for the base year. In it, all the principles of statistics apply which are used in Index numbers. In basic standard no change is allowed to be made. These standard can be used where routines and operations are well established and working conditions do not change. But it is not suitable for cost control.
  - Normal Standard – This standard is based on past experience. It is known as average standard also. In establishing these standards allowance is given to normal waste and scrap. But it cannot be used for cost control purpose.
  - Current Standard – This standard is fixed on the basis of current conditions and remains in force for a short period of time.
- **Setting of Standard:** The success of standard costing system depends upon the accuracy and reliability of standards of each element of cost. For setting the standards, it is very necessary that routine and working conditions should be studied thoroughly. Reliable relevant information are collected to ensure that standards are realistic. Setting of standards can be divided into two categories as under:



- Quantity Standards – It implies the relationship between units produced and resources consumed.
- Price Standard – It implies in money terms, the cost per unit of resources consumed.

#### 11.2.4 Basic Requirements of Standard Costing

The introduction of Standard Costing involves the following preliminary steps which may be considered to be the basic requirements:

- **Organisation Structure:** Standard Costing demands the existence of a sound organisation structure with well-defined authority relationships. The organisation chart showing such relationships is of considerable use in supplying the basic data with regard to different operations and the personnel in-charge of those operations.
- **Technical and Engineering Studies:** It is absolutely necessary to make a thorough study of the production methods and the processes required. It is equally necessary to have a thorough knowledge of material specifications, material and labour price projections, and work study and work measurement. Losses, both normal and abnormal, in each process should be gone into for a considerable period of time.
- **Preparation of Manual:** It is necessary to prepare a detailed manual for the guidance of staff. The manual should describe the system to be introduced and the benefits thereof. It is equally necessary to specify the classification of accounts, and coding incomes and expenses to facilitate speedy collection and analysis.
- **Co-operation of Executives and Staff:** For the successful working of a standard costing system, it is necessary to enlist the co-operation of executives and the staff operating the system. Standards can be fixed only with the co-operation of managerial personnel. Nobody should be made to feel that system is being imposed upon him.
- **Fixation of Standards:** Standards should be set for each element of cost. The standards set should be scientific. They should neither be very high nor very low. It is also necessary to determine standard cost for each product. In setting the standards, time and motion study staff, technical and drawing office staff should come together and accomplish the work by coordinating their efforts.
- **Competent Staff:** The successful operation of standard costing system requires existence of well qualified and trained staff for fixing the standards, measuring performance and reporting variances





to different levels of management. The reports submitted help the management in applying the principle of “management by exception” which means that the management pays attention only to those cases where performance is below or above the standard.

- **Existence of Budgetary Control System:** Existence of budgetary control system is a pre-requisite for the standard costing system. Budgets fix the targets which the executives have to achieve. They create a sense of discipline, financial or otherwise, among employees at different levels. Budgets are projections for the future and therefore they are of great use to the effective functioning of the standard costing system.
- **Proper Delegation of Authority and Responsibility:** Standard costing system requires proper delegation of authority and responsibility at different levels. This is possible by drawing an organisation chart clearly laying down the authority and responsibility of different executives in the organisation.
- **Efficient Accounting System:** An efficient accounting system is also an essential requisite for successful operation of the standard costing system. The accounting information supplied should not only be accurate but also be complete and up to date. The system of coding may be used for speedy recording and analysing the accounting information. Appropriate cost centres should also be set up in the organisation.

### 11.2.5 Industries where Standard Costing is used

Industries where standard costing is used categorised as under:

- Process industries where the method of production and nature of output are the same. The examples of such industries are chemical industries, distilleries, paper-making and metal processing etc.
- Repetitive production – Industries where the methods of manufacture are repetitive and products are more or less homogeneous, e.g., agricultural and food products.
- Service industries where operation costing is also applicable like transport, gas and water, electricity etc.
- Engineering and textile industries where large range of products are manufactured.
- Extraction industries such as coal, oil and timber.



### 11.3 Check Your Progress

1. Standard costing is a technique of:
  - a) Planning business activities
  - b) Cost Control
  - c) Staffing
  - d) Motivating
2. Standard costing is a yard stick for:
  - a) Measuring efficiency
  - b) Controlling prices
  - c) Reducing losses of business
  - d) Planning business activities
3. Standard costing involves:
  - a) Preparation and use of standard costs
  - b) Comparison of standard with actual
  - c) Analysis of variances
  - d) All of the above
4. Standard costing is suitable for industries which are:
  - a) Producing standard products
  - b) Producing goods of repetitive nature
  - c) Sugar, Textiles, Fertilizers, steel industries
  - d) All of the above
5. Which of the following is an advantage of standard costing?
  - a) Promoting and measuring efficiencies.
  - b) Controlling and reducing costs.
  - c) Helps in fixation of selling prices.
  - d) All of the above.
6. Basic standard is established for a:
  - a) Long period.
  - b) Short period



- c) Current period
  - d) Indefinite period
7. Excess of actual cost over standard cost is known as
- a) Abnormal effectiveness
  - b) Unfavorable variance
  - c) Favorable variance
  - d) None of these

## 11.4 Summary

Standard costing is a technique which uses standards for costs and revenues for the purpose of control through variance analysis. Standard is a predetermined measurable quantity set in defined conditions against which actual performance can be compared, usually for an element of work, operation or activity. Standard cost is a predetermined calculation of how much costs should be under specified working conditions. It is built up from an assessment of the value of cost elements and correlates technical specifications and the qualification of materials, labour and other costs to the prices and/or usage rates expected to apply during the period in which the standard cost is intended to be used. Its main purpose is to provide basis for control through variance accounting for the valuation of stock and work-in-progress and in some cases, for fixing selling prices.

## 11.5 Keywords

- **Cost:** Cost denotes the amount of money that a company spends on the creation or production of goods or services.
- **Costing:** It can be any system for assigning costs to an element of a business.
- **Standard Costing:** Technique which uses standards for costs and revenues for the purpose of control through variance analysis.
- **Variance:** Difference between an actual amount and a pre-determined standard amount or the amount budgeted.
- **Budgetary Control:** It is the process by which budgets are prepared for the future period and are compared with the actual performance for finding out variances, if any.



- **Historical cost:** It is a measure of value used in accounting in which the value of an asset on the balance sheet is recorded at its original cost when acquired by the company.

## 11.6 Self-Assessment Test

### Short Answer Questions:

- Q.1 Explain standard costing.
- Q.2 Explain features of standard costing.
- Q.3 What are the various types of standards?
- Q.4 Write down any 5 industries where standard costing used.
- Q.5 Difference between standard costing and budgetary control.
- Q.6 Difference between standard costing and estimated cost.
- Q.7 What are the steps involved in standard costing?

### Long Answer Questions:

- Q.1 What do you mean by standard costing? Describe their essential features and advantages of standard costing.
- Q.2 Explain standard costing and discuss its merits and demerits.
- Q.3 What is standard costing? Discuss its advantages and application in different industry.
- Q.4 Define standard costing. Explain different types of standards.
- Q.5 Explain standard costing, what are main requirements for setting up of standards. Also explain the steps used for setting up standards in an organisation.

## 11.7 Answers to Check Your Progress

1(b), 2 (a), 3(d), 4 (d), 5(d), 6 (d), 7(b)

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<b>Variance Analysis</b>	

**Structure**

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**12.0 Learning Objectives**

After going through this lesson, you should be able to



- Know the meaning of variance analysis.
- Understand the importance, limitations and uses of variance analysis.
- Understand the different types of Material and Labour variances

## 12.1 Introduction

Variances obtained under Standard Costing system have to be reported to management for taking remedial steps. Before taking any action, the management must try to know the causes of such variances. In a business organization, control is a relative rather than absolute concept. Variance means the deviation of the actual cost or actual sales from the standard cost or profit or sales. Calculation of variances is the main object of Standard Costing. This calculation shows that whether costs are under controlled or not. A variance may be favourable or adverse.

### 12.1.1 Meaning of Variance

‘Variance’ is the difference between planned, budgeted or Standard Cost and actual costs and similarly in respect of revenues. This should not be confused with the statistical variance which measures the dispersion of a statistical population. A mere knowledge of the variances is not sufficient and useful to the management; the causes responsible for these variances should also be brought to the knowledge of the management of the business. The process of finding out the causes of the variances and evaluating their effect is regarded as ‘Analysis of Variance.’

