

E-CONTENTS

OF

ESTIMATION & COSTING

Estimating

Introduction

It is an art of finding the cost, which is likely to be incurred on the manufacture of an article, before it is actually manufactured. Thus, it is the calculation of a probable cost of an article before the manufacturing starts. It also includes predetermination of the quantity and quality of material, labour required etc.

Forecasting is the estimation of type, quantity and quality of future work e.g, sale, demand etc. Through forecast of demand, we evaluate the factor in the environment which influence the operation of the firm and formulate annual plan. Based on the forecast, we plan for production, material procurement, cash flows, inventory level, manpower, plant capacity etc. Forecasting, therefore, plays a crucial role in the development of plans for the future.

For efficient forecasting following steps are necessary:

1. Identification of objectives.
2. Determine categories of product in which it falls e.g. capital goods, consumer durables (like T.V, refrigerator, watch etc), non-durable goods (like food, beverages etc).
3. Selecting a proper method.
4. Interpretation of results.

Importance of Estimating

In all organizations, before starting actual production or filling up the tenders, estimation is done. Therefore, accurate estimating is necessary to compete in the market and to be sure whether manufacture of a particular product will be profitable or not. Both over and under estimating are dangerous. Over-estimating leads to increase the cost and hence tenders may not get suitable response. Under-estimating may lead to heavy losses to the concern. Hence accurate estimating is very essential and, therefore, staff of the estimating department must be well qualified, experienced and trained in this profession.

Aims of Estimating

1. To help the factory owner in deciding the manufacturing and selling policies.
2. To help in filling up the tender enquiries.
3. To decide about the amount of overheads that helps in comparing and checking the actual overheads of the factory.
4. To decide about the wage rates of the workers after making "Time Study".
5. It helps to decide whether a particular material should be purchased from the market or to be manufactured.

Purposes of Estimating

- Saturation limit of the market.
- Tastes and preferences of consumers.
- Income level of consumers.
- Buying power of the consumers.
- Replacement/new demand.
- Helps in deciding marketing strategies.
- Helps in material planning, product planning, production planning, manpower planning, financial planning, sales planning and budgeting.

Sales Estimating

A sales forecast is an estimate of the amount of sales for a specified future period under a proposed marketing plan or program. Sales forecast can be defined as an estimate of sales in terms of money or physical units for a specified future period under a proposed marketing plan or program and under an assumed set of economic and other forces outside the unit for which the forecast is made.

Accurate sales forecasting is essential for a business house to enable it to produce the required quantity at the right time. Further, it makes the arrangement in advance for raw materials, equipments, labour, etc. Some firms manufacture on the other basis, but in general, firms produce the material in advance to meet the future demand.

Types of Forecasting

There are two types of forecasting.

1. Short-term estimating
2. Long-term estimating

Short Term estimating

This type of forecasting can be defined when it covers a period of three months, six months or one year. Generally, the last one is most preferred. The period is dependent upon the nature of business. If the demand fluctuates from one month to another, forecasting can be done only for a short period.

Long Term estimating

The forecasting covers a period of 5, 10 and even 20 years. The period here also depends upon the nature of business, but beyond 12 years, the future is assumed as uncertain. But in many industries like ship-building, petroleum refinery, paper making industries, a long term forecasting is needed as the total investment cost of equipment is quite high.

Purpose of Short Term estimating

1. To adopt suitable production policy so that the problem of over-production and short supply raw material, machine etc, can be avoided.
2. To reduce the cost of raw materials, machinery etc.
3. To have proper control of inventory.
4. To set the sales targets.
5. To have proper controls.
6. To arrange the financial requirements in advance to meet the demand.

Purpose of long Term estimating

1. To plan for the new unit of production or expansion of existing unit to meet the demand.
2. To plan the long term financial requirements.
3. To train the personal so that man power requirement can be met in future.

Business estimating

Following points must be taken into consideration before making estimating

1. State whether your business forecasting is short-term or long-term, its objectives, only for a single understanding or for whole industry.
2. Select a good method of forecasting.
3. Select the different variables which are affecting the forecasting.
4. Gather the data for different variables.
5. Determine the best possible relationship by some statistical method between different variables.
6. Make the forecast and interpret the results.

Following points must be made clear before making a estimating.

1. Business Forecast must be made in terms of currency of sale volume or in units.
2. Forecast must be made on annual basis and then further divided as requirement, i.e. by month wise, week wise, or so on the basis of previous year's records.
3. Forecast for new product by month wise, may be done either using other manufacturing concerns data or by survey.
4. Forecast must be in terms of product groups and broken for individual products, the division may be according to the sizes, grand's, cables, colors etc. a typical example show how the product group is divided.

Estimating Procedure

Estimating procedure is explained step by step below:

1. Production planning department decides the requirements and specifications of the product.
2. Production planning department makes out the drawings. Lays down the method and sequence of operations, machines to be used, rates allowed to the labor in consultation with the time and motion study department and wages department.
3. To decide accuracy and finish required.
4. To prepare a list of the components of the product.
5. To decide which component can be manufactured in the concern itself and which should be procured from outside.
6. Determine the material cost by calculating the quantities of various types of material required.
7. Determine the time required on various operations by using calculation methods or by time and motion study and adding suitable allowances.
8. Determine labor cost considering the wage rate allowed for various categories of operators and other workers employed for manufacturing the product.
9. Determine the prime cost after adding direct expenses in the direct material and direct labor costs.
10. Determine the factory overheads including depreciation and expenditure on maintenance of the plant, insurance, power etc.
11. Determine administrative overheads considering the policy of the concern for calculating these expenses (i.e. by percentage or by hourly rate or by unit rate.)
12. Determine the packing and delivery charges etc.
13. Then to calculate the total cost.
14. To decide profit and add in the total cost, in order to fix up the sale price.
15. To decide the discount allowed to distributor.
16. To decide delivery time in consultation with the production department and sales department.

Sources of Errors in Estimating

There may be some errors in estimating. These errors are of the following 2 types:

1. Unavoidable errors.
 2. Avoidable errors.
1. **Unavoidable Errors:** These are those, which cannot be avoided. Some of the examples of such errors are given below:
 - a. Machinery breakdown
 - b. Power failure
 - c. Accidents
 - d. Drop in the efficiency of workers.
 - e. Drop in the efficiency of machines and tools.

- f. Strikes.
2. **Avoidable Errors:** Some of the errors can be avoided by the estimator while preparing the estimates. These errors may occur due to less experience, carelessness and hurry in preparing the estimates.
 - a. Poor analysis.
 - b. Omission of some factors.
 - c. Not considering up to date data.
 - d. Repetition of some factors.

Difference between Estimating and Costing

Although estimating and costing both are required to decide the price of the product, even then the two are different as explained below:

1. Estimation is aimed to calculate the probable cost of the product before the manufacturing starts, and while costing is the determination of actual cost of the product by adding various elements of expenses incurred.
2. Estimation requires a highly technical knowledge hence an estimator is basically an engineer and costing requires the knowledge of accounts and therefore costing is done by accountants.
3. Estimation forecasts about the probable cost and hence one can know before the manufacture that the manufacturing of the product shall be profitable or not, and whether one should manufacture it or not, but costing tells after the manufacture about the profitability of the product.

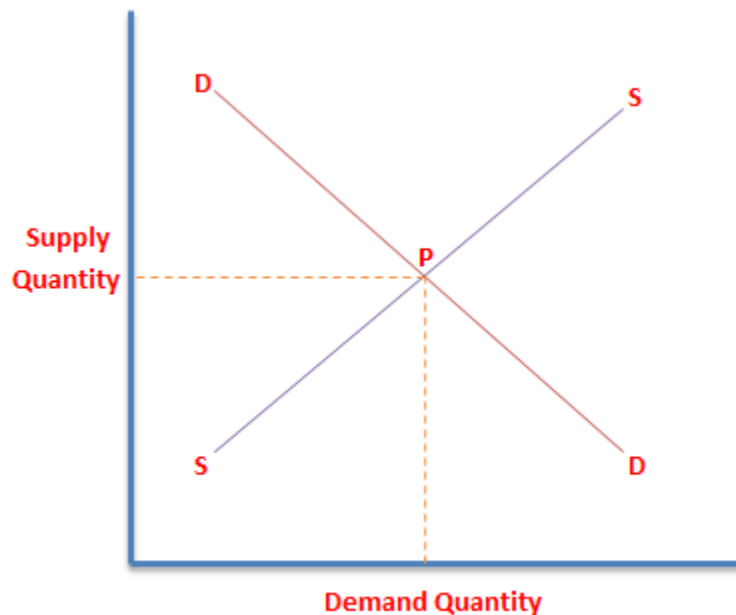
Pricing / Costing

Introduction

One basic element of the marketing mix is pricing. A "Price" for a product or service refers to the amount of money needed to acquire that product or service. In a competitive business environment, Marketing Managers strive to establish pricing policies for goods or services to meet certain objectives, such as:

- i) To enable the firm to earn a fair percentage of profit.
- ii) To meet or stay ahead of competition.
- iii) To maintain or increase the firm's share of the market and
- iv) To stabilize its prices.

Economic theory assumes that a firm will set prices that will maximize profits. To achieve this goal, prices will be set where the quantity of a product demanded at a certain price is equal to the quantity that suppliers are willing to supply at that price. This demand and supply relationship is shown by Demand and Supply curves. The "Demand Curve" shows the amount of a product demanded at different prices. The "Supply Curve" shows the quantity of goods offered for sale at various prices. The point at which the quantity demanded is equal to the quantity supplied is called the "Equilibrium Prices". It is shown in the diagram by the point "P".



