

Tensile/Compressive Stress

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

P: load

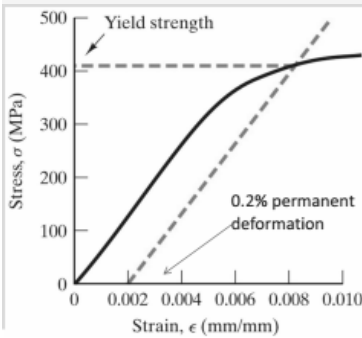
A₀: Original cross-sectional area before loading

Shear strain

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

alpha: angular displacement
Strain is dimensionless

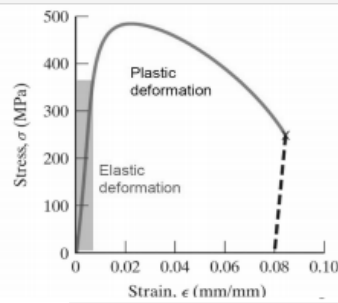
Yield strength



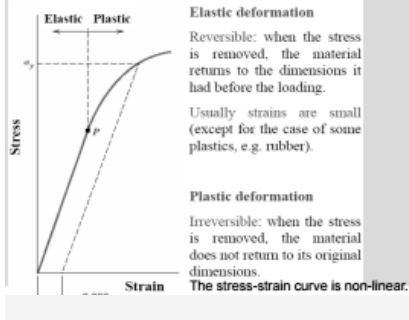
Shear stress

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

Stress vs. Strain Curve



Elastic/plastic deformation



Tensile/Compressive strain

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

E: Tensile/compressive strain
l: length