Shear Stress Notes

Units and symbols:

σ Normal stress (Pa)

T Shear strength (Pa)

τ Shear stress (Pa)

ρ Density (kg/m^3)

g Acceleration of gravity (9.81 m/s^2)

m Mass (kg)

H Depth/height (m)

N Newton = Force

FORCE

$$force = mass * gravity$$

Units of force: N = kgm/s^2

How would we convert forces into pressures?

PRESSURE

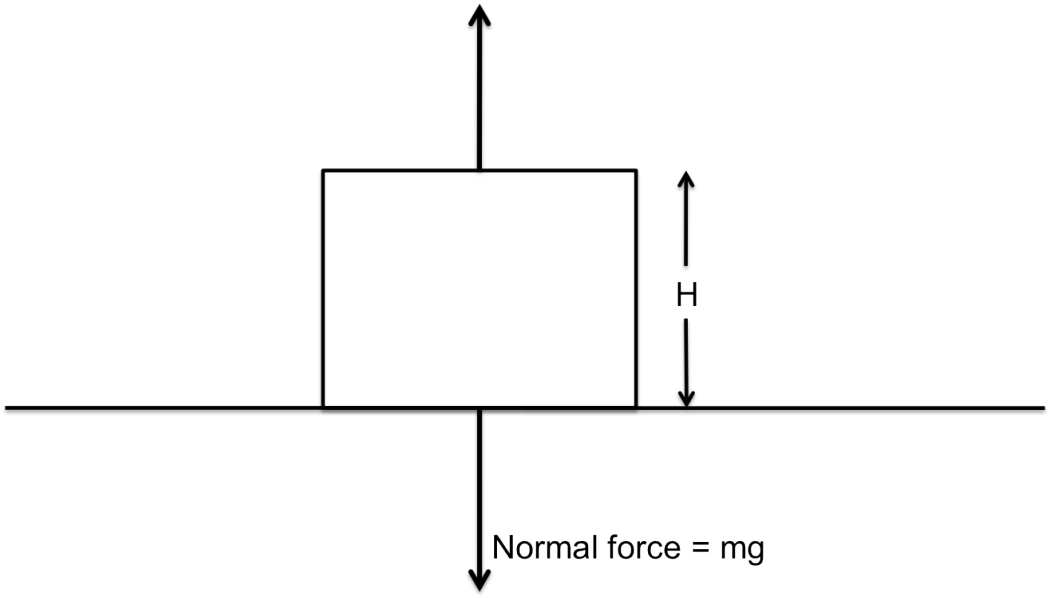
$$pressure = \frac{force}{area} = \frac{mass * gravity}{area}$$

Units of Pressure: Pa = N/m^2 = kg/ms^2

kPa = Pa/1000

Shear Stress Notes

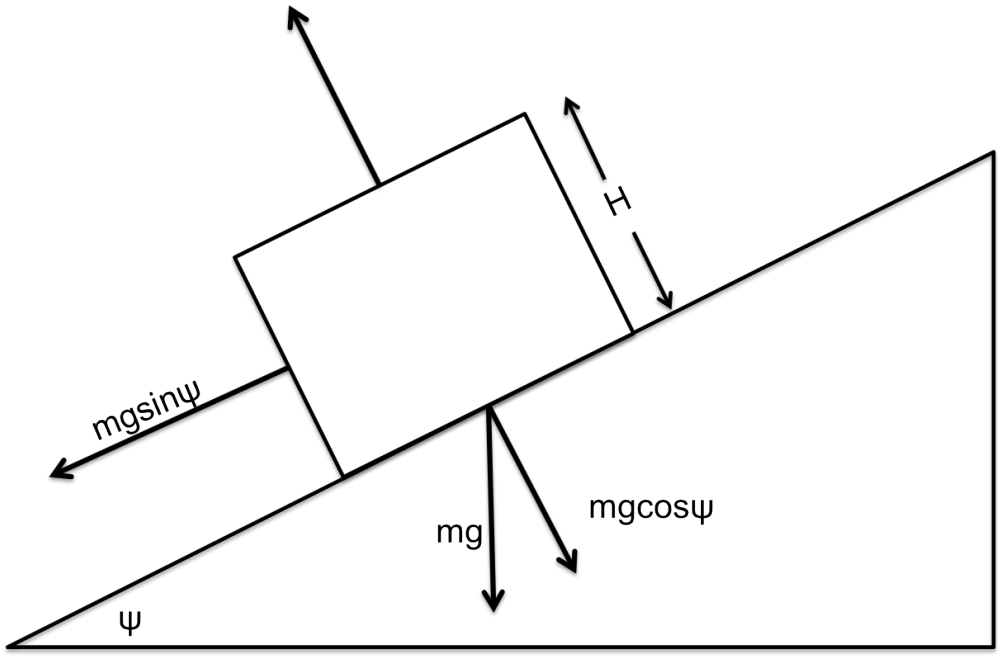
Free-body Diagram on a Flat Surface



Normal stress (flat plane):

$$\sigma = \rho \cdot g \cdot H$$

Free-body Diagram with Slope



Shear stress:

$$\tau = \rho \cdot g \cdot H \cdot \sin(\psi)$$