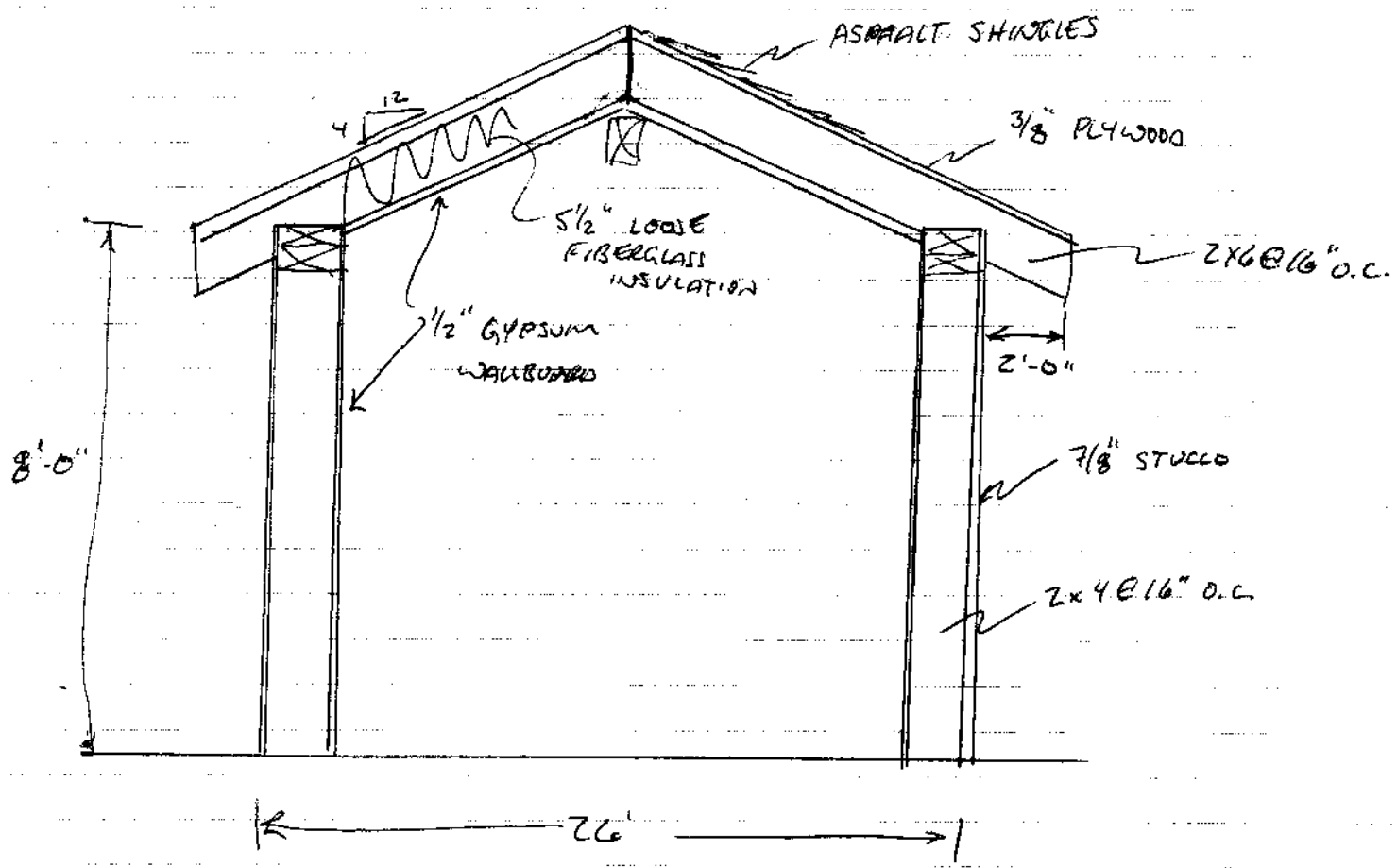


# WOOD DESIGN

- 2.1 GIVEN THE HOUSE FRAMING SHOWN  
 FIND ROOF DEAD LOAD IN PSF ON A HORIZONTAL PLANE  
 WALL D IN PSF OF WALL SURFACE AREA  
 WALL D IN LB/FT  
 BASIC UNIT ROOF LIVE LOAD IN PSF  
 BASIC ROOF LIVE LOAD IF SLOPE IS CHANGED  
 TO 3/12



ROOF DEAD LOAD = MEASURED ON THE SLOPE  
 SLOPE LENGTH =  $15' \frac{(4^2 + 12^2)^{1/2}}{12} = 15.81'$

$2 \times 6 \quad 1.72 \frac{16}{ft^2} \left( \frac{12''}{16''} \right) = 1.29 \text{ lb/ft}^2$

