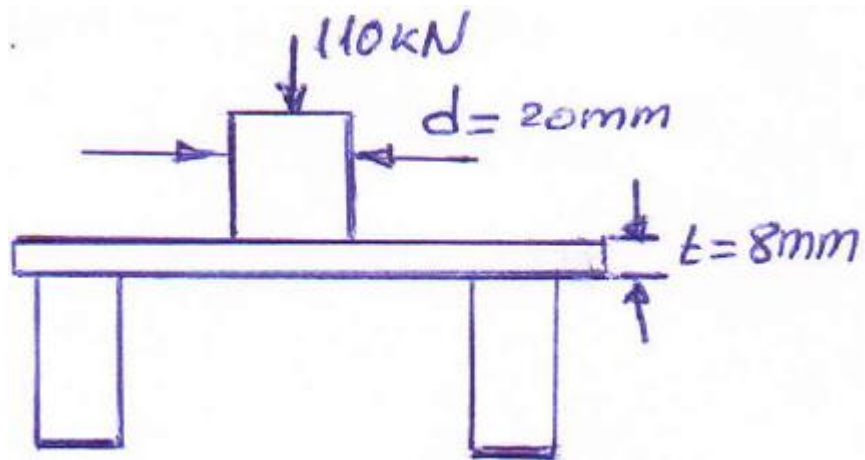


Philadelphia University
Faculty of Engineering
Dep. Of Mechanical Engineering
Quiz:1 .A,2^dsem. 2015
Solid Mech.

Dr. Nabil Musa

A punch for making holes in steel plates shown in figure. If a punch having diameter $d = 20 \text{ mm}$ is used to punch a hole in 8-mm plate. Determine the shear stress in plate and the normal stress in the punch.



$$A_s = \pi dt = \pi(20 \times 8) = 502,7 \text{ mm}^2$$

$$\tau = \frac{P}{A_s} = \frac{110 \times 10^3}{502,7 \text{ mm}^2} = 219 \text{ MPa.}$$

$$\sigma_c = \frac{P}{A_{\text{punch}}} = \frac{110 \times 10^3}{\frac{\pi}{4} 20^2} = 350 \text{ MPa}$$