S219

DIRECTORATE OF DISTANCE EDUCATION

COMMERCE

M.COM., Second Year

PART II – Group A
ADVANCED COST ACCOUNTING
VOLUME - I

Madurai Kamaraj University
Madurai – 625 021

ADVANCED COST ACCOUNTING

SYLLABUS

Unit I

Cost Accounting - Meaning and Functions - Difference between Financial and Cost Accounting - Relationship with Management Accounting - Necessity and Importance of Cost Accounting - Place of Cost Accounting in the Organisation - Installation of Costing System - Requisites of Good Costing System - Cost Concept.

Unit II

Elements of Costing - Material - Material Planning - Purchasing System-Storing and Issuing Procedures - Organisation of Stores Material Record and Accounting - Methods of Pricing Material Issues - Inventory Valuation-Inventory Control.

Unit III

Labour Computation of Labour Cost - Direct and indirect Labour - Method of Wage Payments - Labour Cost Control - Treatment of idle Time - Overtime Wages Payroll Accounting - Principles - Methods of Remuneration - various incentive wages System.

Unit IV

Overhead - Nature of overhead Cost - Classification - Collections -allocation, apportionment and Absorption of overhead - Under and Over Absorption of Overheads.

UnitV

Methods of Costing - Job Costing - Nature and Purpose - Pre-requisites of Job

Costing - Process Costing - Treatment of Normal and Abnormal Losses -Equivalent Units -Inter Process Profits.

Unit VI

Output Costing - Preparation of Cost Sheets and Cost Statements Accounting for Joint Products and By-products-Operating Cost.

Unit VII

Cost Control Accounting - Integral and Non-integral Accounting - Reconciliation between Cost and Financial Accounts.

Unit VIII

Contract Costing - Profit Calculation of Incomplete Contracts.

Unit IX

Standard Costing - Meaning and Definition - Objectives - Types - Setting standards - Problems of setting Standard Costing - criticism of Standard Costing - Standard Costing Vs. Estimated Costing - Standard Costing Vs Budgetary Control-Variance Analysis - Material - Labour - Overhead variances -Sales Variance.

UnitX

Transfer Pricing - Necessity - Methods - Guiding Principles in Fixing Transfer Prices - Benefit of Transfer Pricing Policy - International Transfer Pricing.

Books Recommended

1. Cost Accounting-Charles T. Hongren
2. Lectures on Costing-L. Swaminathan

3. Advanced Costing -Nigam & Sharma

4. Cost Accounting-Wagne J.Marse

5. Principles and Practice of Cost Accounting - N.K.Prasad

6. Advanced Costing-S.P.Jain and K.L.Narang.

7. Cost Accounting-B.K.Bhar

8. Cost Accounting-Biggs

9. Wheldon's Cost Accounting and Costing Methods - L.W.J. Owler and J.L.Brown

10. Advanced Cost Accounting and Cost System - Ravi M.Kishore.

Note: Distribution of Marks between Theory and problem in the ratio of 40:60 respectively.

STUDY MATERIALS COMPILED BY:

STAFF

DEPARTMENT OF COMMERCE

DIRECTORATE OF DISTANCE EDUCATION,

MADURAI KAMARAJ UNIVERSITY.

ADVANCED COST ACCOUNTING
Scheme of Lesson

	Volume -1
1.	Cost Accounting - An Introduction
2.	Elements of costing
3.	Material management
4.	Store keeping
5.	Inventory control
6.	Material cost control
7.	Material pricing
8.	Inventory valuation and Accounting for Materials
9.	Labour- Nature, scope and control
10.	Methods of wage payment
11.	Idle time, Over time and Labour Turnover
12.	Accounts, Recards and Reports
13:	Overhead
	Volume- II
14.	Job costing
15.	Process costing
16.	Process costing (contd.)
17.	Output costing
18.	Joint - Products and By- Products
19.	Operating Costing
20.	Cost Ledger control Accounting - Non - Integral Accounting
21.	Integral Accounting
22.	Reconciliation of cost and Financial Accounts
23.	Contract costing
24.	Standard costing
25.	Transfer pricing

CONTENTS

Lesson - 1

NOTES

Cost Accounting - An Introduction

1.1 Introduction

Financial accounting is mainly concerned with the provision of information to the shareholders, creditors and Government. In short, financial accounting has "to account for" the money entrusted to the business. Profit and Loss Account and Balance Sheet serve that purpose. The financial statements enable the shareholders, creditors and others to know the financial position of the enterprise, overall progress, strengths and weaknesses of the enterprise. But the management requires far more information than what the financial statements can provide. The management tries to fill up the information gap by making use of cost accounts. Thus the deficiencies or limitations of financial accounting have led to the development of cost accounting. The needs of the management are fulfilled by cost accounting and hence it has been regarded as an ad joint to financial accounting.

Shareholders:

Someone who holds shares of stock in a corporation

Cost:

The total spent fo goods or service including money an time and labour

1.2 Meaning of Cost

Cost accounting deals with cost and therefore it is necessary to know what the term "cost" means. According to the I.C.M.A. terminology, in general, cost means "the amount of expenditure (actual or notional) incurred on, or attributable to a given thing". In the verbal sense, the term cost means "to ascertain the cost of a given thing". However, it is not easy to define cost because its interpretation depends on the nature of business and the context in which it is used.

Some business institutions may ignore the selling expenses if they are meager while calculating the cost of the product. On the other hand, if the selling expenses are heavy, it would be wrong to exclude them while calculating the cost under such circumstances. The meaning of cost differs from business to business.

Cost may be factory cost, office cost or simply an item of expense. The cost of material refers to the money spent on material. Similarly the cost of labour

NOTES

refers to the money spent on labour. Work in progress is valued at factory cost. Finished goods are valued at office cost. There are many other costs also. The sample use of the term cost may mean any of these costs. Consumers equate cost with the price paid for a product. Therefore the term "cost" should be used with qualification only to refer to the right cost. It is with reference to the context of usage that the meaning of cost depends upon.

Discretionary:

Having or using the ability to act or decide according to your own discretion or judgment.

It must also be noted that there is no exact cost or true cost because a cost figure is not true under all circumstances and for ail purposes. Some items of cost of production are treated in a discretionary manner by different business institutions and this may lead to different costs for the same product when all other conditions of production remain the same. For example, the amount of depreciation provided depends upon the method of depreciation adopted. However, attempt should be made to calculate as far as possible the accurate cost of product or service.

Cost is different from value. Cost is measured in terms of money. Value is measured in terms of usefulness or utility of a product.

1.3 Definitions

The Terminology of Cost Accountancy published by the Institute of Cost and Management Accountants (I.CM.A) gives the following definitions.

Cost Accountancy

"The application of costing and cost accounting principles, methods and techniques to the science, art and practice of cost control and the ascertainment of profitability. It includes the presentation of information for the purpose of managerial decision making". Thus, Cost Accountancy includes costing, cost accounting, cost control, budgetary control and cost audit.

Cost Accounting

As defined by I.C.W.A. London; "Cost Accounting is the application of

accounting and costing principle, methods and techniques in the ascertainment of costs and the analysis of saving and or excesses as compared with previous experience or with standards".

NOTES

As defined-by James M. Frengen, "Cost accounting is the process of recording, classifying, allocating and reporting the various costs incurred in the operation of an enterprise".

Costing

According to the I.C.W.A. terminology, the term costing means "the techniques and processes of ascertaining cost".

The term cost accounting, costing and cost accountancy should not be used interchangeably . It is absolutely essential to use the right term in the right place to convey the correct meaning.

The following limitations of financial accounting are responsible for the development of cost accounting:

Financial accounts are not classified so as to provide cost data for each product, process operation or department.

Financial accounts do not properly control materials and therefore material losses will be there.

As wages and labour are not recorded for each job or process, it is not easy to introduce an incentive payment system.

Incentive:

An additional payment (or other remuneration) to employees as a means of increasing output

There is no apportionment of expenses. The expenses are not classified in to direct and indirect expenses.

There is no standard costing which will help to determine the efficiency of the enterprise in the use of resources.

As financial accounting is historical in nature, it will not help to

NOTES

predetermine the cost.

The basic weakness of financial accounts is that they do not provide detailed cost information and therefore it is difficult to fix prices.

Financial accounts do not provide information for the purpose of interfirm or intrafirm comparisons.

1.4 Development of Cost Accounting

It is erroneously believed by some that cost accounting had developed from accounting during the last half a century. It is also wrong to think that cost accounts had originated with factory system due to the Industrial Revolution in England in 18th century. In fact, many cost accounting theories date back to the fourteenth century. The Scientific Management movement led to the use of standard costs in manufacturing operations and in the evaluation of efficiency. However, the major developments in the field of cost accounting occurred during 1920 - 45. Since 1945, Cost Accounting has been providing useful data to the management for planning future activities. Another major development in the field of cost accounting is the extension of cost audit and cost control under the Companies Act.

Objectives:

The goal ntended to be attained

1.5 Purposes or Objectives of Cost Accounts

1. Analysis and classification

The foremost objective of cost accounts is to analyse and classify with reference to the cost of products and operations the same expenditure which has been recorded in the financial accounts under the heading "Nominal Accounts"..

2. Cost of Production and cost Standards

Cost Accounts must help to arrive at the cost of production of every unit, operation or process. Cost standards also must be developed.

3. To Indicate inefficiencies

Cost accounts must indicate inefficiencies and wastes of all kinds relating to materials, time, money or the use of machinery, tools and equipments.

4. To provide data

Cost accounts must supply periodical data for the preparation of profit and loss Accounts and Balance sheet.

5. To point out sources of economics in production

Cost accounts must point out the sources of economics in production with reference to the methods, types of equipment output and layout. The information must be provided at frequent intervals in order to ensure prompt action.

6. Price fixation

Price Fixation:

(government) control (by agreement among producers or by government) of the price of a commodity in interstate commerce

Actual figures of cost must be provided for purposes of comparisons with estimates as well as for price fixation.

7. To facilitate comparison

Cost accounts must provide comparative cost data for different periods for purposes of comparison within the firm and also between similar firms.

8. To facilitate comparison with standard costs

If Standard costs are established, cost accounts must show what the cost of production is to be as well as the actual costs which may be compared.

9. To make or buy

Cost accounts must indicate whether it would be more economical to buy certain articles or components from outside sources if their cost of production within the factory is too much.

10. To reveal the sources of profit or toss

NOTES

Cost accounts must explain in full the sources of profit or loss for the purpose of better Control. The cause of a decrease or an increase in the profit of loss must be indicated. Profitable and unprofitable activities must be disclosed so that profitable activities can be reduced.

1.6 Installation of Costing System

While installing a costing system, the following conditions should be observed.

1. Design must be suitable to business

The costing system must be designed to suit the particular business. The system should be adapted to the organisation of the business. No attempt should be made to alter the plan of business in order to adopt a costing system because it may not produce satisfactory results.

2. Technical aspects

All the technical aspects of the business should be studied carefully. Attempts should be made to get the support and willing co-operation of the workers.

Determination:

The quality of being determined to do or achieve something; firmness of purpose

3. Determination of objectives

All the activities of a business are directed towards the achievement of objectives. The costing system also should be so adapted to help in the attainment of business objectives.

***4.* Co-ordination**

The assistance and participation of staff is absolutely essential to make any system successful. Costing system is not exception to this rule. Before introducing the costing system, the staff should be consulted and their objections should be overcome.

5. Records and Forms

Complete details relating to records to be maintained should be prepared. The forms to be used by workers must be standardized and they should be kept to the minimum. The forms must be so designed as to ensure the minimum of clerical work. Each original entry in the form must be supported by an examiner's signature to ensure reliability.

6. Supply of cost data

Arrangement should be made to provide promptly the required cost data to the different levels of management.

7. Examination of the accounting system

The cost system and financial accounts should be interlocked in one integral accounting system and there must be perfect co-ordination between them. The existing accounting system should be examined in all its dimensions especially with reference to the suitability of personnel and adequacy or records.

8. Timing and Supervision

The timing of installation counts much in deciding the success of the cost system. There must be effective supervision after the installation of the system to ensure its success.

1.7 Distinction between Financial Accounting and Cost Accounting

The main differences between financial accounting and cost accounting are given below.

1. Nature of information

Financial accounting provides general information regarding profit and loss to the owners and outsiders. Cost accounting provides information to the management for planning, control and decision making.

Decision making:

The quality of being determined to do or achieve something firmness of purpose

2. Account maintenance

Accounts are maintained in such a way as to fulfill the needs of Income Tax Act and Companies Act to keep cost records. Accounts are maintained to meet the needs of management. Now it is obligatory in some manufacturing industries

3. Manner of recording expenditure

Transactions are classified and recorded in a subjective manner i.e. according to the nature of expenses. In cost accounting expenditure is recorded in an objective manner. They are classified according to the purpose for which the costs are incurred.

4. Nature of emphasis

Emphasis:

Special importance or significance

The main emphasis is on recording and not on control. Cost accounting helps to exercise effective control..

5. Periodicity of information

It provides information regarding financial position generally at the end of the year. Cost provides information as and when required through cost reports.

6. Treatment of costs

In financial the costs are reported in aggregate basis. But in the Cost accounting the costs are broken down on a unit

7. Nature of transactions

Financial accounts are in respect of commercial transaction of the enterprise, Financial accounts deal with external transaction (i.e., with outsiders). The transactions from the basis of payment or receipt of cash. Cost accounts relate to transaction connected with manufacturing of goods and services. The cost accounts relate to internal transactions.

8. Disclosure of profit or loss

Financial accounts disclose the net profit or loss for the whole business. Cost accounts disclose profit or loss for each product, service or operation.

9. Treatment of expenses

All expenses (manufacturing, office, selling expenses) are included; In cost accounting those expenses which enter into production alone are included.

10. Information on relative efficiency

No information is provided regarding the relative efficiency of workers, plant and machinery. Valuable information is provided relating to the relative efficiency of plant and machinery.

Valuation:

An appraisal of the value of something

11. Valuation of Stock

Stock valuation is at cost or market price whichever is lower. In Costing stocks are valued at cost

12. Objectives

The main objective of financial accounting is to measure the economic activity of the enterprise as a whole. Three objectives of cost accounting are 1) Ascertainment of cost 2) Cost control 3) Cost analysis for decision making.

1.8 Distinction between Cost Accounting and Management Accounting

A comparison of cost accounting with management accounting is useful to understand the role of each in business enterprises.

Principle:

A basic generalization that is accepted as true and that can be used as a basis for reasoning or conduct

Cost Accounting	Management Accounting
1.Objectives 1) Cost ascertainment 2) Cost control 3) Cost analysis for decision making.	The objective of management accounting is to provide information to the management for decision making.
2. Governing Principle Cost accounts adhere to costing principles and concepts.	There are no restrictions; usefulness alone is the deciding factors.
3. Nature of dependence Cost accounting is a part of management accounting.	Management accounting is dependent on financial accounting and cost.
4. Frequency of reporting Costing information is to be provided weekly or fortnightly.	Reporting is to be done on a daily, regular basis.
5. Nature of analysis Each department, cost centre and process is analysed.	Various segments of the enterprise are analysed.
6. Nature of work Actual are compared with standards and performance is measured. Management is requested to rectify mistakes and improve efficiency. Cost accounting work out the year's operating statements.	In addition to comparing actual with standards and rectifying mistakes management concentrates on finance, profitability and productivity. Management accounting proceeds further to plan and workout future operating statements of the enterprise.

A Bird's Eye view on system, methods and Techniques of costing are given below: .

1.9 Systems of Costing

Cost is to be ascertained in a systematic and planned manner. Costs are accumulated and recorded in an orderly manner by setting up the cost accounting system. The frequently used cost accounting systems are.

1) Historical costing 2) Standard costing and 3) Uniform costing

1. Historical Costing

I.C.W.A. defines historical costing as "the ascertainment of costs after they have been incurred." Batty points out that the ascertainment and recording of actual costs represents the first stage in the work of cost accountant.

The historical cost system has some limitations.

i) Post - mortem examination

As stated in the definition, the costs are ascertained after they have been incurred. Such a cost analysis will not help to control purpose.

ii) Cost comparison - not possible

Actual costs differ from one period to another and as such cost comparisons cannot be made.

iii) Measurement of efficiency – not possible

Operating efficiency cannot be measured in the absence of standards of performance.

iv) Inaccuracy of costs

If guesswork is done to compute actual costs, costs cannot be accurate.

v) Difficulties in price fixation

Inaccuracy:

The quality of being inaccurate and having errors

When the costs are inaccurate. It is not possible to fix the price correctly.

vi) No proper interpretation of cost data

Interpretations based upon inaccurate data will lead to wrong conclusions. The every objective of cost accounting is thus defeated.

2. Standard Costing

Ascertainment:

Be careful or certain to do something; make certain of something

The limitation of historical costing has led to the development of standard costing. Standard costing is a technique of cost ascertainment as well as cost control.

- The emphasis in historical costing is on what a product or service has cost.
- The emphasis is also a cost ascertainment and not a cost control.
- The emphasis in standard costing is on what a product of service should cost. Its emphasis is also on cost control.

Standard costing lays down a standard against which the actual performance is measured and compared. Whenever there are deviations the management can correct the same.

3. Uniform Costing

Some writers do not consider uniform costing as a distinct method of costing. I.C.W.A. defines uniform costing as "the use by several undertakings of the same costing systems, i.e., the same basic costing methods and superimposed principles and techniques". Uniform costing enables inter firm comparisons. It enables a firm to compare its own efficiency in terms of the industry's standard. It helps to improve labour and machine performance and production methods.

1.10 Methods of Costing

The I.C.W.A., London has classified the costing methods into two categories—

1) Specific order costing 2) Operation costing

Some other cost accountants classify the methods into two other categories.

1) Job costing and 2) Process costing

Intact, there is no difference between specific order costing and job costing. Similarly, there is no difference between operation costing and process costing. But specific order costing and operation costing have wider meaning and scope than the other two. As pointed out by Batty "many costing systems do not fall neatly into the category of either job or process costing". That is why he uses the term "hybrid costing system" to accommodate those systems which combine in them the features of the basic costing methods. Different industries use different methods depending upon their needs, nature of product and operations. As observed by Wheldon "the general fundamental principles of cost ascertainment are the same in every system of cost accounting, but the methods of collating and presenting the costs vary with the type of production to be posted.

i) Specific Order Costing

I.C.W.A., Terminology defines specific order costing as follows. "The category of basic costing methods applicable where the work consists of separate contracts, job or batches, each of which is authorised by a special order or contract".

Specific order costing is suitable for calculating the cost of non standardized products and services. Under this method, each contract job or batch is treated as a cost limit and the cost is ascertained.

NOTES

Subdivisions of specific order costing

Job costing, batch costing, contract costing, multiple or composite costing and terminal costing are the subdivisions of specific order costing.

1. Job Costing

I.C.W.A. Terminology defines job costing as "that form of specific order costing which applies where work is undertaken to customer's special requirements. As distinct from contract costing, each job is of comparatively short duration. The work is usually carried out within a factory or Workshop where each job moves through the processes or operations as a continuously identifiable unit. Job costing is also referred to as "specific order", "production order" or "job lot cost system". Whenever the cost of a separate job is required, job costing method is tried. Among the industries which make use of job costing system are printing, engineering, furniture, made-to-order articles, machine tools etc.

atch Costing:

is applied where rders for identical roducts are produced convenient lots or atches.

2. Batch Costing

The I.C.W.A has defined batch costing as "that form or specific order costing which applies where similar articles are manufactured in batches either for sale or for use within the undertaking. In most cases the costing is simulating to job costing".

This method is also applied where work is undertaken to customer's special requirements. Under the job costing system, whenever a customer orders, the cost of each item is calculated. But under the batch costing system, whenever a customer orders a particular quantity of identical items, the items are put together to constitute a batch and the total cost of the batch is ascertained. The cost per unit is determined by spreading the cost of the batch to units in the batch. The industries which use batch costing include medicines, confectionery, readymade garments etc.

3. Contract Costing

The I.C.W.A. has defined contract costing 'as that form of specific order costing which applies where work is undertaken to customer's special requirements and each order is of long duration compared with those to which job costing applies. The work is usually of a constructional nature. In general, the method is similar to job costing, all though it has certain distinctive features".

Job costing is of short duration. But contract costing is of long duration. Contract costing is applicable to building contractors and civil engineering concerns which are engaged in construction of bridges, dams, buildings and roads.

4. Multiple or Composite Costing

This method is used when a variety of components are produced and assembled later. The cost of each component and assembly is separately calculated.

5. Terminal Costing

If it is possible to terminate the cost at some point and relate it to a particular job, it is referred to as terminal costing.

II. Operation Costing

I.C.W.A. has defined Operation Costing as "the category of basic costing methods applicable where standardized goods or services result from a sequence of repetitive and more or less continuous operation or processes to which costs are charged before being averaged over the units produced during the period".

Under this method, the cost unit is the operation. Operation costing is suitable under the following circumstances.

1) Mass Production 2) Repetitive processes and 3) Final products are not measurable in terms of single units.

Operation costing includes I) Output costing 2) Process costing and 3) Service costing.

1. Cutput costing

This method is used by those concerns, which produce a single article or a few articles, which are identical. Such concerns manufacture the product on a mass scale. The number of units produced in order to calculate the cost per unit divides the total cost during a given period.

2. Service costing or operating costing

According to the I.C.W.A. Terminology, service costing is that form of operation costing which applies where standardized services are provided either by an undertaking or by a service cost centre within an undertaking. The method may be used where the service is not completely standardized but where it is convenient to regard it as such, and to calculate average costs per period in relation to the standardised unit of measurement, e.g. ton-mile in the cases of goods transport or patient a day in the case of hospitals Service costing is used by public utility undertakings such as water work, transport, electricity, gas etc.

3. Process costing

Process Costing:

This method of cost ascertainment is used where the input is processed through several distinct processes to be converted into a finished product.

I.C.W.A. has defined process costing as "that form of operation costing which applies where standardised goods are produced". Process costing is used by industries where production is continuous (not intermittent) and production consists of a series of processes. Process costing is used to ascertain the cost of a product at each stage of process or operation.

1.11 Techniques of Costing

Techniques of costing are as under:

1. Absorption Costing

It is also called total cost approach. It is defined as "the practice of changing all costs, both fixed and variable, to operations, processes or products. It is useful in submitting tenders and preparing job estimates.

2. Marginal Costing

This technique bifurcates the total cost of product or operation into two classes namely, fixed costs and variable costs. Fixed costs which do not change but remain constant for any level of production and variable costs which vary proportionately to the change in the volume. This approach is useful in guiding the management in the task of decision making in cost volume profit analysis.

3. Budgetary Control

The system of estimated cost makes use of budgetary control. The budgets are predetermined plans relating to activities of a business expressed in physical units and monetary values. Budgets are prepared for a period with respect to sales, production, purchase etc. This techniques ensures the actual performance to be in line with the budgets

4. Standard Costing

Standard performance is set in terms of costs. The actual costs are compared with the standards. Any variation or deviation found between the two are recorded and causes thereof are analysed and necessary remedial steps are taken. It enables control of costs and measurement of efficiency of operation.

Standard Cost:

This cost is set i advance for differer elements of cost.

1.12 Cost Accounting Procedure

The major objective of cost accounting is cost ascertainment. Cost is ascertained for the purposes of income measurement and inventory valuation. Cost accounting which has to account for costs starts with the recording of income and expenditure. The cost accounting procedure involves the following steps.

1) Accumulation and classification of cost
2) Allocation of cost
3) Apportionment of cost

4) Assignment of costs to cost units or cost centre's.

Cost, data can be found in the very same documents out of which financial accounting is written up. However, the data are not in the form in which they are required for cost accounting purposes. Therefore, they are to be classified depending upon the purposes of cost accounting.

After the classification of data, the costs are to be assigned of cost units or cost centers'. If the cost are assigned wholly, it is called allocation. If the costs are distributed among the cost units and cost centers', it is called apportionment. The next step is to link the total cost of the centre to the output.

Cost Centre:

It is a term which includes various departments both production and service department in relation to which costs are ascertained or accumulated.

Cost Unit

Costing is defined as cost ascertainment. For ascertaining the cost, it is necessary to decide the unit in terms of which cost can be ascertained. A cost unit is the unit of quantity of a product, the product itself or the unit measurement. Cost unit simply means the unit in which products and services are expressed. Cost units are not uniform. For example, the cost unit for coal is one tone, for electricity it is kilowatt hours, for medicines one batch etc.

The cost unit must be neither too large nor too small. It is too large, cost trends may go unnoticed. If it is too small, it will involve a lot of clerical work.

Units or cost are of two types namely,

1. **Simple (Single) unit**

   Examples: tonne, kilogram, gallon, litre a piece.

2. **Composite (Compound) unit**

   It is a combination of two simple units.

   Examples: tonne-kilometre, passenger-kilometre, kilowatt hour.

The I.C.W.A. London defines cost unit as a quantitative unit of product

or service in relation to which costs are ascertained; In relation *to* job costing method, it consists of a group of similar articles' which maintain its identify throughout one or more stages of production: and in relation to contract costing method, it consists of a single contract".

Cost centre

The I.C.W.A. London has defined a cost centre as "A location, person, or item of equipment (or group of these) for which costs may be ascertained and used for the purposes of cost control". They are six types of cost centres:

1. Production cost centres

Cost centres are concerned with production are known as production cost centres, e.g., Machine shop, Welding shop and Assembling shop.

2. Service cost centres

Service cost centres are those which provide service to production cost centres, e.g., power house, store house, boiler house etc.

3. Personal cost centres

It consists of a person or a group of persons. The cost may be accumulated by individuals like fireman, store keeper, works manager, sales manager etc.

4. Impersonal cost centres

It consists of location of item of equipment, e.g., Machine or Store yard.

5. Operation cost centres

It consists of machines and / or persons carrying out similar operations, e.g., Machines and operatives engaged in welding, turning or machinery.

NOTES

Departmentation:

A specialized division of a large organization

6. Process cost centres

It consists of a specific process or a continuous sequence of operations. The costs are to be charged to cost units. For this purpose, the business enterprise

is divided into departments. This kind of departmentation is different from the departmentation resorted to for administrative purpose. For costing purposes, the departments are known as production and service departments. The costs accumulated are distributed among the cost units. In case, a department is too big, it may be further subdivided into smaller cost centres.

1.13 General Principles of Cost Accounting

1. Cost - Cause relationship

The cost must be-related to its causes for the purpose of recovering costs or to distribute the burden of costs on the units. For instance, a foreman supervises several units and therefore it is Wrong to treat his salary as the cost of a single unit.

2. Cost to be charged after it has been incurred

The cost of an individual unit should be ascertained by including only those costs which have been actually incurred. Costs which are yet to be incurred should not be included. For instance, selling cost should not be included when a product is still in the factory. But it can be included when the product is sold.

3. Too much importance to historical costing to be ignored

Accountants are conservative in nature and they attach to much importance to historical costing while calculating cost. This conventional approach must be ignored as otherwise the appraisal of profitability of a project may be affected. As observed by W.M. Harper "A cost statement should as far as possible, give the fact with no known bias. If a contingency needs to be taken in to consideration it should be shown distinctly and separately".

4. Abnormal cost to be excluded

The costs which are not related to normal operations of the enterprise are abnormal costs. For instance, any cost incurred as a result of negligence or accident is an abnormal cost. The inclusion of such cost will distort the cost figure and mislead the management regarding the operations of the enterprise under normal conditions: Therefore, abnormal costs must be excluded to get the correct picture.

5. Past costs not to be included in future period

Past costs which have not been charged should not be included in future period because future results will be distorted.

6. Double entry principles to be applied whenever necessary

Cost sheets and cost statements are greatly used for cost ascertainment and cost control. Double entry principles should be applied to cost ledger and cost control accounts

1.14 Limitations of Cost Accounting

Cost accounting is not an exact science. The limitations of cost accounting are:

1. Lack of Uniformity

Cost accounting does not conform to any uniform procedures. Historical cost accounting procedures have their own limitations. Even though uniform and detailed cost accounting, procedures have been prescribed, it is open, to doubt whether two equally competent cost accountants will be able to arrive at the same result from the same data.

Apportionment:

The act of distributing by allotting or apportioning; distribution according to a plan

D

A

d

o

2. Apportionment of joint costs

All costs are interrelated. Joint costs incurred at several points cannot be apportioned exactly because there is no clear formula. Joint costs are arbitrarily apportioned as per discretion.

3. Difficulties in division of overhead

If complete information, is not available, it is difficult to allocate direct labour and material costs. Costs are simply estimates and steps, must be taken to ensure that these estimates are as exact as possible. In spite of this limitation, cost accounting is an effective tool for solving many managerial problems.

Model Questions

1) "Cost is simply an instrument of management control"
"Costing is nothing but a detailed analysis of expenditure" Reconcile these statements quoting examples to explain the truth of each.

2) Define cost accounting and trace its development. State the objectives of cost accounts.

3) You have been appointed to instal a suitable system of cost accounting in a large private factory. State the main criteria which you would consider in this regard.

4) Distinguish cost accounting from financial accounting and management accounting.

5) Explain the systems of cost accounting.

6) Critically examine tile costing systems, methods, and techniques.

7) Explain the general principles and limitations of cost accounting.

8) How is a. cost centre different from a cost unit?

Lesson - 2

ELEMENTS OF COSTING

If Cost Accounting is to help management in exercising control on cost, it is necessary, to analyse and classify costs. Classification of costs is necessary for detailed recording and true cost ascertainment.

2.1 Cost Classification

Cost Classification:

Cost classification is the process of grouping costs according to this common characteristic.

Cost classification is the process of grouping costs according to this common characteristics. Since cost accounting is "the process of accounting for cost", the process should necessarily start with collecting figures from the basic documents which originate them. The figure thus collected should be collated and presented to the management which makes use of the same for various purposes as the 'objectives* of cost accounting. Accordingly, if cost information should be of any use to the management, the costs collected should be classified to suit a particular purpose, such as cost ascertainment, inventory valuation, cost control and decision-making. Thus, cost accounting involves both analysis and synthesis of costs. Cost is classified in terms of a managerial objective. Its presentation requires sub-classification and appropriate sub-classification depends on the uses to be made of the cost report.

Classification which is absolutely necessary to bring out the significance of cost information is "the identification of each item and the systematic placement of like items together according to their common features. Items grouped together under common heads are further defined according to their fundamental differences".

The Terminology of Cost Accountancy, The Institute of Cost and Works Accountants, London defines cost classification as

i) The process of grouping costs according to their common features.

ii) A series of specified groups according to which costs are

classified". Thus, classification involves breaking down the stream of costs into its elements and the grouping of these various elements into the combinations best suited to the purpose on hand.

For classification, it is necessary to follow certain accepted rules while classifying costs. These are:

1) Items should be classified by one characteristic at a time.

2) Overlapping classifications should be avoided, i.e., each item should fit into only one classification.

3) A place should be provided for every item in a group to be classified.

4) A miscellaneous classification may be used for a small number of items not important enough in the total to justify separate groups.

Overlapping:

Covering with a design in which one element covers a part of another

The cost accountant will need to use some kind of classification in order to distinguish costs which may be carried from one accounting period to another. Production cost primarily comes under the first category although there may be other costs which are treated as deferred revenue expenditure. Furthermore capital expenditure must be separated and apportioned to accounting periods on some agreed basis.

Lang, McFarland, Schiff and others describe the classification of costs thus: "In the process of cost accounting costs are arranged and rearranged in various, classifications, each of which helps to answer some of the questions frequently asked about costs. The same costs thus appear in several different classifications, depending on the purposes which the costs are to serve. For different purposes different kinds of information are required. Hence, costs must, be so arranged and classified that they can be combined in different ways to serve different purpose".

Cost can be classified according to:

I. Elements;

II. Functions;

III. Relationship to the object coated;

IV. Behaviour-wise classification;

V. Controllability;

VI. Time when computed;

VII. Normality; and

VIII. Decision-making costs.

1. Elements of Cost

The total cost of a product is composed of three main elements namely:

a) Materials cost i.e., the cost of commodities supplied to an undertaking.

b) Labour or wage cost i.e., the cost or remuneration, such as wages, salaries, commissions, bonuses, etc., of the employees of an undertaking; and

c) Expenses i.e., the cost of services provided to an undertaking and the normal cost of the use of owned assets, (e.g., depreciation on plant and machinery, land and building, etc.)

Two broad further such divisions of the elements of costs may be made as follows:

1. Direct Expenditure in

a) Materials

b) Labour and

c) Expenses

2. Indirect Expenditure in

a) Materials

Direct Expenses:

These are the expense which can be directl identified with a unit o output, job, process o operation.

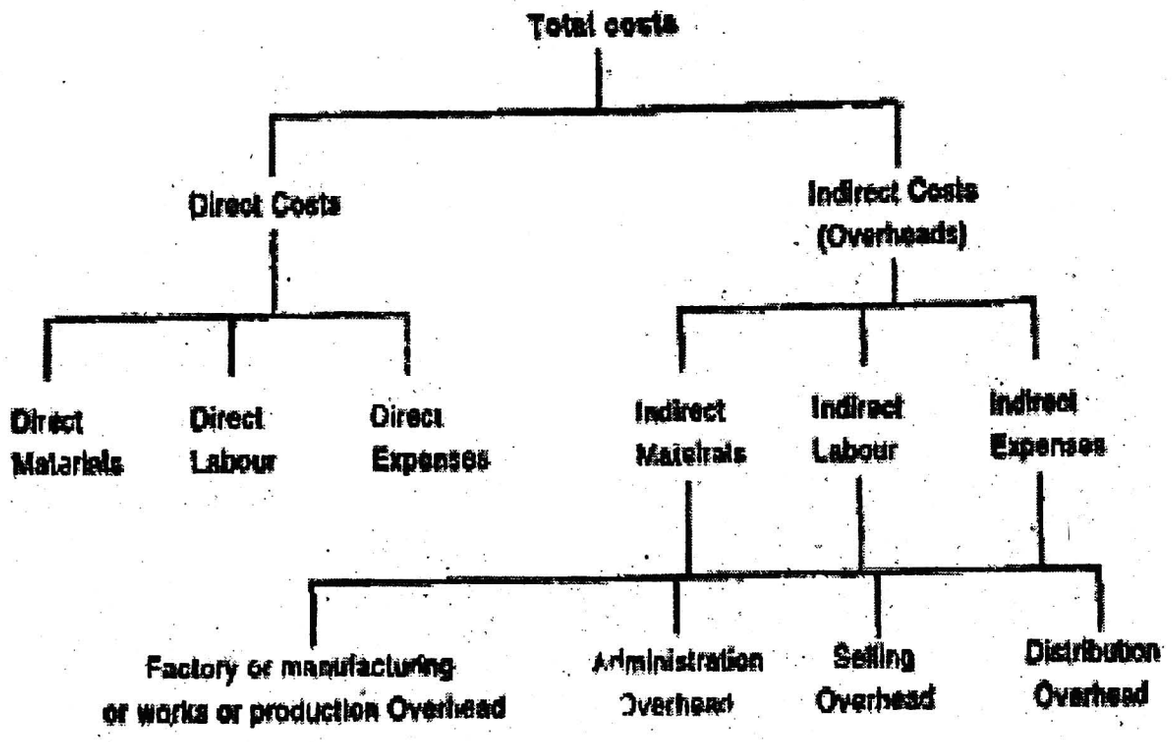
b) Labour and

c) Expenses

Each of these definitions being self-explanatory, we may now sub-divide these three elements and present them in the form of a chart.

Total Costs:

Total cost includes both direct cost and indirect cost.



'Direct' means that which can be identified with and allocated to cost centres or cost units. On the other hand, the term 'indirect' means that which cannot be allocated but which can be apportioned or absorbed by cost centres and cost units. Production is generally carried on in different cost centres departments or processes. Costs which can be directly identified with cost centres, processes or production units are regarded as direct costs. On the other hand, when costs cannot be identified with cost centres or cost units they are to be distributed on some equitable basis. These costs are indirect costs.

The general rule of identification of direct and indirect costs is not always strictly followed in determining which are direct and which indirect costs are. Sometimes the tracing of direct costs would not be justified due to time and trouble involved in its identification. The same analogy may be applied in case of

labour cost as well.

The sum of direct materials, direct wages and direct expenses is known as prime cost and all costs incurred over and above prime cost are known as over head'. 'Overhead' is, therefore, the aggregate of indirect materials cost, indirect labour and indirect expenses. These overheads may be divided on functional basis as Factory or Works overhead, Administration overhead, Selling overhead and Distribution overhead.

Direct Materials

Direct Material:

Materials which can be identified with units of output or service are known as direct material.

Direct materials are those materials which enter into and form part of the product., e.g., the wood in furniture, cloth in garments, leather in shoes. Direct materials are also called Process Materials and Prime cost Materials. Direct Materials include,

a) All materials specially purchased or requisitioned for a particular process, job or production order;
b) All components, either by purchase or by production similarly used;
c) All materials passing from one process or operation to the other;
d) All primary packing materials e.g., cardboard boxes, cartoons etc.

The cost of direct materials includes not only the invoice price but also the expenses directly incurred on acquiring them such as carriage inward, freight, duty and octroi, clearing charges etc. Where it is not convenient or practicable to charge these purchase, expenses to direct materials they may be included in factory or works overhead.

Indirect Materials

Indirect materials are those materials which cannot be traced as part of the product. Indirect materials are also known as "On cost" Materials or Expense Materials. Example are.

a) Fuel, lubricating oil, etc., required for operating and maintaining plant and machinery;

b) Small tools for general use;

c) Materials consumed for repair and maintenance work;

d) Sundry stores (of small value) used in the factory.

The grouping of materials into direct and indirect sometimes becomes a matter of convenience and materials of small value which should be termed as direct and indirect for the sake of simplicity. For example, in the manufacture of shirts, the thread used forms part of the finished shirts and hence should be classified as direct materials. But considering the time and expense involved in measuring the thread required for each shirt, it is desirable that the cost of thread be treated as indirect material cost.

Direct Labour:

This cost is the cost of labour directly engaged in production operation.

Direct Labour

It refers to the cost of wages paid to operatives who help in altering the construction, composition, conformation or condition of the product manufactured by a concern. When a concern does not manufacture but instead renders a service, the term direct wages refer to the cost of wages paid to those who directly carry out the service. For example, wages paid to driver, conductor of a bus in Transport Services. Direct wages are also called Direct Labour,. Productive Labour, Process Labour, Operating Labour and Prime Cost Labour. Under certain circumstances wages which are commonly treated as indirect may be treated as direct. Direct Labour, cost of which is insignificant, as that of trainees, may be considered as indirect labour.

Indirect Labour

Indirect labour represents the coat of labour employed in the works or factory which is ancillary to production. In short, wages which cannot be directly with a job, process or operation, are generally treated as indirect wages. For example, wages for maintenance workers such as workshop cleaners, mechanics, miscellaneous allowance to labour, wages payable to storekeeper, watch and ward. Indirect wages are to be apportioned on the basis of benefit received indirectly by cost centres.

Direct Expenses

Direct expenses are those which are neither direct materials cost nor direct wages but are directly identifiable with a job, process or operation. Direct expenses are also known as chargeable expenses, prime cost expenses, process expenses or productive expenses. One of the distinguishing features of direct expenses is that these expenses are not incurred while the job or contract is in the process of execution as direct materials or direct labour; but these are expenses leading to a job or contract. Again the utility of these expenses should exhaust with the completion of the job or contract. Examples: Cost of Special pattern, drawings or layout, maintenance costs of special tools, expenses leading to the receipt of a contract (gifts, presentations, and travelling expenses), excise duty, royalty, architect's fees etc. In short, items of direct expenses are very few and they usually form a small part of total cost.

Indirect Expenses

Expenses which cannot be charged to production directly and which are neither indirect materials cost not indirect Wages are regarded &s indirect expenses.

For example, Rent, rates of taxes, insurance, canteen expenses, depreciation, repairs, power, lighting, heating, advertising, show-room expenses research and development expenses, office expenses etc.

Wheldon defines Overhead as "The cost of indirect materials indirect labour, and such other expenses including services as cannot conveniently be charged direct to specific cost units."

The Terminology defines overhead as "The aggregate of indirect material cost, indirect wages (indirect labour cost) and indirect expenses". A distinction is drawn between indirect expenses and overhead. Indirect expenditure refers to expenses actually incurred, but the term 'overhead' refers to the estimated expenses. In other words, indirect expenses have I- he charged to or recovered from the range of products, since they cannot be identified with any specific job

or a products, and charged to the same.

II. Functional Classification of Costs

With the development of cost accounting, cost could be obtained by classifying costs according to business functions such as production, administration and sales and sometimes research and development costs.

The manufacturing or production overhead includes the indirect materials cost, the indirect labour cost, and the indirect factory expenses connected with the manufacture of an article from the stage of the receipt of the raw material enduring with the storage of the finished product. Examples are consumable stores, such as cotton waste, oil and grease, small tools and minor items.

The administration overhead includes, "all expenses incurred in the direction, control and administration (including secretarial, accounting and financial control) of an undertaking". In other words, expenses of the day-to-day administration are grouped under this head. Examples are rent, rates and taxes for the office building, furniture and equipment, staff salaries, legal expenses, printing and stationary, and such other charges incidental to the administration of the concern.

Selling Overheads:

This included indirect selling and distribution expenses.

The selling overhead comprises expenses incurred in connection with creating and stimulating demand, and of securing orders; Advertising, bad debts, sales office and show room expenses, market research expenses, etc., are the examples of selling overhead.

The distribution overhead comprises "all expenditures incurred from the time the product is completed in the works until it reaches its distinction". Examples are warehouse rent, warehouse staff salaries, packaging expenses, normal loss of finished goods, the cost of repairing and reconditioning, empties. etc.

III. Relationship to the Object Costed

Costs may also be classified on the basis of their relationship to the object costed. i.e., the cost unit or cost centre, or on the, basis of their identifiability with the cost unit. On this basis, costs are classified, as, direct and indirect. Direct costs are those that can be identified with and allocated to cost centres or cost units, while indirect costs are those that cannot be identified with and allocated, but which can be apportioned to, or absorbed by, cost centres or cost units.

IV. Behaviour-wise Classification

With the increase or decrease in production, some costs will increase or decrease directly. Some costs will remain unaffected while others will change but not in direct proportion to the change in volume. Thus, costs can be grouped according to their behaviour as:

a) Variable cost,
b) Fixed cost,
c) Semi-variable or Semi-fixed cost.

a) Variable cost

Variable Cost:

A cost which tends to vary directly with volume of output.

Cost which tends to vary directly with volume of output is known as variable cost. Variable costs are also known as direct costs. Examples are direct materials, direct labour, direct expenses, etc.,

b) Fixed Cost

Cost which tends to remain unaffected by variations in volume of output, within a given period of time. These costs are expected to remain fixed. That is why fixed costs are also known as period costs. Examples are Rent, rates of taxes,-insurance of factory building, administration expenses etc.

c) Semi - Variable Cost

Semi-variable Cost:

A cost which is partly variable.

These costs are partly fixed and partly variable. In other words, both fixed

and variable elements are present in these costs. Semi-variable costs are also known as semi-fixed, costs. Examples, are salary of supervisors, service department charges, telephone charges, maintenance expanses etc. The expenditure on maintenance is to a large extent fixed if the output does not change significantly. If production rises beyond a particular limit, further expenditure on maintenance will be necessary although the increase in the maintenance expenditure will not be in proportion to the rise in output.

V. Controllability

Since cost control is of primary importance, costs may be classified on the basis of the area of responsibility. According to the Terminology, "'a cost which can be influenced by the action of a specified member of an undertaking" is known as the controllable cost, while "a cost which cannot be influenced, by action of a specified member of an undertaking" is known as the uncontrollable cost. Direct Costs, for instance, become amenable to control at the shop level, but costs of a service department, although these can be controlled by the foreman of the department receiving the service. Again, items of cost which cannot be controlled in the short run can be controlled in the long run. Thus, controllability or otherwise depends upon the area of responsibility and the time involved.

VI. Time When Computed

On the basis of the time of computing costs, they are classified into historical costs and predetermined costs. Historical costs are those that are computed following the incurrence of costs, while pre-determined costs are those that are computed in advance of production on the basis of a specification of all the factors affecting the cost. A pre-determined cost may either be an estimated cost or a standard cost. Estimated costs which are less scientific than standard costs, are used to evaluate performance by a comparison with the actual.

Normality:

Being within certain limits that define the range of normal functioning

VII. Normality

Cost can be classified on the basis of normality as 'normal costs' and abnormal costs.

Normal costs are those which are incurred at a given level of output under normal conditions. It is a part of cost of production.

Abnormal costs are those which are incurred at a given level of output under abnormal conditions. They are incurred in exceptional circumstances and as such they are not charged to the cost of production but to costing profit and loss account. The idea is that abnormal costs are not allowed to affect the cost of production. However, in abnormal costs have been incurred for a job at the request of a customer, they may be directly charged to the job.

VIII. Decision making costs

For the purpose of managerial decision making, costs are classified as differential costs, sunk costs, opportunity costs, imputed costs, out of pocket cost etc.

Differential costs are costs resulting from a contemplated change in output or from a new project. They may be classified either incremental of decremental costs. **Incremental cost** refers to the added cost i.e., net increase in cost due to increase in output. In appraising profitability of a change in output, incremental costs must be compared incremental income i.e., additional revenue resulting from increased output. On the overhead, reduction in costs resulting from a change is known as **decremental costs.**

Sunk costs represents expenses incurred in the past and have no effect on future decision making. For example, when replacement of an asset is under consideration, the non depreciated value of existing asset is the sunk cost and so irrelevant for decision making.

Sunk Cost:

A cost which is incurred in the past and is not relevant to the decision making.

