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GIVEN: 4 boards each 1" x 6" glued and nailed as a column section.

A) DETERMINE ARRANGEMENT FOR THE STRONGEST SECTION.

B) DETERMINE ALLOWABLE AXIAL LOAD FOR:

\[ L = 10'-0" \quad 20'-0" \quad 30'-0" \]

Braced at ends only

\[ E = 1760000 \text{ psi} \]
\[ E_c = 1800 \text{ psi} \]
\[ f_c = \frac{3.60E}{(g/4)^2} \quad \frac{f}{f_c} \leq 170 \]

Placing the material as far as possible from the N.A.

\[ A = 4(6) = 24 \]

\[ I_x = I_y = \frac{7(7)^3}{12} - \frac{5(5)^3}{12} = 148.0 \]

\[ r = \frac{\sqrt{148}}{24} = 2.483 \]

\[ F = \frac{3.6 E}{(g/r)^2} = \frac{3.6(1760000)}{2.483^2} = \frac{1}{12} \left( \frac{39072000}{24} \right) \]

\[ P = \frac{1}{24} \left( 93772800 \right) \text{ lbs} \]

For \( L = 10'-0" \):

\[ \frac{P}{f_c} = 120/2.48 = 48.4 < 170 \quad \checkmark \]

\[ P_c = \frac{1}{120^2}(93772800) = 65120 \text{ lbs} \quad f_y = 1800(24) = 43200 \text{ lbs} \]

For \( L = 20'-0" \):

\[ \frac{P}{f_c} = \frac{248}{2.48} = 100 < 170 \quad \checkmark \]

\[ P_c = \frac{1}{248^2}(93772800) = 15246 \text{ lbs} < 43200 \]

For \( L = 30'-0" \):

\[ \frac{P}{f_c} = \frac{360}{2.48} = 145.2 < 170 \quad \checkmark \]

\[ P_c = \frac{1}{360^2}(93772800) = 7235 \text{ lbs} < 43200 \]