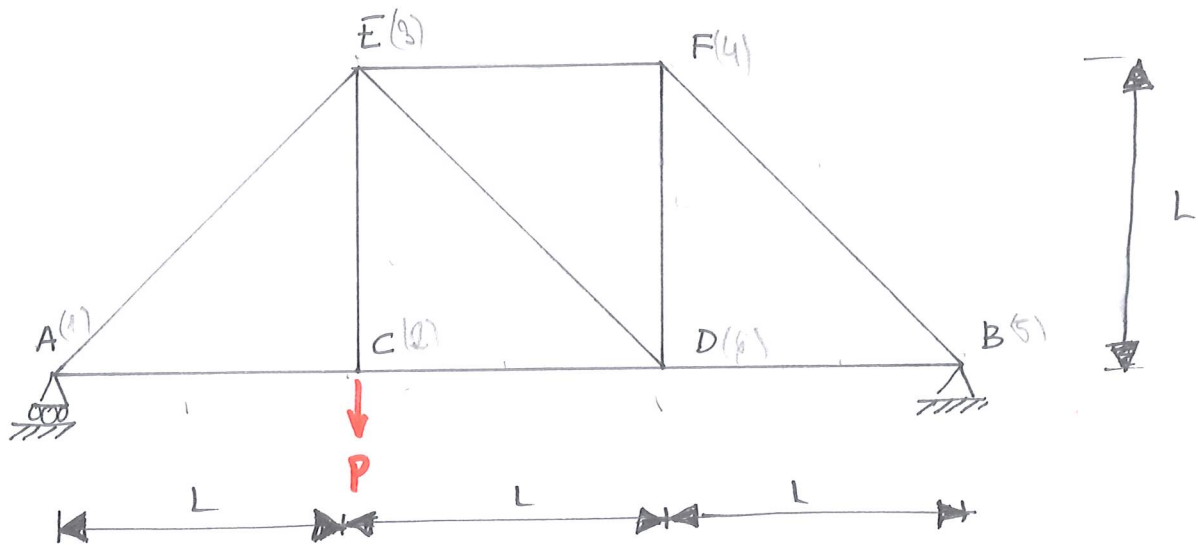


STÅNGBÄRVERK

2.2.5

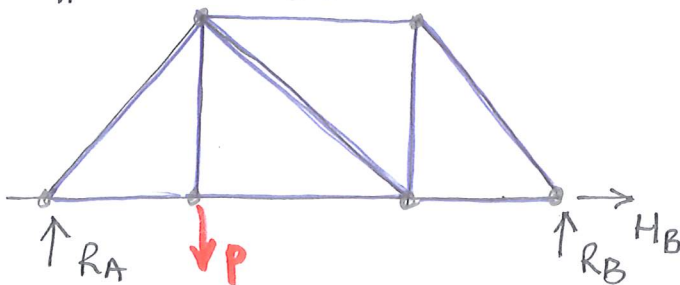
GIVET: Alla stänger har tvärsnittarea A.



SÖKT: Normalspänningarna i samtliga stänger.

LÖSNING:

1// Frilägg:



$$\begin{array}{l} \text{OBEK} \\ 9 \text{ stänger} \\ 3 \text{ reak} \\ [12 \text{ OBEK}] \end{array} = \begin{array}{l} \text{EKV} \\ 6 \text{ knut} \Rightarrow 2 \text{ ekv} \\ [12 \text{ EKV}] \end{array} \Rightarrow \text{STATISTKT BESTÄMT}$$

$\sum m_v :$

$$\rightarrow : H_B = 0$$

$$\sum A : LP - 3LR_B = 0$$

$$R_B = P/3 \quad (1)$$

$$\uparrow : R_A = 2P/3 \quad (2)$$

2// Snitta och frilägg en knut i taget

\rightarrow Ställ upp två kraftekv. för varje knut

\rightarrow Börja med en knut där endast två obekanta stångkrafter finns.

KNUT A:



$$\sum F_V: \uparrow: R_A + \frac{\sqrt{2}}{2} N_{AE} = 0$$

$$N_{AE} = -R_A \cdot \frac{2}{\sqrt{2}}$$

$$N_{AE} = -\sqrt{2} R_A$$

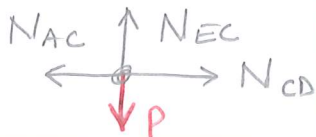
$$N_{AE} = -\frac{2\sqrt{2}P}{3} \quad (3)$$

$$\sum F_W: \rightarrow N_{AE} \frac{\sqrt{2}}{2} + N_{AC} = 0$$

$$N_{AC} = -N_{AE} \frac{\sqrt{2}}{2} = +\frac{2\sqrt{2}}{3} \frac{\sqrt{2}P}{2} \Rightarrow N_{AC} = +\frac{2}{3}P$$

(4)

