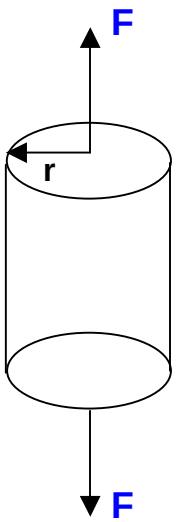
Loading

Examples of tension (compression), shear, bending, torsion.

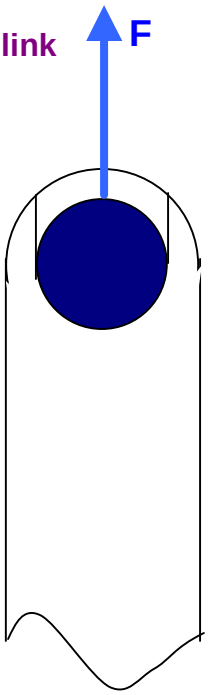
Tension:

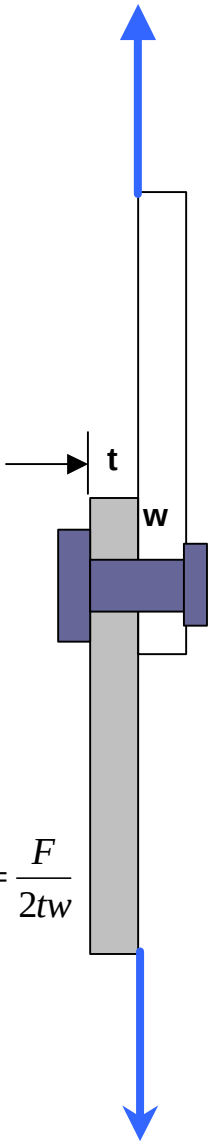


$$s = \frac{F}{A} = \frac{F}{pr^2}$$

Shear:

Tear out on link



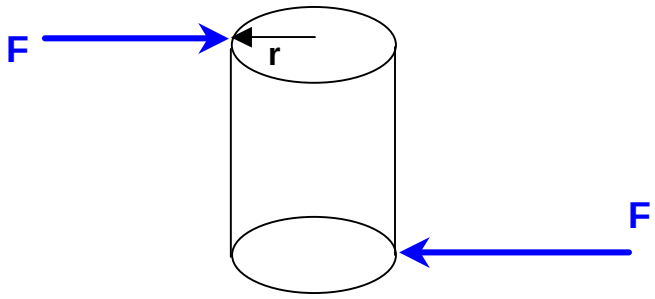


$$t_{tear\,out} = \frac{F}{A_s} = \frac{F}{2tw}$$

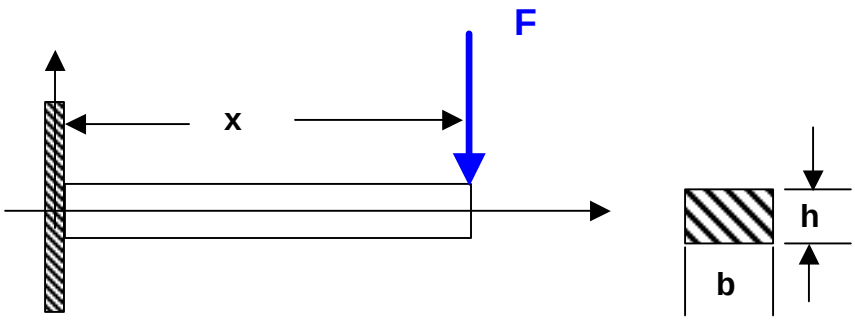
Pin connects two links—F is in opposite direction on 2nd link

Shear in Pin

$$t = \frac{F}{A} = \frac{F}{pr^2}$$



Bending:



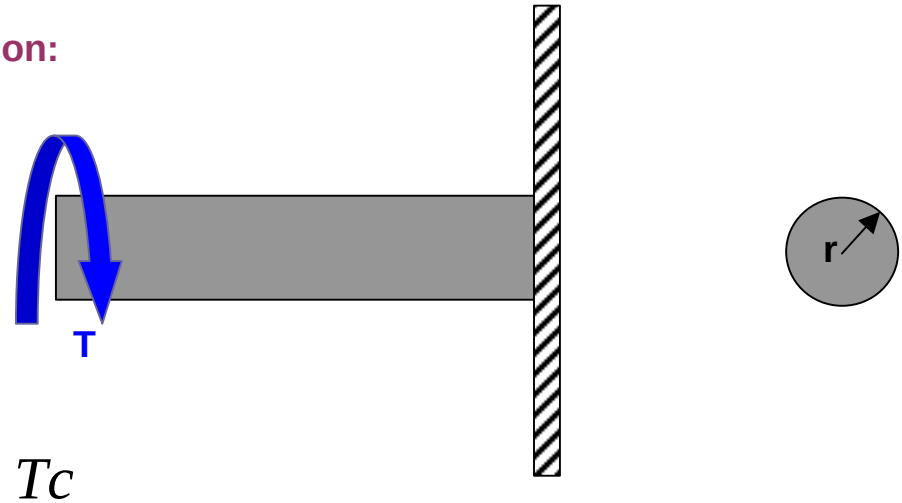
Bending is about z axis
distance to neutral axis is (–y)
Moment is F*x

$$I_{zz} = \frac{1}{12} bh^3$$

$$s = \frac{My}{I} = \frac{Fxy}{\frac{1}{12} bh^3}$$

Top fibers will be in tension (+)
Bottom fibers will be in compression (-)

Torsion:



$$t = \frac{Tc}{J}$$

c = distance to neutral axis
J = polar moment of inertia T = twisting moment