ARCH 324 - Structures 2, Winter 2009

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Moment Equation:

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

\[ M_A = 12k(10) = 120 \text{ k-ft} \]
\[ M_B = ? \text{ (FIND)} \]
\[ M_C = 0 \text{ (UNRESTRAINED END)} \]
\[ L_1 = 24', \quad L_2 = 30', \quad L_1 + L_2 = 54' \]

\[ EI \theta_1 = \frac{PL_1^2}{16} + \frac{WL_1^2}{24} = \frac{16(24)^2}{16} + \frac{24(24)^2}{24} = 1152 \]

\[ EI \theta_2 = \frac{5PL_2^2}{81} = \frac{5(9)(30)^2}{81} = 500 \]

\[ (EI \theta_1 + EI \theta_2) = 1652 \]

\[ 120(24) + 2M_B (54) + 0(30) = 6 \left[ 1652 \right] \]
\[ M_B = 65.11 \text{ k-ft} \]

Mun Reactions by Superposition:

Loads:

\[ \downarrow 12k \quad \downarrow 12k \quad \downarrow 16 \quad \downarrow 9k \]

Moments:

\[ 120 \quad \downarrow 5.0 \quad \downarrow 5.0 \quad \downarrow 651 \]

Total \[ \Sigma \]

\[ + 34.267 \text{ k} \quad + 25.883 \text{ k} \quad + 0.83 \text{ k} \]

At A

At B

At C