

Evaluation of loads Expected on Fire House Bay

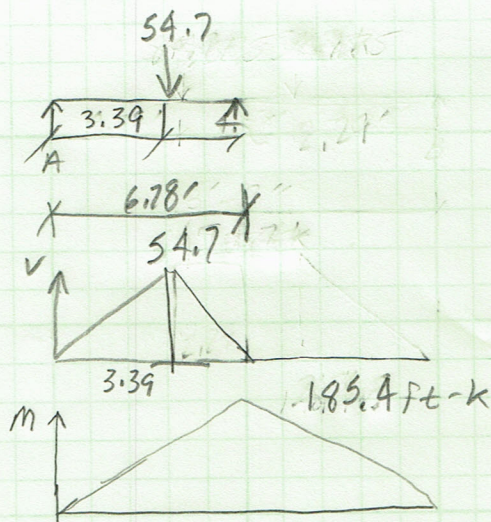
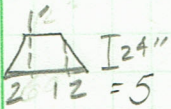
$$31,000 - 12,000 = 19,000$$

Assumptions:

Conventional Slab

Apparatus Max Weight 13,400 # on drive axle
Soil bearing Capacity = 1500 psf, FS=2 \therefore 750 psf \times 2.5 s.f.

Each double wheel sits on concrete 12" \times 12" (1.0 s.f.) Soil supports 18,750# in this Area
Each double wheel supports 73.4 k - 18.7 k = 54.7 k



$$A = B = 14.9 \text{ k}$$

$$M_{\max} = \frac{1}{2}(4.58 \times 14.9 \text{ k}) + (4.58 \times 14.9 \text{ k}) + \frac{1}{2}(4.58 \times 14.9 \text{ k}) = 185.4 \text{ ft-k}$$

Assume Slab Thickness = 8"
Slab Self weight = $(8" \times \frac{1}{2}) \times 150 \text{ psf} = 100 \text{ psf}$

$$M_u \text{ concrete} = \frac{.1 \text{ ksf} \times (13.7')^2}{8} = 2.36 \text{ ft-k}$$

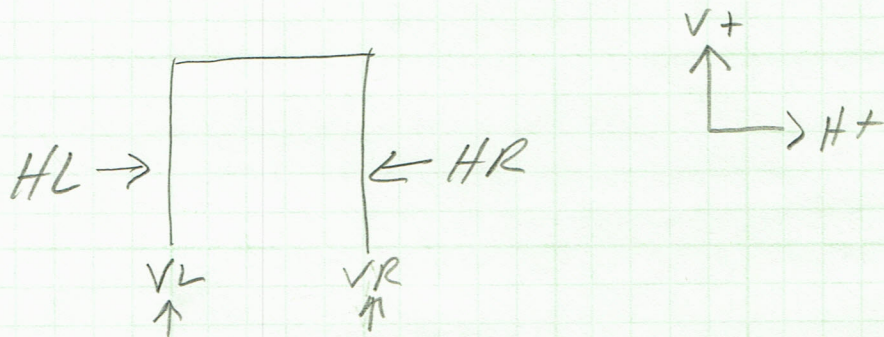
$$\text{Total } M_u = 187.8 \text{ ft-k}$$

$$\frac{M_u}{\phi b d^2} = \frac{(12'/ft)(187,993 \text{ ft-}\#)}{(0.9)(12'')(6'')^2} = 5796.1 \text{ psi}$$

$$\text{Use } \rho_{\min} = 0.0033$$

$$A_s = \rho b d = (0.0033)(12)(8) = 0.3168$$

Use #5 bars @ 12" o.c.



Max HL -12.68 or +11.52

Max HR -12.68 or +11.52

Max VL -20.38 or +14.83

Max VR -20.38 or +14.83

Frame # 1 of 4
LINE

Max HL -12.68 or +11.52

Max HR -12.68 or +11.52

Max VL -20.38 or +14.83

Max VR -20.38

Frame # 2 of 3
LINE

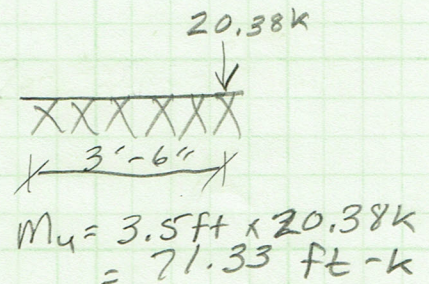
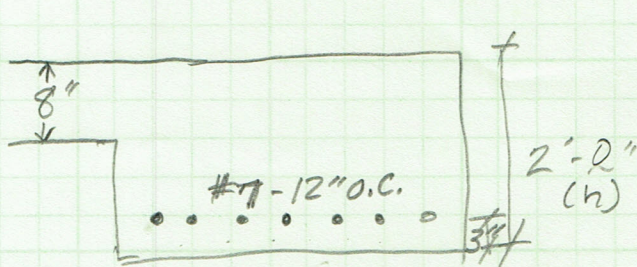
Size of footing Required for Column Loads of metal Building

Assumption

Soil bearing capacity = 1500 \#/ft^2 FS of 2 $q_u = 750 \text{ psf}$
 Max Vertical Load = $20.38 \text{ K} \downarrow$

Spread Footing for Column Loads
 Calculation:

$$\frac{20,380 \text{ \#}}{750 \text{ \#/ft}^2} = 27.2 \text{ ft}^2 \text{ minimum}$$



$$M_u = 3.5 \text{ ft} \times 20.38 \text{ k} = 71.33 \text{ ft-k}$$

$$d = 24 - 3 = 21"$$

$$b = 12"$$

$$\frac{M_u}{\phi b d^2} = \frac{12 \text{ \#/ft} \times 71,330 \text{ ft-k}}{(0.9)(12 \text{ \#})(21 \text{ \#})^2} = 179.7 \text{ psi}$$

Tab A.13 $f_y = 60 \text{ ksi}$; $f'_c = 4 \text{ ksi}$
 $e = 0.0031 < e_{\text{min}} 0.0033$
 Use $e_{\text{min}} = 0.0033$

b_{avg} for entire footing = 48"

$$A_s = e b h = (0.0033)(48 \text{ \#})(24 \text{ \#}) = 3.81 \text{ in}^2$$

Use 7 #7 bars @ 12" O.C. (4.20 in^2)