Mechanics of Materials II:

Thin-Walled Pressure Vessels and Torsion

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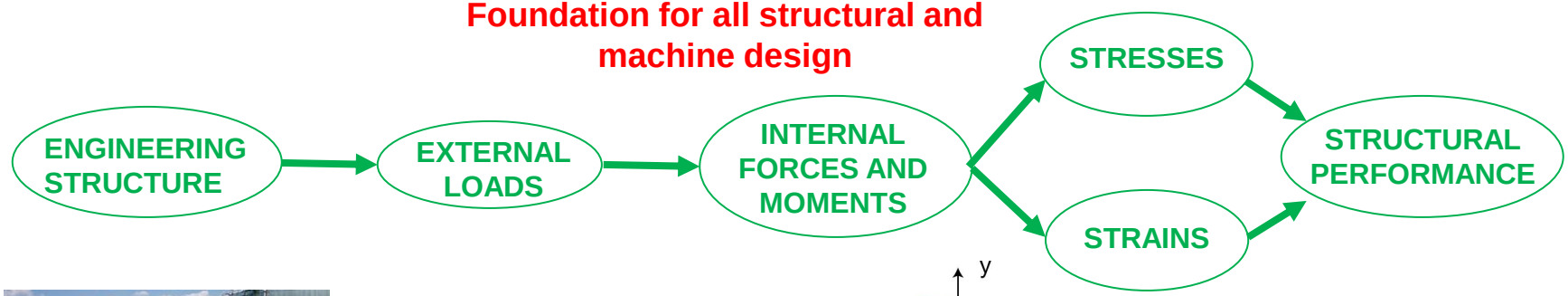
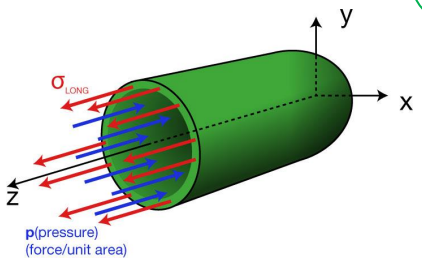
Module 4 Learning Outcome

- Develop an expression for hoop stress for a thin-walled pressure vessel in terms of the pressure and the dimensions of the vessel

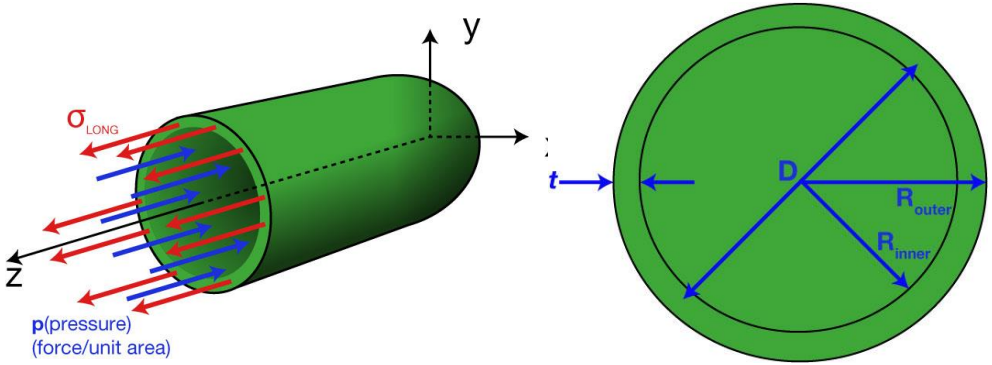
Mechanics of Materials

Foundation for all structural and machine design





Thin-Walled Pressure Vessels



Longitudinal Stress:

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

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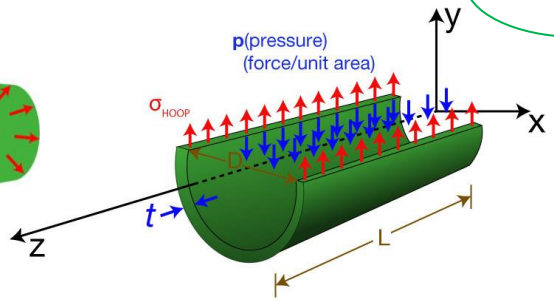
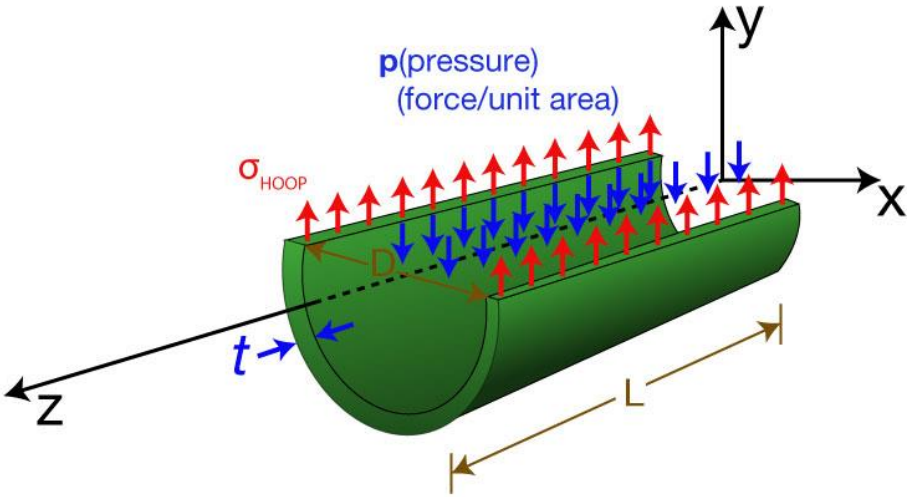
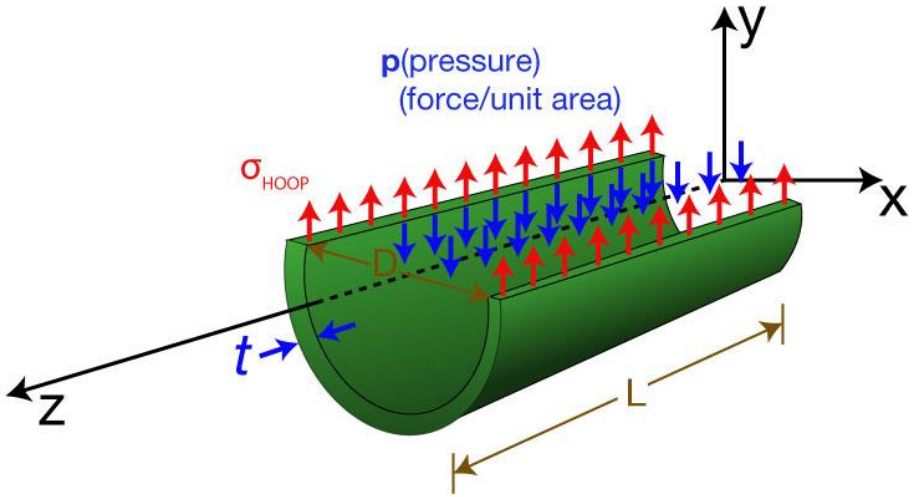
ENGINEERING STRUCTURE → EXTERNAL LOADS → INTERNAL FORCES AND MOMENTS → STRESSES / STRAINS → STRUCTURAL PERFORMANCE



Thin-Walled Pressure Vessels



Thin-Walled Pressure Vessels



Hoop Stress:

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