

Remarks: See §5.6, example 2, pages 381 till 382

Answers:

a. $\tau_{\text{bolt}} = 47,75 \text{ N/mm}^2$

b. $\tau^{(1)} = 2,5 \text{ N/mm}^2$

c. $\sigma_{\text{upsetting}}^{(1)} = 30 \text{ N/mm}^2$

d. $\tau^{(2)} = 1,5 \text{ N/mm}^2$

e. $\sigma_{\text{upsetting}}^{(2)} = 15 \text{ N/mm}^2$

Explanation:

a. Area of the bolt cross-section: $A = 78,54 \text{ mm}^2$

$$\tau_{\text{bolt}} = \frac{7,5 \times 10^3 \text{ N}}{2 \times (78,54 \text{ mm}^2)} \text{ (double shear lap)}$$

b. $\tau^{(1)} = \frac{7,5 \times 10^3 \text{ N}}{2 \times (60 \text{ mm})(25 \text{ mm})}$

c. $\sigma_{\text{upsetting}}^{(1)} = \frac{7,5 \times 10^3 \text{ N}}{(10 \text{ mm})(25 \text{ mm})}$

d. $\tau^{(2)} = \frac{\frac{1}{2} \times 7,5 \times 10^3 \text{ N}}{2 \times (50 \text{ mm})(25 \text{ mm})}$

e. $\sigma_{\text{upsetting}}^{(2)} = \frac{\frac{1}{2} \times 7,5 \times 10^3 \text{ N}}{(10 \text{ mm})(25 \text{ mm})}$