Fatigue Flow/Logic

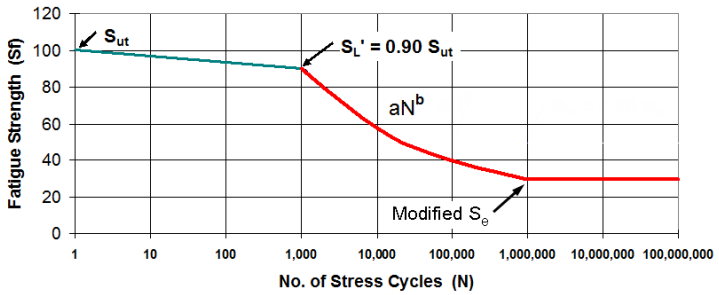
A. You always need:
1. The material – Sut & maybe Sy
2. The type of Loading
   - Axial; Bending; or Shear
3. The Max and Min Stress

} Use these to get Se'

→ Get σ_{mean} & σ_{alt}

B. If you have Reliability, Surface, or Size information, then you must adjust Se' to represent your part. Se = Kf * Ks * Kr * Se'.

C. If $\sigma_{mean} = 0$, then it's fully reversing and we use an S/N diagram
1. If $\sigma_{alt} < Se$, life is infinite and you're done.
2. Otherwise, calculate the 1000 Cycle value SL, and draw the S/N plot.
3. Calculate a = SL^2/Se, and b = -1/3 Log10 (SL / Se)
4. Then you can calculate S = aN^b or N = $(\sigma alt / a)^{1/b}$



D. If $\sigma_{mean} \neq 0$, then it's fluctuating and we use a Goodman diagram
1. Draw the Goodman line between Se and Sut.
2. Add the Yield Line between Sy and Sy.
3. Plot the operating point (σmean, σalt).
4. Depending on how the stress might increase, calculate the FOS.