

Module 5

ESTIMATING & COSTING: Components of costs such as Direct Material Cost, Direct Labour Cost, Fixed, Over – Heads, Factory Costs, Administrative – Over Heads, First Cost, Marginal Cost, Selling price

Need for Estimating and Costing

1. For determining the cost of production: Estimating and costing provides reliable data regarding expenditure on materials, wages and other things which helps in determining the cost of production precisely.
2. For controlling the costs: It provides the cost for each product, process, job, department etc., which helps in identifying profitable and non-profitable areas in the organization. This guides the management to take corrective measures of their non -profitable activities. It helps in reducing the total manufacturing cost. It helps to reduce material wastages and control labour wages.
3. For fixing selling price: Costing provides information for fixing the selling price of the product. The cost and volume of production, profit and break-even analysis serves as a basis for determining the selling price of the product.
4. For preparing the quotations and submitting tenders: A quotation is the information regarding the selling price of a product or service offered to a prospective buyer. A tender is the information regarding the selling price given to a prospective buyer, but given in a sealed envelope. The principles of costing help immensely in preparing quotations and submitting tenders.

Objectives of Cost Accounting

The main objectives of cost accounting can be summarized as follows:-

1. **Ascertaining Costs:** - The first and foremost objective of cost accounting is to find out cost of a product, process or service. The other objectives which have been mentioned hereafter can be achieved only when the costs have been ascertained.
2. **Determining Selling Price:** - Business enterprises are run on a profit – making basis. It is thus necessary that the revenue should be greater than the costs incurred in producing goods and services from which the revenue is to be derived. Cost accounting provides information regarding the cost to make and sell such products or services.

3. **Measuring and Increasing Efficiency:** - Cost accounting involves a study of the various operations used in manufacturing a product or providing a services. The study facilitates measuring of the efficiency of the organisation as a whole as well as of the departments besides devising means of increasing the efficiency.
4. **Cost Control and Cost Reduction:** - Cost accounting assists in cost control it uses techniques such as budgetary control, standard costing etc. for controlling costs. Budgets are prepared will in advance. The standards for each item of cost are determined, the actual costs are compared with the standard costs and variances are found out as to their causes. This greatly increases the operating efficiency of the enterprise. Besides it, cost is required to be reduced also constant research and development activities help in reduction of costs without compromising with the quality of goods or services.
5. **Cost Management:** - The term 'Cost Management' includes the activities of managers in short-run and long-run planning and control of costs. Cost management

has a broad focus. It includes both cost control and lost reduction. As a matter of fact cost management is often invariably linked with revenue and profit planning. For instance, to enhance revenue and profits, the management often deliberately incurs additional costs for advertising and product modifications.

6. **Ascertaining Profits:** - Cost accounting also aims at ascertaining the profits of each and every activity. It produces statements at such intervals as the management may require. The financial statements prepared under financial accounting, generally once a year or half – year, are spaced too far apart in time to meet the needs of the management. In order to operate the business at a high level of efficiency, it is essential for the management to have a frequent review of production, sales and operating results. Cost accounting provides daily, weekly or monthly volumes of units produced, accumulated costs together with appropriate analysis so that quantum of profit and profitability is known.
7. **Providing Basis for Managerial Decision – Making:** - Costs accounting helps the management in formulation operative policies. These policies may relate to any of the following matters:-
 - (i) Determination of cost – volume – profit relationship.
 - (ii) Shutting down or operating at a loss.

- (iii) Making or buying from outside supplies.
- (iv) Continuing with the existing plant and machinery or replacing them by improved and economical means.

6.4 Elements of costing

There are three broad elements of cost:-

- (a) Material
- (b) Labour
- (c) Expenses
- (a) **Material:** - The substance from which the product is made is known as material. It may be in a raw or a manufactured state. It can be direct as well as indirect.

Direct Material: - All material which becomes an integral part of the finished product and which can be conveniently assigned to specific physical units is termed as “Direct Material”.

Following are some of the examples of direct material:-

- (i) All material or components specifically purchased produced or requisitioned from stores.
- (ii) Primary packing material (e.g. – cartoon, wrapping, cardboard, boxes etc.)
- (iii) Purchased or partly produced components.

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

Indirect Material: - All material which is used for purposes ancillary to the business and which cannot be conveniently assigned to specific physical units is termed as “Indirect Material”.

