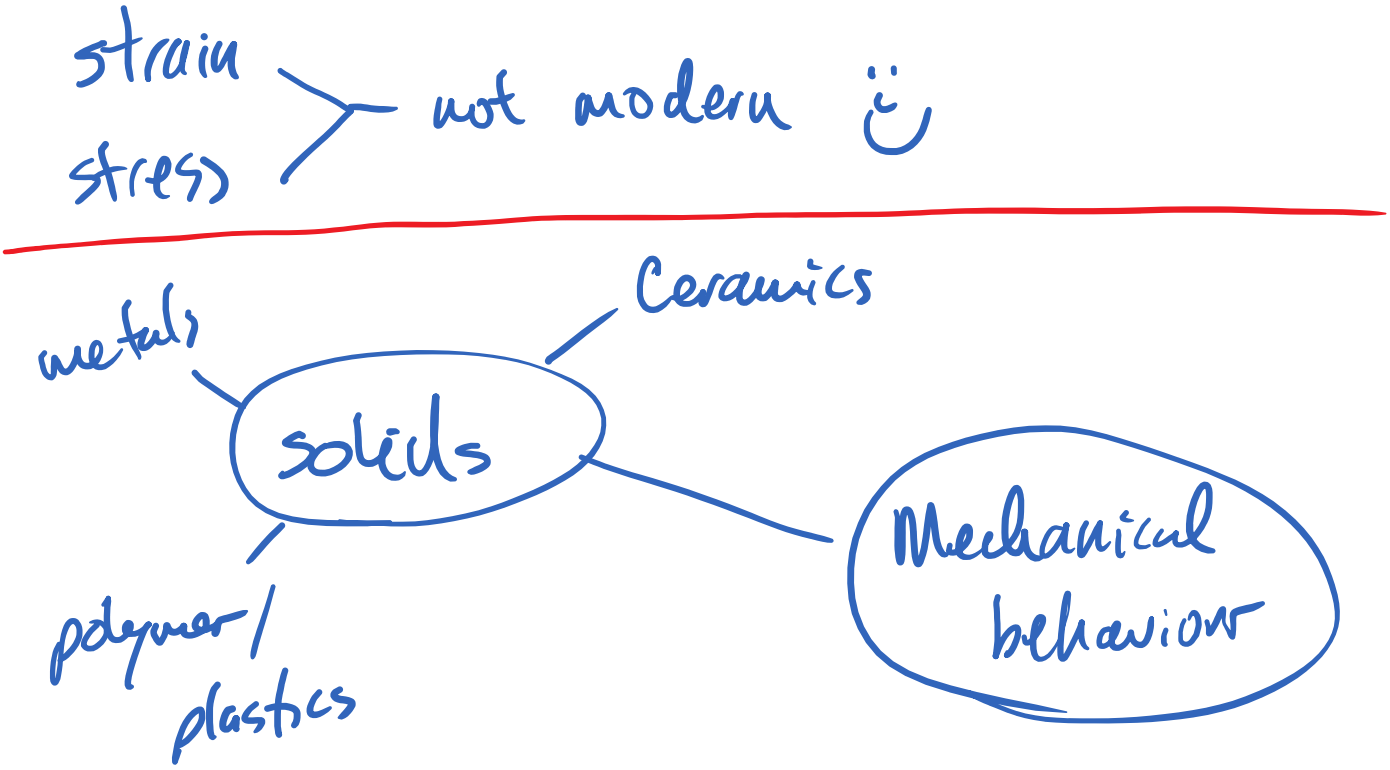
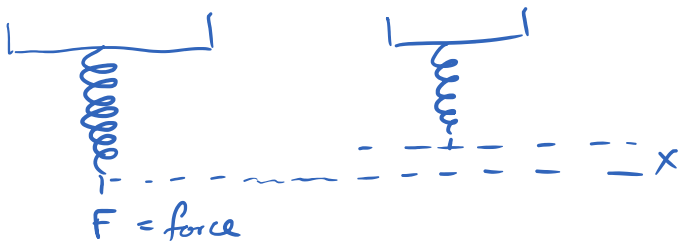
APS110H1f2024 - Sept 9 2024

