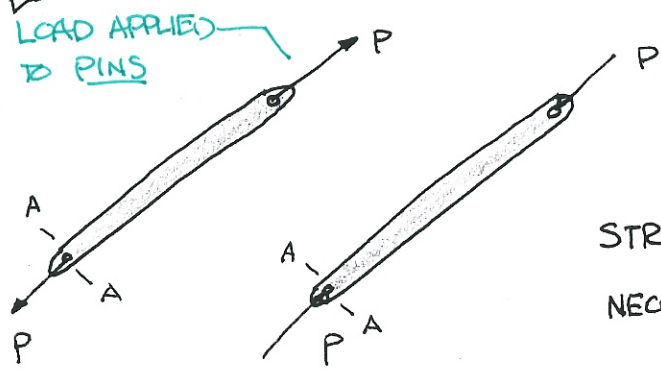


TENSION & COMPRESSION IN A LINK W/ PINS



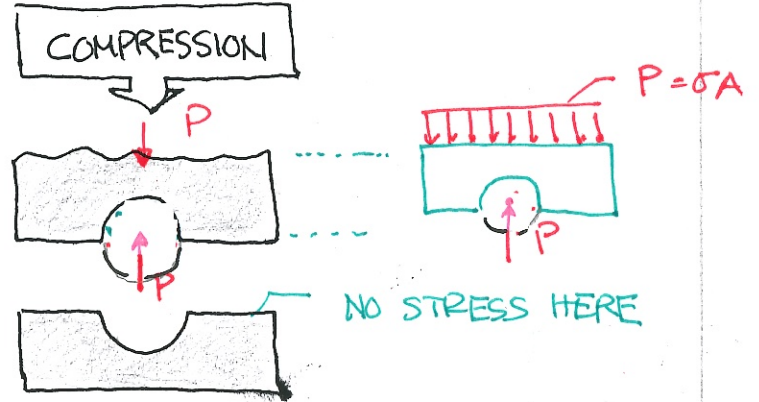
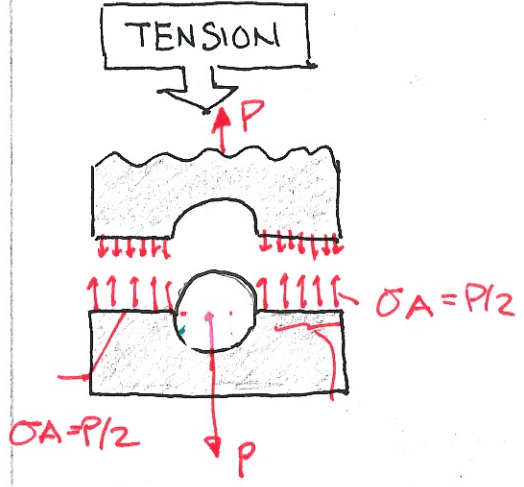
<http://www.wikipedia.org>



STRESS @ A-A IN TENSION NOT
 NEGATIVE of STRESS @ A-A IN
 COMPRESSION

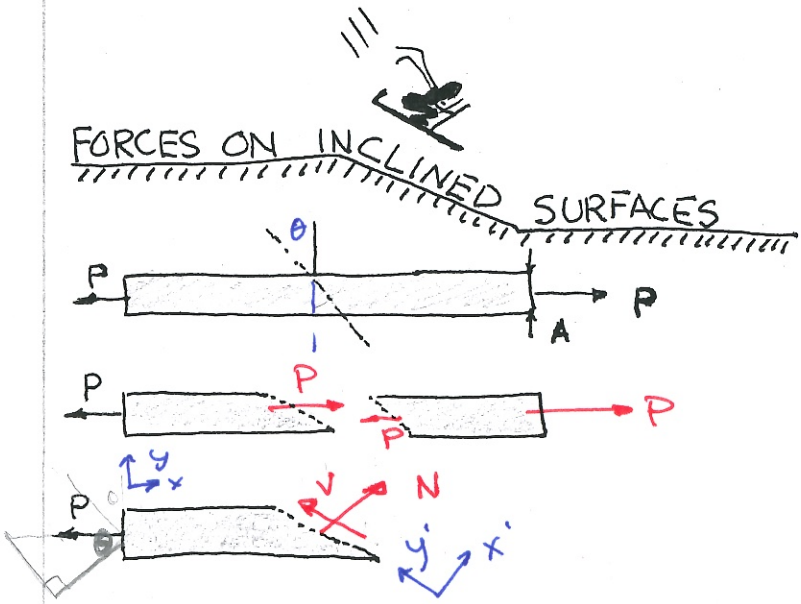
IN TENSION IN COMPRESSION

DRAW THE FREE BODY DIAGRAMS:



THE WAY LINKS ARE LOADED IS IMPORTANT!