### 12.1.2 Meaning of Variance Analysis

‘Variance Analysis’ is the analysis of variances arising in a Standard Costing system into their constituent parts. It is the analysis and comparison of the factors which have caused the differences between predetermined standards and actual results, with a view to eliminating inefficiencies. When actual cost is less than Standard Cost or profit is better than the standard profit, it is known as ‘Favorable Variance’. On the other hand, where the actual cost is more than standard cost or profit is better than the standard profit, it is known as ‘Unfavorable Variance’ or ‘Adverse’. A controllable variance is when a variance is treated as the responsibility of a person with the result that his or her degree of efficiency can be reflected in size. When a variance arises due to some unforeseen factors, it is known as uncontrollable variance. The management should look more carefully at controllable variance,



for it is these variances that require examination and possible corrective measures. The uncontrollable variances may be ignored.

Variance analysis highlights areas of strengths and weaknesses, but doesn't indicate what action, if any, should be taken. A manager must be able to correctly interpret the significance of variances before he can initiate control action. All planning is based on estimates (e.g., of prices, costs, volumes) and actual outcomes will rarely be precisely in line with these estimates. Some variation is inevitable.

- *According to C.I.M.A. London, The process of computing the amount of variance and isolate the causes of variances between actual and standard.*

### 12.1.3 Importance of Variance Analysis

There are many objectives fulfilled with their analysis. Without analysis of variance, there is no use of Standard Costing. Using Variance Analysis in the decision-making process renders the following positive impacts:

- **Competitive advantage:** Variance analysis helps an organization to be proactive in achieving their business targets, helps in identifying and mitigating any potential risks which eventually builds trust among the team members to deliver what is planned.
- **Identifying the changes required in the business strategy:** In some of the cases, comparing budget with actual results may point out the requirement for re-evaluating the target customer base or product line of the company. Several assumptions go into developing a budget. In case those assumptions are blowing up the budget, it could be because the budget-related projections are wrong for a variety of reasons. It could also be due to changes in the economy or delays in getting the products/services sent to end customers.
- **Identifying any managerial concerns:** At times, variance analysis could also provide insight as to how well an organization is being managed. For instance in the case of purchasing, the inability to negotiate volume discounts or securing the competitive bids could indicate managerial problems within the purchasing department. Moreover, weak sales could also be an indication that the salespersons are not trained properly or they lack motivation. By addressing such issues, the variances could disappear as the organization gets on track.
- **Managing risk:** With the help of Variance Analysis, the finance heads gather insights which they require to understand the reasons for controllable and uncontrollable variances. Once we are aware





of such variance, then in a position to implement policies to mitigate such risks arising from such variances.

- **Creating shareholder value:** When an organization brings in proper internal controls, a cross-functional environment, efficient internal audit process, and the culture of meeting commitments, it increases the chances that the variances would be favorable which means that the business commitments would be met or even exceed the expectations.

#### 12.1.4 Limitations of Variance Analysis

- **Timing delay:** The accounting staff gather variances at end of every month before providing results to the management. In most of the cases, management requires the feedback much faster, and so it tends to rely on warning flags or measurements which are generated on spot.
- **Source of variance:** Most of the reasons for the variances aren't available in accounting records, so accounting personnel needs to go through the information like labor routings, bills of material, and overtime records for determining the reasons for such variances. Such add-on activity is cost-effective only when the management could actively fix the problems based on the information provided.
- **Detailed analysis:** If budgeting isn't performed considering the detailed analysis of every factor, the budgeting process might be loosely done that would deviate from actual numbers. Analysing variances might not make sense in such scenario.

#### 12.1.5 Uses of Variance Analysis

- **Comparing Budget with Actual:** Variance analysis helps in managing the annual budgets by monitoring the budgeted figures and comparing it with the actual revenue/cost. In case of companies which are project program driven, the financial data are evaluated at key intervals such as month close, quarter end, ect. For example, the month end reports can just provide quantitative data with respect to revenue and expenses or inventory levels. However, variance analysis would help to understand the reasons behind the variances between planned and actual revenue/cost which could lead to adjustments in the business strategies and end objectives.
- **Identifying Relationships:** Relationship between a pair of variables/elements/items could also be identified with the help of variance analysis. Correlations (both positive and negative) are critical in business planning. For instance, variance analysis could reveal that when the sale for Product A



risers there's a correlated rise in the sales for Product B. Thereby, revealing a positive correlation between two products.

- **Forecasting:** Forecasting uses patterns of the past data for developing a theory about the future business performance. Variances are placed into the context which helps analysts in identifying factors. For example, seasonal change holidays could be a major cause of positive/negative variances.

### **Illustration: 1**

Standard cost of a product in a factory is predetermined as follows:

Material (5 units @ Rs.4 each)	Rs. 20
Labour (20 hours @ Rs.1.50 per hour)	Rs. 30
Overhead expenses	Rs. 10
Total	Rs. 60

During a period, 8,000 units were produced whose actual cost was as follows:

Material (40,500 units @ Rs. 5 each)	Rs. 2,02,500
Labour (1,50,000 hours @ Rs. 1.60 each)	Rs. 2,40,000
Overhead expenses	Rs. 90,000
Total	Rs. 5,32,500

Prepare a statement showing standard cost, actual cost and variances.

### **Solution:**

Statement of Standard Cost, Actual Cost, and Variances

Particulars	Standard cost (Rs.)	Actual cost (Rs.)	Variance (Rs.)
Material	1,60,000	2,02,500	42,500 (A)
Labour	2,40,000	2,40,000	—
Overhead expenses	80,000	90,000	10,000 (A)
<b>Total</b>	<b>4,80,000</b>	<b>5,32,500</b>	<b>52,500 (A)</b>

## **12.2 Material Variances**



Classification of material variances are as under:

- Material Cost Variance (MCV)
- Material Price Variance (MPV)
- Material Usage Variance (MUV)
- Material Mix Variance (MMV)
- Material Yield Variance (MYV) or Material Sub-usage Variance (MSUV)

### 12.2.1 Material Cost Variance

Materials Cost Variance is the difference between the standard cost of materials specified and the actual cost of materials used.

- Material Cost Variance = Standard Cost of Material for Actual Output – Actual Cost of Materials Used OR
- $(TSC - TAC)$  OR
- $(SQ \times SP) - (AQ \times AP)$

Material cost variances arise due to variation in the price of the material or in its usage. In accordance with this, material cost variances may be analysed under two heads, viz. material price variance and material usage variance.

### 12.2.2 Material Price Variance

This is that portion of the material cost variance which is due to the difference between standard price specified and the actual price paid. Material price variance is that portion of the direct materials cost variance which is the difference between the standard price specified and actual price paid for the direct materials used. This is an “incurring” variance. This reflects the extra price paid on the units purchased. While making this calculation standard consumption of units should not be given any consideration. It is computed by multiplying the actual quantity by the difference between the standard price and the actual price. The formula is:

- Material Price Variance = Actual Quantity (Standard unit price – Actual unit price) OR
- $AQ (SP - AP)$

In other words, material price variance is the difference between ‘what it actually cost and what it would have cost if the actual usage had been paid for at the standard price’.



### Causes of Material Price Variance

The reasons for material price variance may be one or more of the following:

- Changes in market price of materials used;
- Changes in quantity of purchase or uneconomical size of purchase order resulting in a different price;
- Failure to obtain cash and/or trade discounts which were provided while setting standards;
- Rush order to meet shortage of supply;
- Failure to take advantage of off-season price, or failure to purchase when price is cheaper;
- Emergency purchase on the request of production/sales manager;
- Changes in issue price due to differences in changes related to store-keeping, materials handling, carriage inward expenses etc.;
- Changes in the amount of taxes and duties;
- Changes in quality or specification of materials purchased;
- Use of substitute material having a higher or lower unit price;
- Changes in the pattern or amount of taxes and duties.

The materials price variance is generally the responsibility of the purchase manager. However, the variance may be ultimately traceable to factors beyond his control like changes in the market price.

### 12.2.3 Material Usage Variance

This is that portion of material cost variance which is due to the difference between standard quantities of materials specified and the actual quantity used. Material usage variance is that portion of the direct material cost variance which is the difference between the standard quantity specified for the production achieved and the actual quantity used both valued at standard prices. The difference of actual quantity of materials used from the standard quantity set, multiplied by the standard price is known as the materials usage variance. The formula for the calculation of this variance is:

- $\text{Material Usage Variance} = \text{Standard Price} (\text{Actual Quantity} - \text{Standard Quantity})$
- Or  $\text{SP} (\text{AQ} - \text{SQ})$

### Causes of Material Usages Variance

The usage variance may have been caused by one or more of the undernoted factors:



- Lack of due care in the use of materials;
- Defective production necessitating additional materials for correction;
- Abnormal wastage through pilferage or other losses in the use of materials;
- Inefficiency in production due to improper method or lack of necessary skill in workmen;
- Use of a material-mix other than the standard mix; and
- Yield from materials in case excess of or less than that provided as the standard yield;
- Purchase of inferior materials or change in quality of materials;
- Rigid technical specifications and strict inspection leading to more rejections which require more materials for rectifications;
- Use of substitute material leading to poor quality;
- Improper maintenance of machine leading to breakdowns and more use of materials; and
- Poor inspection of raw materials.

