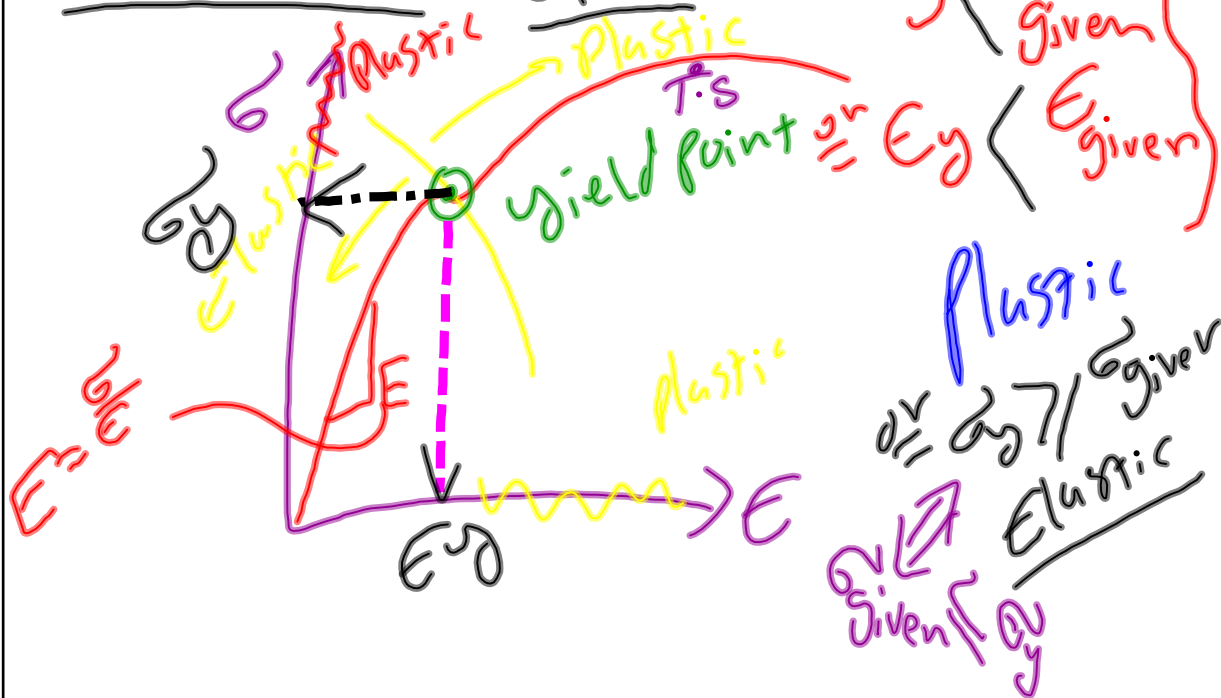


Tutorial #2

CH. 6

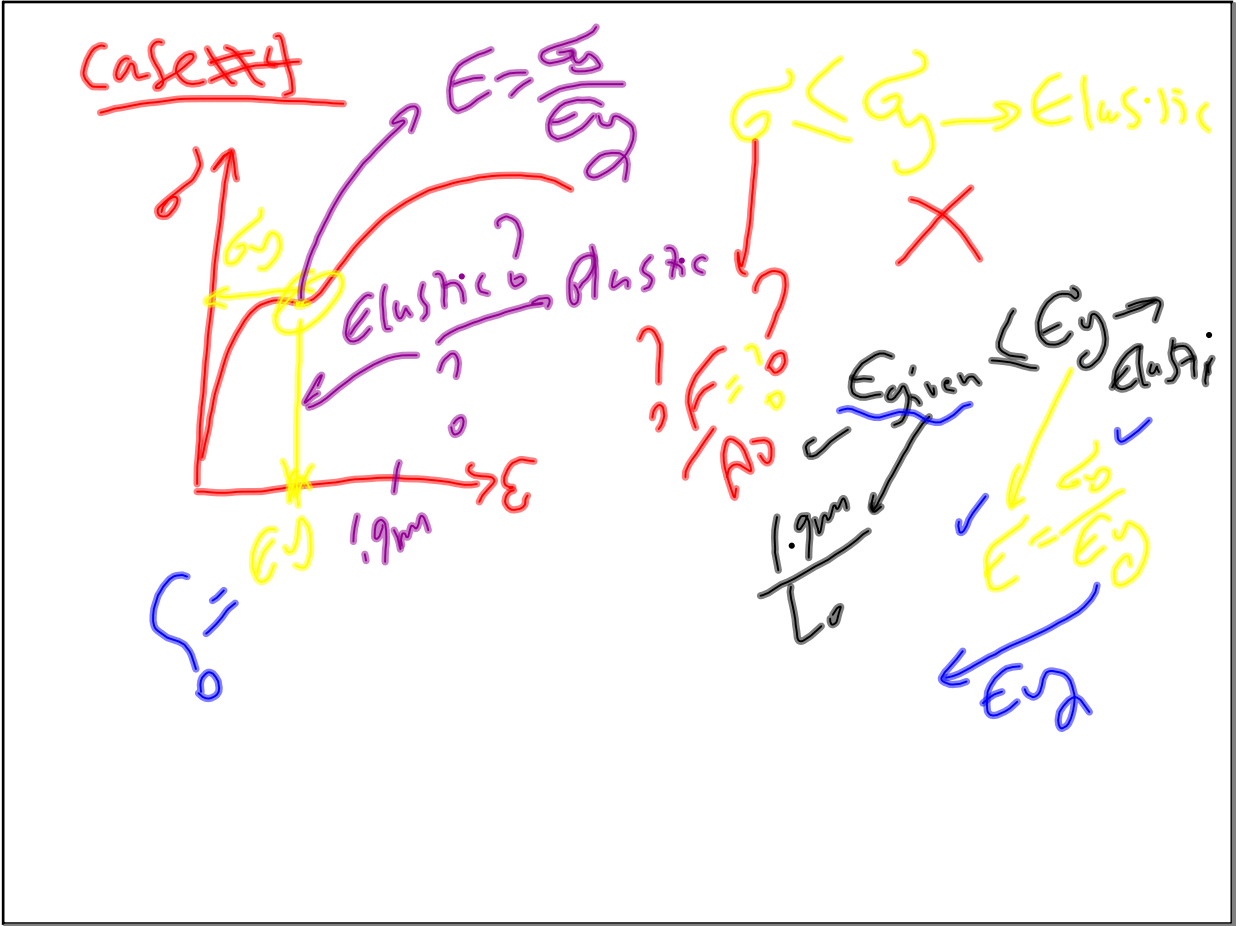


Oct 22-4:09 PM

Elastic Zone

$$E = \frac{\sigma}{\epsilon} = \frac{F/A}{\Delta L/L_0} \Rightarrow \Delta L = \frac{F \cdot L_0}{A \cdot E}$$

Oct 22-4:19 PM



Oct 22-4:22 PM

if answer was $E_{given} < E_y$ (Elastic)

