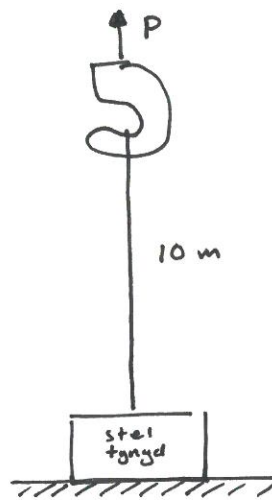


2.1.14.

Givet



* Massa stång $\rho = 1200 \text{ kg/m}^3$

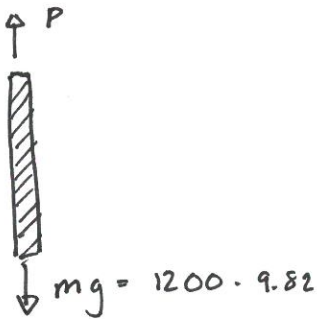
* Lina $A = 1 \text{ cm}^2$

* $E_{\text{linn}} = 200 \text{ GPa}$

Sökt Höjning för att vikt ska lätta från golv

Lösning

1. Frilägg

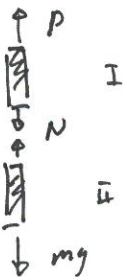


2. Jämvikt

$$\uparrow \therefore P - mg = 0$$

$$\Leftrightarrow P = mg = 1200 \cdot 9.82 \text{ kg} \cdot \frac{\text{m}}{\text{s}^2} = 11784 \frac{\text{kg} \cdot \text{m}}{\text{s}^2}$$

3. Snitta



4. Jämvikt

$$\uparrow_I \therefore P - N = 0 \Rightarrow P = N = mg$$

$$\uparrow_{II} \therefore N - mg = 0 \Rightarrow \underline{N = mg}$$

5. Normalspänning

$$\sigma = \frac{N}{A} \rightarrow \sigma = \frac{mg}{A}$$

6. Konstitutiv samband

$$\sigma = E \epsilon \rightarrow \epsilon = \frac{\sigma}{E}$$

$$\underline{\epsilon = \frac{mg}{EA}}$$

7. Kompatibilitet

$$\epsilon = \frac{du}{dx} \rightarrow u = \delta = \Delta = \int_0^{10} \epsilon dx = \left[\frac{mg}{EA} \cdot x \right]_0^{10} = \frac{10 \cdot mg}{EA} = \frac{10 \cdot 1200 \cdot 9.82}{200 \cdot 10^9 \cdot 1 \cdot 10^{-4}} = \underline{\underline{5.89 \text{ mm}}}$$