E \text{ wood} = 2,000 \text{ KSI} \\
E \text{ steel} = 30,000 \text{ KSI} \\
F_{u} \text{ wood} = 15 \text{ KSI} \\
F_{u} \text{ steel} = 22.5 \text{ KSI}

\text{Reactions:}
\sum M_{R1} = 0 = 7.2(12) - R_{2}(24) + 6(28)
R_{2} = 10,6 \text{ k}

\sum H_{R2} = 0 = R_{1}(24) - 7.2(12) + 6(4)
R_{1} = 2.6 \text{ k}

\text{Check:} \sum F_{V} = 10.6 + 2.6 - 7.2 - 6 = 0

\text{Shear:}
\begin{align*}
&\text{2.6 k} \\
&11.267
\end{align*}

\text{Moment:}
\begin{align*}
&11.267 \text{ k}\cdot\text{ft} \\
&\text{Plates here}
\end{align*}

\text{DESIGN MOMENT} = 24.0 \text{ k}\cdot\text{ft}
STRAIN COMPATIBILITY:

ASSUME WOOD CONTROLS STRAIN:

\[ \varepsilon = \frac{\sigma}{E} = \frac{1.5}{2000} = 0.00075 \]

\[ \varepsilon = \frac{\sigma}{E} = 30000 \times 0.00075 = 22.5 = \eta \]

STEEL AND WOOD HAVE BALANCED STRAIN AS IS

FIND MOMENT CARRIED BY WOOD:

\[ M_{\text{Wood}} = 1.5 \times \left( \frac{4}{6} \times \left( \frac{12}{2} \right) \right) = 14.4 \text{ k} \cdot \text{ft} \]

\[ = 12 \text{ k} \cdot \text{ft} \]

FIND MOMENT CARRIED BY STEEL:

\[ M_{\text{Steel}} = M_{\text{Total}} - M_{\text{Wood}} = 24 - 12 = 12 \text{ k} \cdot \text{ft} \]

FIND B OF STEEL PLATES:

TWO PLATES

\[ M_{\text{Total}} = f_s \cdot L = f_s \cdot \left( \frac{b \cdot d^2}{6} \right) \cdot 2 = 22.5 \cdot \left( \frac{b \cdot (12)^2}{6} \right) \cdot 2 = 12 \times 12 \]

\[ b = \frac{1.33}{2} = 0.665'' \]

FIND LENGTH OF PLATES (SEE MOMENT DIAGRAM)

WOOD WILL CARRY 12 k·ft ALONE, THEREFORE FIND PORTION OF MOMENT DIAGRAM > 12 k·ft

ON CANTILEVER:

\[ 6 \times L = 12 \]

\[ L = 2.1 \]

BETWEEN SUPPORTS:

\[ 12 = L \left( 4.6 - 3.12 \right) + L \left( 3.12 \right) \]

\[ 0 = -0.15 L^2 + 4.6 L - 12 \]

\[ L = \frac{0.15 L^2 + 4.6 L - 12}{2} = 2.879 \]

\[ L_{\text{Total}} = L_1 + L_2 = 2 + 2.88 = 4.88 \]