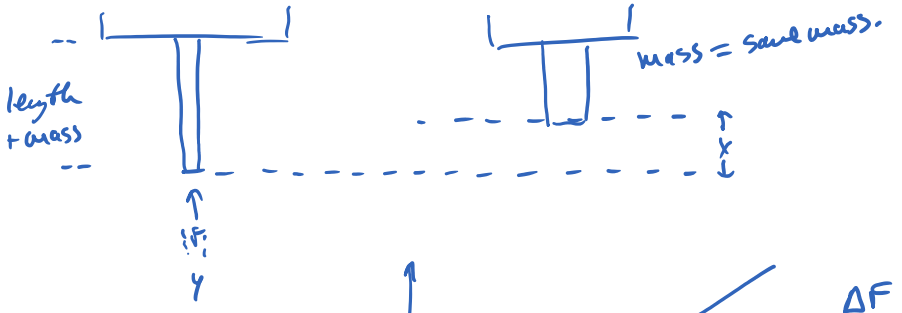
September 8, 2024 10:12 AM

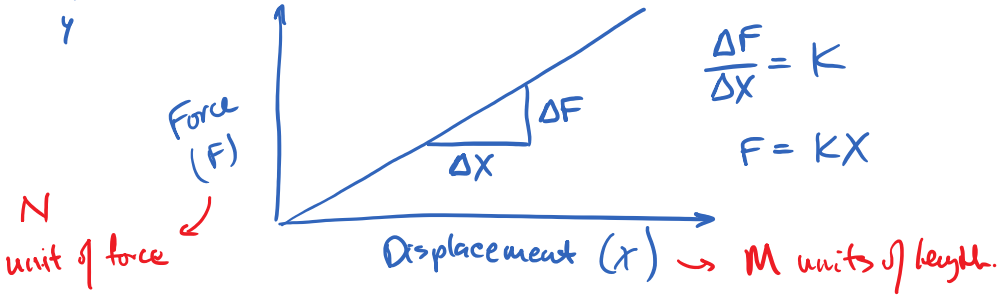


Hooke's Law

September 5, 2024 2:34 PM

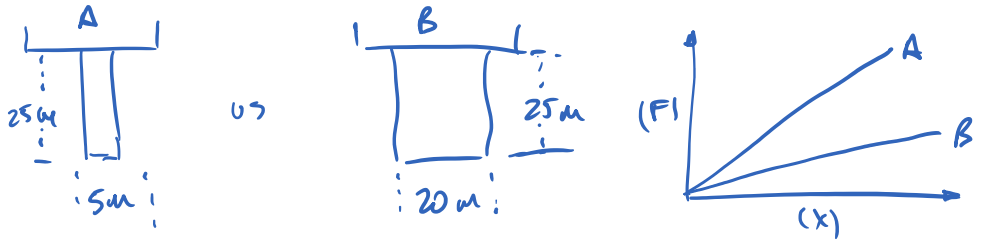




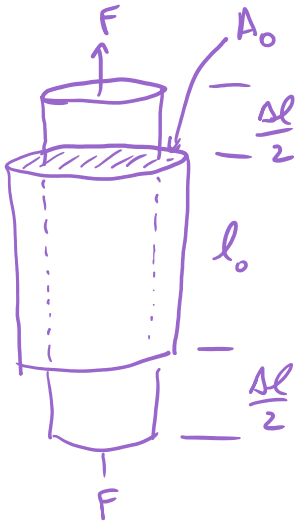


$\frac{\Delta F}{\Delta X} = K$

$F = KX$



stress / strain.

