ARCH 324 - Structures 2, Winter 2009

von Buelow, Peter

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ARCH 331  PROBLEM 16-1 D  26 NOV 91 BB

LOAD

\[ \begin{align*}
30^\circ & \quad 30k \\
16' & \quad + \\
8' & \quad 30k \\
\end{align*} \]

SHEAR

\[ \begin{align*}
30k & \quad 15k \\
(240) & \quad (240) \\
\end{align*} \]

MOMENT

\[ \begin{align*}
2560 & \quad 960 \\
240 k-F & \quad \text{撬动} \\
\end{align*} \]

TRIAL SLOPE

\[ \begin{align*}
16' & \quad 960 \\
-2560 & \quad EI \\
\end{align*} \]

CORRECTED SLOPE

\[ \begin{align*}
1706.7 & \quad 13387 \\
\text{撬动} & \quad \text{撬动} \\
\end{align*} \]

Find \( x \) by trial and error so that area \( A = B \) (cont)
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 baseline. Approximately triangular areas near the center can be \( \frac{1}{2} b h \)

![Diagram](image)

**Trial 1 - \( x = 12' \)**

- Area 1: \( 1067(12) = 12804 \)
- Area 2: \( 5120 + 6827 + \left[ \frac{1}{2} \times 853.4(16-12) \right] = 13654 \)

**Trial 2 - \( x = 13' \)**

- Area 1: \( 1067(13) = 13871 \)
- Area 2: \( 11947 + \left[ \frac{1}{2} \times 853.4(16-13) \right] = 13227 \)

**Trial 3 - \( x = 12.6' \)**

- Area 1: \( 1067(12.6) = 13444 \)
- Area 2: \( 11947 + \left[ \frac{1}{2} \times 853.4(16-12.6) \right] = 13398 \)

**Average Area 5 = 13421**

**Deflection**

\[
\text{Deflection} = \frac{\text{Area}(1728)}{EI} = \frac{13421(1728)}{29000(1330)} = 0.6''
\]