ARCH 324 - Structures 2, Winter 2009

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Find $x$ by trial & error so that area $A = B$
To solve for \( x \), guess a trial \( x \) and then calculate the areas. Adjust \( x \) so that area 'A' below equals area 'B' above the base line. Approximately triangular areas near the center can be \( \frac{1}{2} \cdot b \cdot h \\n
\[ \text{Trial 1} - x = 12' \]

Area A \( = 1067 \cdot 12 \) \( = 12,804 \)

Area B \( = \frac{5120}{2} + 6827 + \left[ \frac{1}{2} \cdot 8534 \cdot (16 - 12) \right] \) \( = 13,654 \)

\( 6.4\% \) off

\[ \text{Trial 2} - x = 13' \]

Area A \( = 1067 \cdot 13 \) \( = 13,871 \)

Area B \( = 11,947 + \left[ \frac{1}{2} \cdot 8534 \cdot (16 - 13) \right] \) \( = 13,227 \)

4.4 % off

\[ \text{Trial 3} - x = 12.6' \]

Area A \( = 1067 \cdot 12.6 \) \( = 13,444 \)

Area B \( = 11,947 + \left[ \frac{1}{2} \cdot 8534 \cdot (16 - 12.6) \right] \) \( = 13,398 \)

0.3 % off

Avg Areas = 13,421

Deflection = \( \frac{\text{Area}(1728)}{EI} \) = \( \frac{13,421(1728)}{29,000(1330)} \) = 0.6"