Example 2.1.5

Figure 1 shows a double-lug joint which is loaded in tension by 3 kN. The pin is a perfect cylinder of radius 7.5 mm. Calculate the shear stress in the pin.

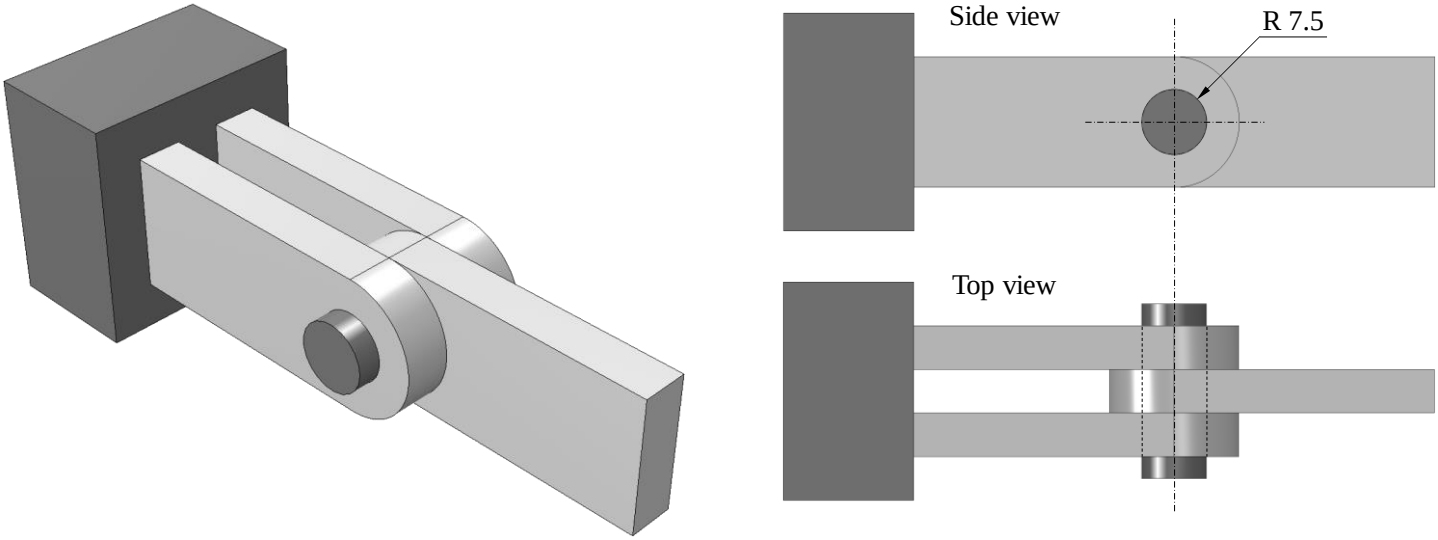

Figure 1: A double-lug joint (dimensions in mm).

Pin cross-sectional area:

$$A = \pi r^2 = (3.14)(7.5\ \text{mm})^2$$

$$A \cong 176.715\ \text{mm}^2$$

The force to be used is $T = 3\ \text{kN}$

This force acts on **two** cross-sectional areas.

$$\tau = \frac{T}{2A}$$

$$\tau = \frac{3\ \text{kN}}{2\left(176.715\ \text{mm}^2\right)}$$

$$\tau = 8.488\ \frac{\text{N}}{\text{mm}^2} = 8.488\ \text{MPa}$$