A favorable variance may not always be advantageous for the concern. For instance, a saving in material usage may perhaps be effected by a reduction in wastage by slowing down the work but the resulting increase in the labour and overhead costs may far exceed the favorable materials usage variance. Material usage variance may further classified into:

#### 12.2.4 Material Mix Variance

One of the reasons for material usage variance is change in the composition of the materials mix. It results from a variation in the material mix used in production. Thus, if a larger proportion of the more expensive material is used than that laid down in the standard mix, materials usage will reflect a higher cost than the standard. Contrarily, the use of cheaper materials in large proportions will indicate a lower cost of materials usage than the standard.

It is that portion of the material usage variance which is due to the difference between the standard and actual composition of a mixture of materials. In other words, this variance arises due to a change in the ratio of actual material mix from the standard ratio of material mix. It is calculated as the difference between the standard price of standard mix and the standard price of actual mix.

Suppose for producing an article the materials standard is 6 kg of material A @ Rs. 5 per Kg. and 4 Kg. of material B @ Rs. 6 per kg, actual quantities used are 5 kg of material A and B each. The



total quantity used is still 10 kg but the materials cost will increase as shown below:

		Rs.	Rs.
Standard: Material A 6 kg. @ Rs. 5		30.00	
Material B 4 kg. @ Rs. 6		24.00	54.00
Actual:	Material A 5 kg. @ Rs. 5	25.00	
	Material B 5 kg. @ Rs. 6	30.00	55.00

Due to the change in the relative proportions of the two materials, the total cost has risen; this is the nature of the mix variance. It is calculated by comparing (revised) standard mix at standard prices and the actual mix at standard prices.

- Material Mix Variance = Standard Price (Revised Standard Quantity – Actual Quantity) = SP (RSQ - AQ)

Revised Standard Quantity (RSQ) = [Total of Actual quantities of all types of material (TAQ) × Standard Quantity of each material / Total of Standard quantities of all types of material (TSQ)]

### 12.2.5 Materials Yield Variance

Yield Variance is the difference between the standard yield specified and the actual yield obtained. In other words, the difference between actual yield of materials in manufacture and the standard yield (i.e. expected yield from a given standard input) valued at standard output price is known as materials yield variance. This variance is of great significance in processing industries, in which the output of one process becomes the input of the next process till the finished product is obtained at the final stage. The analysis of this variance helps effective control over usage. A low actual yield is unfavourable yield variance which indicates that consumption of materials was more than the standard. A high actual yield indicates efficiency, but a constant high yield is a pointer for the revision of the standard.

- Material Yield Variance = Standard cost per unit (Actual yield – Standard yield) = SC (p.u.) (AY - SY)

Note: AY will never change. SY will calculate for actual mix of quantity as under:

New SY = Old SY × TAQ / TSQ



The yield variance may be caused by such factors as: defective methods of operation, sub-standard quality of materials purchased, lack of due care in handling, lack of proper supervision etc.

### Illustration: 2

For producing one unit of a product, the materials standard is:

Material X: 6 kg. @ Rs.8 per kg., and

Material Y: 4 kg. @ Rs.10 per kg.

In a week, 1,000 units were produced the actual consumption of materials was:

Material X: 5,900 kg. @ Rs.9 kg., and

Material Y: 4,800 kg. @ Rs.9.50 per kg.

Compute the various variances.

### Solution:

Standard cost of materials of 1,000 units:

Standard			
Material X:	6,000 kg.	Rs. 8	48,000
Material Y:	4,000 kg.	Rs. 10	40,000
<b>Total</b>	<b>10,000</b>		<b>88,000</b>
Actual			
Material X:	5,900 kg.	Rs. 9	53,100
Material Y:	4,800 kg.	Rs. 9.50	45,600
<b>Total</b>	<b>10,700</b>		<b>98,700</b>

- Total materials cost variance      10,700 (A)
- Material Price Variance: Actual Quantity (Standard Price - Actual Price)
  - X = 5900 (Rs. 8 - Rs. 9)                      = Rs.5,900 (A)
  - Y = 4800 (Rs. 10 - Rs. 9.50)              = Rs.2,400 (F)

Total MPV = 3,500 (A)
- Material Usage Variance: Standard Price (Standard Quantity - Actual Quantity)
- X = Rs.8 (6,000 - 5,900) = Rs. 800 (F)



- $Y = \text{Rs.}10 (4,000 - 4,800) = \text{Rs.}8,000 \text{ (A)}$

$$\text{Total MUV} = 7,200 \text{ (A)}$$

Verification: Material Cost Variance 10,700 (A) = Materials price variance [Rs.3,500 (A)] + Material Usage Variance + 7200 (A).

- Material Mix Variance = SP (RSQ – AQ)
  - For Material X = Rs.8 (6420 – 5900) = Rs.4160 (F)
  - For Material Y = 10 (4280 – 4800) = Rs.5200 (A)
  - Total MMV = Rs.4160 (F) + Rs.5200 (A) = Rs.1040 (A)
- Material Yield Variance = SC per unit  $\times$  (AY – SY)
  - MYV = 88 (1,000 – 1,070) = Rs. 6,160

Verification: Material Usage Variance + 7200 (A) = Material Mix Variance [Rs.1,040 (A)] + Material Yield Variance + 6,160 (A).

- **Working Note:**

- RSQ for X =  $\text{TAQ} \times \text{SQ} / \text{TSQ} = (10700 \times 6) / 10 = 6420 \text{ kg.}$
- RSQ for Y =  $(10700 \times 4) / 10 = 4280 \text{ kg.}$
- SC per unit =  $\text{TSC} / \text{SY} = 88,000 / 1,000 = \text{Rs. } 88 \text{ per unit}$
- AY given in question i.e. 1000 kg.
- SY for actual quantity =  $(\text{Old SY} \times \text{TAQ}) / \text{TSQ} = (1 \times 10700) / 10 = 1070 \text{ kg.}$

**Illustration:3**

The standard mix to produce one unit of product is as follows:

Material A	60 units @ Rs. 15 per unit	= Rs. 900
Material B	80 units @ Rs. 20 per unit	= Rs. 1,600
Material C	100 units @ Rs. 25 per unit	= Rs. 2,500
Total	240 units	= Rs. 5,000

During the month 10 units were actually produced and consumption was as follows:

Material A	640 units @ Rs. 17.50 per unit	= Rs. 11,200
Material B	950 units @ Rs. 18.00 per unit	= Rs. 17,100





Material C      870 units @ Rs. 27.50 per unit      = Rs. 23,925

Total    2,460 units      = Rs. 52,225

Calculate all material variances.

**Solution:**

Revised standard mix to produce 10 unit of product is as follows:			
	SQ	SP (Rs.)	Total Standard Cost (Rs.)
Material A	600 units	15.00	9,000
Material B	800 units	20.00	16,000
Material C	1,000 units	25.00	25,000
<b>Total</b>	<b>2,400 units</b>		<b>50,000</b>
	AQ	AP (Rs.)	Total Actual Cost (Rs.)
Material A	640 units	17.50	11,200
Material B	950 units	18.00	17,100
Material C	870 units	27.50	23,925
<b>Total</b>	<b>2,460 units</b>		<b>52,225</b>

- Material Cost Variance
  - $A = \text{Rs. } 9,000 - 11,200 = \text{Rs. } 2,200 \text{ (A)}$
  - $B = \text{Rs. } 16,000 - 17,100 = \text{Rs. } 1,100 \text{ (A)}$
  - $C = \text{Rs. } 25,000 - 23,925 = \text{Rs. } 1,075 \text{ (F)}$
  - Total MCV = Rs. 2,225 (A)

- Material Price Variance = AQ (SP- AP)

Material A	640 units (Rs. 15 – Rs. 17.50)	Rs. 1,600 (A)
Material B	950 units (Rs. 20.00 – Rs. 18)	Rs. 1,900 (F)



Material C	870 units (Rs. 25 – Rs. 27.50)	Rs. 2,175 (A)
<b>Total MPV = Rs. 1,875 (A)</b>		

- Material Usage Variance = SP (SQ- AQ)

Material A	Rs. 15 (600 – 640 )	Rs. 600 (A)
Material B	Rs. 20 (800 – 950)	Rs. 3,000 (A)
Material C	Rs. 25 (1,000 – 870)	Rs. 3,250 (F)
<b>Total MUV = Rs. 350 (A)</b>		

