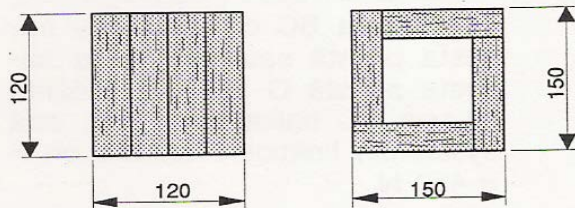


TMKS0600 STATIIKKA JA LUJUUSOPPI

Tehtävä L5-2

Määritä nurjahduskuormat

TEHTÄVÄ 8.8.



$$E = 12,5 \text{ GPa}$$

$$B_a = 120 \text{ mm}$$

$$L_n = 3500 \text{ mm}$$

$$B_b = 150 \text{ mm}$$

$$B_c = 90 \text{ mm}$$

$$F_n = \pi^2 E_T I_T / L_n^2$$

$$F_{na} = 174027 \text{ N}$$

$$I_a = B_a^4 / 12$$

$$I_a = 17280000 \text{ mm}^4$$

$$I_b = (B_b^4 - B_c^4) / 12$$

$$I_b = 36720000 \text{ mm}^4$$

$$F_{nb} = 369808 \text{ N}$$

Tarkistus:

$$L_n = 3500 \text{ mm}$$

$$\lambda = L_n / i = 101,04 > \lambda_{\min}, \text{ nurjahtaa Eulerin mukaisesti}$$

$$i = (I/A)^{1/2} = 34,6410 \text{ mm}$$

$$I = BH^3/12 = 17280000,0 \text{ mm}^4$$

$$A = 14400 \text{ mm}^2$$

$$\lambda_{\min} = 80 \text{ taulukosta}$$

$$L_n = 3500 \text{ mm}$$

$$\lambda = L_n / i = 69,31 > \lambda_{\min}/2 \text{ ja } < \lambda_{\min} \text{ eli välialueella}$$

$$i = (I/A)^{1/2} = 50,4975 \text{ mm}$$

$$I_b = (B_b^4 - B_c^4) / 12 = 36720000,0 \text{ mm}^4$$

$$A = 14400 \text{ mm}^2$$

$$\lambda_{\min} = 80 \text{ taulukosta}$$