Consumable stores, oil and waste, printing and stationery etc. are a few examples of indirect material

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

- (b) **Labour:** - For conversion of materials into finished goods, human effort is needed such human effort is called labour. Labour can be direct as well as indirect.

Direct labour: - Labour which takes an active and direct part in the production of a particular commodity is called labour. Direct labour costs are, therefore specially and conveniently traceable to specific products.

Direct labour is also described as process labour, productive labour, operating labour, manufacturing labour, direct wages etc.

Indirect labour:- labour employed for the purpose of carrying out tasks incidental to goods or services provided, is indirect labour such labour does not alter the construction, composition or condition of the product. It cannot be practically traced to specific units of output wages of store – keepers, foreman, time – keepers, directors, fees, salaries of salesmen, etc. are all examples of indirect labour costs.

Indirect labour may relate to the factory the office or the selling and distribution division.

(c) Expenses: - Expenses may be direct or indirect.

Direct expenses: - These are expenses which can be directly, conveniently and wholly allocated to specific cost centers or cost units. Examples of such expenses are: hire of some special machinery required for a particular contract, cost of defective work incurred in connection with a particular job or contract etc.

Direct expenses are sometimes also described as “chargeable expenses”.

Indirect expenses:- these are expenses which cannot be directly, conveniently and wholly allocated to cost centers or cost units.

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

Indirect expenses may be classified under the following three categories:-

(a) Manufacturing (works, factory or production) expenses:-

Such indirect expenses which are incurred in the factory and concerned with the running of the factory or plant are known as manufacturing expenses. Expenses relating to production management and administration are included there in. Following are a few items of such expenses:

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

(b) Office and Administrative expenses

These expenses are not related to factory but they pertain to the management and administration of business such expenses are incurred on the direction and control of an undertaking example are :- office rent, lighting and heating, postage and

telegrams, telephones and other charges; depreciation of office building, furniture and equipment, bank charges, legal charges, audit fee etc.

(c) Selling and Distribution Expenses:-

Expenses incurred for marketing of a commodity, for securing orders for the articles, dispatching goods sold, and for making efforts to find and retain customers are called selling and distribution expenses examples are:-

Advertisement expenses cost of preparing tenders, traveling expenses, bad debts, collection charges etc.

Warehouse charges packing and loading charges, carriage outwards, etc.

The above classification of different elements of cost can be presented in the form of the following chart(figure 6.1)