Opportunity cost is the cost of resulting an alternative which has been forsaken. It arises in case of facilities having alternative uses. For example, a building can be used for either business purpose or for letting on hire basis. If it is used to carry on a business the probable rent which could have been earned by letting it is an opportunity cost.

Imputed costs are imaginary costs which do not involve payment in cash. Examples; Interest on capital, Rent on own building and change in respect of fully depreciated asset.

Out of pocket costs are those that involve cash outlay as contrasted, with depreciation which is non-cash expenditure. Examples: Payment of salary and purchase of a machine for cash.

Non-cost Expenses

The following expenses are excluded from the computation of total cost.

a) Capital expenditure such as purchase of building, plant, equipment, etc.

b) Capital losses such as loss on sale of fixed assets, abnormal losses, goodwill, preliminary expenses written off, excessive depreciation, abnormal idle time, loss due to strikes and lockouts.

c) Expenses of raising finance.

Examples: Cost of issue of shares and debentures, brokerage and underwriting commission, discount on issues of shares and debentures.

d) Appropriation profits like reserves, dividends, income-tax, bonus to shareholders etc.

e) Matters of pure finance (income & expenses) cash discount, interest on debentures and bank loan, interest on investment, rent received, profit on sale of fixed assets etc.

f) Donations, charity, damages paid under court decree etc.

Prime Cost:

It is the aggregate of direct materials, direct labour and direct expenses, which are easily identifiable with the product.

Divisional Classification

The various elements of cost outlined are grouped under the following divisions.

Direct materials Direct labour Direct expenses	Prime cost (1)	
Indirect Materials Indirect Labour Indirect factory expenses	Works overhead (2) Or Production Overhead	(1) and (2) work Cost or production Cost or manufacturing cost
All items of office expenses	Office Overehead (3) or administration or establishment	(1) (2) and (3) cost of production
All items of selling and distribution expenses	Selling and (4) distribution overhead	(1) (2) (2) (3) and (4) cost of sales or total cost of selling cost

From the above divisions of cost we get the following cost formula:

Direct material cost + direct Labour cost + direct expenses = Prime cost
Prime cost + works overhead = work cost
Work cost + administrative overhead = cost of production
Cost of production + selling and distribution overhead = cost of sales or total cost

Prime Cost:

It is the aggregate of direct materials, direct labour and direct expenses, which are easily identifiable with the product.

Model Questions

1) Define and distinguish with examples:

   a) Direct material and indirect material

   b) Direct labour and indirect labour

   c) Direct expenses and indirect expenses

2) Explain with examples the functional classification of costs.

3) What items are not included in the cost accounts?

4) Explain the divisional classification of various elements of costs.

Lesson - 3

Material Management

Business deals with men, money, machines, market and materials. Every management is interested in optimizing the use of two important in/puts - men and materials. It has been estimated that on an average, materials constitute 60 percent of production cost in India, Japan and the U.S.A. Sometimes, materials management is considered as "the last gold mine" for business managers.

3.1 Definitions

As pointed out by Bethel, "materials management as concerned with planning, directing and controlling the kind amount, location movement and timing of the various flows of commodities used in and produced by a business enterprise".

In the words of L.Lee and D.W. Dobler, materials management can be defined "as a confederacy of traditional materials activities/bound by a common idea - the Idea of an integrated management approach to planning, acquisition, conversion, flow and distribution of production materials' from the raw material state to the finished product state."

As defined by A.K. Datta, "materials management is essentially an activity of an enterprise for the procurement and us" of materials distinctly separated from the process of procurement and use of human skills and labours for the ultimate deployment to attain some predetermined objectives. "Materials management may be said to be an activity integrated, co-ordinate and entwined with such widely dispersed functions of management as budgeting, purchasing, receiving, production-scheduling, manufacturing, maintenance, inventory and material quality control as also storage, warehousing, shipping, traffic and salvaging. Thus it begins working from the very inception stage of procurement of materials down to the final distribution."

NOTES

As pointed out by P.J.H. Baily "the term materials management is widely used in the U.S.A.. usually to denote the broad range of activities concerned with procuring, moving, storing and handling materials from the supplier to the end of production line, considered as a functional group to be managed integrally. It sounds a loose term and research shows that it is used loosely."

3.2 Need for Material Management

Material constitutes an important asset in any manufacturing business. Of the total cost of product, material cost accounts for a larger share. As the materials occupy such an important place. Materials management should be given sufficient importance. The success or failure of a business depends largely on fc efficient materials purchasing, storage, use, handling and accounting.

As the material cost is the single largest item of cost of a product, if the material cost could be reduced or kept to the minimum by efficient purchases, it would be possible to earn higher profits due to increased profit margin.

In the absence of effective materials management, there may be excess stock of some items. Capital is unnecessarily tied up in such excess stocks, Further there are also risks of loss due to obsolescence and deterioration.

Capital:

Assets available for use in the production of further assets

In the absence of effective materials, management, there may also be shortage of stock. Such shortage may result in production delays. Urgent and haphazard purchases to relieve such shortages may result in the acquisition of poor quality and costly materials.

An efficient material management will help to cut down losses, and wastage. An effective material control system will check the incoming material to ensure whether they correspond with the order.

An effective material control system will reduce and prevent theft, breakage and deterioration. The use of excessive floor space can be reduced. It is also possible to cut idle time in the factory.

When there is efficient materials management, correct records relating to

receipt and issue of materials will be available. The availability of correct records will help the cost accountant to prepare accurate cost statements.

3.3 Requirements of Material Management and Control

The major requirements of a system of materials management and control are as follows:

1) There should be perfect coordination between the department which are involved in material purchasing, receiving, inspection, storage and accounting.

2) Purchasing should be centralized under the direction and authority of a competent buyer.

3) Material requirements should be planned and programmed.

4) There should be material standardization and simplification.

5) Materials should be properly classified and if possible codified.

6) While placing orders, requisitions etc., written and signed instructions should be given in standard forms.

7) They should be an effective budgetary control system as regard materials and equipment purchases.

8) The operation of an effective internal check system will help to ensure that all transactions relating to materials are checked by independent and competent officials.

9) Materials should be properly stored in well planed and correctly designated stores with adequate safeguards and supervision

10) Stock control producers and stock maintenance records should be perfect.

Standardization:

The condition in which a standard has been successfully established

NOTES

11) The minimum quantity of each item of material should be prescribed so that it is possible to check that the inventory level does not drop from the minimum. The maximum quantity of each item of material should also be prescribed in order to ensure that the stock ts not carried beyond that level.

12) Regular reports should be submitted to management regarding materials purchased, issued, balances, returns to suppliers and also regarding spoiled, obsolete and waste materials.

3.4 Classes of Materials

The various types of materials in the materials flow system are raw materials, parts, in-process materials, supplies equipment items, and finished goods.

1) Raw Materials

Raw materials are generally available in an unprocessed condition. They are used in making the product, (e.g.) cotton, jute, iron steel, chemicals, leather, and hides.

2) Parts

Parts are items which are used in the assembly of the product, e.g., bolts, nuts, screws etc.

3) In-Process Materials

In-process materials are called Works-in-process inventories. They are. Semi-manufactured items.

4) Supplies

Supplies refer to goods which are consumed in the process of manufacturing, e.g., stationery, oil etc.

5) Equipment items

Equipment items refer to, the physical facilities, fixtures, fittings and other parts of machines.

6) Finished Goods

Finished goods' are fully manufactured goods which' are ready to be delivered to ultimate consumers. The static inventories (raw material, purchased parts, finished and supplies) are controlled; by the use of inventory management and control. Purchase management controls the flow of materials into the plant. Production planning and control controls the work in process. Quality control aims, at controlling the quality of materials.

3.5 Effective Management Control

The following activities make materials management effective

I. Decisions relating to make or buy
II. Determination of the sources of supply
III. Purchasing
IV Production planning and control
V Inventory management
VI. Quality control, Materials
VIII.Traffic
IX. Receiving and stores

Determination:

The quality of being determined to do or achieve something; firmness of purpose

These activities are described briefly in the following pages.

I. Decisions Relating to make or Buy

Many parts and components go to make up the final product. The business concern has to decide as to which of the parts and component it has to make and which parts and components it has to purchase. Deciding, whether a part is to be manufactured or purchased is called 'make or buy' decision.

Factors which favour making the part

1) Cost Considerations

If it is less costly to manufacture a part than purchases from external suppliers, a business concern will decide to manufacture the part provided the other conditions are fulfilled.

The cost of making should be computed and it should be compared with the cost of purchasing the parts. While computing the cost of making a part, the following costs should De included: delivered.raw material costs, direct labour costs, incremental factory overhead costs, incremental managerial costs, incremental purchasing, costs, incremental inventory carrying costs and incremental costs of capital. While calculating the cost of a part TO be purchased, it is necessary consider the purchase price of the part, transportation costs and receiving and inspection costs.

2) Control of Production

Those business concerns which want to exercise close control over Production operations decide to make the. Part themselves. Business concerns which want to maintain their time schedule and those which have tight time schedules decide to make the parts and components themselves:

Quality:

A degree or grade of excellence or worth

3) Control over Quality

If a part or component has to strictly conform or quality control requirements, that part may be decided to be made by the business concern .itself.

4) Design Secrecy

If it is essential to maintain secrecy of a part's design or manufacture, it may be decided to be manufactured.

5) Unreliable Suppliers

It would be better to make 'a part or component it the suppliers are highly

unreliable. Unreliable delivery or unpredictable service will greatly affect the continuity of production and therefore it would, better to make such parts. If a supplier is consistently unreliable, the business concern may shift to an another supplier. But frequent shifts may prove to be .harmful).

6) Need for Integration of Plant Operations

If the business concern desires to integrate plant operations is the best interests of prediction, a decision may be made to make the product.

7) Utilization of excess Plant Capacity

If there is any excess plant capacity which can be productively used to absorb fixed overhead, making the part *or* component would be advantageous.

Factors which favour buying the part

1) Less Costly to Purchase

If a part can be purchased at a cost which is lesser than the cost of making it internally a decision in favour of buying that part would be made.

2) Supplier's Specialised Knowledge

A part may be decided to be purchased in order to take advantage of the specialized knowledge and research efforts of the supplier.

3) Limited Facilities

A business concern having limited production facilities may decide to purchase certain parts external sources.

4) Small Requirements

If the required quantity of parts or components is very small and it their production is not economical then it may be better to purchase such items.

5) Work Force Stability

In the interests of maintaining work force stability, it may be decided to purchase parts, business concern whose production level is fluctuating has to expand or contract its work force depending upon production demands. There are difficulties in getting the right type of work force. Temporary workers may not be loyal. To avoid these problems, minimum work force may be maintained. Under such circumstances, whatever are not possible to be manufactured will be purchased from external sources.

6) Multiple Source Policy

Some business concerns may make as well as purchase certain parts. If at any time the internal supply is inadequate or production schedule is not maintained, external sources of supply may be tapped.

Consideration:

The process of giving careful thought to something

7) Indirect Managerial Control Consideration

Some concerns decide to make as well as purchase parts. They want to compare the cost and quality of purchased parts with their own parts. If there are major deviations, corrective action may be taken.

II. Determination of Sources of Supply

There are two primary sources of supply for a business firm-the firm itself and external suppliers. The selection of good suppliers is an important function of the purchasing manager. A good supplier alone will be able to deliver the best, quality goods promptly at competitive prices.

The following factors are considered in selecting the source of supply.

1. The source should assure continuity of supplies.

2. The size of the supplier is an important consideration. A small supplier

cannot fulfill a larger order economically. Similarly, a small order will be uneconomic from the view point of a large supplier.

3. The number of suppliers is to be decided carefully. By making all the purchases form a single source, a business firm will be able to reap the economies of large scale purchases. But there are risks in such concentration. Risks can be spread by placing orders with more than one source. But small orders with too many suppliers may not command quantity discounts and between services.

4. The next problem is whether manufacturer is to be selected or distributor is to be selected is to be selected. The nearness of a particular source is not the deciding criterion but it is the function of a sources.

5. It is to be seen whether the management orientation of the supplier fits in with the requirements of the business firm

6. The section of a source should be from unethical influences. For instance, the purchase manager should not select as a particular supplier simply because the supplier had offered him some gift. No kind of commercial bribery should allow.

7. Care should be taken not to select dishonest suppliers. It is necessary to investigate a source of supply fully before entering into a contract.

8. Sometimes, the need for maintaining better trade relations and reciprocity also influence the selection of sources. Reciprocity refers to the policy of "I will buy from you, if you buy from me".

III. Purchasing

An effective control over materials, is essential in order to i) produce goods at maximum level of efficiency; ii) keep the investment in. inventories at reasonable level; and iii) to render the best type of service to the customers. Thus, the main objectives of material control may be listed out as follows:

NOTES

1. To ensure a regular supply of materials so that. the production process is left uninterrupted;

2, To ensure the right quality of materials.

3. To provide adequate and proper storage of. materials;

4. To ensure effective utilization of materials.

5. To prevent abnormal loss or wastage or materials.

6. To avoid over - stocking and the consequent locking- up working capital by way of proper planning and management of the levels of inventory.

7. To procure the required materials on most favorable terms so that maximum economy is affected, in the cost of buying.

In a nutshell-materials control primarily aims "at provision of materials of right quality, at right quality, at right time and at right cost for effective utilization. Since inventories usually account for a large proportion of the working capital, the operational success of any enterprise .largely depends .on an effective management of materials and stores.

Control:

Exercise authoritative control or power over

Materials control can be effected; through Purchase Control, Issue. Control and stores Control.

Purchase Manager

Purchase control is the first phase in the material control ,process. Procurement of materials is known as the purchasing function and the functional responsibility for the procurement of materials lies with the purchase manger. Though purchasing-is. a managerial function, he cost accountant *AS* concerned with the. Cost implications, of the procurement function and' as such he is interested in drawing he attention of the management to the cost control aspects in this area-As it is the purchase manager who buys materials in large quantities, he has the power *to* commit the organization, for large sums of money: Consequently the efficiency or inefficiency of this purchase manager shall have far – reaching

effects on the content the responsibilities and qualifications of the purchase manager shall have to be "well defined.

The functional responsibilities of purchase manager are;

- To prepare a purchase budget for the organization as a whole;
- To receive purchase requisition and estimate the total material requirements;
- To identify the source of supply;
- To invite tenders from the approved suppliers-;
- To select the goods to be supplied;
- To receive and inspect the goods supplied.
- To verify the invoice, make adjustment for any discrepancies arid arrange for payments;
- To organise a" research cell to make available improved and cheaper materials as substitutes and.
- To help the engineering department in developing standard specifications of materials and coding system for easy identification of materials.

purchase manager should possess the following qualifications;

- Knowledge of the industry and organisation;
- Knowledge of technicalities of the production process;
- Knowledge of the various aspects of the materials, spares and other stores which he buys for the organisation.
- Knowledge of the sources of supply and market conditions,
- Knowledge of the policies of the organization and of the government to his field of the specification. .
- Efficiency to organise the Purchase function and manage staff, and departmental affairs.

Knowledge:

Everything that is known

Organisation for Material Purchase Control

The structure and sophistication of organisation of the purchase department depend upon the scale of operation and managerial policies of the enterprise. A large scale enterprise usually has a separate purchase Manager is a functional specialist assisted by his staff in the. department. The important issue that decides the nature of this organizational set - up is whether the purchasing of materials is to be centralized or decentralized. Both the systems have advantages as well as disadvantages. These are explained below.

Centralization of Purchase

When all materials are purchased by one specialised department, centralization takes place. The purchase manager, heading the purchasing department, takes up the ultimate responsibility for buying all types of materials required by the various departments but the actual purchases are made by single department (purchase department) on behalf of the entire organisation. It distributes the materials among the needy departments:

Advantages of Centralization

1. Economies of bulk buying

Under the system of centralized buying materials are purchased in bulk for the organisation as a whole This result in quantity discount, trade discount and similar favours Consequently, materials are purchased at a rate cheaper than what it would be when be when purchases are decentralized.

Saving:

An act of economizing; reduction in cost

2. Savings In transport cost

As a result of bulk buying, materials are transported from the source place to the factory at concessional rates. This savings in the carriage inwards cost further reduces the cost of purchases.

3. Quality of materials

Since the purchase manager and his staff are experts in the field, they can use their skills and knowledge in procuring quality materials. This leads to

minimization of waste, breakage, spoilage etc. The cost of production is kept under control by means of savings in usage (consumption) of materials.

4. Consistency In policies & Procedures

Since a single department is entrusted with the powers to make purchases, it specialises in the job and consequently standardises the procedures, norms and terms. Purchase policies shall be defined and consistently followed. This prevents haphazard planning and the resultant confusion and losses.

Limitations of centralised purchasing

1. High administrative cost

Since a separate department is to function for making centralized purchase, additional costs are to be incurred in administering the department. This cost of maintaining a separate baying This may defeat the savings generated by centralized buying. This may defeat the very purpose of centralization of buying.

2. Procedural delays

Centralization involves many procedures and formalities. Sometimes it leads to unnecessary hindrance to the smooth functioning of a factory. Bulk buying may cause a department wait till purchases are made by the buying department. Such delays arise when the requirements of a "particular department are not available immediately in the buying departments stock. If the individual ' departments are allowed to make their respective purchases, the flow of materials shall be uninterrupted and the production cycle is unaffected.

Decentralization of Purchases

Decentralization refers to the system of making purchase by individual departments according to their requirements. The authority to buy materials lies with the head of the respective departments.

As such each departmental manager acts as a purchase manager as and

when he makes purchases for his deportment. The purchase function is, thus, decentralised to the departmental levels. Obviously the benefits available with the centralized system are derived by the organization which follows the decentralization of purchasing.

Of these two systems, merits weigh more in favour of the centralization than the other. So, centralization may be adopted with a vantages but, at, the same time, some individual departments should be permitted to make their own purchase; of small values in order to ensure smooth working of the department. Such an integrated purchase policy may be adopted as a compromise between the two systems of centralisation and decentralisation. This is because neither of the two systems is considered wholly satisfactory for all types of enterprise. For instance, centralised system is best suited to a large enterprise operating only one plant with centralised manufacturing or with two or more plants located very close to each other. On the other hand, if the plants are dispersed in distant places and/or producing different products requiring different raw-materials the most suitable system is the decentralisation.

Steps in Purchase Procedure

As mentioned earlier, the basic objective of *the* purchasing department is to ensure continuity of raw- materials and stores on most economical terms. This, involves making decision with regard to:.

a). What to buy?

b) When to buy?

c) Where to buy from?

d) How much to buy?

e) What prices to be paid for?

Before taking decisions on such crucial matters, the management has to decide on a scientific purchase procedure which shall facilitate *an.* effective purchase control. The following steps are involved in the purchasing process.

1) Ascertaining the material requirements of the various departments and summarising the requirement of the entire organization.

2) Selecting specific source or sources of supply.
3) Inviting tenders and quotations.

4) Preparing a comparative statement on quotations tenders and prices.

5) Selecting a supplier or a panel of suppliers.

6) Placing purchase orders.
7) Following-up the purchase order, to ensure delivery in time..
8) Receiving and inspecting the. materials
9) Making payments for the purchases.

Tender:

The price at which the items of output are offered for sale is known as tender.

The functions and responsibilities of the purchase manager in respect of some of the major steps .in purchase procedure are explained in the ensuring paragraphs.

1. Ascertainment of material requirements

The various departments in the organisation requiring materials prepare their 'Purchase requisitions' or 'Indent' at the beginning of the year itself. After receiving requisitions form at departments, the purchasing department prepares a consolidated statement on the purchases to be made. The procedure involved in requisitioning, must be unambiguous and well defined. The purchase requisition should specify

a) the number and date
b) the description of materials requisitioned

c) the place where to be delivered

d) the purpose for which they are to be used

e) The past purchase and.

f) The stock on hand . The requisition is to be signed by the person who is authorised to send requisitions.

(Specimen Requisition)

ABC Co. Ltd., Madurai.

Purchase Requisition			No Date		
Item	Particulars	Materials Code No	Qty-Required	Qty. of Stock	Remarks
1) 2) 3) 4)					

(Sd.) Plant Engineer/Store-Keeper/Department head.

For use in Purchase Dept.

Purpose ..... Delivery required on..... at.....

Quotation Invited		Purchase Order			
Date	From Whom	Date	No.	Supplier's address	Date of Delivery

(Sd.) Chief Engineer.

2. Placing the order for purchase

The next step in the purchase process after receiving the requisitions is to place the order for purchases. This has four phases

a) finding out suitable sources of supply
b) inviting quotations
c) sheeting the most appropriate suppliers and
d) Issuing the purchase order.

The purchase departments will usually maintain list of all suppliers and is in constant touch with the various sources of supply. New sources shall also be identified and approached:

Quotations and tenders shall be invited from all these sources. All particulars in respect of price, time and mode of delivery mode of payments, credit period allowed and similar terms and conditions shall be solicited finally, a consolidated statement on those suppliers and their terms shall be prepared. This facilitates the selection of the source of supply.

While selecting the supplier, the purchase manager usually chooses the supplier who has given the lowest quotation without compromising on the quality of materials. He has to take judicious decisions considering the various factors such as price, quality, time of delivery, discounts, and credit period.

Having selected the supplier, the purchase manager has to prepare and issue purchase order. The purchase order is prepared in four copies. The original is sent to the supplier, one copy is sent to the receiving department, one to the store-keeper to make necessary arrangement for storing materials properly, another copy to the accounts department to arrange funds for the payments and the last copy is retained by the purchasing department itself for future reference. The purchase order should contain all necessary particulars. A specimen of purchase order is presented below: „

NOTES

XYZ Company Ltd.,
Madurai Purchase Order

To..... Date .....

..... Requisition No.....

(Supplier's Name & address)

Please Supply, in accordance with the instruction given and attached conditions of purchase, the following items'

No.'	Particulars	Qty.	Code No.	Price		Date of Delivery
				Per Unit	Total	

Remarks Packing & Despatching instructions.....

Discount allowed .....

Terms of payment .....

Condition regarding empties .....

Excise duty & Sales Tax .....

(Sd:) Chief Purchasing Officer

3. Receiving and Inspection

When goods a. eceived, they are to be inspected and verified, with actual

"quantities and compared with purchase order. A report on shortages, damages in transit, returns to suppliers etc., should be prepared. A receiving report is prepared for distribution of materials among various departments, and finally, goods are delivered to the stores. All these vital functions are carried out by a receiving and inspection department, purchasing department and the costing department or necessary action to be taken. Specimens of the receiving report and the inspection report are given below.

XYZ Company Ltd., Madura).

Goods Received Note

From

Date.

_____

Purchase Order No.

(Suppliers Address)

Advice Note No.

Item No.	Particulars	Code No.	Qty		No. of Packages	Weight	Amount to be filled (Costing Dept.)		Remarks
			Ordered	Received			Rate	Total	
1	2	3	4	5	6	7	8	9	10

XYZ Company Ltd,, Madurai

Inspection Report

Quantity accepted	Quantity rejected	Reasons	Received by ..... Requisitioned by....

Date of Inspection.....

Inspected by.....

Payment for goods purchased

The suppliers send the invoice of the goods supplied after dispatching the goods to the buyer. On receipt of the invoice, the purchase manager compares it with the purchase order to verify whether the invoice is related to the goods which were actually ordered for. Further, it must be verified before payment is arranged whether goods have been actually received and inspected. The goods received

note is compared for this purpose. If any discrepancies are reported in the Goods received note and inspection note as to excess, shortage, damages, substandard quality etc., appropriate adjustments are to be effected for such discrepancies. When the invoice is found correct or necessary adjustments made, an endorsement is made thereon and it is sent to the accounts department for payment.

IV. Production Planning and Control

NOTES

Production control and materials control are very much interrelated. Production Planning and Control, controls the work in - process;-It is broader in scope than inventory control. In addition to controlling the flow of materials in the plant, production control aims at making the optimum utilisation of men and machines.

Production planning and control involve five activities; planning, routing, scheduling, despatching, and expediting.

Planning involves the determination of what, where, when, how and who is to produce,

Routing specifies where each work is to be done. In short, it prescribes the manufacturing path. It describes the movement of the materials through the various stages, the operations to he performed on them and the machines to be used in the process.

Scheduling establishes the time sequence. It lays down when an operation is to be performed and when it is to be completed.

Dispatching:

Send away towards a designated goal.

Despatching is concerned with the issue of orders and the assignment of work to the workers.

Expediting or follow up is concerned with whether the work is progressing in accordance with the plan Expediting expedites and ensures the smooth flow of work.

V. Inventory Management

Inventory control is an important function of materials management. Studies reveal that inventory constitutes 15 to 25 per cent of invested capital of a concern while carrying costs of inventories account for 7 to 24 per cent of average inventory value.

NOTES

Inventories may be raw materials, spare parts, equipments, in-process materials and finished goods. Inventory management starts with the preparation of a complete inventory catalogue followed by ABC analysis.

After classification and identification of the inventory materials an inventory catalogue is prepared. An inventory catalogue serves two purposes. Firstly, it serves as a medium of communication; secondly, it facilitates inventory control operation.

ABC Analysis:

Always, Better, Control technique of inventory control.

ABC analysis is called so because it analyses the range of stock items into three classifications known as A. B, and C on the basis of usage value. All inventory items are listed. The Quantity of each item used in a year is multiplied by unit cost to arrive at the annual usage value. Then inventories are sorted by value and arranged in the order of usage value. For example 70 per cent of the cost of materials may be accounted for by 10 per cent of the items stocked under class A Twenty per cent of items stocked under class B may account for 20 per cent of usage value. Class C item may account for 70 per cent of the stock range but they may account for just 10 per cent of usage value. ABC analysis helps the management to make a sound allocation of funds among the various items stock.

Inventory Control Systems

There are three basic inventory control systems: 1. Cyclical ordering system 2. Fixed order quantity system, and 3. Material requirements planning system.

The cyclical ordering system is time based system involving scheduled periodic review of the stock level of each item. If an item is found to be insufficient to sustain production, an order will be placed to replenish jt.

The fixed order quantity system is based on the order quantity rather than on the time factor. This system duly recognizes the fact that there is an optimum order quantity for each item. -

The materials requirements planning (MRP) system differs from the

traditional" approaches. It is highly suitable in intermittent ' manufacturing operations. Under the MRP system production material requiren.' .is' are calculated several weeks in advance of the actual need on the basis of production schedules which are updated weekly. Thus if helps to acquire each item of material several days prior to the starting of manufacturing activities.

NOTES

Determination of order quantity

It the cyclical ordering system is followed, the quantity of material to be ordered will be determined taking into consideration three factors: the duration between inventory reviews, the expected daily usage during the cycle period and the quantity of stock on hand at the time of review. The quantity ordered will cover the ensuring period. If the fixed order system is followed, order can be placed for any quantity, depending upon the stock level. Thus the unlimited flexibility in the fixed order system does not help to determine the most advantageous order quantity for each item. The economic order quantity (EOQ) concept helps to determine the most advantageous order quantity. As observed by P.H.A. Baily, "the aim of EOQ theory is that for each item, we choose the order quantity which gives the lowest total variable cost including both the stock - holding costs which increase^ when we take the order bigger because-this makes average stocks bigger, arid ordering costs which decrease when we make the order bigger because this means fewer orders.

VI. Quality Control

Quality:

A degree or grade of excellence or worthy

Quality control, controls the quality of goods during the manufacturing process Bethel, Atwater and Stackman have defined quality control as follows : "Quality Control is the. systematic control of those variables which affect the excellence of the end product. These variables result from the application of materials, man, machines and manufacturing conditions. The production system processes these input to produce desirable outputs. Only when the variables in "the inputs are regulated to the extent that they do not deviate.

Quality control aims at preventing defects in manufacturing First measurable standards, norms or specifications re lid down in order to facilitate the

NOTES

measurement and valuation-of the final product. Raw materials are inspected to ensure whether they conform to the quality standards. Statistical techniques may also be used to ascertain whether the quality is under control. To make objective evaluation, measuring instruments or devices may be used. Production operations are checked often. The quality of the equipments and other devices is also tested. Materials are inspected at various points.

VII. Materials Handling

Materials handing includes all movements and packaging of materials. It also includes transportation of materials between plants. The handling of materials within work stations and the transfer of materials between station are also included under materials handling. As pointed out by J.L. Lundy, the major objective of materials handing is "the reduction of overall production and distribution costs for specific volume and range of output".

Guiding principles on materials handling

1) It is necessary to eliminate as much handing as possible.

2) Skilled labourers should be relieved from material handling so that they can pay their full attention to their tasks.

3) It is uneconomical to use bigger handling equipments for small handling works. In other words, the right type of handling equipment should be used for each handling work.

4) Small items should be moved and stored in groups and not individually.

5) A higher volume of goods can be moved by moving materials at higher speed and in larger groups.

6) If Materials move at constant rates of speed, over loading as well as idle periods can be avoided.

7) The space above the operating machines can effectively be used for storage or movement of materials provided safety regulations and convenience requirements permit the same.

8) The equipments should be so arranged as to save transport distances.

9) By having a straight-line layout, a smooth flow of materials can be ensured and back tracking can be avoided.

10) As far possible, rehandling of goods should be avoided.

11) Operations should not be allowed to get congested.

12) The most flexible equipment should be selected.

13) All equipments used in the plant should be standardised.

14) Mechanical handing devices should be used to eliminate or facilitate manual operations.

15) If possible, the movement and storage of items should be combined.

16) Material handing equipments should be, made available at the right time and right place.

17) Operators should be completely trained in handling techniques.

18) The passages should be sufficiently lighted.

1.9). Demurrage charges and transportation costs should not be under estimated;

Materials should not be allowed to get mixed.

20) Parts, containers etc. should be labeled to avoid misdeliveries.

21) Equal importance should be given in handling scrap materials.

22) There should be an effective preventive maintenance programme for the handling, equipment.

NOTES

Traffic:

The amount of activity over a communication system during a given period of time

VIII. Traffic

Traffic function is part of materials management. As pointed but by L. Lee and D.W. Dobler, "its importance is magnified by the fact that transportation cost and service factors significantly affect a firm's total cost of materials, the efficiency of its production operation and ultimately its" ability to compete in the market place". The traffic function is concerned with the following four major areas:

Selection of the right mode of transport (parcel post, bus service, air cargo, rail freight, motor freight, freight forwarded, inland water freight etc.)

1. Arrangements for transportation of incoming materials
2. Arrangements for transportation of outgoing materials
3. Arrangements for transportation of materials inside the firm.

In most firms, the purchasing department and the traffic department work jointly in establishing the firm's policy relating to traffic.

IX. Receiving and Stores

Receiving and stores operations for the last link in the material management chain.

Receiving and stores operations facilitate production operation by ensuring the smooth physical flow of materials into production. Stores orgnisation is responsible for safeguarding and controlling^ lot of the current assets. Quantity buying and the advantages arising due to it are made possible due to the operation of stores.

It is the responsibility of the. receiving department to ensure expeditious receipt, identification and general inspection of all incoming materials. Another responsibility is that informing all interested parties regarding the receipt of materials and the condition of the materials.

Any error or problem in a purchase will come to light during the receiving

operation. At this stages, it is possible to detect shortage in quantity, damaged materials, wrong items, excessive supplies etc.

Receiving stage is an important control point. The receiving clerk can ascertain as to how many of. the suppliers come up to the expected standard of quality and service, how many remaking late deliveries, whose supplies have the maximum rejects and who are making too many split deliveries.

There are four steps in typical receiving procedure.

1) Unloading and Checking the Shipment

To ascertain whether full consignment has been delivered, it is necessary to check the number of unloaded containers with the freight bill. External damages should also be checked.

Inspecting:

Look over carefully

2) Unpacking and Inspecting the Materials

Soon after unpacking the material the receiving clerk should verify whether the materials received correspond with the orders, whether the quantity and quality of goods are the same as-ordered, whether the materials are in good condition.

3) Completion of the Receiving Report

After inspecting the materials, the receiving clerk should prepare and complete the receiving report. Regarding the receipt of materials he has to notify the requisitioned, purchasing department, counting department and the inspection department.

4) Delivery of the Material

In the case of non-stock items, the receiving department has to deliver them to the requisitioned or to the internal delivery systems. As far as inventory materials are conceived, the practice varies from firm to firm.

NOTES

Generally, substantial amount of company's working capital is invested in stores. Hence the problem of storage is of great interest to a company. So due attention should be given to stores routine. There should be a system of proper accounting of materials and supplies. Moreover, materials and supplies from important part of cost of manufacturing. The error it is essential that they should be safeguarded and accounted for properly. Stores department renders very, important functions for the organization.

Need For Materials Control

Materials constitute a major portion of cost of production and therefore there arises the need for materials control. The objectives of materials control are:

1. Availability of material

All types of materials should be continuously available to ensure uninterrupted production. If production is help up for want of materials it is bad reflection on materials management. Minimum quantity of material is determined to keep up the production schedule.

2. To avoid excessive investment

Investment:

The act of investing; laying out money or capital in an enterprise with the expectation of profit

Too much of funds should not be locked up by way of investment in materials. This is a bad investment policy. Overstocking is itself bad mainly for two reasons. Firstly, scarce finds are tied up, Secondly; if. the market prices of materials decline, the concern will be loser. In order to avoid excessive investment in materials, maximum quantity is prescribed on the basis of past experience, requirements and. the experience of similar concerns.,

3. Reasonable price

No doubt, materials should be purchased at a reasonably low price. This does not mean that quality must be sacrificed for the sake of. low price. Materials of the required quality alone: must be-purchased.

4. Minimum Wastage

In any production process, wastage is unavoidable; But steps must be taken to ensure that there is minimum wastage. Wastage up to the normal level should be allowed. Leakage or theft of materials must be avoided. Wastages due to dust, dirt or rust must also be avoided by keeping the stores nearly. A scientific procedure must be prescribed for handling materials.

5. To overcome spoilage and obsolescence

Maximum quantity of each material is prescribed to overcome the risks of spoilage and obsolescence. The issue of materials also must be properly regulated. Materials received earlier must be issued in the first instance.

6. To record regarding availability of materials

As the store keeper maintains an up to date record of stocks it is his duty to inform the management regularly regarding the availability of materials so that production planning is possible.

Materials control involves the performance of the following operations.

I. Purchase of materials

II. Receipt of materials

III. Inspection of materials
IV. Storage of materials
V. Issue of materials
VI. Maintenance of inventory records

VII. Stock audit.

These operations are briefly described below.

1. Purchase of Materials

There must be a separate purchase department headed by a purchased manager for purchasing materials. The following points must be borne in mind if

Audit:

An inspection the accounti procedures a records by a train accountant or CP

the right quantity of materials is to be purchased at right price.

1) All purchases (except small purchases) must be centralised to reap the economies of bulk purchase.

2) There must be the fullest possible co-operation between purchase department and other departments.

3) There must be close coordination between purchase department and the finance department as every purchase results in financial liability.

4) Excessive purchases must be avoided.

5) The purchase manager must have enormous technical knowledge and administrative ability.

6) A scientific purchasing procedure must be established as indicated below.

A) Purchase Requisition

The purchase function is said to commence as soon as the purchase requisitions are received by the purchasing department. It is the store keeper who has to prepare the purchase requisitions for all regular stock items, For special items, the concerned department a had has to prepare the purchase requisitions. These requisitions are prepared in triplicate (the original is sent to the purchase department, the second copy is retained by the one who prepares it and the third copy is sent to the costing department.)

)uotation:

statement of the urrent market rice of a security r commodity

B) Calling for Quotations

The purchase department will call for quotations for the supply of materials. A schedule of quotations will be prepared.

C) Purchase Committee

The schedule of quotations is and other related documents will be placed for the consideration of purchase committee which is headed, by the purchase

manager.

D) **Placing Order**

If the purchase committee decides to purchase, a purchase order will be prepared as directed by the committee.

II. Receipt of Materials

As soon as the materials arrive, they are unpacked and verified by the receiving department. The packages are verified with the consignment notes.- Entries are made. Materials received report is prepared.

III. Inspection of Materials

It is the duty of the inspection department to check up and. find whether the materials received are in accordance, with purchases order specifications. Inspection reports are prepared in triplicate - one to the purchase department, one to the stores department and one is retained for reference.

IV. Storage of Materials

Storage:

A depository for goods

The store keeper has to arrange for the storage of materials He has to accept, identify, classify and place the materials in the right place. The store keeper has to observe the following points. ...

A) Checking of materials

The store keeper must verify the materials with the consignment note, inspection report and materials received report and then only accept them.

B) Classification

The materials should be classified according to their nature. A code number should be assigned to each store item to avoid confusions Alphabetical method and numerical method are the commonly adopted methods of

codification. Sometimes, both the methods are combined to secure exact information. When coding is done, the title of an account need not be written every time. Secrecy can be maintained.

C) Placing materials into bins and racks

The store must be conveniently divided into several sections, depending upon the number of materials. Each section should have bins and racks. Each bins or rack should be numbered and indexed for quick identification. The entrance to each store must have a floor plan to facilitate quick location.

D) Quantity of stock

The management has to fix the maximum and minimum quantity of stock so that over investment or and investment can be avoided. The store keeper has to observe these levels.

E) Maximum level

Level:

A position on a scale of intensity, amount or quality

The management has to fix the maximum quantity of a material that pan be kept as stock in store room. The prescription of maximum level helps to avoid excess investments in stock and also prevents losses due to deterioration, obsolescence or theft.

F) Minimum level

The management has to fix the minimum quantity of stock of each" materials to that production are not interrupted due to want of material.

G) Ordering level (Reorder level)

Reorder level is the level at which an order should be placed or replenishment of stock. It is fixed between the maximum and minimum level in such a way that there is sufficient stock of materials. In hand to meet production needs till the material ordered is received.

H) Danger level

Danger level is the level below which the stock of materials should not be lowed to fall. If the stock position comes to this level, immediate action must be taken to replenish the stock.

I) Economic order quantity

Economic order quantity is also referred to as optimum or standard order quantity or Economic lot size. It refers to the exact quantity or a material to be ordered at a time to achieve maximum economy on purchases, it depends on the cost of acquiring and the cost of holding an inventory.

V. Issuing Materials

The store keeper must issue materials only on receipt of material Requisition Note. I.C.M.A. defines Material Requisition Note as "a document, which authorizes and records the issue of materials for use" Before issuing materials the store keeper has to make entries in the bin card and sign in the requisition before it is sent to the costing department for posting purposes.

VI. Stores or Materials Records

The two important stores records that are maintained to record the various items of stores are: a) Bin card and b) Stores ledger.

a) Bin card

A bin card is also known as a locker card, bin tag or stock card. A bin card is a simple stores record which shows basic information relating to receipts, issues and balance of a particular item of stores. Separate bin cards are used for each item of stores. The store keeper has to record the physical movement of stores and maintain stores records. He is personally responsible for any difference between the balance as shown in the bin card and the actual stock. The bin card is debited as soon as stores are received and credited whenever stores are issued and

the balance is struck immediately so that it is possible to know the balance of each item easily. The principle of "touch the bin card before touching the item" is followed to have an up to date relating to balance of stores. Just a reference to the bin card wilt discloses the stock position.

Each bin card carries information relating to "minimum, quantity, maximum quantity and ordering quantity. This information helps to maintain a watch over the balance so that requisitions for replenishment can be placed if and when necessary.

b) Stores ledger

In addition to bin cards, stores ledger is also maintained by the stores ledger in addition to bin cards while others maintain bin cards only. When both are maintained independently, entries in the bin card are made on the basis of physical movement of stores while entries in the stores ledge are made on the basic of physical movement of stores while entries in the stores ledge are made on the basis of documentary evidence.

Decentralised:

Withdrawn from a center or place of concentration; especially having power or function dispersed from a central to local authorities

In a centralised stores, both the records may not be found side by side. In a decentralised store both are maintained and readily available. The maintenance of both these records greatly facilitates inventory control and stock ascertainment for balance sheet purposes. Discrepancies can be easily set right.

Both are quantity and value of receipts, issues and balance of each item of stores is recorded in the stores ledger. The points of difference between bin card and stores ledger will help to understand them better.

Bin card	Stores Ledger
1. It records quantities only	It records both quantities and values.
2. It is maintained by the store Keeper.	It is maintained by the costing department
3. Postings in the Bin card are made before the transactions take place.	Postings are made after the transactions completed.
4. Each transaction is posted individually.	Transactions are summarized and posted periodically
5. It is kept inside the stores.	It is kept outside the store.

Bin Card:

Each bin in which materials are kept is attached with bin card.

Are bin cards unnecessary?

Some argue that if stores ledger is maintained, bin cards need not be maintained. This is a wrong notion and also against the principles of' stores accounting due to the following reasons.

1. If there is no bin card, how can the store keeper maintain a record of stores?

2. How is it possible to fix responsibility if there is defiance in stock as shown by the stores ledger and the actual in the stores?

3. How can we know the up-to-date balance of stock in the absence of bin cards?

4. How can we cross check the balance of stores as shown by the stores ledge if there are no.bin cards?

5. Is it not wrong to ask the store keeper to maintain stores ledger when revaluation of stores is the exclusive responsibility of costing department?

For these reasons, both bin cards and stores ledger should, be maintained separately.

Reconciliation of bin cards with stores ledger

After making entries in the bin cards (relating to receipt and issue of stores) the purchase order, the goods received notes and requisition notes are passed on the stores ledger clerk for the purpose of making entries in the stores ledger. As both the bin cards and stores ledger record all the physical movement of stores, one may expect that the balance of stock as shown by both must agree with each other. But in practice, they do not agree on several occasions.

The reasons for such differences are :--. 1. Postings done in wrong bin card or wrong sales ledger account.

2. Posting issues in the receipts column or posting receipts in the issue column.

3. Extracting wrong balance due to arithmetical errors.

4. Failure to post receipts or issues in bin cards or stores ledger.

The differences between bin cards and stores ledger should be reconciled regularly. Up-to-date postings will help to avoid differences. A specimen of stores ledger is presented in the next page.

....Company Limited

Stores Ledger

Name of the article ..... Minimum quantity.....

Code No. ..... Maximum quantity.....

Bin No..... Ordering quantity .....

Location code.....

Date	Receipts				Issues				Balance		
	G.R. No.	Qty	Rate	Amount	M.R .No.	Qty	Rate	Amount	Qty	Rate	Amount

VII. Stock Audit

Stock audit means the physical verification of stock. Even if the stores ledger is maintained on perpetual inventory basis, physical verification is essential to check the correctness of perpetual inventory records.

Physical verification may be periodic or continuous. When the physical verification is done on an yearly basis or half yearly basis it is called periodic stock verification. The weakness of the system is that all transaction in or out of

the store should be suspend during the time of verification.

Continuous stock verification implies that the checking is done in different sections by rotation. This method is adopted by large business concerns having well trained staff. The advantages of this system are:

1. Business operations need not be suspended.

2. It acts as a moral check on the employees.

3. Up-to-date information is available regarding stock.

Lesson - 4

Store Keeping

4.1 Introduction

In some manufacturing concerns, store keeping is not given as much \ importance as other functions. While the production and finance department are given too much attention, the stores department remains neglected. It is hardly realised that the loss of stock, wrong issue, out-of-stock situations and the consequent delays in manufacturing are all due to ill equipped stores department; An efficient store keeping will facilitate smooth production, minimise loss and reduce costs.

4.2 Responsibilities and Functions of Stores Department

In big organisations, there will be a separate receiving department and stores department. The receiving department is responsible to expeditiously receive, identify and inspect all incoming materials. Further, it has to notify the concerned departments of the receipt of the materials and their, condition. The stores department is responsible for safe and sound physical storage of all production materials, some in process inventory and most MRO items. In some companies; even the storage of finished goods is the responsibility of the stores department while in others it is not so. As observed by L. Lee and D.W.Dpbler "the stores department must protect materials in its custody against pilferage, authorised usage, and unnecessary damage' or deterioration. It must also adequately classify, mark, and locate all materials in a manner which permits ready accessibility. Finally, the stores department must control the physical issuance of tail items- in a manner that provides effective service for the production operation and at the same time, protect against un-authorised withdrawal of materials"

The Functions of stores department are as follows:

NOTES

Maintenance:

Activity involved in maintaining something in good working order

1) The receiving, storing and safeguarding of materials,

2) The issuing of right quantity of materials on requisition.

3) The maintenance of stores records which will have complete details relating to materials on hand item and issue of materials etc.

4) The giving of timely notice when replenishment is needed by determining minimum quantities for each item and issuing requisitions.

5) The stores department should help to reduce costs by its efficient operation.

4.3 FUNCTIONS OF STORES DEPARTMENT

These functions are described below

1. Receipt of materials into stores

Meyenberg gives an interesting account of the flow of material into and out of stores and the clerical works associated with the same.

When the materials enter, the receiving department prepares seven copies of the receipt. Copies 1 to 4 are called preliminary receipts while copies 5 to 7 are called definite, receipts. Copy 1 is sent to the purchase department immediately. Along with the supplier's invoice, copy 2 is sent to the accounts department. The accounts department will train the invoice and send copy 2 to the purchasing department for filing. Copies 3 and 4 will be sent to the technical inspection department which will certain copy 3 for its files and send copy 4 with its remarks to the purchase department. The acceptability of the materials will be decided by the purchase department and the decision will be entered on copy 4 which will be sent to the. receiving department. The receiving department will send copies 4 and 5 together to the purchasing department for purposes of comparison with the supplier's invoice. The purchase department will then send copies 1,4 and 5 along with the invoice to the accounts department which in turn will return the receipts 1,4 and 5 to purchasing department files. Along with copy

of invoice copy 6 will be sent to stores control while copy 7 will be kept by the stores. Goods returned to the stores by the buyers are also treated in the same manner.

