

Given: 3 Story Wood Frame Construction Building

Required: Determine loads acting on Fitch beam
19'-4" in length.

Assumptions: Room Live Loads = 40 psf
Corridor Live loads = 40 psf

Estimate Loads: Ceiling/Floor System

$$\frac{3}{4}'' \text{ Gyp Crete} = \frac{.75''}{12''/ft} \times 100 \text{ pcf} = 6.25 \#/ft^2$$

$$\frac{3}{4}'' \text{ Plywood} = 2.5 \#/ft^2$$

$$\text{Truss System} = 2 \#/LF$$

$$2 \text{ layers } \frac{5}{8}'' \text{ Gyp \& Hot Channi} = 6.5 \#/ft^2$$

$$\begin{array}{r} \text{Total} \\ (56.75 \#/ft^2 \times 29') \\ \hline \end{array} = 17.25 \#/ft^2 \quad \downarrow \quad \begin{array}{r} 12.97' (215 \#/LF) \\ \hline \end{array}$$

↑
Beam or load bearing wall

Total Floor supported by beam or load bearing wall = 271.75 #/LF

Estimate Loads: Load bearing Wall

$$\text{Wall height} = 8 \text{ ft}$$

$$2 \times 4 \text{ Stud wall w/ } \frac{5}{8}'' \text{ gyp both sides, insulation} = 11 \#/ft^2 \times 8 \text{ ft}$$

$$\text{Total Wall weight} = 88 \#/LF$$

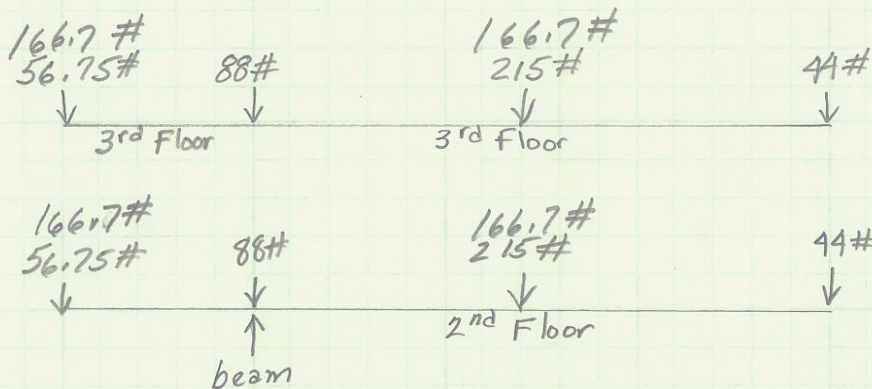
$$\frac{1}{2} \text{ wall over entrance will be added to beam} = 44 \#/LF$$

Estimate loads from both tubs each tub 2.5' x 5' x 2' deep.

$$\begin{aligned} \text{Typical Tub weight } & 240\# \\ \text{Typical Tub capacity } & 50 \text{ gallon} = 6.68 \text{ ft}^3 \times 62.4 \#/\text{ft}^3 \\ & = 416.8\# \end{aligned}$$

Each tub = 2.5 ft wide \therefore Each floor truss supports approx 166.7#

Estimate Total Dead Load on beam/LF



$$(166.7 \times 4) + (56.75 \times 2) + (88 \times 2) + (215 \times 2) + (44 \times 2) = 1,474\#/\text{LF} \text{ DL}$$

Live loads according to IBC

$$40\# \times 3.25' = 130\#/\text{LF}$$

$$40\# \times 12.5' = 500\#/\text{LF}$$

$$40\# \times 3.25' = 130\#/\text{LF}$$

$$40\# \times 12.5' = 500\#/\text{LF}$$

$$\text{Max Live Load} = (130 \times 2) + (500 \# \times 2) = 1,260\#/\text{LF} \text{ LL}$$