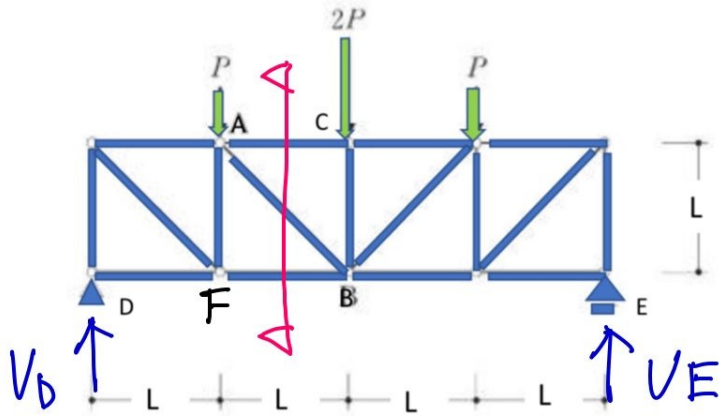


問題演習 (H29-No5)

・横型平行弦トラス①斜材ABの軸方向力を求める ②平行弦ACの軸方向力を求める

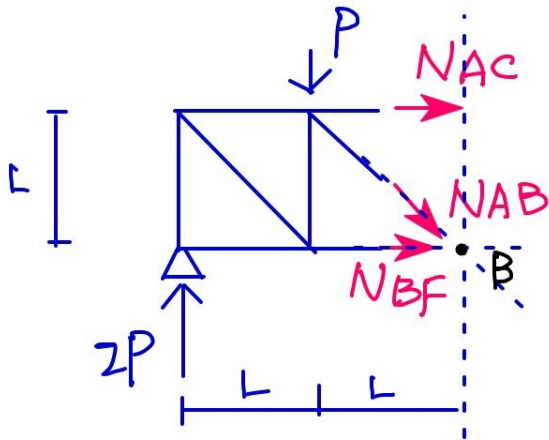


★ 反力を求める

$$V_D = \frac{P + 2P + P}{2} = 2P = V_E$$

★ トラスを切断する

切断面に軸方向力を引張方向に仮定 → 力の合計式で求める



★ N_{AC} を求める

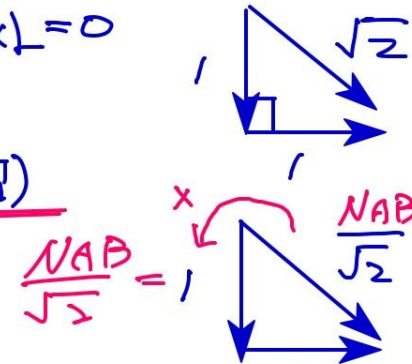
$\sum M_B = 0$ より

$$N_{AC} \times L + 2P \times 2L - P \times L = 0$$

$$N_{AC} L = -3PL$$

$$\underline{N_{AC} = -3P \text{ (圧縮)}}$$

★ N_{AB} を求める

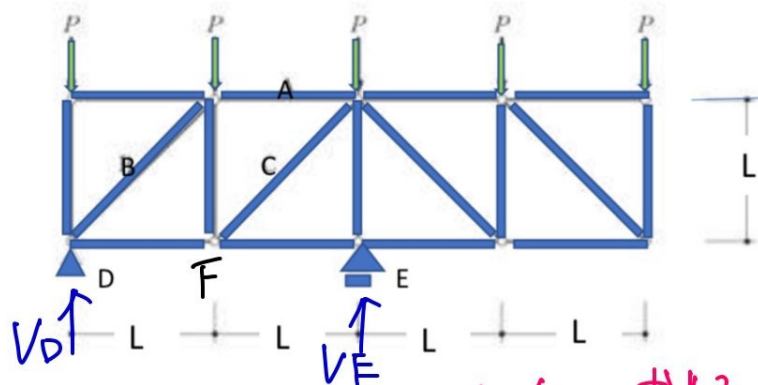


$\sum F_y = 0$ より

$$-\frac{N_{AB}}{\sqrt{2}} + 2P - P = 0 \quad \frac{N_{AB}}{\sqrt{2}} = P \quad \underline{N_{AB} = \sqrt{2}P \text{ (引張)}}$$