(Supply and Demand is in Equilibrium at Point P)

Demand is described as elastic or inelastic. When buyers will buy more of certain goods at low prices than at high prices, the demand is said to be "Elastic". For other goods, demand is inelastic, means increase or decrease in prices will bring about relatively little or no change in demand.

Costing

Costing has been defined by the Institute of Cost and Works Accountants, England as: "The technique and process of ascertaining costs". Whereas, Wheldon has defined the costing as: "Costing is the classifying, recording and appropriate allocation of expenditure for the determination of the costs of products or services; and for presentation of suitably arranged data for the purposes of control, and guidance of management".



It is the determination of an actual cost of an article, after adding different expenses incurred in various departments.

It may also be defined as the system, which systematically records all the expenditure to determine the cost of manufactured products.

It differs from the estimating that costing is a determination of cost after knowing the expenditure incurred in various departments on the product, while estimating is the pre-determination of cost based on the assumptions and previous experiences.

Aims of costing

The important aims and objects of costing are:

1. To determine the cost of each article.
2. To determine the cost incurred during each operation, to keep control over workers wages.
3. To provide information to ascertain the selling price of the product.
4. To supply information for detection of wastages.
5. It helps in reducing the total cost of manufacture.
6. It suggests changes in design, when the cost is higher.

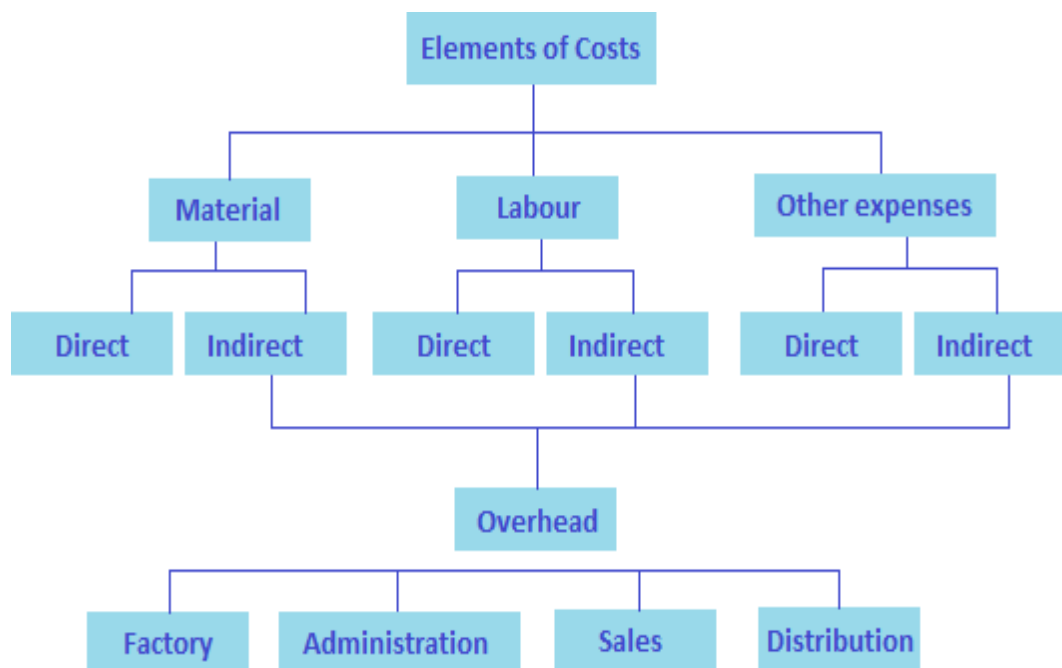
7. To help in formulating the policies for charging the prices of the products.
8. To provide information for economic consideration for purchasing new machines.
9. To help the management in decision making.
10. To facilitate preparation of estimate for submitting in tenders or quotations.
11. To compare the actual cost with the estimated cost of the component.

Classification of Cost

Cost classification is the process of grouping costs according to their common characteristics. Costs can be classified in the following ways:

1. Classification according to elements

According to this method, costs are divided into 3 categories, namely, materials, labor and expenses.



2. Classification according to the function

This classification is according to the purpose for which they are incurred i.e. production cost, administrative cost, selling cost and distribution cost.

3. Classification according to variability

Costs are also classified into fixed, variable and semi-variable depending on the basis of variability of cost in the volume of production. Fixed cost is the cost that tends to be unaffected with the volume of output and depends upon the passage of time, Variable cost tends to vary directly with the volume of output. Whereas semi-variable costs are those which are partly fixed and partly variable. Example, repairs, telephone bill etc.

4. Classification into direct and indirect costs

Direct costs are identified with the cost centre of cost unit, whereas indirect costs cannot be identified with the cost centre or cost unit, but can be apportioned to or absorbed by cost centres of cost units.

Advantages of Efficient Costing

Efficient Costing has got following advantages:

1. It helps in tracing wastage, leakage and spoiled materials.
2. It gives information regarding profitable and unprofitable activities.
3. It provides an effective check on wage system.
4. Actual causes of reduction in profits can be easily found.
5. It gives information regarding component parts, that whether it is profitable to manufacture them in the factory or to purchase from outside market.
6. It also helps in the settlement of wage rates with trade unions at the time of dispute.
7. It provides data for comparison between actual cost and estimated cost of a product.
8. It provides data for overhead charges etc. to assist in the preparation of estimates for future work.
9. It helps the management in forming the policies for price determination.
10. It provides information of detailed expenditure so that, it can be checked, when it is tending to exceed.
11. It keeps control over selling price.
12. The main advantage of costing is to compare the output of the people of same trade and working on same type of machines.
13. It helps in determining the efficiency of administrative and operative functions and decides the weak point, where wastage and expenses need check.
14. It helps the planning department in deciding about the quantity of materials required.

Pricing Policy

Different methods are used by the firms in pricing their products. Some firms base their pricing on costs, while others chalk out their pricing policies considering competitive conditions in the market.

Thus, different firms use different methods of pricing depending upon their own concept of market situations and the operational convenience, price determination is an important function, as this directly affects the earnings of the concerns.

Procedure for Costing

Actual expenditure incurred in various departments on different times are collected by the costing department. The expenditures are then categorized under the following main heads:

1. Direct material cost,

2. Direct labor cost,
3. Factory overheads,
4. Administrative overheads,
5. Selling overheads.

Component Cost

The various components of cost are:

1. Prime cost
2. Factory cost
3. Office cost
4. Total cost

Prime Cost

It consists of direct material cost, direct labor cost and direct expenses.

i.e. Prime cost = Direct material cost + Direct labor cost + Direct expenses.

Prime cost is also named as Direct Cost.

Factory Cost

It consists of prime cost and factory expenses.

i.e. Factory cost = Prime cost + Factory expenses.

Factory cost is also named as works cost.

Office Cost

It consists of factory cost and administrative expenses.

i.e Office cost = Factory cost + Administrative expenses.

Office cost is also named as manufacturing cost or cost of production.

Total Cost

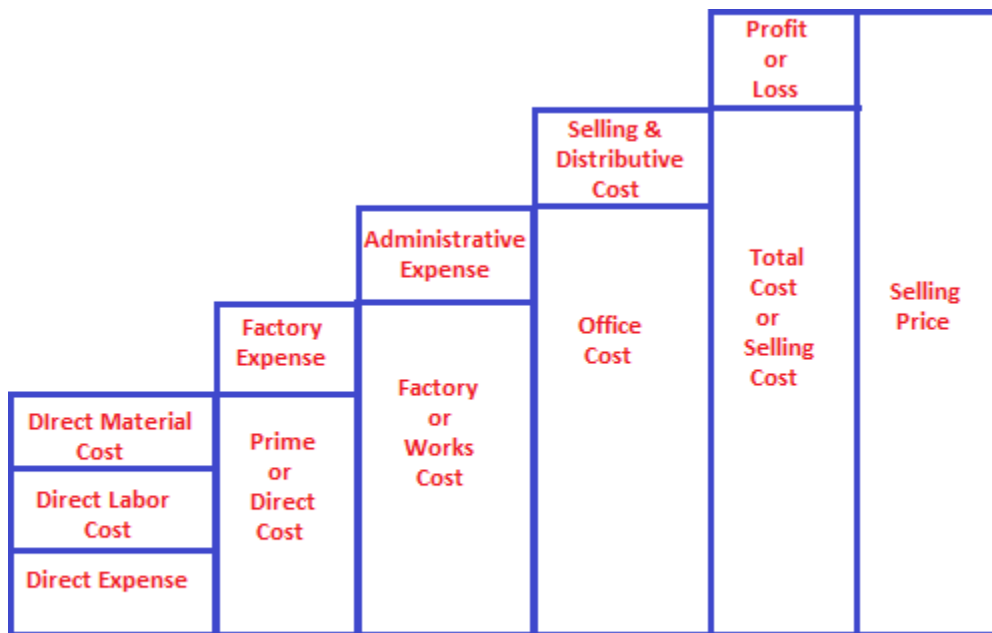
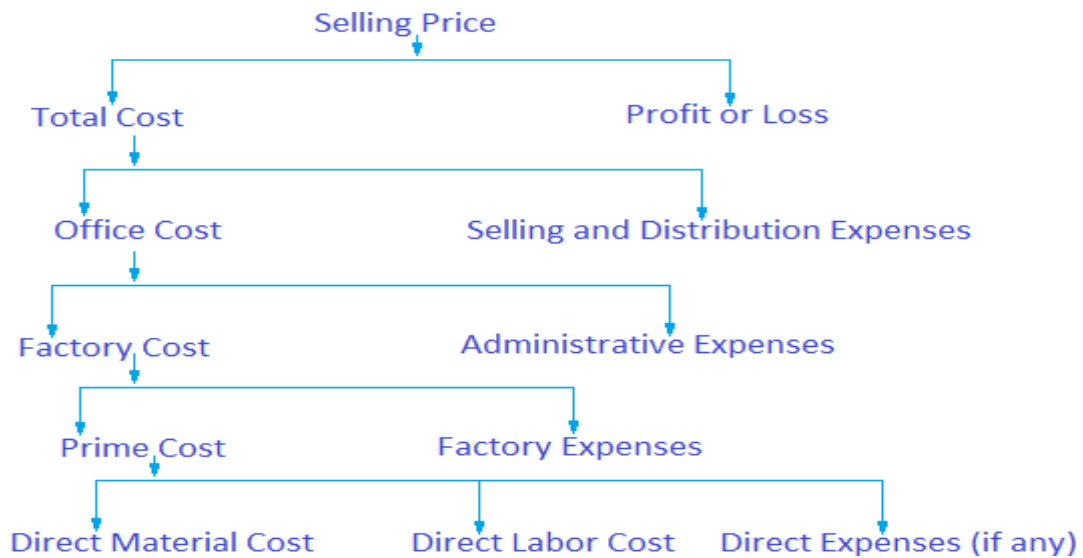
It includes office cost, and selling and distribution expenses.

i.e. Total Cost = Office cost + Selling expenses + Distribution expenses.

