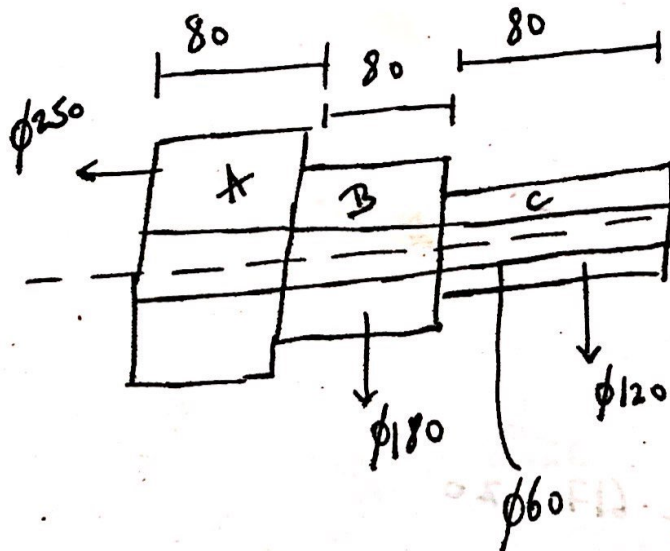


Estimation of Material Cost!



$$Wt = \rho \times V.$$



$$\rho = 7.009 \text{ g/cc.}$$

$$A = \frac{\pi d^2}{4}$$

$$V = A \times l$$

$$\frac{\pi (250)^2}{4} \times 80 = 3.927 \times 10^6 \text{ mm}^3$$

$$= 3,927 \text{ cm}^3.$$

Volume of B

$$V_B = \frac{\pi (180)^2}{4} \times 80$$

$$= 2,036 \text{ cm}^3.$$

$$\text{Volume of C} = \frac{\pi (120)^2}{4} \times 80$$

$$= 904.7 \text{ cm}^3$$

$$V_D = 678.6 \text{ cm}^3.$$

COSTING

The term 'cost' means the amount of expenses [actual or notional] incurred on or attributable to specified thing or activity.

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

To get the results we make efforts. Efforts constitute cost of getting the results. It can be expressed in terms of money; it means the amount of expenses incurred on or attributable to some specific thing or activity. The term cost is used in this very form. In reference to production/manufacturing of goods and services cost refers to sum total of the value of resources used like raw material and labour and expenses incurred in producing or manufacturing of given quantity.

ESTIMATION

It is the assessment of the total cost in manufacturing a product even before it is manufactured. One must have a sound knowledge of material, labour, processing costs, quality and quantity of material required, selection of manufacturing method, manufacturing time required, etc. in order to do a proper estimation. The engineer must be able to state the probable cost at the stage when only sketch plans are drawn. If the available funds are known, the designer has to work backwards i.e. will have to design the building/product which may be constructed within the available sum.

Proposal A:-

Land Cost + Building + Compression

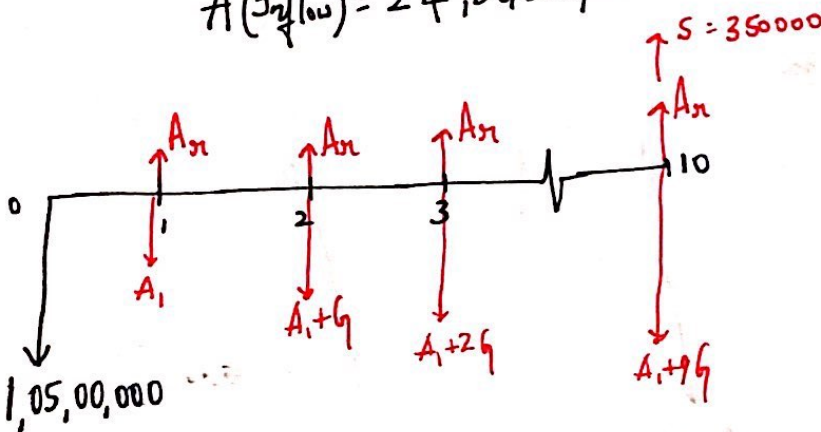
$$\text{Initial Cost } P = 35,00,000 + 60,00,000 + 10,00,000 = 1,05,00,000/-$$

$$\text{Annual Cost} = 2,00,000 + 6,50,000 = 8,50,000 \rightarrow A_1$$

$$\begin{aligned} A \text{ increases by } 30,000 \\ G = 30,000/- \\ S = 3,50,000/- \end{aligned}$$