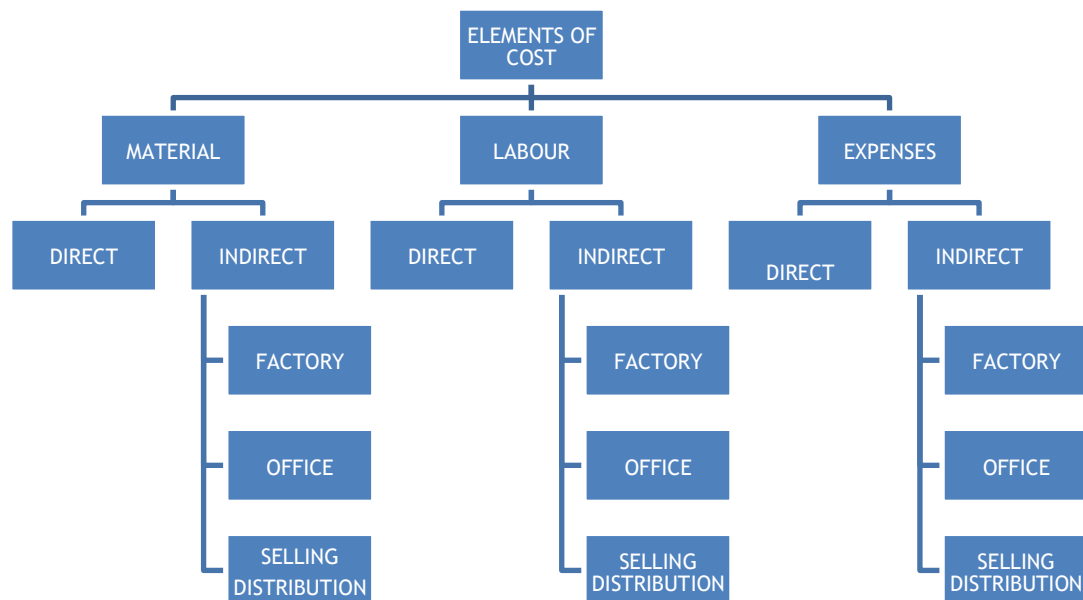


Figure 6.1 : Elements of cost

OR

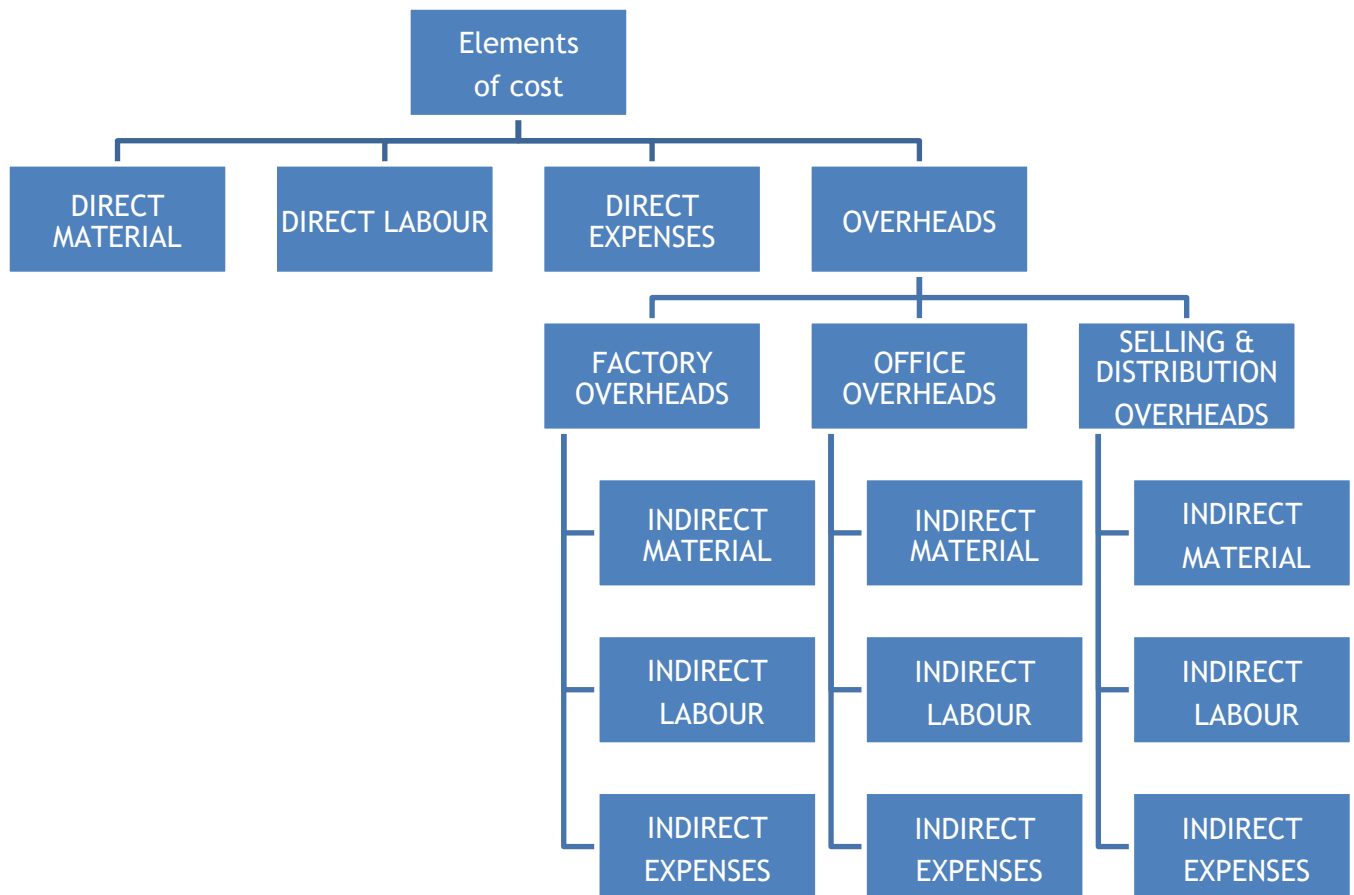


Figure:6.2. Elements of cost

Methods of Costing

The methods of costing are as follows.