Selling Price

If the profit is added in the total cost of the product it is called selling price. The customers get the products by paying the price which is named as selling price.

The relation between the elements of cost and components of cost can be best illustrated by the chart given below.



Block diagram to illustrate the relation between 'Elements of Cost' & 'Components of Cost'.

Costing Methods

Costing method to be followed in a particular enterprise depends upon:

1. Nature of industry
2. Class of products being manufactured
3. Quantity of goods products and
4. The wages of the workers employed and paid the system of payment.

However, the following may be considered to be the important methods of costing:

1. Multiple costs
2. Job costs
3. Departmental costs
4. Unit costs
5. Process costs
6. Operating costs

Calculating Labor Cost

Labor employed in any organization may be of following two classes:

1. Direct Labor
2. Indirect Labor

Direct Labor

The workers, who actually work or process different materials manually or with the aid of machines is known as direct labor. This is also called 'productive labor'. The nature of their duties is such that their wages can be directly charged to the job, which they are manufacturing.

Workers engaged for operating on various production machines in machine shop, welding shop, electric winding, assembly shop etc. are known as direct labor.

Indirect Labor

Any other labor, who helps the productive labor in performing their duties is known as indirect labor. The nature of their duties is such that their wages cannot be charged directly to a particular job but are charged on the total number of products produced in the plant during a particular period.

Foreman, supervisors, inspectors, gate-keepers, store keepers etc. are classified as indirect labor.

Now again consider the above example of milling machine shop, the worker who is producing gears continuously on the milling machine is known as direct labor, while the foreman, supervising in the milling machine shop, the inspector checking the accuracy of gears and helper, who is bringing blanks and taking away gears from the worker are examples of indirect labor.

Calculating Direct Labor Costs

For the purpose of calculation of labor cost, estimator must have knowledge of :

- a. All operations, which are carried out for the manufacture of the product.
- b. Tools
- c. Machines, used for production.

Estimator should also take the advice of production department about the correct estimated time for each operation. He should also consider various allowances like:

- 1. Set up time**
- 2. Operating time**
 - a. Handling time
 - b. Machining time
- 3. The tear down time**
- 4. Miscellaneous allowance**
 - a. Personal allowance
 - b. Fatigue allowance
 - c. Tool changing and grinding allowance
 - d. Measurement checking allowance
 - e. Other allowances for cleaning, oiling, getting stocks etc.

Direct and Indirect Expenses

In every industry there are several other expenditures, such as cost of advertisement, building rent, depreciation charges of plant and factory building, cost of packing, cost of transportation, salaries and commission to salesmen etc. All these expenditures are known as expenses. So, we can say that except direct material and direct labor cost, all other expenses, which are incurred in the factory are known as expenses.

The cost of indirect material and indirect labor is also included in the expenses.

Expenses may be of 2 classes,

1. Direct or chargeable expenses
2. Indirect expenses

Direct Expenses

These are those expenses, which can be charged directly to a particular job and incurred for that specific job only. For example, cost of special jigs and fixtures, cost of some special patterns and cost of experimental work on a particular job etc.

Indirect Expenses

These are also known as overhead charges, on cost, burden or indirect charges. These can be further classified as:

- a. Factory expenses
- b. Administrative expenses
- c. Selling expenses
- d. Distribution expenses

Factory Expenses

These overheads include all the expenditures made on the actual operation of the product in the plant, such as indirect materials and indirect labor. It is also named as works on cost.

Administrative Expenses

These overheads include all the expenditure made on the salaries of general office staff and executive staff, telegraph, fax, computer and telephone charges, depreciation of office building and equipment etc. This is also known as establishment on-cost or office expenses.

Selling Expenses

These overheads include all the expenditure made on the salaries of persons working in sales department, advertising expenses and agency expenses etc.

These overheads include all the expenses made on holding finished stock, dispatching them to the customer and packing cost etc.

Distribution Expenses

These overheads include all the expenses made on holding finished stock, despatching them to the customer and packing cost etc.

Depreciation

Whenever, any machine or equipment performs useful work, its wear and tear is bound to occur. This can be minimized up to some extent by proper care and maintenance but can't be totally eliminated. Its efficiency also reduces with the lapse of time and at one time it becomes uneconomical to be used further and replacements by another new unit.

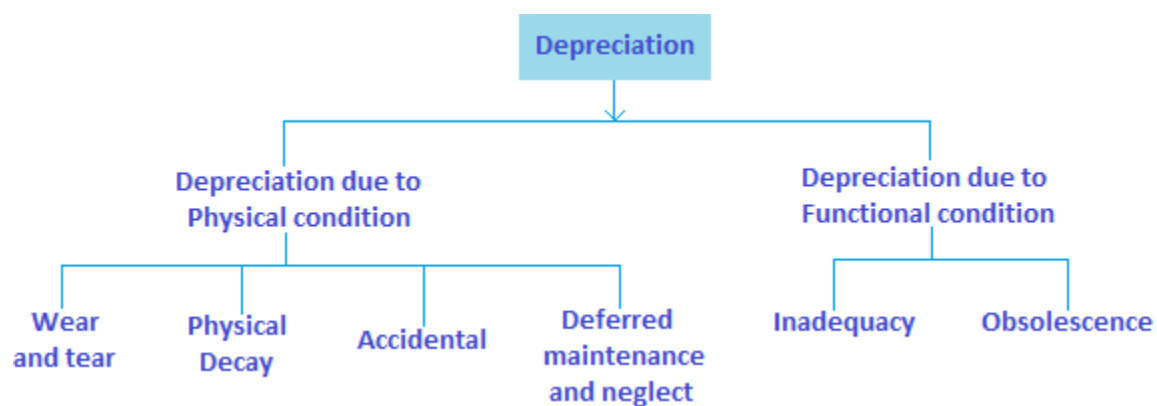
Therefore we can say that efficiency and value of machine or asset reduces with the lapse of time during use, which is known as 'Depreciation', So some money must be set aside yearly from the profit, so that when the equipments becomes uneconomical, it can be replaced by the new one. Therefore, the initial cost of the machine *plus* installation charges *plus* repair charges *minus* scrap value is charged against overheads and is spread over the machine useful life.

For this purpose an account for the complete plant or individual equipment is opened in the Company's Books known as 'Depreciation Fund' or 'Sinking Fund'. This amount is deducted yearly from the profits and kept separately to have sufficient money for replacement at the end of useful life.

Causes of Depreciation

The other cause of depreciation is physical decay, accidents, deferred maintenance and neglect, inadequacy etc.

For further understanding, depreciation can be classified as under:



Obsolescence

Suppose a factory owner purchases a machine for his production shop but after some duration a better machine comes in the market, whose production rate is very high and much economical. Although the old machine is efficient but becomes out of fashion and uneconomical due to the new better machine which has come in the market. This is known as 'Obsolescence'. Consideration of this factor is of much important and some money also should also be set aside from the profit for this cause. Hence, obsolescence is the depreciation of existing machinery or asset due to new and better invention or design of equipment or processes etc.

It is very difficult problem for the estimator to provide for the on-cost on obsolescence, because nobody can say when a revolutionary change in the machine is coming in the market. But is a general practice to reduce the life of machine so as to account the effect of obsolescence.

Now the depreciation and obsolescence charges are calculated in the reduced life.

Suppose an estimator expects the life of machinery as 20 years then the depreciation rate will be $100/20=5\%$. By considering obsolescence also, its life may be taken as 15 years. Then the combined

depreciation and obsolescence charges will be $100/15 = 6.66\%$ instead of 5% . Therefore, the difference $6.66 - 5.00 = 1.66\%$ will be obsolescence charges.

Cost Accounting

Introduction

Cost Accounting may be defined as “*Accounting for costs classification and analysis of expenditure as will enable the total cost of any particular unit of production to be ascertained with reasonable degree of accuracy and at the same time to disclose exactly how such total cost is constituted*”.

Cost Accounting can also be explained as follows :-

Cost Accounting is the process of accounting for cost which begins with recording of income and expenditure and ends with the preparation of statistical data. It is the formal mechanism by means of which cost of products or services are ascertained and controlled.

It establishes budgets and standard costs and actual cost of operations, processes, departments or products and the analysis of variances, profitability and social use of funds.

