Tensile/Compressive Stress

$$\sigma = \frac{P}{A_0}$$

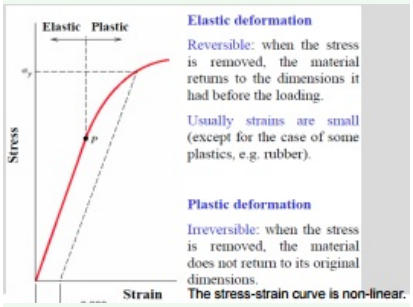
P: load

Ao: Original cross-sectional area before loading

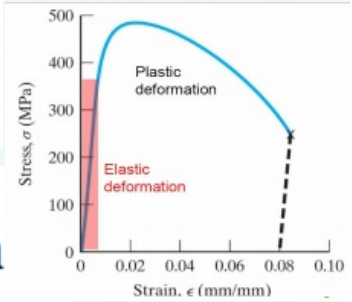
Shear stress

$$\tau = \frac{P_S}{A_0}$$

Elastic/plastic deformation



Stress vs. Strain Curve



Shear strain

$$\gamma = \frac{\Delta y}{z_0} = \tan$$

alpha: angular displacement

Strain is dimensionless

Tensile/Compressive strain

$$\epsilon = \frac{l - l_0}{l_0} = \frac{\Delta l}{l_0}$$

E: Tensile/compressive strain

l: length

Yield strength