(4) Calculate Capacity:

\[ C_M = C_6 \left[ \phi M_p - \phi M_{LP} \right] \]

\[ C_6 = \frac{50x}{3Dx} \]

\[ L_9.1 = 1.67 \]

\[ C_6 = \frac{12.5(A_k)}{2.5M_{MAX} + 3M_a + 4M_b + 3Me} \]
\[ \phi_{MN} = 1.67 \text{ ft-kips} \]

\[ \phi_{MN} = 1.86 \text{ ft-kips} \]

\[ \phi_{MN} = 1.31 \text{ ft-kips} \]

\[ L_p = 9.29 \text{ ksi} \]

\[ R_p = 11.9 \text{ ksi} \]

\[ W_{MP} = 698 \text{ ft-kips} \]
Let's correct the calculations:

\[ \frac{F_L}{L} = \frac{3.76 \sqrt{2400}}{22.3} = 9.15 \]
\[ \frac{F_T}{T} = \frac{8.32 \sqrt{22}}{22.3} = 9.34 \]

Planar Stresses:

\[ \frac{\sigma_1}{F_T} = \sigma_2 = 9.34 \]

Lateral Bending at only one end

Grade 50

\[ M_{14 \times 99} \]

Find Crack at I': Let's simplify - suppose it becomes

Example 2:
\[ \phi \text{ LNB} (\text{F}) = \frac{6.49 - (6.49 - 4.71)}{9.34 - 9.18} = 4.46 \text{ ft} - \text{Kip} \]

(4) Calculate Capacities

(3) Calculate Cb : Cb = 1.0

\[ \text{F}_{\text{L}B} : L_{p} < \text{L} < L_{c} \quad \text{F}_{\text{M}} = C_{b} \left[ \phi_{\text{MP}} - \phi_{\text{MR}} \right] \left( \frac{L_{c} - L_{p}}{L_{b} - L_{p}} \right) \]

\[ \text{F}_{\text{L}B} : \text{R} < L < \text{R}_{c} \quad \text{F}_{\text{M}} = \phi_{\text{MP}} - \phi_{\text{MR}} \left( \frac{R_{c} - R}{R_{p} - R_{c}} \right) \]

(2) Determine Governing Equations

\[ : \text{Need to check } \text{F}_{\text{L}B} \text{ and } \text{L}_{B} \]
B2: 

Design Charts - For B2 frame w/ Intermediate Lateral Support

\[ L_b = \frac{g}{f - k} \leq 6.21k \text{ in} \]

\[ 340 \text{ fl-lips} \]

\[ \phi_{MN} = 0.33 \text{ ft-lips} \]

\[ \phi_{MN} = 0.33 \text{ ft-lips} \]

\[ = 6.33 \text{ fl-lips} \]

\[ = 0.0 \]  

\[ 6.49 - 6.55 (1.6 - 1.3.5) \text{ ft-lips} \]

\[ = 6.49 \text{ ft-lips} \]

\[ \phi_{MN} \text{ (RF)} = 0.36 \text{ ft-lips} \]

\[ \phi_{MN} \text{ (RP)} = 0.36 \text{ ft-lips} \]
Design Charts for $C_b \neq 1.0$

- Use of Beam Design Charts with $C_b = 1.0$

- Checks:
  - $N_d$, gives actual moment capacity.
  - Also gives capacity at $C_b$

- Most economical:
  - Choose section above and to the right (Soleil line)
  - Enlarge chart with $L_6$ and required $C_b$

- Use of Beam Design Charts with $C_b = 1.0$
2. Check if design chart or equations

1. Use Zx tables to get trial section

Design Chart Approach

2. Check to make sure section is complete

3. Check to make sure predicted capacity < phi

\[ \frac{Eh}{\phi M} \]

Enter chart m/ Cb
Design Chart:  \[ \frac{C_b}{M_u} = \frac{865}{721} \]  

Solution - \( C_6 = 1.2 \)

(c) \( C_b = 1.0 \)  

(b) \( C_b = 1.2 \)

(a) \( C_b = 1.0 \)  

\[ C_b = 1.0 \rightarrow M_u = 450 \times 99 \]

Design a beam for: \( M_u = 865 \text{ ft-kips} \)

Design Example Beam Design Chart
\[ \text{Design Charts: } \frac{C_6}{W_n} = \frac{865}{518} = 1.67 \]

\[ C_6 = 1.67 \]

Use L30 \times 90.

\[ \phi_{wp} = 0.06 \]

\[ \phi_{mn} = C_6 (800) = 960 \geq 865 \]

Check L30 \times 90; \phi_{mn} = C_6 (800)

\[ L = 30 \times 90 \]

2x T6x6: M27x84

M27x94

Possible Sections: L30 \times 90
Use W27 x 84

\[ \phi \]

\[ \phi_{\text{min}} = 0.6 (6.92) \div \phi \]

115/8 < 915

W27 x 84 (\(\phi_{\text{min}} = 0.61\) < 11/8 x 86.5)

Poss ble Sections: W18 x 76 (\(\phi_{\text{min}} = 0.61\) < 11/8 x 86.5)