Thus Cost Accounting is a quantitative method that collects, classifies, summarizes and interprets information for product costing, operation planning and control and decision making.

Costing : Costing is defined as the technique and process of ascertaining costs.

The technique in costing consists of the body of principles and rules for ascertaining the costs of products and services. The technique is dynamic and changes with the change of time. The process of costing is the day to day routine of ascertaining costs. It is popularly known as an arithmetic process. For example If the cost of producing a product say 200/-, then we have to refer material, labour and expenses accounting and arrive the above cost as follows:

Material	:	100
Labour	:	40
Expenses	:	60
Total Cost	:	200

- (a) It is a science because it is a systematic body of knowledge having certain principles which a cost accountant should possess for proper discharge of his responsibilities.
- (b) It is an art as it requires the ability and skill with which a Cost Accountant is able to apply the principles of Cost Accountancy to various managerial problems.
- (c) Practice includes the continuous efforts of a Cost Accountant in the field of Cost Accountancy.

Such efforts of a Cost Accountant also include the presentation of information for the purpose of managerial decision making and keeping statistical records.

Objectives of Cost Accounting

The following are the main objectives of Cost Accounting :-

- (a) To ascertain the Costs under different situations using different techniques and systems of costing
- (b) To determine the selling prices under different circumstances
- (c) To determine and control efficiency by setting standards for Materials, Labour and Overheads
- (d) To determine the value of closing inventory for preparing financial statements of the concern
- (e) To provide a basis for operating policies which may be determination of Cost Volume relationship, whether to close or operate at a loss, whether to manufacture or buy from market, whether to continue the existing method of production or to replace it by a more improved method of production. ...etc

Scope of Cost Accountancy

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

- (a) **Cost Ascertainment:** The main objective of Cost Accounting is to find out the Cost of product / services rendered with reasonable degree of accuracy.
- (b) **Cost Accounting:** It is the process of Accounting for Cost which begins with recording of expenditure and ends with preparation of statistical data.
- (c) **Cost Control:** It is the process of regulating the action so as to keep the element of cost within the set parameters.
- (d) **Cost Reports:** This is the ultimate function of Cost Accounting. These reports are primarily prepared for use by the management at different levels. Cost reports helps in planning and control, performance appraisal and managerial decision making.
- (e) **Cost Audit:** Cost Audit is the verification of correctness of Cost Accounts and check on the adherence to the Cost Accounting plan. Its purpose is not only to ensure the arithmetic accuracy of cost records but also to see the principles and rules have been applied correctly.

To appreciate fully the objectives and scope of Cost Accounting, it would be useful to examine the position of Cost Accounting in the broader field of general accounting and other sciences. i.e Financial Accounting, Management Accounting, Engineering and Service Industry.

Financial Accounting and Cost Accounting

Financial Accounting is primarily concerned with the preparation of financial statements, which summarize the results of operations for selected period of time and show the financial position of the

company at particular dates. In other words Financial Accounting reports on the resources available (Balance Sheet) and what has been accomplished with these resources (Profit and Loss Account). Financial Accounting is mainly concerned with requirements of creditors, shareholders, government, prospective investors and persons outside the management. Financial Accounting is mostly concerned with external reporting.

Cost Accounting, as the name implies, is primarily concerned with determination of cost of something, which may be a product, service, a process or an operation according to costing objective of management. A Cost Accountant is primarily charged with the responsibility of providing cost data for whatever purposes they may be required for.

Difference between Financial Accounting and Cost Accounting

Financial Accounting

- (a) It provides the information about the business in a general way. i.e Profit and Loss Account, Balance Sheet of the business to owners and other outside partners.
- (b) It classifies, records and analyses the transactions in a subjective manner, i.e according to the nature of expense.
- (c) It lays emphasis on recording aspect without attaching any importance to control.
- (d) It reports operating results and financial position usually at the end of the year.
- (e) Financial Accounts are accounts of the whole business. They are independent in nature.
- (f) Financial Accounts records all the commercial transactions of the business and include all expenses i.e Manufacturing, Office, Selling etc.
- (g) Financial Accounts are concerned with external transactions i.e. transactions between business concern and third party.
- (h) Only transactions which can be measured in monetary terms are recorded.
- (i) Financial Accounting deals with actual figures and facts only.
- (j) Financial Accounting do not provide information on efficiencies of various workers/ Plant & Machinery.
- (k) Stocks are valued at Cost or Market price whichever is lower.
- (l) Financial Accounting is a positive science as

Cost Accounting

- (a) It provides information to the management for proper planning, operation, control and decision making.
- (b) It records the expenditure in an objective manner, i.e according to the purpose for which the costs are incurred.
- (c) It provides a detailed system of control for materials, labour and overhead costs with the help of standard costing and budgetary control.
- (d) It gives information through cost reports to management as and when desired.
- (e) Cost Accounting is only a part of the financial accounts and discloses profit or loss of each product, job or service.
- (f) Cost Accounting relates to transactions connected with Manufacturing of goods and services, means expenses which enter into production.
- (g) Cost Accounts are concerned with internal transactions, which do not involve any cash payment or receipt.
- (h) Non-Monetary information likes No of Units / Hours etc are used.
- (i) Cost Accounting deals with partly facts and figures and partly estimates / standards.
- (j) Cost Accounts provide valuable information on the efficiencies of employees and Plant & Machinery.
- (k) Stocks are valued at Cost only.
- (l) Cost Accounting is not only positive science

it is subject to legal rigidity with regarding to preparation of financial statements.

(m) These accounts are kept in such away to meet the requirements of Companies Act 2013 as per Sec 128 & Income Tax Act, 1961 Sec 44AA.

but also normative because it includes techniques of budgetary control and standard costing.

(m) Generally Cost Accounts are kept voluntarily to meet the requirements of the management, only in some industries Cost Accounting records are kept as per the Companies Act.

Cost Control

Cost Control is defined as the regulation by executive action of the costs of operating an undertaking, particularly where such action is guided by Cost Accounting.

Cost control involves the following steps and covers the various facets of the management:

Planning: First step in cost control is establishing plans / targets. The plan/target may be in the form of budgets, standards, estimates and even past actual may be expressed in physical as well as monetary terms. These serves as yardsticks by which the planned objective can be assessed.

Communication: The plan and the policy laid down by the management are made known to all those responsible for carrying them out. Communication is established in two directions; directives are issued by higher level of management to the lower level for compliance and the lower level executives report performances to the higher level.

Motivation: The plan is given effect to and performances starts. The performance is evaluated, costs are ascertained and information about results achieved are collected and reported. The fact that costs are being complied for measuring performances acts as a motivating force and makes individuals endeavor to better their performances.

Appraisal and Reporting: The actual performance is compared with the predetermined plan and variances, i.e deviations from the plan are analyzed as to their causes. The variances are reported to the proper level of management.

Decision Making: The variances are reviewed and decisions taken. Corrective actions and remedial measures or revision of the target, as required, are taken.

Advantages of Cost Control

The advantages of cost control are mainly as follows

- (i) Achieving the expected return on capital employed by maximizing or optimizing profit
- (ii) Increase in productivity of the available resources
- (iii) Reasonable price of the customers
- (iv) Continued employment and job opportunity for the workers

- (v) Economic use of limited resources of production
- (vi) Increased credit worthiness
- (vii) Prosperity and economic stability of the industry

(a) Classification by Nature of Expense

Costs should be gathered together in their natural grouping such as Material, Labour and Other Direct expenses. Items of costs differ on the basis of their nature. The elements of cost can be classified in the following three categories. 1. Material 2. Labour 3. Expenses

Material Labour Expenses Cost Classification by nature

Material Cost: Material cost is the cost of material of any nature used for the purpose of production of a product or a service. It includes cost of materials, freight inwards, taxes & duties, insurance ...etc directly attributable to acquisition, but excluding the trade discounts, duty drawbacks and refunds on account of excise duty and vat.

Labour Cost: Labour cost means the payment made to the employees, permanent or temporary for their services. Labour cost includes salaries and wages paid to permanent employees, temporary employees and also to the employees of the contractor. Here salaries and wages include all the benefits like provident fund, gratuity, ESI, overtime, incentives...etc

Expenses: Expenses are other than material cost or labour cost which are involved in an activity.

(b) Classification by Relation to Cost Centre or Cost Unit:

If expenditure can be allocated to a cost centre or cost object in an economically feasible way then it is called direct otherwise the cost component will be termed as indirect. According to this criteria for classification, material cost is divided into direct material cost and indirect material cost, Labour cost is divided into direct labour and indirect labour cost and expenses into direct expenses and indirect expenses. Indirect cost is also known as overhead.

Material Cost Classification by relation to cost centre Direct Indirect Labour Expenses Material
Labour Expenses

Direct Material Cost: Cost of material which can be directly allocated to a cost centre or a cost object in an economically feasible way.

Direct labour Cost: Cost of wages of those workers who are readily identified or linked with a cost centre or cost object.

Direct Expenses: Expenses other than direct material and direct labour which can be identified or linked with cost centre or cost object.

$$\text{Direct Material} + \text{Direct labour} + \text{Direct Expenses} = \text{Prime Cost}$$

Indirect Material : Cost of material which cannot be directly allocable to a particular cost centre or cost object.

Indirect Labour : Cost of wages of employees which are not directly allocable to a particular cost centre.