2. Issue of materials from the stores

The materials requisitioned from the stores may be reserved stock and "available" stock. They are shown separately in the stores records. Reserved stocks are those for which orders had already been received but work is yet to be started. Mostly it is raw or 'direct' material. Available stock may be direct or indirect material which can be issued on requisition. For direct materials, the planning department will make out the requisition slip while for indirect materials the consuming department will make out the requisition slip.

The Planning department prepares the requisition slip and sends the original and copy to the workshop which forwards them to the stores. The stores department sends the copy of the requisition and the requisitioned materials to the workshop while the original requisition is sent to the stores control. In the stores control, all details relating to materials issued are entered in a card index system. After entering the value of the issued material in the card index, and requisition slip, a summary will be prepared m duplicate and sent to the costing department. The costing department will verify and certify whether the summary is correct. If found correct, the summary will be sent to the stores control and short voucher will be sent to the accounts department for making entries into the accounts.

3. Storing and safeguarding of materials

Safeguarding:

Make safe

All storage operations should aim at minimising deterioration and spoilage. Depending on the material, suitable storage method should be followed.

Some materials deteriorate or become obsolete. The storage system for such materials should be such as to ensure the issue of old material ahead of new material. "First-in first out" usage system ensure this. Under this system, materials will be withdrawn from the left end of the stock, moving progressively towards the right and. Materials which enter for storage purposes will be stored

on the right.

Some materials require special protection. Metal parts which are subject to rust or corrosion should be stored in dry areas after-covering then with rust-inhibiting compounds.

Materials which may get spoiled due to dust should be stored in airtight containers or drawers. If such items air available in sealed plastic packages, the need for special dust-free storage will not arise.

Liquids which are sensitive to whether conditions should be stored suitably. Similarly, granulated materials which a sensitive to moisture should be stored suitably.

Materials which are subject to pilferage should be stored in locked cabinets or ether safe places.

4. Record keeping and issue of purchase requisitions

The storekeeper has to maintain a quantity stock record of each material. The record is known as bin card.

If the accounts department maintains stock ledger and the production control department maintains stock records, bin cards are sometimes disposed with on the grounds that thy are duplicating in nature and that the storekeeper can be relieved from unnecessary clerical work. However it" should be relieved that the maintenance if bin cards by the store man will enable the store man to exercise better control over the stores.

A bin card is attached to the bin-shelf or drawer where each material is stored. The bin card provides a continuous record of all receipts and issues of materials. At the time of each receipt of issue a entry will be made and the new balance will be arrived at. if the store man is responsible for initiating purchase requisitions, the bin card will contain details relating to maximum and minimum stock, reorder level and quantity to be ordered. Whenever an item reaches reorder level, the store man has it, prepare the purchase requisition.

A model bin card is illustrated below.

Maximum Level			**Bin** Card				Material code		
Order level									
Description									
Receipts			Issues			Balance	Audit		
Date	G.R.No.	Qty.	Date	Req. No	Qty.	Qty.	Date	Remarks	Initial

5. Stores and cost reduction

Receiving and stores activities contribute to cost reduction in several ways. Inventory carrying costs rising from deterioration and pilferage of materials and indirect stores labour are controllable by the receiving and stores department. A alert stores department will help to reduce the costs of obsolescence by devising suitable check systems to check inactive materials. Inventory carrying costs can be reduced by effectively using the storage space. The stores can help to reduce direct labour costs also. A strategically located store will provide prompt service and thus save the time of workers and equipments in the production department.

4.4 Principles of Store Organisation And Layout

The following basic principles should be borne in mind in the stores organisation and layout.

NOTES

Floor space must be used to the optimum level. By building upwards, materials can be stocked by using stocking trucks. If stocking is not possible, bins or shelves must be provided. Metal racks occupy less space and so they are better than wooden racks.

There should be separate entrances for the receipt of materials into stores and for the issues of materials from the stores. The storekeeper should, keep under his control all stores and stockyards and keep them locked when not used.

The materials stored should be properly classified and coded by using alphabetical and numerical symbols. The classification should be such as to easily locate the individual items. If the materials are properly classified, the following advantages arise.

- Clerical effort can be saved as symbols can be easily and quickly written.
- Ambiguity can be avoided as code refers to only one item.
- Coding helps in tracing particular class of materials in a card index or price list.
- Coding is a must for punched card stock control system.
- Materials should be pre packed to facilitate their issue.

mbiguity:

n expression
hose meaning
innot be
etermined from
s context

Those materials which- are subject to depreciation, deterioration or obsolescence should be stored in such a way that thy can be used at the earliest point of time.-It is important that the materials should be accurately weighed, counted and measured.

The stores accounting system and records should be perfect. The physical stocks and the entries in the records must agree with each other so that the production control department can confidently plan the manufacturing operations. Stored material must be protected properly; the materials face the following risks fire, rust and corrosion, deterioration, evaporation, dust; theft and effects of weather. It is necessary to take steps to protect materials against. these risks.

4.5 Advantages of good storage methods

The following are the advantages of good storage methods:

1) Materials will be easily and readily accessible.

2) Space will be utilised efficiently.

3) The need for materials handling equipments will be less.

4) Material deterioration and pilferage will be minimum.

5) Physical counting will be easier.

4.6 Store Room Location

Location:

A determinatio of the plac where somethin is.

The store room location should be such as to ensue the smooth flow of materials with the minimum of transpiration and handling. This implies that the materials should be stored nearest to then- points of Use. To achieve these objectives and to reduce manufacturing costs, decentralised storage offers significant advantages.

The following are the advantages of centralised stores:

1) As all the materials are received and issued at one central point, effective control is possible. Centralised stores facilitate the control for materials, manpower, equipment and space utilisation.

2) The economies of bulk buying can be gained as the purchase orders are sent by the concern as a single unit and not by each and every department.

3) Centralised stores demand improved layout which ultimately results in the saving storage space.

4) As there are fewer overall staff, easier supervision and coordination are

possible.

5), Clerical costs can be reduced as the records are centralised.

6) It is possible to check stick with greater ease.

7) Space and equipment can be used efficiently as the storage area is larger the

Disadvantages of central stores are:

1) It would be more costly to move small quantities of stores to the points of usage.

2) The issue of stores is not likely to be prompt as there is distance between stores and departments. If a man or van is sent to get a single item, it is uneconomical.

Considering the concrete advantages of both the centralised and decentralised locations, a company will use both the systems to derive the benefits of both. A company may have two or the large storerooms (the number depends on the size and the nature of the manufacturing organisation) located near the different manufacturing areas. Heavy, bulky or costly materials and equipment will also be stored near to their points of use.

A good storeroom layout aims at achieving the following objectives pointed out by L. Lee and D.W. Dobler:

1) A straight-line flow of activity through the storeroom with minimum backtracking

2) Minimum handling and transportation of materials.

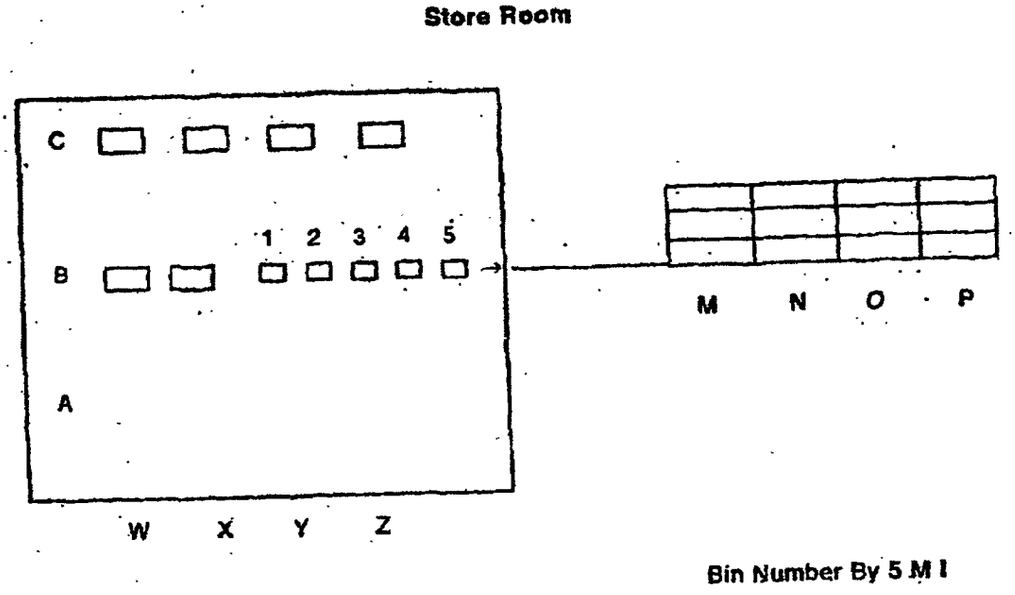
3) Minimum travel and waste motion for personnel.

4) Efficient use of space.

5) Provision for flexibility and expansion of layout. Storage Location Address

A common slogan found in most storerooms is a place for everything and everything in its place. It is somewhat easy to plan a place for everything. What is difficult is to keep everything in its place. This difficulty can be overcome by developing a good storage location address system.

There are several ways of addressing storage locations. One popular method is illustrated below. Under this system, the entire storeroom is divided into blocks of storage units. Each block is assigned a lateral block letter and longitudinal block letter. Each block will have rows of shelves. Every row will be given a number. Every row will be further divided vertically into columns and horizontally into shelves. By reading the letters and numbers in the following sequence, particular bin will be identified lateral "block, longitudinal block, row, column and self. This kind of arrangement is illustrated below.



Thus each item stored in the storeroom will have its storage location address. If an inventory catalogue is maintained, the address will be listed in it. If not, the address will be listed in the stores location index.

4.7 Types of Stores

Stores may be very broadly classified as follows:

1).Raw material

2) Component
3) General stores
4) Work in progress.
5) Finished goods
6) Tool
7) Pattern
8) Plant maintenance

On the basis of issue, stores may be classified in two ways (1) stores which are issued continuously, and (2) stores which are generally used (1) closed stores system and (2) open stores system. A concern may use both systems. The adoption of either of the systems depends on the nature of manufacturing operation and the manner of using materials. Some big concerns us the random access storage system.

Stores System

There are mainly two systems for the physical control of stores materials 1) closed stores system ad 2) Open stores system. A firm may use both the methods.

a) Closed Stores System

Under the closed stores system, materials are stored in a closed area. Stores personnel alone have access to the area. Inward and outward movement of materials should be supported by proper authorizations. This system provides security to the materials and ensures right control also.

Authorizations:

The power or right to give orders or make decisions

b) Open System

Under the open stores system, there is no storeroom as such. Instead each materials stored at its nearest point of use. Bins, shelves, racks and pallets are used to store materials. It is called open system because the storage facilities are completely open and each worker has access to the storage facility.

The stores personnel are responsible for delivering the materials

received by them to the concerned departments. The physical storage arrangements should be worked out with the production supervisors.

The open system helps to expedite production activities. This system is justifiable in so far as it ensures the relatively quick use of material without a high rate of deterioration or obsolescence.

But the open system places less emphasis oh the physical security and the accounting control of materials. Materials are directly used in manufacturing without the need for any requisition or control document. Perpetual inventory, records are not maintained. It is not easy to determine the quantum of materials actually used. To ascertain the actual materials used, it is necessary to physically count the materials at the end of a period and compare the same with the beginning period.

To conclude, the open system is highly suitable in highly repetitive production operations; producing standardized products. Care should be taken to see that materials are not subjected at pilferage or damage. If there are pilfer able items, it is better to use closed storeroom. Open system will be found to be successful if it is applied to a fewer items.

c) Random access storage system

The random access storage system is kind of closed stores system. In this system, materials do not have a fixed storage location. As and when the materials arrive, they are stored in the first available shelf or bin which is suitable for the storage. Whenever materials are withdrawn from the store, the available space is used to store any incoming material suitable for the space, Thus the materials are stored at random locations throughout the storeroom. However, materials of similar size and storage requirement will be grouped together.

The storekeeper locates the stored item on the basis of paper control system which uses punched card data processing equipment. When a material enters storeroom, a punched record card is prepared. The card will include the storage location, address of the material. The card is filed. When a requisition is

received for an item, (in punched card form) with the help of an electronic equipment, the requisition and the stored materials cards are allowed to run together in order to locate the stored materials card which matches the requisition. The corresponding card contains the storage, address where the material can be located.

The random access storage system is subject to many limitations. Firstly, there should be large operations. Secondly, it requires electronic equipments to process .the data. Thirdly, it involves an expensive control system. Still, tight control over materials is difficult to achieve, Fourthly, the storekeeper will be rarely similar with the total stock of any item in storage. If a record card is lost, it is as if that item itself had been lost. Lastly, it involves a lot of time to take physical inventory.

The random access storage is not without any advantages. It has been found in practice that it uses storage space far more effectively than the fixed location system. No space is left vacant for fluctuating inventory level. Secondly, the system is highly flexible in the sense that it can accommodate different types of materials as well as any sudden increases in. the stock levels of certain materials.'

4.8 Equipments Used In Storing Materials.

The following are the most commonly used : equipments in storing materials:-

1). Pullets and skids

2) Cabinets

3) Open and closed shelves

4) Bins

5) Storage racks

6) Stacking boxes

7) Gravity feed racks

8) Outdoor platforms and racks

To determine the types and combinations of storage equipment to be used, it is necessary to compile the following information relating to each item in storage.

1) The space required to store the item properly

2) The number of units withdrawn at a time (in other words, is the item to be stored singly, in pairs or in dozens

3) The maximum number of units to be stored at a time

4) Considering the weight, shape etc., the kind of storage facility best suitable for the item.

5) The nature of handing equipment required to transport the item

6) The frequency of withdrawal of the item from the stores.

7) The point at which the item is most frequently used in the production operation.

NOTES

Model Questions

1). Define materials management. Account for the need for materials management. Point out the major requirements of a system of materials management and control?

2) Explain briefly the activities which go to make materials management effective?

3) What factors would you take into consideration in deciding to make or buy a product?

4) Explain the role of inventory management, production control and quality, control in materials management?

5) Explain the basic principles to be born in mind in organising the stores department. What re the functions of stores keeping?

6) Explain the various methods of stores systems. Which is the best?

7) What are the requirements for an effective control over purchase of., material?

8) Bring out the respective merits and demerits of the centralised and decentralised buying?

Lesson - 5

Inventory Control

Inventory Control:

Inventory control is system which ensures th maintenance of require quantity of inventories c the required quality at th required time wit minimum amount c investment.

5.1 Meaning of inventory

According to the definition given by the Accounting Principles Board of the American institute of Accountants, the term inventory means "the aggregate of those items of tangible personal property which (a) are held for sale in the ordinary course of business (b) are: An the process of production for such sales: (c) are to be currently concerned in the production of goods or services to be available for sales".

Based on this definition inventories can be classified as follows;

1) Raw materials

This represents that portion of the stock which consists or materials that are directly consumed in the production of the final product.

2) Work-in-process

At any time when the closing stock is valued, certain materials are in the production process remaining partly finished and partly unfinished. (Such semi finished goods are also called work-in-process.

3) Finished goods

This represents materials which are already converted, into finished products, and are ready for sales in the market.

4) Consumable stores and Spare Parts

In the production of certain types of industrial goods, some spar parts and consumables may be used. The stock of such materials should also be included in the inventories.

5.2 Cost involved in Building Inventories

Sufficient stocks of inventories should be built up in every organisation in order to safeguard against the risks involved in the uncertainty in the supply of materials and also to have a smooth and uninterrupted flow of. materials throughout the production cycle-. However, to keep sufficient quantity of materials and then stocks, we have to incur certain expenses. They are:

1. Capital is locked up in the form of materials, finished and semi-finished goods and the cost of capital invested in the inventories.

2.Expenses incurred with regard to the storage of goods should also be considered as an associated cost e.g. warehouse rent and maintenance expenses, premium paid for insurance of the goods and godown etc., are such expenses which increase the cost value of the stock,

3.. Depreciation wastage in warehousing leakage and such normal loss of weight due to the inherent quality of the goods cannot be avoided. Again due to efflux of time and obsolescence the value of the stock may be reduced. Such costs are to be recovered from the remaining units "of the stock.

These are major items of costs incurred on the inventories. Such costs are often called **"inventory carrying costs".**

In addition to these, certain other costs may also be associated with inventories.

5.3 Need for inventory control

In the previous paragraph, we have seen that various types of costs incurring on inventories. So, money is locked up in materials and other items of stock 'lying in storage'. The business has to wait for its realization in the form of cash till sales are affected. This concept waiting time is crucial for the business concern's since waiting involves spending money by way of floor rent, insurance of the foods in the go down, interest on capital etc. Thus, inventories not only involve investment if money but also causes- expenses to carry them (carrying

costs). Therefore, managements are interested in controlling the costs involved in building up. inventories in such a way that the investment in inventories at any time is kept as low as possible. However, in an anxiety to keep investment low situation should, not be developed wherein the machine has to be shut down or tack of. supply of materials or the sales postponed or cancelled for lack of finished goods. .Therefore; the inventory control system should also ensure adequate stocks for continuity of operations.

5.4 Objectives of Inventory Control (Inventory Policies)

Policies:

A plan of action adopted by an individual or social group

The two major objectives of inventory control are:

1. The capital investment and the-cost of carrying inventory should be kept as low as possible. 2. The control system should not cause idle time due to shortage of raw materials and spare parts nor should it affect sales by inadequate supply of finished goods. In the words of Lundy 'An inventory control system should ensure adequate stocks for' continuity of operations and sales."

Quite obviously, these objectives tend to be conflicting with each other, large quantities of inventories are maintained,' large investments and expensive storage are required. It may also cause losses due to deterioration, obsolescence, of declining prices. Physical control of the materials and proper record keeping become more costly and difficult. On the other hand, minimization of inventories may result in increase costs of purchasing and handling of materials. It may also cause frequent delays and interruptions in operations and sales. Therefore a compromise is needed between these two policies. A sound system of inventory control should balance one against the other in order to arrive at an optimum result. As Lundy observes, "it is the function of inventory control personnel to see that the best level of inventories from an overall point of view is maintained".

NOTES

5.5 Inventory Control Methods

1) ABC Control Method

This method is useful in business organisation which are dealing in a number of items of good. When a variety of goods are to be manufactured or procured, equal attention cannot be given to all the items, therefore, depending upon the monetary value of the items discriminatory attention is given and control is exercised proportionately. This is to say that the most valuable goods are given most of our attention and care and less valuable goods are given proportionately, less attention. Usually the various items of inventories are grouped under three heads - viz., (a) items of, high value (b) items of medium value and (c) items of low value. Specific monetary limits should be set for each category. For instance, goods worth Rs~ 500 and above may be placed under the first group (items if high value): goods worth above Rs. 100 but blow Rs. 500 and goods worth below Rs. 100 may be placed, under the second and third groups respectively. A chart may also be prepared to show the proportion of the inventory. The ultimate aim of this control method is to have a direct control over the more value of goods. More the value of the inventory the more will be the control and regulation under this method.For example, the pattern after analysis may be as under:

Category	No, of inventory items	%	total Value Rs.	%
A	600	12	7.25,000	50
B	1, 500	.30	5.07.500	35
C;	2,900	58	2,17,500	15
	5.000	100	U. 50,000	100

This means that 12% of the total items account for 50% of the inventory value. The number of items being 600 only in this category, it will be possible to devote more attention to them and even deductions of 10% in the stock of each of them yield a 5% deduction in inventory cost. Thus the object of this system is to direct control to more significant items:

2) Perpetual Inventory System

Perpetual:

Continuing forever or indefinitely

Perpetual inventory system is a system of records maintained by the controlling department which shows the physical movement of stocks and the latest balance. It involves two aspects such as maintenance. of Bin card and Stores Ledger which show the goods received, issued and the stock on hand to any time and (b) continuous stock taking to compare the actual stock with stock shown by Bin card and Stores Ledger.

Continuous stock taking is opposed to a system of stock taking at the end of the financial period, i.e., periodical stocktaking. Under Continuous stock taking .system, a permanent stock taking team is appointed. This team daily verifies the physical stock if various selected items at random. The. variances found between the actual stock and bin card balance are noted and ah enquiry for finding out causes is made. It makes note of condition of different materials and finds materials turnover rate of each item. The stock verification is done throughput the yea. The advantages of perpetually inventory system are given bellow.

1) It eliminates the elaborate and costly periodical stock taking,

2) Since there is a permanent stock taking team, it is not necessary to draw persons from other departments for stock verification.

3) The business need not be closed for the purpose of stock taking.

4) Bin cards and Stores Ledger provide ready figures of stock position at any.

NOTES

5) This system helps to prepare Profit and Loss Account and Balance Sheet for interim accounting period.

6) It enables to keep continuous watch on Materials though continuous stock taking. Difference between the actual stock and book stock is immediately detected and adjusted.

7) Perpetual checking by surprise prevents employees from playing mischief with stores materials.

8) Stock levels can be revised from time to time to avoid over or under stocking of material'.

9) Timely replenishment of fresh stock can be ensured.

10) Stores records are maintained up-to-date.

11) Stock verification is done by experts and so it is more reliable.

12) Since the speed of material movement can be judged easily, the minimum stock of slow moving materials may be kept or existing stock may be reduced quickly.

13) Percentage of normal loss can be fixed accurately and reviewed constantly for exercising control over wastage and losses.

14) It facilitates proper planning of production programmes, framing buying policies, accepting new orders etc., as ready information of stock position is available.

However, this system is having the following drawbacks.

i) The system is expensive and a small concern cannot have it.

ii) The information about actual stock of a particular item on a particular day may not be available. Only book figures are available.

3) Periodic Inventory System

Periodic inventory system refers to physical verification of entire stock once in a specific period, generally on the' last day of the accounting year. Hence it is also known as annul stocktaking. The. procedure followed inner this system is that, on the last day of the year business is closed and a stock taking committee is constituted by drawing personnel from different departments. This committee undertakes the task of counting, weighting and measuring the items in the stores and the observation is recorded in the 'Stock Verification Sheet'. This sheet provides columns for the description of item, code number, actual stock in the bin, stocks as per bin card, the surplus or deficiency, ledger adjustment, reasons for discrepancy in the stock and also the condition of material. It is signed by the stock verifier, store keeper and stores accountant..

Alternatively, the Is a-practice of removing all bin cards and depositing them with the stores accountant on day earlier to the stock taking. The 'Inventory Tag ' is issued to the stock verifier on which he records .the description of items, location code, actual, quantity and condition of material. These, inventory tags are collected by the accounting section and the stores accountant prepares "Stock Verification Sheet" is maintained above. This practice prevents any mischief being played by the stores employees to conceal their frauds by adjusting bin cards or but temporary replacement of materials in the bin from Outside or by misplacement of excess material.

The periodical inventory system claims the following merits : T) It is cheaper method and it suits male firms as. permanent stock taking team is not required.

2) It gives the quantity of actual stock of all items held in stock on a particular day and hence the stock figures are reliable.

3) Irregularities in stores are exposed. It also provides check in the employees.

However, it suffers from the following defects:

1) Business has to be stopped during the stock taking period.

2) The verification will have to be done hurriedly within the limited time.

3) Stock verifiers are not experts in stock taking; therefore the work is not perfect.

4) Since the date of stock taking is fixed well in advance, the dishonest employees gets sufficient scope for hiding his manipulations.

5) Reasons for discrepancies between actual stock and book stock cannot be traced easily due to passage of time.

Nevertheless, even where the continuous stock taking is in practice the periodic stock verification is adopted for the following reasons:

a) It provides counter verification of results shown by continuous stock taking.

b) It is required for the items not covered by continuous stock taking as for instance work in progress, tools, spares etc., .

c) It gives the value of actual stock on hand. Under continuous stock taking the closing stock is calculated by using book figures.

4) Inventory Turnover Ratio

It is nothing but Material turnover ratio which the value of materials, consumed during a period bears to the average stock held during the period. It can be calculated as under:

$$\frac{\text{Value of material consuming the per period}}{\text{Value of average stock held during the period}}$$

Average stock held is the half of the total of opening and closing stock. This ratio can also be expressed in terms of days by the following formula;

$$\text{Material Turnover in days} = \frac{\text{Days during the period}}{\text{Material Turnover Ratio}}$$

The purpose of calculating this ratio is to ascertain the speed of movement of a particular item. A high ratio indicates that the item is fast moving and investment in it is minimum. A lower ration denotes that the item is not consumed in more quantity. It is going out of demand arid-has led to overstocking. This type of show moving materials should be disposed off as early as possible; Of course, this rule cannot be applied to machinery, spare parts which are stored for repairing machinery and equipments. In their case lower rate-of turnover would indicate efficiency of the machinery and equipment.

5) Input-Output Ratio Analysis (1.0. Ratio)

The ratio of quantity of a material put in the-manufacturing process to the quantity of the material in the final output is called Input - Output ratio. For example, if 5 kg of material 'X' is put in the production process and the content of the material 'X' in the final product is 4 kg, the input - output ratio wills he5/4 i.e., 125%. The ratio helps to know whether usage of material is favourable or adverse. It evaluates the efficiency of the manufacturing department. It guides to ascertain the cost of raw material in the finished product by multiplying cost per unit of the raw material by the 1.0. Ratio.

A standard 1.0. Ratio is determined to serve as a basis for comparison with the actual ratios. If the standard ratio is higher than the actual ratio, the performance of the material or manufacturing department is bet r. If the actual ratio is higher than the standard ratio the performance is not good. Higher actual 1.0. Ratio indicates that the loss in manufacturing process is more which may be due to inferiority or impurity of raw material itself or due to the fact in the process. Accordingly, the reasons may be traced and proper action may be taken. Thus this ratio helps in exercising control over scrap and wastages in production.

6) VED Analysis

VED - Vital, essential and desirable - analysis is an effective one for control of spare parts. The spare parts can be classified into three types namely vital, essential and desirable.

The spares, the stock-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 called "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 of production is high and which is. essential for the production to continue, are known as "essential spares".

The desirable spares are those spares which are needed for production, but their absence for even a week will not lead to stop of the production.

Some spares, though negligible in monetary value, may be vital for production to continue .and require continuous attention. Such spares may not receive proper attention if they are maintained ' according to ABC analysis as their value of consumption is small-. In such cases the usage of V^AED analysis yields, effective results.

5.3 Aspects of Inventory Control

The inventory control personnel can, exercise their control in the following respects. 1) Despatching of materials from the place of supply to the factory premises must be regulated in such a way as to reduce the 'transit time' the minimum level of course consistent with requirements.

2) Supply points must be located nearer to the points of usage so that minimum inventory is on transit.

3) The lead time should be minimised by executing the procurement functions with the least possible time. For this purpose procedures for making enquiries, analysing orders and placing orders should be

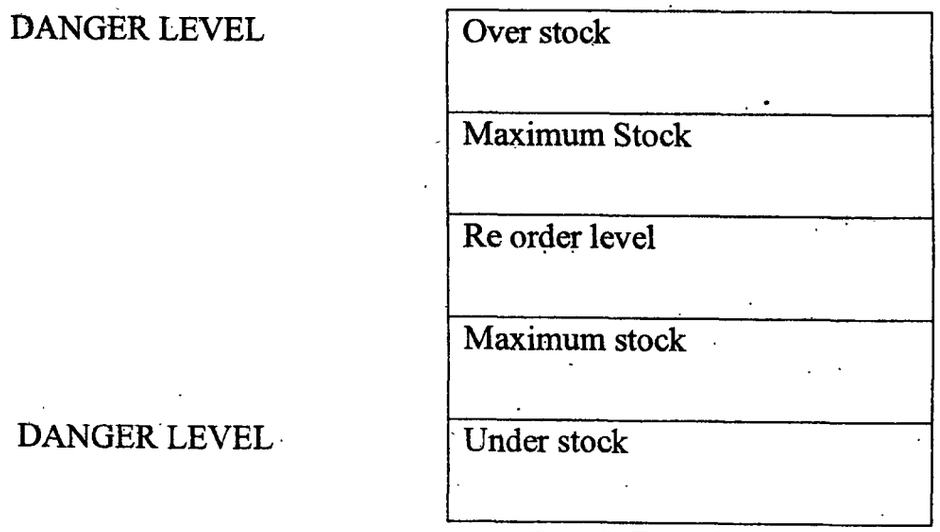
simplified.

4) The different levels of stock like maximum level, reorders level etc.-, should be fixed and periodically revised.

5) Sufficient accounts should be maintained to control the stores.

5.6 Stock Levels

Considering the objectives and policies of; inventory control one can realise that the level of stock should be the optimum at any time. So, a progressive management should have a policy to review its stock levels at, regular intervals in order to check the position of over-stock or under-stock since both are not profitable. Realising the demerits of over-stock and under-stock, the inventory control, personnel have to fix the maximum and minimum stock levels for every item of inventory. The position and relation of the different stock or levels may be illustrated diagrammatically as follows:



Stock Levels

Since we have already considered the drawbacks of over stocking and under-stocking, below we discuss the remaining types of stock levels.

NOTES

a) Maximum Level

Obviously, this refers to the maximum quantum or value of stock that can be built up at any stage, consistent with the requirements of the production department. To fix the maximum level of stock, the stock controller must consider the following factors, giving due allowance for the special circumstances, if any

1) The total amount of capital to be employed in the maximum stock availability of such capital and the relevant cost of capital.

2) Storage space required for this-stock level and the availability thereof

3) Possibility of applying quality control methods while keeping the materials in the stores.

4) Any restrictions imposed by the government for storing certain kinds of goods (e.g., explosives or highly inflammable goods)

5) Any special problems of warehouse keeping and implications of record keeping.

6) Economics of bulk-buying and handling, including the insurance of warehouse.

Thus, depending upon the above mentioned factors the quantity and value for maximum stock level can be prescribed. If the stock level exceeds this point, it will result in many diseconomies and many disadvantages.

Formula

Maximum level = Reorder level + Reorder Quantity - (Minimum

Consumption x Minimum delivery period)

b) Minimum Level (Cushion Stock)

It as any stage the stock level goes down beyond a point, it will result in disasters. This danger point is the minimum level. Stock level falling down below this point is more dangerous than it exceeding the maximum point because it results in under - stock with all its consequences e.g., men and machines have to . be kept idle and waiting for the supply of materials and for the sales department - has to meet with difficulties in executing the orders or keeping up the delivery dates. It provides a cushion to insured continuous operation.

So fixation and maintenance of minimum level are very crucial. This minimum level depends upon the specific nature of the business and also the general factors which, apply to any stock level. They are (1) Rate of consumption of materials and stores under both normal and special circumstances production planning and works determine the relevant level'(2) "The. Lead Time" required - the lead time refers to the time necessary to procedure the materials at factory doors. It is the time which elapses between the recognition of a need for an item and the fulfillment of that heed. This time lag is inevitable in all types of business. By planning ahead of requirements and by simplifying the procurement procedures, this lead time can" be brought to abnormal time".

Formula

Minimum Level = Reorder Level - (Normal consumption x Normal delivery period)

C) Re-order Level

Weldon defines this lever as "the quantity fixed between the maximum and minimum stock figures, at which time it is essential to' initiate purchase requisitions for new supplies of the material, In short, it refers to; that level of stock at Which the stock must be replenished with fresh orders. This reorder level is slightly higher than the minimum stock figure in order to cover any

emergencies like abnormal usage, of the materials or unexpected delay in the supply of materials calculation of the different levels of stock:

Formula

(a) Reorder. Level's=Maximum consumption x Maximum reorder period

Or

(b) Reorder Level= Minimum Stock x Average consumption during normal delivery time.

Illustration: 1

The following is the weekly forecast with regard to the materials consumed
in an organisation:

Normal consumption of material	-	460
Maximum consumption of material	-	600
Re order quantity (RQ)	-	3,000
Re order quantity (RP)	-	4-5 weeks

Re order level Maximum consumption x maximum reorder period

= 600 units per weeks x 6 weeks

R.O.L. = 3,600 units

Minimum level = R.O.L- (Normal consumption x normal reorder period)

3,600 units (450 units x 5 weeks)

ML = 3,600 units- 2,250=1,350 units.

Maximum Level = R.O.L.+(Minimum consumption x Minimum Recorder Period)

= 3,600 units+ (300 units x 4 weeks)

= 3,600 + 1,200 = 4,800 units.

$$\text{Average stock level} = \frac{\text{Maximum Stock + Minimum stock}}{2}$$

$$= \frac{\text{4,800 Units + 1.350 units}}{2}$$

= 3.074 units.

Note: The average stock level measures the average quantity of materials held during an accounting period.

Basic Inventory Problem

There are two basic inventory problems namely

. 1) How much to order at a time. It involves the consideration and calculation of Economic Order Quantity (EOQ) and 2) When to order this quantity- It involves the consideration and calculation of Re-order level.

Thus, the issue is related to Ordering Level and Ordering Quantity.

1) Economic Order Quantity

In determining 'EOQ' the problem is one to set a balance between two opposing costs, namely, ordering costs and carrying costs. Ordering costs are basically the cost of getting an item into the company's inventory.. Carrying costs (holding costs) are costs of carrying the item into the company inventory such as storage costs interest on funds in inventories etc.

The management may be tempted to order huge quantity lots so as to minimise ordering costs ;or, it may be tempted to order small quantify lots so as to minimise carrying costs. Both these courses will have an unfavourable effect on profits..The optimum course open to the management is to seek a

NOTES

compromise and to order- in such quantities which will minimize the total of ordering and carrying costs. At this point the carrying costs and ordering costs will be equal.

Such Economic Order Quantity (EOQ) can be calculated with the help of the. following formula.

$$EOQ = \sqrt{\frac{2AB}{CS}}$$

where A = Total annual requirement in units

B = Buying cost per order

C = Cost per unit

S = Storage and carrying cost per unit

2) Re-order Level

Once it is determined how much should be ordered at a time the next problem facing the management is when it should be ordered. It involves the calculation of re-order point. There-order point of an item is that level of this item in the company inventory which tells the purchasing agent that it is time to place a purchase order to replenish the stock.

To calculate the Recorder Point, we must know -

I) Usage Rate : it means the number of units used per day.

II) Lead Time : It means the time interval between ordering of goods and receiving those goods.

Once we know the usage rate and lead time, the reorder point can be easily computed under two basic conditions:-

a) If the company does not keep any safety, stock.

b) If the firm keeps some safety stock.

Illustration : 2

Calculate the Economic Order Quantity, if the annual demand for the product is 5,000 units, the ordering cost is Rs. 30 per order and the carrying cost is Rs. 6 per unit per year.

Given EOQ = $\sqrt{\frac{2AB}{CS}}$

A = 5,000 = $\frac{\sqrt{2X5,000x\ 30}}{6}$

B = Rs.30 = $\frac{\sqrt{3,00,000}}{6}$

EOQ = 224 units

Illustration : 3

Calculate the reorder point if the daily consumption is of 200 units and the. lead time is 10 days.

Reorder Level = Usage Rate x Lead Time

= 200x10 = 2,000 units

Illustration: 4

Calculate the reorder point if

NOTES

1) The daily consumption is 100 units

2) The lead time is 10 days and

3) The safety stock is 500 units

Reorder Level = (Usage Rate x Lead Time) + Safety Stock

= (100x10) + 500 = 1,000 + 500 = 1,500 units,

Illustration : 5

Furnished below are the particulars relating to material X. Minimum consumption per day 75 units . Maximum consumption per day 125 uriits Minimum delivery period 4 days Maximum delivery period 6 days Reorder Quantity 500 units

Consumption during March 1990 3,000 units.

Calculate

a) Average stock level, and

b) Material turnover index.

Solution

Here, the average stock may be calculated by two alternative formula.

1. Average stock = 1/2 (Maximum stock + Minimum stock)

2. Average stock - Minimum stock + 1/2 Reordering quantity

Now, it is clear under both the formula, it is necessary to find out other stock levels first.

Thus,

a) **Reorder Level** = Maximum consumption-x Maximum delivery period

=125x6

= 750 units

b) **Minimum stock level.** = Reorder level - (Normal Consumption x Normal delivery period)

where average consumption is

$$\frac{125+75}{2} = 100 \text{ units}$$

and Average delivery period is = $\frac{6+4}{2} = 5$ days

Minimum Stock Level =750 –(100x5)

= 250 units

c) **Maximum Stock Level.** = Recorder level + Recorder quantity

— Min .Consumption x Min. delivery period) =750 + 500 (75x4)

= 950 units

d) Average Stock= ½ (Max. Stock Level + Min. Stock Level)

= ½ (950 + 250)

= 600 units

NOTES

$$\text{Material Turnover Index} = \frac{\text{Material consumed}}{\text{Average stock level}}$$

$$= \frac{3,000}{600} = 5$$

Alternatively

Average stock = Min. stock level + ½ recorder quantity

= 250 + (500 + 2)

= 500 units

$$\text{Material Turnover Index} = \frac{\text{Material consumed}}{\text{Average stock level}}$$

$$= \frac{3,000}{500} = 6$$

Illustration: 6

After inviting tenders two quotations are received as follows

a) Rs.1.20 per unit

b) Rs. 1.10 per unit plus.Rs. 3,000 fixed charges to be added it-respective of units ordered.-

Advice with your arguments with whom orders should be placed and what quantity to be ordered?

The following additional information may be of interest

	Units
Present stock	35,000
Average monthly requirements	10,000
Maximum level	80,000
Minimum level	30,000

Sales tax problem may be ignored.

Solution

At the outset, it is necessary to calculate the ordering quantity by using the following formula (It is used to calculate maximum stock)

Maximum Stock = Reorder level + Ordering Quantity

--(Minimum consumption x Minimum Delivery Time)

Alternating the formula :

Ordering Quantity = Maximum Stock-Reorder Level

+ (Minimum consumption x Minimum Delivery Time)

Here, the above formula is having one unknown factor i.e., Delivery time.

NOTES

Delivery time can be found out as follows :

Reorder level = Minimum Stock + Average monthly consumption x Delivery time)

35,000 = .30,000 + (10,000 x Delivery time) .

35,000-30,000 = 10000 x Delivery time

Now taking up the **main formula** :

Ordering Quantity = 80,000 -35,000+ (10,000 x $^1/_2$)

= 50,000 units

Therefore, Quantity to be ordered = 50,000 units.

In buying 50,000 units, we have to calculate the relative cost of both tenders.

Purchase cost under tender.(a)

.= 50,000 x Rs,1.20 = Rs. 60,000

Purchase cost under tender (b)

Price 50,000 x Rs. 1.10 = Rs. 55,000
ADD: Fixed charges = Rs. 3,000

Total = Rs. 58,000

The purchase cost of tender (b) is cheaper than tender (a) for buying 50,000 units. Hence tender (b) is preferred.

Illustration : 7

Following information in an inventory problem is available :

Annual Demand	2,400 units
Unit price	Rs. 2.40
Ordering cot	Rs.4.00
Storage cost	2% per year
Interest rate	10% per year
Lead time	1./2 month

Calculate EOQ, Re – order level and total annual inventory cost. How much does not the total inventory cost vary if the unit price is changed to Re.5?

Solution

$$EOQ = \sqrt{\frac{2AB}{CS}}$$

Where A = Annual demand

B = Buying cost per order

C = Carrying cost per unit per annum

$$= \sqrt{\frac{2x2,400}{2.40x \frac{12}{100}}} = \sqrt{\frac{19,200}{.288}}$$

= 258 Units

Reorder level = maximum consumption per month x Maximum delivery time

=200 x ½ = 100 units

NOTES

Total inventory cost	Rs.
Cost of 2,400 unit at Rs.2.40	5,760.000
Order cost $\frac{2,400}{258}$ = 9.3 order say 10 orders	40.00
At Rs. 4 per order	
Carrying cost of average inventory = $\frac{258}{2} x.288$	37.15
	5,837.15

In order to find out total inventory cost if the unit price is changed to Rs.5, it is necessary to work out the EOQ at the revised price.

$$\text{Revised EOQ} = \sqrt{\frac{2x2,400x4}{5x\ \frac{12}{100}}} = 179 \textit{ units}$$

No. of orders = $\frac{2400}{179}$ =134 orders or say 10 orders

Total annual inventory cost at revised price

	Rs.
Cost of 2,400 unit at Rs.5 per unit	12,000.00
Ordering cost 14x4	56.00
Carrying cost of average inventory = $\frac{179}{2} \times \frac{5 \times 12}{100}$	53.70
	12,109.70

= Rs. 12,109.70 - Rs. 5,837.15 = Rs. 6,272.55

Model Questions

1. Explain the following concepts, and state how they are determined

   A) Maximum Stock Level

B) Minimum Stock Level

C) Re-order level

D) Economic Order Quantity

2. Give a brief account of each of the following

A) ABC Control Method

B) Perpetual Method

C) Periodic Control Method

D) Inventory Turnover Ratio

E) VED Analysis

3. Describe the concept of "Cost or Market Price whichever is low .

4. From the following data Calculate (i) Maximum Stock level (ii) Minimum Stock level and, (iii) Reorder level.

Reorder quantity 6,000 units , Minimum stock 50 weeks

Average delivery time 4 weeks, Maximum stock 20 week.

Average consumption 400 units, Minimum consumption in 4 weeks -1,200 units

5.Two components namely A and B are used in a factory. The relevant data:

Normal usage / week - 50 units each

Minimum usage / week - 25 units each

Maximum usage / week - 75 units each

NOTES

Reorder quantity A = 400 units

B = 600 units

Reorder period A = 4 - 6 weeks

B = 2 - 4 weeks

Calculate for each component

i) Reorder level

ii) Minimum level

iii) Maximum level

iv) Average stock level

6. The usages forecast for a particular consumption material is shown below:

Month	Fore cost
January	13,300
February	13,000
March	13,700
April	14,800
May	16,000
June	16,200

It normally takes one month from the date of order to secure this material.

Required :

a) The order print to be established during the forecast period.

b) Computation showing the minimum stock to carry.

c) Computation showing the maximum inventory, if the standard order quantity is 15,000 units.

(**Ans**: (a) Reorder level = 16,200 units (b) Minimum stock level = 1,700 units; and (c) Maximum stock level =- 18,200 units)

Lesson - 6

Material Cost Control

6.1 Introduction

The cost of materials received is calculated by adding the invoice price (less trade discount), freight, carriage, insurance, duty, sales tax, octroi and purchase commission. Here, for the sake of convenience and profitability the expenses of purchase department, receiving department and ware house are treated as overheads.

Discounts:

A reduction in the selling price of something

6.2 Meaning of Discounts

Discount is reduction allowed by the supplier in the invoice price of materials bought.

6.3 Kinds of discount

There are three kinds of discounts.

1. Trade Discount

It is a percentage allowed by the supplier on the purchase price. It is deducted from the invoice price.

2. Quantity Discount

It is a special discount given on large orders. The rate of discount varies according to the size of orders. This discount is also deducted from the invoice price of the goods purchased.

3. Cash Discount

It is an allowance made to the debtor for prompt payment of his dues.

Since the availability of cash discount is regarded as a matter of financial policy, it is not included in the computation of material cost.

Illustration :1

A factory bought 10 tons of material 'X' at the rate of Rs. 1,000 per ton, less 2% trade discount on invoice price. Freight paid was Rs. 300, Cartage and Coolie Rs. 100 and Octroi @ 5% on the invoice price. The expenses of purchases an shortage for the year amount to Rs. 20,000. Ascertain cost of material per kg. to be charged to jobs.

Solution

		Rs.	Rs.
Invoice price of 10 quintals @ Rs. 1,000		10,000	
Less: Trade Discount @ 2%		200	
			9,800
Freight			300
Cartage and Coolie			100
Octroi 5% on Invoice price			
Total cost			10,700
Cost per kg. =	10,700 / 1,000		10.70

6.4 Cost of containers

1) If the supplier has not charged the invoice separately for containers in which goods are delivered, there is no need for any accounting for them in calculating material cost. But if they can be resold, the resale price should

Containers:

Any object that can be used to hold things (especially a large metal boxlike object of standardized dimensions that can be loaded from one form of transport to another)

be estimated and credited to overhead or deducted from the material cost.

2) If the containers are separately charged by supplier and if they are not returnable or saleable, their value should be included in material cost.

3) Where the cost of containers is separately charged and they can be returned to supplier or resold, the difference between their cost and resale or return value should be included in material cost.

4) Where the supplier agrees to give credit to the fu" cost of containers charged by him in the invoice on their return, there so no need of including the cost of containers in the material cost on the presumption that they will be returned.

Illustration : 2

A consignment consisted of two chemicals A and B. The invoice gave the following data:

	Rs.
Chemical A - 4,000 kgs. (a) Rs. 5 per kg	20,000
Chemical B - 3,000 kgs (a) Rs. 6.50 per kg	20,800
Sales tax	1,632
Railway Freight	768
Total Cost	43,200

A shortage of 200 kgs in A and 128 kgs in B was noticed due to breakages. What is the stock you would adopt for pricing issues assuming a provision of 5% towards further deterioration?

Solution

Particulars	Chemical A			Chemical B		
	Kgs.	Cost per kg. Rs.	Total cost	Kgs.	Cost per kg. Rs.	Total cost Rs.
Invoice Price	4,000	5.00	20,000	3.200	6.50	20,800
Add: Sales tax		0.20	800		0.26	832
[ratio of value i.e,, 200:208] Add: Freight		0.104	426		0.106	242
[ratio of quantity i.e., 40:32]	4,000	5.304	21,226	3,200	6.866	21,874
Less: Breakage (Treated as normal loss)	200			128		
	3,800	5.58	21,226	3,702	7.16	21,874
Add: 5% Provision for deterioration		0.28			0.36	
Issue Price per kg.	—	5.86	—	—	7 52	—

Illustration : 3

A manufacturer of plastic toys, purchased two items of his raw material coded as GM - 3 and AR - 5. The invoice gave the following details:

GM - 3 1,200 Kgs (a) Rs. 4 per kg.	4,800
AR - 5 600 Kgs (a) Rs.6 per kg	3,600

	8,400
Less : Trade Discount	840
	7,560
Insurance, duty & Octroi	1,680
Packaging	450
Freight	360
Total	10,050

In transit 200 kgs of QM - 3 and 100 kgs of AR - 5 were spoiled in an accident. The packages could be sold for Rs. 225. He provides 5% for meeting loss due to evaporation which is natural with these materials.