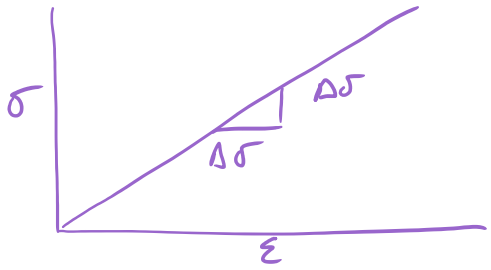


$\sigma = \frac{F}{A_0}$ — force / initial area. = stress

"sigma"

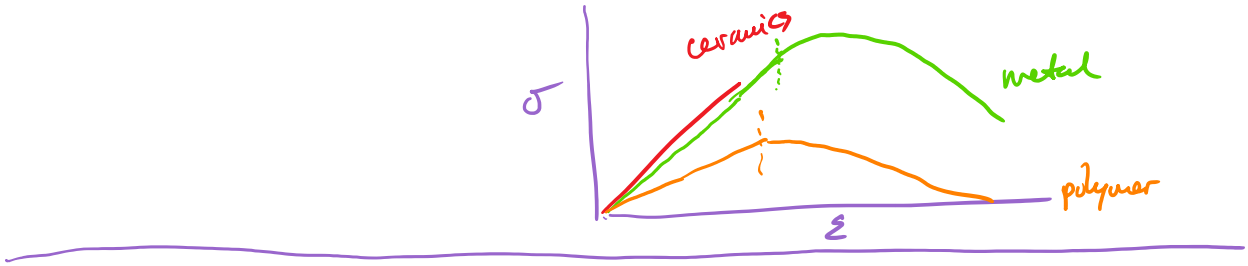
$\varepsilon = \frac{\Delta l}{l_0}$ = strain

"epsilon"



$\frac{\Delta \sigma}{\Delta \varepsilon} = E$

↑ "Young's"

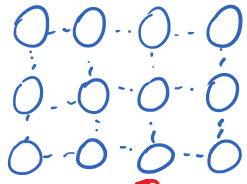


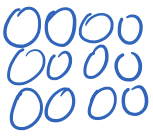
elastic

"start"

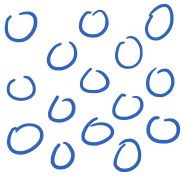
or no...