FORCES ON INCLINED SURFACES



USE EQUILIBRIUM TO FIND
 N & V.
 (HINT: TILT YOUR AXES)

N: NORMAL FORCE
 V: SHEAR FORCE

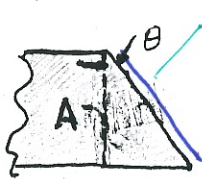
$$\sum F_{x'} = 0 = -P \cos \theta + N$$

$$\sum F_{y'} = 0 = P \sin \theta + V$$

$$N = P \cos \theta$$

$$V = -P \sin \theta$$

NOW CALCULATE NORMAL & SHEAR STRESSES: (HINT: THINK ABOUT WHAT AREA TO USE.)

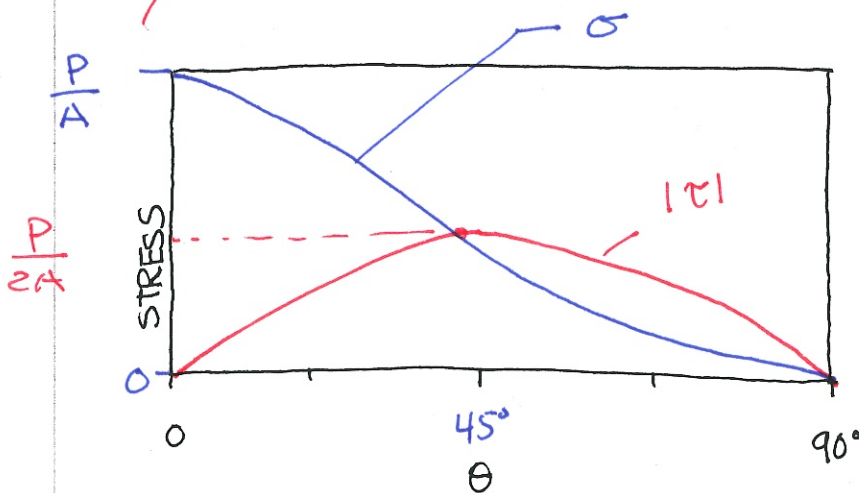


$$\cos \theta = \frac{A}{A_n} \quad A_n = \frac{A}{\cos \theta}$$

$$\sigma = \frac{N}{A \cos \theta} = \frac{N \cdot \cos \theta}{A} = \frac{P \cos^2 \theta}{A}$$

$$\tau = \frac{V}{A \cos \theta} = \frac{V \cos \theta}{A} = \frac{-P \sin \theta \cos \theta}{A}$$

PLOT ^{MAGNITUDE} NORMAL & SHEAR STRESS AS FUNCTIONS OF θ :



σ : ———
 τ : - - - -

WHERE IS $\tau = \tau_{\max}$?

$\theta = 45^\circ$

THINGS TEND TO FAIL IN SHEAR



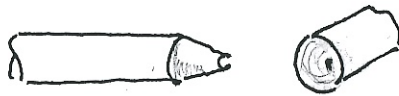
NOTES:

(NORMAL)

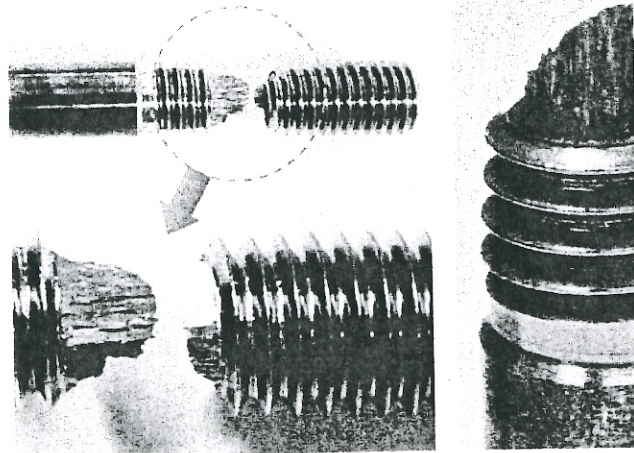
1. FOR AN AXIAL LOAD, WE CAN STILL HAVE SHEAR STRESS.

2. FAILURE MODE FOR A SPECIMEN IN TENSION IS OFTEN DESCRIBED AS SHEAR.

FAILURE PLANE IS 45° FROM LINE of ACTION of FORCE.



"CUP & CONE" FAILURE.



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