

Answer on Question #57200-Engineering-Mechanical Engineering

A block of material 150mm x 50mm x 75mm has a shear modulus of 50 GPa. Determine the shear stress and the shear strain induced by the 2kN shearing force.

Solution

The shear stress is

$$\tau = \frac{P}{A} = \frac{2\text{kN}}{50\text{mm} \cdot 75\text{mm}} = 0.533 \text{ MPa.}$$

The shear strain is

$$\gamma = \frac{\tau}{G} = \frac{0.533 \text{ MPa}}{50 \text{ GPa}} = 1.066 \cdot 10^{-5}.$$