ARCH 324 - Structures 2, Winter 2009

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**Problem 17-4 III**

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**Req'd**

**Use 3-moment equation to solve beam reactions.**

3-moment equation:

\[ M_A + 2M_B (L_1 + L_2) + M_C L_2 = 6 [E1\theta_1 + E1\theta_2] \]

- \[ M_A = 12(8) = 96 \, k\]
- \[ M_B = ? \] (Find)
- \[ M_C = 0 \] (Unrest. End)
- \[ L_1 = 24 \]
- \[ L_2 = 30 \]
- \[ L_1 + L_2 = 54 \]

\[ EI\theta_1 = \frac{WI^2}{24} = \frac{24(24)^2}{24} = 576 \]

\[ EI\theta_2 = \frac{4L^3}{EI} = \frac{4(18)(30)^2}{EI} = 800 \]

\[ [E1\theta_1 + E1\theta_2] = 576 + 800 = 1376 \]

\[ 96(24) + 2(M_B)(54) + 0(30) = 6[1376] \]

**M_B = 55,111 k\**

**Reactions by superposition**

**FBD of loads**

- **12**
- **124**
- **18**

**FBD of moment**

- **96k**
- **55,111 k**
- **A = 25,704 k**
- **B = 18,133 k**
- **C = 10,163 k**