Remarks: See §5.2.3, pages 288 till 294

Hint:

Calculate the total shear force that half of the beam must carry.

Answer:

The minimum number of dowels required is 10

Explanation:

Cross-sectional properties:

$I_{zz} = 138,24 \times 10^6 \text{ mm}^4$

$S_z^{\text{a}} = 864 \times 10^3 \text{ mm}^3$

The shear force per unit length:

$$s_x^{\text{a}} = \frac{V \times (864 \times 10^3 \text{ mm}^3)}{138,24 \times 10^6 \text{ mm}^4} = (6,25 \times 10^{-3} \text{ mm}^{-1}) \times V$$

$V_{\max} = 3,6 \text{ kN}$

Total shear force for half of the beam:

$$\int_{\frac{1}{2}\ell} s_x^{\text{a}} \mathrm{d}x = \frac{1}{2} \times (2000 \text{ mm})(6,25 \times 10^{-3} \text{ mm}^{-1})(3,6 \times 10^3 \text{ N}) = 22500 \text{ N}$$

The required dowels for half of the beam:

$$n \geq \frac{22500 \text{ N}}{5 \times 10^3 \text{ N}} = 4,5 \Rightarrow n = 5$$

Therefore 10 dowels are required for the whole beam .