Mechanics of Materials II:

Thin-Walled Pressure Vessels and Torsion

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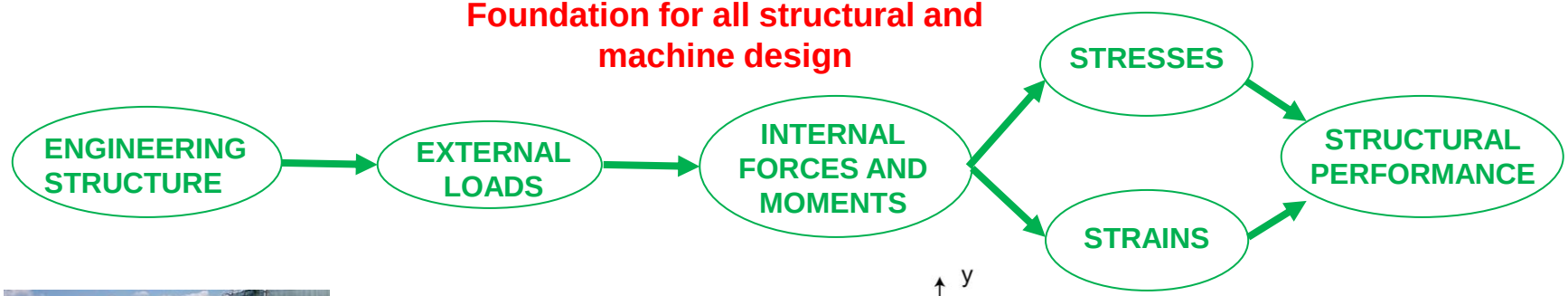
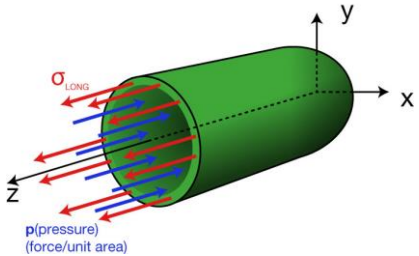
Module 5 Learning Outcome

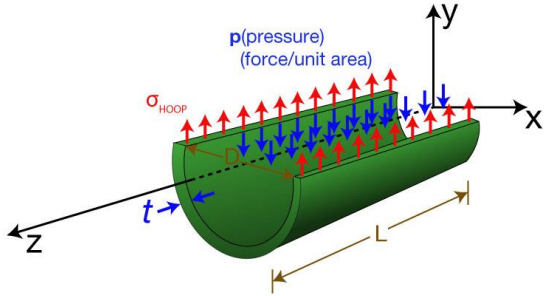
- Determine the relationship between longitudinal stress and hoop stress for a thin-walled pressure vessel

Mechanics of Materials

Foundation for all structural and machine design







Longitudinal Stress:

$$\sigma_{LONG} = \frac{pD}{4t}$$

Hoop Stress:

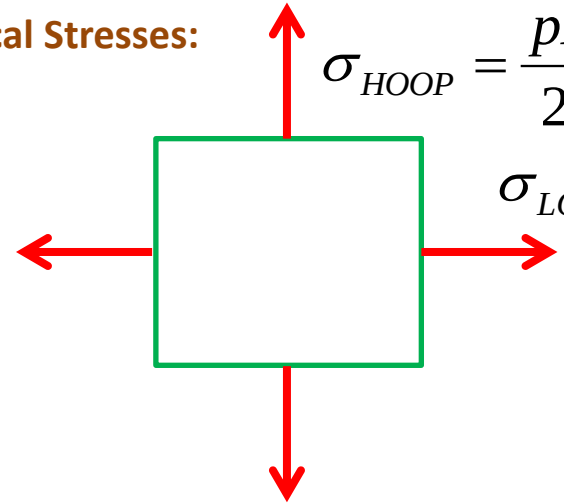
$$\sigma_{HOOP} = \frac{pD}{2t}$$

Thin-Walled Pressure Vessels

Cylindrical Stresses:

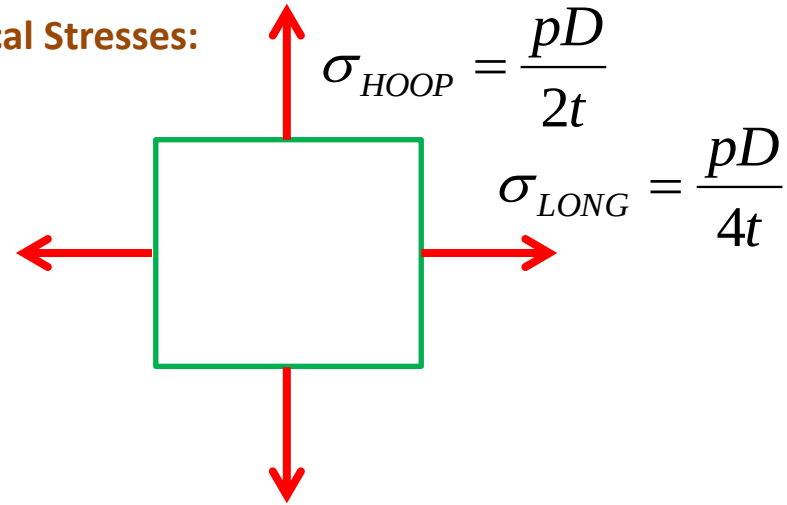
$$\sigma_{HOOP} = \frac{pD}{2t}$$

$$\sigma_{LONG} = \frac{pD}{4t}$$



Thin-Walled Pressure Vessels

Cylindrical Stresses:



Mohr's circle for Plane Stress