問題演習 (R04-No5)

・A,B,C部材に生じる軸方向力 N_A, N_B, N_C の大小関係を求める



⊛ 反力を求める

$$\sum M_E = 0 \text{ (反時計回り)}$$

$$V_D \times 2L - P \times 2L - P \times L + P \times L + P \times 2L = 0$$

$$V_D = 0$$

⊛ 各節点に軸方向力を仮定

1. $N_A < N_B < N_C$
2. $N_B < N_A < N_C$
3. $N_C < N_A < N_B$
4. $N_C < N_B < N_A$

⊛ N_A を求める

$$\sum M_F = 0 \text{ (反時計回り)}$$

$$N_A \times L - P \times L = 0$$

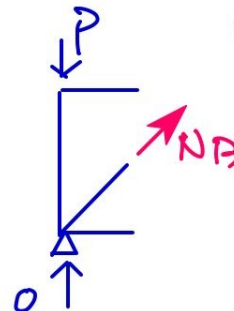
$$N_A = P$$

⊛ N_B を求める

$$\sum Y = 0 \text{ (上向き)}$$

$$\frac{N_B}{\sqrt{2}} - P = 0$$

$$N_B = \sqrt{2}P$$

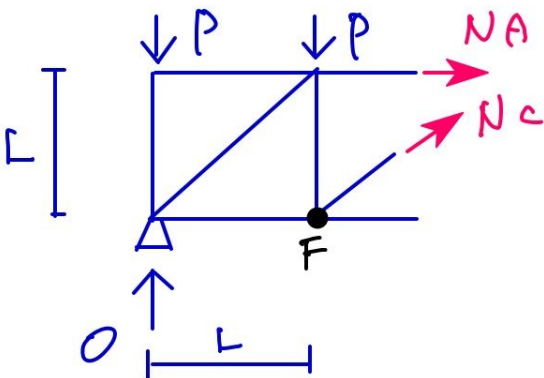


⊛ N_C を求める

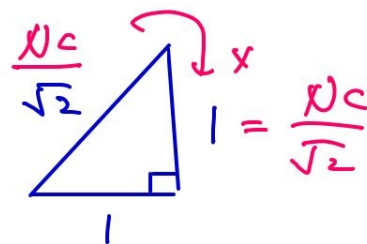
$$\sum Y = 0 \text{ (上向き)}$$

$$\frac{N_C}{\sqrt{2}} - P - P = 0$$

$$\frac{N_C}{\sqrt{2}} = 2P \quad N_C = 2\sqrt{2}P$$

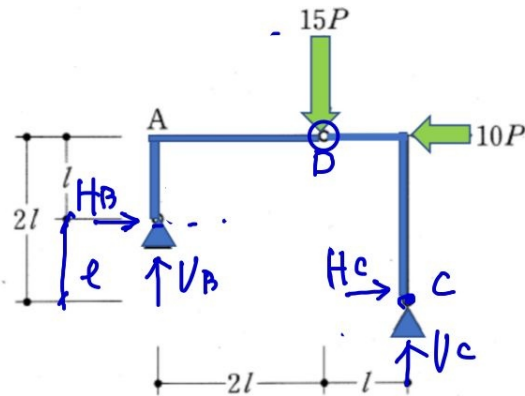


$\therefore N_A < N_B < N_C$



H21-No3

A点に生じる曲げモーメントを求める。

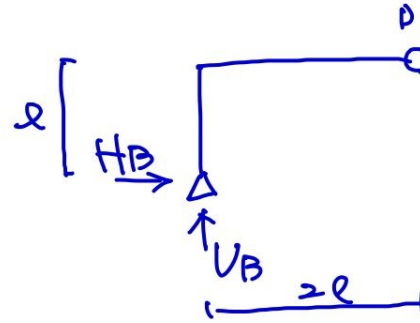


$$\begin{aligned} \Sigma X = 0 \text{ (右)} & \quad \Sigma Y = 0 \text{ (上)} \\ H_B + H_C - 10P = 0 & \quad V_B + V_C - 15P = 0 \end{aligned}$$

