Remarks: See §5.2.3, pages 288 till 294

Hint:

Determine the total shear-force that half of the beam must carry

Answer:

32 shear connectors are needed.

Explanation:

Cross-sectional properties:

$I_{zz} = 3,21\times10^{9}\ \text{mm}^4$

$S_z^{\text{a}} = 7200\times10^{3}\ \text{mm}^3$

The shear force per unit length is calculated by:

$$s_x^{\text{a}} = \frac{V\times(7200\times10^{3}\ \text{mm}^3)}{(3,21\times10^{6}\ \text{mm}^4)} = (2,243\times10^{-3}\ \text{mm}^{-1})\times V$$

$V_{\max} = 20\ \text{kN}$

Resultant shear force between two battens for half of the beam:

$$\int_{\frac{1}{2}\ell} s_x^{\text{a}}\text{d}x = \frac{1}{2}\times(2000\ \text{mm})(2,243\times10^{-3}\ \text{mm}^{-1})(20\times10^{3}\ \text{N}) = 44860\ \text{N}$$

The number n of connectors needed:

$$n \geq \frac{44860\ \text{kN}}{6\times10^{3}\ \text{kN}} = 7,47 \ \Rightarrow\ n = 8$$

Therefore the total number of bolts needed is 16, (and the total number of connectors is 32)