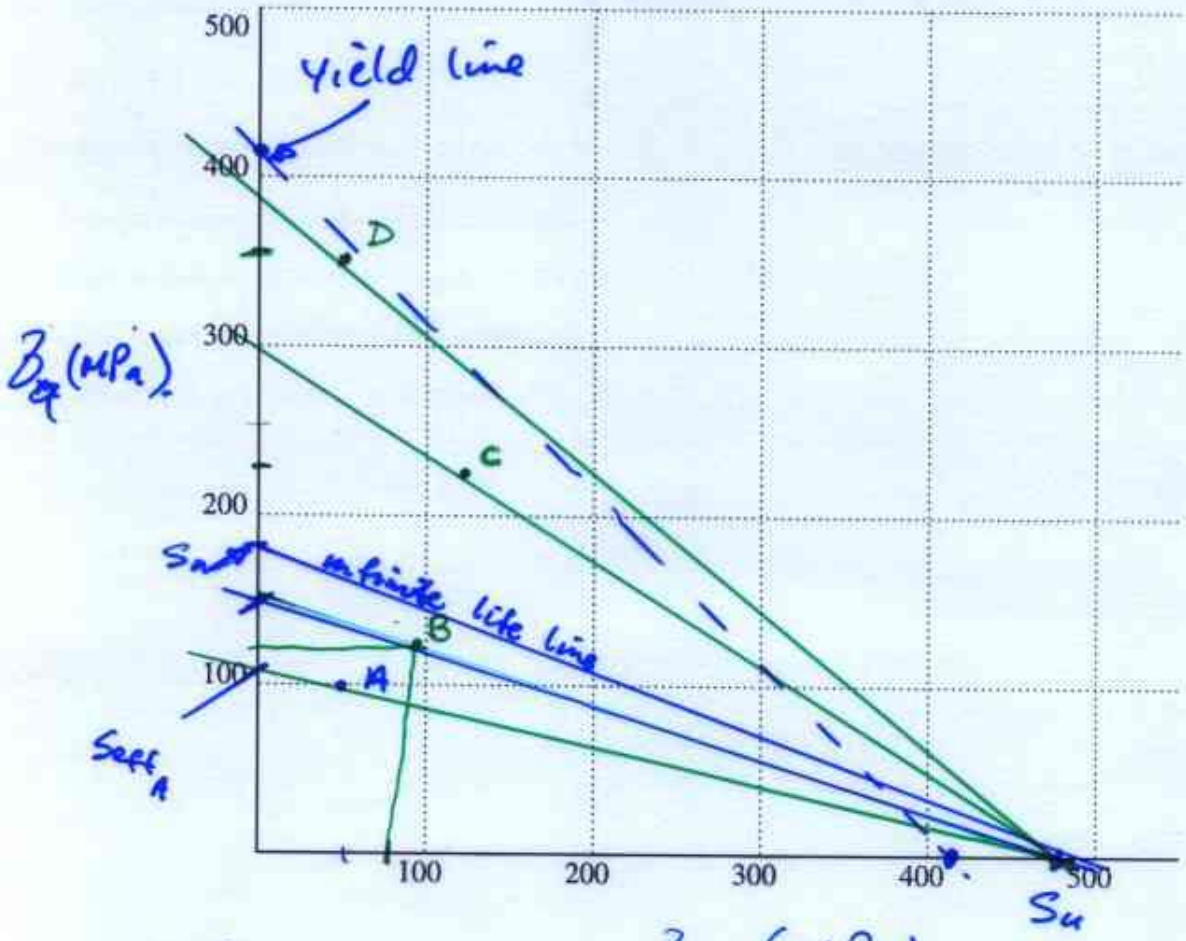
10 Sample Problem

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

- 2 cycles at $\sigma_a = 100MPa$ and $\sigma_m = 50MPa$
- 4 cycles at $\sigma_a = 125MPa$ and $\sigma_m = 75MPa$
- 2 cycles at $\sigma_a = 225MPa$ and $\sigma_m = 125MPa$
- 1 cycle at $\sigma_a = 350MPa$ and $\sigma_m = 50MPa$

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

Calculate the expected life of the component.



	σ_{eff}
A	100 MPa
B	150 MPa
C	300 MPa
D	390 MPa

use these to find N (lifetime).