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ARCH 324 - Structures 2, Winter 2009

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DETERMINE BUCKLING LOAD \( (Pcr) \), BASED ON THE EULER EQUATION
FOR AN 8' LONG WOOD 2\( \times \)4" (USE FULL DIMENSIONS)
ENDS PINNED \( K = 1.00 \) \( E = 1500 \) KSI
IF \( Fy = 6 \) KSI, WHAT IS MINIMUM LENGTH FOR WHICH THE EULER
EQUATION IS VALID?

EULER EQUATION:
\[
Pcr = \frac{\pi^2 EL}{(KL)^2}
\]
\[
Pcr = \frac{\pi^2 (1500) 8}{(96/577)^2}
\]
\[
Pcr = 4.28 K
\]

MIN. VALID LENGTH:
\[
Pcr = \frac{\pi^2 E}{(KL)^2}
\]
\[
G = \frac{\pi^2 (1500)}{(L/577)^2}
\]
\[
G = \frac{\pi^2 (1500)}{L/577}
\]
\[
L = \frac{\pi^2 (1500)}{G/577} = 28.66" \text{ (minimum)}
\]