metal





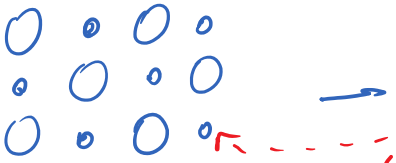
or

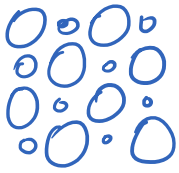


more density

maybe yes

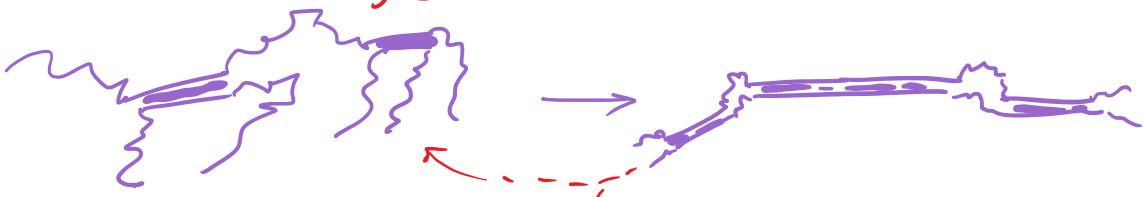
example CuO





maybe

polymer



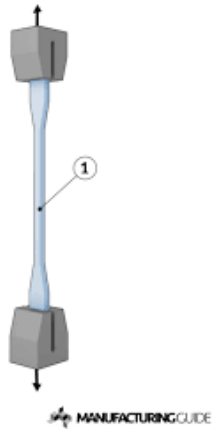
maybe

… just an example

September 9, 2024 9:16 AM

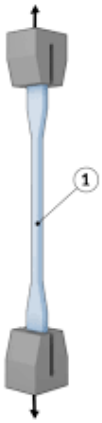
Tensile Test

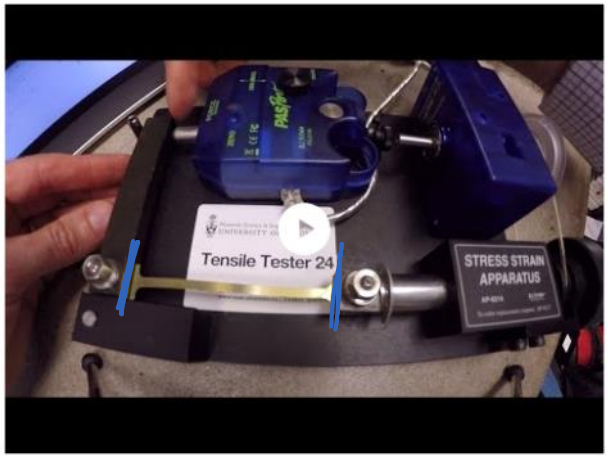
September 5, 2024 2:59 PM



APS110H1f2024 - Sept 11 2024 - Tensile Test

September 5, 2024 2:59 PM





MANUFACTURINGGUIDE

equilibrium ?

10cm

6cm

strained

metals + ceramics.

equilibrium ?

15cm

stress

maybe unlikely

equilibrium ?

strain

or

yes likely

plastic

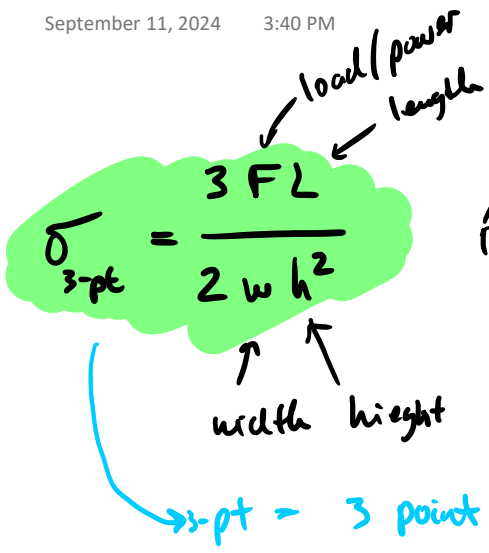
equilibrium ?