Indirect expenses: Expenses other than of the nature of material or labour and cannot be directly allocable to a particular cost centre.

$$\text{Indirect Material} + \text{Indirect Labour} + \text{Indirect Expenses} = \text{Overheads}$$

(c) Classification by Functions:

A business enterprise performs a number of functions like manufacturing, selling, research...etc. Costs may be required to be determined for each of these functions and on this basis functional costs may be classified into the following types:-

- (i) Production or Manufacturing Costs
- (ii) Administration Costs
- (iii) Selling & Distribution cost
- (iv) Research & Development costs

Production Cost classification by function Administration Research & Development Selling
Distribution

(i) Production or Manufacturing Costs: *Production cost is the cost of all items involved in the production of a product or service.* These refer to the costs of operating the manufacturing division of an undertaking and include all costs incurred by the factory from the receipt of raw materials and supply of labour and services until production is completed and the finished product is packed with the primary packing.

The followings are considered as Production or Manufacturing Costs:-

- (1) Direct Material
- (2) Direct Labour
- (3) Direct Expenses and
- (4) Factory overhead, i.e., aggregate of factory indirect material, indirect labour and indirect expenses.

Manufacturing cost can also be referred to as the aggregate of prime cost and factory overhead.

(ii) Administration Costs: *Administration costs are expenses incurred for general management of an organization. These are in the nature of indirect costs and are also termed as administrative overheads.* For understanding administration cost, it is necessary to know the scope of administrative function. Administrative function in any organization primarily concerned with following activities :-

- (1) Formulation of policy
- (2) Directing the organization and
- (3) Controlling the operations of an organization. But administrative function will not include control activities concerned with production, selling and distribution and research and development.

Therefore, administration cost is the cost of administrative function, i.e., the cost of formulating policy, directing, organizing and controlling the operations of an undertaking (Administrative cost will include cost of only those control operations which are not related to production, selling and distribution and research and development). In most of the cases, administration cost includes indirect expenses of following types:

- (1) Salaries of office staff, accountants, directors
- (2) Rent, rates and depreciation of office building
- (3) Postage, stationery and telephone
- (4) Office supplies and expenses
- (5) General administration expenses.

(iii) Selling & Distribution Costs: *Selling costs are indirect costs related to selling of products are services and include all indirect costs in sales management for the organization. Distribution costs are the costs incurred in handling a product from the time it is completed in the works until it reaches the ultimate consumer.*

Selling function includes activities directed to create and stimulate demand of company's product and secure orders. Distribution costs are incurred to make the saleable goods available in the hands of the customer.

Following are the examples of selling and distribution costs:

- (1) Salaries and commission of salesmen and sales managers.
- (2) Expenses of advertisement, insurance.
- (3) Rent, rates, depreciation and insurance of sales office and warehouses.
- (4) Cost of insurance, freight, export, duty, packing, shipping, etc.,
- (5) Maintenance of Delivery vans.

(iv) Research & Development Costs: Research & development costs are the cost for undertaking research to improve quality of a present product or improve process of manufacture, develop a new product, market research...etc. and commercialization thereof.

R&D Costs comprises of the following:-

- (1) Development of new product.
- (2) Improvement of existing products.
- (3) Finding new uses for known products.
- (4) Solving technical problem arising in manufacture and application of products.

- (5) Development cost includes the costs incurred for commercialization / implementation of research findings.

(v) Pre-Production Costs:

These are costs incurred when a new factory is in the process of establishment, a new project is undertaken, or a new product line or product is taken up but there is no established or formal production to which such costs may be charged. Preproduction costs are normally treated as deferred revenue expenditure and charged to the costs of future production.

(d) Classification based on Behaviour – Fixed, Semi-variable or Variable

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

Cost classification by behaviour Fixed Variable Semi-variable

Fixed Cost: Fixed cost is the cost which does not vary with the change in the volume of activity in the short run. These costs are not affected by temporary fluctuation in activity of an enterprise. These are also known as period costs. Example: Rent, Depreciation...etc.

Variable Cost: Variable cost is the cost of elements which tends to directly vary with the volume of activity. Variable cost has two parts (i) Variable direct cost (ii) Variable indirect costs. Variable indirect costs are termed as variable overheads. Example: Direct labour, Outward Freight...etc.

Semi-Variable Costs: Semi variable costs contain both fixed and variable elements. They are partly affected by fluctuation in the level of activity. These are partly fixed and partly variable costs and vice versa. Example: Factory supervision, Maintenance...etc.

(e) Classification based on Costs for Management Decision Making

Ascertainment of cost is essential for making managerial decisions. On this basis costing may be classified into the following types.

Marginal Costing: Marginal Cost is the aggregate of variable costs, i.e. prime cost plus variable overhead. Marginal cost per unit is the change in the amount at any given volume of output by which the aggregate cost changes if the volume of output is increased or decreased by one unit. Marginal Costing system is based on the system of classification of costs into fixed and variable. The fixed costs are excluded and only the marginal costs, i.e. the variable costs are taken into consideration for determining the cost of products and the inventory of work-in-progress and completed products.

Differential Cost: Differential cost is the change in the cost due to change in activity from one level to another.

Opportunity Cost: Opportunity cost is the value of alternatives foregone by adopting a particular strategy or employing resources in specific manner. It is the return expected from an investment other than the present one. These refer to costs which result from the use or application of material,

labour or other facilities in a particular manner which has been foregone due to not using the facilities in the manner originally planned. Resources (or input) like men, materials, plant and machinery, finance etc., when utilized in one particular way, yield a particular return (or output). If the same input is utilized in another way, yielding the same or a different return, the original return on the forsaken alternative that is no longer obtainable is the opportunity cost. For example, if fixed deposits in the bank are proposed to be withdrawn for financing project, the opportunity cost would be the loss of interest on the deposits. Similarly when a building leased out on rent to a party is got vacated for own purpose or a vacant space is not leased out but used internally, say, for expansion of the production programme, the rent so forgone is the opportunity cost.

Replacement Cost: Replacement cost is the cost of an asset in the current market for the purpose of replacement. Replacement cost is used for determining the optimum time of replacement of an equipment or machine in consideration of maintenance cost of the existing one and its productive capacity. This is the cost in the current market of replacing an asset. For example, when replacement cost of material or an asset is being considered, it means that the cost that would be incurred if the material or the asset was to be purchased at the current market price and not the cost, at which it was actually purchased earlier, should be taken into account.

Relevant Costs: Relevant costs are costs which are relevant for a specific purpose or situation. In the context of decision making, only those costs are relevant which are pertinent to the decision at hand. Since we are concerned with future costs only while making a decision, historical costs, unless they remain unchanged in the future period are irrelevant to the decision making process.

Imputed Costs: Imputed costs are hypothetical or notional costs, not involving cash outlay computed only for the purpose of decision making. In this respect, imputed costs are similar to opportunity costs. Interest on funds generated internally, payment for which is not actually made is an example of imputed cost. When alternative capital investment projects are being considered out of which one or more are to be financed from internal funds, it is necessary to take into account the imputed interest on own funds before a decision is arrived at.

Sunk Costs: Sunk costs are historical costs which are incurred i.e. sunk in the past and are not relevant to the particular decision making problem being considered. Sunk costs are those that have been incurred for a project and which will not be recovered if the project is terminated. While considering the replacement of a plant, the depreciated book value of the old asset is irrelevant as the amount is sunk cost which is to be written-off at the time of replacement.

Normal Cost & Abnormal Cost: Normal Cost is a cost that is normally incurred at a given level of output in the conditions in which that level of output is achieved. Abnormal Cost is an unusual and typical cost whose occurrence is usually irregular and unexpected and due to some abnormal situation of the production.

Avoidable Costs & Unavoidable Costs: Avoidable Costs are those which under given conditions of performance efficiency should not have been incurred. Unavoidable Costs which are inescapable costs, which are essentially to be incurred, within the limits or norms provided for. It is the cost that must be incurred under a programme of business restriction. It is fixed in nature and inescapable.

Uniform Costing: This is not a distinct system of costing. The term applies to the costing principles and procedures which are adopted in common by a number of undertakings which desire to have the benefits of a uniform system. The methods of Uniform Costing may be extended so as to be useful in inter-firm comparison.

Engineered Cost: Engineered Cost relates to an item where the input has an explicit physical relationship with the output. For instance in the manufacture of a product, there is a definite relationship between the units of raw material and labour time consumed and the amount of variable manufacturing overhead on the one hand and units of the products produced on the other. The input-output relationship can be established the form of standards by engineering analysis or by an analysis of the historical data. It should be noted that the variable costs are not engineered cost but some administration and selling expenses may be categorized as engineered cost.

Out-of-Pocket Cost: This is the portion of the cost associated with an activity that involve cash payment to other parties, as opposed to costs which do not require any cash outlay, such as depreciation and certain allocated costs. Out-of-Pocket Costs are very much relevant in the consideration of price fixation during trade recession or when a make-or-buy decision is to be made.

Managed Cost: Managed (Programmed or Discretionary) Costs all opposed to engineering costs, relate to such items where no accurate relationship between the amount spent on input and the output can be established and sometimes it is difficult to measure the output. Examples are advertisement cost, research and development costs, etc.,

Common Costs: These are costs which are incurred collectively for a number of cost centres and are required to be suitably apportioned for determining the cost of individual cost centres. Examples are: Combined purchase cost of several materials in one consignment, and overhead expenses incurred for the factory as a whole.

Controllable and Non-Controllable Costs: Controllable Cost is that cost which is subject to direct control at some level of managerial supervision. Non-controllable Cost is the cost which is not subject to control at any level of managerial supervision.

(f) Classification by nature of Production or Process:

Cost Classification by nature of Production or Process Batch Cost Process Cost Operating Cost Contract Cost Joint Cost

Material Cost Calculation

Materials can be classified into 2 types:

1. Direct materials
2. Indirect materials

Direct Materials

These are those materials which when operated or processed in factory shops through various stages form the final useful shape of the main product or component part of the main product. These are also known as 'Productive materials'. Examples of Direct materials are wood for furniture, steel for bolts.