$$\begin{aligned} \Sigma M_C = 0 \text{ (逆)} & \\ H_B \times 2l + V_B \times 3l - 15P \times l - 10P \times 2l & \\ H_B l + 3V_B l - 35Pl = 0 & \text{--- (1)} \end{aligned}$$

$$\begin{aligned} \Sigma M_A = 0 \text{ (逆)} & \\ -M_A - 14Pl = 0 & \\ M_A = -14Pl \text{ (右)} & \end{aligned}$$

- 1 $2Pl$
- 2 $4Pl$
- ③ $14Pl$
- 4 $28Pl$



$$\begin{aligned} \Sigma M_D = 0 \text{ (逆)} & \\ -H_B \times l + V_B \times 2l = 0 & \\ -H_B l + 2V_B l = 0 & \text{--- (2)} \end{aligned}$$

$$\textcircled{1} + \textcircled{2}$$

$$\begin{aligned} H_B l + 3V_B l - 35Pl = 0 & \text{--- (1)} \\ +) -H_B l + 2V_B l = 0 & \text{--- (2)} \\ \hline 0 + 5V_B l - 35Pl = 0 & \end{aligned}$$

$$5V_B l - 35Pl = 0$$

$$5V_B l = 35Pl$$

$$V_B = 7P \rightarrow \textcircled{2} \text{ 代入}$$

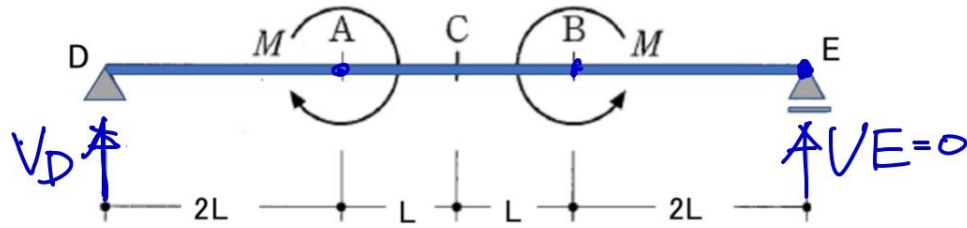
$$-H_B l + 2 \times 7P \times l = 0$$

$$H_B l = 14Pl$$

$$H_B = 14P$$

$$\underline{\underline{M_A = 14Pl \text{ (右)}}}$$

H20-02 A-D間、A-B、B-E間のせん断力、C点の曲げモーメントを求める。

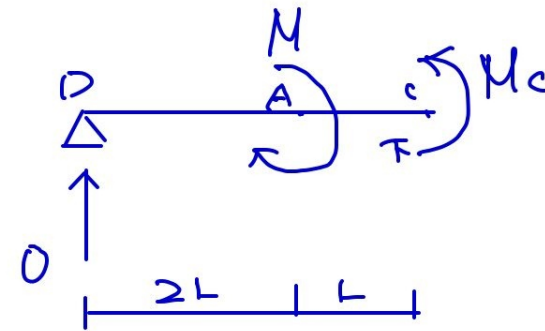


$$\Sigma M_E = 0 \text{ (逆時計回り)}$$

$$V_D \times 6L + \underbrace{M - M}_0 = 0$$

$$\underline{V_D = 0, V_E = 0}$$

$$\Sigma F = 0 \text{ (逆時計回り)}$$



$$\Sigma M_c = 0 \text{ (逆時計回り)}$$

$$-M_c + M = 0$$

$$\underline{\underline{M_c = M}}$$