- a. Job costing
- b. Process costing
- c. Marginal costing
- d. Batch costing
- e. Single output costing

Job costing refers to a system of costing in which costs are ascertained in terms of specific jobs or orders which are not comparable with each other. Industries where this method of costing is generally applied are printing press, automobile garage, repair shop, ship-building, house building, engine and machine construction, etc.

Process Costing- Where a product passes through distinct stages or processes, the output of one process being the input of the subsequent process, it is frequently desired to

ascertain the cost of each stage or process of production. This is known as process costing. This method is used where it is difficult to trace the item of prime cost to a particular order because its identity is lost in volume of continuous production. Process costing is generally adopted in textile industries, chemical industries, oil refineries, soap manufacturing, paper manufacturing, tanneries, etc.

Single output costing is used where a single article is produced or service is rendered by continuous manufacturing activity. The cost of whole production-cycle is ascertained as a process or series of processes and the cost per unit is arrived at by dividing the total cost by the number of units produced. The unit of costing is chosen according to the nature of the product. Cost statements or cost sheets are prepared under which various items of expenses are classified and the total expenditure is divided by total quantity produced in order to arrive at unit cost of production. This method is suitable in industries like brick-making, collieries, flour mills, cement manufacturing, etc. This method is useful for the assembly department in a factory producing a mechanical article e.g., bicycle.

Preparation of Cost Sheet (Job Costing)

Problem 1: Calculate prime cost from the following information:-

Opening stock of raw material = Rs. 12,500

Purchased raw material = Rs. 75,000

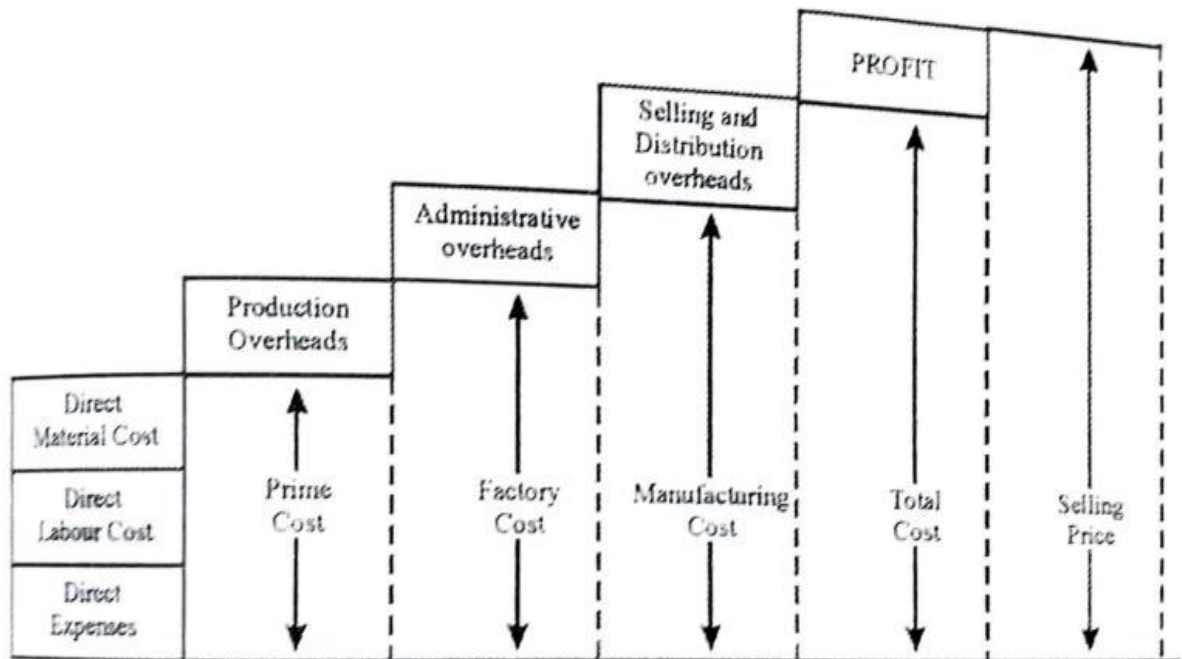
Expenses incurred on raw material = Rs. 5,000

Closing stock of raw material = Rs. 22,500

Wages Rs. 47,600 Direct expenses Rs. 23,400

Determination of selling price

- 1) prime cost= direct material cost+ direct labour cost+ direct expenses
- 2) factory cost= prime cost+ production or factory overheads
- 3) manufacturing cost= factory cost+ administrative overheads
- 4) total cost= manufacturing cost+ selling and distribution overheads
- 5) selling price= total cost+ profit
- 6) marginal cost= increase in costs for unit increase in production.



