

Steel

$$S_{10^6} = 60 \text{ ksi}$$

$$S_{10^3} = 140 \text{ ksi}$$

corrected for
 C_L C_D C_S
 etc.,

LOADING

Typical Block: $\left[\begin{array}{l} 5 \text{ cycles @ } 80 \text{ ksi} \\ 2 \text{ @ } 90 \text{ ksi} \\ 1 \text{ @ } 100 \text{ ksi} \end{array} \right] \leftarrow \underline{20 \text{ seconds}}$

predict life

$$\log_{10} S_f = b \log_{10} N + \log_{10} a \quad (*)$$

$$\log_{10} (140) = 3b + \log_{10} a$$

$$\log_{10} (60) = 6b + \log_{10} a$$

$$3b = \log_{10} (60) - \log_{10} (140)$$

$$\Rightarrow \underline{b} = \underline{-0.123}$$

$$\underline{\log_{10} a} = \log_{10} (60) - 6b = \underline{2.5414}$$

because
 $\log_{10} 10^3$
 $= 3$

find life @ each stress level.

Rearrange (*)

$$\log_{10} N = \frac{\log_{10} S_f - \log_{10} a}{b}$$

$$\Leftrightarrow N = 10^{\left(\frac{\log_{10} S_f - \log_{10} a}{b} \right)}$$

We know $\log_{10} a$, b , S_f