Calculate the rate at which the issues may be charged.

Solution

Statement showing Material Cost

Particulars	Ratio	Chemical A			Chemical B		
		Kgs	Cost per Kg Rs.	Total Cost	Kgs	Cost per kg Rs.	Total Cost
Chemical at given price		1200	4800	4.00	600	3600	6.00
Less: Trade Discount							
(in the ratio value)	4:3		480	0.40		360	0.60
			4320	3.60		3240	5.40
Add: Insurance,							

duty and octroi	4:3		960	0.80		720	1.20
Add: Packaging	2:1		300	0.25		150	0.25
Add. Freight	2:1		240	0.20		120	0.20
			5820	4.85		4230	7.05
Less: Cost of material spoiled in an accident		200	970	4.85	100	705	7.05
(Abnormal loss)		1000	4850	4.85	500	3525	7.05
Less: Value of packages sold (basis- Quantity)	2:1		150	0.15		75	0.15
		1000	4700	4.70	500	3450	6.90
Add:5% Provision for evaporation (natural)				0.24			0.35
Material cost per kg.				4.94			7.25

6.5 Storage and issuing losses

Many items of stores do not permit exact measurement of issues. This gives rise to storage and issue losses. The following situations clarify this idea: i) Many liquids are amenable to temperature changes, which may increase *or* decrease the apparent volume taken from store

ii) The issue of a store item may be made in units, which are convenient but this unit may not correspond exactly with the units in which it is purchased.

iii) Wastage in stores may be inevitable due to evaporation or the difficulty of breaking bulk.

It is, therefore, necessary in these cases to ensure that (a) cost of production is charged with the true cost of the issues and (b) book stock is not necessary inflated because no allowance for wastage or necessary approximation has been made.

For calculating the material cost, adjustment in original price should be

made for normal storage and issuing losses. The calculation of normal loss and abnormal loss will create disagreement and different opinions. But, based on past experience and nature of stores item, the normal storage loss and issuing loss can be calculated.

The abnormal storage and issuing losses do not form part of cost of production. So they are directly charged to Costing Profit and Loss Account.

6.6 Control of Material Cost

The following organizational and operational procedure should be followed to achieve the maximum managerial control over material cost in the manufacturing concern.

1) The organisation should attempt budgeting of the sales, finished goods and production schedule. This step will provide useful guidelines for the smooth operation of a centralised purchase department.

2) The activities such as placing of orders, receiving, storing and issue of materials should be routines and systematised.

3) The use of integrated series of printed forms will prevent errors and help in fixing responsibilities.

4) The organisation should avoid unnecessary investment in inventory by using an adequate and effective system of internal check, balancing and "material accounting. This also helps in preventing frauds and thefts.

5) The organisation should maintain efficient records of quantities received, issued and the balance on hand of all materials along with the cost thereof.

6) The pricing of ail requisition and inventory balance should be attempted in such a way as to provide reliable cost of manufacturing.

7) The organisation should control accounting for acquisition and use of material by means of control accounts, subsidiary ledgers and material

usage reports.

8) The company should organise the material cost sections, administrative and supervisory staff in such a way that divisions can be made promptly and efficiently.

9) The organisation should use standard cost accounting system by setting standards for material cost.

Illustration : 4

A box maker bought 6,000 kgs, of cardboard Rs. 5 per kg. to manufacture boxes of one kg each. Of the off-cuts produced in process, 1,000 kgs. of off-cuts were suitable for making small boxes and 500 kgs, of off-cuts were sold as scrap for Rs.700. 4,000 good boxes were turned out and an additional 250 boxes which were spoiled in the process could be rectified at extra material of Rs.350.

Calculate 1) Material cost of big boxes

2) Waste in the process.

Solution

1) Statement showing Material Cost of Big Boxes

Particulars	Kgs.	Rs.
Raw Material @ Rs.5 per kg.	6,000	30,000
Less: Off-cuts used for small boxes i.e., @ Rs.5 per kgs.	1,000	5.000
	5.000	25,000
Less: Sale of scrap	500	700
	4.500	24.300
Add: Cost of rectification of 250 boxes (Material cost)		350
		24,650
Material cost per box = 24,650 / 4,250		5.80

2) Calculation of waste in the process

	Kgs.
Raw material purchased	6,000
Less: Output used for small boxes	1,000
Scrap sold (in Qty.)	500
Materials quantity in big boxes	4,250
	5,750
Wastage in process	250

6.7 Material Issue Control

Control over materials is exercised in three phases - first at the stage of purchasing, secondly at the time of issuing the materials to the various departments which actually use them and lastly at the point of store keeping. The first phase of materials purchase control was discussed in Previous Lesson. The second phase of material control i.e., controlling the issues of material is discussed here.

Materials received by the store-keeper and stored by him are ultimately meant for issue of production units. Since the responsibility to receive and store lies with the store keeper, he is accountable for every item issued. As such, material control necessitates issue control also.

Objectives of Controlling the Issue of Materials

The issue of materials is controlled with a view to ensuring that -

1) every issue of material from the stores is authentically authorised;

2) every issue of materials is properly accounted for;

3) every issue of appropriately priced;

4) every priced issue is correctly charged to the cost; and

5) every charged issue regularly reconciles with financial records. These objectives are discussed below in detail

1. Every issue is to be authorised

To safeguard against unauthorised issues of materials, there must exist the necessary authority for drawing the right type of material, at the right quantity and from the right lot. This can be ensured by a proper issue procedure laid down by the management. The first step in this issue procedure involves the preparation of a list of those persons who shall have the authority to draw materials from the stores. Normally, departmental supervisors are given this authority. The store keeper is given a list of the names and specimen signatures of such authorised persons. Materials are to be issued only against authentic Material Requisition Slips signed by the authorised personnel. The Requisition slip is prepared in triplicate so that two copies are sent to the stores and the third copy is retained by the requisitioning authority for reference purpose. The store keeper posts the requisition in the Bin Card, issues the requisitioned materials and forwards the first copy of the slip to the accounting section after signing thereon.

The quantity requisitioned must be covered by necessary sanction which is usually given in the form of a document called Bill of Materials. The Planning Department prepares this document by listing out the various items of materials that will be required in each department. The store keeper has to check up the relative Bill of Material whether the requisitioned material has been sanctioned for issue to the said department against the said job. If the Slip and the Bill reconcile with each other then the materials shall be issued; Otherwise, the slip is returned to the department with instructions to refer it back to the Planning Department for necessary sanction. Similar control is also exercised in respect of the quantity of each type of material by recording the quantity issued and balance still to be issued for each job. Like the Bill of Material and the Requisition slip, there are two more important, documents used for issue control; they are materials return note and materials transfer note.

NOTES

Authority:

The power or right to give orders or make decisions

Materials Return Note

When materials drawn for a job remain surplus after completion of the job, they are returned ' the stores through this Note. This is also prepared in triplicate and is dealt with in the same way i the Requisition slip. This ensures that the actual quantity of materials used is charged to the job id that the unused materials are added back to the stores. The Return Note is also useful to record e return of rejected materials, cut pieces off cuts etc.

Material Transfer Note

Whenever the surplus materials originally drawn against one job can be used against another in the same department, they need not be returned to the stores they can be used by the same department which shall have to prepare a Transfer Note and send it to the stores for proper accounting.

2. Issues must be accounted for

Every document of issue originating from the departments must be accurately accounted for it only in the stores but also in the accounting section. In the stores, the stocks issued shall be bitten off from the Bin Card and the accounting section records the issues to prepare the materials summary. For these purpose, all documents connected with issue of materials should be properly accounted.

3. Every issue must be properly priced

When materials are issued from the stores, they should also be priced appropriately for active control over the cost. The main objectives of pricing the issues are (a) to cover the purchase of materials (b) to reflect the current market price (c) not to cause any significant cost variation m period to period and (d) to avoid heavy adjustments in values at the valuation of closing stocks. There are different methods of pricing the issues. A detailed discussion on these methods is given other.

4. Every issue must be charged to the cost

When every Material Requisition slip is priced, the cost represented by the slip should be correctly charged to the relative costs entered as well as the job number therein. This actually quires processing the Material Requisition slips with reference to cost centres and the job number each cost centre.

The cost centres should be specifically determined so that the responsibility for the materials drawn against such centres can be related to individuals within each cost centre, specific numbers are assigned to each job so as to cover production orders, service orders and stock orders- The analysis of Requisition slips both by cost centres and job order numbers is depicted in the form of a statement below.

Material Cost summary

Date	Abstract No.	Total Rs.	Cost centre X				Cost centre Y			
			Job Nos.				Job Nos.			
			Total Rs.	101	102	103	Total Rs.	201	202	203
1997										
Jan. 1	301	6.350	4,500	1.250	1,750	1.500	1,850	750	500	600
11	302									
21	303									

NOTES

5. Every issue must be reconciled with Financial Records

When the materials are purchased, such transaction are debited in the financial books against the bills paid and the Stores Ledger is debited against the Store Receipt Note- However, when the materials are issued from the stores, both the financial books and the Stores Ledger are getting the credit entries from the same source, namely Material Requisition Slip. The issues that are written off the stores stock account in the financial books is the consolidated sum of the issues of materials as derived from Materials Cost Summaries. This total is posted periodically. Since both the financial books and the Stores Ledger get entries for the same purchases and issues of materials they should show the same balance, however, if there is any difference between these two records, they should be reconciled by unearthing the errors of omissions and commissions in the postings. This process of periodical reconciliation avoids any difficulties in compiling the Stock figures at the year end.

Reconciliation:

Getting two things to correspond

Stores Cost Statements

These statements prepared periodically provide information on i) the item of consumption ii) the quantity of consumption Hi) the value of consumption and iv) the cost centre of consumption. The details to be provided in such a statement depend upon the person to whom it is presented. For instance, the departmental foreman shall be interested in the items; and the quantity under each item; whereas the Works Manager may be interested in the value of consumption in each centre. So the statement is prepared to suit the requirements of the person using it. A specimen statement in a general form is given below :

Stores Cost Statement

Cost Centre : For the month of .

Foreman:

	Target	Actual	Difference
Production : Units Production : Targets Value of Issue			

SL No	Description	Unit	Actual			Targets		
			Qty.	Value Rs.	Per Unit Rs.	Qty	Value Rs.	Per Uni
1								
2								
3								
4								
5								
	Total							

Model Questions:

1. X Ltd received a consignment consisting of two chemicals namely A and B the invoice showed the following details

Chemical A – 8,000 Kgs (a) 4 per kg	32,000	
Chemical B – 6,000 kgs (a) Rs. 3 per kg	18,000	
	50,000	
Less : Quantity discount	2,000	
	48,000	
Add other charges sales tax duty insurance	2,500	
Containers (returnable at 75% of their value)	350	
Carriage	140	
Freight	210	3,200
		51,200

5% of cash discount on payment within a week. 500 kgs of each material were found short on account of theft in transit. Calculate cost per unit of each chemical. The company provides 5% for further deterioration.

(Ans: 1. Cost of Material A - Rs. 4.27 per kg. and B - 3.21 per kg.

2. Value of containers returned for material A Rs. 141 and material B Rs. 103.

3. Cash discount is ignored, since it is a matter of financial policy.)

2) Sri Charan has a factory where he manufactures certain tiny spare parts for a machinery. The production is done in batches. The following is the information relating to batch number 15-75. .

a) Total input 2,000 kgs at the rate of Rs. 4.50 per kg.

b) The off-cuts and trimming resulted from the process amounted to 500 kgs. the value of which is estimated to be Rs. 800.

c) Some units were spoiled, of which units weighting 75 kgs could be disposed for a nominal price of Rs. 100/- and the remaining were improved at an additional expenditure of Rs. 300/-.

d) 7,000 units were produced, each of them weighing 0.20 kg.

scertain cost per unit of final product. Determine the quantity of wastage.
(Ans: Cost per unit Rs. 60; wastage - 25 kgs)

3. From the following particulars, workout the issue rate per 1,000 ot first class and second class bricks.

a) Paid for supply at the kilo site for 30 lakhs first class bricks (a) Rs. 30% per 1,000 bricks.

b) Paid for supply at the kilo site for 60 lakhs second class bricks (a) Rs. 25% per 1,000 bricks.

c) Paid carriage charges for carrying all bricks from kilo to store yard (a) Rs. 1.50 per 1.000 bricks.

d) Paid unloading charges Rs. 90. (lump sum)

e) Paid for stocking in the store yard: Rs. 180 (lump sum)

f) Breakage in handling: 1% for first class bricks. 2% for second class bricks.

(Ans: Cost of 1,000 First class bricks - Rs. 31.85: Cost of 1.000 Second class bricks Rs. 27.07).

4. A lorry load of materials of mixed grades was purchased for Rs. 9.000. They are sorted into following grades whose market rate is shown against each.

Grade	Unit	Selling rate per unit
A	5,000	Rs.1.20
B	3.000	Rs. 1.00
C	2,000	Rs, 0.50

Find the purchase rate per unit of each grade of material, assuming all grades yield the same rate of profit.

Ans: (Purchase rate per unit of A = Rs. 1.08; B = Re. 0.90 and C - Re. 0 45)

5. Briefly explain the objectives of controlling the issue of materials.

6. Explain the procedure to be followed for controlling the material cost in a manufacturing unit.

Lesson -7

Material Pricing

Materials are purchased and stored for the purpose of consumption in the production process. As such Materials are issued against Materials Requisition slips. These slips are passed on by the stores keeper to the cost accounting department for pricing the materials to be issued sc that issues can be valued and the amount entered in the Stores Ledger. Subsequent, the job or the work order for which the issues were made is debited with the value of the materials so issued- Pricing of materials issues is thus, an important element in the materials management.

7.1 Objectives of Pricing Issues

The main objective of pricing the materials at the stage of issue itself is the ascertainment of the cost of materials in a job or work order. However, pricing of issues is equally important for inventory costing. Therefore, it can be said that the twin objectives of pricing issues are.

i) To charge the cost of materials consumed to production on a consistent and realistic basis; and

ii) To provide a scientific basis for valuation of inventories.

7.2 Problems of pricing issues

When materials are purchased for consumption in a specific job. there is no problem in pricing because their purchase cost can be entirely debited to the job. In effect, there is no difference between the issue rate and. the purchase rate Contrarily. When purchased materials are put into stock and the issues are made again different jobs or work orders, the problem of pricing arises. When the price of materials is not stable during a period different consignments have different costs. The problem of pricing under such conditions arises because the materials

lose their identity when mixed in the stock and yet have different purchase costs.

Therefore, a proper method of pricing issues must be consistently followed.

7.3 Methods of pricing issues

There are several methods of pricing the materials issued. Every one of these methods has its own merits and limitations. Therefore, it is not possible to describe any one method as the best. Each organisation has to choose a method best suited to it. But whatever be the method it must be followed consistently and uniformly throughout the organisation. The different methods of pricing are grouped as under.

I. At Cost or Actual Price Method

1) Specific price

2) First-in-first-out (FIFO)

3) Last-in-first-out (LIFO)

4) Base stock

5) Highest-in-first-out (HIFO)

6) Next-in-first-out (NIFO)

7) Average Price Methods:

i) Simple average price

ii) Weighted average price

iii) Periodic simple average price

iv) Periodic weighted average price

v) Moving simple average price

vi) Moving weighted average price

II. Standard Price Method

III. Market Price Method

IV. Inflated Price Method

V. Re-use Price Method

A detailed discussion on the merits and limitations of each of the methods is presented below with illustrations.

1. Specific Price Method

Specific Price method:

The materials specifically purchased are issued for a specific job.

Specific price refers to the purchase price of the materials (i.e., the actual invoice price). Under this method the identity of the materials purchased every time is maintained so that the relevant invoice price of the materials purchased is charged to the issue. In other words, the purchase price and the issue price are one and the same. This method is practicable only when materials are purchased for a specific job.

Merits

1. Since materials issues are priced at cost, no profit or loss arises from the issue pricing.
2. It is suitable for pricing expensive and special purpose items of materials.
3. Closing inventory is valued at cost easily.

Limitations

1) A lot of clerical work is involved in maintaining independent records.

2) Difficulty arises in maintaining the identity of each stem or batch.

3) Identification of issues for a particular job is difficult when the issues are numerous,

2. First-in-First-out (FIFO) Method

FIFO Method:

Different lots of the same material received are noted in the order in which they have entered into the stock.

Basic assumption of this method is that the materials received in successive lots are placed one above the other. As such issues are supposed to be made in the order of receipt of the lots, i.e., the lot which was received first must be issued first, then the second lot to be issued next and so on. This facilitates identification of each lot and its cost is charged to the relevant issue. Thus issues are priced on the basis of the order of receipt whether the issues are actually made in that order or not.

Merits

1) Pricing is based on actual cost.

2) It is in compliance with the store keeping principle, i.e., the oldest items are issued first to avoid deterioration.

3) Closing stock, valued at cost of the latest arrivals, reflects current market price. It is suitable for slow-moving items of high-cost.

Limitations

1) The cost of production, under this method fluctuates from period to period when the prices fluctuate.
2) During periods of rising price product costs are under estimated and profit overstated. The opposite is the effect during periods of falling prices.
3) Cost comparison between jobs is difficult because two similar jobs may be charged with materials at different prices.

This method is illustrated below.

Illustration : 1

The receipts side of stores ledger account shows the following details:-

500 units purchased @ Rs. 3.00 .

700 units purchased @ Rs. 3.10

400 units purchased @ Rs 3 20

Successive issue were made of 300 and 1,000 units. What would be the placements of the issues under the FIFO method?

Solution

Stores Ledger

Material.... S.L. Folic No

Code No .... Maximum Level....

Ordering Level Minimum Level

Date	Receipt			issue			Balance		
	Qtv-	Rate Rs.	Amount Rs	Qty.	Rate Rs.	Amount Rs.	Qty.	Rate Rs.	Amount Rs.
	500	3.00	1.500				500	200	1,500
	700	3.10	2.170				1,200	3/3.10	4670
	400	320	1,280				1.600	350	4,960
				300	3.00	900	130C	3/3.10	4.050
				1.000	3/3.10/3.20	3.090	300	350	960

Workings

		Rs.
Issues 300 units Rs. 3.000 per unit	=	900
Balance of 1,300 units valued as follows		
		Rs.
First 200 x 3.00	=	600
700 x 3.10	=	2,170
400 x 3.20	=	1,280
Total		4,050

II. Issue of 1000 units priced as follows		Rs.
200 x Rs. 3.00	=	600
200 x Rs. 3.10	=	2,.170
100 x Rs. 3.20	=	320
Total	=	3,000

Balance of 300 units valued as follows		
300 x Rs. 20 per unit	=	960
		Rs.
I issue cost	=	900
II issues cost	=	960
Balance stock cost	=	960
Total	=	**4,950**

Illustration : 2

Following are the details regarding the Receipts and Issues of materials in an organisation. Issues are priced under the FIFO method. The stock verifier noticed a shortage of 5 kgs, of materials on 15th September. Write out stores Ledger Account regarding the transactions.

2003		Kgs..			Rs. P
Sep. 1	Opening balance	500	@		25.00
3	Issue	70			
4	Issue	100			
8	Issue	80			
12	Receipt	200	@		24.50
14	Refund of surplus from work order	15	@		24.00
16	Issue	180			
20	Receipt	240	@		24.37
24	Issue	304			

Solution

STORES LEDGER

Material SL. Folio No.

Code No Maximum Level....

Ordering Level Maximum Level...

Date	Receipts			Issues			Balance		
	Qty Kgs	Rate Rs	Amt Rs.	Qty Kgs	Rate Rs	Amt Rs.	Qty Kgs	Rate Rs	Amt Rs.
20031	-	-	-	-	-	-	500	25.00	12,500
3	-	-	-	70	25.00	1.750	430	25.00	10.750
4	-	-	-	100	25.00	2.500	330	25.00	8,250
8	-	-	-	80	25.00	2,000	250	25.00	6,250
12	200	24.50	4,500	-	-	-	250 200	25.00 200	11,150
14	15	24,00	360	-	-	-	15 250 200	24.00 25.00 24,50	11.510
15	-	-	-	5 (Shortage found)	24.00	120	110 250 200	24.00 25.00 24.50	11.390
16.	-	-	-	10 170	24.00 25.00	4,490	80 200	25.00 24.50	6.900
20	240	24.30	5.932	-	-	-	80 200 240	25.00 24.50 24.30	12.732
24.	-	-	-	80 200 24	25.00 24.50 24.30	7,483.20	216	24.30	5,248.80
						18,343.20			5,248.80

3. Last-in-First-out Method (LIFO)

Under this method, the materials issued are priced on the assumption that the materials received last are issued first. As such, the issue price at a point of time reflects the market price ruling at the time. As a result of the adoption of this technique, the cost charged to manufacture differs from period TO period when prices of materials fluctuate. Similarly, closing stock valuation also requires periodical adjustments. Closing stock does not reflect the ruling market price and hence, when the prices are falling the closing stock values under LIFO method shall be greater than the market price; however during periods of raising prices, the value of closing stock shall be less than the market value and shall, therefore, be left unadjusted (stock should be valued at cost or market value which ever is less). Pricing of issues under this LIFO method and the computation of the value of consumption is illustrated below.

Illustration : 3

From the following particulars for the month of April 2003, prepare a Stores Ledger A/c for the month ending April 2003 using the Last-in-First-out (LIFO) method:

1.4.03	-	Closing stock of materials - 500 units @ Rs.2
2.4.03	-	Purchased 500 units @ Rs.2.50
3.4.03	-	Issued to the factory 600 units
6.4.03	-	Issued to the factory 100 units
10.4.03	-	Purchased 200 units @ Rs.3
12-4.03	-	Purchased100units@Rs-2.75
15.4.03	-	Issued to the factory 300 units
19.4.03	-	Purchased 200 units @ Rs.3
22.4.03	-	Issued to the factory 100 units

27.4.03 Issued to the factory 50 units

Solution:

STORES LEDGER

Date	Receipt			Issue			Balance		
	Qty Kgs.	Rate Rs.	Amt. Rs.	Qty Kgs.	Rate Rs.	Amt. Rs.	Qty Kgs.	Rate Rs.	Amt. Rs.
2003	...	...	...	...	—	—	500	2.00	1.000
April 1									
	500	2.50					500	2.00	2.250
							500	2.50	
3	—	—	1,250	500	2.50	1.450	400	2.00	800
				100	2.00				
6	—	—	...	100	2.00	200	300	2.00	600
10	200	3.00	600	...	—	...	300	2.00	1,200
							200	3.00	
12	100	2.75	275		...	...	300	2.00	1.475
							200	3.00	
15	—	—	—	100	2.75	875	300	2.00	60,0
				200/	3.00				
19	200	3.00	600	...	...	—	300	2.00	1.200
							200	3.00	
22	—	—	—	100	3.00	300	300	2.00	900
							100	3.00	
27	—	—	—	50	3.00	150	300	2.00	
							50	3-00	750

4. Base Stock Method

Under this method, a fixed quantity of materials is always held as the minimum stock and it is valued at the original cost. This base, or minimum stock is considered as a fixed asset and is not normally issued to production unless an emergency requires the consumption of such a stock. In practice, the base stock is always a part of the first lot purchased and it is valued at actual cost. The quantity of materials over and above this base stock may be priced on the basis of FIFO or LIFO or some average method. This Base Stock method is generally used in industries having a relatively long processing period and where the cost of finished product is largely made up the basic raw materials (e.g. hides & crude oil).

Base stock method:

Minimum balance of stock is called the base stock method.

Merits

1) It does not result in unrealised profit or loss

2) It simplifies the inventory valuation

3) It facilitates the matching of cost with current selling price.

Limitations

1. The assumption that base stock is a fixed asset is not scientific one.

2. Estimation of base stock may be difficult.

3. It is not an independent method and it suffers from the disadvantage of FIFO, LIFO or other average method adopted for valuation of the remaining stock.

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

As the name of the method suggests the HIFO method assumes that it is desirable to maintain the closing inventory value at the lowest possible price. Therefore, materials with highest price in the stock are treated as issued first

irrespective of the date of purchase. In other words, materials of the lot purchased at the highest price are first issued to production irrespective of the order or receipt. When the whole lot is exhausted, materials issued to production thereafter must be priced at the next higher price at which materials of the respective lot were purchased. This method sounds well only in theory but in practice, it is" not much popular.

Merits

1. It ensures, the recovery of the highest price of the materials first.

2. Since it recovers actual cost, there is no room for unrealised profit or loss.

3. Closing stock is valued at the minimum possible price and this is in conformity with the accounting principle conservatism.

Limitations

1. During periods of rising prices, the valuation of closing stock under this method accounts to undervaluation and hence results in creation of secret reserves.

2. It results in equitable comparison of job costs.

3. Calculations are tedious.

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

This method uses the price of the materials next to be received as the basis for pricing the issues, i.e., issues are priced at the cost of materials which have been ordered but yet to be received. This method is of no practical significance and is rarely in vogue.

7. Average Price Method

These methods are based on two assumptions. They are

1) When different lots of materials are received into the store, their identifies are lost and or that reason materials issued cannot be easily traced to a specific lot.

2) The wide fluctuations in the prices of purchases should be smoothened and the change in the issue price should be gradual. Based on these assumptions the prices of materials purchased are averaged for the purpose of pricing the issues. The average price in this context may be a pimple average *or* a weighted average or a variation of these. These methods are discussed below.

(i) Simple average price method

Under tins method, issues are priced at the average purchase cost computed as follows:

$$\text{Average price} = \frac{\text{Sum of unit prices of different lots in stock}}{\text{Number of lots in stock}}$$

Thus, irrespective of the number of units in each lot, the price per unit in respect of each lot is taken into consideration: these prices are added and the sum is divided by the number of lots considered. Suppose the following are the four different lots of materials in stock (available for issue).

500 units @ Rs. 6.00 per
unit 1000 units @ Rs- 6.50
per unit 1250 units @ Rs.
7.00 per unit 2000 units @
Rs. 8.50 per unit

The average price in this case will be calculated as follows

$$\text{Average Price} = \text{Rs.} \frac{6 + 6.50 + 7 + 8.50}{4}$$

$$= \text{Rs. } 7 \text{ per unit}$$

Periodic simple average:

In this method the total value of the purchases is divided by the total number of prices during the accounting period to find average price.

(ii) Periodic simple average

Under this method, the average price is calculated not at the time of every issue (as in the previous case) but calculated periodically, say, once in a week or month. To compute the issue rate, the unit prices of all lots received during a particular period are added and the total is divided by the number of prices, ignoring the price of the opening stock. The rate thus computed is used to price all issues made during the next period. The closing inventory is also valued at the same rate.

(iii) Moving simple average

This method is similar to the periodic simple average method except that the average price is found out by dividing the total of the periodic simple average prices for a given number of periods by the number of periods. To determine the moving simple average price. It is first necessary to fix up the number of periods, say, months. If, for example, a six monthly period is taken and the moving average price for the month of June is to be calculated, we have to make a list of periodic simple average prices for the months January to June. These average prices for the six months are to be-added up and the sum is to be divided by 6. To calculate such an average price for the month of July, the average price for the month of January is to be deleted from the list and the average price for the month of July is to be added therefore so that the list always contains monthly average

prices for six months. The total of this list is as usual divided by six to get the moving simple average price for July. This prices of deletion and addition in the list is repeated every month to compute that month's moving simple average price.

(iv) Weighted average price Method:

Weighted average price method:

It is calculated by dividing the value of stock in the stores by the quantity in the stock from which materials are to be issued.

This method provides a contrast to the simple average method. The weighted average takes into consideration both the quantity and the unit price in respect of each lot of materials purchased. The weighted average is calculated by multiplying the unit prices by weights, the weights being the quantities of the respective lots. These products are added and the sum is divided by the total quantity of all lots.

$$\frac{(Q_1P_1) + (Q_2P_2) + (Q_3P_3)+.....}{Q_1+Q_2+Q_3 +}$$

where Q_1 Q_2, Q_3 are the quantities of the different lots of purchases.

$P_1.P_2.P_3$ are the price per unit of the respective lots. Thus, the weighted average price is calculated by dividing the total costs of all lots in stock by the total quantity of all such lots. In effect, this is the average unit cost when all units in the stock are taken into consideration.

Illustration : 4

From the following particulars for the month of January 2003, calculate the values of issues and the closing stock using the method of weighted averages pricing assuming that the issued are under FIFO.

1.1.03 Opening stock 300 kgs @ Rs. 30 per kg.

2.1.03 Received 150 kgs. @ Rs. 40 per kg.

3.1.03 Issued 200 kgs.

4.1.03 Issued 150 kgs.

5.1.03 Received 50 kgs. @ Rs. 50 per kg.

6.1.03 Originally issued on 2.1.97 now returned to store 10 kgs.

Solution

STORES LEDGER

(weighted Average & FIFO)

Date	Receipts			Issues			Balanc		
	Qty. Kgs.	Rate Rs.	Amt. Rs.	Qty. Kgs.	Rate Rs.	Amt. Rs.	Qty. Kgs.	Rate Rs.	Awit Rs.
2003									
Jan. 1	—	—	—	—	—	—	300	30.00	9,00(
2	150	40.00	6,000		—		450	33.33	15,00(
3	....	....	—	200	33.33	6,667	250	33.33	8,33
4				150	33.33	5,000	100	33.33	3.33
5	50	50	2,500	—	....	—	150	33.88	5.83
5				100	3B.88	3.888	50	38.88	1,94
6	10	33.33 (Refund	333	....	....		60	37.96	2.278

Current issue rate = Rs 37.96 per kg.

Workings:

Issues were priced as follows:

2.1. $\frac{(300x30)+(150x40)}{300+150} = \frac{15,000}{4.55} = 33.33$

3.1 03: 200 Kgs x Rs. 33.33 = Rs. 6.667

4.1. 03: $\frac{(15.000-6,667)}{250} = \frac{8,333}{250} = 33.33$

5.1 03: $\frac{(100x33.33)+50x50}{100+50} = \frac{5,833}{150} = 38.88$

5.1 03: 100 kgs x Rs. 38.88 = Rs. 3,888

6.1.03: $\frac{1.945+333\ 2,278}{50+1060}$

(v) Periodic weighted average price

Under this method, the weighted average price is computed with reference to a particular period. In other words, the average issue price is computed by taking to consideration quantities purchased during a particular period (say, a month) and unit prices. Thus the total cost of purchased made during a period is divided by the total quantity purchased during that period. The value and quantity of opening stock should, however, be ignored in computing the average issue price.

Illustration : 5

From the following data, prepare the Stores Ledger using

(A) Periodic simple average (monthly)

(B) Periodic weighted average (monthly)

2003

March 1 Stock on hand 100 kgs @ Rs. 2.00 per kg.

5 Purchases 200 kgs @ Rs. 3.00 per kg.

10 Issues 120 kgs

16 Purchases 250 kgs (a) Rs. 3.20 per kg.

20 Issues 150 kgs

31 Purchases 100 kgs @ Rs. 3.40 per kg.

April 14 Issues 300 kgs

16 Purchases 200 kgs @ Rs. 3.60 per kg.

19 Issues 150 kgs.

25 Purchases 100 kgs @ Rs. 4.00 per kg.

Solution:

STORES LEDGER

(Periodic Simple Average)

Date	Receipts			Issues			Balance		
	Qty Kgs.	Rate Rs.	Amt. Rs.	Qty Kgs.	Rate Rs.	Amt. Rs.	Qty Kgs.	Rate Rs.	Amt! Rs.
2003						....			
March 1							100	2.00	200
5	200	3.00	600				300		
10				120			180		
16	250	3.20	800				430		
20				150			280		
31	100	3.40	340				380		
Total		3.20 (Average		270	3.20	864	380	3.00	1.216
April 1							380	3.20	1.216
14				300			80		
16	200	3.00	720	150			280		
19							130		
25	100	4.00	400				230		
Total		3.80 (Average		450	3.80	1.710	230	380	874

STORES LEDGER

(Periodic Weighted Average)

Date	Receipts			Issues			Balance		
	Qty. Kgs.	Rate Rs.	Amt. Rs.	Qiy. Kgs.	Rate Rs.	Amt. Rs.	Qty- Kgs.	Pale Rs.	Amt. Rs.
2003									
March 1							100	2.00	20
5	200	3.00	600				300		
10				120			180		
16	250	3.20	800				430		
20				150			280		
31	100	3.40	340				380		
Total	5b0	3.16 [= 1,740 5501	1,740	270	3.16	853.20 [=270x 3.16]	380	3.16	1,200.80 [=380x 3.16]
April 1					....	....	380	3.16	1,200.80
14				300			80		
16	200	3.60	720				280		
19				150			130		
25	100	4.00	400				230		
Total	300	3.73 [=1,120 300]	1,120	450	3.73	1,678.50 1= 450 x 3.73]	230	3.73	57.90 [= 230 x 3.73]

(vi) Moving weighted average price

Under this method, the periodic weighted average prices for a given number of periods are first calculated. These periodic weighted average prices are then summed up and the sum is divided by the number of such periods. The moving weighted average is calculated by deleting the earliest period and adding the latest period in the list of the given number of periods.

Illustration : 6

Compute the Moving weighted average prices for the months of August and September 2003 from the following data on basis of 5 months period.

April	100
May...	110
June....	105
July....	110
August....	115
September....	105

Solution

2003	Monthly Weighted Average price per Kg.	5 Monthly moving Weighted	5 Monthly moving
April	100		
May	110		...
June	105	...	
July	110		
Aug.	115	540(A)	108(B)
Sep.	105	545(C)	109(D)

Notes:

(A) 100+ 110+ 105 +110+ 115 = 540

(B)540 /5=108

(C)540-100 + 105=545

(D)545/ 5 = 109

Standard price method:

This price is a predetermined price fixed on the basis of all factors affecting the price.

II. Standard Price Method

Under this method, issues are priced on the basis of a standard price fixed for a specific period. The standard price is defined as "a pre-determined price fixed on the basis of a specification of all factors affecting that price". Thus the standard price is fixed for a future period on the basis of factors like quantity of materials to be purchased in future, their present prices and future price trends forecast. The standard price is only a notional price and is not based on actual purchase cost. This method is adopted where the standard costing system is in practice. The difference between the standard price and the actual price is called price variance and it is transferred to Material Price Variance Account.

Illustration : 7

Prepare the Stores Ledger A/c from the following particulars on the basis of standard pricing system.

2003 June 1' Opening Stock -100 units @ Rs. 41 per unit

4 Purchases - 50 units @ Rs. 42 per unit

8 Issues - 80 units

12 issues - 50 units

15 Purchases - 100 units (a) Rs. 44 per unit

20 Issues - 60 units

25 Issues - 30 units

28 Purchases - 40 units @ Rs. 45 per unit

30 Issues - 50 units

The standard material price is Rs. 40 unit ..

Solution:

STORES LEDGER ACCOUNT

Date	Receipts			Issues			Balance		
	Qty.	Rate Rs.	Amt. Rs.	Qty. Kgs.	Rate' Rs.	Amt. Rs.	Qty. Kgs.	Rate Rs.	Amt. Rs.
2003 June 1	....	—	....	....	....	....	100	41.00	4.100
4	50	42.00	2,100	....	....	—	150	—	6,200
8		—	....	80	40.00	3.200	70	—	3,000
12	—	....	....	50	40.00	2,000	20	—	1,000
15	100	44.00	4,400	—	....	—	120	—	5,400
20	....	—	....	60	40.00	2,400	60	—	3.000
25		—	—	30	40.00	1,200	30	—	1,200
28	40	45.00	1,800	....	....	—	70	—	3.600
30	....	—	—	50	40.00	2,000	20	—	1,660

Standard Value of closing stock 20 units x Rs. 40 = 800

Actual Value of closing stock = 1,600 Price

Variance

(Adverse) (transferred to Price Variance Account) = 800

III Market Price Method

Materials issued to production are period under this method at the market price prevailing on the date of issue. The principle of this method is that cost should reflect the current market conditions of the market. The market price may be the replacement price or the realised price. If this distinction is adopted, materials meant for consumption are valued at a price at which they can be replaced, (i.e., prevailing market price) while the furnished goods meant for sale should be valued at realised price.

Inflated price method:

This method aims at covering the costs of contingencies in addition to the purchase price.

IV Inflated Price Method

Under this method, material issues are priced over and above their cost- This excess amount is added to the cost of materials to recover contingent expenses and losses. The inflated price, thus recovery the cost as well as losses arising out of evaporation, leakage, breakage, spoilage and shortage due to loading and unloading of materials. Instead of adopting the overhead recovery rate for absorbing such losses and expenses, this method treats them as a direct charge to materials consumed.

V Re-use Price Method

Wherever materials issued to production are found unusable they are rejected and returned to stores. Such materials may sometimes be put to an alternative use. In such cases, materials issued fur alternative uses are valued at a price different from the purchase price, such a price is termed as re-use price.

Pricing of Returns

Materials issued to production departments may be returned to stores. Such returns may be of the following types

(i) Unused quantities of materials remaining in their original form, (ii) Materials requisitioned for a specific job order which was late cancelled,

(iii) Residuals, scraps, waste.

Materials thus returned to stores are recorded in the respective Bin Cards as well as in the stores. Ledger either as additional receipts or as deductions from issues. The unused returned materials are valued in one of the following ways.

At the Original Issues Price

Under this method, returns are recorded in the Stores Ledger at a price at which they were originally issued. The relevant requisition slips are used for determining the original issue price.

At the Current Issue Price

Under this method, materials returned to stores are recorded at the same rate at which similar materials are issued presently.

The pricing of residual materials, scrap, waste and spoiled materials shall be done on different bases depending upon the condition of the materials returned. These returns are recorded and priced separately so that they are not mixed with other types of returns.

Illustration : 8

The following details are given of a certain material for the month of March 2003.

2003 March 1 Opening Stock - 200 tons at Rs. 460 per ton.

4 Issue to job No. 1-140 tons

7 Purchase - 350 tons at Rs. 450 per ton.

9 Condemned due to deterioration in quality and transferred to scrap - 30

tons.

10 Issue to job No. 2 - 8 0 tons.

13 Issue to job No. 3 - 2 1 0 tons.

18 Purchase - 200 tons at Rs.480

20 Issue to job No. 4 - 120 tons.

26 Purchase -180 tons at Rs. 470.

28 Issue to job No. 5 - 280 tons.

31 Excess found in stock - 40 tons, reason traced to the use of wrong measure during the month.

Show the Stores Ledger entries assuming (1) FIFO and (2) LIFO as the pricing system.

Solution

STORES LEDGER

FIFO Method

Date	Receipts			Issues				Balance		
	Units	Rate	Rs.	Job	ums'	Rate	Rs.	Units	Rate	RS.
2003								200	460	92,000
Mar										
4	—	—	—	1	140	450	64.400	60	460	27,600
7	330	450	1,57.500	—	_	—	_	60	460	27.600
								350	450	157500
9				Soap	30	460	13,800	30	460	13,800
								350	550	157.000
10				2	30	460	13,800	300	450	135.000
					50	460	22.500			
13				3	210	450	94,500	90	450	40.500
18	200	430	96,000	—	—	_	—	90	450	40.500
								200	480	96,000
20	—	—		4	90	450	40.500	170	480	81.600
					30	480	14.400			
26	180	470	84,600	—	—	—	—	170	480	81,600
								180	470	81,600
28	—	—	—	5	170	480	81.600	70	470	32,900
					110	470	51,700			
31	40	470	18,800					110	470	51,700

Note

1) Scrap is valued according to usual issue rate under FIFO

2) Excess of stock is valued at current issue price i.e., Rs. 470

3) Surplus stock is transferred to Costing P&L A/c, as it is an abnormal gain due to unavoidable cases.

STORES LEDGER

LIFO METHOD

Date	Receipts			Issues				Balance		
	Units	Rate	Rs.	Job	ums'	Rate	Rs.	Units	Rate	RS.
2003	-							200	460	92,000
Mar										
4	—	—	—	1	140	450	64.400	60	460	27,600
7	350	450	1,57.500	—	–	—	–	60	460	27.600
								350	450	157500
9	-			Soap	30	460	13,800	60		27,600
								320		
10	-			2	30	460	36,000	60		1.44.000
						460		240		
13	-			3	210	450	94,500	60		27,660
								30		13,600
18	200	430	96,000	—	—	–	-	60		27,600
								30		13,600
								200		96,000
20	—	—		4	120	450	57,600	60		27,600
						480		30		13,500
								80		38,400
26	**180**	470	84,600	—	—	—	—	60		27,600
								30		13,500
								80		38,400
28	—	—	—	5	180	470	84,600	60		27,600
					80	480	38,400	10		4,500
31	40	470	18,800	--	-	-	-	60		27,600
								10		22,500

Note Surplus stock is valued at Rs. 450 (Current issue rate)

Illustrations : 9

Enter the following transactions in the Stores Ledger of 'X' material using (1) the FIFO Method and (2) LIFO Method.

2003

Jan 1 Balance 200 units @ Rs. 1 per unit

5 Issued 50unitson M.R-No.41

6 Received 800 units Vide G.R. No. 3 @ Rs. 1.10 per unit

9 Issued 300 units on M.R. No. 43

10 Returned to stores 20 units issued on M.R. No. 41 13 Received 300 units, per G.R.No. 5 @ Rs. 20 per unit

.16 Issued 320 units (M.R. No. 63)

18 Received 100 units, Vide G.R. Note @ No. 67 Rs. 1.20 per unit.

20 Issued 120 units, (M.R.No. 82)

22 Returned to vendors 40 units from G.R.No.67 received on 18instant.

25 Received 200 units on (G.R.No. 86) @ Re. 1 per unit

28 Freight paid on purchase (Vide G.R.No.86) Rs. 50

30 Issued 250 unit on M.R.No. 93

Note :M.R. - Material Requisition

G.R.Note - Goods Received Note.

Solution

STORES LEDGER

(1) FIFO Method

Date	Receipts			Issues					Balance		
	G.R. Note	Units Kgs.	Rate Rs.	Amt. Rs.	M.R. No.	Units Kgs.	Rate Rs.	Amt. Rs.	units Kgs.	Rate Rs.	Amt. Rs.
2003	—			—	—		—	—	200	1.00	200
Jan. 1											
5	—		—	—	41	50	1.00	50	150	1.00	150
6	3	800	1.10	880	—	—	....	—	150	1.00	150
									800	1.10	880
9	—	—	—	—	43	150	1.00	150	650	1.10	715
						150	1.10	165			
10		20*	1.00	20	....	....	....	—	20	1.00	201
									650	1.10	715
13	5	300	1.20	360	....	....	....	....	20	1.00	20
									650	1.10	715
16	—	—		....	63	20	1.00	20	350	1.10	385
						300	1.10	330	300	1.20	360
18	67	100	1.20	120	....	—		....	350	1.10	385
									400	1.20	480
20	—	—		—	82	120	1.10	132	230	1.10	253
									400	1.20	480
22		—		—		40	1.20	44	230	1.10	253
									360	1.20	432
25	86	200	1.25	250	....	....	—	....	230	1.10	253
									360	1.20	432
30	—	....	—	....	93	230	1.10	253	340	1.20	408
						20	1.20	24	200	1.25	205

Note:

1) Material returned to the stores is taken at the price which was originally issued and reissued at the same price in the very next issue. This practice appears to be consistent with FIFO principle which charges earliest price first. Alternatively, it may be treated as fresh purchase. But as for as possible, it should be treated as from the original lot and issued first.

2)** Goods returned to vendors are priced at the price at which they have been purchased (G.R. Note 67) as they were yet in stock.

Model Questions

1. Bring out the materials and limitations of at Cost or Actual Price Methods.

2. Compare and contrast FIFO and LIFO Methods.

3. Discuss 'Standard Price' method. What are its advantages and disadvantages?

4. Describe the following methods of valuing materials issued to production and discuss advantages and disadvantages.

   a) Simple average method b) Weighted average method c) Replacement Price.

5. The following figures are available in stores department in respect of June 2003.

   June 2003

   1 Received 500 units @ Rs. 2 each

   12 Received 350 units @ Rs. 2.10 each

   13 Issued 600 units

24 Received 600 units @ Rs. 2.20 each

25 Issued 450 units

26 Received 500 units @ Rs. 2.30 each

27 Issued 510 units

28 Issued 100 units

Prepare Stores Ledger Account under, FIFO Method, as well as under LIFO Method.

6. Given below is a statement of stores transactions relating to material "X\ Write up Stores Ledger for this item using weighted average cost method.

Jan 2003

1 Balance 200 pieces @ Rs. 2.50

2 Issued (M.R.No. 83) 40 pieces

10 Returned to vendors (Vide Dr. Note 112) 60 pieces

12 Received 150 pieces under Purchase Order No. 117 @ Rs. 5 each.

20 Issued (M.R.No. 242) 60 pieces

25 Received (under Purchase Order No. 123) 210 pieces @ Rs. 3.20 each

30 Stock Audit Note shows a shortage of 10 pieces.

(Ans: Issues price per piece - on 2nd and 8th Rs. 2.50; on.20th Rs. 4 and shortage at Rs"3.58; Closing stock 390 units at Rs. 1,396.20)

Lesson - 8

Inventory Valuation And

Accounting For Materials

8.1 Introduction

Valuation of stock is of great importance for a number of reasons. It is a legal obligation to show a true and fair view of the operations for a particular year in terms of profit earned. Profit earned affects the share prices. Optimism or pessimism may be induced by profit earned. This can have far-' reaching effects on the attitude of the directors and leading institutions. These are only a few of the factors which may be affected by the profit earned and hence the need for stock valuation.

