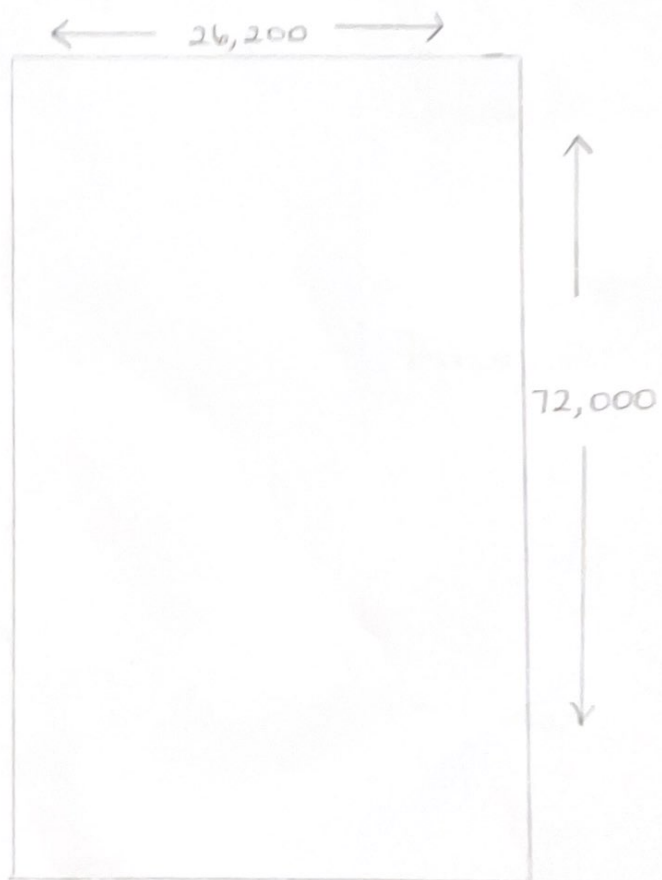
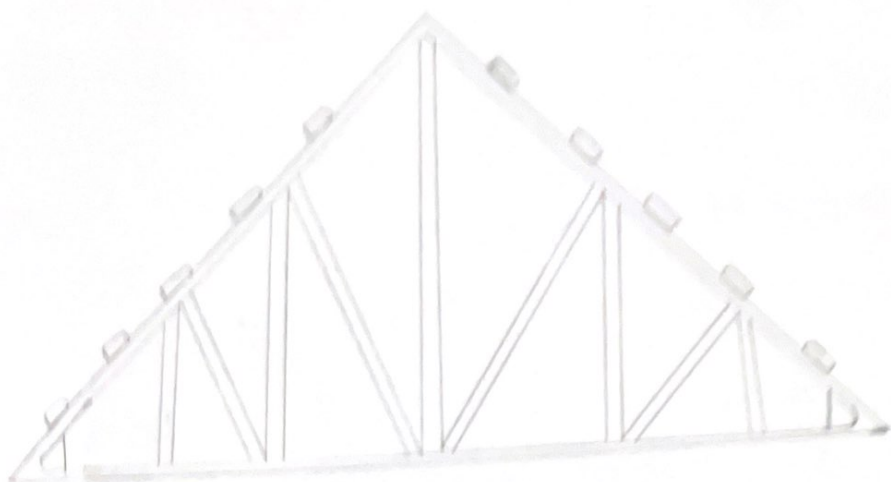




A Roof construction

Wall plate

$$\text{Length } 72,000 + 200 = 74,000$$

$$\text{Width } 26,200 + 200 = 26,400$$

$$\begin{aligned} P &= 2(L+W) \\ &= 2(74,000 + 26,400) \\ &= 200,800 \end{aligned}$$

No of joints

$$\frac{200,800}{6,000} - 1$$

$$= 32.46$$

$$= 33 \text{ Quantity}$$

TRUSSES

$$\text{Length} = 26,200$$

$$\begin{aligned} \text{Walls} &= 200 \times 2 \\ &= 400 \end{aligned}$$

$$\begin{aligned} \text{Eaves} &= 300 \times 2 \\ &= 600 \end{aligned}$$

$$\begin{aligned} \therefore 26,200 + 400 + 600 \\ &= 27,200 \end{aligned}$$

$$\begin{aligned} \frac{1}{2} \text{ Span} &= 27,200 / 2 \\ &= 13,600 \end{aligned}$$

LENGTH OF ROOF

$$\text{Length } 72,000$$

$$\text{Walls } 200 \times 2 = 400$$

$$\text{Eaves } 300 \times 2 = 600$$

$$\begin{aligned} \therefore 72,000 + 400 + 600 \\ &= 73,000 \end{aligned}$$

$$\begin{aligned} \text{Ridge } 73,000 \\ - 27,200 \\ \hline 45,800 \end{aligned}$$