- MMV = Standard Price × (Revised Standard Quantity-Actual Quantity)

- Revised standard Quantity = (SQ × TAQ) / TSQ
- Material A (600 × 2,460) / 2,400 = 610 units
- Material B (800 × 2,460) / 2,400 = 820 units
- Material C (1,000 × 2,460) / 2,400 = 1,030 units
- Total RSQ = 2460 units

Material A	Rs. 15 (610 – 640 )	Rs. 450 (A)
Material B	Rs. 20 (820 – 950)	Rs. 2,600 (A)
Material C	Rs. 25 (1,030 – 870)	Rs. 4,000 (F)
<b>Total MMV = Rs. 950 (F)</b>		

- MSUV = Standard Price × (Standard Quantity - Revised Standard Quantity)

Material A	Rs. 15 (600 – 610 )	Rs. 150 (A)
Material B	Rs. 20 (800 – 820)	Rs. 400 (A)
Material C	Rs. 25 (1,000 – 1,030)	Rs. 750 (A)
<b>Total MSUV = Rs. 1,300 (A)</b>		

#### Illustration: 4



In a brass foundry, standard mixture consists of 70% Copper and 30% Zinc; standard loss 10% of input. During the month following was actual production. Calculate variance from the standard:

	AQ	AP	TAC	SQ	SP	TSC
Copper	2,900 kg.	Rs. 14	40,600	2,800 kg.	Rs. 14	39,200
Zinc	1,200 kg.	Rs. 4	4,800	1,200 kg.	Rs. 4	4,800
<b>Total</b>	<b>4,100 kg.</b>		<b>45,400</b>	<b>4,000 kg.</b>		<b>44,000</b>
<b><u>Loss:</u></b>	(410 kg.)			(400 kg.)		
Yield	3,690 kg.			3,600 kg.		

**Solution:**

- Material Cost Variance

Standard Quantity for Actual Output:

- Copper =  $(2,800 \div 3,600) \times 3,690 = 2,870$  kg.
- Zinc =  $(1,200 \div 3,600) \times 3,690 = 1,230$  kg.

- Total Standard Cost for Actual output

- $(Rs. 44,000 \div 3,600) \times 3,690 = Rs. 45,100$

- Total Actual Cost = Rs. 45,400

$$MCV = TSC - TAC = (Rs. 45,100 - Rs. 45,400) = Rs. 300 \text{ Unfavourable}$$

- Material Price Variance =  $AQ \times (SP - AP)$

- Material A 2,900 units  $(Rs. 14 - Rs. 14) = Rs. 0$
- Material B 1,200 units  $(Rs. 4 - Rs. 4) = Rs. 0$
- MPV = Rs. Nil

- Material Usage Variance =  $SP \times (SQ - AQ)$

- Copper =  $Rs. 14 (2,870 - 2,900) = Rs. 420 (A)$
- Zinc =  $Rs. 4 (1,230 - 1,200) = Rs. 120 (F)$



- Total = Rs. 300 unfavourable
- Revised Standard Quantity:  $(SQ \times TAQ) / TSQ$ 
  - Copper =  $(2,800 \div 4,000) \times 4,100 = 2,870$  kg.
  - Zinc =  $(1,200 \div 4,000) \times 4,100 = 1,230$  kg.
  - Total RSQ = 4100 kg.
- MMV = Standard Price  $\times$  (Revised Standard Quantity-Actual Quantity)
  - Copper =  $(2,870 \text{ kg.} - 2,900 \text{ kg.}) \times \text{Rs. } 14 = \text{Rs. } 420$  unfavourable
  - Zinc =  $(1,230 \text{ kg.} - 1,200 \text{ kg.}) \times \text{Rs. } 4 = \text{Rs. } 120$  favourable
  - Total = Rs. 300 unfavourable
- MYV = Standard cost per unit  $\times$  (Standard yield for Actual Mix –Actual yield)
  - Standard Yield for Actual Mix:
  - Copper =  $(3,600 \text{ kg.} \div 4,000 \text{ kg.}) \times 4,100 \text{ kg.} = 3,690$  kg.
  - Actual Yield = 3,690 kg.
  - Standard Cost per unit =  $\text{Rs. } 44,000 \div 3,600 \text{ kg.} = \text{Rs. } 12.22$  per unit
  - MYV = Standard cost per unit  $\times$  (Standard yield for actual mix –Actual yield)
  - MYV =  $\text{Rs. } 12.22 (3,690 \text{ kg.} - 3,690 \text{ kg.}) = \text{Nil}$

Material Cost Variance	Rs. 300 Unfavourable	
Material Price Variance	Nil	= Material Cost Variance
Material Usage Variance	Rs. 300 Unfavourable	
Material Mix Variance	Rs. 300 unfavourable	= Material Usage Variance
Material Yield Variance	Nil	

### 12.3 Labour Variances

Classification of labour variances as under:

- Labour Cost Variance (LCV)
- Labour Rate Variance (LRV)
- Labour Efficiency Variance (LEV)
- Labour Mix Variance (LMV)
- Labour Idle Time Variance (LITV)



- Labour Yield Variance (LYV) Or Material Revised Efficiency Variance (LREV)

### 12.3.1 Labour Cost Variance

Labour Cost Variance (also termed as direct wage variance) is the difference between the standard direct wages specified for the activity achieved and the actual direct wages paid. The formula for labour cost variance is:

- $LCV = (\text{Standard Hours} \times \text{Standard Rate}) - (\text{Actual Hours} \times \text{Actual Rate})$  OR
- $LCV = (SH \times SR) - (AH \times AR)$

As the cost of labour is determined by labour time and wages, the labour cost variance is composed of either or both of variances relating to labour time and labour rate. As such, labour cost variance is analysed into two separate variances, viz., wages (labour) rate variance and labour efficiency variance.

#### Illustration: 5

Standard Time for one unit of product	12 Hours.
Standard Rate	Rs. 5 per hour
Actual Production was 1000 units	
Actual Time	13,200 Hours
Total Actual Wages	Rs. 59,400

Calculate Labour Cost Variance, Labour Efficiency Variance and Labour Rate Variance

#### Solution:

- $ST = 1,000 \times 12 \text{ hrs.} = 12,000 \text{ hrs.}$
- $SR = \text{Rs. 5 per hour.}$
- $AT = 13,200 \text{ hours}$
- $AR = \text{Rs. } 59,400 / 13,200 = \text{Rs. 4.50 per hour}$
- $\text{Standard Cost of Labour} = (12,000 \times \text{Rs. 5}) = \text{Rs. 60,000}$
- $\text{Actual Cost of Labour} = (13,200 \times \text{Rs. 4.50}) = \text{Rs. 59,400}$
- $\text{Labour Cost Variance} = \text{Rs. 60,000} - \text{Rs. 59,400} = \text{Rs. 600 (A)}$

### 12.3.2 Labour Rate Variance



This is that portion of the wages variance which is due to the difference between the actual rate and standard rate of any specified. It is calculated like the materials price variance.

- Labour Rate Variance = Actual Hours (Standard Rate - Actual Rate) OR
- $LRV = AH \times (SR - AR)$

### Causes of Wages (Labour) Rate Variance

Wage rate variance occurs due to the following causes:

- Change in basic wage structure or change in piece work rate.
- Overtime work in excess of that provided in the standard rate.
- Employment of one or more workers of a different grades than the standard grades.
- Payment of guaranteed wages to workers who are unable to earn their normal wages if such guaranteed wages form part of direct labour cost.
- New workers not being allowed full normal wage rates.
- Use of different method of payment i.e. payment of day rates while standards are based on piece work method of remuneration.
- Higher wages paid on account of overtime for urgent work.
- The composition of a gang as regards the skill and rate of wages being different from that laid down in the standard.

Wage rates are usually determined by factors beyond the control of the personnel department such as conditions in the labour market, wage awards by wage boards, etc. Wage rate variances are therefore, mostly uncontrollable except for the portion which arises due to deployment of wrong grade of labour for which the departmental executive may be held responsible.

### 12.3.3 Labour Time or Efficiency Variance

Also termed as Labour Efficiency Variance, is that portion of the direct wages variance which is due to the difference between the standard labour hours specified and the actual labour hours expended. Obviously, this variance provides a key to the control of workers' efficiency and labour cost. In effect, it is a usage variance. The computation of variance is as follows:

- Labour Efficiency Variance = Standard Wage Rate (Standard Hours of Production – Actual Hours Worked) OR



- $LEV = SR \times (SH - AHW)$

### Causes of Labour Efficiency Variance

The causes giving rise to labour efficiency variance are as follows:

- Lack of proper supervision or stricter supervision than specified;
- Poor working conditions;
- Defective machinery and equipment;
- Discontentment in workers due to unsatisfactory personnel relations;
- Increase in labour turnover;
- Use of non-standard material requiring more or less operation time;
- Basic inefficiency of workers due to insufficient training, faulty instructions, incorrect scheduling of jobs, etc.
- Wrong selection of workers.

