Chapter 5, Shear Forces and Shear Stresses Due to Bending

Remarks: See §5.4.1, pages 311 till 322

## Answer:

- a.  $\tau_{avg} = 4 \text{ N/mm}^2$
- b.  $\tau_{\text{max}} = 6 \text{ N/mm}^2$
- c.  $\tau = 4.5 \text{ N/mm}^2$
- d.  $\tau_{\rm max}$  Does not change.

## Explanation:

c. The static moment at quarter-height is:

$$S_z^a = \frac{1}{4}bh \cdot \frac{3}{8}h = \frac{3}{32}bh^2$$

And the shear force is:

$$\tau = \frac{V_z \cdot \frac{3}{32}bh^2}{b \cdot \frac{1}{12}bh^3} = \frac{9}{8} \frac{V_z}{bh}$$

d.  $\tau_{\text{max}} = \frac{3}{2} \frac{V_z}{A}$ 

Because  $V_z$  and A do not change,  $\tau_{\rm max}$  also does not change.