Solving for $t = 1$.

$$A(\text{in } 10) = 24,80,000/-$$



$$AEW(\text{Proposal A}) = AE(\text{all rev}) - AE(\text{all Cost})$$

$$= \left[S \cdot \left(\frac{A}{F} \cdot 10\% \cdot 10 \right) + 24,80,000 \right] - \left[\left[A_1 + G \left(\frac{A}{G} \cdot 10\% \cdot 10 \right) + P \cdot \left[\frac{A}{P} \cdot 10\% \cdot 10 \right] \right] \right]$$

$$= \left[3,50,000 (0.0627) + 24,80,000 \right] - \left[8,50,000 + 30,000 (3.7255) + 1,05,00,000 (0.1627) \right]$$

$$AEW(\text{Prop A}) = -1,68,170/-$$

EAW (B) :-

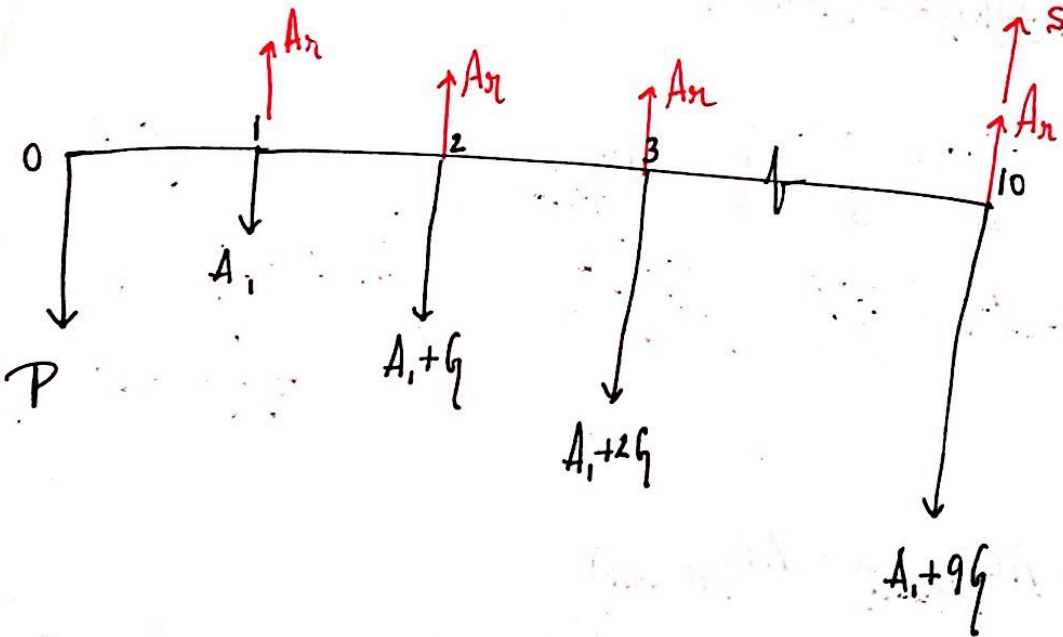
$$P = 35,00,000 + 70,00,000 + 13,50,000 = 1,18,50,000/-$$

$$A_1 = 1,50,000 + 4,80,000 = 6,30,000$$

$$G = 20,000$$

$$A_7 = 24,80,000$$

$$S = 4,30,000/-$$



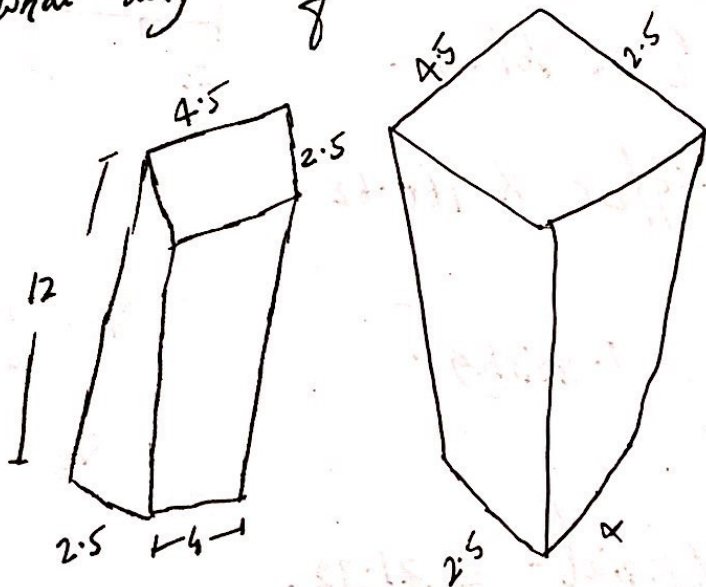
$$EAW(B) = EAW(a) - EAW(c)$$

$$\left[24,80,000 + 4,30,000 \left(\frac{A}{P} 10\% \cdot 10 \right) \right] - \left[(A_1 + G \left(\frac{A}{G} 10\% \cdot 10 \right) + P \cdot \left(\frac{A}{P} 10\% \cdot 10 \right) \right]$$

