

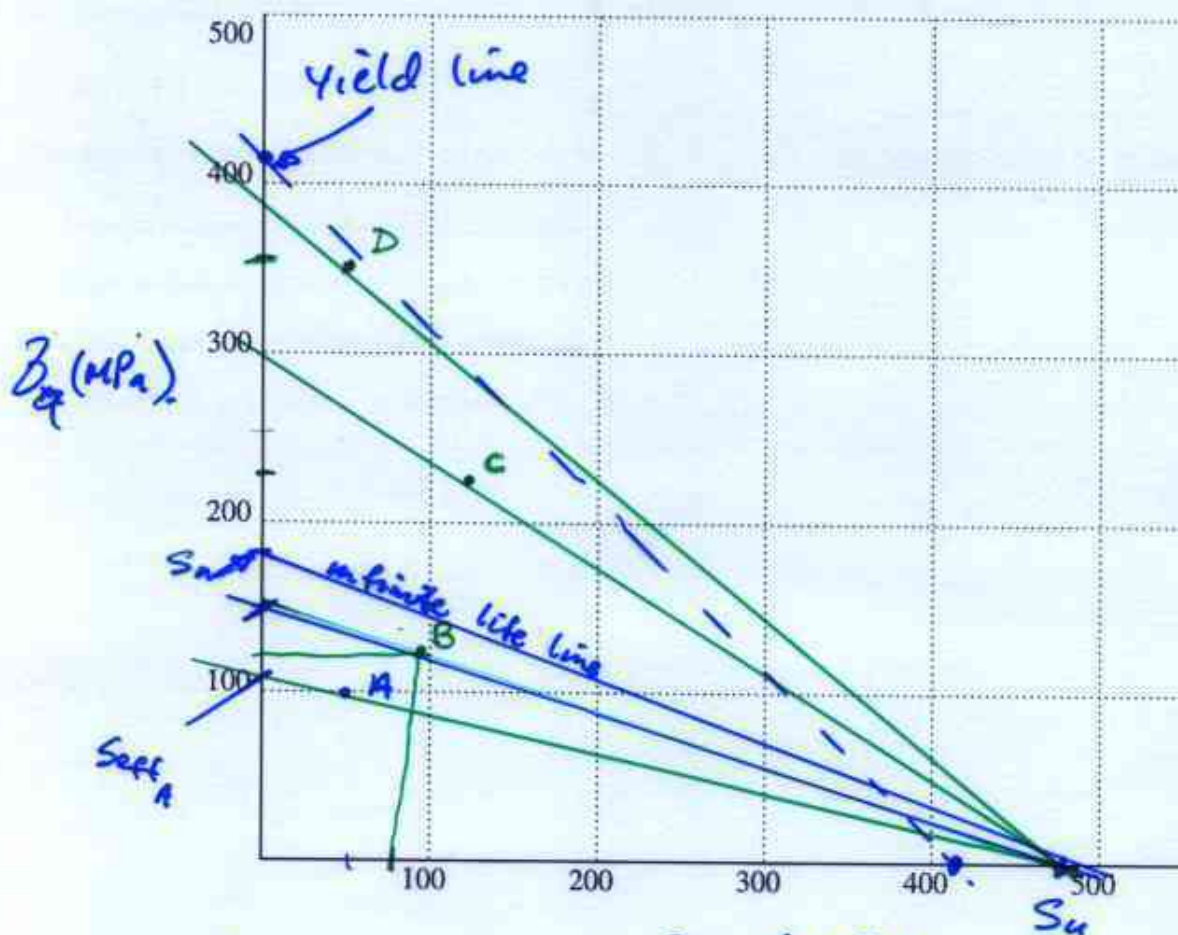
10 Sample Problem

A critical notch is subject to varying nonsteady loading. A typical 6 second period includes the following loading condition

- A • 2 cycles at $\sigma_a = 100\text{MPa}$ and $\sigma_m = 50\text{MPa}$
- B • 4 cycles at $\sigma_a = 125\text{MPa}$ and $\sigma_m = 75\text{MPa}$
- C • 2 cycles at $\sigma_a = 225\text{MPa}$ and $\sigma_m = 125\text{MPa}$
- D • 1 cycle at $\sigma_a = 350\text{MPa}$ and $\sigma_m = 50\text{MPa}$

The part is made from aluminium, and has the following properties: $S_u = 480\text{MPa}$, $S_y = 410\text{MPa}$. Correcting for geometry, surface, etc., the fatigue properties of the notch are: $S_{10^3} = 450\text{MPa}$, $S_{10^6} = 180\text{MPa}$.

Calculate the expected life of the component.



	S_{eff}	use these to find N (lifetime).
A	100 MPa	
B	150 MPa	
C	300 MPa	
D	390 MPa	