Solution: - Calculation of raw material consumed:-

Raw material consumed = Opening stock of material + purchases of Raw material + expenses incurred on raw material - closing stock of raw material

$$= \text{Rs } 12,500 + \text{Rs } 75,000 + \text{Rs } 5,000 - \text{Rs } 22,500$$

$$= \text{Rs. } 92,500 - \text{Rs } 22,500$$

$$= \text{Rs. } 70,000$$

Prime cost = Raw material consumed + Direct labour + Direct expenses

$$= \text{Rs } 70,000 + \text{Rs } 47,600 + \text{Rs } 23,400$$

$$= \text{Rs } 1,41,000$$

It can be shown in a cost sheet as follows

Particular	Details (Rs)	Amount (Rs)
Opening stock of raw material	12,500	
Add:- Purchase	7,500	
Add:- Expenses incurred on purchases	5,000	

Raw material available	92,500	
Less :- closing stock of raw material	22,500	

Raw material consumed		70,000
Add:- Direct wages or labour		47,600
Add:- Direct expenses		23,400

Prime cost		1,41,000

Problem 2:

Calculate works cost or factory cost from the following details:-

Raw material consumed = Rs 50,000

Direct wages = Rs 20,000

Direct expenses = Rs 10,000

Factory expenses 80% of direct wages

Opening stock of work in progress = Rs 15,000

Closing stock of work in progress = Rs 21,000

Solution: - Calculation of factory cost

Particular	Amount (Rs)	Amount (Rs)
Direct material consumed	50,000	
Add:- Direct wages	20,000	
Add:- Direct Expenses	10,000	

Prime cost		80,000
Add:- Factory expenses		16,000

Current manufacturing cost		96,000
Add:- Opening stock of work in progress		15,000

Total goods processed during the period		1,11,000
Less:- Closing sock of work in progress		21,000

Factory cost or work cost		90,000
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Problem 3: Calculate cost of production from the following information:-

Raw material purchased = Rs 42,500

Freight paid (Transportation) = Rs 5,000

Labour charges = Rs 12,500

Direct expenses = Rs 10,000

Factory overhead 80% of Direct labour charges

Administrative overhead = 10% of work cost

	Opening stock	Closing
stock		
Raw material	8,000	10,000
Work in progress	7,500	9,000

Solution: - Calculation of cost of production:-

Particular	Amount (Rs)	Amount (Rs)
Material purchased	42,500	
Add:- freight	5,000	

Total cost of material purchased	47,500	
Add:- Opening stock of Raw material	8,000	

Material available for consumption	55,500	
Less:- Closing stock of Raw material	10,000	

Raw material consumed	45,500	

Add:- Direct labour charges	12,500	
Add:- Direct expenses	10,000	
Prime cost		68,000
Add:- Factory overhead		10,000

Current manufacturing cost		78,000
Add:- Opening stock of work in progress		7,500

Total goods processed during the period		85,500
Less:- Closing stock of work in progress		9,000

Factory cost		76,500
Add:- Administrative overhead		7,650

Cost of production		84,150

2. Determine the selling price of a gear wheel from the following data

- i) No. of gear wheels produced 200
- ii) Labour cost Rs. 2500
- iii) Material cost Rs. 3800
- iv) Factory overheads 40% of Direct cost
- v) Administrative and selling overheads 25% of factory cost
- vi) Profit 30% of total cost

(April, 99', Bangalore University)

Solution.

$$\begin{aligned}\text{Selling Price} &= \text{Prime cost} + \text{Production overhead} \\ &\quad + \text{Administration overhead} + \text{Selling overhead} + \text{Profit}\end{aligned}$$

Also

- i) Direct costs = Prime cost
- ii) Factory cost = Prime cost + Production overhead
- iii) Total cost = Factory cost + Administrative overheads + Selling overheads
- i) Prime costs = 2500 + 3800
- or Direct cost = 6300

$$\text{ii) Factory cost} = \text{Prime cost} + 0.4 \times \text{Prime cost} \\ = 6300 + 0.4 \times 6300 = 8820$$

$$\text{iii) Total cost} = \text{Factory cost} + 0.25 \times \text{Factory cost} \\ = 8820 + 0.25 \times 8820 = 11025$$

$$\text{Selling price} = \text{Total cost} + \text{profit}$$

$$\text{Selling price} = 11025 + 0.30 \times 11025$$

$$\text{Selling price for 200 gears} = 14332.50$$

$$\therefore \text{Selling price of 1 gear} = \text{Rs. } 71.66$$

Here manufacturing cost is not considered.