Optimism:

The optimistic feeling that all is going to turn out well

Obviously, the valuation of stock is not the only matter which affects profit, but it is sufficiently important to warrant very serious consideration.

8.2 Principles of Stock Valuation

Stock are valued in a fundamentally different way from Fixed Assets the latter are usually valued at cost less accumulated depreciation. Stocks are revalued by independent valuation.

On the other hand the valuation of stock involves two stages.

i) Physical Stock - taking (e.g.) Number of units ii) Valuation of the stock (e.g.) Monetary value,

1. Principle of conservatism

The accepted principle is that stock should be valued at conservative prices that is at cost price or market price whichever is lower. The principle is that any anticipated profit should not be taken into account but any anticipated loss should be provided for. Due allowance should be made for the fall in value, in case of

damaged or obsolete stock.

2. Principle of Consistency

Once the most suitable method has been selected, it should be employed in a proper fashion and consistently; otherwise, the result will be distorted.

3. Principle of going concern

This principle is widely accepted by progressive management. It is to be assumed that the business will continue to operate for indefinite periods of time and not that it is going to be liquidated or sold the next day.

8.3 Methods of Stock Valuation

Many methods of stock valuation exist. No single method of stock valuation is suitable for all types of business in all circumstances.

In applying the principle of stock valuation at cost or market price whichever is lower, difference in interpretation may arise.

I. Interpretation of Cost Price

The first difference may arise with regard to Cost Price. In his connection the cost price may be calculated under FIFO method or LIFO method.

1. FIFO (First In First Out)

The earliest lots are exhausted first and hence Closing Stock is valued accordingly. It is assumed that the goods purchase dare sold in the order in which they are purchased (i.e.) strict chronological order is followed".

Example

Purchased on { 15th Oct 10 units @ Rs. 10 each ; 16th Nov. 20 units @ Rs. 11 each }

17th Dec. 25 units @ Rs. 12 each

The closing stock consists of 30 units. It will be valued

25xRs. 12	=	**300**
5 xRs. 11	=	**55**
	Rs.	355

Advantages

It is simple and easy to value the stock when particulars are quite few in number. The method strictly adheres to cost. The value of the closing stock reflects procurement price.

Disadvantage

It tends to inflate profits in times of rising prices and may result in the payment of higher dividends at the expense of working capital. It requires more than one calculation.

This method is suitable for goods of slow consumption.

2. LIFO (Lost In First Out)

The latest lots are exhausted first and hence the closing stock is valued accordingly That is, the latest purchases are sold first. The value of closing stock in our example will be :

10xRs. 10 = 100

20xRs. 11 =220

Rs. 320

Advantages

It is more reliable for fixation of selling price. It tends to deflate profits in times of rising prices as stocks are valued at the lower rate.

Disadvantage

It requires more than one calculation. Its value does not represent the current market value. It tends to inflate profits in times or falling prices.

This method is popular in U.S.A.

3. Average Price (Simple or Weighted Average)

All the lots are merged together and the value of closing stock is calculated as follows:

$$\text{Rs. } 10 + \text{Rs. } 11 + \text{Rs. } 12 = 33 \left(\text{i.e.} = \frac{33}{3} \text{ Rs. } 11\right)$$

$$\text{Rs. } 11 \times 30 = \text{Rs. } 330$$

If we use weighted Average

Rs. 10x10	=	100
Rs. 11 x20	=	220
Rs. 12x25	=	300
55	=	620

$$\frac{620}{55} \text{ Rs. } 11.27$$

$$55 = 11.27 \times 30 = \text{Rs. } 338$$

Advantages

As it take into account the full effect of the various price when purchases are made from time to time. It is most scientific one. It generally adheres to cost.

Disadvantage

This involves much of arithmetical work. A new calculation is required whenever new purchases are made.

This method is suitable for those items which move either slowly or quickly.

4. Base Stock Method

The stock in excess of "basic quantity" is valued at "cost price or market price whichever is lower and the stock of base quantity" is valued at 'normal long period price'.

Where stock is permanently retained at a fixed original cost say 20 units @ Rs. 8/-. plus 10 unit@Rs.10orRs.11 or Rs-12 or Rs.11.27.

Advantages

It is simple and easy to workout. This price is revised from time to time keeping in view of the changes in actual prices.

Disadvantages

This method is a deviation from the costing principles.

This method is suitable to those industries where market fluctuations are a few.

II. Interpretation of Market Price

It has so far been explained that the concept of 'cost' is subject to various

interpretations.

Similarly, the concept of 'market price is subject to at least two interpretations. As such Market Price implies either the (i) Replacement Price or (ii) the Realisable Price.

Replacement price refers to the price that has to be paid to replace the stock and the Realisable price refers to the price that can be obtained by the sale or disposal of the item. In other words, Replacement price is the current purchase price ruling in the market and the Realisable Price is the current selling price is adopted to values stock which are held for future consumption while the realisable price is applied to value stocks that are held ready for disposal..Thus, stocks are to be valued at the lowest of cost price, replacement price or the realisable price - i.e., cost or market price whichever is lower.

In application of the cost or market price whichever is lower stocks may be valued under two different computational techniques - i.e., Pick and choose technique and the global technique.

Under the first method, the lower of the two values (cost and market price) is considered for each item of the stock whereas under the second method (Global method) the items are valued at both the values separately, than the sum total of both the values *are* considered and the lower total is taken to be the value of the stock.

Code of the items of stock	Oty	Cost Price		Market Price		Pick & choose Value Rs.
		Rate	Value Rs.	Rate Rs.	Value Rs.	
A 321	250 Cms	2 00	500	2.20	550	500
A 322	720 kgs	1.25	900	1.10	792	792
A 323	340 Metres	0 75	255	0.80	272	255
B431	520 cms	0.80	416	0.75	390	390
B432	675 kgs	1.20	810	1.24	837	810
B433	80 metres	2.50	200	2.40	192	192
Total value Rs.			3.081		3.033	2.939

The closing stock shall be valued at Rs. 2,939 under the pick & choose method and a Rs. 3,033 under the Global method.

Cost of Holding Inventory (Carrying Cost)

In addition to the amount invested on the inventory, the organisation has to incur expenses on holding the inventory. These expenses are recurring expenses as they are incurred as long as there are inventories held in the organisation. These expenses include warehouse rank, warehouse insurance, - watchman salaries, warehouse maintenance, insurance on the stock, rates and taxes, transportation handling and distribution, wastage spoilage and physical deterioration, obsolescence and" interest on investment It has been estimated that the cost of carrying (holding) inventories would be between 10 and. 15 percent of the total value of the stock. Hence the need to keep the inventory at the minimum possible, level.

Valuation of Stock on the date of Financial Accounts

Suppose Gunasekar chooses his account books on 31st December every year. In 2003, he had completed his stock taking on 24-12-2003, as a result of which it was valued at Rs- 20,000. However he made purchases to the extent of Rs. 5,000 between 25th and 31st December. We can easily give his closing stock on 31st December as Rs. 25,000 [Rs.20.0.00 + Rs. 5,000], In continuation of the same illustration, he sold goods worth Rs. 8,000 between 25th and 31st December. Let it be supposed that he marks the selling price at cost plus 331/3% Then stock will be deducted to that extent on 31st December. But sales include profit element. This has to be removed in order to find out the cost of the goods sold.

4^1 t^{Rs}- 8,000 x % = Rs. 2.000 profit element. Therefore the cost of sales is

Rs. 6,000]. We have to deduct this Rs. 6,000 from Rs. 25,000 in order to find out the stock on 31st December.

Value of Stock on 31.12.1994 is Rs. 19,000

Cost plus 331/3% means Cost is 100 and profit on cost is

The rate of profit on sales is 100 tf3

Illustration : 1

Saja Confectionery Works Ltd., use large quantities of sweetening materials for its products. The following figures relate to this material during the calender year 2003.

Quarters ended 2003	Purchases Tonnes	Invoice cost per tonne Rs.	Consumption (Tonnes)
March 31	1,100	620	600
June 30	2,000	630	1.200
September 30	700	640	1,500
	5,000		4,650

The stock of materials on 31st December 2002 was 1000 tonnes purchased at Rs.600 a tonne.

You are required to compute the value of stock on December 31, 2003 applying. ..

a) LIFO:

b) FIFO: and

c) Market Replacement Cost assuming that the stock of material on December 31,2003 was 1,350 tonnes valued at Rs.660 a tonne by way of Market Replacement.

Solution

1) Statement Showing value of the Stock of Materials as on 31st December 2003 on 'LIFO' Basis. :

	Tonnes
Stocks on 31st December 2002	1,000
Add Purchases during the year 2003	5,000
	6,000
Less Consumption during the year 2003	4,650
6,000 Less Consumption during the year 2003	4,650
Closing stock on 31st December 2003	1,350

Value of Stock on 31.12.03

The latest stock are exhausted first and hence closing stock is valued accordingly:

			Rs.
1.000	tones at Rs. 600 per tone	=	6,00.,000
350	tonnes at Rs. 620 per one	=	2,17,000
1350			8,17,000

2) Statement showing the value of the Stock of Materials as on 31st December 2003 on 'FIFO' Basis.

		Rs.
1,200 tonnes at Rs. 670 4 per tonne	=	8.04,000
150 tonnes at Rs. 640 4 per tonne		**96,000**
1.350		9,00.000

3) statement showing the value of the Stock of Materials as on 31st December 2003 on Market Replacement Cost

		Rs.
Stock on 31.12. 2003		
1,350 tonnes at Rs. 660	=	8,91.000

Valuation of Closing Stock 1,350 tonnes as on 31.12. 2003

Rs.		
'LIFO' basis	=	8.17.000
'FIFO' basis	=	9.00,000
'Market Replacement Cost' basis	=	8,91,000

Illustration : 2

A periodic inventory of oil on hand of a bulk distributor is taken when the books are closed at the end of each month. The following summary of information is available for the month.

Sales	Rs. 9,45,000
General administration cost	Rs. 25,000
Opening stock : 1,00,000 litres @ Rs.3 per litre	Rs. 3,00,000

Purchases (including freight inward)

June 1 2,00,000 litres @ Rs. 2.85 per litre

June 30 10,00.000 litre @ Rs. 3.03 per litre

une 30 Closing stock 1,30,000 litre.

Compute the following data by the FIFO, LIFO and weighted average method of inventory costing:

a) Value of inventory on June 30

b) Amount of cost of goods sold in June

c) Profit or loss for June

Solution

(1) FIFO Method

(a) The Closing stock of 1,30,000 litres will be valued at the latest purchase price i.e..,

Rs.	
1,00,000 litres @ Rs. 3.03	)3,000
30,000 litres @ 2.85	85,500
Value of closing stock	3,88,500

(b) Cost of goods sold for June

Opening Stock	3,00,000
Purchase: June 1	5,70,000
June 30	3,03,000
	11.73,000
Less: Closing stock (as valued above	3,88,500
Cost of goods sold in June	7,84,500

(c) Profit or loss for June

Cost of goods sold	7,84,500
Add: General administration cost	25,000
Total cost	8,09,500
Sales Value	9,45,000
Profit	1,35,500

(II) LIFO Method

(a) Value of doing stock

Since the details of issue are not given, it is assumed that the purchase of 30th June could not have been issued. Hence, the closing stock of 1.30.000 litres would have included 1.00.000 litres purchased on 25th June and 30.000 litres from opening stock. Therefore

Rs	
30.000 litres @ 3.00	90.000
1.00.000 litres @ 3.03	3.03.000.
	3,93.000

b) **Cost of goods sold** 11,73.000 - 3.93.000 = 7.80,000

c) Profit for the month of June

Cost of goods sold	7,80,000
Add: General Administration cost	25,000
Total Cost	8,05,000
Sales value	9,45,000
Profit	1,40,000

(Ill) Weighted Average Method

a) Value closing stock

1,30,000 litres @ Rs. 3 per litre Rs. 3,90.000 The rate of valuing closing stock has been worked out as follows .

Rate on receipt of first purchase :

(1.00,000 x 3.) + (2,00,000 x 2.85)	8.70,000	
1,00,000 + 2,00.000	3,00,000	Rs 2 90

Balance after issue : 1,30,000 litres

(30.000 x 2.90) + (1,00,000x3.03)	3,90.00	
30.000 + 1,00,000	1,30,00	

b) Cost of goods sold

	Rs.
Opening stock (1,00.000 x Rs. 3)	3.00.000
Purchase : June 1	5.70.000
June 25	3.03.000
	11.73.000
Less: Value of closing stock (as above)	3.90.000
Cost of goods sold	7,83.000

c) Profit for June

Cost of goods sold	7.83.000
Add: General Administration cost	25.000
Total cost Sales value	8,08,000
	9.45.000
Profit	**1.37.000**

8.4 Accounting for Materials

Accounting for materials is concerned with

i) Purchase and receipts of materials

ii) issue of materials

iii) Wastage Spoilage and Detective units

I. Purchase and Receipts of Materials

When goods are actually purchased, the accounting department receives the 'Good Received Note'. At this stage, the following entries are passed.

a) On purchase

Materials Control a/c Dr.

To Cost Ledger Control a/c (being the purchase of materials)

b) On purchase for special jobs

Work - in - Progress Ledger Control a/c Dr.

To Cost Ledger Control a/c

(being the purchase of materials for special jobs)

c) On Return of goods to suppliers

Cost Ledger Control a/c Dr.

To Materials Control a/c

(being the return of materials)

8.5 Special factors affecting Purchase

While accounting for materials purchase, the following must be given due consideration

i) Frieght

ii) Handling charges

iii) Containers and

iv) Cash Discounts.

I) Freight

Freight incurred on transportation of materials from the place of purchase a to the factory is to be considered as part of the cost of materials. It may be treated in one of the following ways:-

a) the amount may be charged to Materials control a/c

or

b) a Freight a/c may be opened separately and the amount be allocated to the individual materials and finally the amount be transferred to Materials control a/c.

or

c) Freight may be treated as a manufacturing overhead cost.

ii) Handling charges

These include expenses involved in receiving, storing issuing and handling of materials. For these, a separate materials handling overhead rate should be computed or, the weight basis of on the basis of cost of the materials used. Sometime, pre-determined rates are computed and applied, in such cases, accounting entries are based on variance accounting.

iii) Cash Discounts (Purchase Discounts)

This can be treated in the following two ways:

a) Purchases must be recorded at cost less each discount; however, cash discount is available only on prompt payment of the invoice bills: hence

b) Cash discount should be credited to manufacturing overhead control a/c.

iv) Containers

While accounting for containers, it must be ascertained whether they are returnable or not. If the containers are returnable, the cost of containers should be segregated. The entry is,

Materials Control a/c Dr.

To Cost Ledger Control a/c

In return of the containers, either the cash deposit is received back or the creditors account is adjusted. The entry is:

Cash (or creditors) a/c Dr.

To Deposits for containers a/c

Further, the original entry should be reversed as follows at the time of returning the containers:

Cost Ledger Control a/c Dr.

To materials Control a/c

If the containers are now-returnable, the entry is;

Another related issue 's whether to treat the container cost as part of manufacturing cost are selling and distribution cost. The principle to be adopted is as follows:

1) If the container is necessary for the sale of the product (as in the case of edible oil) the cost of container is to be treated a part of manufacturing cost.

2) If the container is necessary only for transporting goods, then the cost of container becomes part of selling and distribution cost.

II. Issue of Materials

1) When issued to production order / Job order / Work order

Work - in - Progress Ledger Control a/c Dr.

To Materials Control a/c

2) When issued to production

Production overheads a/c Dr.

To Materials Control a/c

3) When issued for packing etc.

Selling & Distribution cost a/c Dr.

To Materials Control a/c

4) When returned from production to stores

Materials (stores Ledger) control a/c Dr.

To work - in - Progress Ledger Control a/c

III. Waste, Scrap, Spoilage and Defective Work

Waste:

Waste is a part raw material lost in the process of production having no recoverable value.

A) Waste

"Waste" is the residue such as smoke, dust, gases, slag etc., which arises in the course of processing, having no recovery value. Waste. is complete loss- Waste may be normal or abnormal. A percentage of normal waste is standardised for the purpose of exercising control over it and this normal waste may be spread over good unit by inflating their cost proportionately. In case waste is abnormal, it is separated from the cost and is transferred to costing profit & loss account, Normal waste arises due to courses beyond control and abnormal wastes are due to controllable causes.

Scrap:

It is the residue from certain manufacturing activities usually having disposable value.

B) Scrap

'Scrap is in the form of incidental material residue from certain type of manufacturing processes, usually in amounts and low market value, recoverable without further processing. Examples' are: scrap may be arise in the form of turnings, borings, trimmings, filings, shavings, etc.. from metals on which machine operations are carried out; saw dost and trimmings n-s the timber industry; dead heads and bottom ends in boundaries. Scrap should always be physically available unlike waste which may or may not be present in the form of a residue. Control on scrap can be exercised by setting standards for scrap and fixing responsibility for scrap by departments, persons etc., and maintaining scrap records for proper accounting. Accounting for scrap may be done in the following ways.

i) Treatment by neglect

If scrap is of small value and identifiable with job/process, the net sale

proceeds from it may be deducted from the material cost. If it is not identifiable, the sales proceeds may be credited of works overhead.

Alternatively, scrap may be parked in bales and transferred to stores by debiting appropriate stores account and crediting job / process account of its realisable value. It may be reissued to some other job or process at the same price, if it could be used. This method ensures proper control over scrap.

The above treatment shows that the loss due to scrap is absorbed by the concerned job or process without need of any special adjustment in their regard, ft increases the cost of job or process proportionately and therefore is known as "inflated cost method" or "treatment by neglect method"

ii) Original Value Method

Scrap resulting from one process may be valued at the cost of good material originally charged to the Job and is debited to the concerned stores account, crediting the concerned job process account. This method helps in determination of accurate cost as the entire cost of material lost by way of scrap is not allowed to burden the job or process.

The scrap may be reissued to another process at the" same price. If it had been sold, the sale proceeds will be credited to relevant stores account transferring the loss (if any) to costing profit and loss account,

C) Spoilage

Spoilage:

It occurs when goods are damaged beyond rectification.

When production does not come to the standard specification or quality it has to be rejected outright. The portion of production which is damaged beyond rectification and as such can be sold out as "Second" or "Third" quality goods without further processing is referred to "spoilage". The cost of work spoiled is determined by accumulating material, labour and overhead expenses incurred uptq the point of rejection.

The cost of spoiled goods may be treated in anyone of the following two materials:

1) The loss on account of spoilage may be charged to the relevant production order; or

2) Loss on spoilage may be charged to manufacturing overhead account and the loss be Spread over the cost of all jobs. This is known as treatment by neglect.

Under the first method, the entry is

Spoiled goods stock a/c Dr.

To work in progress a/c

(being th6 sale value of spoiled work credited to work in progress a/c)

Under the first method. the entry is

Spoiled goods stock a/c Dr.

Manufacturing overhead control a/c Dr. (loss due to spoilage)

To work in progress a/c

(being spoilage of goods)

Example

Towels India Ltd:, got a job order, for 1,200 towels. The cost structure per towels is:

Materials	Rs. 3.20
Labour	Rs. 8.00
Overheads	Rs 2.80
Total	Rs. 14.00

While manufacturing, 100 towels were spoiled and were estimated to be sold for Rs. 5 each. Show how the spoilage be treated in cost accounting.

I. Method

Work - in - Progress a/c	Dr.	16,800	
To Materials			3,840
To Labour			9,600
To Overhead			3,360

(Being the cost of work put to process)

Spoiled Goods a/c	Dr.	500	
To Work - in - Progress a/c			500

(Being loss on spoilage transferred)

Finished Goods a/c	Dr.	16.300	
To Work - in - Progress			16,300

(Being cost of towels transferred)

II. Method

The first entry is the same as under the I Method.

The next two entries are:

Spoiled Goods a/c	Dr.	500	
Overheads a/c	Dr.	900	
To Work - in - Progress a/c			1,400
Finished Goods a/c	Dr.	15,400	
To Work - In - Progress a/c			15.400

NOTES

Defective:

It is a part of production which can be rectified and made into good units with additional cost.

D) Defective work

"Defectives" are the position of production which may be rectified at extra expenditures termed as Salvage costs, Rectification costs or Rework costs.

Accounting treatment of defective goods is similar to that of spoilage. If the production is for a special order, the additional cost caused by defective work should be charged to that specific job. If the defect occurs on the manufacturing of order, the additional cost or perfecting the goods should be charged to manufacturing overheads. The accounting entry is:

1) Work - in - Progress a/c Dr.

To Materials Cost a/c

To Overheads Cost a/c

(On the basis of predetermined rates)

2) Work - in - Progress a/c Dr.

To Labour Cost a/c

To Manufacturing Overheads a/c

(Additional cost perfecting the defect)

3) Furnished goods a/c Dr.

To Work - in Progress a/c

8.6 Central of Waste, Scrap, Spoilage and Defectives

Since it is not possible eliminate waste, scrap, spoilage and defectives, it is essential to follows rigid procedure of control to keep them down. The control procedure should consider the following factors.

a) Setting Standards

Standards are to be established in respect of scrap, spoilage and defectives having regard to the nature of manufacturing process, quality of raw materials, workmanship and working condition of plant and equipment. These standard represents normal limit of wastes, scrap etc., which is regular and due to unavoidable reasons. The standard may be expressed generally in percentage to production.

b) Reporting

Standard forms are to be used for prompt and accurate reporting. These reports should furnish clearly information such is the name of the department, number of cost centre, date and report number, actual waste, scarp etc., in both quantity and percentages, normal limit, the difference between the actual and the standard, cost calculated, the causes for difference and the relevant action to be taken, it should be signed by the responsible person who may be inspector.

c) Remedial Action

Where the reports show may any deviation of actuals from standards, the reasons should be carefully analysed and immediate remedial actions must be taken. The steps may be:

i) to repair the machinery and equipment, if defects exist in them;

ii) to replace the parts scrapped; and

iii) to return the materials to the suppliers if they are defective any obtain fresh supply of materials of required quality, in short every remedial effort should be made to bring the loss with in normal limits. If normal limit allowed is found to be more than the actual the standard set should be reviewed and revised.

Model Questions

1. How will you treat the scrap, spoilage and defectives in the cost accounts?

2. The flour mill does not maintain a perpetual inventory of wheat which is boys and issues to the mills. The physical stock taking held on 1st January, showed 20 tons at Rs. 800 per ton.

The purchases during the year were as under:

From Jan. to April - 200 tons @RS; 820 per ton.

From May to August -100 tons @ Rs. 900 per ton.

From Sept. to December - 20 tons @ Rs. 920 per ton.

The physical inventory taken on 31st December shows a stock of 30 tons of wheat on hand.

Compute the inventory value by (i) FIFO Method and (ii) LIFQ Method.

(Ans: Value of stock under FIFO Rs. 27,400. In the absence of particulars regarding issues it is not possible to evaluate the stock under LI FO method.)

3. The following transaction took place in respect of material X during the month of Jan. 1990.

Dati	3	Particulars	Quantity Kgs	Rate per unit Rs.
Jan	3	Received	2,000	10
Jan	6	Received	300	12

Jan	8	Issued	1.200	...
Jan	10	Received	200	14
Jan	12	Issued	1.000	—
Jan	20	Received	300	11
Jan	31	Issued	200	—.

Compute the value of Closing stock under (i) LIFO, (ii) Simple average and (iii) Weighted average method.

(Ans: Closing stock under LIFO Rs. 4.100 under Simple average Rs. 2.203; and under Weighted average Rs. 4,367.)

4. Describe the following methods of valuation of closing stock

a) FIFO Method

b) LIFO Method

c) Average Price Method

d) Base Stock Method and

e) Replacement Price Method.

Lesson - 9

Labour - Nature, Scope and Control

9.1 Introduction:

Labour cost occupies a significant portion of the total cost of a product manufactured or services rendered. Economic utilisation of labour is therefore a need of the present day industry. To this end, everything right from recruitment should be directed. It goes without saying that management is interested in the accumulation and analysis of labour cost because they serve as a basis for:

a) Control over labour cost:

b) Managerial decisions; and

Direct Labour:

This cost is the cost of labour directly engaged in production operation.

c)Inventory costing and profit determination which requires that products be costed by assigning direct labour and an equitable portion of indirect labour costs to products.

Labour Cost may be sub divided into

a) Direct labour cost;and

b) Indirect labour cost.

Labour Cost includes additional expenditures made by the employer on behalf of the employee and would cover the following

A) Monetary or pecuniary Benefits

i) Basic Wages

ii) Dearness Allowance

iii) Production bonus.

B) Deferred Monetary Benefits

i) Employer's contribution to provident fund

ii) Employer's contribution to E.S.I.

iii) Retirement gratuity

iv) Contribution towards old age pension

C) Fringe Benefits or Non - pecuniary Gains

i) Free or subsidized food

ii) Free or subsidised education to children

iii) Medical and holiday facilities

Fringe Benefits:

An incidental benefit awarded for certain types of employment (especially if it is regarded as a right)

9.2 Direct Labour Cost or Direct Wages Cost

According to I.C.M.A. London it is "the cost remuneration for employee's efforts and skills applied directly to a product or saleable service".

Direct labour cost is that portion of wages or salaries which can as a practical matter be identified with and charged to a single costing unit. Labour may be classified as direct when

a. there is a direct relationship to the product through a process or a costing unit;

b. the labour cost may be measured in the light of this relationship; and

c. the labour cost is sufficiently material in amount.

In short the distinction between direct and indirect is a matter of convenience and expediency and this cost varies directly with the volume of output and allocated to cost units. Direct wages being variable can be easily

controlled.

9.3 Indirect Labour Cost or Indirect Wages Cost

Indirect Labour:

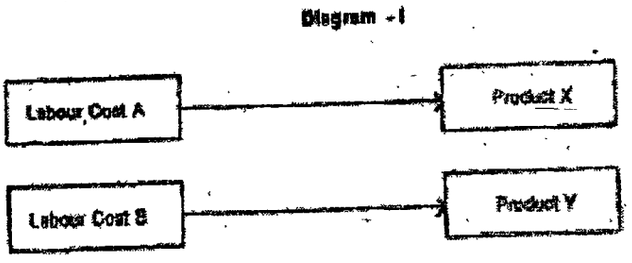
Indirect labour cost s the remuneration paid for labour engaged to help the production operations.

According to I.C.M.A.. London, it means "Wages Cost other than direct wages cost".

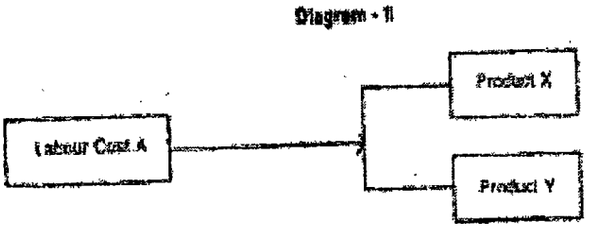
In other words Indirect labour is that labour which cannot be easily and conveniently allocated and is directly related to production activities. Indirect labour costs are those which are not identifiable with or incurred, directly, indirect labour may be classified into two categories- Indirect costs in service departments such as purchasing,, engineering and timekeeping; and labour cost of certain workers in the producing department such as foreman, clerical assistants and auxiliary labour such as that for store-room, factory, office and maintenance.

The classification of indirect labour accounts should be devised in such a manner that over these costs may be "maintained. Indirect labour cost accounts should be coded in order to facilitate the distribution of charges.

The concept of direct labour cost and indirect labour cost may be illustrated with the help of the following two diagrams:



Labour cost A and labour cost B are direct labour cost



Labour Cost A is indirect labour Cost.

It should be noted that in Diagram - I, labour cost can be directly identified with a particular product cost, while in Diagram -11 it is not so.

9.3 Importance of Direct and Indirect Labour Cost

a) To provide a more accurate product cost and to provide a strict control over labour costs.

b) Because direct labour efficiency is measured by the number of units completed by direct labour/while the efficiency of other types of labour have either no relationship or very little relationship with the number of units produced.

c) If this distinction is not made, there may be errors in the allocation of overheads

Many of the decisions that the management must take are based upon cost data. To make such decisions management must have adequate labour cost data to determine the amount of fixed and variable labour. The labour records should be devised as to enable the management to have these, data without loss of much time when the need for cost data arises.

Labour cost control

Like material cost labour also forms a significant part of cost of production. Therefore, it is essential that there should be proper effective control over labour , cost. Labour cost control will lead to minimisation of cost of labour per unit of output. In this connection, it may be pointed out that labour is not a commodity and it does not behave like a commodity. From this angle, the task of exercising control over labour cost is even more difficult than that of material cost or other expenses. In other words, the human element involved in production should be clearly distinguished in its utilisation from other resources of production. A large number of non - financial factors aftect the efficiency of labour and they should not be lost sight of in a study of labour cost control- For example, temperature control, ventilation, lighting of the working area will have

NOTES

an effect on the labour efficiency- Therefore, labour cost control scheme will be of little practical use if an attempt is not made to evaluate the effects of all non - financial factors with the financial factors.

Organisation for Control

The following departments will help to exercise control over labour cost by their co-ordinated efforts:

a) Personnel Department.

b) Engineering and work study Department

c) Time - Keeping Department

d) Pay roll Department

e) Accounting Department

Areas of Control

Control over labour cost will include control over the following activities

a) Recruitment, increments and promotions.
b) Formulation of wage policy and incentive schemes, payment and accounting of wages.
c) Allocation of cost. These are now discussed is short

Promotion:

Encouragement of the progress, growth or acceptance of something

A) Recruitment, increments and promotions

Recruitments is. a crucial function for ultimate success in attainment of labour cost control. A well defined recruitment policy is the essential requisites for control over recruitment. These should be an orderly replacement of out going and retiring workers.

Increments are generally granted on a grade basis and thus over a periods of years a worker may double his efficiency as compared to rise in remuneration.

While in another case the rise in remuneration may not be in commensurate with the rise in efficiency.

Promotions to better grades and higher positions will lead to improvement of internal relationships and attainment of more efficiency. Efficiency and seniority may be the proper basis of promotion: indiscriminate promotions with an eye to nepotism, favoritism and it will vitiate the working conditions and hence should be avoided.

B) Formulation of Wage policy and incentive schemes, payment and accounting of wages

A sound wage policy and incentive schemes can make a positive contribution towards improving employer - employee relationships and hence reducing labour turnover Control over payment of wages aims at checking that there are no financial irregularities during actual disbursements. Physical control over attendance records and at the time of making disbursements should be ensured. It should be ensured that wages paid are properly accounted.

Incentives:

An additional payment (or other remuneration) to employees as a means of increasing output

C) Allocation of Costs

Control over allocation of labour cost aims at securing that each job, work order or process undertaken bears its own share of cost so that production cost represents true cost. Direct labour cost are concerned, allocation does not pose any serious problem as total wages can be allocated on the basis of time spent or units produced. In the case of indirect labour allocation is made on an estimated basis e.g. direct labour hours, machine hours etc.

9.4 Techniques of Control

The following techniques may be used for exercising control on labour cost.

(A) Standard Costing

(B) Comparison with the help of Ratios.

A) Standard Costing

The Terminology of Cost Accountancy defines standard costing as "the preparation and use of standard cost, comparison with actual costs, and the analysis of variances to their causes and points of incidence". While actual costs tell us what the costs are likely to be but standard costs attempt to show what the cost should be for clearly defined conditions and circumstances. Standard costing is also a system of costing. It makes use of predetermined standard costs for every element of cost. Standard costing is' a yardstick against which actual cost can be compared and operational efficiency can be measured. It is a management tool of analysis of variances, fixation of responsibility, adoption of the principle of "management by exception" cost control and cost reduction. It ensures accurate and prompt reporting of cost data to the management.

B) Comparison with the help of Ratios

The different aspects of labour performance can be expressed in ratios and shown to management through periodical reports. This will help management to look into different aspects of labour cost which needs immediate action. The following may be used for labour cost control.

1 Efficiency Ratio $= \dfrac{\text{Stanard time for actual Production}}{\text{Actual hours taken}}$

2. Utillisation Ratio $= \dfrac{\text{Actual time taken}}{\text{Available hours}}$

3. Cost Ratios

a. $\dfrac{\text{Total labour cost}}{\text{Cost of Production}}$

b. $\dfrac{\text{Diret labour cost}}{\text{Cost of Production}}$

c. $\dfrac{\text{Indirect labour cost}}{\text{Directlabour cost}}$

4. Illness Ratio = $\frac{\text{Hours lost due to illness}}{\text{Totalman} - \text{hoursworked}}$

5. Absenteeism Ratio = $\frac{\text{Hours lost due to absenteesm}}{\text{Totalman} - \text{hoursworked}}$

9.5 Labour - Time Keeping

Whatever the methods of remuneration it is necessary, for disciplinary purposes, that some form of time record, should be kept for all classes of labour. Moreover, if wages are paid on a time basis it will be required for the ascertainment of the wages payable. Recording of time is primarily done Tor two purposes, viz. for time-keeping and time - booking. The main object of time keeping i.s to record the time for attendance purposes and for calculation of wages. While the time booking is recording of time for purposes of cost analysis and apportionment of labour costs between various jobs. It is desirable that every factory should have time recorded for time, keeping. and time booking-Time Keeping Time keeping records the time of arrival and of departure of the workers at and from the factory. This recording of time is normally done twice during the day where, however, the workers leave the factory premises for lunch break, the time recording has to be done on four occasions. The recording of time could either done at the entrance to the factory or at the entrance to the departments where the worker is actually employed, in small concerns this function is usually accomplished by ' the production or the cost accounting department. In the case of large concerns, this function is done by a separate time keeping department.

9.6 Objectives of Time - keeping

The chief object of time - keeping is the preparation of the pay roll. Although this is true in the case of those who are paid on the basis ot time from the point of view of enforcing discipline however the recording of time is essential in the case if all workers, regardless of the differences in the mode of payment. Further, according to the Indian Factories Act, 1948 no worker can be made to

work for more than 9 hours a day or 48 hours a week. This statutory requirement can be complied with by maintenance of the attendance record- This record also becomes necessary to satisfy social legislation and taxation laws. Thus the various of time - keeping including its utility to the management are

1) to have a correct record of workers' attendance at the factor
2) to enforce discipline in attendance
3) to comply with statutory provisions
4) to calculate the wages of time paid worker
5) to ascertain the labour cost and
6) to distinguish between normal time, late attendance, early leaving and overtime.

Time Keeping:

This department is concerned with maintenance of attendance time and job time of workers.

9.7 Methods of Time - Keeping

The various methods used for recording time may be grouped under two heads. They are manual methods and mechanical methods.

1. Manual Methods

Where the worker himself records the attendance, the two common methods at present in use are Attendance Register method and Disc method.

a) Attendance Register Method

The names of the workers are entered in the attendance register and it is kept at me gate of the factory or concerned department. The workers are required to sign the register at the time of arrival. The entry in the register my be made by the worker himself or an employee appointed for this purpose. The workers who are not reported within the. time are marked absent. This method is cheap ' and quite simple to operate. This method may, perhaps, be employed in a very small factory, but in a factory where thousands of workers are employed, this method will be found most unsatisfactory. The danger under this method is that a fellow

worker may sign fraudulently for his colleague who has not reported for duty. Further, calculation of short leave and making of late attendance involve too much clerical work. In this system, there will be hold ups of workers at the time of. arrival and departure and there is no automatic check on the dishonest practice of noting down wrong time by the worker.

b) Disc Method

Another system of time - recording still occasionally met with is the use of metal .tags or discs. A number disc is assigned to each worker and hung in numerical sequence on an outboard at the gate of the factory. On arrival the worker will take his disc from the outboard and place it upon an inboard. After the scheduled time, the outboard is usually removed and all late arrivals must obtain their disc from the gate keeper who will record the exact time of their arrival and forward necessary details lo the Wages office. This system is, not a reliable method of time- recording. The danger under this method is that a follow worker may proxy for his colleague by putting his identification number in calculation of attendance, short leave and overtime. This method is applicable only to small scale organisation.

2. Mechanical Methods

To overcome the defect of the manual methods of time-recording, modern factories have devised a mechanical method, A mechanical record is necessary if absolute is desired. A mechanical time recorder will avoid disputes and establish confidence as each employee can see the entry, when it is made. There are a number of types of time recording clocks, and the usual ones that are employed by large concerns in modern times are the card time recorders and dial time recorders.

a) Card Time Recorders

Under this method, workers are given clock cards. Attendance may be recorded on these cards either for a week or even a month, sometimes. A weekly clock card may appear as follows:

WEEKLY TIME CARD Jeyanth & Co.,

Name of worker: Dept:

Clock No: Week-ending:

Days	Morning		Afternoon		Total Hours	
	In	Out	In	Out	Ordinary	Over time
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						
Saturday						

Under this system, a time clock is placed near the entrance of the factory. Two racks are placed on two sides of time clock. The rack nearer to the entrance is called "out-rack" and the other rack is called "in-rack" Before the gate is opened the clock cards of the employees are arranged on the "out-rack". On entering the gates of the factory, the worker picks out his clock card from the "out-rack" and inserts it into the slat of the clock and presses the handle of the clock, when so done the clock records on the card, the actual time of arrival. After getting the time recorded workers take cards out and put them in the appropriate slats of the "in-rack". When workers come out of the factory at the end of the working period, they take the cards from the "in-rack" and insert in the clock which records the liming and then they put it in the respective slot of the out-board- The "in" and "out" racks and worker s stamping the time are under the eye of a watchman. The watchman particularly notices that a worker does not handle more than one card. The cards left over the "out rack" represent those of the absentees when the

number of workers is large, there may be more than one "out" and "in" racks. In some organisations a time clock, "out" board and "in" board are placed in every department to save time. This mechanical device of time recording overcomes the disadvantages of the manual method.

b) Dial Time Recorder

A dial time recorder has a dial round the clock with a number of holes, each of which bears a number corresponding to the identification number of the worker concerned. There is a radial arm mounted at the centre of the clock. When a worker enters into factory, he is to press the arm after placing it at the appropriate hole. The time recorder automatically records the time of arrival and departure of the worker on a roll of paper within the machine against the number of worker. The chief merit of this type of clock is that it economics clerical work in preparing the pay roll. Further, when a large number of workers is employed, there is no need for them tostand in a queue for clocking purposes. However, the high installation cost, the inability of workers to see the time clocked and its use for only a limited number of workers are some of the disadvantages of this method.

The mechanical methods have the following advantages over the manual methods.

1. They provide an accurate record of attendance of workers and thus eliminate the possibility of disputes.

2. They distinguish between normal time, late arrivals, early leavings and overtime.

3. They eliminate the possibility of inclusion of dummy workers in the pay roll.

4. They reduce clerical labour and vacillate the preparation of the pay roll and wage tickets.

9.8 Time Booking

Time booking is the recording of time spent by the worker on the different jobs carried out by- him during his period of attendance in the factory. It is necessary to distinguish-between time keeping and time booking. While time keeping is a reference to recording of attendance time or gate time which is necessary mainly for the preparation of the pay-roll, time booking is the recording of time spent by the worker on a job. The objects of time booking are:

1. To ensure that the time paid for is properly utilised.

2. To ascertain the labour cost against each individual job.

3. To provide a basis for the apportionment of overheads against individual jobs.

4. To segregate idle time so as to control it.

5. To generate statistical data for determining productivity and control of labour cost.

Time Booking:

Time spent by the worker on different jobs and work is called time booking.

9.9 Methods of Time Booking

There are variety of methods of booking the time on individual jobs. Small organisations book the time manually, while large organisations book the time mechanically.

a) Manual Methods

Under the manual method of time booking either a time sheet or a job ticket is used.

1. Daily time sheet

This is a daily record of the work done by a worker, showing the jobs on which he worked and the hours spent against each. The time sheets can be used with advantage in small organisations. These sheets will not however be suitable for medium or large scale organisations, since a considerable amount of time will be involved in preparing these sheets and in consolidating them for purposes of labour cost.

DAILY TIME SHEET

Name: Dept: Hourly Rate E.B. No.

Date:

Job No	Operations to be done	Quantity	Time		Hours	Cost
			On.	Off		
Worker / Dept.		**Clerk** Foreman			Cost Dept.	

2. Weekly Time Sheet

Under this system, each worker is allotted a time sheet on which the worker enters all the particulars of the work carried out for. a complete week. The weekly time sheet gives ready consolidations of the total hours worked during the week and this total is reconciled with the total hours shown in the clock cards. Like the daily sheets, the weekly time sheets would also require a separate job-wise abstract to be made from them in order to ascertain the labour cost against each job. Weekly time sheets are mainly suitable for intermittent jobs and are extensively used by contractor's civil engineers and decorators.

WEEKLY TIME SHEET

Name: E.B. No

Oept: Hourly Rate Week end

Day	Job No		Job No		Job No		Total Hours		Cost
	On	Off	On	Off	On	Off	Ordinar	Overtime	
Monday									
Tuesday									
Wednesday									
Thursday									
Friday									
Saturday									

Checked and Agreed with

Attendance records

Foreman Worker / Dept. Clerk Cost Dept.

These time sheets can be conveniently used where thenumber of jobs handled by a worker is not many. Where these sheets are filled up by the worker it is likely that the recording of time will not be correct and the extent of idle time will be suppressed..Further, standard of literacy amongst the workers in our country is not sufficient enough to enable them to understand the significance of these records and the need to write them up correctly. Apart from incorrect allocations of time, these sheets are also likely to be damaged or lost.

3. Job Ticket

The job ticket is a document giving the full details of the specific operations to be carried out by the worker against the job. These tickets are issued as and when a Job is passed on to the worker. On completion of the job the necessary entries are made in the tickets and these are returned to the foreman. Compared to the time sheet the job ticket has an advantage, in that, it contains full instructions regarding the job to be carried out and a direct allocation of labour costs against each job. However, where the number of jobs on hand are many and the same job has to

pass through a number of workers, the documentation work will increase.

JOB TICKET

Job No:- Name:

Dept: Hourly Rate: Job

Description. Drawing / Specification No.

Started on ... at.... , Completed on .... . at....

Operation	Quantity	Time		Hours		Cost
		On	Off	Ord.	O.T.	

Worker / Dept. Clerk. Foreman Inspector

Cost Dept.

Where job ticket is in use, a separate idle time ticket has to be provided for so that the worker can book on this card the time not spent on regular job.

b) Mechanical Methods

The booking of time against the various job carried out by a worker can also be done mechanically with the aid of time clocks. The records used for mechanised time booking could either be.

1. A job card for each worker or.

2. A job card for each job.

NOTES

ob Card:

he total number f hours on the ob and total abour cost can e ascertained om the card.

1. Job Card for each worker

Under this system a weekly job card may be issued to every worker to enable him to record jobs on which he has worked during the week. The job numbers are entered either by the Foreman or the departmental clerk and the time of starting and completing each job is automatically recorded by the recording clerk. I n respect of jobs completed during the over-time hours, the time of completion is marked in a distinctive colour. The advantage of "this job card is that it gives a complete record of the time spent by the worker during the day or work: and a reconciliation between the time -of attendance and the time booked against job is readily obtained. The compilation of labour cost against each job would, however, require a separate abstract to be made from all the job cards.

Specimen of Job Card for each worker is presented below;

Name: **JOB CARD** E.B. No.

Dept:

Hourly Rate Week lending

Job No.		Mon-day	Tue-day	Wedne-day	Thur-day	Friday	Satur-day	Hours	Cost
	On								
	Off								
	On								
	Off								
	On								
	Off								
Total	N							Total Hours	
	OT							Normal Overtime	
								Idle Time	

Checked and verified

Foreman

Worker / Dept.Clerk Cost

2 Job Card for each job

Instead of issuing a separate job card for each worker, a job card may be employed for each [1] job. This card travels along with the Job from worker to worker. As and when an operation is completed, the concerned worker enters his clock number and department and gets the time of starting and completing the operation clocked automatically. The main advantage of this card is that it eliminates the preparation of separate abstracts of the job cards for cost purposes. This card gives the total labour cost against the Job but does not provide the total labour hours against each individual worker. It is also necessary to prepare'an idletime card to account for the full working hours for the week, in as much as the, closing time of one job cannot ordinarily be the starting.time of another job. A typical job card for each Job may appear as follows:

JOB CARD — Specimen No:

Job No: — Quantity:

Job Description: — Completed on .-. . .at....

Dept.	Worker	Hourly Rate	Operation	Time		Hours	Cost	Date
					Hours			
				Off				
				On				
				Off				
				On				

Dept.		
Foreman		

Time Keeping for Piece rated workers

Piece rated workers are those whose basic earnings are related to the unit of production and not to the hours of attendance. The purpose of time keeping is not merely to calculate the wages, but has also the following uses.

1) It ensures that the production hours have been properly utilised;

2) It gives the data for overtime and bonus calculations;

3) It provides a basis for the allocation of labour costs;

4) It facilitates apportionment of overhead expenses and

5) It is required for the calculation of dearness allowances

All these five uses are as much essential for piece rated workers and for time-rated workers. It is, therefore, necessary to maintain time keeping records for piece rated workers as well.

Model Questions

1) Define direct labour. How is the labour cost recorded and treated in cost accounts?

2) Distinguish between direct and indirect labour. What are the expenses which are generally classified as indirect labour in a manufacturing concern?

3) Distinguish between time-keeping and time booking. Mention several timekeeping and time booking procedures.

