

## FAQ's

### **1. What is Shear stress?**

Shear stress can be defined as the ratio of the force acting coplanar to the surface to the cross sectional area that resists the force. While tensile stress causes elongation shear stress causes shearing. The shear stress is given by:

$$\text{Shear stress} = \text{coplanar force} / \text{resisting area}$$

### **2. Define Shear strain.**

Shear strain is the strain resulting from the application of opposing forces in a direction parallel to a surface or to a planar cross section of a body. It is an angular change at some point in a shape. When scissors cut paper, they cause the paper to undergo a shear strain so large that the paper yields, coming apart where it is strained.

### **3. Define Modulus of rigidity.**

Mathematically the shear modulus is equal to the quotient of the shear stress divided by the shear strain. The shear stress, in turn, is equal to the shearing force  $F$  divided by the area  $A$  parallel to and in which it is applied, or  $F/A$ . The shear strain or relative deformation is a measure of the change in geometry and in this case is expressed by the trigonometric function, tangent ( $\tan$ ) of the angle  $\theta$  (theta), which denotes the amount of change in the  $90^\circ$ , or right, angles of the minute representative cubic volume of the unstrained material

**4. A rock 150 cm long and 2 cm in diameter is subjected to an load of 200Kn. If the Modulus of rigidity of the material is  $2 \times 10^5 \text{ N/mm}^2$ , Determine**

**a. Shear stress**

**b. Shear strain**

**Solution:**

$$\begin{aligned}\text{Shear stress} &= \text{load} / \text{area} \\ &= (200 \times 1000) / ((\pi \times 20^2) / 4) \\ &= (200 \times 1000) / 314.1592 \\ &= 636.61 \text{ N/mm}^2\end{aligned}$$

$$\text{Modulus of rigidity} = \text{shear stress} / \text{shear strain}$$

$$\text{Shear strain} = 636.61 / (2 \times 10^5) = 0.00319$$