Here

3. 'Pizza corner' employed 75 workers in a particular month to work in the outlets as well for home delivery. The following are the details of expenditure.

- i) Cost of material = Rs. 80,000
- ii) Rate of wages for each workers = Rs. 20 per hour of normal duty, Rs. 40 per hour of overtime duty.
- iii) Man hours per day of normal duty = 8 hours
- iv) No. of holidays per month (without wages) = 5 days
- v) Total overhead expenses = Rs. 20,000
- vi) Total overtime availed by workers = 200 hours
- vii) Profit = 20% of Total cost

Determine

- i) Total cost for the month
- ii) Profit for the month
- iii) Man hour rate of overheads

Solution.

$$\text{i) Total cost} = \text{Direct labour cost} + \text{Direct material cost} + \text{Direct expenses} \\ + \text{Total overhead expenses}$$

$$\text{Direct labour cost} = \text{Cost of Labour during normal working hours} \\ + \text{cost of labour in overtime}$$

$$= 20 \times 8(30 - 5) 75 + 200 \times 40 \\ = \text{Rs. } 3,08,000$$

$$\text{Total cost} = 3,08,000 + 20,000 = 328000$$

$$\text{ii) Profit} = 0.20 \times 328000 \\ = \text{Rs. } 65,600/-$$

$$\text{iii) Man hour rate overheads} = \frac{\text{Total overhead costs for the month}}{\text{No. of man hours for the month}}$$

$$\text{Man hour Rate} = \frac{20000}{75 \times 8(30 - 5) + 200}$$

$$\therefore \text{Man Hour Rate} = \text{Rs. } 6.25$$

4. Find the factory cost of a forge hammer made from solid cast Iron press of circular cross section of 30 cm dia and 160 cm length. The casting and machining time taken to make the press is 150 minutes and the labour rate is Rs. 22 per hour. Factory overheads are 40% of direct labour cost. The density of the material is 6.8 gm/cm³ and the cost of the material is Rs. 12/kg.

Solution.

$$\text{Density of CI} = 6.8 \text{ gm / cm}^3 = 0.0068 \text{ kg/cc}$$

$$\text{Weight of Iron press} = \text{volume} \times \text{density}$$

$$= \frac{\pi d^2}{4} \times L \times \rho$$

$$= \frac{\pi \times 30^2}{4} \times 160 \times 0.0068$$

$$\text{Weight of cast Iron} = 51.27 \text{ kg}$$

$$\text{Cost of material} = \text{weight of CI} \times \text{cost of CI per kg}$$

$$= 51.27 \times 12$$

$$= \text{Rs. } 615.25$$

$$\text{Labour cost} = \text{No. of hours worked} \times \text{labour rate per hour}$$

$$= 150 \text{ Minutes} \times 60 \text{ per hour}$$

$$= 2.5 \times 60$$

$$= \text{Rs. } 150$$

$$\text{Factory overheads} = 0.4 \times 150$$

$$= \text{Rs. } 60$$

$$\text{Factory cost} = \text{Material cost} + \text{Labour cost} + \text{Factory overheads}$$

$$= 615.25 + 150 + 60$$

$$\text{Factory cost of CI press} = \text{Rs. } 825.25$$

5. A factory manufactures steel bolts and nuts whose cost estimates are made on the basis of lots of 2000 nuts and bolts as shown below.

i) Direct material cost

Rs. 1000

ii) Direct labour cost

(a) Forging shop	
Cutting to length	Rs. 40
Setting up	Rs. 150
(b) Machine shop	
Milling heads	Rs. 150
Threading	Rs. 90
Drilling	Rs. 75
Chamfering	Rs. 55
iii) Direct Expenses	
Cost of Tools	Rs. 110
Jigs & Fixtures	Rs. 150
iv) On costs	
(a) Forging shop	120% of labour cost
(b) Machine shop	100% of labour cost
(c) Office establishment	20% of factory cost
(d) Packing and transporting	Rs. 120

If the selling price of each nut and bolt is Rs. 2.50 determine whether the factory is making a profit or loss. If so by what amount per piece.

