Stress, Strain and Deformation
Compound Cross-Sections – Examples

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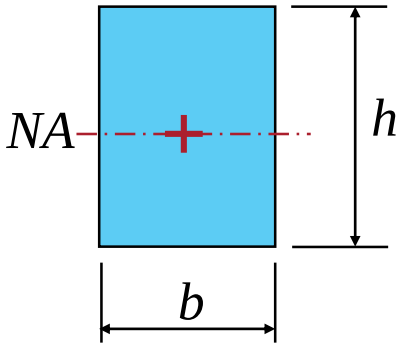
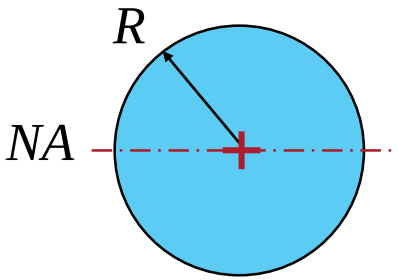
Bending Stresses and Strains – Formulae

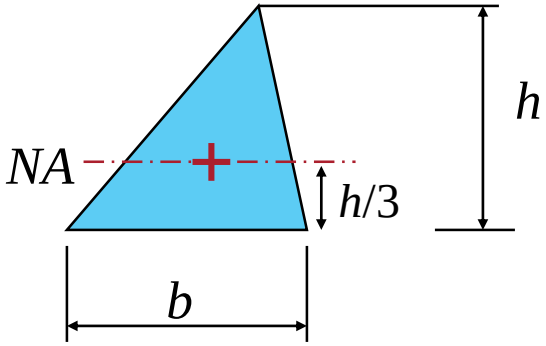
Engineer's theory of bending

$$-\frac{\sigma}{y}=\frac{M}{I}=\frac{E}{R}$$

Basic 2nd moments of area







$$I_{NA}=\frac{b\,h^3}{12}$$

$$I_{NA}=\frac{\pi\,R^4}{4}$$

$$I_{NA}=\frac{b\,h^3}{36}$$

Parallel axis theorem

$$\bar{y}_{NA}=\frac{\sum_i\left(A_i\,\bar{y}_i\right)}{\sum_i\left(A_i\right)}$$

$$d_i=\bar{y}_i-\bar{y}_{NA}$$

$$I_{NA}=\sum_i\left[I_i+A_i\left(d_i\right)^2\right]$$

Textbook - Stress, Strain & Deformation

- **Gere & Goodno – Mechanics of Materials**
  - 8th ed. (2013): **online access**
  - Other editions: **TA405 GER**
- Entire book is relevant
- **CAUTION: the book uses a different sign convention for <u>shear</u>!**