

WALKWAY CHANNEL DESIGN CONT.

$$C12 \times 20.7, 50 \text{ KSI}, S_x = 21.5 \text{ IN}^3$$

$$F_b = 0.6 F_y = 0.60 \times 50 \text{ KSI} = 30 \text{ KSI} = 30,000 \text{ PSI}$$

$$RM = SF_b = M \quad RM = \frac{21.5 \text{ IN}^3 \times 30,000 \text{ PSI}}{12} = 53,750 \text{ FOOT LBS} \\ = 645,000 \text{ IN-LB}$$

$$M = \frac{WL}{8}, L = 22'-0"$$

$$\text{THEN } W = \frac{8M}{L} \text{ OR } W = \frac{8 \times 53,750 \text{ FOOT LBS}}{22} = 19,545.45 \\ \rightarrow 19,545 \text{ LBS}$$

$$\text{LOAD } W = \frac{19,545 \text{ LBS}}{22'} = 888 \text{ \#/LF ON BEAM}$$

$$\text{CHECK DEFLECTION } \rightarrow \text{ USE } \frac{L}{360} = \frac{22' \times 12}{360} = 0.73"$$

$$C12 \times 20.7 \quad I_x = 129 \text{ IN}^4, S_x = 21.5 \text{ IN}^3, A = 6.09 \text{ IN}^2$$

$$M = F_b \times S = 30 \text{ KSI} \times 21.5 \text{ IN}^3 = 645 \text{ K-IN}$$

$$P = \frac{4M}{L} = \frac{4 \times 53,750 \text{ FT-LBS}}{22'} = 9,773 \text{ LBS} = 9.8 \text{ K}$$

$$0.73" = \frac{PL^3}{48EI} \text{ OR } I = \frac{(9.8 \text{ K})(22' \times 12)^3}{48 \times 29,000 \times 0.73} = \frac{1,803,174.91}{10,161.60} = 177.44$$

$$I = 177.44 \text{ IN}^4 > 129 \text{ IN}^4 \rightarrow \text{NO GOOD}$$

→ C 12x 20.7 NO GOOD

TRY MC 12x31, $S_x = 33.8 \text{ IN}^3$, $I_x = 203$

$$M = F_b \times S = 30 \text{ KSI} \times 33.8 \text{ IN}^3 = 1,014 \text{ K-IN}$$