Solution.

Prime cost = Direct material cost + Direct labour cost
+ Direct expenses

$$\therefore \text{Prime cost} = 1000 + [40 + 150 + 150 + 90 + 75 + 55] \\ + [110 \text{ (for 2000 nuts \& bolts)} + 150 + 1000 + 560 + 260]$$

$$\text{Prime cost} = 1820$$

$$\begin{aligned} \text{Factory costs} &= \text{Prime cost} + \text{Factory overheads} \\ &= 1820 + \text{Forging shop overheads} + \text{Machine shop overheads} \\ &= 1820 + [1.2 \times 560 + 1 \times 560] \\ &= 3500 \end{aligned}$$

$$\begin{aligned} \text{Manufacturing cost} &= \text{Factory cost} + \text{Administrative overheads} \\ &= 3500 + 0.2 \times 3500 \\ &= 4200 \end{aligned}$$

$$\begin{aligned}\text{Total cost} &= \text{Manufacturing cost} + \text{Selling overheads} \\ &= 4200 + 120\end{aligned}$$

$$\text{Total cost} = 4320$$

(for 2000 nuts & bolts)

$$\begin{aligned}\text{Selling price of 2000 Nuts \& bolts} &= 2.5 \times 2000 \\ &= 5000\end{aligned}$$

$$\begin{aligned}\text{Profit} &= \text{Selling price} - \text{Factory cost} \\ &= 5000 - 4320\end{aligned}$$

Profit = Rs. 680/-

Therefore profit is made by the factory on each lot of 2000 nuts and bolts and is Rs. 680/-

6. The catalogue price of a washing machine is Rs. 7500 and the commission allowed to the proprietor of the showroom is 20%. The administrative and the selling expenses are 60% of the factory cost and the material cost, labour cost and factory overheads are in the ratio of 2 : 3 : 1. If the cost of the labour on the manufacture of machine is Rs. 1650, determine the profit on each washing machine.

Solution.

Catalogue price of each washing machine = Rs. 9000.

If commission earned by distributor is 20%, the selling price of the machine to the distributor = $9000 - 0.2 \times 9000 = 7200/-$

Direct Material cost : Direct Labour cost : Factory overheads

2 : 3 : 1

If Direct labour cost Rs. 1650

$$\text{Direct Material cost} = \frac{1650}{3} \times 2 = 1100$$

$$\text{Factory overhead} = \frac{1650}{3} \times 1 = 550$$

Factory cost = Prime cost + Factory overheads

$$= 1650 + 1100 + 550$$

$$= 3300$$

$$\begin{aligned}
 \text{Total cost of each machine} &= \text{Factory cost} + \text{Administrative and selling overheads} \\
 &= 3300 + 0.6 \times 3300 \\
 &= 5280
 \end{aligned}$$

$$\begin{aligned}
 \text{Therefore profit on each washing machine} \\
 &= \text{Selling price} - \text{Total cost} \\
 &= 7500 - 5280
 \end{aligned}$$

Profit = Rs. 2200/-

7. A company produces 30,000 units per annum. The various cost components are as follows :

Direct materials Rs. 6/- per unit

Direct labor Rs. 5/- per unit

Fixed overheads Rs. 60,000

Variable overheads Rs. 2.50 per unit

Prepare the fixed budget for the above.

(VTU Jan'06)

Solution.

Given : No. of units = 30,000

Direct materials = Rs. 6/unit

Direct labor = Rs. 5/unit

Fixed overheads = Rs. 60,000

Variable overheads = Rs. 2.50/unit

Total Costs = ?

Note : To prepare fixed budget is to find the total expenses to be incurred in producing all the units required.

Total costs = Direct material cost + Direct labor cost + Fixed overheads + Total variable overheads

$$= 6 \times 30000 + 5 \times 30000 + 60000 + 2.50 \times 30000$$

$$\therefore \text{Total costs} = 465000$$

$$\text{Total cost / unit} = \frac{465000}{30000} = \text{Rs. } 15.50 / \text{unit}$$

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