4) * Evaluate the following methods of recording daily attendance of labourers:

a) Disc Method

b) Time recording clock

5) What are the merits and demerits of the following methods of recording

labour time.

1. Daily time sheets

2. Weekly time sheets and

3. Job cards accompanying each job.

Lesson -10

Methods of Wage Payment

10.1 Introduction:

Remuneration:

Total wages earned by the employees is termed as remuneration.

Remuneration paid to workers is known as wages. It is usually paid at the end of a day. week, fortnight or a month. It is important for workers because it is the source of their income and livelihood. It is also important for the employers because wages constitute part of the total cost of production.

Man does work for his bread though he does not live by bread alone. His attitude towards the employer depends primarily upon the wages he earns. Employers aim at minimisation or reduction of wages because greater the wages like would be the cost of production. Thus, wages have been one of the major causes where their aims go in the opposite ways.

Wages can be broadly divided into two categories nominal and real wages. Nominal wages or money wages refer to the remuneration paid to the workers in the form of money only. On the contrary, the real wages include pecuniary and non peculiarly payment to them. Non-pecuniary wages may be in the form of free housing facilities, distribution of subsidised goods to them, free education of their children, free medical facilities etc. Nominal wages do not give the exact picture of the standard of living of the workers, it is the real wages that determine their standard of living.

10.2 Factors affecting wage rate

Determination of wages depends upon a number of factors. Some of the important factors are discussed below:

a) Demand and Supply

Higher the demand and lower the supply of labour, highest would be tht wage rate, lower the demand and abundance for the supply of labour, lower woul<

be the wage rate.

b) Bargaining capacity

Wage rate is also influenced by the relative bargaining power of labour unions and employees, if the workers are large in number and also united and behind a trade union it means that they are strong. It will act as a moral threat to the employers to have the wage rates determined and kept at a higher level.

c) Cost of living

Progressive employers fink payment of wages with the cost of living, and they try to increase the wages with the increase in cost of living. Unions also claim higher wages based on Cost of Living Index.

d) Capacity to pay

The employer's capacity to pay differs from employer to employer and from time to time. It is influenced by the changes in prices, volume of sales and future costs also. More his capacity higher wages could .be paid.

e) State Regulation

The government is concerned with the rates of the labourers. Because, they affect the economic as well as non-economic stability of the country to a large extent. Moreover all trade unions in all industries will not be strong. Hence, any welfare Government has to regulate the wage rates so that the workers are guaranteed a minimum wage to lead a decent living.

10.3 Methods of Wage Payment

One of the most difficult and the most important functions of cost management is the determination of the rates of monetary compensation. Because, wages and salaries constitute the bulk of the expenditure.

Edwin B. Flippo points out that" one does not know exactly how "much pay is the scientifically correct amount that any man should receive. There is no

definite, exact and completely accurate means of determining the correct wages". Many approaches-have been developed and applied and their validity is yet to be established.

There are two basic methods of remunerating the workers. They may be either paid on the basis of time or work done. The first is known as time wage system and the second Is known as piece wage system. There are other methods also. But they are only more modification of these two fundamental system.

(A) Time Wage System

This system is the simplest and oldest system of wage payment. It is also known as the day wages system. Because, olden days the workers were paid daily wages which were determined on the daily basis. Under time wage system, wages are fixed on the basis of time. It may be paid on the basis of a day week, fortnight or month. Thus the workers are paid on the basis of time that a worker devoted to his work at the spot. If a worker is paid at the rate of Rs. 5 per day, his wages for 15 days will be Rs. 75. That is to say T x R = Time Wage. Here, 'T is the time spent at the work spot and R is rate of wage per unit of time.

Under this system, there is no distinction between one worker and another worker in the same category. That is to say, there is no distinction between an efficient worker and an inefficient worker. However, if a worker is altogether inefficient, the employer will sack him, but an extra. Ordinarily efficient worker will, on the contrary, stand a fair chance for promotion.

Time wage system has the following advantages

i) The calculation involved in this system is the easiest one. This methods is satisfactory because it considers the time spent on the work.

ii) It gives the workers a sense of security because the remuneration under this system is certain.

iii) Under this system, the workers are free to perform the job at a fair pace and they need not hurriedly finish their work. This suits those lines of

production where skill of the workers and quality of products matter more than the speed.

iv) This system avoids over-speeding and its allied damage to machinery and equipment.

v) It is a just method where the productivity of the workers cannot be accurately measured. It thoroughly suits the lines of production where the productivity is not standardized.

vi) This system is suitable for line of production in which the workers are called to undertake assembling of the products. He cannot be expected to perform the work greater speed as his work dependent upon the work done by another worker in the earlier process.

This system does not differentiate among workers. Thus it promotes solidarity and kinship among workers. Hence it is readily accepted by trade unions.

This system has the following disadvantages:

i) This system does not offer any positive incentive to the workers to improve their performance. It does not differentiate between efficient and inefficient workers.

ii) Under this system the productivity of workers is not taken into account at all. There is no strict rule about individual worker's output. Hence, the output fluctuates for the same amount of wages. This aspect introduces the element of uncertainty in the cost of production.

iii) It offers the much of security to workers. Whether production level is maintained or not, they have to be paid without deduction of even a paise.

iv) As the efficiency of workers cannot be evaluated exactly the promotions are based on seniority But promotion on seniority is not sound at all times.

v) The efficient use of this system can be made only when there is adequate provision for effective supervision so that the workers do not waste their time. Effective supervision can be practiced only in smaller concerns.

Suitability

Considering the above discussion on its advantages and disadvantages, the time wage system can be suitably applied in the following cases: (1) Where the number of men employed is small and personal relations are close (2) Where priority has to be given for quality of product. (3) Where the process of production is continuous and individual workers have no control over the rate of production. (4) Where certain types of indirect workers are employed and (5) 'Where apprentices are employed.

(B) Piece Wage System

This is another important system of labour remuneration. Under this system the wage are paid on the basis of work done and not the time taken. If a worker produces 10 units of a product when the wage rate is Rs. 4 per unit, the total wages will be Rs. 10x4= 40. That is to say N x R = Wage (for a worker). Here, 'N' is the number of units of a product and 'R' is the rate per unit of product.

This system ensures higher wages when the production is higher and vice versa- This system is being adopted where emphasis is laid on efficiency, mass production and reduction in cost per unit. But the fixation of wage rate per unit or piece rate is a difficult task and it should be done with much care.

The Piece Wage System can be commended for the following advantages

i) It distinguishes between the efficient and inefficient workers- Because under this system people with poor efficiency will be penalized. Those who are working hard can earn more and raise their standard of living.

ii) As the wages are linked with quantity of output, the cost of production can be estimated well in advance.

iii) Unlike Time Wage system, expenses on supervision will be brought to the minimum in this system, because the workers are themselves, interested in the maximization of wages through the maximization of output.

This system has got the following disadvantages :

i) This method of wage determination is not simple as Time Wage System.

ii) It makes the workers feel insecure. Because they are not definite about their wages as they linked with the output.

iii) in their zeal to produce more and earn more, the workers do not pay as much attention to the quality as to the quantity.

iv) In order to earn more, they may work in a break-neck speed which may cause greater wear and tear to the machinery. At times, this will make the whole machinery go out of gear. Moreover workers health and efficiency may get injured.

v) It is not preferred by Trade Unions. Because", it gives way,to greed an unhealthy rivaling born out of suspicion and jealousy amorg workers.

vi) The fixation of piece rate may not be acceptable to the workers and this may give rise to controversies. Ultimately industrial relations will suffer a lot.

vii) if workers are not able to produce more (due to breakdown of machinery, non -availability of raw - materials etc.) and earn more they will develop dissatisfaction which will seriously affect the cordial employer - employee relationship.

viii) It involves the maintenance of elaborate production and payments records.

ix) It is not suitable for jobs such as dedicate works of artistic nature and construction of building etc.

Suitability

Considering the above discussion on its advantages and disadvantages the piece wage system can be suitably applied in the following cases; 1) where the quantity of work done can be accurately measured. 2) where the work is of a standardised and recurring nature and 3) where there is urgent need to enhance the output.

10.4 Incentive Plans

Both time wage and piece wage systems are the fundamental systems of wage payment. These two systems have got their own strong merits and demerits. The former assigns the gains or Masses arising from variations in worker's productivity to the employer and the latter, offers no guarantee of consistently reasonable wage and passes on the gains or losses to the workers. Constant efforts have been made to devise various incentive plans with a views to inducing the workers to improve their productivity, increase their remuneration and to bring about maximum possible production- Those incentive plans are nothing but a blending of these two fundamental systems of wage payment. In essence they simply combine the merits of both the systems in the best possible manner.

10.5 Advantages and objectives of Incentive Plans

An ideal incentive plans will encourage individual productivity and this will lead to a cut in the indirect unit costs. In the first instance the total indirect costs may increase because of the installation of the plan. But this will not continue.

Incentive plan prove the worth of the employee. To earn more a worker should produce more. In a sense, a worker supervises himself.

Another objective of incentive payment is suitable placement. It is good to the employer and employee if each individual find himself in the most suitable

job. Incentive payment facilitates the selective placement as it rewards the good workers better than marginal workers. This forces the marginal and below average workers to seek those jobs which will enable them to produce more.

Incentive plan benefits employees also. Employees will be able to earn more than average wages.

As pointed out by Taylor, higher earnings for labourers and low unit costs to management are both compatible under the incentive plan.

In practice, it has been found that incentive schemes fulfill one or more of the following objectives.

1. To improve the profit of the enterprise through a reduction in the unit costs of labour, material or both.

2. To increase workers, earnings without forcing the enterprise into a higher wage rate structure.

3. To avoid or minimise additional investment of capital.

4. To secure better utilisation of personnel, better production scheduling and performance control.

10.6 Monetary and non - monetary incentives

Incentives may be monetary and non-monetary. Besides wages monetary incentives include allowances, profit bonus, overtime pay and such other payments which give recognition to the increased productivity of worker.

Non - monetary incentives include job security, training scheme, welfare schemes, recreational and social facilities, sound promotion schemes, canteen facilities, educational opportunities, sympathetic attitude of the supervising staff etc.

The following generalisations regarding incentives may be noted.

1. Incentives are important motivators

2. Financial incentives are closely linked with basic motivation or deficiency needs.

3. Non - financial incentives are linked with higher motivation or becoming needs.

4. The people at the higher levels of organisational hierarchy are vulnerable to non-financial incentives to a greater extent.

Non-financial motivation techniques greatly influence the employee behaviour. But money occupies the higher position in the list of motivational tools- Money is the mainspring of motivation.

Problems of incomplete Incentive coverage

Two basic problems arise because of complete incentive coverage.

If the incentive plan does not cover a section of worker they will object to the plan. The wage hierarchy may sometimes be altered.

If the workers are to work for a part of the day on time basis and another part of the day on incentive basis it will lead to a lot of-manipulations.

10.7 Conditions Favouring Incentives

If the output is really and easily measurable incentive plan is favourable. Incentives will be more useful if the employee can exercise greater control over his output.

If the employee has no control over his output, the incentive plan is less likely to be successful.

Difficulty of supervision favours the adoption of incentive plan (Salesman 'exercise self supervision)

Where safety regulations are not likely to be violated, incentive system is suitable.

10.8 Desirable characteristics for incentive plans.

- Before establishing incentive plans, the jobs should be simplified and standardised. Incentives should not be super imposed on inefficient methods.
- The employees should be guaranteed that there will be no unjust tightening of standards. This enables the employees to contribute their might for their organisation.
- The incentive plan should be simple. A plan that is not understood by the employee will not produce any positive result. Some employees may even start thinking that they are purposely cheated by a complex plan.
- There should be a complete coverage of work. Partial coverage will weaken the morale of those employees whose works have not been covered.
- There should be a high correlation between effort and productivity. The earnings should be proportional to the output.
- Quality control provisions should be defined and explained clearly to the employees. The penal consequences of quality deterioration should also be explained in advance.
- The situations and factors beyond the control of the employees should be given due consideration.
- Time payments and incentive payments should be made separately.
- Production standards should be made known before the work is completed and not afterwards. As standards are viewed as targets, the employees should have an idea of them at the earliest possible time.
- The plan should be acceptable to both employees and management. If genuine acceptance from either side is lacking, the plan's success is doubtful.
- The incentive formula chosen should be one which offers the lowest total cost. This does not mean that the plan's which results in the lowest total is the best one.

10.9 Precautions in installing Incentive Plans

- Incentives will contribute to success if they are based upon sound base routes and employed fairly. But in no case the incentive plan can be excepted to replace sound base rates and efficient management.
- Incentives cannot contribute something for nothing. An attractive plan enables the employees to earn extra earnings.
- Workers may develop a tendency to sacrifice quality for the sake of quantity and this should be discouraged.
- The incentive scheme should be protected from becoming inflexible.

10.10 Limitations of Incentive Plans

Some of the limitations of incentive plans should be borne in mind.

The incentive plans might be misused by the incompetent people. Employees may be abused intentionally.

Employees aim at greater output only and in the process, the safety regulations may be neglected. Machinery may not be properly used.

The implementation of incentive plan requires additional personnel. But it should be worthwhile to remember that the gains to productivity far exceed the cost of implementation of incentive plan

While operating the incentive plan the management may resort to rate cutting. The unit time allowed may be out. The production standards may be raised. Rate cutting is incompatible to the success of incentive plan. Taylor deplored rate cutting vehemently.

10.11 Different types of Plans:

Some of the most important plans are discussed below:

1) Halsey Plan

Halsey plan is considered to be the first modern incentive plan of wage payment. It was first introduced by F.A. Halsey an American. Its aim is to increase efficiency amongst workers as well as to guarantee them wages on the basis of time. The essential features of this plan are as follows: (a) minimum wage is guaranteed to every worker on the basis of time; (b) standard time for doing a job is determined beforehand on the basis of time and motion studies and / or from past records: (c) workers who perform the job in less than standard time and thus save time are paid bonus or premium. The amount is 50% of the value of time saved as measured by the hourly rate; (d) the workers who are not able to finish the job in the same time are not punished but paid wages according to time wage system.

Illustration : 1

If a worker is paid at the rate of Rs, 2 per hour, the standard time fixed is 10 hours and he is able to finish the work within 8 hours he will get Rs. 16 minimum guaranteed wage. The premium is assumed to be fixed at 50% of time saved. Hence, the premium will be Rs. 2 (premium rate x time saved x hourly rate) (i.e. 1*1/2* x 2 x 2). His total wages will be (16 + 2) = 18.

According to Halsey, if the standard time for the job is fixed after scientific motion study, the premium should be paid at the rate of 50 percent and where it is fixed on the basis of past day work records it should be at 30 percent.

Evaluation

The plan has the following merits.

i) It assumes every worker of a definite hourly wage rate and thus makes all feel secure.

ii) When efficiency is rewarded, inefficiency is not penalised. This encourages efficiency.

iii) The gains resulting from the increased efficiency are divided between the employer and employees equitably.

iv) The plan is easy to introduce and simply to understand. As, it lays emphasis on the time saved and not on increased output, the workers do not offer resistance to its adoption

The plan has the following demerits

i) The determination of standard time based on past experience may be arbitrary.

ii) The main criticism, against this system is that the worker is not given the full benefit of his efficiency: He is paid only 50% of the wages for the time saved by him. If the saving of time results from the efforts of the worker this criticism holds good. But if the management has also co-operated with the workers with better tools, machinery etc., it is proper that the worker should take only a share of the benefit of the saving in time.

iii) In their hurry to produce more in lesser time, the workers may not take care of their health, quality of products and wastages of raw materials.

iv) This system is suitable for standardized jobs where the time can be determined before hand on the basis of time and motion studies.

2) Rowan Premium Plan

The Rowan Premium Plan was devised by James Rowan of David Rowan & Sons, Glashow, Scotland 1901. It is quite popular in England, it involves only a slight modification from the Halsey plan. The main difference between them relates to the determination of the premium- The premium is paid on the basis of time saved. Under the plan the wages of time taken shall be increased by the same percentage as that by which the time set for the job has been reduced. When 25% of time is saved, the wages would be increase by 25%.

The premium calculated can be expressed in the following formula.

$$\text{premium} = \frac{\text{Time saved}}{\text{Time allowed}} \times \text{Minimum guaranteed wage}$$

Illustration : 2

Let us assume that the rate per hour is Rs. 2 and the standard time is 20 hours. If the worker finishes the job in 15 hours, then he will get Rs. 37.50 by way of wages. It has been calculated as follows

Minimum guaranteed wage	Rs. 30.00
Premium: 5/20 x 30	Rs. 7.50
	Rs. 37.50

The worker has saved 25% of time (5hrs. out of 20hrs) So he is getting 25 percent of time wage (Rs. 7.50 out of Rs.30) as premium.

3) Halsey vs Rowan plan

If the worker computes the work in half the time fixed for it the result under the Rowan Plan will be similar to that under the Halsey Plan (with bonus at 50%). If the time saved is less than 50% of the standard time, the Rowan plan is better,' otherwise the Halsey plan is preferable.

Illustration : 3

Standard time fixed for a Job in a manufacturing concern is 20 hours. Time rate is 50 paise per hour. The actual time taken by the worker A,B and C is 10 hours, 8 hours and 15 hours respectively, Calculate total remuneration of A,B and C on the basis of (i) Halsey Plan and (ii) Rowan Plan.

Solution

Total Remuneration of A,B and C under Halsey Plan (Bonus = 50% of wages of time saved)

Name of Workers	Time taken	Time saved	Time wage	Bonus	Total
			Rs.	Rs.	Rs.
A	10	10	5.00	2.50	7.50
B	8	12	4.00	3.00	7.00
C	15	5	7.50	1.25	8.75

Total remuneration of A,B and C under Rowan Plan

Name of Workers	Time taken	Time saved	Time wage	Bonus	Total
			Rs.	Rs.	Rs.
A	10	10	4.00	2.50	7.50
B	8	12	4.00	3.00	6.40
C	15	5	7.50	1.87	9.37

i) If the time saved is half of the standard time (worker A) both the plans are similar.

ii) If the time saved is more than half of the standard time (worker B), the

Halsey plan is better for the workers, iii) If the time saved is less then the half of the standard time (worker C). the Rowan Plan is better for the workers.

3) Halsey -Weir Plan

The Halsey Plan was modified by Weir. This plan is the same as above except for one difference i.e., the bonus should be 331/3% of the standard time saved.

Illustration : 4

Standard time 20 hours.

Time taken 16 hours

Time rate Rs. 2 per hour.

Calculate the total earnings under Halsey and Halsey - Weir plans.

Solution

Halsey plan

Total earnings = 16 x Rs. 2 + 1/2 x 4 x Rs. 2 = Rs. 36 Halsey - Weir **Plan** = 16 x Rs. 2 + 1/3 x 4 x Rs. 2 = Rs. 34.67

4) Taylor's Differential Piece Wage Plan

F.W- Taylor, the founder of the modern scientific management, devised this plan in 1880. The essential features of this plan are: a) the standard output is fixed after careful study and analysis, b) two or differential piece rates fixed, one for those who attain or just exceed the standard and the other for those who do

Minimum guaranteed wage	Rs. 30.00
Premium :- 5/20 x 30	Rs. - 7.50

Rs. 37.50

The worker has saved 25% of time (5 hrs. out of 20 hrs) So he is getting 25 percent of time wage (Rs. 7.50 out of Rs. 30) as premium.

4)Halsey vs Rowan plan

If the worker computes the work-in half the time fixed for it the result under the Rowan Plan will be similar to that under the Halsey Plan (with bonus at 50%). If the time saved is less than 50% of the standard time, the Rowan plan is better,' otherwise the Halsey plan is preferable.

Illustration : 3

Standard time fixed for a Job in a manufacturing concern is 20 hours. Time rate is 50 paise per hour. The actual time taken by the worker A,B and C is 10 hours, 8 hours and 15 hours respectively, Calculate total remuneration of A,B and C on the basis of (i) Halsey Plan and (ii) Rowan Plan.

Solution

Total Remuneration of A,B and C under Halsey Plan (Bonus = 50% of wages of time saved)

Name of Workers	Time taken	Time saved	Time wage	Bonus	Total
			Rs.	Rs.	Rs.
A	10	10	5.00	2.50	7.50
B	8	12	4.00	3.00	7.00
C	15	5	7.50	1.25	8.75

Total remuneration of A,B and C under Rowan Plan

Name of Workers	Time taken	Time saved	Time wage	Bonus	Total
			Rs.	Rs.	Rs.
A	10	10	4.00	2.50	7.50
B	8	12	4.00	3.00	6.40
C	15	5	7.50	1.87	9.37

1) If the time saved is half of the standard time (worker A) both the plans are similar.
2) If the time saved is more than half of the standard time (worker B), the halsey plan is better for the workers.
3) If the time saved is less then the half of the standard time (worker C), the Rowan Plan is better for the workers.

Illustration : 5

The standard task is 15 units per day and the piece rate is Re. 1 if production is 15 units or more and 80 paise per unit if production is less than 15 units. When a worker is able to produce 16 units he will get at the rate of Re. 1 and his wages would be Rs. 16. But when he is able to produce only 14 units, he will get at the rate of 80 p. perunit his wages would come to Rs. 11.20 only.

Evaluation

It has the following advantages

i) It encourages high standard of performance by the workers. It gives enough incentive.to the efficient workers.

ii) It penalises the inefficient workers heaviiy. Thereby, it acts as an indirect encouragement to improve their efficiency, especially when they produce only a little less than the standard.

iii) In fact, if the system remains in operation in an industrial concern for sometime, it will gradually eliminate the inefficient workers.

It has got the following limitations:

i) Severally affects those who are a little less efficient.

ii) Differential rates create disparities among the workers. But the modern trend is towards the equlization of earnings.

iii) It makes no allowance for reductions of output due to prolonged illness or accident of the workers.

iv) It is not acceptable to trade unions as it breaks the solidarity of the workers.

v) It does not lay down any basic guaranteed time wage. Thereby, it makes the workers feel insecure.

Although this system is not adopted by many concerns it has become the basis of many other incentive, schemes. Those schemes provides for bonus on output rather than on time saved.

7.Merrick Multiple Piece Rate Plan

It involves only a modification of the Taylor's scheme. Taylor's plan prescribes two rates -one for the slow and inefficient workers and the other for efficient workers. But Merrick Multiple piece rate plan lays down three rates, one for the. beginners, the second for the developing workers and the third for the highly skilled and efficient workers. All other conditions for Taylor's plan should be kept in mind. The three rates are that the first is up to 83 percent of the standard task production, the second is more than 83 per cent or the task point, and the third is at and beyond the task point. Like Taylor's plan it lays down a standard output though time studies and expects the workers to attain it. But no guaranteed, time rate is assured of.

Illustration : 6

It is assumed that the basic piece rate is 60 paise per unit. Wages will be paid at this rate to those who produce upto 83% of the standard task. Those who produce more than 83% of the standard task will get a bonus of 10% (i.e., 60 +" 6 = 66 p. per unit). While those, who attain or exceed the standard task will be entitled to another

increment of 10% (60 + 6 + 6 = 72 paise per unit).

Evaluation

There is no sudden rise in the wages at one point in this system. Also, penalty for inefficiency is relatively lighter. But, the limitation to Taylor's plan apply to this plan also

Illustration : 7

From the following particulars, compute the wages of three workers viz., X, Y and Z under Merrick's Differential Piece Rate System.

Piece **Rate** - 40 paise per unit

Standard Output - 48 units *(per* day of 8 hours)

Output of X = 32 units

Y = 42 units

Z = 50 units

Solution

Earnings of X, Y and Z

Worker	Hours Day	Standard Output	Actual Output	Efficiency	Level of Efficiency	Rate per unit Raise	Wages Rs. P.
X	8	48	32	67%	Below 83%	40	12.80
Y	8	48	42	87%	Above 83% But below 100%	44	18.48
Z	8	48	50	104%	Above 100%	48	24.00

Emerson's Efficiency Plan

Harrington Emerson.devised this plan of wage payment with a view to improving labour efficiency. Like Taylor he has been also a staunch advocate of scientific management- The essential features of this plan are (a) standard time for a job is fixed after careful study (b) minimum time wage is guaranteed to every worker (c) the efficiency of the worker is determined on the basis of rate between the standard time fixed and the actual time taken for doing a job and (d) no bonus is paid to the workers who are not able to attain 662/3% efficiency and beyond this efficiency there is a gradual rise in the bonus payable to a worker.

Illustration : 8

Suppose for doing a job the standard time fixed is 20 hours, it a worker does it in 40 hours his efficiency is only 50% if he does it in 10 hours his efficiency will be 200% and if he does it in 20 hours his efficiency is 100%. No bonus is paid until a worker achieves 662/3% efficiency. At 662/3% efficiency a bonus of 1% on wage earned according to time rate would be paid. This rate of bonus would increase as efficiency raises, so that at 93% efficiency, the bonus would be .10% and at 100% efficiency the bonus would rise to 20% at 120% efficiency he will get a bonus at the rate of 40% and so on:

Assume that at 662/3% efficiency, the bonus is paid at the rate of 1% of the time wage. If the standard output fixed is 100 units and the time wage is Rs. 20 and the worker is able to produce 100 units the efficiency will be equal to 100% and he will get time wage plus 20% i.e., Rs. 20+4 (20% of Rs. 20) = Rs. 24

Evaluation

The Emerson plan has the following merits;

i) It is easy to understand and introduce.

ii) The calculation of efficiency under this system is logical enough and hence

easy.

iii) It gives enough incentive to the beginners besides providing incentive to the skilled and efficient labour.

The plan suffers from the following demerits i) When a worker reaches the point of standard efficiency the incentive beyond it becomes too mild.

ii) The less ambitious workers are tempted to relay on the guaranteed rate plus bonus upto standard efficiency.

iii) The percentage fixed for the calculation of bonus would need modification under circumstances.

Illustrations : 9

Standard output in 8 hours 100 units. Actual output in 8 hours 110 units. Time rate Re. 1 per hour. Compute the total earnings according to Emerson Plan.

Solution

$$\% \text{ efficiency} = \frac{\text{Actual output}}{\text{Standard output}} \times 100$$

$$\frac{110}{100} X100 = 110\%$$

According to the Emerson's plan = the 8onus is at 100% efficiency

= 20 % of time wages **Plus** 1%for

each 1% increase in efficiency = 10 % of time wages

Total Bonus = 30% of time wages.

Total Earnings = Time wages + Bonus

= 8 hours x Re. 1 + 30% of Rs. 8 = Rs. 8.00 + Rs. 2.40 = Rs. 10.40

Gantt s Task and Bonus Plan

This incentive plan was first devised by H.L. Gantt while working with Taylor at Bethlehem Steel Company. It was devised to moderate Taylor's plan. In fact it combines the merits of different plans such as Halsey plan, Tayior plan and Emerson plan. The essential features of this plan are as follows a) it guarantees the minimum time wage to all the workers b) a good standard of performance under these best conditions is determined on the basis of careful study of work and c) the bonus is paid to the workers who show a cent percent efficiency and no bonus is payable to any worker who shows less than 100% efficiency.

Illustration : 10

Suppose the standard time fixed for finishing a task is 10 hours, the hourly rate of wages Rs. 2 and bonus is fixed at 20% of the standard time wage- If a worker is able to finish the task in 11 hours he will not get any bonus because his efficiency is less than 100 percent. But he will be paid Rs-20 by way of minimum wages. When he is able to do the work in 10 hours, his efficiency is 100 percent, and he will get a bonus also. He will be paid Rs. 4 by way of bonus (20% of Rs. 20) and his total earning will be Rs. 24 (20 +4).

Evaluation

The plan has got the following advantages:

It is simple to understand and hence it can be easily introduced.

ii) It is human in its operation. It provides both security and incentive to the workers by laying down guaranteed time wage and a bonus for those who are able to reach the standard output..

iii) It encourages planning and better supervisions. Under this plan, a careful study of all conditions of work is made with the object of assisting the workers by removing all obstacles. A further incentive for supervision is provided by giving bonus to the foreman when a given number of workers under him get the bonus.

iv) Under this plan special attention is given to the training of the workmen if they lack the skill necessary to earn the bonus.

v) The workers remain satisfied because their bonus is handsome. The plan has got the following disadvantages.

i) t is argued that it makes a distinction between the efficient and the inefficient workers. Thus, it leads to disunity among them. Hence, the Trade Unions oppose this plan.

ii) If the standard time happens to be very low the worker will not be in a position to finish the task in that period of time. Hence, he may not get any bonus at all.

In fact this plan has got undoubted merits. It had proved to be highly successful in many plants which were under Mr. Gantt's personal direction.

Bedaux Point Premium Plan

The essential features of this plan are: (a) the chief novelty of this plan is that the value of time saved is divided between workers and foremen. In the proportion of 75% to workers and 25% to foremen. The determination of standard time is done in a

different way i.e., the standard time determined is expressed in terms of minutes which is known as 'B's. Each 'B' represents a point equal to-one minute, (b) the time wage is guaranteed to each worker and the premium is payable if the actual time taken does not exceed the standard time"

Illustration : 11

Job	Standard time	Rate per unit	B's
1	10 hours	50 paise	600

Actual time worked = 480 'B's (8 hours)

Saving of time in terms of 'B's = 120 minutes

120

Saving in terms of hours

If the worker completes his job in 8 hours (standard time 10 hours) he will get the minimum guaranteed wages of Rs. 4 plus 75 paise by way of premium. His total remuneration is Rs. 4 + 0.75 = Rs. 4.75.

Premium has been calculated as follows:

75% of 2 x 50p. as the time saved is 2 hours.

Evaluation

It is good that it gives incentive to the foremen also. Because the work cannot be done properly without the co-operation of the foremen with the workers. But the workers may not like the distribution of premium to the foremen also, the calculation of the standard time is beyond the comprehension of illiterate workers.

Group Incentive Plans

The incentive plans discussed above are meant for providing incentive to the individual workers and not a group of workers. Hence group incentive plan may be adopted to provide enough incentive to the whole group of workers so that they make efforts to improve their efficiency as a group- Under group piece wage plan, the premium is calculated for the whole group and then it is distributed to the individual workers in an agreed ratio or in proportion to their basic time earnings for the time spent by them on group work. But the demerit in this system is that the efficient as well as the inefficient will get the same premium. The efficient workers will resent to it.

Individual incentive system will be favoured by those employees who contribute more to the output as their efforts and earnings are directly related. But under certain circumstances individual incentives may be improved e.g. workers for which joint efforts are necessary. Sometimes, the workers may force their co-workers to accept group incentives.

Some point out that group incentive is far better than individual incentive for the following reasons. If some in the group are slow because of the attitude or ability the members of the. group will pull them up or force them to quit, it is also pointed out that there will be a team spirit among the group members.

One limitation of the group incentive is that the earning of one are restricted by others productivity- In this sense compare " to individual incentive group incentive is low.

Illustration : 12

In an Assembly shop of an engineering concern four workmen Palani. Mohan. Vadivel and Alagar work together as a group and are paid on group piece rate. They also work individually on other jobs on hourly rate basis. In a 44 hours week, the following hours have been spent by them on group piece work.

Palani 40 hours, Mohan 40 hours, vadivei 30 hours and Alagar 20 hours.

The balance of the time has been booked by these workmen on other job for which they are paid at the following hourly rate.

Palani - Rs. 10 per hour Mohan - Rs. 15 per hour Vadivel - Rs. 20 per hour Alagar - Rs- 20 per hour

The group piece rate is Rs. 20 per unit and the group produced 150 units in the week. Calculate the total weekly earnings of each of the workmen taking into account their individual relative efficiencies.

Solution

In the absence of specific ratio of division agreed among members of the team, the group piece wage should be divided in the ratio of basic earning for time spent by each on the job. Therefore, probable time earning of the hour spent on the group work:

Workmen	Hours	Rate per Hour Rs.	Rs	Ratio of Time Earning
Palani	40	10	400	2
Mohan	40	15	600	3
Vadivel	30	20	600	3
Alagar	20	20	400	2

Total Group Wages = 150 units x Rs. 20 =. Rs. 3.000 is divided among workmen in the ratio of 2:3:3:2 respectively. Palani - Rs. 600; Mohan - Rs. 900; Vadivel - Rs. 900 and Alagar Rs. 600.

Particulars	Palani Rs.	Mohan Rs.	Vadivel Rs.	Alagar Rs.
Time earning for the week	40.00	60.00	280.00	480.00
Palani (44-40 hrs @ Rs. 10)	600.00	900.00	900.00	600.00
Mohan (44 - 40 hrs @ Rs. 15)				
Vadivet (44 - 30 hrs @ Rs. 20)				
Alagar (44 - 20 hrs @ Rs. 20)	640.00	960.00	1,180.00	1,080 00

10.12 Profit Sharing

Several old values and traditional concepts have undergone a major change in this century and one of them is the concept of profit. To day profit is no longer looked upon as the exclusive right of the capitalist. The workers are accepted as the partners of "an enterprise. Hence, a share of the profit made by the concern with their active co-operation is considered to be their rightful due. Under the scheme of profit - sharing the workers are paid a share of the annual profit over and above wages. In other words, it is a method of industrial remuneration under which a share in the net profits of the enterprise in addition to their regular wages, is paid. It does not include gratuities paid by the employer to the employee. But profit sharing is based neither on time nor on output. It is. thus, quite different from other methods of wage payments discussed earlier. It is just an arrangements entered into by which the employee receives a share, fixed in advance, of profits.

10.13 Special features of Profit Sharing

On an analysis of the various definitions of profit sharing, the following can be treated as its features;

1. Such payment is an addition to normal wages.

2. The share of profit is determined before hand on the basis of agreement between the employer and workers.

3. It is generally made to all categories of employees.

4. It is given to the workers only if the total net profit exceeds certain specified amount

5. Such payment does not form part of the total cost of production.

10.14 Advantages

1. Profit sharing creates in the minds of workers a genuine desire to work whole heartedty for the concern. They start thinking that more the output, more the profit would be and more they will get by way of share from it. Hence they minimise waste, gear up the whole production machinery and improved quality.

2. It improves the relationship between the employer and the employees. Because, the workers also become interested in increasing the production and profits of the concern.

3. It may bring about security and continuity of service to workers.

4. It contributes towards the material welfare of the workers because profit sharing is a means of additional earning.

5. When the workers are given a share of profit their morale is built and they will not need much of strict supervision.

6. It achieves some measure of social justice. Surely, it is a step towards equitable distribution of incomes between the employer and the employees.

10.15 Limitations

1. Profit sharing does not distinguish between the efficient and inefficient workers, it is not based on the individual merits of the workers.

2. Profit does not result merely from the availability of capital or the efforts of labour. It depends also upon the efficiency of management, market condition, economics of size and location and other factors which are beyond the control of workers. Thus there is no direct link between the work and the reward. Sometimes the workers may work with utmost sincerity and devotion but the profit may be miserably low due to unfavorable trends in the market. This will make the workers feel dissatisfied.

3. The distribution of share of profits to the workers takes place only at the end of the year or middle of the year. It means that they are paid long after they have done the job. By that time their enthusiasm for increasing production is tampered.

4 The determination of profit of the concern itself may be a cause for discontentment among the workers. Also, there is possibility for the management to manipulate the accounts and show lesser profits. Under such circumstances the very purpose of the plan is defeated.

5. The employers may want the workers to share the losses too, of the concern- They may take the stand to oppose the scheme on the ground that workers should not be given any share out of the profits if they are not ready to bear the losses of the concern.

6. Trade unions consider this plan to be a mischievous as devised by the capitalists to create disunity in the ranks of the working class. Workers belonging to concerns which make good profits may lose interest in the trade union movement. They may not sympathies with their less fortunate colleagues in other concerns.

7. Sometimes, the workers may demand a share in the profit as a matter of right without working hard and trying to improve their productivity.

Profit sharing schemes have not met with success in India as well as in advanced countries like the U.K. and U.S.A. They have their own limitations as discussed above.

Group Bonus Systems

The term bonus is commonly used to denote a share in the profits earned by the business concern payable to employees in addition to their wages.

To encourage group efficiency when a work is carried on in a group, the bonus may be paid to the whole group. Group bonus may be shared by members of the group in an agreed ratio. In the absence of any proportion, it may be distributed in the ratio of their basic earnings for time spent by them on group work.

The main advantages of group bonus is that it enhances productivity of the group, develops co-operation and team spirit among members. Efficient workers may train less efficient workers. However, efficient do not get direct incentive for their efforts. That is an inefficient worker gets share in bonus, though he does not deserve. It may encourage 'laziness, leading to bickering in the group.

The group bonus scheme may be either Production bonus plan or Cost premium plan.

Production bonus plan

Under this plan, a standard output is determined for the group. If actual output exceeds the standard, the group bonus is given in the proportion of the increase in output.

Illustration : 13

Suppose for a department standard output for a week is 50,000 units and

actual production is 60,000 units. Here the increase in production is 10.000 units i.e.. 20% of standard production. Hence the worker of the'department shall be given bonus at 20% of their wages.

Cost premium plan

Under this plan, standard costs for a unit of output is determined for each department. Then the actual costs are compared with the standard costs. If the actual costs are less than the standard costs, the difference is divided between the employee and employer in an agreed proportion. It develops consciousness among workers to check the spoilage of materials, waste of time etc. But the workers are denied the fruits of their efficiency if cost could not be reduced on account of factors beyond their control.

Illustration : 14

Gem Engineering Industries has introduced a bonus wage system on slab rates based on cost reduction towards labour and overheads. The following are the rates applied.

Up to 10% of saving - 5% of the earning Up to 20% of saving - 10% of the earning
Up to 40% of saving - 30% of the earning Up to 60% of saving - 40% of the earning

Above 60% of saving - 50% of the earning

The overhead recovery rate is 500% on productive wages. The rate per hour for the workers X, Y and Z are Re. 1.00, Rs. 1.20 and Rs. 1.10 respectively. The standard cost towards wages and overheads per unit is determined at Rs. 240 per unit.

It the time taken by X, Y and Z to produce 100 units is 26 hours, 30 hours and

20 hours respectively, what is the total amount earned by them.

Solution

Statement showing hours percentage applicable to each worker

Worker	1 Hours Taken	i Wages rate	Total basic wage Rs.	Overhead @ 500 % on wage	Total cost Rs.	Standard Rs.	Saving		Hours percentage applicable
							Rs.	%	
X	26	1.00	26-00	130.00	156.00	240.00	84	35%	30%
Y	30	1.20	36.00	180.00	216.00	240.00	24	10%	5%
Z	20	1.10	22.00	110.00	132.00	240.00	108	45%	40%

Statement showina total earnina of each worker

Worker	Basic Wage Rs.	Bonus rate applicable	Bonus Rs.	Total Earnings Rs.
X	26.00	30%	7.80	33.80
Y	36.00	5%	i.80	37.80
z	22.00	40%	8.80	3G.80

Labour Co-partnership

To create more interest among the workers in the industry they may be given some share in the ownership of the firm. It is achieved through labour co-partnership. It is only an extension of the idea at profit sharing. Under "co-partnership", the workers are given representation on the board of directors, consultation committee etc. instead of paying workers their share in profit in cash, it is accumulated and bonus shares are issued to them. Thus the workers become share holders, having all

rights and privileges of equity shareholders to represent in the management. However, these shares may not be allowed to be transferred.

Evaluation

They have their own merits. But they also have their own limitations which the profit sharing schemes have.

The employers do not want to share the ownership and control of the concern with the workers. Even if they allow, the latter may not have the competence required for the management of the concern.

Illustration : 15

Calculate total monthly remuneration of three workers. A, B and C from the following data.

a) Standard Production per month per worker - 1000 units

Actual production during the month: A 850 units B 750 units C 950 units

b) Piece work rate is Re. 1 per unit (Actual production)

c) Additional production bonus is Rs- 10 for each percentage of actual production exceeding 80% of standard production.

Examples: 79% Nil; 80% Nil; 81% Rs.10; 82% Rs. 20 and so on.

d) Dearness pay fixed = Rs. 500 per month.

Solution

Particulars	Workers		
	A	B	C
(a) Actual output	850 units	750 units	950 units
(b) Efficiency (a) 7 1000x100	85% 5%	75%	95% 15%
(c) Efficiency above 80% for bonus	Rs. 850	Rs. 750	Rs. 950
(d) Piece rate at the rate of Re. 1 per unit	50	500	1-50
(e) Bonus at Rs.10 for each additional 1% above 80%	500 1,400	1,250	1,600

Note: Since his efficiency is below 80% 'B' does not get bonus.

Illustration : 16

A multiple piece rate plan is operated as follows:

a) basic piece rate upto 85% efficiency

b) 110% basic piece rate between 85% to 100% efficiency

c) 120% basic piece rate above 100% efficiency

Guaranteed day rate is equal to 70% efficiency. Assuming that 100% efficiency is 100 pieces per hour and the piece rate is 10 paise per piece.

Calculate the labour cost per piece at 5% interval between 60% and 120% (inclusive) of 100% efficiency.

Solution

The following are the wage rates applicable.

Up'to=70% efficiency (i.e.. 70 units per hour):

Day Rate *= 70 x 10 p. = Rs. 7. 70% to 85% efficiency (70 to 85 units per hour)

Basic piece rate = i.e.. Re. 0.10 i.e.. 10 paise unit 85% to 100% efficiency (86 units to 100 units per hour)

110% of Re. 0.10 « Re. 0.11 i.e., 11 paise per unit 100% to 120% efficiency {100 to 120 units per hour)

120% of Re. 0.10 = Re. 0.12 i.e.. 12 paise per unit.

Levels of Efficiency	Units	Applicable Rate (in paise)	Wages per hour Rupees	Labour Cost per piece (paise)
60%	60	Day rate	7.00	11.67
65%	65		7.00	10.77
70%	70		7.00	10.00
75%	75	10.00	7.50	10.00
80%	80	10.00	8.00	'10-00
85%	85	11.00	9.35	11.00
90%	90	11.00	9.90	11.00
95%	95	11.00	10.45	11.00
100%	100	12.00	12.00	12.00
105%	105	12.00	12.60	12.00
110%	110	12.00	13.20	12-00
115%	115	12.90	13.80	12-00
120%	120	12.00	14.40	12.00

Note

$$\text{Total Labour cost per piece} = \frac{\text{Total Wages Earned}}{\text{Pieces Produced}}$$

Illustration : 17

In a factory two workmen A. and B produce the same product using the same material. The normal wage rate is also the same. They are paid bonus according to Rowan Plan. The time allotted to product is 40 hours. 'A' takes 25 hours and 'B' takes 30 hours to finish the product- The factory cost of product for

A is Rs. 1 93.75 and for 'B' Rs. 205.00. The factory overhead rate is one rupee per man hour. Calculate the normal rate of wages and cost of materials used for the product.

Solution

Let us assume M = Cost of material and

W = Wage rate per hour

Factory cost of the product produced fay 'A' is Rs. 193.75

So, material = M

Labour = $\left(25 + \frac{15}{40} \times 25\right) W$

Overhead = 25 hrs x Re. 1 = Rs. 25

$$M + \left(25 + \frac{15}{40} \times 25\right) W + 25 = \text{Rs. } 193.75$$

Or, M + (25 + 9.375) W + 25 = Rs. 193.75

Or. M + 34.375 W + 25 = Rs. 193.75 . - - (i)

Factory cost of the product produced by "B' is Rs. 205

So. Material = M

$$\text{Labour} = \left(30 + \frac{10}{40} \times 30\right) \quad W$$

Overhead = 30 hrs x Re. 1 = Rs. 30

M + 37.5 Wt30= Rs. 205 ... (ii)

Solving equations (i) and (ii)

M	+	37.5 W	+	30	=	205.00
M		+34.375 W	+	25	=	193.75
		3.125 W	4	5	=	11.25

3.125 W = 11.25 -5 = 6.25 W = 6.25 4- 3.125 = Rs. 2

= M +37.5 x2 + 30 = Rs. 205

= M + (75.+ 30 i.e., 105) = Rs. 205

M = 205-105 = Rs. 100

Material M is Rs. 100 **Labour** W is Rs. 2 per hour

Illustration : 18

In a factory's bonus system, bonus hours are credited to the employee in the proportion of time taken, which time saved bears to time allowed. Jobs are carried

forward from one week to another. No overtime is worked and payment is made in full for all units worked on, including those subsequently rejected, From the following you are required to calculate for each employees;

a) The bonus hours and amount of bonus earned.

b) The total wage cost

c) The wage cost of each good unit produced.

Solution

(a) Statement showing Bonus Hours (Time saved) and Bonus

Particulars	Employee		
	A	B	C
Unit produced	2.500	2,200	3,600
Rejected unit	100	40	400
Good units	2.400	2,160	3.200
Time allowed for 100 units (hrs)	2.6	3.0	1.5
Time allowed (hrs)	65. hrs	66 hrs	54 hrs
Time taken (hrs)	52 hrs	75 hrs	48 hrs
Time saved (hrs)	13 hrs	-	6 hrs
Bonus	Rs. 52 (13X5)	-	Rs, 40 (if 6X7.50)

(C) & (C) Statement showing Total Wage Cost and Wage Cost of each Good Unit Produced

Particulars	Employee		
	A	B	C
	Rs.	Rs.	Rs.
Basic pay (A = 52 x 5); (B = 75 x 8); (C = 48 x 7.50)	260	600	360
Bonus	52	--	40
Total Wages	312	600	400
Good units produced	2,400	2,160	3,200
Wage cost per unit (Total wages - Good units produced}			

Day	Hours worked	Output in units
Monday	**150**	24,700
Tuesday	**160**	25,500
Wednesday	**145**	17.060
Thursday	155	18.050
Friday	**170**	28,900
Saturday	160	21.150
	940	1,35,360

Illustration : 19

In an engineering workshop 15 persons work in a group. If the weekly production of the group exceeds 120 units per hour (which is the standard) each—man gets a bonus in addition to his hourly earnings.