$$= 24,80,000 + 4,30,000 (0.0627) - \left[63000 + 20000 (3.7255) + 1,18,50,000 (0.0627) \right]$$

$$= -1,25,544/-$$

An Iron wedge is made by forging out a 3cm dia round bar. The length & breadth of wedge is 4.5cm and 2.5cm respectively. The length & breadth of other end of wedge is 4 & 2.5cm. The height of wedge is 12cm. If density of material is unchanged after forging what length of bar is required to make wedge.



$$\text{Volume} = \frac{h}{3} [a_1 + a_2 + \sqrt{a_1 a_2}]$$

$$= \frac{12}{3} [(4.5 \times 2.5) + (4 \times 2.5) + \sqrt{(4.5 \times 2.5) \times (4 \times 2.5)}]$$

$$V = 127.4 \text{ cc}$$

$$\text{Volume of rod} = \frac{\pi}{4} d^2 \times l$$

$$127.4 = \frac{\pi}{4} \times (3)^2 \times l$$

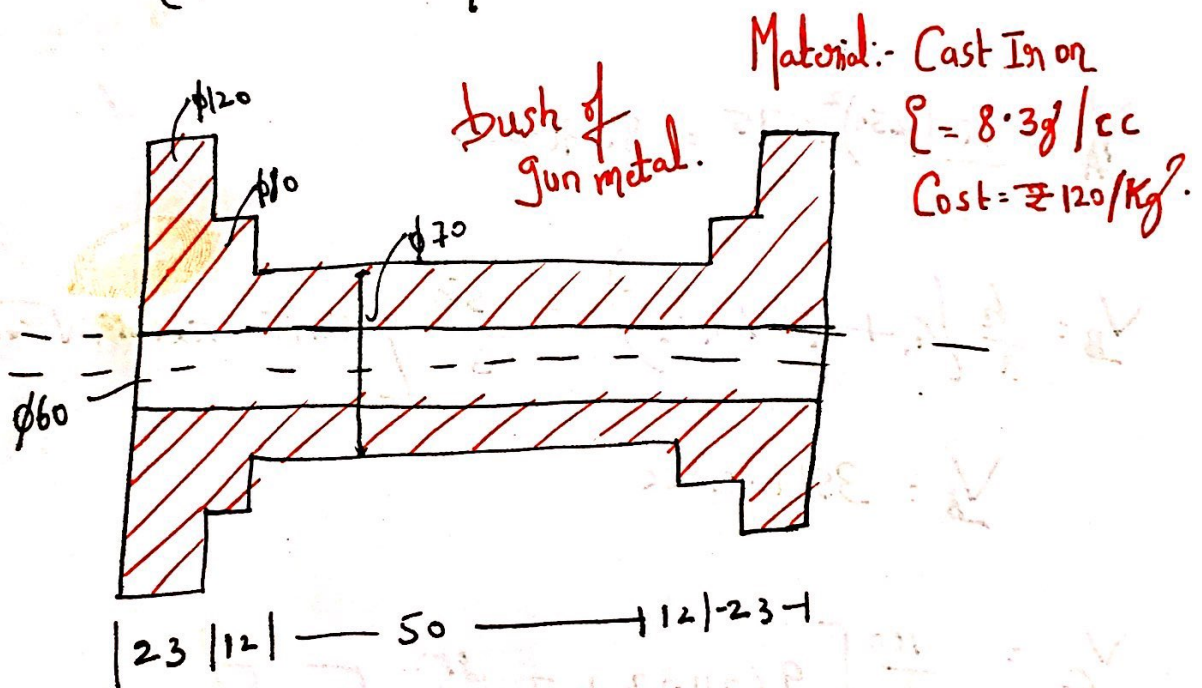
$$l = 18.02 \text{ cm}$$

The following figure shows bush of gun metal

Calculate material cost of 15 gun metal

bushes assuming $\rho = 8.3 \text{ g/cc}$. Cost of material

is $\text{₹} 120/\text{kg}$ (Consider 8% material loss during process).