**[Labour Cost Variance = Labour Efficiency Variance + Labour Rate Variance or LCV = LEV + LRV]**

### Illustration: 6

Assuming:	Actual hours worked	5,600
	Actual wage paid	Rs.7,840
	Standard rate per hour	Rs.2
	Standard hours produced	4,000

**Solution:** Labour Cost Variance = Standard cost – Actual cost ( $4,000 \times \text{Rs.}2$ )

$$= \text{Rs.}8,000 - \text{Rs.}7,840 = \text{Rs.}160 \text{ (F)}$$

Labour Rate Variance = Actual hours (Standard rate - Actual rate)

$$\text{Actual Rate} = \text{Rs. } 7840 / 5600 = \text{Rs. } 1.4$$

$$= 5600 (2 - 1.4) = \text{Rs.}3,360 \text{ (F)}$$

Labour efficiency rate variance  $2 (4,000 - 5,600) = \text{Rs.}3,200 \text{ (A)}$

Labour Cost Variance = Labour Rate Variance + Labour Efficiency Variance



$$= 3360 (F) + 3200 (A) = \text{Rs.}160 (F)$$

**Labour efficiency variance is sub-divided into the following variances:**

- Idle time variance
- Labour mix variance
- Labour yield variance (or Labour revised-efficiency variance)

#### **12.3.4 Idle Time Variance**

This variance which forms a portion of wages efficiency variance, is represented by the standard cost of the actual hours for which the workers remain idle due to abnormal circumstances.

Labour Idle Time Variance (LITV) = (Actual hours paid for x Standard rate) – (Actual hours worked x Standard rate) OR Idle Hours x Standard rate.

It is always adverse. Suppose in the example given above the actual time includes 1,000 idle hours. The Idle Time Variance will then be Rs.2,000 (A); the efficiency variance will be then Rs.1,200 (A), making a total of Rs.3,200 (A).

#### **12.3.5 Labour Mix Variance**

It is also known as Gang Composition Variance. This is a sub-variance which arises due to change in the composition of a standard gang or combination of labour force.

Labour mix variance = (Actual hours at standard rate of actual gang – Actual hours at standard rate of standard gang) OR

Standard rate (Revised standard labour hours - Actual labour hours) OR

$$\text{LMV} = (\text{RSH} - \text{AHW}) \times \text{SR}$$

$$\text{Revised labour hours} = \text{Total actual time} / \text{Total standard time} \times \text{Standard time}$$

The calculation is just like that the materials. It is included in the efficiency or time variance discussed above.

#### **12.3.6 Labour Yield Variance**

This is due to the difference in the standard output specified and the actual output obtained. This is computed as follows:





Labour yield variance = Standard labour cost unit (Actual output – Standard output) OR

(Standard loss of actual total input – Actual loss) x Average standard rate per unit.

OR

LYV = SC per unit (AY – SY)

Note: AY will never change. SY will calculate for actual mix of hour as under:

New SY = (Old SY × TAH) / TSH; If the actual output is more than standard output, it is favorable variance and vice versa.

### **Illustration: 7**

100 skilled worker, 40 semi-skilled, and 60 unskilled worker were to work for 30 weeks to get a contract job completed. The standard weekly wages were Rs. 60, Rs. 36, and Rs. 24 respectively.

Actually 80 skilled worker, 50 semi-skilled, and 70 unskilled worker work for 32 weeks to get contract job completed. The job paid Rs. 65, Rs. 40, and Rs. 20 respectively as weekly wages. Find out the labour cost variance, labour rate variance, labour mix variance and labour efficiency variance.

	Standard Mix			Actual Mix		
	ST (weeks)	SR	SLC	AT (weeks)	AR	ALC
Skilled	100 × 30 = 3,000	60	1,80,000	80 × 32 = 2,560	65	1,66,400
Semi-Skilled	40 × 30 = 1,200	36	43,200	50 × 32 = 1,600	40	64,000
Unskilled	60 × 30 = 1,800	24	43,200	70 × 32 = 2,240	20	44,800
<b>Total</b>	<b>6,000</b>		<b>2,66,400</b>	<b>6,400</b>		<b>2,75,200</b>

- Labour Cost Variance:
  - Skilled (Rs. 1,80,000 – 1,66,400) = Rs. 13,600 (F)
  - Semi-skilled (Rs. 43,200 – 64,000) = Rs. 19,800 (A)
  - Unskilled (Rs. 43,200 – 44,800) = Rs. 1,600 (A)
  - **Total LCV = Rs. 8,800 (A)**



- Labour Rate Variance = AT (SR – AR)
  - Skilled = 2,560 weeks (Rs. 60 – Rs. 65) = Rs. 12,800 (A)
  - Semi- Skilled = 1,600 weeks (Rs. 36 – Rs. 40) = Rs. 6,400 (A)
  - Unskilled = 2,240 weeks (Rs. 24 – Rs. 20) = Rs. 8,960 (F)
  - Total = Rs. 10,240 (A)
- Labour Efficiency Variance = SR (ST– AT)
  - Skilled = Rs. 60 (3,000 – 2,560 weeks) = Rs. 26,400 (F)
  - Semi- Skilled = Rs. 36 (1,200 – 1,600 weeks) = Rs. 14,400 (A)
  - Unskilled = Rs. 24 (1,800 – 2,240 weeks) = Rs. 10,560 (A)
  - Total = Rs. 1,440 (F)
- **Labour Cost Variance = LRV + LEV = Rs.10,240 (A) + Rs. 1,440 (F) = Rs. 8,800 (A)**
- Labour Mix Variance: SR × (Revised Std. Hours – Actual hours)
  - Skilled = Rs. 60 (3,200 – 2,560 weeks) = Rs. 38,400 (F)
  - Semi- Skilled = Rs. 36 (1,280 – 1,600 weeks) = Rs. 11,520 (A)
  - Unskilled = Rs. 24 (1,920 – 2,240 weeks) = Rs. 7,680 (A)
  - Total = Rs. 19,200 (F)
- Revised Standard Hour (RSH)
  - Skilled =  $(3,000/6,000) \times 6,400 = 3,200$  Hours
  - Semi-skilled =  $(1,200/6,000) \times 6,400 = 1,280$  Hours
  - Unskilled =  $(1,800/6,000) \times 6,400 = 1,920$  Hours
- Labour Revised Efficiency Variance: Standard rate × (Standard hours – Revised standard hours)
  - Skilled = Rs. 60 × (3,000 – 3,200 weeks) = Rs. 12,000 (A)
  - Semi- Skilled = Rs. 36 × (1,200 – 1,280 weeks) = Rs. 2,880 (A)
  - Unskilled = Rs. 24 × (1,800 – 1,920 weeks) = Rs. 2,880 (A)
  - Total LREV = Rs. 17,760 (A)

## 12.4 Check Your Progress

1. Excess of actual cost over standard cost is known as:
  - a) Abnormal effectiveness
  - b) Unfavorable variance



- c) Favorable variance
  - d) None of these
2. Which of the following statements are true about labour idle time?
- a) Labour idle time variance is not caused by non-availability of raw material
  - b) Labour idle time variance is measured as: Abnormal idle hours  $\times$  Actual hourly rate
  - c) Labour idle time variance is always unfavorable or adverse
  - d) All of the above
3. Material mix variance is measured as:
- a) Total standard cost - Total actual cost
  - b) Standard cost of revised standard mix - Standard cost of actual mix
  - c) (Standard unit price - Actual unit price)  $\times$  Actual quantity used
  - d) (Standard quantity - Actual quantity)  $\times$  Unit standard price
4. The data related to Production of T are for material X standard data and actual data are 40 kgs @ Rs 10 and 55 kgs @ Rs 9, respectively. The standard data and actual data for material Y are 50 kgs @ Rs 5 and 35 kgs @ Rs 7. Determine material usage variance:
- a) Rs 75 favorable
  - b) Rs 75 unfavorable
  - c) Rs 90 unfavorable
  - d) Rs 90 favorable
5. When actual output is different from standard output, determine
- a) Standard cost of revised standard mix for standard output
  - b) Actual yield for standard output
  - c) Standard quantity for actual output
  - d) None of the above
6. Material sub-usage variance is also known as
- a) Material revised usage
  - b) Revised quantity variance
  - c) Both a and b
  - d) None of the above



## 12.5 Summary

Variance Analysis is a process of identifying causes of variation in the income and expenses of the current year from the budgeted values. It helps to understand why fluctuations happen and what can / should be done to reduce the adverse variance. This eventually helps in better budgeting activity. Variance Analysis deals with an analysis of deviations in the budgeted and actual financial performance of a company. The causes of the difference between the actual outcome and the budgeted numbers are analyzed to showcase the areas of improvement for the company. At times, it is also a sign of unrealistic budgets, and therefore, in such cases, budgets can be revised. A variance in management accounting may be favorable (costs lower than expected or revenues higher than expected) or adverse (costs higher than anticipated or revenues lower than expected). Either positive variance or negative variance is reflected negatively on the budgeting efficiency unless caused by extreme events. These variance is classified as direct material variance, direct labor variance, overhead variance, and sales variance.