- SHINGLE = 2 psf
- GYPSUM = 2.2 psf
- FIBER  $1.1 \times (5.5) = 6 \text{ psf}$
- SHEATHING  $3/8' \times 3 \text{ psf} = 1.13 \text{ psf}$

12.62

a) TOTAL ROOF DEAD LOAD = ~~12.62~~ → ~~12.62~~ psf ON SLOPE

$$\left(\frac{15.81}{15}\right) \cdot 12.62 \left(\frac{15}{15.81}\right) = \frac{12.62}{1.33} \text{ psf ON HORIZONTAL PLANE}$$

b) 2x4  $1.094 \left(\frac{12}{16}\right) = 0.82 \text{ psf}$

GYP BOARD 2.2 psf

STUCCO  $(125 \text{ lb/ft}^2) \left(\frac{7/8''}{12}\right) = 9 \text{ psf}$

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12 psf OF WALL

c) WALL DEAD AS A LINE LOAD

WALL 12 psf  $(8')^2 = 96 \text{ lb/ft}$

ROOF  $\frac{12.8(15')}{2} = 96 \text{ lb/ft}$

(÷2 BECAUSE 1/2 GOES TO RIDGE BEAM)

HEADERS (2 - 2x4) = 2.2 lb/ft

~~110.2~~ 194.2 lb/ft

d) BASIC UNIT ROOF LIVE LOAD

e)

$R_1 = 1$  FOR EITHER CASE

$R_2 = 1$

∴ ROOF  $L_p = 20 \text{ psf HORIZONTAL PROJ}$   
 $= \frac{20(15)}{15.81} = 19 \text{ psf SLOPED PROJECTION}$

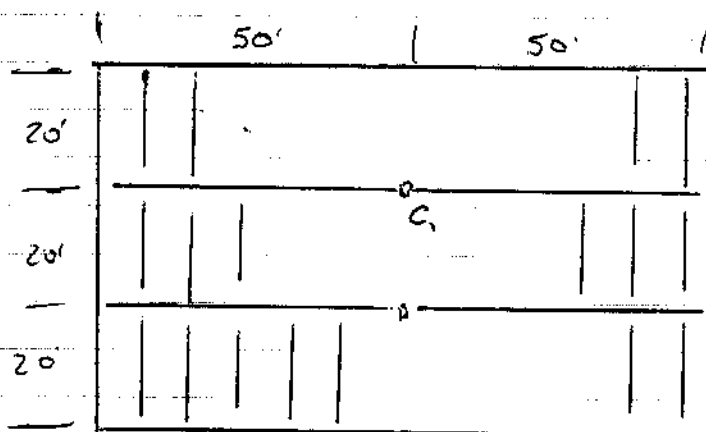
## 2.4 ROOF FRAMING OF INDUSTRIAL BUILDING

FLAT ROOF  $1/4"$  / FT SLOPE

ROOFING 5 PLY - FELT

SHEATHING  $15/32"$  PLYWOODSUBPURLIN  $2 \times 4 @ 24"$ PURLIN  $4 \times 14 @ 8'$  CENTERSGIRDER  $6 \frac{3}{4} \times 33 @ 20'$  CENTER

ASSUME UNIFORM LOADS

LOADS

5-PLY FELT 6 psf

 $15/32$  PLYWOOD  $\frac{15}{32}(3) = 1.4$  psfSUP-P  $2 \times 4 @ 24" = 1.094 \left( \frac{32}{24} \right) = 0.55$  psfPURLIN  $4 \times 14 @ 8' = 9.66 \left( \frac{12}{8} \right) = ~~14~~ 1.21$  psfGIRDER  $6 \frac{3}{4} \times 33 = 222.8 \text{ in}^2 \left( \frac{1}{144} \right) (30 \text{ psf}) = 46.42 \frac{\text{lb}}{\text{ft}} \frac{1 \text{ lb}}{20'} = 2.32 \text{ p/sf}$ TOTAL DEAD = 11.5 lb/ft<sup>2</sup>

b) TRIBUTARY DEAD LOAD TO SUBPURLIN

$$= 6 + 1.4 + 0.55 \text{ psf} = 7.95 \text{ psf}$$

$$\times 2'$$

$$15.9 \text{ lb/ft}$$

c) TRIBUTARY DEAD LOAD TO PURLIN

$$= 7.95 + 1.21 = 9.16 \text{ psf}$$

$$\times 8'$$

$$73.3 \text{ lb/ft}$$

d) TO GIRDER

$$= 9.16 + 2.32 = 11.48 \text{ psf}$$

$$\times 20'$$

$$230 \text{ lb/ft}$$

e) TRIBUTARY DEAD TO COLUMN c<sub>1</sub>

$$11.5 \frac{\text{lb}}{\text{ft}^2} (50')(20') = 11.5 \text{ k}$$

f) ROOF UNIT LIVE LOAD

$$= 20 \text{ psf}$$