8.GAIA: Gilbordura

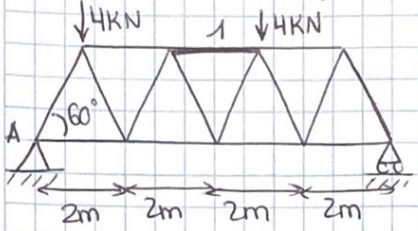
RESIS

Irudiko egitura gilbeatuan kalkulatu:

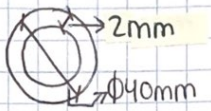
a) 1 barrak jasaten duen indarra

b) Barra honen gilbordurarekiko karga kritikoa

c) Gilbordurarekiko segurtasun koefizientea



Sekzioa

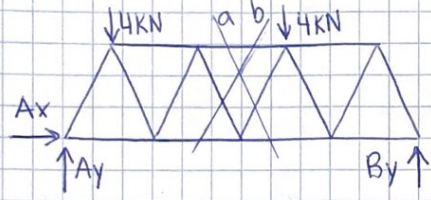


$v_1 = 18mm$

$v_2 = 20mm$

$E = 200GPa$

a) Egitura askatu eta erreakzioak:



$\Sigma F_X = 0 \rightarrow A_X = 0$

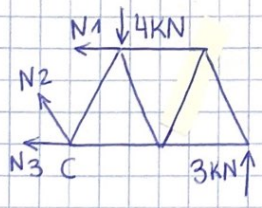
$\Sigma F_Y = 0 \rightarrow -8 + B_Y + A_Y = 0$

$\Sigma M_A = 0 \rightarrow -4 \cdot 1 - 4 \cdot 5 + 8 \cdot B_Y = 0 \rightarrow B_Y = 3KN$

$A_Y = 8 - B_Y = 5KN$

Ritterren metodoa:

a mozketa eskuina



$\Sigma M_C = 0 \rightarrow -1 \cdot 4 + 3 \cdot 4 + N_1 \cdot tg\,60° \cdot 1 = 0 \rightarrow \boxed{N_1 = -4,62KN}$

b) Gilbordura karga kritikoa:

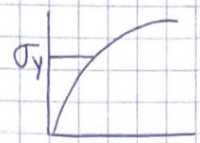
$$P_K = \frac{\pi^2 E I_{min}}{L^2} = \frac{\pi^2 \cdot 200 \cdot 10^3 \cdot \left(\frac{\pi(20^4 - 18^4)}{4}\right)}{2000^2} = 21326,12N = \boxed{21,3KN}$$

$$I_y = I_z = \frac{\pi r^4}{4} = \frac{\pi(20^4 - 18^4)}{4}$$

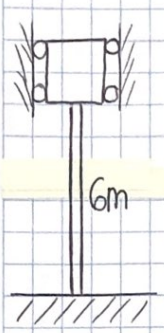
Makurdura → gilbordura

c) $n = \frac{P_K}{N_1} = \frac{21,3}{4,6} = \boxed{4,63}$ → altura

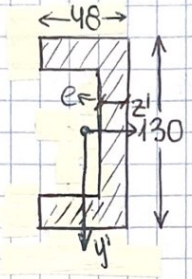
d) $\sigma_y = 500 MPa$. Konpresio moduan aztertuz isurpena gainditzeko karga.



$$\sigma_y = \frac{N = P_y}{A} \rightarrow P_y = \sigma_y \cdot A = 500 \cdot \pi (20^2 - 18^2) = \boxed{119,38\ KN}$$



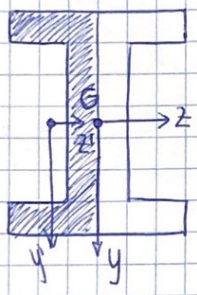
C130; $E = 200 GPa$; $L_p = L \cdot 0,5 = 6 \cdot 0,5 = 3m$



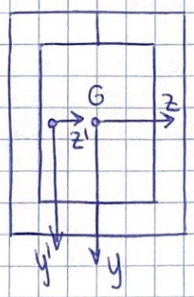
$e = 12,2mm$; $A = 1710 mm^2$; $I_{z'} = 3,7 \cdot 10^6 mm^4$;

$I_{y'} = 2,64 \cdot 10^5 mm^4$

a)



b)



a) $I_y = (I_{y'} + A \cdot e^2) \cdot 2 = (2,64 \cdot 10^5 - 1710 \cdot 12,8^2) \cdot 2 = 1,04 \cdot 10^6 mm^4$

$I_z = I_{z'} \cdot 2 = 3,7 \cdot 10^6 \cdot 2 = 7,4 \cdot 10^6 mm^4$