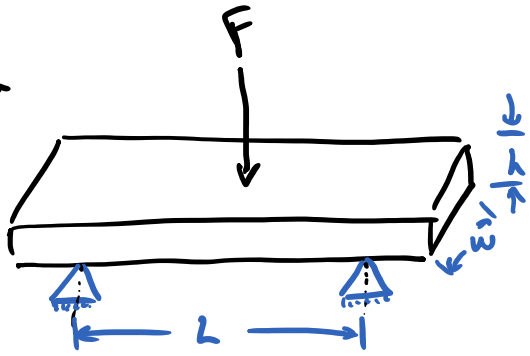
stress

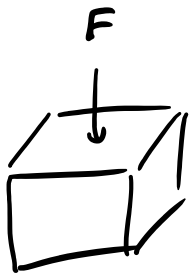
yes likely

"Bending" method

September 11, 2024 3:40 PM

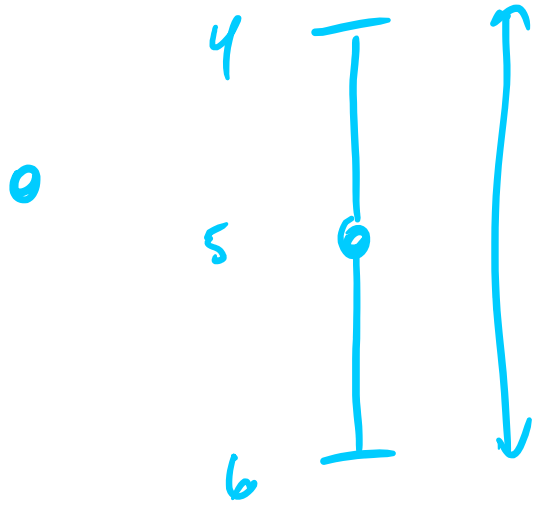






3-pt = 3 point bend strength

September 11, 2024 3:55 PM



APS110H1f2024 - Sept 13 2024

September 12, 2024 2:44 PM

Density ⟶ Sept 16, 2024 / Monday

Demo

... was from 09-11-2024

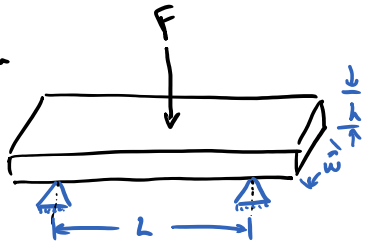
September 11, 2024 3:40 PM

"Bending" method

$$\sigma_{3\text{-pt}} = \frac{3FL}{2wh^2}$$

load (power) · length · width · height

3-pt = 3 point bend strength



$F = n\,Pa$ n = number

$$\sigma_{3\text{-pt}} = \frac{3Pa\ mm}{2\ mm\ mm^2}$$

$= n\ Pa/mm^2$ typo during glass :)

Demo #1 glass

h - 4.8 mm = 0.48 cm

w - 152 mm = 15.2 cm

L - 250 mm = 25 cm data #1 ✗

382 mm = 38.2 cm data #2 ✗

116 mm = 11.6 cm data #3 ✓

#2

h - 2 mm = 0.2 cm

w - 152 mm = 15.2 cm

L - 116 mm = 11.6 cm data #3 ✓

382 mm = 38.2 cm data #2 ✗

250 mm = 25 cm data #1 ✗

---

metal

h - 4.0 mm = 0.40 cm

w - 154 mm = 15.4 cm

L 250 mm = 25.0 cm ~ 1st glass

382 mm = 38.2 cm - worse than 1st glass

116 mm = 11.6 cm - seems "ok"

---

plastic

h - 6.0 mm = 0.6 cm

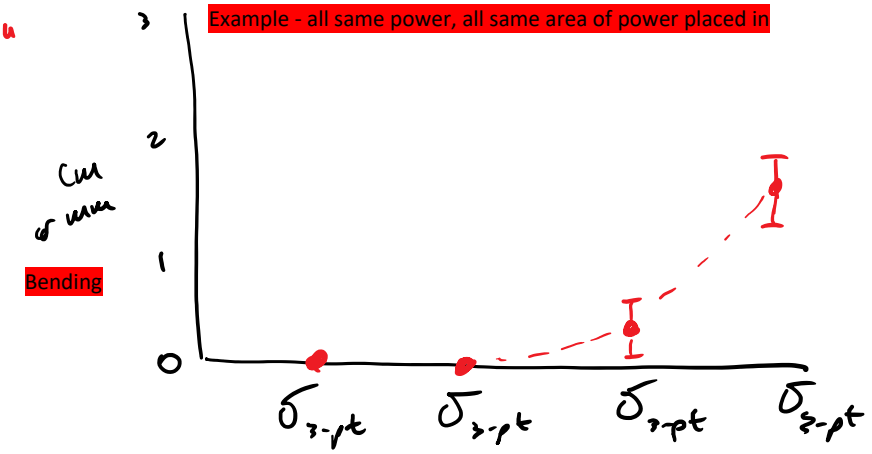
w - 156.0 mm = 15.6 cm

L 250 mm = 25.0 cm X

382 mm = 38.2 cm X

116 mm = 11.6 cm maybe

"glass #1"

