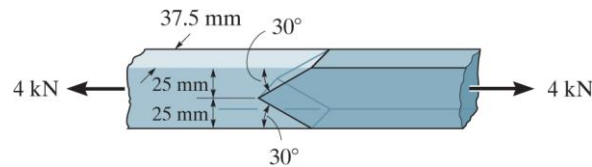1. The two members used in the construction of an aircraft fuselage are jointed together using a 30^0 fish-mouth weld. Determine the <u>average normal</u> and <u>average shear stress</u> on the plane of each weld. Assume each inclined plane supports a horizontal force of 2 kN. [15%] Ans:533.33kPa,923.76kPa


2. The crimping tool is used to crimp the end of the wire E. A force of 100 N is applied to the handles. (a) Determine the <u>average shear stress in the pin at A</u>. The pin is subjected to double shear and has a diameter of 5 mm. (b) Determine the <u>average shear stress in the pin at B</u>. The pin is subjected to double shear and has a diameter of 5 mm. Only a vertical force is exerted on the wire.   [20%] Ans:29.709 MPa, 12.732 MPa
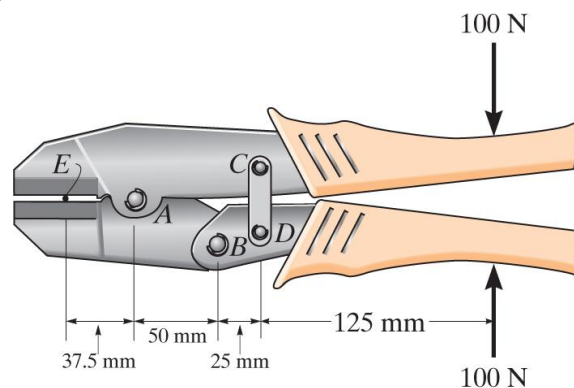

3. Determine the <u>largest load P</u> that can be applied to the frame without causing either the average normal stress or the average shear stress at section a-a to exceed $\sigma = 150\,\text{MPa}$ and $\tau = 60\,\text{MPa}$, respectively. Member CB has a square cross section of 25 mm on each side.   [15%] Ans:62.5 kN
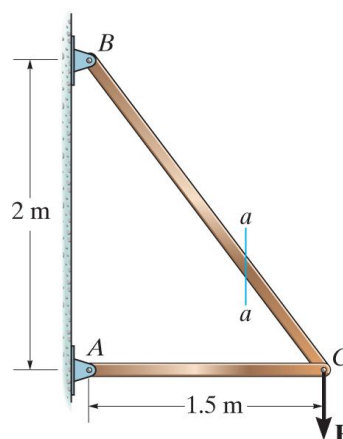
4. The rigid beam is supported by a pin at *A* and wire *BD* and *CE*. If the load *P* on the beam causes the end *C* to be displaced 10 mm downward, determine the normal strain developed in wires *CE* and *BD*. [15%] Ans:0.0025, 0.00107
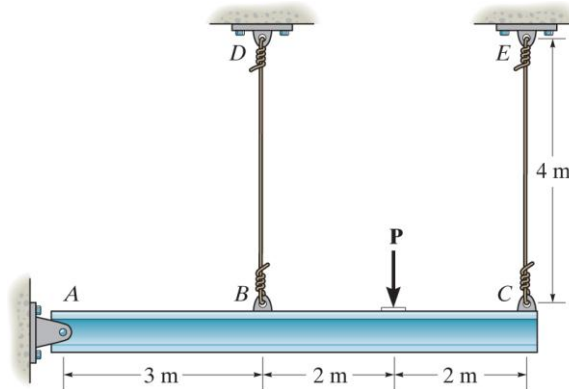
5. The square plate is given the displacement indicated by the dashed lines. (a) Determine the shear strain at the corners *A* and *B*. (b) Determine the average normal strains along side *AB* and diagonal *DB*. [20%] Ans:(a)0.206 rad, -0.206 rad (b)-0.0889, -0.1875
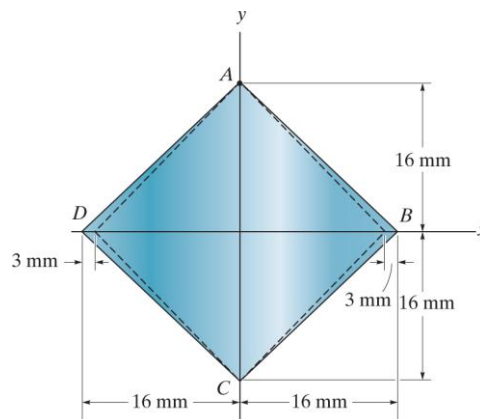
6. The rectangular plate is deformed into the shape shown by the dashed lines. Determine the average normal strain along diagonal *BD*, and the average shear strain at corner *B*. [15%] Ans:1.6x10^{-3},0.0148 rad