Mechanics of Materials I:

Fundamentals of Stress & Strain and Axial Loading

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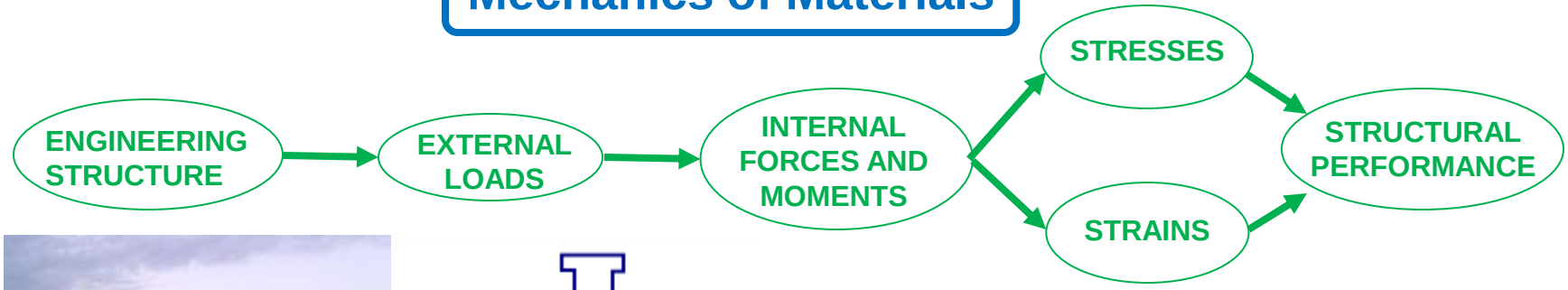
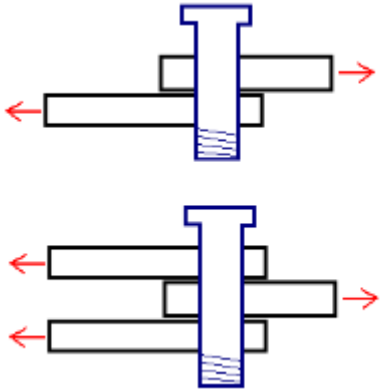
Module 14 Learning Outcomes

- Define/Discuss Shear Stress
- Review 3D Stress at a point along with the sign convention
- Define/Discuss 2D Pure Shear

Mechanics of Materials





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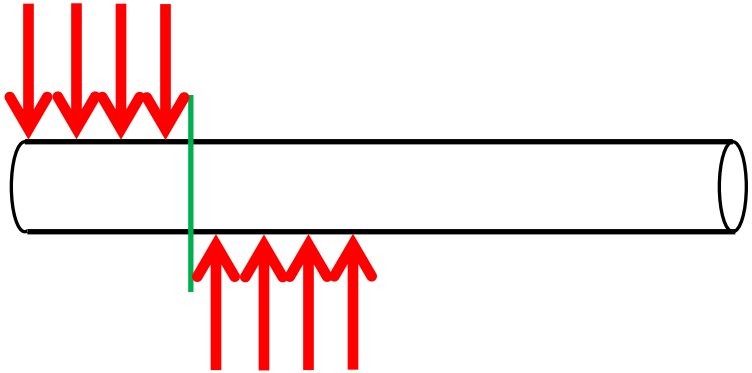
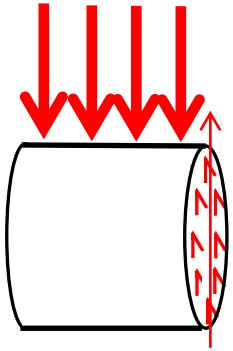
Shear Stress

Show actual
shear bolt to start

Cross section





Assume
Uniformly
Distributed

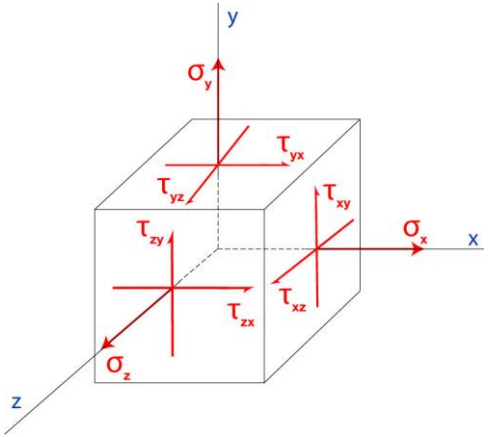
V

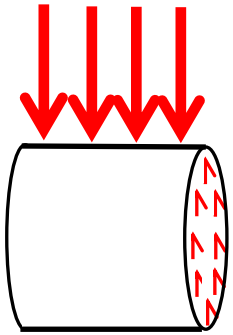
Shear Stress

Force per unit area parallel
to the cut surface

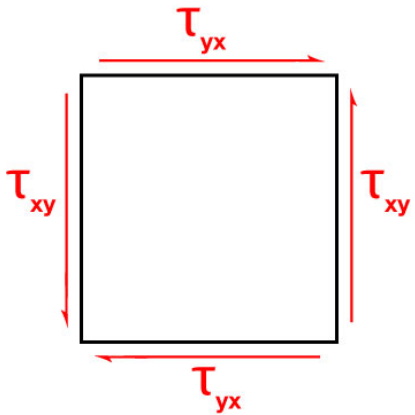
$$\tau = \frac{V}{A}$$

3D State of Stress at a Point
(shown in positive sign convention)





2D Pure Shear



By Equilibrium:

$$\tau_{xy} = \tau_{yx} = \tau$$