$$\Delta L = \frac{F \cdot L_0}{A_0 \cdot E}$$

$F = ?$

Oct 22-4:30 PM

~~CH#8~~ Fatigue & creep

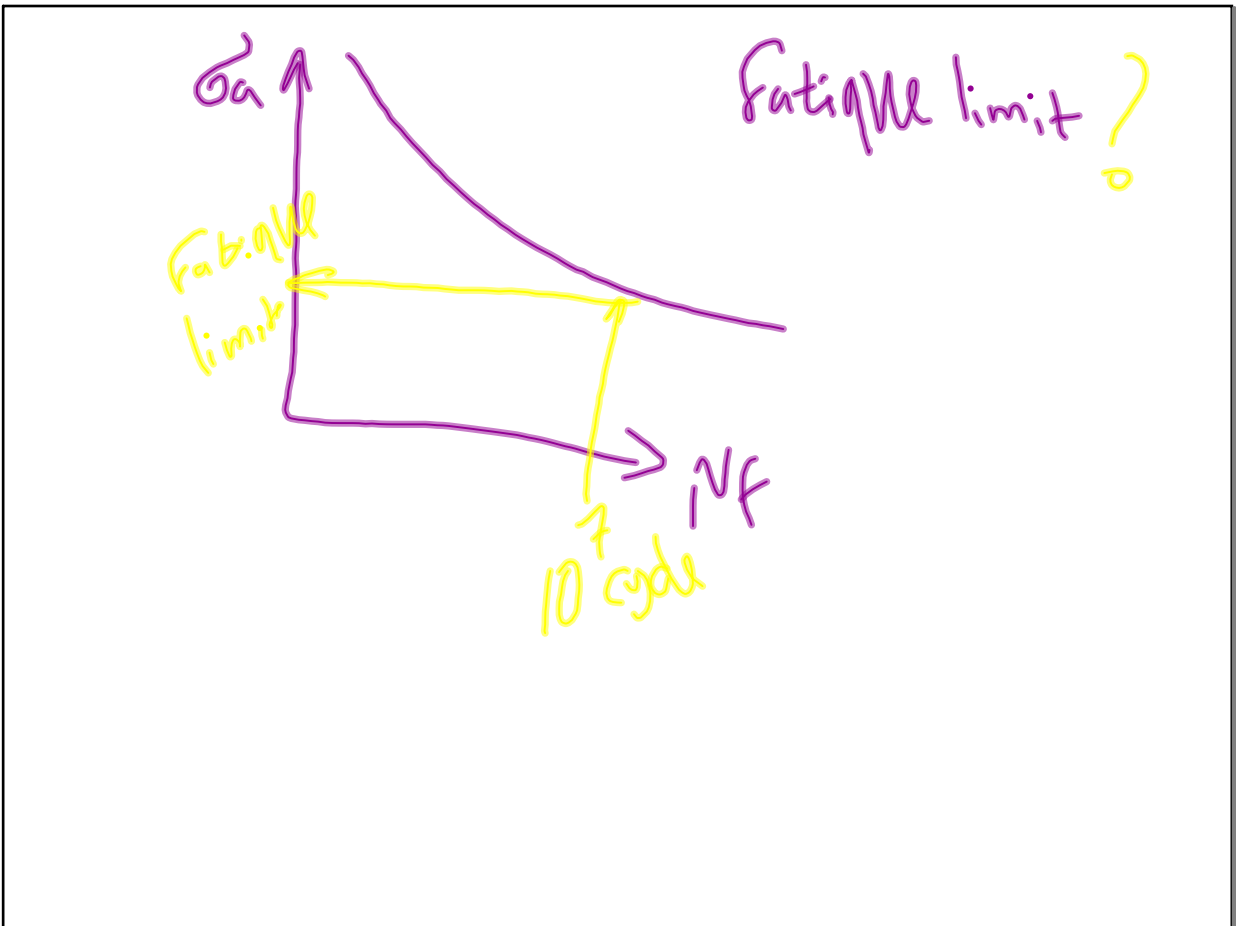
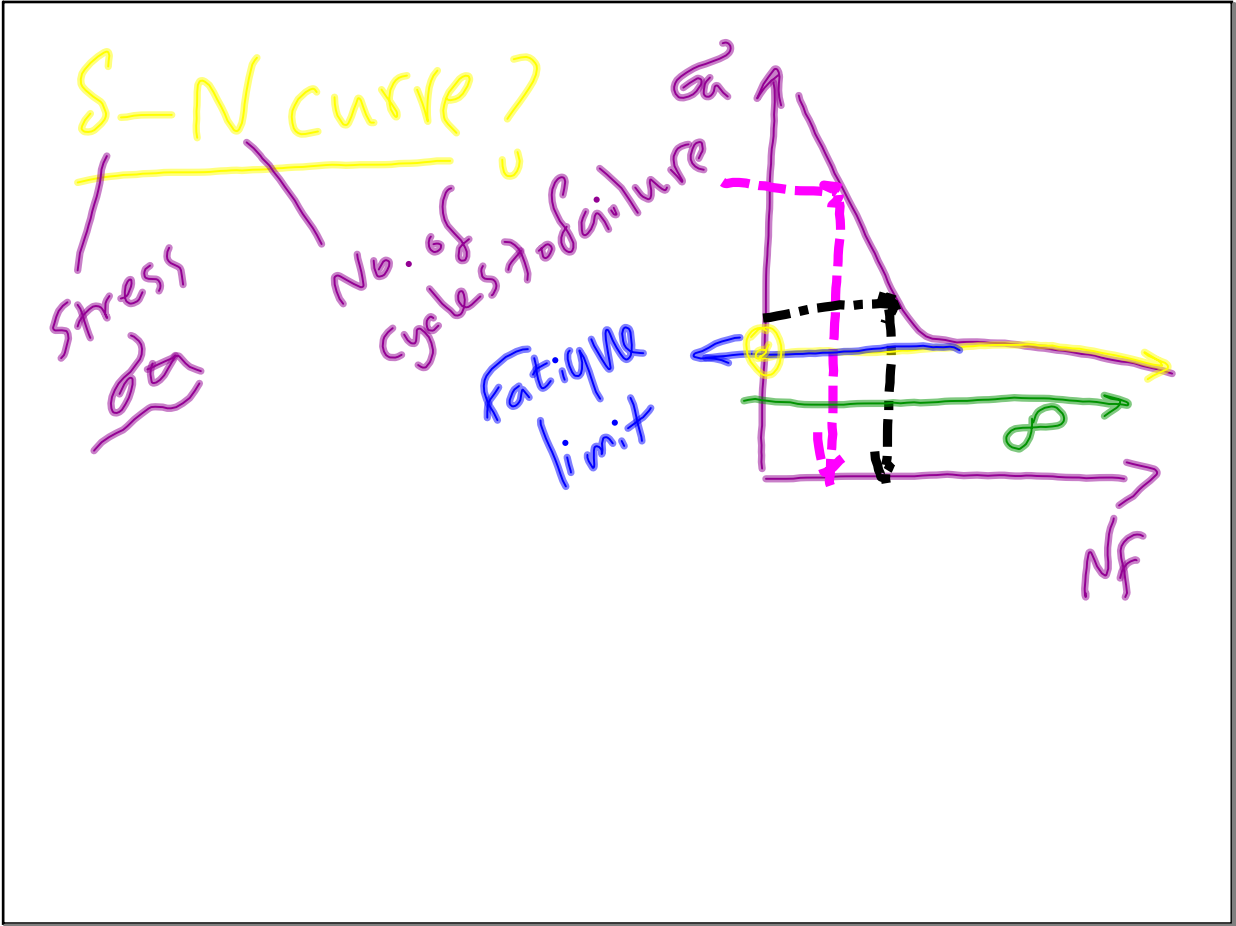
Fatigue?