No. of trusses

$$\frac{45,800}{27,200} + 1$$

$$= 2.68 \text{ Say } 3$$

No. of joints in length

$$\frac{45,800}{27,200} - 1$$

$$= 0.68 \text{ Say } 1$$

Common rafters

$$\frac{13,400}{27,200}$$

$$= 0.49 \text{ Say } 1$$

Principle rafter

- H1 - length of rafter
- H2 - length of tie
- H3 - length of strut
- H4 - length of King post

$$H1 = \cos 23 = \frac{\frac{1}{2} \text{ span} + \text{wall} + \text{eave}}{H1}$$

$$\cos 23 = \frac{13600}{H1}$$

$$H1 = \frac{13600}{\cos 23}$$

$$= 14.774$$

$$H2 = \tan 23 = \frac{H2}{\frac{1}{2} 13100}$$

$$H2 = \tan 23 \times 6550$$

$$= 0.176$$

H3

$$\cos 23 = \frac{6550}{H3}$$

$$H3 = \frac{6550}{\cos 23}$$

$$H3 = 7.11566$$

$$H3 = 7.116$$

H4

$$\tan 23 = \frac{H4}{13100}$$

$$H4 = \tan 23 \times 13100$$

$$= 0.364$$

$$\text{Principle rafters} = \text{No of trusses} \times 2 \times \text{length of rafter.}$$

$$= 3 \times 2 \times 14.77$$

$$= 88.62$$

$$\text{Common rafters} = \text{No of trusses} \times 2 \times \text{length of rafter}$$

$$= 1 \times 2 \times 14.77$$

Tie Beam

$\frac{1}{2}$ Span + wall

$$13600 + 200$$

$$= 13800 \times 2$$

$$= 27600$$

No. of Trusses

$$3 \times 27600$$

$$3 \times 27.6 = 82.8 \text{ Say } 83$$

King post = H4

$$= 0.364$$

$$3 \times 0.364$$

$$= 1.092$$

$$2 \times 3 \times 0.18$$

$$2 \times 3 \times 7.17$$

$$= 43.02$$

} ties & struts

No. of purlins

$$\frac{14774}{1000} + 1$$

$$= 15.774 \text{ Say } 16$$

$$2 \times 16 \times 73$$

Length of purlin = 2336

$$\frac{73000}{27200} - 1 = 1.683 \text{ Say } 2$$

$2 \times 16 \times 2 = 16$ Scarfed joints on purlins

$$45.8 = 175\text{mm} \times 25\text{mm} \text{ ridgeboard}$$

Ridgeboard

length of walls & eaves

$$\frac{45.8}{27.2} - 1 = 1$$

1 Scarfed joints on ridgeboard.

Hip rafters



$$C^2 = a^2 + b^2$$

$$C^2 = 37^2 + 136^2$$

$$C^2 = 1369 + 18496$$

$$C^2 = 19865$$

$$C = \sqrt{19865}$$

$$C = 14.023 \text{ — hip rafter length}$$

hip rafter length x 4 hip rafters

$$14.023 \times 4$$

$$= 56.092 \quad 100 \times 50 \text{ mm}$$

Roof apex — upper level = length of triangle

$$11300 - 7600 = 3700$$

$$= 3.7$$

Roof covering

2 x length of rafter

2 x length of purlin

$$2 \times 14.77 \times 23.36$$

$$= 690.054$$

$$4 \times 14.02 = 56.08$$

4 ends of hip cap

Eaves & Verges

$$2(L+W)$$

$$2(73+27.2)$$

$$2(100.2) = 200.4$$

Centreline of eaves boarding

Perimeter of fascia board 200400

deduct 150 on each side of fascia board = 300

300 x 4 corners
= 1200

$$\begin{array}{r} \therefore 200400 \\ - 1200 \\ \hline 199200 \end{array}$$

$$19.92 \times 0.30 = 5.976$$

Bearers

$$\text{Length } 72000 + 400 = 72400$$

$$\text{Width } = 26200 + 400 = 26600$$

$$P = 2(L+W)$$

$$P = 2(72400 + 26600)$$

$$P = 2(99000)$$

$$P = 198000$$

No. of joints

$$\frac{P}{\text{width}} - 1$$

$$\frac{198000}{26600} - 1$$

$$= 6.44 \text{ Say } 7$$

1980 50x50 mm bearers plugged to
wall and prime back of frame 0-100
grth

T = No. of Scarfed joints on bearers

$$\text{Runners} = \frac{19800}{\text{Spacing of runners}} - 1$$

$$= \frac{19800}{2000} - 1$$

$$= 98$$