Indirect Materials

These are those materials which are essentially needed in various shops for helping the materials to be converted into the final useful shapes. Difference between direct and indirect forms of materials can be easily understood by the following example:

Suppose a person continuously working in milling machine shop is cutting gear teeth on cast iron blanks. Now the cast iron blank, of which the gear is made, will be the direct material while the coolant required for cooling the cutter, grease and lubricating oil needed for lubricating the machine, kerosene oil and cotton waste etc. needed for leaning the machine are known as indirect materials.

Calculation of Materials Cost

For the calculation of materials cost following procedure should be adopted:

- a. Calculate the volume of each component by applying the mensuration. For the calculation of volume, necessary machining allowance must be added on the sides which are required to be machined.
- b. Add the volume of all components to get the total volume of the product.
- c. Multiply this volume by the density to get the weight of the material.
- d. Multiply the cost per unit weight to the total weight of the material to get the cost of the material.

Machine Shop Estimating

Introduction

For estimation purposes, machining cost is calculated after finding the material cost. Machining is done on castings, forgings and bar stocks etc., for getting the exact size and shape of the product.

Machine Shop Operations

Generally following operations are performed in the machine shop on different machines:

1. Turning.
2. Knurling.
3. Facing.
4. Drilling.
5. Boring.
6. Reaming
7. Threading.
8. Tapping.
9. Milling.
10. Grinding.
11. Shaping.
12. Planning.

In estimating, our aim is to find out the time, which an operator takes for performing the machining operation, for calculating their wages. In addition to this machining time (also known as operation time), following time considerations are taken:

- (i) Setting up the job and tool or cutters.
- (ii) Setting up the machine.
- (iii) Inspection of job.
- (iv) Fatigue allowance.
- (v) Tool changing and sharpening time.
- (vi) Machine cleaning and servicing time.
- (vii) Personal allowance.

In the study of machining time following terms are generally used:

Cutting Speed

It is the distance which tool travels along the material in one minute. Its unit is meters/min.

Let us consider an example, in which a job of D dia is revolving at a speed of N r.p.m. Then, distance travelled by the tool point in one min = Distance moved in one revolution x Revolutions performed in one min.

Therefore, cutting speed = $3.14 DN/100$ m per min

Cutting speed depends on the following factors:

- (i) Hard material requires a lower cutting speed than that of soft and ductile materials.
- (ii) High speed tools and tools of special cutting alloys can cut at higher cutting speeds than carbon steel tools.
- (iii) If the depth of cut and feed is more, then less cutting speed is taken and vice versa
- (iv) By using good cutting fluids, cutting speeds may be increased.

An estimator should consider above factor while selecting a suitable cutting speed.

- (i) Cutting speeds for grinding in Table show the speed of the work at which it travels against the grinding wheel, while grinding wheel has its speed for external grinding at 1800 m/min, for internal grinding as 1200 m/min and for surface grinding as 1500 m/min.
- (ii) When the tungsten carbide tools are used, the cutting speeds are 2 to 3 times of these speeds.

Feed

It is the distance, through which the tool advances into the work piece during one revolution of the work piece or the tool or cutter. Its unit is mm/rev.

As the feed depends on the depth of cut, cutting speed and power of the machine, hence no specific values for this can be mentioned.

Depth of Cut

It is the amount by which a tool or cutter is inserted into the metal during one cut. In other words, it is the thickness of the metal removed in one cut. It is generally measured in mm.

Welding

Introduction

Welding Technology is gaining importance in the field of fabrication, reconditioning of worn parts, and has become principal joining process of numerous metal products of different sizes and shapes. The welded joints give the strength equal to that of original metal. With the increase in the importance of welding, estimation of welding cost has also become important, and therefore estimation of the welding cost is being discussed below.

Welding is the process of joining two or more metal pieces by heating them up to the desired temperature with or without the application of pressure and with or without the use of filler metal.

Gas Welding

In case of gas welding following two welding techniques are adopted in practice:

- (i) Leftward or Fore-hand welding.
- (ii) Rightward or Back-hand welding.

Left-ward Welding

In this type, welding is started from right hand side of the joint and proceeds towards the left hand side. This method is suitable for welding plates up to 3 mm thickness without edge preparation.

Right-ward Welding

In this type, welding is started from left hand side of the joint and proceeds towards the right hand side. This method is suitable steel plates which are of more than 5mm thickness. In plates up to 8mm thickness, edge preparation is not required beyond 8mm thickness plates should be beveled to about 30° .

Gas welding can only be done on plates up to 25mm thickness.

Estimation of Welding Cost

For estimating the welding cost, following cost elements should be considered.

- a. **Preparation Cost:** It includes the cost of edge preparation, proper fit up and other elements before actual starting of welding.
- b. **Actual welding Cost:** This includes two costs.
 - (i) Cost of material used in welding process like $O_2H_2C_2$ filler rod, and flux etc.
 - (ii) Labor Cost. It will be obtained from wages sheets.
 - (iii) Welding Finishing Cost. This includes, the expenditure made for finishing the welding joint after welding. Post welding treatment (such as heat treatment) cost can also be taken in to account.

- (iv) On-cost. All the other overheads on the equipment and other facilities considered under on-cost heading.

Forging

Introduction

Forging is the process in which metal is heated at sufficiently high temperature to bring it to the plastic state. During this plastic state desired shape is given by applying sufficient force either by hand (manually) or by machine.

The shop in which forging is done is known as 'Forging shop'.

Type of forging

- a. Hand forging.
- b. Machine forging.

Hand Forging

When forging is done by hand, the process is known as hand forging. In case of heavy jobs, smith is assisted by a hammer-man. Important hand forging operations are drawing down, upsetting, bending, punching, swaging and shearing etc.

Machine Forging

The processes, in which forging is done by machines are known as Machine Forging. Machine forging is useful for heavy and complicated jobs requiring large forces.

(i) **Smith forging:** In this process metal is heated in suitable forges and then shaping of the metal is carried out by power or steam hammers and hand tools. In this method accuracy depends upon the experience and skill of the smith.

With this method, similar pieces cannot be obtained and process requires too much time. This method is used for large and simple types of products.

(ii) **Drop forging:** It is a process of hammering the metal during plastic state in impression dies. Die is used in two parts, one die is allowed to drop on the other, the hot metal in the plastic state is thus squeezed between the two dies and thus form the desired shaped of the forged product. Steam or power hammer can be used, instead of allowing the upper die to drop on the lower die from certain height. This process takes less time.

This is generally used, where large numbers of identical shapes of good quality forgings are to be produced.

(iii) **Press Forging:** Very heavy forgings are given proper shapes by the presses. This press can either be hydraulically operated or mechanically operated. Press forging method employs squeezing

of plastic metal or metal in plastic condition and gives the required shape in the dies. Pressure is applied continuously and gradually. By applying gradual pressure excessive vibration can be avoided, which may otherwise disturb the machine alignment by rapid blows of hammer.

Forging Operations

The shape of material can be transformed by forging with the aid of the following operations:

1. **Drawing Down:** It is also known as Drawing Out. This operation is performed to increase the length of the work piece in forging by decreasing the cross-sectional area.

This process is performed by hammering the hot work piece lengthwise to reduce cross-section.

2. **Up Setting:** This is the reverse of Drawing Down operation. In this operation, the cross-section of work piece is increased at the expense of length.

This process is performed by hammering one end of hot work piece while other end is supported against the anvil.

3. **Bending:** Bending is done by holding the work piece between two fixtures and desired bend can be given by striking the work piece with the help of hammer. This operation can also be carried out on the anvil break.

4. **Punching and Drafting:** Punching operation is performed by a tool called punch, for producing holes in the work piece, when it is in the hot state; and drafting is an operation carried on by a special tool known as draft to enlarge the hole.

Forging Estimation Procedure

Estimation procedure varies from shop to shop and person to person but for a general procedure, following factors may be considered:

Estimation of Net Weight

For estimation of net weight of the forged component, following procedure is adopted:

- a. Break up the job drawing into suitable geometrical section, whose volumes can easily be calculated by using mensuration.
- b. Next, find the value of each section, neglecting rounded corners and taking suitable assumptions.
- c. Now, find total volume of material required by subtracting volume of the hollow spaces.
- d. Lastly, calculate the weight of the component by multiplying the total volume with its density.

Estimation of Losses

Certain amount of material is lost during different forging operations. The exact estimation of losses is very difficult, but by practical experience, the losses can be calculated during forging as accurate as possible. Various losses in forging are:

(i) **Tong Loss:** While performing forging operations, some length of stock is required for holding the job in tong. This length is an extra length, which is removed after completion of the job. For estimation purposes, the weight of the extra length is also considered and is known as Tong loss. 2 to 3 cm of the stock length.

(ii) **Scale Loss:** The outer surface of the hot metal is generally oxidized, and when hammering is done oxidized film is broken and falls down in the form of scale. It reduces the dimensions of the job, and therefore, this loss must be considered for estimation purposes. Generally, it is taken as 6% of the net weight.

(iii) **Flash Loss:** It is the surplus metal, which comes out between the two meeting surfaces of the dies. For getting finished product, this surplus metal is required to be trimmed off. This loss may be calculated by assuming it to be 20mm wide and 3mm thick all around the periphery of the dies.

Thus, volume of flash loss = periphery x 20x 3 cu mm nearly.

(iv) **Shear Loss:** The required sizes of work piece for forging operations are obtained from long bars by sawing or shearing. In sawing operation, some material is always lost. If last piece of bar is not to be required length, it is rejected. This loss of material is taken as 5% of the net weight.