KNUT C:



$$\sum F_V: \rightarrow; -N_{AC} + N_{CD} = 0$$

$$N_{CD} = N_{AC}$$

$$N_{CD} = +\frac{2}{3}P \quad (5)$$

$$\uparrow; N_{EC} - P = 0$$

$$N_{EC} = P \quad (6)$$

KNUT E:



$$\uparrow: -\frac{\sqrt{2}}{2} N_{AE} - \frac{\sqrt{2}}{2} N_{ED} - N_{EC} = 0$$

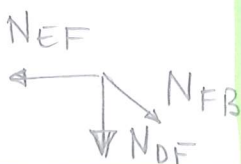
$$N_{ED} = -N_{AE} - \sqrt{2} N_{EC}$$

$$N_{ED} = +\frac{2\sqrt{2}P}{3} - \sqrt{2}P \Rightarrow$$

$$N_{EF} = -\frac{P}{3} \quad (8)$$

$$N_{ED} = -\frac{\sqrt{2}P}{3} \quad (7)$$

KNUT F:



$$\rightarrow: -N_{EF} + \frac{\sqrt{2}}{2} N_{FB} = 0$$

$$N_{FB} = \frac{2}{\sqrt{2}} N_{EF}$$

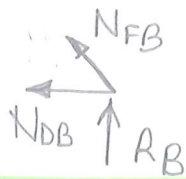
$$\uparrow: -N_{DF} - \frac{\sqrt{2}}{2} N_{FB} = 0$$

$$N_{FB} = -\frac{\sqrt{2}P}{3} \quad (9)$$

$$N_{DF} = \frac{P}{3} \quad (10)$$

$$\leftarrow N_{DF} = -\frac{\sqrt{2}}{2} N_{FB}$$

KNUT B:



$$\rightarrow: -N_{DB} - \frac{\sqrt{2}}{2} N_{FB} = 0$$

$$N_{DB} = -\frac{\sqrt{2}}{2} N_{FB}$$

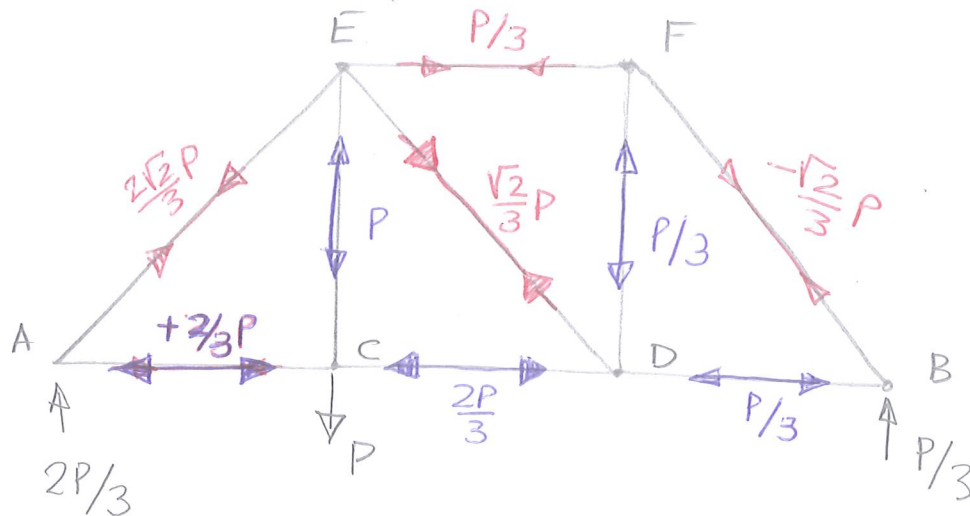
$$N_{DB} = P/3 \quad (11)$$

$$\frac{\sqrt{2}}{2} N_{FB} + R_B = 0$$

$$-\frac{P}{3} + \frac{P}{3} = 0$$

✓ ALT.

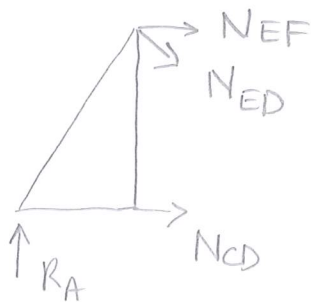
⇒ Har inte använt knut D och vertikala ekv.



⇒ Spänningar ⇒

$$\sigma = N/A$$

ALT:



$$\sum E: -N_{CD}L + \frac{2P}{3}L = 0$$

$$N_{CD} = 2P/3$$

$$\uparrow: -N_{ED}\frac{\sqrt{2}}{2} - P + R_A = 0$$

$$N_{ED} = -\frac{\sqrt{2}P}{3}$$

$$\rightarrow N_{CD} + N_{EF} + N_{ED}\frac{\sqrt{2}}{2} = 0$$

$$N_{EF} = -P/3$$