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**Problem 17-4 III** 12-2-92

**ARCH 331**

**Use 3-Moment Equation to Solve Beam Reactions:**

3-Moment Equation:

\[
M_A + 2M_B(L_1 + L_2) + M_CL_2 = 6 \left[ EI \theta_1 + EI \theta_2 \right]
\]

- \( M_A = 12(24) = 288 \text{ k',} \)
- \( L_1 = 24 \)
- \( L_2 = 30 \)
- \( L_1 + L_2 = 54' \)
- \( EI \theta_1 = \frac{WJf^2}{24} = \frac{24(24)^2}{24} = 576 \)
- \( EI \theta_2 = \frac{4.1f^2}{81} = \frac{4(18)(30)^2}{81} = 800 \)
- \( [EI \theta_1 + EI \theta_2] = 576 + 800 = 1376 \)
- \( 96(24) + 2(M_B)(54) + 0(30) = 6[1376] \)
- \( M_B = 55,111 \text{ k}' \)

**Reactions by Superposition**

FBD of Loads:

- **12**
- **24**
- **18**

FBD of Moment:

- **96 k**
- **55,111 k**
- **A = 25704 k**
- **B = 17813 k**
- **C = 10,143 k**