(v) **Sprue Loss:** The portion of metal between the length held in the tong and the material in the die is called sprue. This is also a metal loss and can be taken as 7% of the weight.

Thus we can see that nearly 15-20% of the net weight of metal is lost during forging. Therefore, in estimation their consideration is very essential and total weight will be net weight of job plus sum of the weight of different losses occurred during forging. Thus this gives the amount of weight of material required for forging.

Jigs and Fixtures

Introduction

The productivity and economics of machining work piece in a large quantity is greatly affected with the use of tools and work holding devices like jigs and fixtures. These devices reduce the production cost and ensure interchangeability of machined work pieces.

They are defined as under:

Tool

It is a device which removes material from a workplace under stable conditions and gives it desired shape and size.

These may be of the following types:

- a. Single-point tools.
- b. Multiple-edge tools.
- c. Non-mechanical or noncontact tools.
- d. The press which is used to handle these tools itself is called machine tools.

Jig

It is a device which holds and locates a work piece and guides and controls one or more cutting tools.

Fixture

It is a device which only, holds and locates a workpiece during an inspection or for a manufacturing operation.

Types of Jigs and Fixtures

The type of jig and fixture totally depends on the type of work to be machined and its quality required. Some simple drill jigs are as below:

1. Template jig
2. Plate jig
3. Diameter jig
4. Channel jig
5. Ring jig
6. Box jig
7. Leaf jig

Advantages of Jigs and Fixtures

- (i) They eliminate the marking out, measuring and other setting methods before machining.
- (ii) They enable production of identical parts which are interchangeable.
- (iii) They increase the machining accuracy of the work piece.
- (iv) They increase the production capacity of the man and machine.
- (v) They reduce the operator's labour and consequent fatigue to him.
- (vi) They enable semi-skilled operator to perform the operation, which saves the labour cost.
- (vii) They minimize the expenditure on the quality control of finished products.
- (viii) They reduce the overall cost of machining by fully or partly automatizing the processes.

Entrepreneur

Introduction

Entrepreneur is an organizer and speculator of a business enterprise. Entrepreneur lifts economic resources out of area of a lower to an area of higher productivity and greater yield. Entrepreneur is either originator of a new business venture or a manager who tries to improve an organizational unit by initiating productive changes. Here, business includes manufacturing, transport, trade and other self-employed vacation in service sector.

Entrepreneur is one who has the initiative, skill for innovation and who looks for high achievements. He is a catalytic agent of change and works for the good of people. He is the key man who envisages new opportunities, new techniques, new lines of production, new products and co-ordinates all other activities.

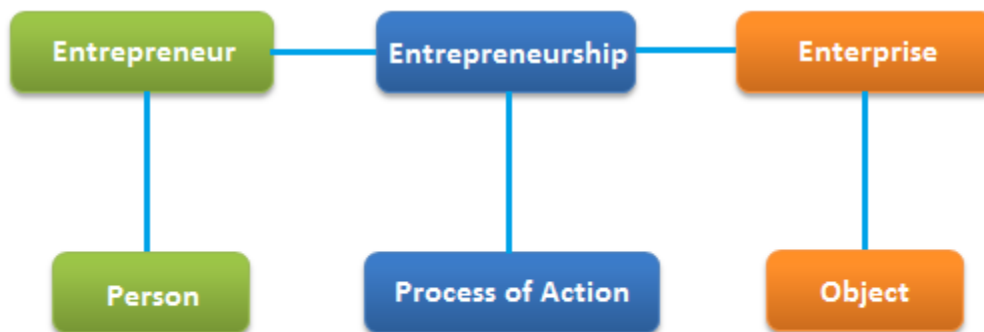
Entrepreneur has become the focal point in economic activities. He is viewed as an initiator of action, a stimulant of socio-economic change and development.

To sum up, we can say that, an entrepreneur is one who innovates, raises money, assembles input, chooses managers and set the organization going with his ability. Innovation occurs through

- a. Introduction of a new product,
- b. Introduction of new quality in a product,
- c. Discovery of fresh demand and a fresh source of supply, and
- d. Changes in the organization and management.

Entrepreneurship

Entrepreneurship is a process of action an entrepreneur undertakes to establish his enterprise. Entrepreneurship is also a resultant mix of many qualities and traits of an entrepreneur.



Concept of Entrepreneurship

According to A.H. Cole, Entrepreneurship is a purposeful activity of an individual or a group of associated individuals, undertaken to initiate, maintain or organize a profit oriented business unit for the production or distribution of economic goods and services.

Other definitions of entrepreneurship are:

Entrepreneurship means the function of creating something new, organizing and coordinating and undertaking the risk and handling, economic uncertainty.

Entrepreneurship is meant the function of seeing investment and production opportunity, organizing an enterprise to undertake new production process, raising capital, hiring labor, arranging for the supply of raw material and selecting the top managers for day-to-day operation of the enterprise.

Entrepreneurship is not confined to industry small or big only, it is needed in all activities where production or services is involved, it may be agriculture or management of government.

Qualities of an Entrepreneur

Entrepreneur is a person who by mobilizing resources starts on industry to get best results by manufacturing a product needed in the market; entrepreneur must therefore be able to mobilize resources like labor, capital, expertise needed for the unit although he may not be having them personally. An entrepreneur must therefore possess following qualities:

- (i) He must have self-confidence.
- (ii) He must be hard working and his initiative and persuasive qualities.
- (iii) He must be able to take risks and accept challenges.
- (iv) He must be result oriented.
- (v) He must be alert and get experience by seeing good points and mistakes of others.
- (vi) He must have qualities of a good leader and should have innovative nature.
- (vii) He should have sufficient technical and managerial abilities.

Financial Management

Introduction

Efficient management of every business enterprise is closely linked with efficient management of its finances. Every organization faces with a problem of managing its expanding and ambitious plans with its limited financial resources.

The financial management has, therefore been assigned the task of planning and controlling the long and short-term financial needs of the firm. Financial management is the 'activity concerned with planning, raising, controlling and administering of the funds used in the business'.

Financial Management is a function related to the procurement of finance and its effective utilization for the achievement of common goal of the organization.

Functions of Financial Management

Financial Manager is concerned with the following aspects:

1. Identifying the present strengths and weakness of an organization, and the scope of improvement, by conducting the financial analysis.
2. Planning the financial strategies. This involves the consideration of methods and levels of funds rising, profitability and the financing of expansion plan of the organization.
3. Arranging the funds when required, in the form needed in the most economical way.
4. Conducting financial appraisal of the possible courses of action. The appraisals are needed in respect of possible take over's and mergers, analysis of capital projects, or alternative methods of funding.
5. Advising about capital structure.
6. Consideration of an appropriate level for drawing by dividends to the owners/shareholders.
7. Ensuring that assets are controlled and used in an efficient manner.
8. Cash management. Preparation of detailed cash budgets and/or forecasts funds flow statement so that future problems can be foreseen and remedial measures taken in advance. These take care of both shortage and excess of cash. Finance managers must find ways of raising more funds needed, or investing excess funds for an appropriate length of time.
9. Finance manager are likely to draw attention on other disciplines also, like accounting and budgeting.

Budget

Introduction

It is a tool of management for planning its future activities including estimate of sales, expenditure and production etc. it is done for indicating the expected results of the business of the business and the and the possible future lines of action to be followed for the attainment of such results. Expected results are projected in financial terms or other numerical terms like units of products, man hours, machine hours etc.

Budgeting or Budget making may be defined "as a forecast of program of operations based on expected operating efficiency".

Budget should be based on estimated future requirement for a definite period of time. It should be prepared by taking the help of previous statistical data. Thus, budgeting can also be defined, as "forecasting and preplanning for the next period, used past experience market trends and present position".

Budget provides predetermined standards of performance for the guidance of the efforts and activities in the business. As budgets provide standards of performance, they usually become the basis for control.

Control used for the execution of budgets is what is called "budgetary control". Thus budgeting is concerned with the planning function of management, while "budgetary control" involves the function of controlling in the organization.

Budgetary Control

As we have already discussed the budget as an "estimate of future requirement about the activities of the concern for a particular period", therefore, a process of comparing the actual result with the corresponding budget data so as to know the actual cause of differences.

It can be also defined "as the process which keeps the actual standard as nearly as possible to the predetermined standard by strict supervision".

Budgetary control is useful to know about the extent of profit or losses being made.

Break Even Analysis

Break even analysis, also known as cost-volume-profit-analysis, is considered with finding the point at which revenues and costs and exactly equal. This point, known as break-even point, represents the volume of output at which neither profit is made nor a loss is incurred. Therefore production/sale must not be allowed to fall beyond this point. This analysis can be carried out either algebraically or graphically.

Assumptions in Break-even Analysis

- (a) It assumes that costs can be classified into fixed and variable costs, ignoring semi-variable costs.
- (b) Sale price is assumed as constant.
- (c) It assumes no improvement in efficiency.
- (d) Changes in input prices are also not considered.
- (e) It considers that production is equal to the sales.

Advantages of Using Break-even Analysis

- (i) It helps in deciding profitable level of output, below which losses will occur.
- (ii) It can help in deciding the target.
- (iii) It helps in deciding as to which product should be manufactured and which should not.
- (iv) It helps in taking plant expansion decision.
- (v) It helps in taking equipment replacement decision.
- (vi) It foretells likely profits or losses at various levels of output.
- (vii) It can indicate margin of safety.

Break Even Analysis Chart

In order to obtain a clear position of the business, it is important to construct "Break Even Chart". It indicates the points at which neither profit nor loss is made. This point at which neither profit nor loss is made is known as Break Even Point (B.E.P). The point where the total lines cut the sales line is the Break-Even Point. At this point the company's earnings are just sufficient to cover the expenses.

