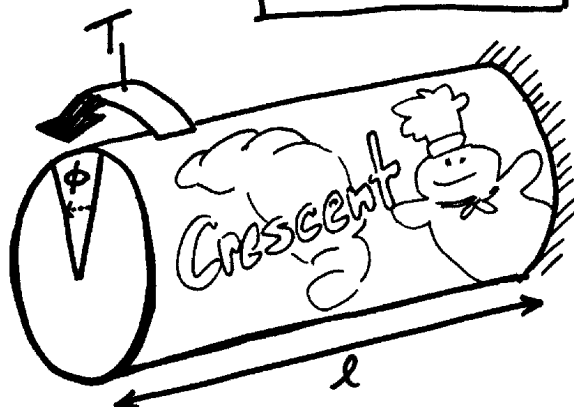


TORSION

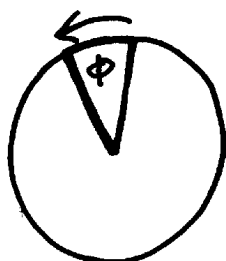


$$\phi = \frac{Tl}{GJ}$$

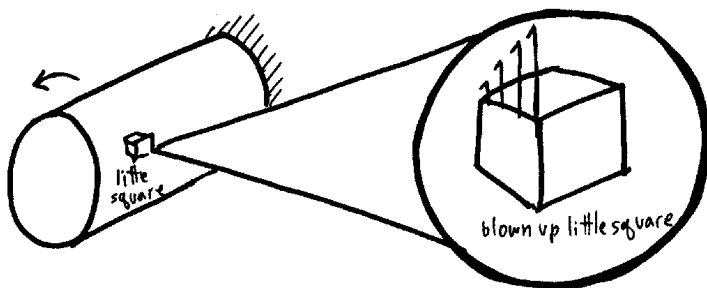
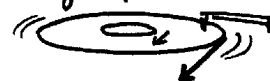
where T is the torque applied, l is the length of the circular shaft, G is the shear modulus, and J is the polar moment of inertia.



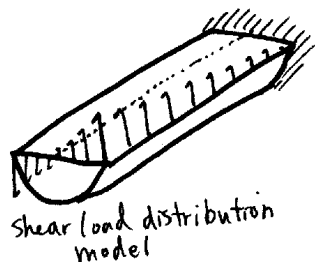
When one side of a circular shaft is constrained, the Torque applied to the other end causes a change of angle ϕ .



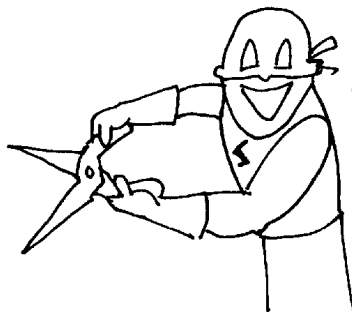
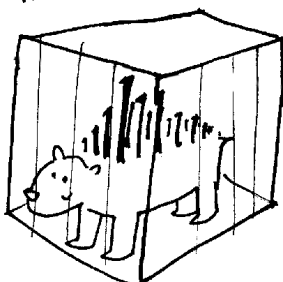
An element on the outside radius will move more than an element closer in. This corresponds to the inner shear stress. Think of a record - the outside edge spins at a greater velocity than the center, but the angular velocity is the same.



Notice that the shear stress is greater at the edge. Also, there is NO AXIAL STRESS



Notice that shear stress decreases as you go inward toward the center as well as when you go back towards the constrained end.



Meet ShearStress porcupine!