Oct 22-4:31 PM



Oct 22-4:37 PM



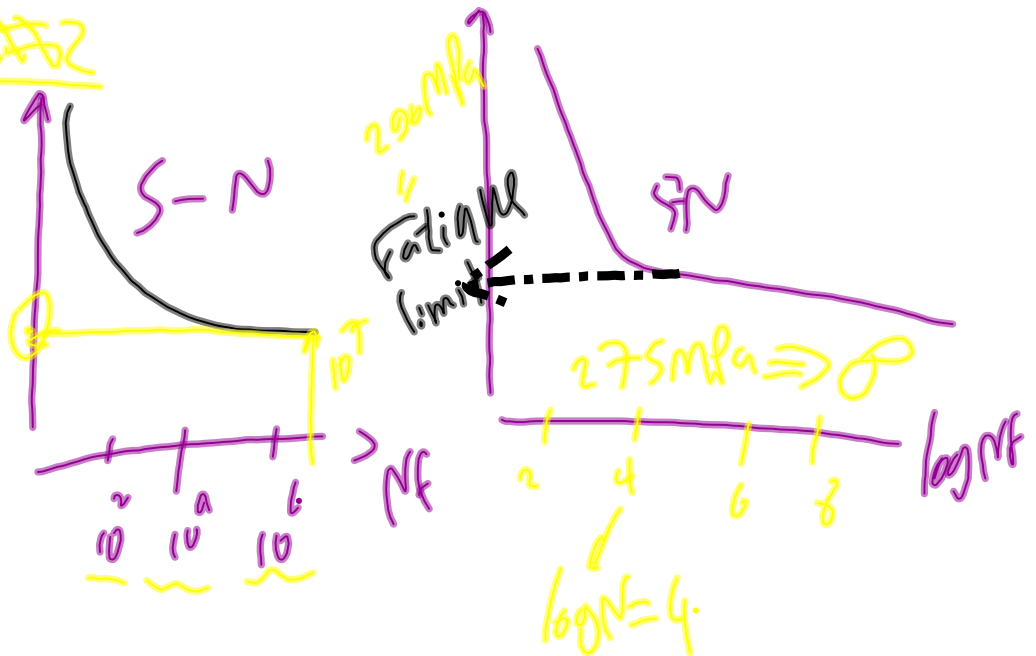
Case #1

$$\sigma_u = \frac{F_u}{A}$$
$$= \frac{f_{max} - f_{min}}{2}$$

