Shear Stress (τ): Stress due to tangential forces.

$$\tau = \frac{F}{A}$$

Bending Stress (f_b): Stress due to bending.

$$f_b = \frac{M}{Z}$$ where Z = sectional modulus = I/Y

Torsional stress: Stress due to torsion.

STRAINS

Longitudinal strain or lateral strain

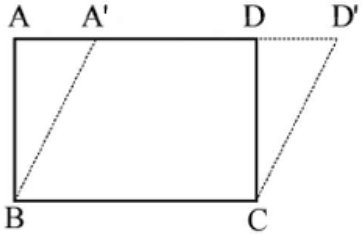
The ratio of deformed length to original length due to normal forces acting on it.

Longitudinal strain = change in length/actual length

Shear strain

It is the change in angle in a member due to tangential force or shear force.

Shear strain = ϕ = AA'/AB = DD'/AB



Volumetric strain

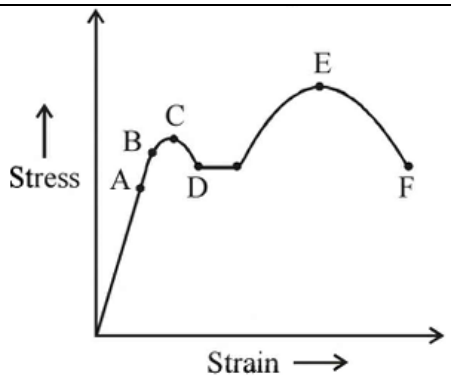
Ration of change in volume to original volume.

Volume strain = $\delta V/V$

STRESS STRAIN GRAPH

Hooke's law : According to Hook's law, stress is directly proportional to strain,

$$\sigma \propto \varepsilon \Rightarrow \sigma = E\delta$$

For mild steel A - Proportionality limit B- Elastic limit C - Upper yield point D - Lower yield point E - Ultimate stress F - Breaking stress EF - region of reducing c/s area or necking.	
For tor steel It does not has specific yield point. Yield stress is found out by drawing a line from 0.2% strain and parallel to initial slope of curve, the meeting point on graph gives yield stress.