## 12.6 Keywords

- **Variance:** Difference between the actual outcome and the budgeted numbers.
- **Cost Control:** Tool of management executives to regulate the working of the manufacturing concern.
- **Standard Costing:** Determining the cost of product under the existing conditions.
- **Budget:** The quantitative statement prepared and approved prior to a defined period of time.
- **Cost Reduction:** Planned positive approach to reduce expenditure.

## 12.7 Self-Assessment Test

### Short Answer Questions:

- Q.1 What is Variance Analysis?
- Q.2 Explain Material Cost Variance.
- Q.3 Explain Labour Cost Variance.
- Q.4 Define Material Mix Variance.

### Long Answer Questions:

- Q.1 What is variance analysis? What are the characteristics and advantages of variance analysis?



Q.2 Explain the term variance analysis. What are the uses of variance analysis?

Q.3 What is material variance? Explain different types of material variance?

Q.4 Details of information for the month of March, 2021 are as under:

Standard output from each ton of material: 50 units; Standard price per ton: Rs.150; Actual usage: 100 tons; Actual price per ton: Rs.200; Actual output: 6000 units; Calculate material variances.

**Answer: (a) Material Price Variance (MPV) = Rs.5,000 (Adverse); (b) Material Usage Variance (MUV) = Rs.3,000 (Favourable); (c) Material Cost Variance (MCV) = Rs.2,000 (Adverse)**

Q.5 A factory, working for 50 hours a week, employs 100 workers on a job work. The standard rate is Rs. 1 an hour and standard output is 200 units per gang hour. During a week in June, ten employees were paid at Rs. 80 p. an hour and five at Rs. 1.20 an hour. Rest of the employees were paid at the standard rate.

Actual number of units produced was 10,200 Calculate labour cost variances.

**(Answer: Labour Cost Variance = Rs.150 (F); Labour Rate variance is Rs. 50 (F); (iii) Labour Efficiency Variance Rs. 100 (F))**

Q.6 The standard cost of a chemical mixture is:

- 40% material A at Rs.20 per kg.
- 60% material B at Rs.30 per kg.

A standard loss of 10% expected in production. During a period there is used:

- 90kgs material A at cost of Rs.18 per kg
- 110kgs material B at cost of Rs.24 per kg.

The weight produced is 182kgs of good product.

Calculate:

- Material price variance
- Material mix variance
- Material yield variance
- Material cost variance.



**Answer: Material Price Variance Rs. 260 (A); Material Mix Variance Rs. 100 (F); Material yield variance Rs.57.6 (F); Material cost variance Rs.102.40 (A).**

## **12.8 Answers to Check Your Progress**

1(b), 2 (c), 3(b), 4 (b), 5(c), 6 (c)

## **12.9 References/ Suggested Readings**

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<b>Subject:</b> Cost Accounting	
<b>Course Code:</b> BCOM 401	<b>Author:</b> Ms. Simran Arya
<b>Lesson No.: 13</b>	
<b>Responsibility Accounting &amp; Reporting</b>	

**Structure**

- 13.0 Learning Objective
- 13.1 Introduction, Meaning & Definition
- 13.2 Meaning & Definition
- 13.3 Responsibility Accounting- Objectives
  - 13.3.1 Essential Features of Responsibility Accounting
  - 13.3.2 Responsibility Centre & its types
  - 13.3.3 Advantages & Drawbacks of Responsibility Accounting
- 13.4 Divisional Performance
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**13.0 Learning Objective**

After reading this lesson, you should be able to

- Understand the issues involved in managing decentralized operations.
- Compare and contrast cost, profit, revenue, and investment centers.



- Understand how managers direct and control decentralized operations.

### 13.1 Introduction

It is used to measure performance of divisions of an organisation rather than organisation as a whole. Responsibility Accounting is a system of control where responsibility is assigned for the control of costs. The persons are made responsible for the control of costs. Proper authority is given to the persons so that they are able to keep up their performance. In case the performance is not according to the predetermined standards then the persons who are assigned this duty will be personally responsible for it. In responsibility accounting the emphasis is on men rather than on systems. Responsibility Accounting collects and reports planned and actual accounting information about the inputs and outputs of responsibility centres”. Responsibility Accounting must be designed to suit the existing structure of the organization. Responsibility should be coupled with authority. An organization structure with clear assignment of authorities and responsibilities should exist for the successful functioning of the responsibility accounting system. The performance of each manager is evaluated in terms of such factors.

### 13.2 Meaning & Definition

- Responsibility accounting is a system of management accounting under which accountability is established according to the responsibility delegated to various levels of management and a management information and reporting system instituted to give adequate feedback in terms of the delegated responsibility.
- Under this system, divisions or units of an organisation under a specific authority in a person are developed as responsibility centres & evaluated individually for their performance.
- **Horngren:** defines “Responsibility accounting is a system of accounting that recognizes various responsibility centres throughout the organisation and reflects the plans and actions of each of these centres by assigning particular revenues and costs to the one having the pertinent responsibility. It is also called profitability accounting and activity accounting”. According to this definition, the organisation is divided into various responsibility centres and each centre is responsible for its costs. The performance of each responsibility centre is regularly measured.
- **Institute of Cost and Works Accountants of India** defines Responsibility accounting as “a





system of management accounting under which accountability is established according to the responsibility delegated to various levels of management and a management information and reporting system instituted to give adequate feedback in terms of the delegated responsibility. Under this system divisions or units of an organisation under a specified authority in a person are developed as responsibility centres and evaluated individually for their performance.”

### **Pre-requisites of Responsibility Accounting**

- It should be a big company with divisionalised organisation structure.
- The organisation should have clearly set goals and targets.
- Managers should actively participate in establishing budgets against which their performance is measured.
- Managers are held responsible only for those activities over which they exercise significant degree of control.

Performance reporting should be timely and contain significant information relating to the responsibility centres.

### **13.3 Responsibility Accounting-Objectives**

Responsibility accounting is a method of dividing the organizational structure into various responsibility centres to measure their performance. In other words responsibility accounting is advice to measure divisional performance measurement may be stated as under:

1. To determine the contribution that a division as a sub-unit makes to the total organization.
2. To provide a basis for evaluating the quality of the divisional managers performance.  
Responsibility accounting is used to measure the performance of managers and it therefore, influence the way the managers behave.
3. To motivate the divisional manager to operate his division in a manner consistent with the basic goals of the organization as a whole.

