HW 6
SOLUTIONS

3.27

**F.B.D. 1 TRUSS 1**

\[ F_{By} = 40k \]
\[ F_{Ex} = 20k \]
\[ F_{EY} = 20k \]
\[ F_{Ex} = 20k \]

**ENTIRE STRUCTURE**

\[ \Sigma M_B = 0; \quad 24(20) + 60(60) + 20(60) - 40(100) - Cx(50) = 0 \]
\[ Cx = 25.6k \]

**F.B.D. 2 TRUSS 2 & MEMBER AB**

\[ Cx = 25.6k \]

**F.B.D. 3 PIN DETAIL @ D**

\[ A_y = 45.4k \]

\[ \Sigma F_y = 0; \quad C_y - 24k - 20k + 5.6k = 0 \]
\[ C_y = 39.4k \]
4.12 Solve by Method of Joints

1) Determine 2520.700 ft. forces: FE, DE, DF, CD, CG, AI

2) Begin analyzing at point A, joint F: \( F_{CF} = 30k \) (C)

\[ F_{FG} = 18k \] (T)

Then, joint C: \( C_y = 24k \) ↑

\[ F_{BC} = 18k \] (C)

and joint G: \( F_{HG} = 18k \) (T)

3) Then continue method of joints at joint I: \( F_{IH} = 36k \) (C)

and joint H: \( F_{AH} = 90k \) (T)

\[ F_{BH} = 72k \] (C)

and joint A: \( F_{AB} = 54k \) (C)

\( A_y = 72k \) ↓

4) If desired, may either use external equilibrium

in matrix or stress at joint B to determine: \( B_x = 36k \) ←

\( B_y = 72k \) ↑

Note: Could alternatively use Method of Sections (Superposition) in combination with external equilibrium and/or Method of Joints.
HW #11 - EXERCISE PROBLEM (TWO-WAY SYSTEM)

FLOOR LIVE LOAD = 100 lb/ft²

SELF-WEIGHT:
SLAB: \((150 \text{ lb/ft}^3) \left( \frac{5}{12} \text{ ft} \right) = 62.5 \text{ lb/ft}²\)

BEAM: \((150 \text{ lb/ft}^3) \left( \frac{8}{12} \text{ ft} \right) \left( \frac{4}{12} \text{ ft} \right) = 116.6 \text{ lb/ft} \)

GIRDER: \((150 \text{ lb/ft}^3) \left( 1 \text{ ft} \right) \left( \frac{20}{12} \text{ ft} \right) = 250 \text{ lb/ft} \)

A) INTERIOR BEAM
\(116.6 + 62.5(1) + 100(5) = 174.1 \text{ lb/ft} \)
\(116.6 + 62.5(5) + 100(5) = 929.2 \text{ lb/ft} \)

INTERIOR GIRDERS
\((2)(9.0k) = 18.0k \)
\(18.0k \)

EXTerior BEAM
\(1875 \text{ lb/ft} \)
\(1875 \text{ lb/ft} \)
\(250 + (12.5 + 100)(10) = 1875 \text{ lb/ft} \)

EXTerior GIRDERS
\(1062.5 \text{ lb/ft} \)
\(9.0k \)
\(250 + (12.5 + 100)(5) = 1062.5 \text{ lb/ft} \)

B) COLUMN B4: \((2)(33.94k) + (2)(9.0k) = 85.9k \)
COLUMN B1: \(33.94k + (2)(4.94k) = 43.8k \)
COLUMN A4: \((2)(18.84k) + 9.0k = 46.7k \)
COLUMN A1: \(18.84k + 4.94k = 23.8k \)