$$V_T = 477.03 \text{ cc}$$

$$\text{unit} = V \times \rho$$

$$= 477 \times 8.3$$

$$= 3959 \text{ g}$$

$$\underline{3.96 \text{ kg}}$$

8% material loss during production:

$$100 + 8\% = 1 + 0.08 = 1.08$$

∴ 15 gun metal bushes.

$$15 \times 3.96 = 59.4 \text{ kg} \rightarrow \times 1.08$$

$$\text{Total wt + material loss} = 64.152 \text{ kg}$$

Material
Cost.

$$\begin{aligned} & 64.152 \times 120 \\ & = 7698.24/- \end{aligned}$$

3) Find the factory cost of forge hammer made from solid cast iron piece of circular c/s of 30cm dia and 160cm length. Casting & Machining time is 150min & labour cost is ₹60/hr. factory OY 40% of D.L.C. The ρ of material $6.8g/cm^3$ & D.M.C is 12/100.

$$Wt = V \times \rho$$

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

$$51.27 \text{ Kg}$$

$$D.M.C = 51.2 \times 12 = 615.25$$

$$D.L.C = 2.5 \times 60 = 150$$

$$F.OY = 0.4 \times 150 = 60$$

$$F.C = M.C + L.C + F.OY$$

$$615 + 150 + 60 = ₹ 825/-$$

This can also be illustrated by the block diagram Fig 5.2

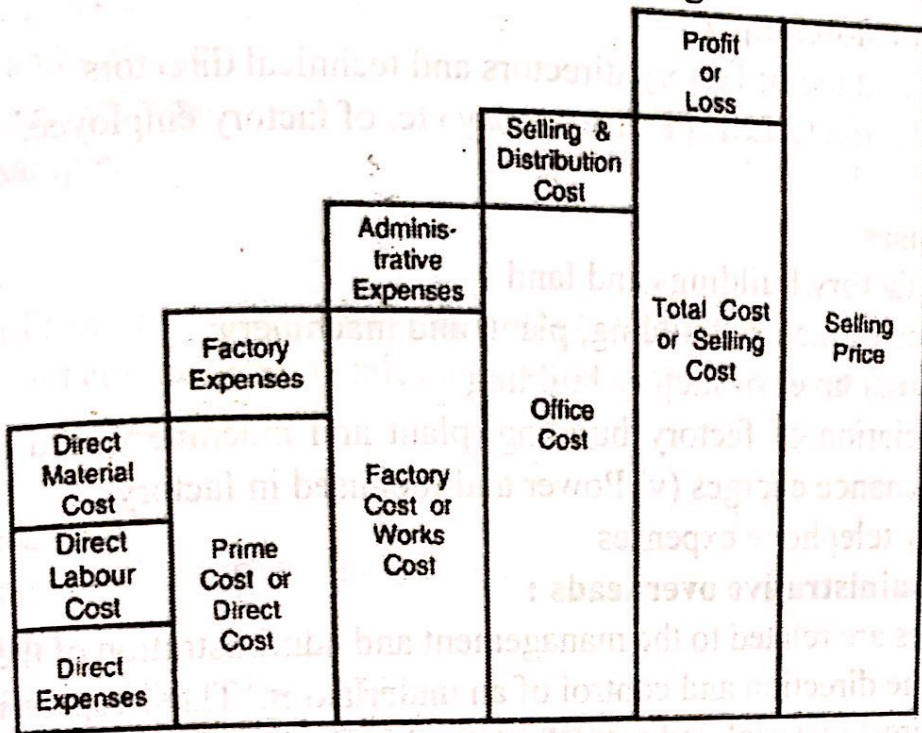


Fig 5.2

5.5 OVERHEADS :

The term overhead has a wider meaning than the term indirect expenses. Overheads include the cost of indirect material, indirect labour and indirect expenses. This is the aggregate sum of indirect material, indirect labour and indirect expenses.

$$\text{Overhead} = \text{Indirect material} + \text{Indirect labour} + \text{Indirect expenses}$$

Overheads are classified into following three categories:

- 1) Factory/works/ production overheads
- 2) Office and administrative overheads
- 3) Selling and distribution overheads

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

a) Indirect materials:

- (i) Grease, oil, lubricants, cotton waste etc.
- (ii) Small tools, brushes for sweeping, sundry supplies etc.
- (iii) Cost of threads, gum, nails, etc.
- (iv) Consumable stores
- (v) Factory printing and stationery

b) Indirect wages