#### **13.3.1 Essential Features of Responsibility Accounting**

1. Relationship between Organisation Structure and Responsibility Accounting System:

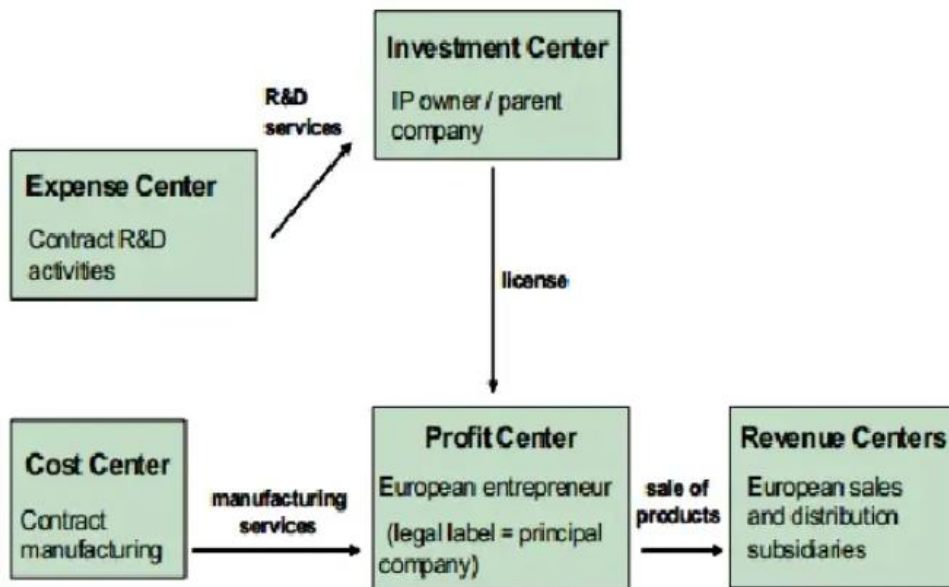


- A sound organisation structures with clear-cut lines of authority—responsibility relationships are a prerequisite for establishing a successful responsibility accounting system.
  - Responsibility accounting system must be so designed as to suit the organisation structure of the organisation.
  - It must be founded upon the existing authority- responsibility relationships in the organisation.
  - In fact, responsibility accounting system should parallel the organisation structure and provide financial information to evaluate actual results of each individual responsible for a function.
2. Assigning Costs to Individuals and Limiting their Efforts to Controllable Costs:
- After identifying responsibility centres and establishing authority-responsibility relationships, responsibility accounting system involves assigning of costs and revenues to individuals.
  - Only those costs and revenues over which an individual has a definite control can be assigned to him for evaluating his performance
  - The following guidelines should be followed while assigning of costs
    - If the person has authority over both the acquisition and use of the services, he should be charged with the cost of these services.
    - If the person can significantly influence the amount of cost through his own action, he may be charged with such costs.
    - Even if the person cannot significantly influence the amount of cost through his own direct action, he may be charged with those elements with which the management desires him to be concerned, so that he will help to influence those who are responsible.
3. Performance Reporting:
- A control system to be effective should be such that deviations from the plans must be reported at the earliest so as to take corrective action for the future. The deviations can be known only when performance is reported.



- Responsibility accounting system is focused on performance reports also known as ‘responsibility reports’, prepared for each responsibility unit.
- Unlike authority which flows from top to bottom, reporting flows from bottom to top. These reports should be addressed to appropriate persons in respective responsibility centres.
- The reports should contain information in comparative form as to show plans (budgets) and the actual performance and should give details of variances which are related to that centre.
- The variances which are not controllable at a particular responsibility centre should also be mentioned separately in the report.
- To be effective, the reports should be clear and simple. Use of diagrams, charts, illustrations, graphs and tables may be made to make them attractive and easily understandable.

### Example of responsibility centres and inter-company transactions



### 13.3.2 Responsibility Centre

- The main focus of responsibility accounting lies on the responsibility centres.
- A responsibility centre is a sub unit of an organization under the control of a manager who is

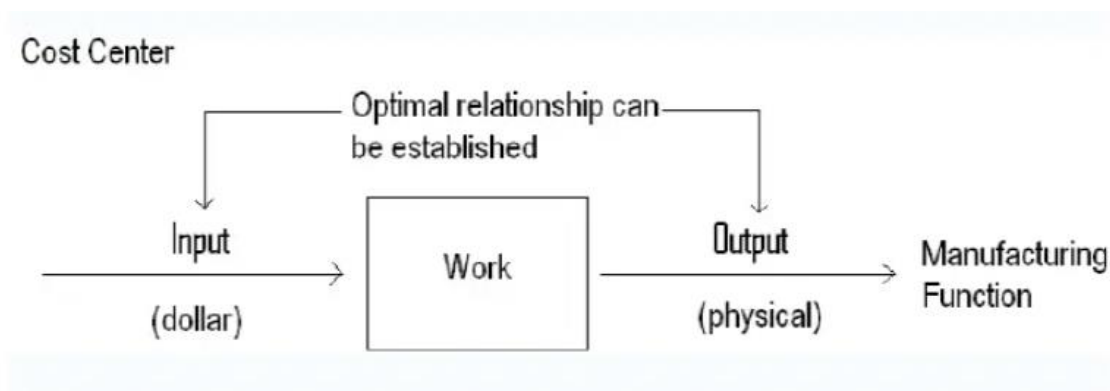


held responsible for the activities of that centre.

- It is like a small business to achieve the objectives of a large organisation

### 1. Cost Centre

- A cost or expense centre is a segment of an organisation in which the managers are held responsible for the cost incurred in that segment but not for revenues.
- According to CIMA, London a cost centre is “a location person or equipment , for which costs may be ascertained and used for purposes of cost control”
- Responsibility in a cost centre is restricted to cost.
- For planning purposes, the budget estimates are cost estimates; for control purposes, performance evaluation is guided by a cost variance equal to the difference between the actual and budgeted costs for a given period.
- Cost centre managers have control over some or all of the costs in their segment of business, but not over revenues.
- In manufacturing organisations, the production and service departments are classified as cost centre. Also, a marketing department, a sales region or a single sales representative can be defined as a cost centre.
- Cost centre may vary in size from a small department with a few employees to an entire manufacturing plant. In addition, cost centres may exist within other cost centres.
- E.g. accounting department, repairs & maintenance department



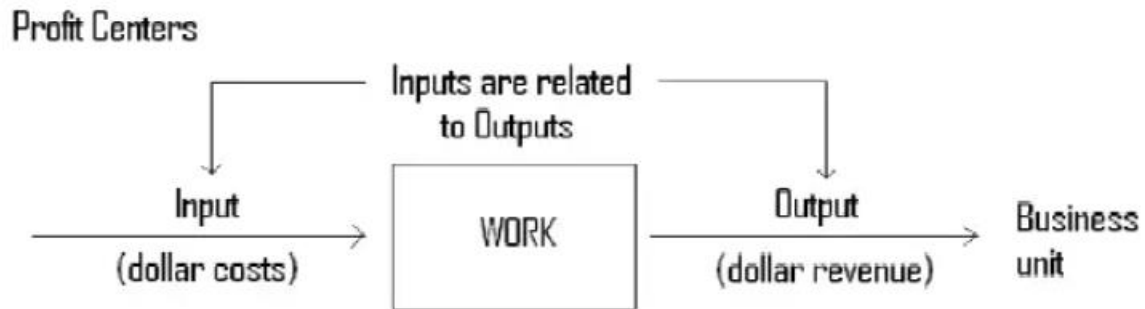
### 2. Revenue Centre



- It is a segment of the organisation which is primarily responsible for generating sales revenue.
- A revenue centre manager does not possess control over cost, investment in assets, but usually has control over some of the expense of the marketing department.
- The revenue centre manager will control the selling price, promotion mix and product mix
- The performance of a revenue centre is evaluated by comparing the actual revenue with budgeted revenue, and actual marketing expenses with budgeted marketing expenses.
- E.g. sales department

### 3. Profit Centre

- Also called business centre
- It is a segment of an organisation whose manager is responsible for both revenues and costs.
- In a profit centre, the manager has the responsibility and the authority to make decisions that affect both costs and revenues (and thus profits) for the department or division.
- The managers are encouraged to act as if they were running their own separate business
- The main purpose of a profit centre is to maximise profit by making decisions relating to production volume, product mix, selling price, marketing strategy.
- Profit centre managers aim at both the production and marketing of a product.

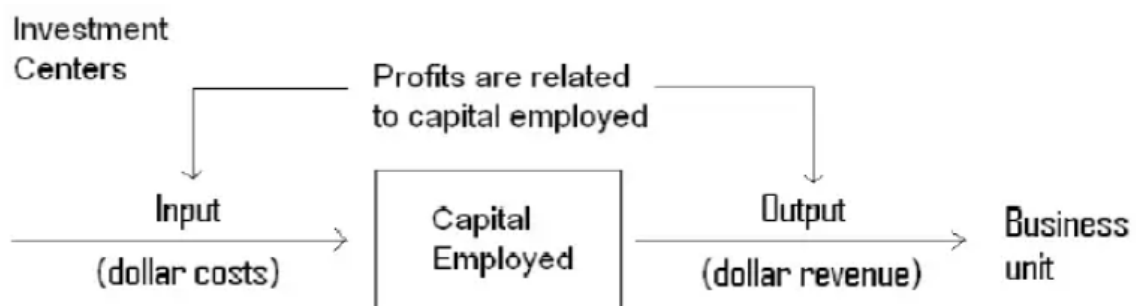


#### 4. Investment Centre

- It is responsible for both profits and investments.
- The investment centre manager has control over revenues, expenses and the amounts invested in the centre's assets.
- He also formulates the credit policy which has a direct influence on debt collection, and the inventory policy which determines the investment in inventory.
- The manager of an investment centre has more authority and responsibility than the manager of either a cost centre or a profit centre.