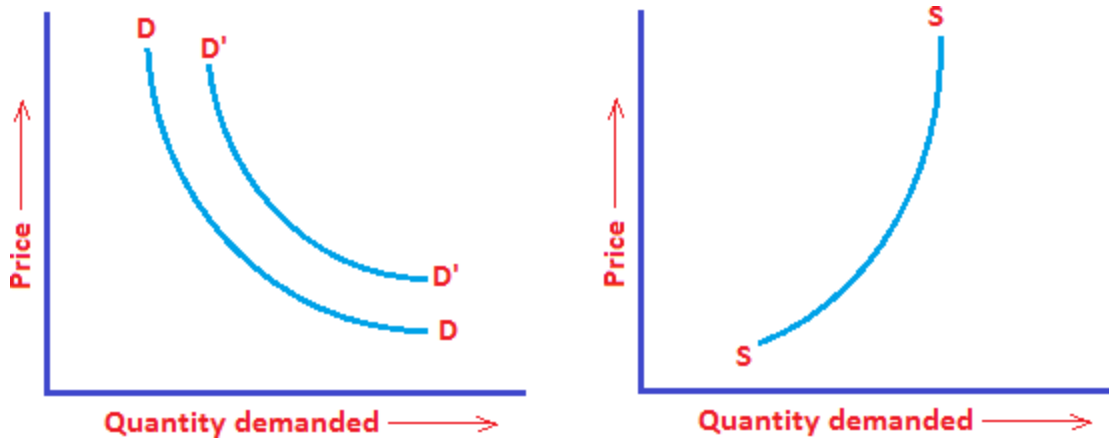
This chart can be demonstrated by the following example:

A.	Output (units)	5,000	10,000	15,000	20,000	2,000
B.	Fixed costs, Rs.	3,000	3,000	3,000	3,000	3,000
C.	Variable Costs, Rs. (per unit 10 paise)	500	1,000	1,500	2,000	2,500
D.	Sale in Rs. (@ Re. 0.50 per unit)	2,500	5,000	7,500	10,000	12,500
E.	Total cost (B+C) in Rs.	3,500	4,000	4,500	5,000	5,500

Supply

Introduction

Supply of a commodity refers to the various quantities of a commodity which a seller is willing and able to sell at different prices in a given market, at a point of time, other things being constant. Price of commodity is affected by the demand and the supply



Law of Supply

"As the price of the commodity rises, its supply increases and as the price falls, its supplies declines". Thus the quantity offered for sale is directly proportional to price *i.e.* larger the supply, higher the price or vice-versa as shown in the figure, other things remain same.

Increase and Decrease in Supply

This means a change in quantity supplied without any change in price. This therefore indicates a shift in supply schedules to the right with increase in supply and to the left with decrease in supply.

Determination of Price

Prices under perfect competition are determined by the laws of demand and supply. Prices will be fixed at a point where the supply and demand are at equilibrium. The equilibrium will change by changes in forces of demand and supply.

Profit

Introduction

As we know that main objective of any industrial enterprise is to produce good quality products to serve the society and thereby to earn maximum profit. For this purpose the enterprise has to concentrate to financial matter along with technical matters. Although we have discussed some of the financial matters in the book at relevant places, here we are discussing some other important matters from the financial management point of view.

Theories of Profit

Various theories of profit have been put forth by different economists to explain the profits. The important among these are:

1. Risks and Uncertainty theory
2. Dynamic Approach to the Profit theory
3. Rent theory of Profits.

Risks and Uncertainty Theory

This theory was introduced by Howley and according to him net profit is the residual income of the owner after making payments for all factors of production and is the reward for the risk taken by him. It concludes that profits are due to the risk taken by the owner. The owner has to bear the risk of losing capital; there are certain risks which cannot be insured. They are known as uninsurable risks. We cannot predict that when fashion will change or when new invention will come or when will war outbreak etc. There are unforeseeable changes and hence in value risks which cannot be insured payments made for these uninsurable risks are called 'profits'.

Dynamic Theory of Profit

Mr. J.B. Clark introduced this theory. According to Clark, the pure profit in a dynamic society is the residual income of the owner after making all payments including rent, wages interest and salary of management. Such pure profit in the form of residual earning result only in a dynamic society where the changes in population, changes in the stock of capital, changes in tastes or fashions, changes in production techniques and changes in management principles etc. occur dynamically. In a static society since there are no such changes, no pure profit may result. Thus pure profit is a sign of progress. Thus to increase profit an owner may produce a new commodity, popularize it and earn large profit and soon competition sets in; the profit decline. Thus in maintaining pure profits high continues progress is essential.

Rent Theory of Profit

This theory was introduced by Walker, who considered profit as a form of rent. He says that owner earns profit in the same way as land earns rent.

Marshall has criticized theory for the following reasons:

- a. Whereas rent on land is in the form of surplus earnings, profit is not.
- b. Land may produce zero or positive, zero or negative rent whereas net profit may be positive, zero or negative.

Starting an Organization

Important steps involved in planning a new enterprise are discussed here under:

Product Analysis and Market Survey

As we know that it is the customer who keeps a business going, therefore it is most important for entrepreneur to carry out analysis of the product and its market to know the view point of the customer. Consumer preferences, his expectation and his needs are analyzed so as to ascertain the 'stability' of the proposed product. Proper share should be given to the design aspect as it has an important role on marketability. The design should be economical, aesthetical, and should be able to meet expectations of the customers. New enterprise should in initial stage concentrate on the manufacture of one or a limited range of products, other varieties can be added thereafter.

In market survey information's should be collected about existing competitors, suppliers, customers, financial and manpower requirements. Market survey can be conducted to know about; raw material and manufacturing equipment, extent of competition in the market, to know about traders and distributors, Geographical locations of distributors and customers, type of customers, and information about manpower and finances. It is also necessary to know whether the demand is seasonal (Air conditioners, water coolers etc.), repeat sale (soap, toothpaste etc.) or a durable article like T.V., V.C.R., a watch, or a refrigerator.

Determine Size of the Enterprise

This size or capacity of the enterprise to be started is very important while planning for new industry. The size should be based on judicious sales estimates. While fixing the size, due consideration should be given to technical managerial, marketing, and financial aspects.

Location of the Industry

Utmost care must be exercised while selecting the area of the proposed industry and to the selection of a specific site, as mistakes of location are very difficult and expensive to rectify. Therefore, location is decided in a systematic and well planned manner. Location is decided in two stages, namely (i) selecting an area (ii) selecting exact site. Location of the enterprise is decided by considering: availability of raw material, nearness to the market, availability of labor, facilities of transport and its cost, availability of power, labor relations in the area, working climate, availability of land, government and facilities.

Exact location is decided based on availability of land, water, power, road, bank, colony etc. while factory layout is designed in such a way that it helps in achieving: maximizing utilization of floor area, smooth flow of material (raw as well as finished), minimum movement of men and material minimizing accidental charges, provides better working condition, and flexibility for future expansion.

Selection of Equipment

Next step an entrepreneur is to decide about the manufacturing process and the machineries to be used for the manufacture. Process and equipment selection depends upon volume of production requires automatic, specialized and complicated machineries. He has to select equipment out of large variety or range of available equipment. Layout plan is drawn after deciding the equipments and the process of manufacture and the space availability. The layout should be such that it helps in achieving efficient production with minimum delays, minimum movement of material and least cost.

Financial Planning

Success of an enterprise depends upon technical planning (as discussed in earlier paragraphs) as well as financial planning. Without proper financial planning industry may fail even if sound technical planning is done. Financial planning involves:

- (i) Correct estimation of funds requirements.
- (ii) How much loan shall be required, and what will be the source of finance?
- (iii) What will be the interest of finance and what will be there terms and conditions?
- (iv) Estimation of profits in relation to investment.
- (v) What are the financial incentives available from the Government?

Organization Structure

For the success of the enterprise, it is necessary to have proper organization structure. Depending upon the size of the concern, functions involved and quantum of work, departments with sufficient manpower of right quality are constituted. The level, span of control, chain of command, and interrelation must be properly defined. Selection of manpower should be done according to these parameters *i.e.* job specifications.

Project Report

A project report also known as feasibility report is a written account of various activities proposed to be taken up by the enterprise, and their technical, financial, commercial and social viabilities. Thus the project report, after giving systematic and critical analysis states as to whether the project is physically possible, financially viable, commercially profitable and socially desirable.

Project report gives detailed project planning including financial resource planning, optimum utilization of resources, planning of scientific managerial system, marketing system, selection of technology and arranging technical know-how.

A project report generally covers following points in detail in addition to other relevant details:

- (i) Site and exact location of the project, after discussing few good alternatives.
- (ii) Details of the products proposed to be manufactured.
- (iii) Market demand of the product, and proposed production capacity.
- (iv) Space area needed.
- (v) Floor area required, whether it should be constructed or hired or renovated after purchasing accommodation.

- (vi) Types of number of machinery required.
- (vii) Manufacturing process.
- (viii) Arranging technical know-how.
- (ix) Requirement of raw material.
- (x) Requirement of power and water and their availability.
- (xi) Cost of production.
- (xii) Funds requirements, Loan to be arranged.
- (xiii) Sources of finance.
- (xiv) Cash flow position *i.e.* pattern of financing.
- (xv) Profitability analysis.
- (xvi) Plan for future expansion.
- (xvii) Organization structure, description of job specification.
- (xviii) Social considerations.
- (xix) Environmental considerations.
- (xx) Details of facilities available from Government.