Elasticity

Stress	$Stress = \frac{Restoring\ force}{Area}$
Strain	$Strain = \frac{Change\ in\ configuration}{Original\ configuration}$
Hooke's Law E = modulus of elasticity	$Stress \propto Strain$ $Stress = E \times Strain$
Tangential/Shear Stress	$\frac{F}{A} = \eta\theta$
Volumetric Stress	$\Delta P = -K\frac{\Delta V}{V}$

Modulus of Elasticity

Young's Modulus	$\gamma = \frac{Normal\ Stress}{Longitudnal\ Strain}$	$\gamma = \frac{F\Delta l}{Al}$
Bulk Modulus	$K = \frac{Volumetric\ Sress}{Volumetric\ Strain}$	$K = \frac{\Delta pV}{\Delta V}$
Modulus of Rigidity	$\eta = \frac{Tangential\ Stress}{Shearing\ Strain}$	$\eta = \frac{F}{A\theta}$

Bulk modulus for differnet thermodynamcis Process

Isobaric	Isochocric	Isothermal	Adiabatic
$K = 0$ $P = const.$	$K = \infty$ $V = const.$	$K = P$ $T = const.$	$K = \gamma P$ Adiabatic Exponent

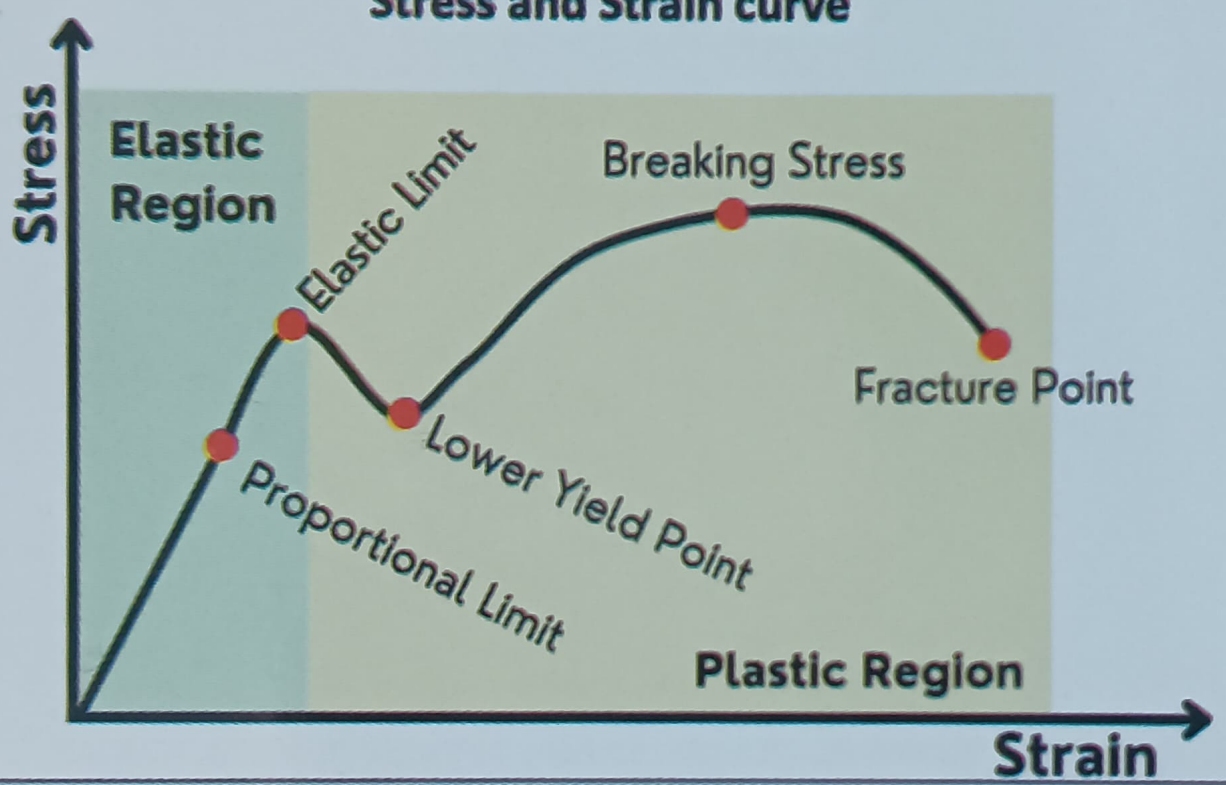
Some Other Formulas

Energy stored per unit volume $\frac{1}{2}F\Delta l$

Energy stored per unit volume

$\frac{1}{2}$ stress × strain	$\frac{1}{2}\frac{(Stress)^2}{Y}$	$\frac{1}{2}(strain)^2 Y$

Stress and Strain curve



Poisson's Ratio(σ) $\sigma = 0.5$ constant volume	$\sigma = \frac{Lateral\ strain}{Longitudnal\ strain} = \frac{-\Delta R/R}{\Delta l/l}$