ARCH 324 - Structures 2, Winter 2009

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ARCH 33 | PROBLEM 16-1A | NOV 25, 1991 | RUB 1/6

LOAD: \( 24k \uparrow \)

\( \frac{2.4\%}{10'} \)

\( \frac{2.4\%}{10'} \)

\( W16 \times 40 \)

\( E = 518 \text{ in}^4 \)

\( E = 29,000 \text{ ksi} \)

SHEAR:

\( 24k \uparrow \)

\( 120 \)

\( -24k \)

MOMENT:

\( 800 \)

\( 1200 \)

\( 800 \)

\( 90k \uparrow \)

\( 2^\circ \)

\( 180 \)

\( 180k \uparrow \)

\( 0 \)

\( 0 \)

\( 0 \)

SLOPE (EI):

\( 5000 \)

\( 1500 \)

\( -1500 \)

\( -1150 \)

\( 5000 \)

\( 0 \)

\( 0 \)

\( 0 \)

\( -1400 \)

\( \Delta EI = 12,500 \text{ K}\cdot\text{F}^3 \)

\( \Delta = \frac{12,500 (1728)}{29,000 (518)} \)

\( \Delta = 1.44 \text{ in} \)

DEFLECTION (EI):

\( 10,000 \text{ K}\cdot\text{F}^3 \)

\( 12,500 \text{ K}\cdot\text{F}^3 \)

\( 0 \)

\( 0 \)

\( \theta \)

\( 4^\circ \)
**Problem 16-1 A**

**Arch 331**

**By 2nd Moment-Area**

**Load:**

<table>
<thead>
<tr>
<th>24 k</th>
<th>24 k</th>
</tr>
</thead>
<tbody>
<tr>
<td>↑ 24 k</td>
<td>↑ 24 k</td>
</tr>
</tbody>
</table>

**Moment/EI:**

800/EI  
600/EI  

**Deflection:**

Θₐ = \( \frac{800}{EI} + \frac{600}{EI} = \frac{1400}{EI} \) k·f²

Δₐ = \( \frac{800(6.25)}{EI} + \frac{600(12.5)}{EI} = \frac{12500}{EI} \) k·f³

= \( \frac{12500 \cdot (12^3)}{29000 \cdot (518)} = 1.44 \text{ in.} \)