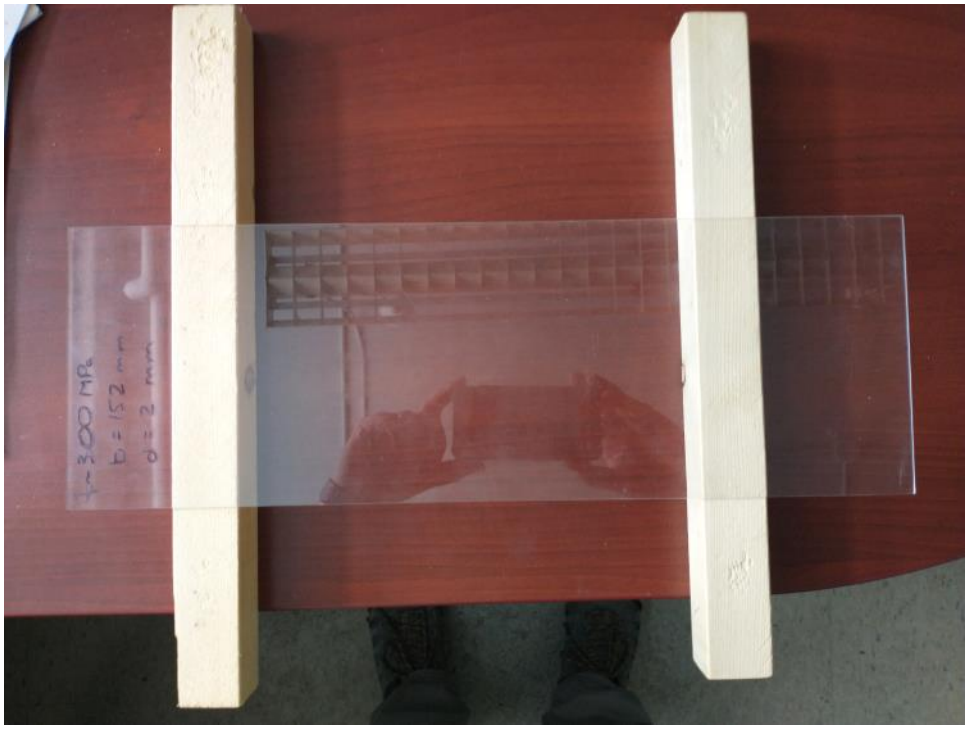


Glass 1

September 13, 2024 4:14 PM

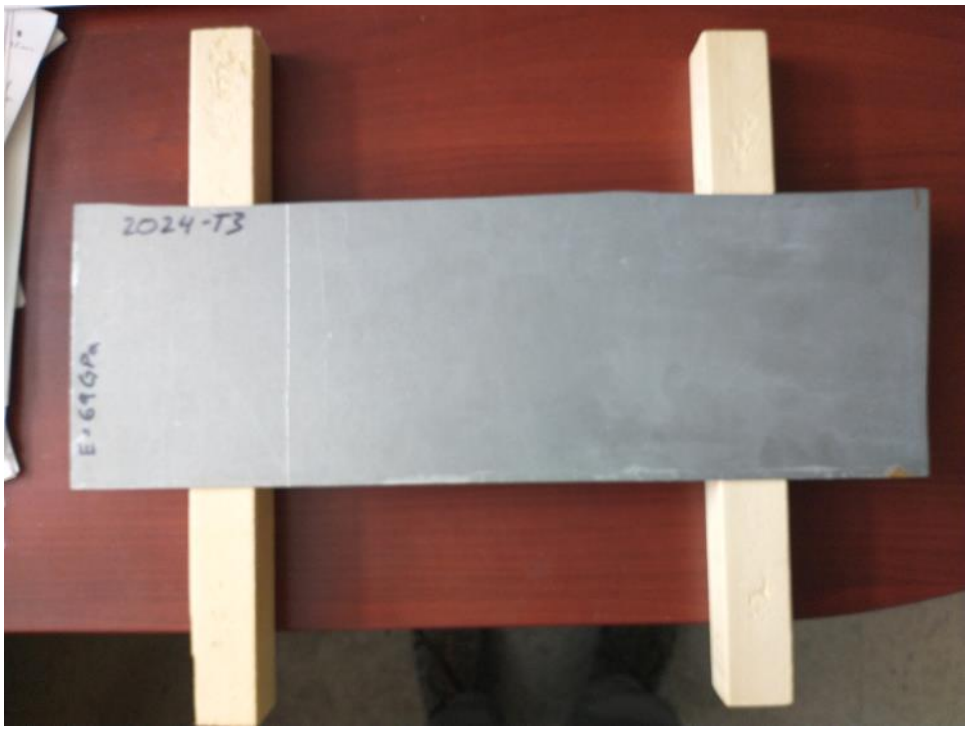
Glass 2

September 13, 2024 4:14 PM



Metal

September 13, 2024 4:14 PM



Plastic

September 13, 2024 4:15 PM