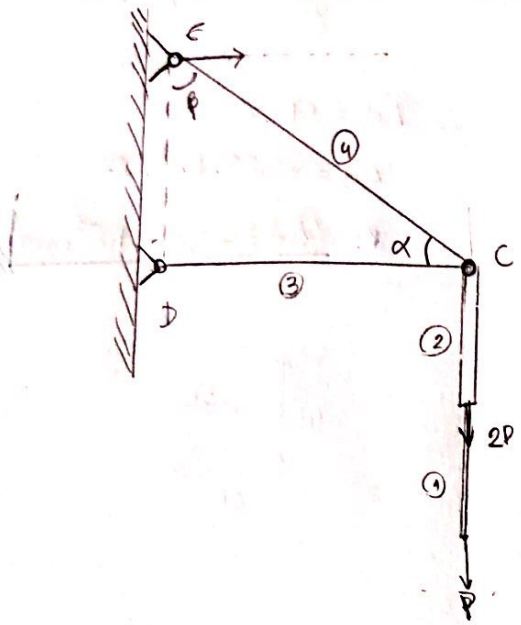
NOME: GIOVANA MOTA ASAO

Ass: Giovana Mota Asao

R.A.: 19.00710-8

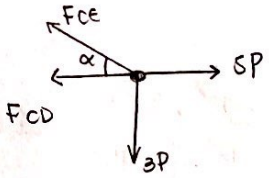


P/ achar o α:

$$tg\alpha = \frac{4L}{5L}$$

$$\alpha = 38,7° \quad \therefore$$

a) equilíbrio do nó C:



$\Sigma F_H = 0$

$5P - F_{CD} - F_{CE} \cdot \cos\alpha = 0$

$F_{CD} = 1,255P$

$F_{CD} = +1,26P$ (Tração)

$\Sigma F_V = 0$

$F_{CE} \cdot \operatorname{sen}\alpha - 3P = 0$

$F_{CE} = 4,798P \rightarrow F_{CE} = +4,798P$ (Tração)

Barra 1

$N_1 = 1P$

Barra 2

$N_2 = 3P$

Barra 3

$N_3 = 1,26P$

Barra 4

$N_4 = 4,80P$

→ R: $N_1 = P$
$N_2 = 3P$
$N_3 = 1,26P$
$N_4 = 4,80P$

b) Barra 1

$$\frac{P}{\frac{\pi}{4} 22^2} \leq \frac{360}{3,5}$$

$P \leq 41271,651$ N $\therefore P \leq 41,272$ KN

Barra 2

$$\frac{3P}{45^2} \leq \frac{360}{3,5}$$

$P \leq 73285,714 \therefore P \leq 73,286$ KN

$\therefore P_{max} = 41,272$ KN

c) $\Delta L_{ABC} \leq \overline{\Delta L}_{ABC}$

$$\frac{N_1 L_1}{E A_1} + \frac{N_2 L_2}{E A_2} \leq 1,5$$

$$\frac{P \cdot 1100}{207 \cdot 10^3 \cdot \frac{\pi}{4} \cdot 22^2} + \frac{3P \cdot 2 \cdot 1100}{207 \cdot 10^3 \cdot 45^2} \leq 1,5$$

$2,97 \cdot 10^{-5} P \leq 1,5$

$P \leq 50463,31$ N

R: $P \leq 50,463$ KN

d) $N_3 = +60\,kN$

Giovana Natália Aso

$\Delta d = \varepsilon t \cdot d$

$\varepsilon t = -\nu \cdot \varepsilon = -\nu \cdot \frac{\Delta l}{l}$

$\therefore \varepsilon t = -0{,}3 \cdot \frac{4{,}19}{5500} = -2{,}29 \cdot 10^{-4}$

$\therefore \Delta L = \frac{N \cdot L}{E \cdot A} = \frac{60 \cdot 10^3 \cdot 5 \cdot 1100}{207 \cdot 10^3 \cdot \frac{\pi}{4} \cdot 22^2} = 4{,}194\,mm$

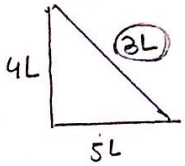
$\therefore \Delta d = \varepsilon t \cdot d$

$\Delta d = -2{,}29 \cdot 10^{-4} \cdot 22$

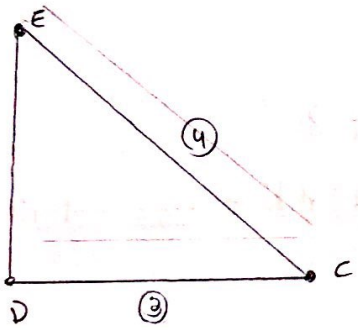
R: $\Delta d = -5{,}033 \cdot 10^{-3}\,mm$

---

e) $\Delta L_3 = 4{,}2\,mm$ → Do ex. anterior



$\Delta L_4 = \frac{N_4 \cdot L_4}{E \cdot A_4} = \frac{250 \cdot 10^3 \cdot 3300}{270 \cdot 10^3 \cdot \frac{\pi}{4} \cdot 44^2} = 2{,}01\,mm$



$\delta_{Vc} = 2{,}01mm$

$\delta_{Hc} = 4{,}19mm$