Bonus regulation - Each worker's share should be half of the percentage in excess of the standard production. The bonus shall be payable at this percentage of

wage rate of Rs. 3 per hour.

The following particulars relate to working during a week in March 1990. Compute:

a) The rate and amount of bonus for the week;

b) Total earnings of Mr. Ganesh who worked 40 hours during the week and his basic wage was Rs.2.40 per hour; and that of Mr.Harim who worked for 48 hours at Rs. 2.50 per hour basic.

Solution

(a) Bonus Rate and Amount:

Actual output 1,35,360 units

Less: Standard production (940 x 120) 1,12,800 units

Excess output over standard $\frac{22,560}{1,12,800}$ 22,560 units

1,12,800 Bonus percentage = 20% x 1/2 = 10%

10 Bonus rate per hour = 3.00 x $\frac{10}{100}$ = Re.0.30

Amount of bonus for the week

= 940 hours @ Re. 0.30 = Rs.282

b) Total Earnings

Earnings = (Hours worked x Rate per hour) + (Hours worked x bonus rate) 1) Mr. Ganesh's earnings

a (40 x 2.40) + (40 x 0.30)

= 96 + 12 = Rs. 108

II) Mr, Harlm's earnings

* (48 x 2.50) + (48 x 0.30) 120+ 14.40 = Rs. 134.40

Illustration : 20

A,B and C are three departments in a factory. In department A, there are 250 men of whom 80 are paid at Rs. 9.60 per,day of 8 hours, 60 at Rs. 9.40 and the last 110 at Rs. 9.20. The nature of work done by ail the men is similar.

in department B, there are 8 men at work and their wage rates are as under:

One Supervisor - Rs. 24 per day Two mechanics - Rs. 16.each per day Five assistants -Rs. 8.80 each per day.

The nature of work, of this department is such that they have to always work jointly in a group

In department C- there are just 3 men each of whom carries out a specialised kind of work . and are paid at Rs. 32, Rs. 20 and Rs. 12 per day respectively.

Two jobs (Job No, 1 and Job No. 2) involve work in the three departments as detailed below:

Determine the method and rate of wage recovery for each department and find out the labour cost of the two jobs.

Solution

Wage recovery rate of Department A

80 x 9.60 = **Rs. 768.00**

60 X 9.40 = Rs. 564.00

110x9.20 = Rs.1,012.00

Total wages = Rs.2,344.00

Wage Recovery Rate per hour = $\frac{2.344}{8}$ = Rs. 293

	Rs.
Supervisor	24.00
Mechanics (2 x 16) = 32.00 Assistants (5 x 8.80)	= 44.00
Total wages	= 100.00

Labour cost per hour = $\frac{100}{8}$ = Rs. 12.50

Wage recovery rate of Department C

Wage rate per hour

First worker Rs. 32÷ 8 hours	=	Rs. 4.00 per hour
Second worker Rs. 20 ÷ 8 hours	=	Rs. 2.50 per heir
Third worker Rs. 12÷8 hours	=	Rs. 1.50 per hour

Labour cost of Job No. 1

Dept. A 40 hr @ Rs. 293.00	11,720.00
Dept. B 5 hrs @ Rs. 12.50	62.50
Dept C 2 hrs @ Rs. 2.50	5.00
3 hrs @ Rs. 1.50	4.50
Total labour cost of Job No.1	11,792.00

Labour cost of Job No.2

Dept. A 40 hr @ Rs. 293.00	13,185.00
Dept. B 5 hrs @ Rs. 12.50	37.50
Dept C 2 hrs @ Rs. 4.00	24.00
3 hrs @ Rs. 1.50	7.50
Total labour cost of Job No.1	11,792.00

Model Questions

1) What are the essentials of a sound wage system? :

2) What are the merits and demerits of time rate and price rate system of wage payment? State the situations in which each system is effective and useful.

3) Discuss the individual merits and demerits of "Halsay plan" and "Rowan plan". Make a comparative study of the two.

4) Explain Taylor's differential piece rate system' and 'Merrick's multiple piece rate system.

5) Discuss (1) Gantt's task and bonus plan (2) Bedaux system and (3) Emerson's efficiency system

6) Explain collective bonus system. What is meant by 'profit sharing' and co-partnership'. What are merits and demerits.

7) In a factory two products are produced X and Y. X requires 15 seconds 100% relaxation Y takes 30 seconds plus 331/3 rest allowance.

One a Saturday a worker worked for 4 hours and produced 400 units of X and 210 units of Y. Wage rate per hour is Rs. 5. Calculate his earnings on that day. (Ans: Rs. 2.2)

8) A worker takes 9 Hours to complete a job on daily wages and 6 hours on an scheme of payment by results. His day rate is 75 paise an hour, the material cost of the product is Rs. 4 and the overheads at 150% of the total direct wages.

Calculate the factory cost of the product under (a) Piece work plan (b) Halsey plan (c) Rowan plan.

[Ans: a) Piece work Plan Rs. 15.25 b) Halsey Plan Rs. 18.05; and c) Rowan Plan Rs. 19]

9) With the help of following information, you are required to ascertain the wages paid to workers °X' and 'Y' under the Taylor's system.

Standard time allowed -10 units per hour Normal wage rate - Re. 1 per hour. Differential rates to be applied: 75% of piece rate when below Standard 125% of piece rate when at or above standard. The workers have produced in a day of 8 hours as follows: X-60 units Y- 100 units (Ans: X = Rs. 4.50; Y = Rs. 12.50)

Lesson -11

NOTES

Idle Time, Over Time and Labour Turnover

11.1 Idle Time

Losses due to idleness of workers occur in most of the factories. Certain losses due to idleness of workers are unavoidable. Excessive idle time is a problem that should attract the attention of the management immediately.

Idle time:
This time which wasted is termed idle time.

Idle time cost represents the wages paid for the time lost during which the worker does not work. This does not however, include the wages paid to him for festival holidays, annual leave etc..The idle time happens due to various causes for which he is not responsible. The worker remains idle but full wages are paid to him. Even for the workers who are paid on the basis of output, idle time payment may be acquired to be made. The idle time costs are arrived at from the hours booked in the job cards and the time sheets under the relevant work order for idle time.

11.2 Causes of idle time

The treatment of idle time costs depends upon the causes contributing to the idle time. Idle time has, therefore, to be analysed by functional causes. The idle time occurs primarily due to the following reasons.

1. Production causes
2. Administrative causes
3. Economic causes

1. Production causes

The production causes may be classified as under

a) Idle time due to machine break down

b) Power failure

c) Waiting for week

d) Waiting for tools and for raw materials

e) Waiting for instructions etc.

Idle time due to these reasons is usually controllable internally. Machine breakdowns can be avoided by a proper preventive maintenance system. Power failure due to lack of inspection and maintenance of power plants may be also avoided by a proper maintenance of plant. Idle time owing to waiting for materials and for tools can be controlled to a great extent if there is a proper stores control and tool scheduling system.

2. Administrative Causes

These arises out of poor planning and delayed- or improper instructions about the work to be carried out. Sometimes, idle time is the result of administrative decisions. This usually happens during a depression period when the management may not wish to get rid of trained staff temporality.

3. Economic Causes

The economic causes are those arising out of lack of demand tor the product necessitating partial loading on machines, stoppage of work on account of strikes and lockouts etc. in the case of industries which produce seasonal goods, it is not possible to get rid of workers during the slack season. In case complementary jobs cannot be found for workmen during the slack season, there is an unavoidable idle time.

Causes leading to idle time may be also classified according to controllability. According to this classification these causes are

lormal Idle time:

he cost of this is orne by the espective jobs or roducts or epartments.

1. Normal idle time

Normal idle time results usually from unavoidable causes which are beyond control. This idle time such as time lost between gate and place of work

break for tea, time interval between one job and another, time for tool setting, adjustment of machines etc:.

2. Abnormal idle time

Abnormal idle time arises usually due to avoidable causes. These idle time occasioned by break down for a considerable period, non-availability of raw materials, negligence on the part of supervisors, strikes or lock outs, fire, flood, storm etc.

11.3 Treatment of idle time

Idle time should not be booked directly to jobs or production orders because such a practice not only increases the cost of direct labour but also vitiates comparison of idle time costs from period to period. In booking time idle time or waiting time should not be normally be recorded in the job card but on a separate idle time card as illustrated below

Idle Time Card

Name. Department Ticket No.

Reason for Idle Time	Standing Order No.	Time			Cost	
		From	To	Period	Rate	Amount
Power failure Break down Waiting for Job Instruction Tools, Materials etc. Atmospheric Condition Other Causes						-

Normal idle time cost arising out of production causes is charged as an item of departmental overheads. The costs due to administrative causes are recovered as a part of general works overheads. The idle time costs arising out of economic causes are not treated as a part of cost of production and are written of straight to costing profit and loss account.

NOTES

Abnormal Idle time:

This time is avoidable idle time which occurred due to conditions which can be prevented.

NOTES

Idle time which is normal and controllable should be segregated under separate standing order number and charged as overheads.

Abnormal idle time which is beyond control would usually be heavy in amount Involving longer periods and it should be charged directly to costing profit and loss account.

11.4 Control of idle Time

Tendency to conceal idle time should be discouraged. Idle time involved not only payment of wages for non-effective time and the resultant loss of profit due to reduced production activity but it also increase the cost per unit of production as the fixed costs continue to be incurred irrespective of the reduced quantum of production due to loss of labour time- Idle time should, therefore, be brought out prominently so that action can be taken to remove the causes thereof Idle time which is within control arising from the causes such as waiting for work. Working for instructions and unscheduled breaks etc., be controlled by proper planning of production in advance and timely providing of materials. Idle time which is beyond control arising from causes such as unforeseen accidents, strikes. lockouts, power failure, shortage of demand etc., cannot be controlled.

For purpose of cost control, the idle time hours would require a detailed analysis by the specific factors contributing to the idle time. Department or person responsible for controllable idle time should be located. Finally effective remedial steps should be taken.

11.5 Over -Time

Over time:

If the work performed beyond the normal hours is called overtime work.[1]

Over time occurs when a worker works beyond his normal working hours. For working beyond the normal hours, the hourly rate of wages is more than the normal rate. Usually it is double the normal rate. Both the Factories Act and the Shops and Establishments Act lay down what constitute overtime, the rate at which overtime should be paid for. and the maximum hours of overtime that could be worked. According to Factories Act 1948, overtime has to be paid at double the rate. This Act further lays down usual working hours and states that the worker working for more than 9 hours on any day or more than 48 hours in a week, is

entitled to overtime payment. The over-time cost is the difference between the wages at the normal rate and the wages at the over-time rate for the hours of over-time worked.

11.6 Causes of Overtime Work

Overtime work is generally required for the following reasons.

1. For completion of a job or work within a specified period as required by the customer.
2. For working as a matter of policy e.g.,due to general rush of work and labour shortage etc.
3. For completing the work delayed due to departmental inefficiency.
4. For making up the time lost due to unavoidable reasons, e.g., power failure etc.
5. For working due to seasonal rush

11.7 Treatment of Overtime Cost

The additional wages paid for the overtime hours should normally be treated as a part of direct labour or Indirect labour depending upon whether the normal wages for those hours, were direct or indirect. Where overtime is worked at customers request so as to complete his work within, a specified period, such overtime cost can be directly charged to him. If, however, the overtime is incurred due to management's inefficient planning, the costs should be borne as a part of department overheads.

If overtime is necessary to make up the time lost due to breakdown of machinery, power failure or any unavoidable reason, the additional may be

charged to the costing profit and loss account- Sometimes overtime costs are charged 10 the prime cost it a work is on a peak load due to seasonal rush in the factory.

11.8 Disadvantages of Over-time working

It is a common experience that overtime working is not a healthy practice. The disadvantages of overtime working are:

1) It results in excess labour cost .

2) It decreases productivity during normal working hours.

3) It gives rise to associated cost like lighting etc.

4) It adversely affects the heajth of workers in the long run,

5) It promotes a tendency among the workers to keep the work pending so that overtime is necessitated and dissatisfaction among the workers who do not get the opportunity of overtime.

11.9 Control of overtime cost

Payment of overtime should be strictly controlled and should as far as possible be discouraged. Overtime should be permitted only in a emergency situations. Overtime work, if necessary, must have a prior sanction of the competent authority. Such a sanction should be recorded in separate overtime slips where in the job number of which overtime is required, the number of hours required to work who are authorised to do overtime should be recorded. All such overtime slips should be sent into the cost office, where these will analysed for future control of these expenses. Periodical report should be made revealing the overtime working in different departments. If it is found that in a particular department overtime has to be worked regularly, consideration must be given TO the question ot permanently increasing the capacity of the department either by an increasing the capacity of the department either by an increase in the number of shifts and workers or by installing additional machinery.

11.10 Labour Turnover

It is common feature that the workers frequently change their jobs either for better prospects or for better environments or they are forced to leave an

employment; Labour turnover is defined as the engagements and, losses in the labour force asrelated the total numbers employed at the beginning of the period. Labour turnover percentage is given by the formula;

$$\frac{\text{Number of leavers replaced}}{\text{Average total number of employees}} \times 100$$

For example, if 200 persons leave a factory in a year and the average number on the payroll is 1,000, the labour turnover will be 20% (200 / 1000 x 100). It must be noted that all persons who leave must be included whether they have voluntarily or are dismissed and irrespective of whether they are replaced or not. Every factory must endeavour to keep labour turnover at a minimum. Increase in labour turnover will not only mean a higher cost of recruitment and of training labour, but would also adversely affect the working efficiency of the factory.

Endeavour: Earnest and conscientious activity intended to do or accomplish something

11.11 Causes of Labour Turnover

Causes of labour turnover may be grouped under (a) avoidable causes, and (b) unavoidable causes.

a) Avoidable causes

1. Lower rates of remuneration
2. Bad working conditions
3. Lack of job-satisfaction
4. Discrimination between one worker and another
5. Unhappy relationship with the supervisors or with other co-workers.
6. Odd hours of work
7. Lack of proper training
8. Lack of incentives and promotional avenues.
9. Retrenchment arising out of bad recruitment policy
10. Dismissal of workers due to insubordination, inefficiency, negligence,

criminal prosecution etc,

b) Unavoidable causes

1. Death, retirement and disablement
2. Lack of housing, educational and transport facilities
3. Personal betterment
4. Marriage and pregnancy in the case of women workers
5. Enrolling for national and emergency services particularly during the period of war.

Redundancy:

More than is needed, desired, or required

6. Redundancy and
7. Other domestic causes personal to the workers.

It should be the endeavours of every organisation to prevent the leavings due to avoidable causes. It most cases, this will require additional expenditure by way of increased remuneration, providing increased amenities and attractive pension and gratuity schemes.

11.12 Effects of Labour Turnover

Labour turnover result in increased cost of production due to the following reasons:

1. Cost of replacing workers
2. Cost of training new worker
3. Loss in production and increased overhead costs due to lower levels of efficiency of workers;
4. Loss arising out of defective work and increased wastage in production

and

5. Newly employed workers are likely to mishandle tools and equipment resulting in breakages of tools etc.,

It will be to the interest of the management to calculate the possible amount of cost under the above heads so that they could compare the utility of the additional expenses which will help in eliminating the avoidable causes of labour turnover.

11.13 Measurement of Labour Turnover

Labour turnover may be measured with the help of the following methods.

1. Separation Rate Method

Under this method, labour turnover is measured by dividing the total number of separations during a given period, i.e., a month or a year, by the average number of workers on the roil during that given period.

$$\text{Labour Turnover} = \frac{\text{separation during the period}}{\text{Average number of workers during the period}} \times 100$$

The average number of workers is calculated by taking the simple average of the worker on the pay roll at the beginning of the period and at the end of the given period.

2. Basic of Accession

Certain authors hold the view that accession is the logical basis for calculating labour turnover. Suppose, an organisation had 800 employees at the beginning of the period and 120.0 at the end of the period. 100 employees left the organisation. It means that there were 500 accessions during the period (1200 + 100)-800).

$$\text{Labour Turnover} = \frac{\text{Accessions}}{\text{Average working force}} \times 100$$

$$= \frac{500}{1000} x100 \doteq 50\%$$

3. Net Labour Turnover Rate Method

This method takes into account only the actual replacements of workers during a given period irrespective of the number of workers leaving. Labour turnover is found out by dividing the number of replacements during a given period by the average working force during the given period.

$$\text{Labour turnover} = \frac{\text{Re placements}}{\text{Average working force}} \times 100$$

4. Labour Flux Rate Method

This method takes into account both separations and men entrants. This is found out by adding all separations and entrants and dividing by the average number of workers during a given period.

Labour Turnover

$$\frac{\text{Number of separations during a period + Number of New entrants during a period}}{\text{Average Number of worksduring a period}}$$

11.14 Control of Labour Turnover

1. A proper recruitment and training policy
2. A proper policy of promotions and transfers
3. A sound social security scheme, e.g., pension, family pension, provident fund, etc.,
4. A sound system of wage payment

5. Provision of amenities and welfare measures

6. Introduction of labour participation scheme and joint consultation schemes.

11.15 Treatment of labour Turnover Costs

In most of the companies the cost of labour turnover forms part of overhead. Preventive costs of labour turnover should be apportioned to the different departments in the ratio of number of persons employed in each department. Replacement costs of labour turnover may be directly charged to product or it may also be treated like preventive costs.

Labour Turnover Report

For controlling the labour turnover in a factory a labour turnover report may be prepared to analyse the causes labour turnover.

Labp-ur Turnover Report			
Dept:		Month ended	
Details	Current month	Last month	Corresponding month, of last year
No. of employees on 1st No. of employees on 31st Average labour force No. of left during the month Labour Turnover Index (%) a) Personal causes Retirement pislike for job Betterment Other reasons b) Unavoidable causes Retrenchment Disciplinary ground Other causes c) Avoidable causes Lower pay Unsatisfactory condition Lack of amenities Others			

Illustration : 1

A personal department of a company gives you the following information regarding labour. Calculate labour turnover rate by using, a) Separation method b) Replacement method and c) Flux method.

No. of workers on the payroll

At the beginning of the month - 900

At the end of the month -1,100

During the month, 100 workers quit while 40 persons are discharged; 150 workers are recruited during the months. Of these, 25 workers are recruited in the vacancies of those leaving while the rest were engaged for an expansion scheme.

Solution.

$$\text{Average No. of workers during the month} = \frac{900 + 1{,}100}{2} = 1.000$$

11.16 Labour Turnover Rate

a) Separation Method

$$= \frac{\text{No. of Separations duringthe period}}{\text{Agerage number of workers}} \times 100 = \frac{10+40}{1{,}000} x100 = 5\%$$

$$= \frac{\text{No. of Separations duringthe period}}{\text{Agerage number of workers}} \times 100 = \frac{25}{1{,}000} x100 = 2.5\%$$

$$= \frac{\text{No. of sepearation + of Replacement}}{\text{Agerage number of workers}} \times 100 = \frac{50+25}{1{,}000} x100 = 7.5\%$$

Illustration : 2

calculated the normal and overtime wages payable to a workman from the following data

Days	Hours worked
Monday	8 hrs
Tuesday	10 hrs
Wednesday	9 hrs
Thursday	11 hrs
Friday	9 hrs
Saturday	4 hrs

Normal Working Hours peer day - 8

Normal rate per hour- Rs. 0.50

Overtime rate - Upto 9 hours in a day at single and over 9 hours at double rate

(Or)

48 hours in a week at single rate and over 48 hours at double rate. Whichever is more beneficial to workman.

Solution

Statement showing calculation of normal and overtime wages. According tc First Alternative.

Day	Hours Worked	Normal Hours	Overtime	
			Single Rate Hrs.	Double Rate hrs.
Monday	8	8	1	1
Tuesday	10	8	1	2
Wednesday	9	8	1	
Thursday	11	8	1	
Friday	9	8		
Saturday	4	4		
	51	44	4	3

	Rs.	
Normal Wages 44 hours @ Re. 0.50	22.00	
Overtime wages - single 4 hours @ Re. 0.50		2.00
-double 3 hours @ Re. 1.00		3.00
		5.00
Total wages		27.00

According to the Second Alternative

	Rs.
Normal wages Re. 0.50 (48 x 0.50)	24.00
Overtime wages Re. 1.00 (3 x 1.00)	3.00
Total wages	27.00

The overtime wages are the same under both methods

Illustration

A work measurement study was carried out in a firm for 10 hours and the following information was generated.

Units produced - 350

Idle time - 15%

Performance rating - 120%

Allowance time - 10% of standard time what is the standard time what is the standard time for the task

Solution

Gross time taken in minutes = 10 hrs x 60 minutes

= 600 minutes

Less : Idle time 15% of 600 minutes = 90 minutes

Net time taken = 510 minutes

Normal time = Time taken x performance rate

$$= 510 \times \frac{120}{1{,}00} x 612\%$$

Normal Time = 612 minutes

Add: Allowance time 1/10th of std. time

or 1/19 th of normal time = 68 minutes

Standard time for Task = 680 minutes

Standard time for one unit = 1.9429 minutes

or

= 1 minute 57 seconds.

Illustration : 4

A engineering works undertakes job work. It pays basic wage at Rs. 6 per hour and overtime rates as under.

Evening overtime - Time +1/3

Weekend overtime - Double time

During a particular period it undertook 3 jobs for which the following hours are booked.

Normal Time Evening O.T Weekend O.T.

	Job1 Hrs.	Job 2 Hrs.	Job 3 Hrs.	Total Hrs.
Normal Time	2.000	3,000	1,000	6,000
Evening OT	120	320	220	660
Week End O.T	20	20	20	60

Calculate the labour cost chargeable under each of the following cases.

a) Where overtime is worked regularly throughout the period as company policy due to labour shortage

b) Where overtime is worked irregularly to meet spasmodic production requirement.

c) Where overtime is worked specifically of the customer's request to

expedite delivery.

Solution

a) Since overtime is a regular feature due to labour shortage, the overtime payments may be charged to jobs at inflated hourly rates as follows.

Normal Time - 6.000 hrs ® Rs. 6.00	= Rs. 36.000
Evening O.T. - 660 hrg @ Rs. 8.00	= Rs. 5.280
Week end O.T. • 60 hrs. @ Rs. 12.00	= Rs. 720
6,720 hrs Total cost	- Rs. 42,000

Hourly rate = $\frac{42.,000}{6,720}$ Rs. 6.25

The labour cost of each job would be as under

Job 1 2.140 hrs @ Rs. 6.25 = Rs. 13.375

Job 2 3,340 hrs @ Rs. 6.25 = Rs. 20,875

Job 3 1,240 nrs @ Rs^ 6.25 ~ Rs. 7.750

Total = Rs. 42.060

b) Since the overtime is not regular, the jobs may be charged at normal rate for hours worked and the overtime premium may be treated as production overhead. Thus labour cost chargeable to jobs would be :

		Rs.
Job 1	2.140 hrs @ Rs. 6.00	12,840
Job 2	3.340 hrs @ Rs. 6.00	20,040
Job 3	1.240 hrs @ Rs. 6.00	7,440
		40,320

Overtime premium to be treated as factory overhead

660 hrs @ Rs. 2	=	1,320
60 hrs @ Rs. 6	=	360
Total		42,000

c) Under this case, the entire wage including overtime premium may be charged specific jobs :

		Rs.
Job 1	2.140 hrs @ Rs. 6.00	12,840
Job 2	3,340 hr6 @ Rs. 6.00	20,040
Job 3	1.240 hrs @ Rs. 6.00	7,440
		40,320

Overtime premium to be treated as factory overhead

660 hrs @ Rs. 2	=	1.320	
60 hrs @ Rs. 6	=	360	
			1,680
Total			**42,000**

1. What is idle time? Indicate the Afferent categories in to which the idle time can be classified and state which of them can be effectively controlled and how?

2. What is meant by 'idle time' in connection with direct labour? Enumerate the causes of idle time. How is idle time treated in cost accounting?

3. Write a note on overtime work. How it is treated in accounts? State the method of control of overtime work.

4. What is meant by 'Labour turnover'? Explain its effect on production cost?

5. What are the causes and consequences of labour turnover? What measures do you suggest to reduce labour turnover to the minimum?

6. Calculate the earnings of workers A and B from the following particulars for a month and allocate the earnings of each to jobs X,Y and 2.

	A	B
a) Basic pay	100	too
b) Dearness Allowance	50%	50%
c) Provident Fund (on basic wages)	8%	8%
d) Employee's State Insurance ion basic wages)	2%	2%
e) Over time	10 hrs.	...
f) Idle time and leave	X	16 hrs.

The normal working hours for the month are 200 hrs. Over time is paid for at double the rate plus DA. The month contains 25 working days and one paid holiday. The workers are employed on job X, Y and Z in the following proportion.

	X	Y	Z
A	40	30	20
B	50	20	30

Ov&r time was done on job Y

NOTES

[Ans: Earning A = Rs. 175 including overtime: B ± Rs. 165 including idle time: Rate.per hour A- Normal Re. 6.80 overtime Rs. 1.50; B - Normal Re. 0.825: Labour cost per job X = Rs. 130.90; Y = Rs. 93.36; Z = Rs. 93.54]

7) Analysis of the time card of a worker on a machine shows that of the total 48 hours (including 4 hours overtime) on production and that 3 hours was idle time due to machine breakdown.The wage rate of the worker is Re. 1 per hour; but overtime is paid at 50% extra. You are required to allocate total wages paid to the worker between 'direct' and indirect labour indicating reasons there.

[Ans: Direct Rs. 45; Indirect Rs. 5 Indirect Labour includes idle time wages Rs. 3 and over time premium Rs. 2]

8) From the following details calculate the normal and overtime wages of a workman in a textile mill

Days	No. of hours worked
Monday	7 hrs
Tuesday	8 hrs
Wednesday	10 hrs
Thursday	9 hrs
Friday	8 hrs
Saturday	5 hrs

Normal working hours - 7 hrs. per, day. Normal rate of wage - Re.1 per hour.

Overtime wage rate - Up to 8 hours in a day at single rate and over 8 hours in a day at double rate.Up to 48 hrs. in a week at single rate and over 48 hrs at double rate whichever is more beneficial to workman.

[Ans: I method - Normal Wages Rs.40; Overtime wages Rs.10. Total wages Rs.50. .

II Alternative method - Normal wages Rs.42; Overtime wages Rs.10. Total wages Rs.52]

Lesson - 12

Accounts, Records and Reports

12.1 Pay Roll Accounting

Employment of labour and utilisation of labour time must be accompanied by proper organisation of wage payment. This involves computation of gross wages earned by the employees and deductions from the gross wages, preparation or wage sheets and disbursement of pay. These functions are undertaken by the Accounts Department. Sometimes, a separate department known as payroll department is set up for the same task.

12.2 Preparation of Payroll Wage Sheets

Payroll accounting is defined as that part of work of the Accounting Department which is concerned with the determination of the periodic earnings of the workmen and recording them in the books of accounts.

The payroll is a consolidated list of workmen which shows the gross wages, deductions and net wages payable to them.

The payroll are either prepared weekly, fortnightly or monthly according to the practice followed in the organisation. The payrolls are prepared department wise, and where the departments work more than one shift, for each shift separately. The essential information to be shown in a payroll are :

1. Name of the Department

2. Wages period covered by the payroll

3. Workers' clock number

4. Workers' name

5. The hours of attendance

6. Overtime hours if any .

7. Workers' production during the wage period

8. The hourly rate of wages

9. The rate per unit of production

10. Deamess allowance

11. Production bonus

12. Details of deductions made

13. Net wages payable.

The specimen form of a simple Pay Roll is enclosed.

Pay Roll

Week Ended .....

Shift :

..... Dept.

Sl. No.	Clock No.	Name	Attendance								Production							Rate per		Wages				Deduction					Net Wages
			Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total	Hour	Unit	Basic	D.A.	Bonus	Gross Wage	P.F.	E.S.I.	Fine	Rent	Total	

It should be noted that the labour cost to be charged to costs is not the net wages of the worker. The actual amount to be charged will be the gross wages of the worker plus the employer's contributions to the Provident Fund and ESI Scheme.

The three stages in the preparation of a pay roll are as follows.

1. Collection of the Basic Data

The basic data for the payroll is collected from the following documents.

a) The time cards provide information for computation of wages due to workers employed on time rate.

b) The performance and gross wages due to workman employed on piece rate are derived from the piece work cards.

c) Where time cards and piece work cards are not used, the departmental attendance register or the departmental production records can be made to serve the same purpose.

2. Calculation of the Wages Payable

The costing department checks up the basic rates marked in pay roll and ensure that the hours paid for are agreed with the hours booked against jobs, and the production paid for is reconciled with the production records. After carrying out this check, necessary calculations are done to arrive at the gross wages, the deductions to be made and net wages to be paid.

3. **Preparing the Actual Pay Roll**

Every calculation in the payroll should be made by one clerk and checked by another. Once the payroll is prepared a wage ticket is made out for each worker and these are distributed to the worker a day before the actual data of payment. The object of distributing this ticket is two - fold.

a) To enable the worker to verify the amount of wages that he will be receiving

and

b) To serve as an identification at the time of payment.

in certain organisations the payroll itself is prepared on continuous perforated sheets so that one copy of it can be used as the wage ticket.

12.3 Labour Cost Accounting And Record

The cost accounting department is primarily responsible for the collection and classification of costs relating to ail labour activities and with the help of time cards, job cards and payrolls, labour cost of various job, work orders and processes, etc. are calculated. The steps involved in accounting for labour cost consist of

a) Analysing the total labour consisting of piece work, overtime labour by departments, jobs, work orders or processes.

b) Charging direct labour consisting of piece work, overtime and incentive bonus as production cost; and

c) Treatment of indirect labour cost as overhead expense.

12.4 Wage analysis or Wages Abstract

Wage analysis refers to the distribution of wages by department jobs, work orders or processes. Wage analysis is made according to the various control accounts. Necessary data for analysis are provided by the wage sheet, time card, piece work cards and job cards. The wages abstract or wages analysis sheet is designed, more or less in the manner shown below.

Week endind _____ WAGES SHEET ANALYSIS

No.	Workman	Job / Work Order					Overhead			
		No.	No.	No.	No.	No.	A/c.No.	A/c.No.	A/c.No.	A/c.N
1										
	Total									

Accounting Treatment

The following are the journal entries which are made in the cost books.

1) When Payment of Wages is made

Wages control A/c..... Dr.

To cost ledger control A/c.

2) When total labour cost of various job is debited to work - in - progress.

Work - in - progress A/c..... Dr.

To Wages control A/c.

3) When indirect labour transferred to factory / administration / selling and distribution overheads.

Factory Overhead control A/c ..... Dr.

Ailrmnist?atian overhead control A/c ..... Dr.

Selling & Distribution overhead control A/c..... Dr.

To wages control A/c.

4) When wages are paid for normal idle time

Job A/c or Overheads A/c..... Dr.

To Wages control A/c.

5) When wages pre paid for abnormal idle time.

Costing Profit and Loss A/c..... Dr.

To wages control A/c.

12.5 Some Special Items of Labour Costs

1) Holiday

Employees are entitled to certain holidays. Compulsory holidays are announced by the government while other holidays are decided by the mutual discussion between the management and the workers. Although payments made for these holidays are unproductive, these are charged to the cost of production. There are two methods of changing these overheads:

1. To treat these payment as full years overheads and.to charges to the year's output.

2. To use inflated direct labour cost rate to cover both normal wages and part of the holiday pay.

2) Leave with pay

Workers are entitled to certain categories of leave with pay every year e.g., casual leave, medical leave etc. Payment made for such leave should be charged to production in the same manner as holiday pay is charged

3) Night Shift Allowance

Sometime, due to pressure of work, workers are. asked to work in night shifts. The additional payments made for night shift work are charged to general works overheads because it Is not fair to load a job with such additional expenses. Where workers are asked to work in night shifts at customer's request so as to complete his job within a specified time, extra payments, therefore, are charged directly to the job concerned.

4) Learners' Time

If learners wages are easily identifiable with a job, they should be treated as direct wages. Some firms may like to treat learners' wages as learning cost which forms part of overheads. Learners are likely to take more time to do job than a trained worker. Therefore, it is desirable that 50% of his time be charged direct to the job to avoid unnecessary loading of the job with excess labour cost and the balance of 50% treated as overhead.

5) Fringe Benefits

Fringe benefits are services and financial compensation given to employees but not directly related to employees' performance. Fringe items involve added labour cost to the employer but are not direct wage payments to employees Fringe benefits, include insurance facilities, pension facilities, medical benefits etc. These are treated as follows:

a) To recover fringe benefits as direct charge by using inflated or supplement labour cost rate.

b) To treat as departmental overhead only, if it can be identified department wise.

c) If department-wise identification is not possible, it should be treated as general overhead.

6) Casual Workers

A casual worker is a worker who is hot a regular employee of the factory and is employed when there is an emergency of work or somebody is on leave. When control workers are employed, on production jobs, job cards should be issued to them and work done by them should be duly certified by the supervisors. In the case of workers for miscellaneous Indirect jobs, time sheets should be issued. The wages paid *to* such workers will be treated as overhead expenditure.

7) Unpaid wages

It is always the case, that all the wage envelops are not collected on the scheduled date of payment, either due to absenteeism of workers or for other reasons. A list of such unpaid wages is made out and the corresponding envelops are returned un-opened to the cashier. These unpaid wages are paid out later a fixed day. Before paying the unpaid wages, it is also desirable that the worker is identified independently either with his service records or by his signature.

8) Advance wages

The workers who go on leave before the normal date of payment are paid their wages' in advance. When such payments are made separate advance wages slips are made out and the cash is drawn against them on the last date of the wages period, so that the workers can be paid their wages before they go on leave. These advance wages slips are preserved till the next regular pay day and the wages envelops pertaining to these are taken out before the envelopes are sent out to the departments for payment.

12.6 Labour Cost Reports

To have an effective control on labour cost, various labour cost reports are to be submitted to the management at regular intervals, say weekly or monthly. These reports are listed below.

1) Monthly report on recruitment cost.

2) Monthly report on training cost

NOTES

3) Monthly / Weekly report " production and labour cost.

4) Report on level of activity obtained

5) Report on efficiency and productivity of labour

6) . Report on utilisation of labour.

7) Report on absenteeism

8) Report on labour costs classifying productive and non-productive

9) Report on accidents, giving monthly accident frequency.

10) Weekly report on wages per person

11) Monthly / Weekly report on labour turnover cost;

12) Monthly / Weekly report on labour cost variances

13) Reports on the working of different welfare schemes.

14) Report on the effect of working of overtime and working in extra shift.

15) Labour attendance report.

16) Report on labour cost per tone.

17) Complement report

18) Report on idle time

19) Report on different ratios concerning labour cost. These ratios are

a) Ratio of direct wages to output;

b) Ratio of total earnings to cost of production;

c) Ratio to total earnings to labour hours;

d) Ratio of total wages to total sales.

20) Report on the effect of incentive schemes on cost of production. Specimen of some" reports are given in the following pages.

1. Statement of labour cost per tone

..... & Co. Ltd

Production Tonne: March 1990
Total Wages Labour cost per tonne

Production Tonne: Total Wages : March 1990
Labour cost per tonne :

Department	Wages	Cost per tonne			(+) or (-) target
		March 1990	Feb. 1990	target	
Production Jute Handling Batching Preparing					
Services Workshop Boiler House Power Housed					
Other costs Leave Wages Pension fund Employees contribution to P.fund					
Total					

2. Complement Report
.....& Co. Ltd

Handle per Loom	March 1990
No. of Looms	Production Tonne
Hessian	Hessian
Sacking	Sanckin
Others	Others

Department	Machinery	Hands		Target	(+) or (-)
		Total	Per Loom		
Jute Handling	Receiving Issuing				
Batching	Softener Teasor Cutter				
Preparing	Breakers				
Total					

3. Report on Labour Efficiency ... & Co. Ltd.,

Labour Efficiency Report March 1990

Department	Unit	Standard output	Actual output	Efficiency percentage
Juts Handling	Quintals per man day			
Softners	Quintals per man day			
Spinning	Kilograms per spinning hour			

4. Idle Time Report
& Co. Ltd.

Department

Period:.Production Hours:

Last Hours :

A - Machine Break down
B - Waiting for workers
C - Lack of Materials
D - Lack of instruction
X - No orders
Y - Power failure
Z - Shortage of raw materials

Machinery	Total Hours Last / Causes						
	Avoidable				Un-avoidaDfe		
	A	B	C	D	X	Y	Z
Total							

Comments

Cost of idle time :

12.7 Production Unit Lost

The reports on labour cost should cover an analysis of the labour cost of the product, labour productivity and the cost of idle or lost time. It should be appreciated that these are certain general reports which will apply to any industry or unit. Apart from these, there will be other special reports specific to certain industries covering other aspects of labour costs e.g., the effect of incentive systems on problems of production costs, the impact of labour turnover'on costs, the total cost of an employee etc.

Illustration : 1

From the following data, prepare a statement showing the cost per day of 8 hours of engaging a particular type of labour.

a) Monthly salary (basic plus dearness allowance) Rs. 200

b) Employee's contribution to provident fund 8 "per cent of salary (items a and

NOTES

c.) Leave salary payable to workman 5 percent.

d) Employer's contribution to E.S.I. 2 y_2 per cent of salary (items a and c)

e) Pro rate expenditure on amenities to labour Rs. 17.95 percent)

f) No. of working hours in a month 200

Solution

Statement showing Labour Cost of a worker per Day

	Rs. P.
Monthly Salary (Basic + D.A.)	200.00
Leave Salary 5% of Rs. 200	10.00
P.F. Contribution 8% of Rs. 210	16.80
Employer's Contribution to E.S.i. 2^1/a% of Rs. 210	5.25
Pro rate expenditure on labour amenities	17.95
Labour cost for the month, i.e., for 200 hrs.	250.00

Illustration : 2

Calculate the direct labour cost of job A from the following data :

Job A	Time Employed in Hours	
	Worker X	Worker Y
Monday	10	8
Tuesday	9	10
Wednesday	10	11
Thursday	11	10
Friday	6	5
Saturday	6	4

a) Normal working hours on week days are 8 hours and on Saturdays 4 hours.

b) Overtime is paid for at double the normal rates.

c) Normal daily wage: X = Rs. 3; Y = Rs. 4

d) Four hours work on Saturdays is paid at full day's wage. Work on Saturday in excess of 4 hours is treated as overtime and is paid for at 1 $^{1}/2$ of normal wages up to a total of 8 hours work and beyond that at double the normal rate.

e) Dearness allowance is to be paid to the total wages including overtime at 50 percent of wages.

Solution

Statement Showing Computation of Normal and Overtime Hours

	Worker X		Works Y	
	Normal Hrs.	Overtime	Normal Hrs.	Overtime
Monday	8	2	8	-
Tuesday	8	1	8	2
Wednesday	8	2	8	3
Thursday	8	3	8	2
Friday	6	-	6	--
Saturday Total	8	(2)	8	..
	46	8 + 2	45	7

"On Saturday's work, the worker is paid for 8 hours for four hours work.

Ordinary Rate

For worker X - Rs. 3 per day of 8 hours = Re. 0.375 per hour For worker Y - Rs. 4 per day of 8 hours = Re. 0.50 per hour.

Statement Showing Wages of X and Y

Particulars	WorKet X		Worker'Y	
	Working	Amount Rs.	Working	Amount
Basic wages	46 hrs. x Re. 0.375 per hr.	17.25 6.00	45 hrs. *x* Re. 0.50	22.50
Overtime wages	8 hrs. x 2 x Re. 0.375	1.125	7 hrs. x 2 *x* Re. 0.50	7.00
Dearness Allowances at	(Ar couple rate)			
50% basic pay and		24.376		29.50
overtime	2hrs x3/2x Re. 0.375	12.187		14.75
Totai Wages		36.562		44.25

Direct Labour Cost of job A = Rs. 36.56 + Rs. 44.25 - *Rs.* 80.81

Illustration : 3

Find out what an average labourer costs the employer for a month of 208 hours assuming 8 hours a day from the following data.

Average basic wage per hour Re. 0.60

Average D.A. oer hour He. 0.40

Number of unpaid holidays fin a year) 27

Number of unpaid holidays (festivals in a year) 3

Number of days sick leave with half pay (in a year)' 15 Provident Fund - 6Vi% of basic wage and D.A. State insurance - 1% of basic wage and D.A. Other amenities per month Rs. 7.00

Solution

Calculation of Effective Hours for the Given Month

Number of hours per month	208
Less: No. of hours per month for unpaid holidays	
No. of unpaid holidays in a year = 27	
No. of unpaid hours in a year = 27 x 8 = 216	
No. of unpaid hours per month = 216 /12	18
	190
Less: Hours of sick leave per month (15 x 8/2)	10
Hours for the given month	180

Calculation of Total Earnings per Labour per month

Details	Amount
	Rs. P
Basic Wage {130 x 0.60}	108.00
D.A. {180 x 0.40)	72.00
Half pay sick leave (10 x 0.50)	5.00
P.Fund - 6%% of basic wages + D.A.	11.25
State Insurance (1% of 180)	1.80
Other amenities per month	7 00
Total earnings per labour	205.05

Note

1) Half pay has been worked out as 50 percent of basic wages and

$$\text{D.A} = \frac{0.60 + 0.40}{2} = 0.50$$

2) Assuming that workers work for 8 hrs a day, 208 hours per month (worked for 26 days). Therefore there is no need to consider further effect of Sundays and Saturdays.

Illustration : 4

Find out the wage per hour based on the following information :

Name : Shri Ram

Wages per year Rs. 24,000

Annual bonus 25% of wages

Contribution of Provident Fund ©10% on wages

E.S.I. Contribution 3% on wages

Travel leave permitted during the year - 60 days

Cost of labour welfare activities including Canteen Subsidy Rs. 3,76.000

No.of. workmen - 200

Normal idle time - 80 hrs.

Working days per annum - 320 days of 8 hrs. each

How will you treat, if Shri Ram had lost 60 hours on some days on account of failure of power supply.

Solution

Effective Hours Per Annum

Total working days	320
Less: Leave (in days)	60
	260

Working Hours:	Hrs.
260 x 8 hrs. per day	2,080
	80
	2000

Wages	24,000
Bonus (25% Rs. 24.000)	6,000
P.F. (10% of Rs. 24.000)	2,400
E.S.t. Contribution (3% of Hs. 24,0u	720
Gross Wages	33.120
Cost of amenities per head (Rs.3,76,000 on	1,880
200 workers)	35,000
Total labour cost	

Loss due to 60 Hours idle time @ Rs. 17.50 = Rs. 1.050

Since this idle time is due to failure of power supply, it is an abnormal idle time. Hence it should be debited to costing profit and loss account.

Note:

Normal idle time of 80 hours has been deducted from total working hours 2,080 and total labour costs have been spread over effective working hours 2.000. Thus costs of normal idle time is loaded on effective hours for the purpose of charging labour cost to production.

Model Questions

1. Describe the preparation of a payroll in a factory. Draw a specimen of the name of the same. Explain how the details contained in the same are made use of in cost department.

2. List the names of some labour reports from the cost accountant. What factors should the cost accountant keep in mind when presenting these reports?

3. Sketch the form of wage analysis sheet and explain what purpose it serves in cost accounting?

4. Compute the net wages cheque and show by journal entries of the recording of the financial and cost accounts:

a) The time tickets show total earnings (gross of workmen) Rs. 1,00.000

b) The deductions *are* made up as follows.

Employees State insurance	1.900
Advance against wages	2,500
Employees Provident Fund	8,000
Income - tax account	1,000

c) The company has to contribute an equal amount to Provident Fund and Rs. 2.000 to Employees State Insurance.

d) The analysis to time tickets shows 75% direct and the rest indirect labour.

5) From the particulars given below, prepare the labour cost per man -day of 8 hours.

a) Basic salary Rs. 2 per day

b) Dearness allowance 25 paise per every point over 100, cost of living index

for working class - current cost of living index 700 points.

c) Leave salary 10% of (a) and (b)

d) Employers contribution to provident fund 8% of (a) (b) and (c)

e) Employers contribution to State insurance 2.5% of (a), (b) and (c)

f) Expenditure on amenities to labour Rs- 20 per head, per mensum

g) Number of working days in a month 25 days of 8 hours each. (Ans: Rs. 10-52)

6) From the following particulars, find the amount of cash required for payment of wages in a factory for a particular month.

	Rs.
i) Wages for normal hours worked	20,500
ii) Wages for overtime	2.200
iii) Leave wages	1,700
iv) Deduction of employee's share to State Insurance Contribution	500
v) Employees Contribution to Provident Fund	1,600

Vi) House rent is to be recovered from 30 employees at the rate of Rs. 10 per month. (Ans: Cash required Rs. 22,000)

7) How would you treat the following in cost accounts?

a) Fringe Benefits (b) Holiday pay (c) Leave pay and (d) Strike pay.

Lesson -13

Overhead

13.1 Introduction:

As we have already discussed, all direct costs form part, of prime cost, which is an aggregate of direct material cost, direct wages and direct expenses.. All direct costs, form part of overhead, which is an aggregate of indirect expenses. Thus, overhead costs are the operating costs of business enterprise which can not be identified or linked with particular units of output. Moreover, the word indirect connotes that which cannot be allocated but which can apportioned to cost units.

For example, if the breakup of expenditure incurred in a-steel works is as follows..

Raw materials	Wages Other	Expenditure
iron	Melting Furnace	Rent rates and taxes
Coal	Casting	Maintenances and repairs
Lime Stone		Depreciation
		Insurance
		General Expenses

Here we may observe that cost of raw materials can be easily attributed to a batch of production units. Also the wages can be identified with the production units. But the. other expenses cannot be allocated to definite production units and hence they are to be apportioned to the cost units. Such is the nature of overhead costs.