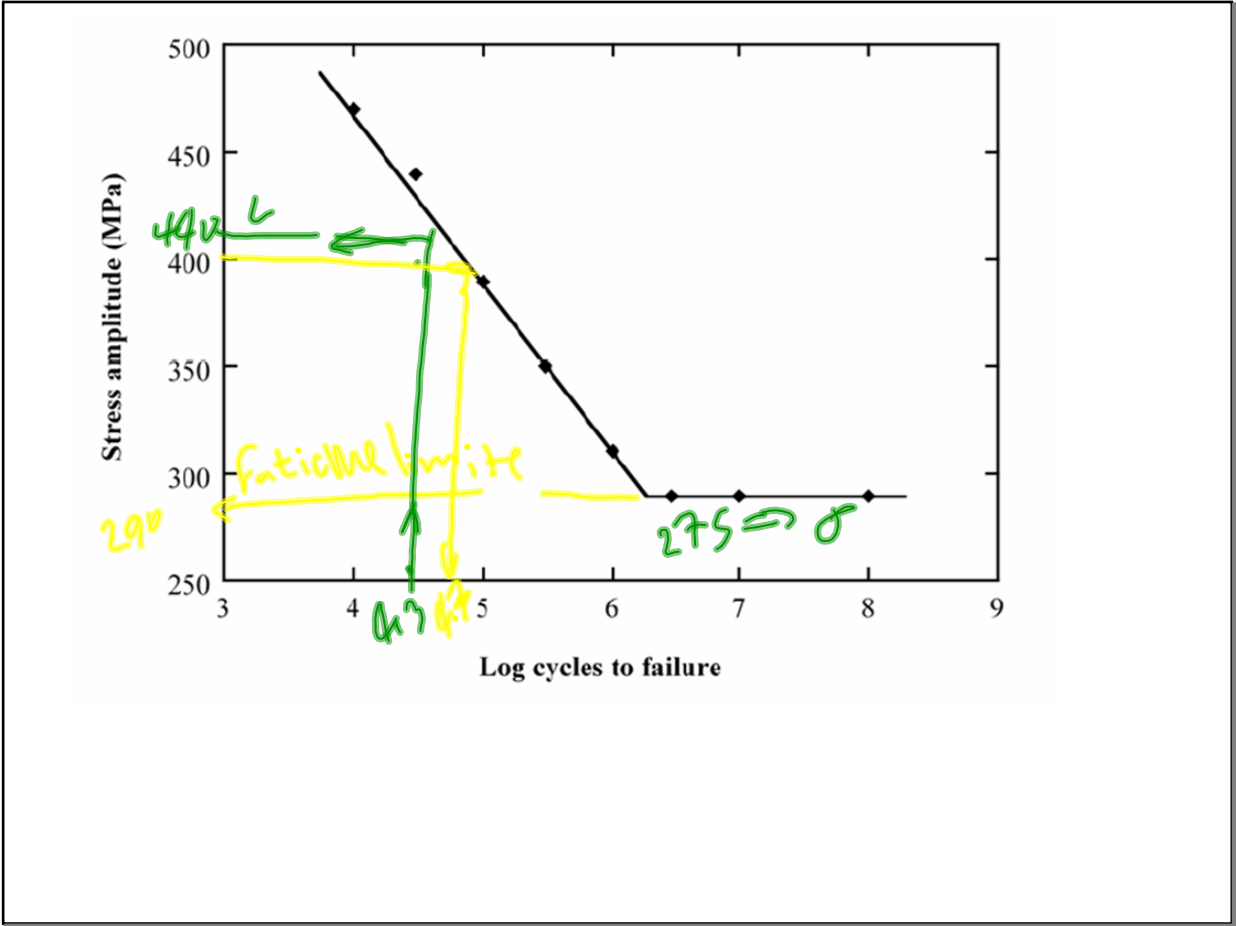


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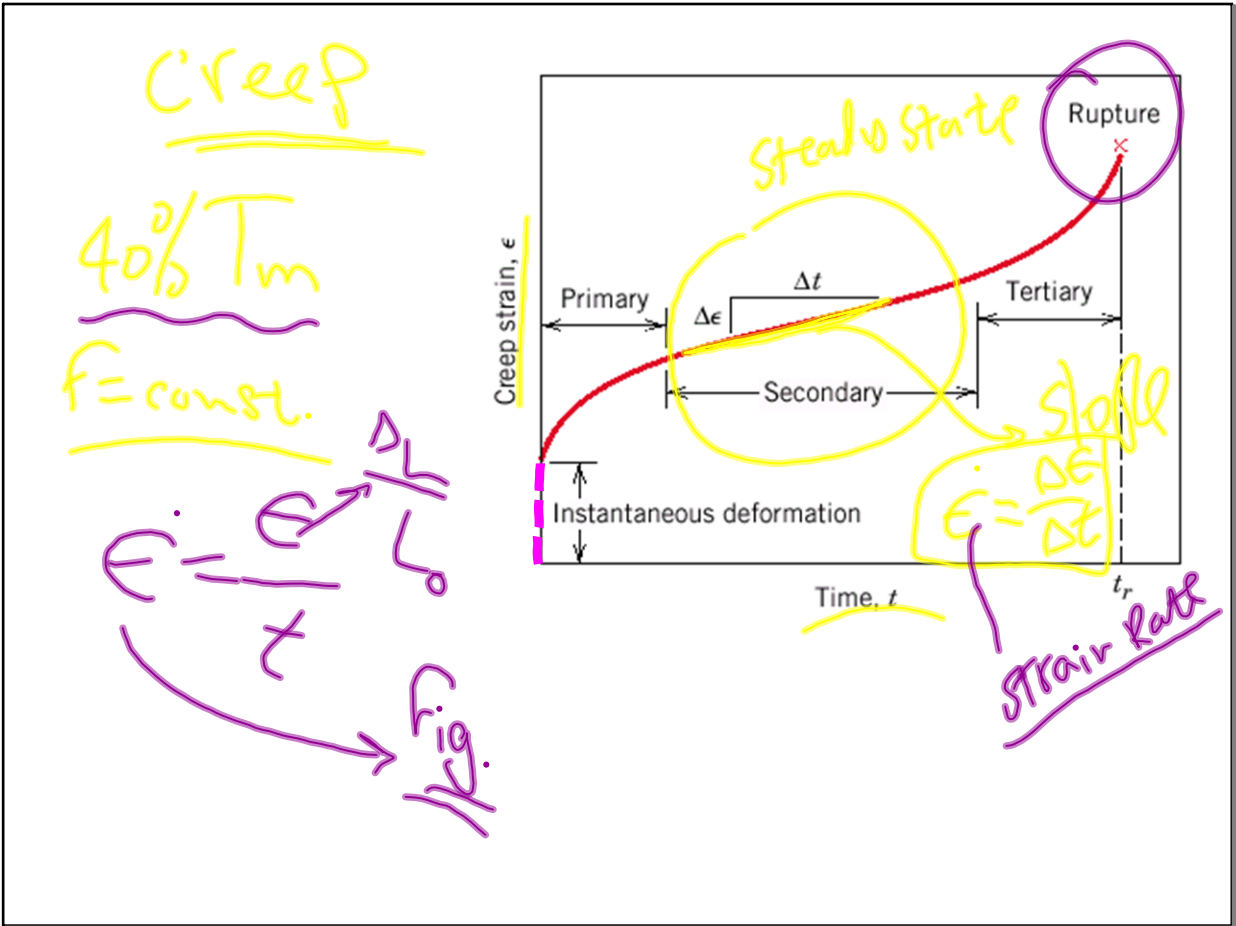
Case #2