Besides controlling costs and revenues, he has investment responsibility too. 'Investment on asset' responsibility means the authority to buy, sell and use divisional assets.

- E.g. a new hotel being developed.



**Steps for Achieving Goals of Responsibility Accounting:**

1. The organisation is divided into various responsibility centres each responsibility centre is put under the charge of a responsibility manager. The managers are responsible for the performance of their departments.
2. The targets of each responsibility centre are set in. The targets or goals are set in consultation with the manager of the responsibility centre so that he may be able to give full information about his department. The goals of the responsibility centres are properly communicated to them.
3. The actual performance of each responsibility centre is recorded and communicated to the executive concerned and the actual performance is compared with goals set and it helps in assessing the work of these centres.
4. If the actual performance of a department is less than the standard set, then the variances are conveyed to the top management. The names of those persons who were responsible for that performance are also conveyed so that responsibility may be fixed.
5. Timely action is taken to take necessary corrective measures so that the work does not suffer in future. The directions of the top level management are communicated to the concerned responsibility centre so that corrective measures are initiated at the earliest.
6. The purpose of all these steps is to assign responsibility to different individuals so that the performance is improved. In case the performance is not up to their targets set, then responsibility may be fixed for it. Responsibility accounting will certainly act as control device and it will help in improving the overall performance of the business.

**13.3.1 Advantages & Drawbacks of Responsibility Accounting****I. Advantages of Responsibility Accounting**

- a) Some responsibility is given to each individual and he is held accountable for his performance. No person can assign his responsibility to others. In this system, responsibility is fixed individually.



- b) Facilitates stricter control on costs & revenue along with helping in planning and decision making.
- c) When responsibility is fixed for each department, managers consider themselves important part of the organisation. It helps in developing spirit of initiative among employees and increases their motivation.
- d) A mechanism for presenting information is provided. A framework for managerial performance appraisal systems can be established on that basis, besides motivating managers to act in the best interest of the enterprise.
- e) Relevant and up to the minute information is made available which can be used to estimate future costs &/or revenue and fix up standards for departmental budgets.

## II. Problems in Responsibility Accounting

- a) For responsibility accounting to be effective, a proper classification between controllable and non-controllable costs is a prime requisite. But practical difficulties arise while doing so on account of the complex nature & variety of costs.
- b) Separate departmental pursuits may lead to inter-departmental rivalry and it may be prejudicial to the interest of the enterprise as a whole. Managers may act in the best interest of their own, but not in the best interest of the enterprise.
- c) Can't be relied upon completely as a tool for management control. It is a system just to direct the attention of management to those areas of performance which require further investigation.
- d) Preparation of an organisation chart which clearly delineates lines of responsibility and authority is a difficult task.
- e) Responsibility accounting reports may be overloaded with all available information.

## 13.4 Divisional Performance- Concept

- a. The whole organisation is divided into separate divisions and each divisional manager has great deal of independence.
- b. The manager of each division is accountable for performance of its operations as also the nature of operations undertaken.





- c. It leads to creation of a decentralised organisation structure and each division is treated as a separate responsibility centre. The performance of each responsibility centre will be separately measured and compared with other responsibility centres for managerial decisions.
- d. However, authority can't be exclusive one, implying that full autonomy can't be fully granted to the divisional head as no unit can be independent of other units within one organisation.
- e. The performance of each division has to be separately and independently evaluated only to place responsibility for effective management so that those who are doing the jobs don't shrink from their duties and the operations which they are bound to perform.

### **Merits of Divisional Performance**

- Promotes quick decision making and avoids red tape and delays
- Motivates divisional managers to perform better. It also helps to improve their job satisfaction and self-fulfilment
- Makes top management free from detailed involvement in the day to day operations and enables them to devote themselves to important policy matters.

### **Demerits of Divisional Performance**

- Various divisions may compete with each other and in that divisional managers may try to increase their own profits at the expenses of other divisions
- There may be lack of coordination and cooperation between divisions. This results in lack of harmony in achieving overall goals of the business

### **Measurement of Divisional Performance**

#### **1. Variance Analysis**

- Actual performance is compared with standard or budgeted performance and any variance between the two is analyzed to know the causes so that responsibility can be established and corrective actions taken.
- Should be undertaken at each cost centre & revenue centre.



## 2. Profit

- The absolute amount of profit earned by a profit centre

## 3. Return on Investment

- ROI addressed divisional profit as a percentage of the assets employed in the division. Assets employed can be defined as total divisional assets, assets controllable by the divisional manager, or net assets.

$$\text{ROI} = (\text{Divisional Profit} / \text{Divisional investment}) * 100$$

$$= (\text{EBIT} / \text{capital employed}) * 100$$

$$= (\text{Profit} / \text{sales}) * (\text{Sales} / \text{capital invested}) * 100$$

- An organisation can improve the ROI either by improving the net profit margin or by increasing the turnover with the same amount of investment. It implies that the performance of a firm/ segment can be improved either by increasing the profit margin per rupee of sales or by generating more sales volume per rupee of investment

- **Advantages**

- Is easy to understand & interpret
- It Is a measure of relative performance and therefore can be used to compare the firms of different sizes.
- Helps in ensuring good congruence between the different divisions and the firm
- Is widely accepted measure of performance because it relates net income to investments made in the division
- Motivate divisional managers to improve their performance by optimum utilisation of the capital invested in the divisions.

- **Limitations**

- Satisfactory definition of profit & investment on which ROI is based are difficult to find
- There are different methods of valuation of assets such as book value, original cost, current replacement cost etc which of these valuations is to be taken for calculating ROI remains a difficult question to answer
- There may be some practical difficulties in calculating the divisional profit which in turn will make calculations of ROI difficult.



#### 4. Residual Income

- Also known as Economic value added (EVA) method
- Was developed by consulting firm Stern Stewart & co.
- Residual income is excess income generated more than the minimum rate of return

Residual Income = Divisional Profit- Cost of capital

=Divisional Profit- (Divisional Investment\* rate of interest)

##### Advantages

- It leads to better decisions than ROI.
- It has the advantage of showing division's ability to earn more than the cost of capital.
- Divisional managers are made to realize that there is an opportunity cost of funds used by the divisions in the form of cost of capital.

##### Disadvantages

- Cannot be used to compare the performance of divisions of different size
- This method is difficult to understand and apply
- It may be difficult to determine the rate of calculating cost of capital.

### 13.5 Check your Progress

Fill in the blanks:

1. ....centre is accountable for sales revenue as well as costs.
2. .... is defined as the profit of a division less cost of capital charge on the investments used by the division.
3. .... refers to an accounting system that reports how well each manager has fulfilled the responsibility assigned to him.
4. .... motivate divisional managers to improve their performance by optimum utilization of the capital invested in the division.

### 13.6 Summary

Responsibility accounting is a concept of accounting performance measurement systems. The basic idea under responsibility accounting is that large diversified organizations are difficult, if not impossible



to manage as a single segment. Thus, they must be decentralized or separated into manageable parts. These parts or segments are referred to as responsibility centers that include: cost centers, profit centers and investment centers. This approach allows responsibility to be assigned to the segment managers that have the greatest amount of influence over the key elements to be managed. There are many advantages and disadvantages of responsibility accounting. The benefits exceed the limitations, thus rendering responsibility accounting a big space to settle in. Transfer prices are the amounts charged by one segment of an organization for a product or service that it supplies to another segment of the same organization.

### 13.7 Keywords

**Cost Center:** A cost center is part of an organization that does not produce direct profit and adds to the cost of running a company.

**Investment Center:** A unit within an organization whose manager not only has profit responsibility but also some influence on capital expenditures.

**Profit Center:** A segment of a business for which costs, revenues, and profits are separately calculated.

**Revenue Center:** Unit within an organization that is responsible for generating revenues.

**Transfer Prices:** Transfer prices are the amounts charged by one segment of an organization for a product or service that it supplies to another segment of the same organization.

### 13.8 Self-Assessment Test

1. Discuss Responsibility accounting in brief.
2. What is responsibility centre? Discuss briefly the nature and various types of responsibility centres.
3. Outline the basic principles of responsibility accounting.
4. Explain the following methods of measuring performance of responsibility centres and evaluate them:
  - i) Return in investment
  - ii) Residual income

### 13.9 Answers to check your progress

1. Profit Centre
2. Residual Income
3. Responsibility Accounting



4. Return on Investment

**13.10 References/Suggested Readings**

1. Lall Nigam B M and Jain I C, Cost Accounting Principles and Practice, Prentice Hall of India.
2. J Madegowda, Advanced Cost Accounting, Himalaya Publishing House, Mumbai.3
3. M N Arora, Management Accountingg, Himalaya Publishing House.



## NOTES

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