However, certain items .of overhead may be traced "directly" to a department or machine (cost centre) but will be "Indirect" as to the unit" of output. Thus overhead costs are indirect costs and are found in all departments unlike direct costs which are found in only producing departments. Therefore, overhead includes.

a) Indirect costs, which cannot be, by their nature, traced to specific units of production.

b) Direct costs, which are so small in amount that it is inexpedient *to* trace them to specific units of production.

The following terms have been interchangeably used.for "overhead".

(i) on cost (ii) burden (iii) indirect expenses (iv) Supplementary costs (v) non productive costs (vi) loading costs etc., These terms are not widely accepted synonyms of overhead.

13.2 Classification of overheads

Cost classification is method of analysis of costs with a view.to determine and control the costs. To classify the cost in to group the costs according to their common characteristics. For this purpose, however, as a preliminary step, there should be various groups. According to which costs are to be classified and accumulated. The classification of overhead involves two steps, (i) the determination of the classes or groups in which the overheads are to be classified and collected; and (ii) the actual process of classification of various items of expenses into one or other of the groups.

Methods of Classification

The determination of classes may take into account the following methods:

I) Function-wise classification

II) Element-wise classification

III) Behaviour-wise classification

I) Function-wise Classification

When the overheads are grouped with reference to the major activity divisions of an organisation, this becomes a functional classification. Then the main groups may be

i) Manufacturing overhead

ii) Administrative overhead iii) Selling overhead; and iv) Distribution overhead

i) Manufacturing overhead (or) Production overhead

It covers all indirect expenditure of the manufacturing division of an organisation. Usually it takes into account the expenditures from the receipt of the raw material until the production is completed and the product is kept ready for despatch. It is also called factory on cost or works on cost. The following are the examples: fuel and power, lighting and heating, factory rent, depreciation on factory machinery and building, salary of works manager, wages of foreman, store keeping expenses, remuneration of inspecting staff, etc.

ii) Administrative Overhead

This consists of all expenses incurred in the direction, control and administration of an undertaking which is not directly related to research and

development and distribution and selling activity of the concern. The following are the examples of administrative overhead: rent of office, salary, printing and stationary, directors remuneration, audit fees, legal expenses, postage and telegram etc.

iii) Selling Overhead

This expenditure is incurred in promoting sales and retaining customers. The examples are; advertisement, salesman salary, window display, training of salesman, bad debts, discount on sales etc

iv) Distribution overhead

This group covers all expenditures incurred from the time the product is completed in the factory until it reaches its destination, e.g., carriage outwards, packing and shipping, maintenance of delivery vans etc.

II. Element-wise Classification

The classification can also be made according to the source and nature of the expenses, i.e., the element of which the expense is made up. The group here follows the definition of overhead, which is broken up into the following elements.

a) Indirect material

b) Indirect Labour and

c) Indirect expenses

Examples of indirect material are: cotton waste, fuel and consumable stores.

Examples of indirect labour are: bonus, wages of maintenance departments, overtime and night shift, leave pay and holiday pay.

Examples of indirect expenses are: depreciation, repairs, taxes, canteen expenses and repairs.

Behaviour-wise Classification

By behaviour means the relation of the expenditure for changes in the volume of production-Some expenses increase with the increase in production volume, some remain constant irrespective of the changes in the level of production, whereas some expenses do not change upto a certain volume but change after that. Based on this behaviour, the expenses may be classified into :

i) Fixed overhead,

ii) Variable overhead, and

iii)Semi - variable overhead

i) Fixed overhead

Expenses that remain almost constant, irrespective of changes in the volume of production are known as fixed overheads. The examples are, rates and taxes on building, manager's salary, supervisor's salary, insurance, etc. Another important point to be noted here is that fixed cost is not a constant quantity permanently. This is because over a long period of time the concern may increase its capacity further, which in turn requires addition to buildings, equipments and other facilities. Then, of course, the fixed charges which were constant do increase. Thus fixed charges are fixed only within a certain range of plant capacity.

ii) Variable overhead

Variable overhead represents that part of indirect costs, which varies with change in volume of activity. Alternatively, overheads which tend to vary directly with variations in volume of production are known as variable overheads. However there may not be perfect mathematical relation. But they necessarily go upon sympathy with the rise in volume of production. The examples of variable overhead are power and fuel, internal transport, consumable stores packing materials, lubricant etc.

iii) Semi - variable overhead

There are certain overhead items which neither fall in the category of fixed overhead or variable overhead. These overheads show mixed relationship i.e., partly fixed and partly variable. These are known as semi-variable overheads. Semi variable overheads do not fluctuate in direct proportion volume. Upto a certain volume of production they are fixed and at other volume they change and after that remain constant again upto certain level of production. Thus, they have no sympathy to the change in volume and at the sametime they are not constant. For example, after particular level of production overhead costs of maintaining building and plant, some of the administrative salaries, postage and stationary do change though they are basically fixed in nature.

Semi variable overheads present the bigger problem in cost analysis because there is no readily ascertainable relationship between cost and volume. For this purpose

of analysis, semi variable overhead must be segregated into fixed and variable element. Intelligent estimate of individual items. High and low method, Method of averages, Scatter graph method, Least square method, etc., are used to separate semi-variable overheads into their fixed and variable comportments.

13.3 Importance of classification of overhead

Overheads are classified into different categories on different bases like functions, elements and variability. The following are the advantages of different classification of overheads.

1. It helps in managerial control of operations.

2. It helps in preparing budgets for future operations.

3. It helps in determining profitability of different product lines or departments of the firm.

4. It helps to use data for different purposes like product costing purposes and control purposes.

5. It helps management in decision making problem.

Codification of overheads

After classification of overheads, each group of expenses shall be given or allotted a particular name, number or symbol so that each group may be distinguished from another. Such a procedure of allotting symbol or number is known as. "codification". The most commonly used plans. of codification of accounts are explained below. The organisation may adopt any one best suited method to its needs.

1. Mnemonic System

Here the better symbols as mnemonic aids e.g., 'R' for repairs, 'S' for salary and so on are used. It is also know was Alphabetical System. The system aids memory.

2. Numerical system

NOTES

Use of numbers sibling an account of overhead, say 005 for factory lighting, in the simplest of coding methods. Here a block of numbers for different categories of expenses are assigned. For examples,

01 to 99	-	Production overheads
100to199	-	Administrative overheads
200 to 299	-	Selling overheads
300 to 399	-	Distribution overheads

Thus any code, member which begins with '0 refers production overhead and that beginning with T refers to Administrative overhead and that beginning with'2'refers to selling overhead and so on.

3. Decimal system

It is also numerical system with a difference that instead of full numbers, decimals are used. Here the whole number may be used to indicate the main, group and the decimals to represent

secondary and other detailed groups. For example, when

201	refers to salary of salesman
201.1	may refer to salary of salesman Grade. A: and
201.1.5	may refer to.salary of salesman Grade A of zone 5..

The decimal method has the advantage of flexibility and unlimited expansion

4. Combined Code System

It is the combination of alphabetical and numerical, systems. The main groupings are represented by alphabetical systems and the detailed groupings are represented by the numerical system. For example, if there are three service departments, say, Workshop, Boiler House and Power House, the codes of these departments may begin with the alphabets SW, SB and SP ('S' denotes service departments) and in addition may have numbers for details of expenses. Thus SW 1.5 may indicate Crankshaft Repair in the workshop (SW - Service department, workshop. 1 = Repair and 5 = Crankshaft).

13.4 Collection of Overheads

All overheads are to be accumulated or collected or recorded under classified account heads which are suitably coded. The. sources for entries are (a) Stores requisition for indirect materials (b) Wage analysis sheet for indirect labour and (c) Expenses vouchers for indirect expenses. While posting from expenses vouchers, special note must be taken of the prepaid expenses and the payment of arrears both of which are not to be changed to the costing period.

Normally all overheads are accumulated at monthly intervals and they are summarised in an overhead Expenses Schedule or Statement for the month. When this summary statement is ready, it actually gives start to the overhead distribution process.

	Dept. A	Dept. B
Direct Wages	5.000	2.500
Indirect Wages	1,000	800
Power charges	1.500	1,500
Shop Sundries	250	100
Repairs to Plants	400	150
Depreciation	1.000	900
Rent and Rates	100	50
Stationary tor manufacturing departments	25	50
Supervision Salaries	600	400
Storekeeper's salaries	150	125

NOTES

Divide the overhead expenses, into fixed and variable expenses and show separately the total fixed and floating overhead rates as percentage of direct wages in each case.

Solution

Fixed Expenses

Divide the overhead expenses, into fixed and variable expenses and show separately the total fixed and floating overhead rates as percentage of direct wages in each case.

Solution

Fixed Expenses

	Dept – A	Dept – B
Rent and Repairs	100	50
Supervision salaries	600	400
Storekeeper's salaries	150	125
Depreciation'	1,000	900
	1,850	1,475

Fixed overheads aspercentage of direct wages

Dept – A

$$\frac{1,850}{5,000} x100 = 37\%$$

Dept – B

$$\frac{1,475}{2,500} x100 = 50\%$$

Depreciation is fixed on time basis and variable on usage basis. Hence it is semi variable but treated as fixed.

Variable Expenses

	Dept - A	Dept - 8
Indirect Wages	1,000	800
Power Charges	1,500	1,000
Shop Sundries	250	100
Repair to plans	400	150
Statiomary to Mfg dept	25	25
	3.175	**2,075**

Variable overheads as percentage of indirect wages:

Dept – A

$$\frac{3,175}{5,000} x100 = 63.5\%$$

Dept – B

$$\frac{2,075}{2,500} x100 = 83\%$$

13.5 Overhead - Allocation and Apportionment

The term 'allocation' and apportionment are not used in the same sense. 'Cost allocation* means the allotment of whole items of cost to cost centres or cost units. For example, the material issued to repair department cannot be linked with specific units of production but this item of overhead can be allocated directly to maintenance service cost centre. Efforts are often made to allocate items of overhead to departments as for as possible,

NOTES

"Cost apportionment" means "the allotment of proportion of items of cost to cost centres or cost units". Items of overhead that can not be allocated are apportioned among the production or service departments on some reasonable basis.

13.6 Principles of Overhead Apportionment

The service or use received by the department, survey of existing conditions and ability of the department to bear overhead should be considered. In case of expenses common to more than one cost centre, the question of cost apportionment will arise. The following are some of the bases utilised in manufacturing concern.

Basis of Apportionment

There is no hard and fast rule as regards the basis to be applied for apportioning overhead costs between departments or cost centres. The following is a list of the more

Over head	Basis of Apportionment
1. Factory Rent, Depreciation of factory building. Insurance and Taxes thereon.	Floor space occupied
2. Heating and Lighting	Number of points. Floor space occupied.
3. Depreciation and Insurance on Machinery.	Value of Machinery
4. Power	Machine hours: Horse power hours; Machine capacities.
5. Supervision	Number of workmen; value of material
6. Service Department overheads :	Cost of materials purchased ;
i) Purchasing	Cost of materials used;
ii) Store - keeping	Number of employed (about hours work
iii) Personnel Department	Machine Hours
iv) Machine shop	Space occupied
v) Maintenance of building	

13.7 Primary Distribution

The allocation and apportionment of different items of overhead to all departments *or* cost centres are known as departmentalisation of overhead. This is also known as primary distribution of overhead. The primary distribution of overhead is by means of a Departmental Distribution Summary.

Illustration : 1

The "prabhat Ltd" is divided into 2 production cost centres. A & B and two service cost centres X & Y. The following is the summary of overhead costs for particular period.

	Rs.
Work Manager's salary	4,000
Power	21,000
Contribution to P.F.	2,000
Plant maintenance	4,000
Depreciation of Plant & Machinery	20,000
Canteen expenses	12,000
Rent	6,000

Following information is made available from the various departments

	Dept A	Dept B	Dept X	Dept Y
No. of employees	16	8	4	4
Area occupied (in sq. ft)	2,000	3,000	500	500
Value of Plant (Rs)	75,000	1,00,000	25,000	--
Wages (Rs)	40,000	20,000	10,000	5,000
Horse Power Ratio	3	3	1	--

Apportion the costs to the various department on most suitable bases.

Solution

Overhead Distribution Summary

Items	Basis	Totai Rs.	Production Depts		Service	Depts.
			Dept. A Rs.	DeptB Rs.	Dept. X Rs.	Dept. Y Rs.
1) Work manager's Salary	No. or' Employees	4.000	2.000	1.000	500	500
2) Power	Technical Fstiniate.(HP)	21.000	9.000	9.000	3.000	—
3) Contribution to P.F.	Wages	9,000	4.800	2.400	1,200	600
4) Plant maintenance	Plant value	4.000	1,500	2.000	500	...
5) Depreciation on P&M	Value	20,000	7,500	10,000	2,500	---
6) Canteen Expenses	No of. Employees	12.000	6,000	3.000	1.500	1,500
7) Rent	Floor Area	6,000	. 2.000	3;000	500	500
Total		.76.000	32.800	30,400	9,700	3.100

Illustration : 2

A company has four department out of which A,B and C are production departments and D is a service department. The following are the costs for a period of three months pertaining to these departments.

	Rs.
Rent	1,000
Repair	600
Depreciation	450
Light	100
Supervision	1,500
Insurance	500
Employee's Insurance paid by Employer	150
Power	900

The following data are also available for the four departments:

	A	B	C	D
Area Sq. Ft	75	55	45	25
No. of workers	12	8	6	5
Total Wages	Rs. 4,000	3.000	2,000	1,000
Value of Plant	Rs. 12.000	9,000	6,000	3.000
Value of Stock	Rs. 7,500	4,500	3,000	

Make the apportionment of the costs of the various departments on the most equitable method.

Solution

Overhead Distribution.Summary

Items of Expenses	Basis for Apportionment	Total	Department,			
			A Rs. P	B Rs. P	C Rs. P	D Rs.P
Rent	Area	1.000	375.00	275.00	225.00	125.00
Repair	Value o: plant.	600	240.00	180.00	120.00	60.00
Depreciation	-do-	450	1B0.00	135.00	90.00	45.00
Light	Area	100	37.50	27.50	22.50	12.50
Supervision	No. of. Workers	1.500	600.00	400.00	300.00	200.00
Insurance*	Valuo ot Plant	500	200.00	150.00	100.00	50.00
Employees	Wages Value of.Plant	150	60.00	45.00	30.00	15.00
Insurance		900	360.00	70.00	180.00	90.00
Power						
	Total	5.200	2.052.50	1.482.50	1,067.50	59/50

* It has been assumed that the Insurance is related to plant.

1Secondary Distribution

The Departmental Distribution Summary having been prepared, it now becomes necessary to reapportion the cost of the Service Departments to Production Departments. The secondary distribution is the next step in our attempt to ultimately apportion the costs of production units. The service department costs are apportioned to the production departments generally on the basis of service rendered, that is, proportion to the benefits received by producing departments.

Methods of Reapportionment

The costs of service departments are reapportioned to production department under the following methods.

1. Direct Distribution Method
2. Step Ladder Method
3. Simultaneous Equation Method
4. Repeated Distribution Method

1. Direct Distribution Method

Under this method, service department costs are apportioned to production departments by ignoring service rendered by one service department to another. That is, the service department costs are entirely distributed to only production departments. This method provides the simplest and quickest remedy for redistributing the costs of service departments. In this method the number of secondary distribution will be equal to number of secondary departments.

2. Step Ladder Method

Under this method, all service departments are arranged is order of their utility in terms of their service to the largest number of other departments. Here the cost of the section which serves the largest number of departments is first apportioned to other service departments as well as production departments. The service departments which serves second largest number of departments is taken up and this way the process continues till the costs of all service departments are apportioned. Obviously, the costs of last service department will be apportioned to production departments. This method is known as step ladder method because the shape of the apportionment chart, under this method, looks like the step of a ladder!

This method does not take full account of inter service department costs. Hence this method cannot be regarded as flawless.

The following illustration explains the Direct Distribution and Step Ladder Method.

Illustration : 4

'XYZ' co., Ltd., has 3 production Depts arid 4 service Depts. The expenses of the depts. are as per Primary Distribution summary as follows:

Production Depts:	Rs.
X	30,000
Y	20,000
Z	15,000
Service Depts:	8,000
Purchase Dept. (1)	6,000
Time keeping and Roll (2)	4,800
Power (3) Labour Welfare (4)	1,200

Prepare a statement showing distribution of overhead costs of service Depts to Production Depts. Under (a) Direct Distribution Method and (b) Step Ladder Method

Solution

a) Direct Distribution Method

Secondary Distribution Summary

Particulars	Basic of apportionment	Total Overhead cost	Production Departments		
			Rs.	Y Rs.	Rs.
Departmental Cost	Primary Summary	65.000	30.000	20.000	15.000
Purchase Dept. Cost	Value ot material requisitioned (2:2:1)	8.000	3.200	3.200	1.600
Time keeping & Pay roll	No.of. Employees (3:2:1)	6.000	3.000	2.000	1.000
Power	H.P. of machines (3:3:2)	4.800	1.800	1.800	1.200
Labour welfare	No. of. employees (3:2:1)	1.200	600	400	200
Total		85.000	38.600	27.400	19.000

b) Step Ladder Method

Basis of Apportionment in the order of utility.

a) Time Keeping - No.of. Employees (6:6:12:36:24:12)

b) Labour welfare - No.of. Employees (6:12:36:24:12)

c) Purchase dept. - Value of Material requisitioned (1:4:4:2)

d) Power - Horse power (3:3:2)

Secondary Distribution Summary

Particulars	Service Departments				Producing Department		
	Time keeping Rs.	Labour welfare Rs.	Purchase Rs.	Power Rs	X Rs.	Y Rs	Z Rs.
As per primary Distribution	6.000 (-	1,200	8,000	4.800	30.000	20.000	15,000
Time keeping	6.000)	375	375	750	2,250	1.500	750
Labour Welfare		(-1.575)	105	210	630	420	210
Purchase			(-8.480)	771	3.084	3.084	1.M1
Power				(-6.531)	2.449	2.449	1.633
Total					38.413	27.453	19.134

3. Simultaneous Equation Method

Under this, method, the algebric technique of "Simultaneous equation" is used and thereby the limitations of earlier methods are overcome and maximum accuracy is achieved.

4. Repeated Distribution Method

Under this method, the costs of service departments are again and again distributed among other departments until the figure becomes too small to be of any significance.

The Simultaneous Equation method and.Repeated Distribution method can be illustrated by solving the following problem..

Illustration : 4

National manufacturing company Limited has four production departments I, II, III and IV two service department namely 'Transport' and "power supply. The particulars of expenses of the respective departments are as follows. Production Departments:

I Rs.1,000; II Rs. 900; Ml Rs. 800; IV Rs. 700

Service Departments;

Transport Rs. 550: Power Suppiy Rs. 380.

The service department expenses are charged out on a percentage basis given below.

Production Departments					Transport	Powers supply
I		II	III	IV		
Transport	10%	30%	20%	20%	20%	
Power supply	30%	20%	30%	10%	10%	

Using the above particulars, apportion the service department expenses to various productions.

a) Simultaneous Equation Method and

b) Repeated Distribution Method

Solution

a) Simultaneous Equation Method and

Let 'T' be the total cost of Transport Dept.

P' be the total cost of Power Suppy Dept. = $T = Rs.\ 550 + \frac{1}{10}P$

P = Rs: 380 + 20% of T

In other words. $T = 550 + \frac{1}{10} P$ ....(i)

$P = 380 + \frac{1}{5} T$ .....(ii)

Substituting the value of'P' as in Equation (i.i) in Equation (i)

$$T = 550 + \frac{1}{10}\left(380 + \frac{1}{5}T\right)$$

$$T = 550 + 38\ \frac{1}{50}T$$

$$T = 588 + \frac{1}{50}$$

$$T - \frac{1}{50}T = 588$$

$$\frac{49}{50}T = 588$$

$$T = 588 \times \frac{50}{49}\ \text{Rs. } 600$$

Now the value of 'P' will be

$$1 = 380 + \frac{1}{5}\ T$$

$$= 380 + \left(\frac{1}{5} \times 600\right)$$

$$= 380 + 120 = \text{Rs. } 500$$

In must be remembered that the above total cost of two service departments are inclusive of the cost of service rendered by each to the other. Hence, out of Rs. 600 (total cost of transport dept.) apportionment to production departments will be only Rs. 480 (i.e., 600 - 20 % to power supply) and out of Rs. 500 (total cost of power supply) only Rs. 450 (i.e., Rs. 500 - 10 % to transport) will be apportioned to production departments.

Thus apportioned will be as follows:

Particulars	Total Cost	Production Departments			
	Rs.	I Rs.	II Rs.	III Rs.	IV Rs.
As per Distribution summary	3,400	1,000	900	800	700
Service Dept. Costs :					
Transport	480	60	180	120	120
Power Supply	450	150	100	150	50
	4,330	1,210	1,180	1,070	870

b) Repeated Distribution Method

Secondary Distribution Summary

Particulars	Production departments				Service Departments	
	Rs.	II Rs.	III	IV Rs.	Transport Rs.	Power Supply Rs.
As per primary summary	1,000	900	800	700	550	380
Transport Dept.	147 5 3	165	110	110	(- 550)	110
Power Supply		93	147	49	49	(- 490)
Dept. Transport Dept.		14	10	10	(-49)	10
Power Supply Dept.		3	3	1		(-1.0)
Total	1.210	1,180	1,070	870	--	--

Absorption of Overheads

As explained earlier, the amount of overhead allocated and apportioned to the producing department is to be borne by ali cost units pertaining to that department. This is known as overhead absorption. According, to the Terminology of I.C.W.A. Overhead absorption is "the allocation of overhead to cost units". Terms such as 'recovery', 'application' are also used in the same sense. For the purpose of absorption of overhead suitable base must be determined. Through these bases overhead expenses can be applied to production units.

13.10 Methods of Overhead Absorption

A number of methods have been devised by business houses for charging factory overhead expenses to production: These methods are found to be suitable for different items of overhead costs any may be used in different departments according to the nature of manufacturing operation

involved. The more common methods in use are ;

i) Direct Labour Hour Method, i.e., Rate per direct labour hour.

ii) Direct Labour Cost Method, i.e., Percentage of direct'labour

iii) Direct Materials Cost Method, i.e., Percentage of direct materials cost.

iv) Prime Cost Method, i.e.. Percentage of prime cost

v) Production Unit Method, Rate per unit of product

vi) Machine Hour Method, i.e.. Rate per machine hour.

1. Direct Labour Hour Method

Factory overheads may be charged to production on the basis of the number of hours for which direct labour is employed. The overhead rate is expressed as so much per direct 'labour hours. The labour hour rate is actually a time rate. That is, the factory overheads are charged to production on the basis of time involved. Thus, if the factory overhead expenses for a particular month are Rs-24,000/'- and the total number of labour hours worked during the period is 6, 000/- the Direct Labour Hour Rate will be Rs. 4 per hour.

2. Direct Labour Cost Method

Under this method, the overhead rate is expressed as a percentage of direct labour cost related to production, ""he formula for determining the same is Factory overhead / Total wages x 100. This method is widely practised because it is simple and wage data can be easily obtained for determining the percentage rate.

3. Direct Material Cost Method

In this method, overheads are charged on the basis of the cost of direct materials used in production. The overhead rate is expressed as a percentage of direct materials cost. Arithmetically the operation may be expressed as:

Factory overhead

$$\text{Percentage of direct materials cost} = \frac{\text{Factoryoverhead}}{\text{Costofdirectmaterialused}} \text{ x-100}$$

Cost of direct materials used

This method gives a fairly accurate result if the prices and grades of materials do not fluctuate widely from time to time and the cost of materials used remains uniform in the case of particular products.

4. Prime Cost Method

This method assumes that manufacturing overheads are related to both materials cost and direct wages. Hence, the base' used is Prime Cost (direct material cost + direct labour cost + direct expenses). The overhead is fixed as a percentage of the prime cost and may be derived as follows:

Factory overhead

$$\text{Percentage of Prime cost} = \frac{\text{Factoryoverhead}}{\text{prime Cost}} \text{ x 100}$$

Prime cost

5. Production Unit Method

Under this method, "the factory overhead expenses are changed to production at the actual or predetermined rate per unit of products manufactured during a given period. The overhead rates derived as follows:

$$\text{Rate per unit of product} = \frac{\text{Factory over head}}{\text{No. of units of product}}$$

6. Machine Hour Method

The cost of operating a machine provides, a satisfactory basis for charging factory overheads to production. Under the machine hour method, the cost of operating a machine per hour represents the overhead-rate and it is known as the machine hour rate. The underlying assumption in this case is that the manufacturing expenses vary in relation to time and machine operations involved. The machine hour rate is obtained as follows.

$$\text{Machine hour rate} = \frac{\text{Factory over head}}{\text{Machine hours}}$$

There are two methods of computing machine hour rate (a) Ordinary machine hour rate and (b) Composite machine hour rate.

Ordinary machine hour rate is computed by taking only direct machine expenses into accounts. Further, machine expenses can be of two categories (i) those proportionate to the operative time of machine and (ii) those which have no relation to operating time. For expenses proportional to operating time namely fuel, power depreciation etc., rate per hour can be calculated directly; where as the machine expenses which are not related to machine hours namely insurance and taxes on machinery etc., are *tope* estimated for the whole period and then to be apportioned over the machine hours during the period.

Composite Machine hour rate takes into account machine expenses as well as other general overhead of the department like rent, light and heating, insurance on building, supervision etc. These are known as standing charges. The standing, charges are apportioned to each machine and is divided by the number of working hours of the machine during the period. This is machine hour rate for standing charges, if this rate is added to the ordinary machine hour rate, we get the composite machine hour rate.

Illustration : 5

The following information relates to the activities of a production department of a factory for a certain period:

Materials used Rs. 36,000

Direct wages	Rs. 30,000
Labour Hours Worked	Rs. 24,000
Hours of machine operation	Rs. 20.0.00
Overhead chargeable to the Dept.	Rs. 25.000

On one order carried out in the department during the period, the relevant data was:

Material used	Rs. 2,000
Direct wages	Rs. 1, 650
Labour Hours	1,650

Machine Hours 1, 200 Calculate by three different methods the overhead chargeable to the job.

Solution

The three different methods applicable in the problems are:

a) direct Wages Method

b) Labour Hour Method

C) Machine Hours 1,200

It is assumed that the overhead are proportional to the job order:

a) Direct Wage Method

Departmental Wages Rs. 30,000: Departmental overheads Rs. 25000: job' Order Wages Rs. 1, 650 : Job Order Overheads = ?

a 30,000 - 25,000 1650 -- ?

$$\frac{25,000 \times 1,650}{30,000} = Rs.1,375$$

b) Labour Hour Method

Labour Hours = 24,000 Overhead = 25.000

24.0000 - 25,000 1,650- ?

1.650 - ?

$$\frac{1,650 \times 25,000}{24,000} = \text{Rs.}1,719$$

c) Machine Hour Method

Department Machine Hours = 20.000

Overheads Charges = Rs. 25,000

20.000 - 25.000

1,200 - ?

$$\frac{1,200 \times 25.000}{\text{Rs. } 1.500} = 1,500$$

20,000

Illustration : 6

Calculate the machine - hour, rate for a machine from the following data:

	Rs.
Cost of machine	19,200
Estimated scrap value	1,200
Average repairs and maintenance charges per month	150
Standing charges allocated to the machine per month	50
Effective working life of machine	10.000 hrs.
Running time per month	160 hrs.

Power used by machine: : 5 units oer hour @ 19 paise per unit.

Solution

Calculation of machine hour rate

Standing charges:

Repairs & maintenance	Rs.150p.m
Other standing charges	Rs. 50 p.m
	200 p.m
Standing charges per hour (200/160 hr)	1.25
Variable expenses	
Depreciation per hour (19200-1200/160hrs)	1.80
Power 5 units @ 19 paise per unit	0.95
Machine hour rate	4.00

Computation of Machine Hoar Rate

Illustration : 8

K.S.D. Co., Ltd., has 3 manufacturing depts.. A, B & C and 1 service dept:, 'S\ The following particulars are available for one with of 25 working days of 8 hrs each. All departments work all days with full attendance.

Expenses	Total	Service Dept.	Production Dept.		
		S	A	B	C.
	Rs.	Rs.	Rs.	Rs.	Rs.
Power & light	1.100	240	200	300	360
Supervisor's salary	2,000				
Rent	500				

NOTES

Labour welfare	600				
Others	1,200	200	200	400	400
Supervisors salary		20%	30%	30%	20%
No.of Workers		10	30	40	20
Floor area in sq.ft.		500	600	800	600
Service rendered by service dept to prod depts			50%	30%	20.%

Calculate the labour hour rate' of each of the depts.. A,B & C

Solution

Primary Distribution Summary

Expenses	Total	Basic of apportion	Depts			
			S	A	6	C
	Rs.		Rs	Rs	Rs	Rs
Power light	1.100	Actual given	240	200	300	360
Supervisors salary	2.000	Ratio given (2:3.3:2)	400	600	600	400
Rent	500	Floor area (5*6:8-6)	-100	V20	160.	120
Labour welfare	600	No.of Workers (1:3:4:2)	6 0	180	240	120
Others	1.200	Given	200	2.00	400	400
Total	5,400		1.000	1.300	1.700	1.400

Secondary Distribution Summary

Particulars	Service Dept.	Production		Depts.
	Rs.	Rs	Rs	Rs.
As per primary Distribution Summary	1.000	1.300	1.700	.400
Reapportionment of service dept. expenses as per ratio given (50:30:20)	(-1.000)	500	300	200
		1.800	2.000	1.600

Computation as Labour hour rate

Total direct labour hrs.

	6.000 (25 x8x30)	8.000 (25x8x40)	4.000 (25x820)
	30 Ps	25Ps	40s
	$\frac{1,800}{6,000} x100$	$\frac{2,000}{8,000} x100$	$\frac{1,600}{4,000} x100$

Illustration : 9

Prepare a machine hour rate to cover the overhead expenses indicated below.

	Per hour annum		Per
Electric Power 53C	75 ps	Repairs	Rs.
Steam 270	**10 ps.**	Rent	Rs.
Water 2.000	2 ps.	Running hrs	Rs.

Solution

Machine Expenses		*Per hour*
1. Electric power		Re. 0.75
2. Steam		Re. 0.10
3. Water		Re. 0.02
4. Repairs	Rs 530.00 p.a.	
5. Depreciation ($7V_2$% of 12.500)	Rs. 937 50 p.a.	
	Rs 1,467 50 p.a.	

$$\text{Hourly rate} = \frac{1{,}467}{2{,}000} \quad \text{Re. 0.73}$$

Standing Charge

6) Rent p.a. Rs. 270

$$\text{Hourly rate} = \frac{270}{2{,}000} \quad \text{Re. 014}$$

Machine hour rate **Re. 1.74**

Note: Book value and the replacement value are immaterial here for calculating depreciation.

Illustration : 10

The following particulars have been collected for the 3 month's period ending 31.12.84 in a light engineering factory. You are required to prepare. Production Overheads Distribution summary showing clearly the basis of apportionment where necessary.

		Production Depts.			Service Depts.	
		A	B	C	D	E
Direct wages	Rs.	2.000	3,000	4.000	1,000	2,000
Direct material	Rs.	1.000	2,000	2.000	1,500	1,500
Staff	Nos.	100	150	150	50	50
Electricity	Kwh	4,000	3.000	2.000	1,000	1.000
Light points	Nos.	10	16	4	6	4
Asset value	Rs.	60,000	40,000	30,000	10,000	10,000
Area occupied	sqm	150	250	50	50	50

The expenses for the period were

Motive power Rs. 550, Lighting Power Rs. 100, Stores Overhead Rs. 400, Amenities to staff Rs. 1.50C, Depreciation Rs.15,000, Repairs and maintenance Rs. 3,000, General overheads Rs. 6,000 and Rent & Taxes Rs. 275.

Apportion the expenses of service department E in the ratio of 3:3:4 and those of service department D in the ratio 3:1:1 to departments A,B & C respectively.

Solution

Production OverheadsDistribution summary for the quarter ending 31-12-84

	Production Depts.			Service Depts.		Total Rs.
	A Rs.	B Rs.	C Rs.	D Rs.	E Rs.	
1 Direct wages				1.000	2,000	3,0(
2. Direct material				1,500	1,500	3,0(
3. Motive Power @ 5 P. per Kwh	200	150	100	50	50	5(
4. Lighting power @ Rs 2.50 per point	25	40	10	15	10	1(
5. Stores overhead @ 5% direct material	50	100	100	75	75	4(
6. Amenities to staff @ Rs. 3 per employee	300	450	450	150	150	1,5(
7. Depreciation @ 10% of the value of asset	6.000	4.000	3.000	1.000	1,000.	15,0(
8. Repairs and maintenance @ 2% of asset value	1,200	800	600	200	200	3.0(
9. General overheads @ 5,0% of direct wages	1,000	1.500.	2,000	500.	1,000	6.0(
10. Rent & Taxes ® Re.0.50 per sq.meter	75	125	25	25	25	2'
Total	S.850	7,165	6,285	4.515	6,010	32.8(
Dept. E (3:3:4)	1,803	1,803	2,404		(6,010)	
Dept. D.<3:1 :,T). Total	2,709	903	.903	(4.515)		
	13,362	9,871	9.592			32,8(

13.12 Under - Absorption and Over - Absorption of Overhead

By following any one of the basis of methods of absorption of overhead, a predetermined or estimated rate of absorption" of overhead is established. This rate is worked out before actual production. It is based on anticipated overhead expenses and anticipated quantum of 'base' and is applied to the products manufactured during the current period. But when actual overhead incurred and quantum of base for the current period are different from anticipated figures, there arises the differences between actual overhead incurred and overhead applied or absorbed.

if the overhead absorbed is less than the overhead actually incurred, it is known as 'under absorption' and when it is more than the actual overhead, it is known as "over absorption'.

The over and under absorption of overhead is transferred to an account called 'Overhead Adjustment Account' and ultimately the net balance of this account is transferred to Costing Profit and Loss Account.

13.13 Limitations of overhead apportionment

Though sincere effort is made to distribute the various elements of overhead costs to units and division of business enterprise, the following are the limitations of this exercise of apportionment.

1. Costs common to one or more of departments, machine groups or products are known as joint costs. There is no scientific method to apportion these joint costs. All existing sets of techniques for apportionment are only 'an approximation'.

2. The fixed costs of a particular period must be ultimately recovered from the production of that period, in effect unit cost per "nit rises during the period of low production and will fall if the production increases. Thus exact determination of fixed cost is impossible.

3. A cost accountant uses different bases of apportionment for different items of cost. A particular method is selected after considering conflicting interests. It is difficult to say that selection of particular method in a particular situation will be accepted by all. Hence the methods used are necessary a compromise between these conflicting objectives.

In conclusion, it may be said that inspite of the limitations of overhead distribution, the accumulated and analysed cost data is an important tool in guiding management leading to production and efficiency-**Overhead - Treatment of Certain Items**

Costing pertaining to a cost centre or cost unit may be broadly divided into two portions i.e., direct and indirect. The indirect portion of the total cost constitutes She Overhead cost which is the aggregate o' indirect material cost, indirect wages and indirect expenses. Broadly, speaking any expenditure over and above prime cost is known as overhead. The overhead costs are analysed for

purpose of cost ascertainment and control by function and for guidance in certain managerial decision by the extent to their variability with production.

1) **Depreciation**

Depreciation is that part of cost of the fixed asset consumed during its period by the firm. Therefore, it has been a cost for services consumed in the same way as costs for such items as wages, rent, lighting and heating. Depreciation is an expenses and will need charging to the profit and loss before ascertaining net profit or net loss.

13.14 Provision for Depreciation as Apportionment of cost.

Depreciation in total over the life of an asset can be calculated quite simply as cost iess amount receivable when the asset is put out of use by the firm. If the item is - bought and sold within one accounting period then depreciation for the period charged as a revenue expense in arriving at the period's net profit. The difficulties start when the asset is issued for more than one accounting period and an attempt is made to charge depreciation to each period with the depreciation of that period. Depreciation is looked as from the point of view that most of fixed assets are used up over a period of time and the task is to determine how these costs should be apportioned, to each accounting period that the asset is in use. Even fluctuations in value of a fixed assets are ignored in depreciation provision calculations.

Even though depreciation provisions are now regarded as apportioning cost to each accounting period, it does not follow that there is any true method of performing even this task. Ail that can be said is that the cost should be apportioned over the life of.the asset in such a way as to charge it as equitably as possible to the periods in which the asset is used.

The rates of depreciation may be worked as :

a) Single Rate

This is the depreciation rate which is calculated by references to the estimated Site of a single asset. Hence the total charge or depreciation is composed of the aggregate of charges of individual assets. The system is simple to calculate and usefully employed where it is necessary to charge the cost of an asset to the products or service which it

alone provides and a small number of costly assets is held. But this system becomes unwieldy owing to maintenance of a large number of records in respect of each asset.

3) Composite Rate

This is a depreciation rate which is calculated by dividing the aggregate of individual depreciation charges in any one period of all assets concerned, by the aggregate of the costs of those assets. This rate is used when processes are continuous or when the assets concerned are engaged on the same job or product or service- Sometimes a group rate is calculated for those assets which form the group of identical type shaving similar physical characteristics.

:) Accelerated Rate

This is a depreciation rate which consists of a normal depreciation rate to provide for additional depreciation sustained by asset normally working in single shift is worked for double shift, the assets depreciate much more rapidly and .herefore extra depreciation must be provided for the additional usage. The Income Tax also provides for accelerated rate of depreciation in case of double shift or triple shift.

2) Obsolescence

It is generally used to indicate a-sudden loss in the value of an asset not due to wear and tear. It arises because a machine has to be discarded in favour of one better adopted to its purpose and giving better result, it is also called external depreciation as the assets has to be withdrawn before the end of its useful life owing to the operation of external factors like technological improvements in the existing machines. It may also arise due to change in the product, or change in the method of manufacture.

If the obsolescence can be foreseen, the loss in value should be covered by additional provision for depreciation. On the other hand, if an unforeseen replacement of an existing asset takes place, the balance if unabsorbed depreciation should not be charged to cost of production but is generally charged to Costing Profit and Loss Account.

3) Plant and Machinery Register

Concerns having a large number of machines usually maintain a plant and machinery register. The maintenance of such a register facilitates the calculation of annual charge for depreciation in respect of each machine. Each machine and plant is

allocated a separate folio where in are recorded the particulars relating to the machine such as purchase price, date of purchase, name and address of supplier, guarantee given, if any, estimated life, estimated scrap value, rate of depreciation used, details and cost of repairs undertaken and the dates of such repairs. The ruling of a plant and machinery register is given below.

Plant and Machinery Register Name of Plant: Department: Description:
Acquired Value: Make; Method of Depreciation: Maker's number:
Rate of Depreciation: Date acquired: Expected Scrap Value: Estimated life:
Insurance Covered for:

Date	Particulars	Opening Value	Additions to be capitalised	Repairs and Renewals	Depreciation	Other deduction and disposals	Closing Value

In the plant and machinery register, a folio is, allotted lo each pliant and - machinery wherein are recorded all the particulars relating to the machine. There is also a provision for recording of additions and disposals. Thus all particulars relating to a machine can be had at a glance. The register also helps to determine the value of the asset on any particular data and to compute the annual charge for depreciation. Additional information relating to the machines, sum as particulars of spare parts supplied free, the dates on which such spare parts are used may also be recorded in the register. Particulars to spare parts purchased may be shown in column for repairs and renewal.

4) Research and Development on existing and new products

If the new products are produced according to the order of the customer, the cost of research and development on the product may be charged wholly to specific order from the customer. Otherwise the cost may be charged in case of existing goods in installments over a number of years as part of research and development expenses, treating it as a Deferred Revenue Expenditure.

5) Inspection Cost or Capacity Cost

It is a production service cost and is chargeable to the various production department on the basis of service hour expended. Since inspection is made at various stages of completion, the number of hours spent by the inspection staff at each department can be ascertained and the aggregate inspection department cost can be apportioned on the basis of inspection hour spent. Materials handing within the stores department is chargeable to stores overhead. The handling charge for delivery of materials from stores to different departments is chargeable, to the respecting department's as departmental overhead. Material handling in each department is a charge at its overhead account and for delivery of materials and semi-finished products to other departments, it is chargeable to the ' recipient department.

6) Income Tax

This being an appropriation of profit, is excluded from cost accounts.

7) Cost of defectives

Defective work means work which is not upto standard. The term is usually used to indicate work that can be set right with some extra labour and cost. The treatment of the additional cost involved in setting right the defective work depends upon the nature of the causes responsible for the defect.

a) If the defect is due to the inherent nature of the product, the cost of rectification should not be charged to the account of the job concerned.

b) if the detect is not due to the inherent nature of the product the additional cost should be treated as an overhead.

c) If the defect is due to the negligence of the worker the additional cost involved in rectification should be debited to the personal account of the worker concerned.

d) If the defect is due to the abnormal reasons such as fire, floods, the cost of rectification should be written off to the costing profit and loss account.

8) Royalties

When royalties are given for patent use in course of production, it is considered, as production cost. When royalties are paid for right to sale finished goods, it is taken as selling cost. But where it is paid for both purpose it will be distributed in the department proportionately.

9) Cost of durable tools

It should be spread over the jobs by a suitable depreciation charge based on the use of such tools. It will be better if depreciation of the tools, is calculated per hour i.e.. dividing the total cost of the tools by the number of hours of expected life. Charge to a job can be calculated by multiplying the rate with the

number of hours the tools are used for a job if such tools are used for a job takinc long time for completion then the job may be charged with the value of such tool* and on completion the value of such tools be credited to the job.

10) Material Obsolescence

Obsolescence is the surplus in stock arising out of a charge in the materia specification or lack of movement. There is either complete loss or there is little salvage value. In a large number of manufacturing companies, obsolete materia can bring about large losses, unless some control is set up. Generally, these losses are charged to costing profit and loss account. A monthly or quarterly report should be prepared by the cost accountant and sent to the works manage giving in detail the units article value and reasons for the necessary write off. A|sc the parts and products which have become obsolete and surplus may be used ir the same plant or in some other work orders, if possible rather than disposed of a a loss.

11) Defectives due to bad workmanship and bad materials

These are materials defectives. When the defectives are normal anc cannot be identified the cost allocated under the Standing Order Number is prorated to the producing departments along with other general factory expenses If these defective goods are sold as seconds, any recovery from the goods is handled through appropriate revenue accounts. If these defective works can be rectified, a Rectified Note Is prepared by the

inspection: If the ioss due tc detectives is heavy the loose is usually absorbed by the good productions.

12) Fringe Benefits

These are the additional payments or facilities given to "the worker apan form the salary and direct cost allowance like house rent, dearness and city compensatory allowances. These benefits may be given in the form of overtime, extra shift duty allowance, travelling fare concessions or allowance, holiday pay pension facilities, insurance facilities, production or profit sharing bonus, medical allowance, welfare facilities, supply of essential commodities at concessions rates. These indirect benefits tend to improve the morale, loyalty and stability of employee towards the organisation. If the amount of fringe benefits is considerably large they may be recovered as direct charge by means - of supplementary wage or labour rate otherwise these may be collected as part of production overheads.

13) Patterns and Dies

Those specially made for particular jobs shall be directly charged to the jobs. Those that are expected to be used for. long periods may be capitalised and

the periodic depreciation calculated preferably by the revaluation method, is charged as production overhead costs.

NOTES

Model Questions

1. Define overhead. Explain the different methods of classification of overhead.

2. Distinguish between

a) Allocation and apportionment of costs

b) Cost apportionment and overhead absorption

3. Explain the various basis of apportionment of overhead to departments with illustration as to the items of expenses.

4. Describe the various methods of absorption of factory overhead. Which of these methods do consider most scientific and why

5 A company has three production departments A,B and C and two service departments D and E. The following figures are extracted from the records of the company.

	Rs.	
Rent and Rates		5,000
indirect wages		1,500
Depreciation on Machinery		10,000
Genera! lighting		600
Power	1,500	
Sundries	10,000	

The following further details are available.

Particulars	Total	A	B	C	D
Floor Space (sq.ft.)	10.000	2,000	2,500	3.000	2.000
Light Point	60	10	15	20	10
H.P. of Machines	150	60	30	50	10
Direct wages (Rs.)	10 000	3.000	2,000	3.000	1,500
Value of Machinery (Rs)	2,50,000	60,000	80.000	1.00,000	,5,000

Working hrs.	6,226	4,028	\4.066	--	

The expenses of D and E are allocated as follows

A	B	O	D	E		
D		20%	30%	40%	—	10%
E		40%	20%	30%	10%	

What is the total cost of an article if its raw material cost is Rs. 50, labour cost Rs. 30 and it passes through department A, B and C for 4, 5 and 3 hours respectively.

[Ans: Cost of an article Rs. 106:25]

6. The following information relates to the activities of production department for a certain period of a factory.

Rs.	
Material used	72;000
Direct wages	60,000'
Hrs. of machine operation	20,000
Labour hrs. worked	24.000
Overhead chargeable to the dept.	48,000
Materials used	Rs. 4,000
Direct wages	Rs. 3,300
Labour Hours	1,650
Machine hours	1,200

Prepare a comparative statement of cost of this order by using the following three methods of recovery of overheads.

I) Direct labour hour method

II) Direct labour rate method and

NOTES

iii) Machine hour rate method.

[Ans. (I) Rs. 10,600 (II) Rs. 9,840 and (III) Rs. 10, 180]