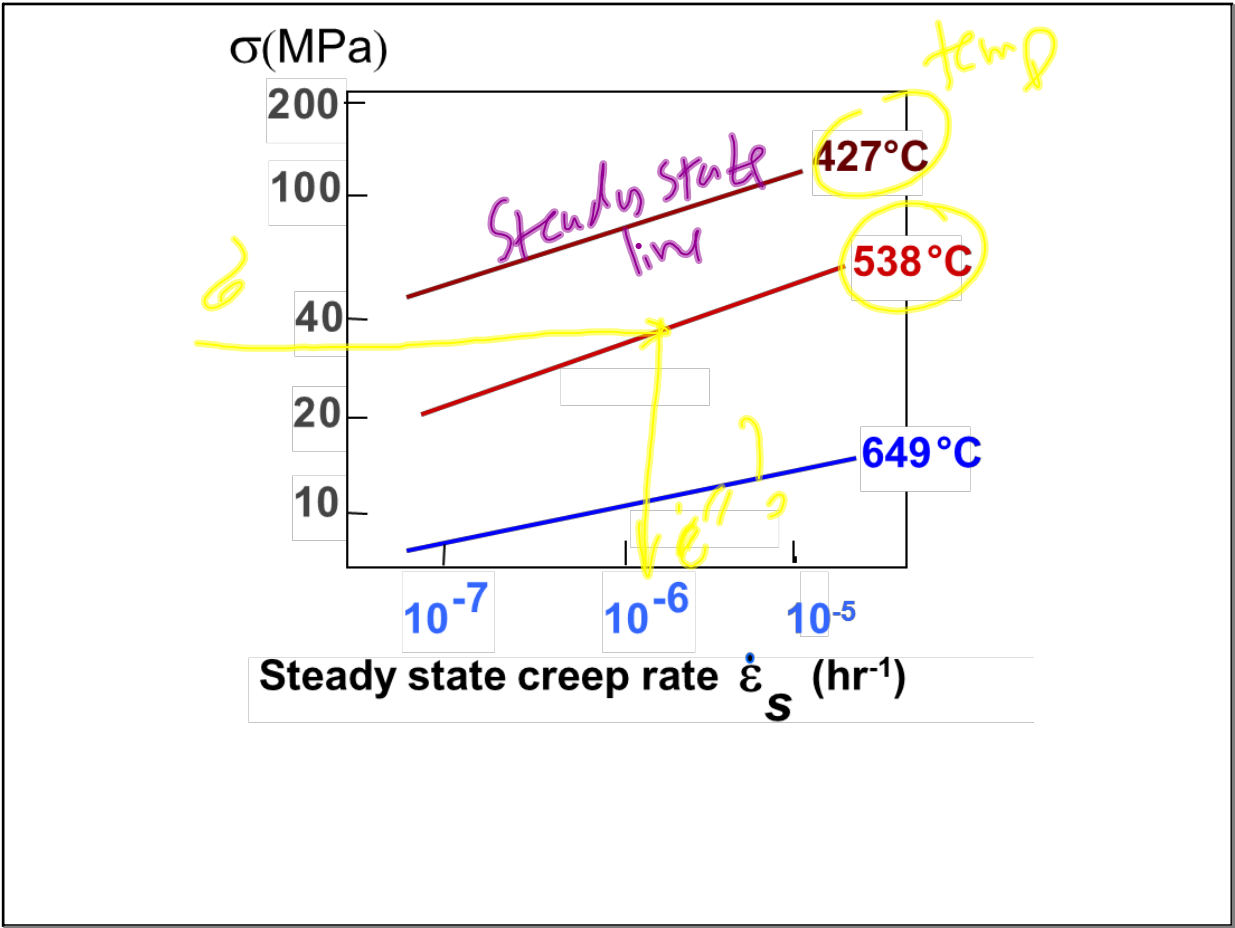
Oct 22-5:03 PM



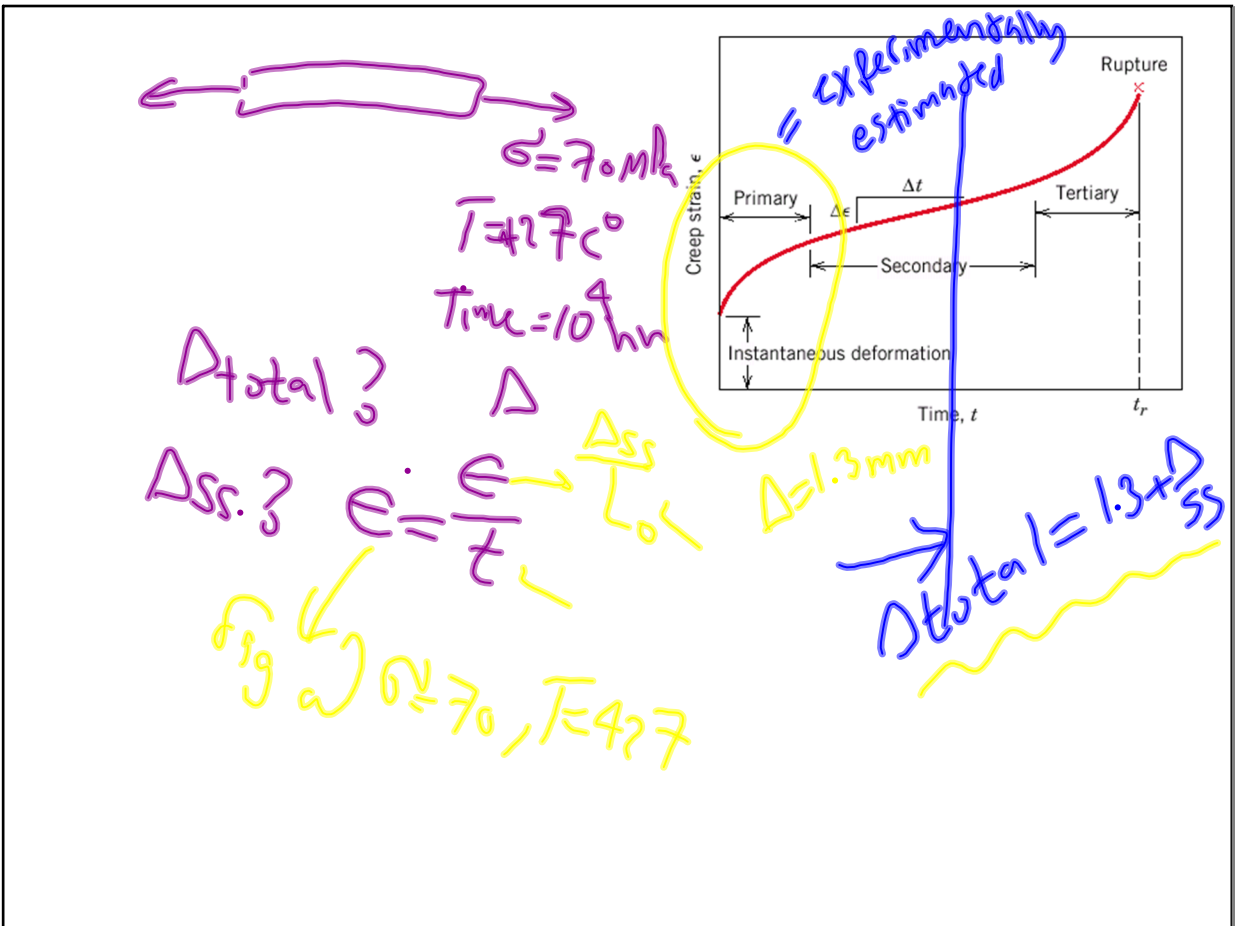
Oct 22-5:09 PM



Oct 22-5:12 PM



Oct 22-5:21 PM



Oct 22-5:26 PM

Calculation?

$$\dot{\epsilon}_s = K_2 \sigma^n \exp\left(-\frac{Q_c}{RT}\right)$$

applied stress σ
 stress exponent (material parameter) n
 activation energy for creep (material parameter) Q_c
 material const. K_2
 Gas constant 8.31 J/mol-K R
 Temp. (K) T

$K_2, Q_c = ?$ unknown \rightarrow known

$n = ?$
 $\dot{\epsilon}_s = ?$

$\frac{\sigma}{T}$

const.
 K_2
 n
 Q_c } for same material

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$$\begin{cases} \dot{\epsilon}_1 = K_2 \sigma_1^n \exp\left(-\frac{Q_c}{RT_1}\right) - eq_1 \\ \dot{\epsilon}_2 = K_2 \sigma_2^n \exp\left(-\frac{Q_c}{RT_2}\right) - eq_2 \end{cases}$$



Solve Q_c & K_2

$$\dot{\epsilon}_3 = K_2 \sigma_3^n \exp\left(-\frac{Q_c}{RT_3}\right) \Rightarrow \dot{\epsilon}_3 = \dots$$

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