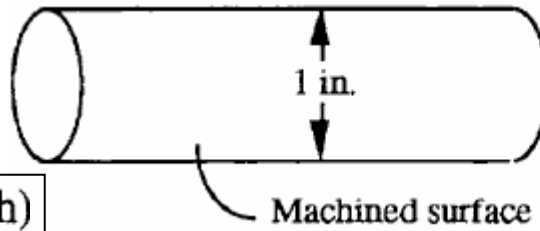


Homework

Known: $D=1$ in, $S_u = 110$ ksi, $S_y = 77$ ksi,
reversed bending, axial, torsional loading, steel, machined
surface

Find: S_n (6×10^4 life cycles)



$S_u = 110$ ksi
 $S_y = 77$ ksi

Endurance limits: (10^6 cycle strength)

$$S_n = S_n' C_L C_G C_s$$

For bending,

$$S_n' = 0.5 S_u = (0.5(110) = 55) \text{ ksi (Fig. 8.5)}$$

$$C_L = 1 \quad (\text{Table 8.1})$$

$$C_G = 0.9 \quad (\text{Table 8.1})$$

$$C_s = 0.74 \quad (\text{Fig. 8.13})$$

$$S_n = (55)(1)(0.9)(0.74) = 36.6 \text{ ksi}$$

10^3 cycle strength

$$0.9 S_u = (0.9(110) = 99.0) \text{ ksi (Table 8.1)}$$

For axial,

$$S_n' = 55 \text{ ksi}$$

$$C_L = 1$$

$$C_G = 0.8 \text{ (between 0.7 and 0.9)}$$

$$C_s = 0.74$$

$$S_n = (55)(1)(0.8)(0.74) = 32.6 \text{ ksi}$$

$$0.75 S_u = (0.75(110) = 82.5) \text{ ksi}$$

For torsion,

$$S_n' = 55 \text{ ksi}$$

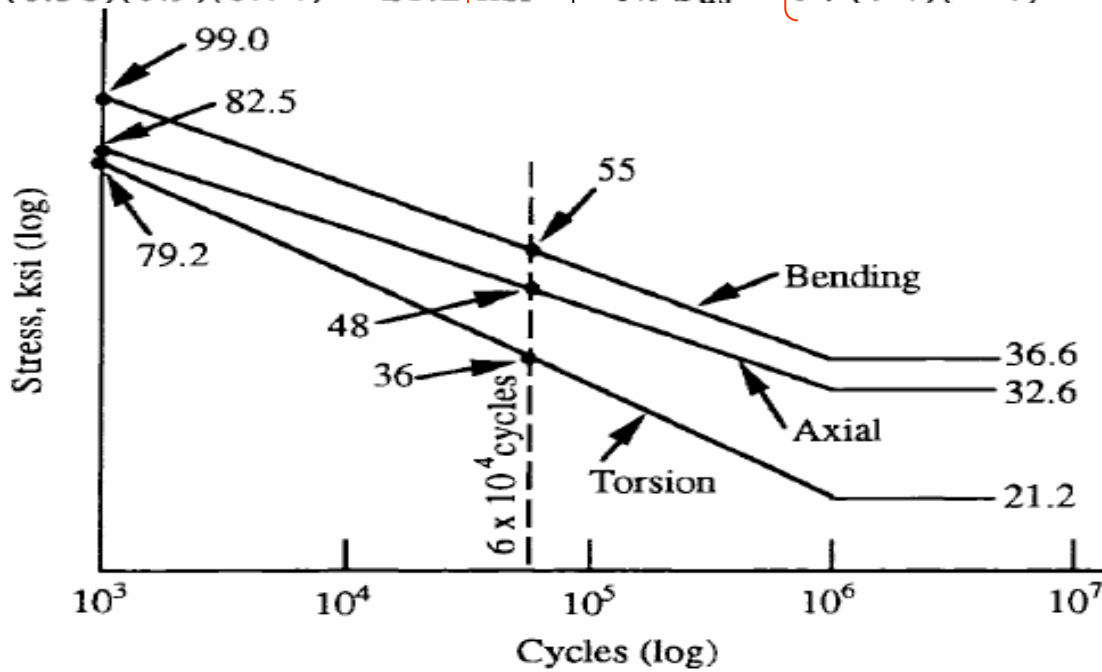
$$C_L = 0.58$$

$$C_G = 0.9$$

$$C_s = 0.74$$

$$S_n = (55)(0.58)(0.9)(0.74) = 21.2 \text{ ksi}$$

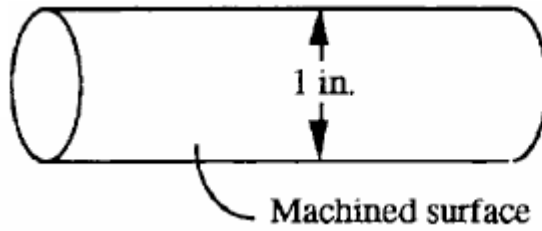
$$0.9 S_{us} = (0.9(0.8)(110) = 79.2) \text{ ksi}$$



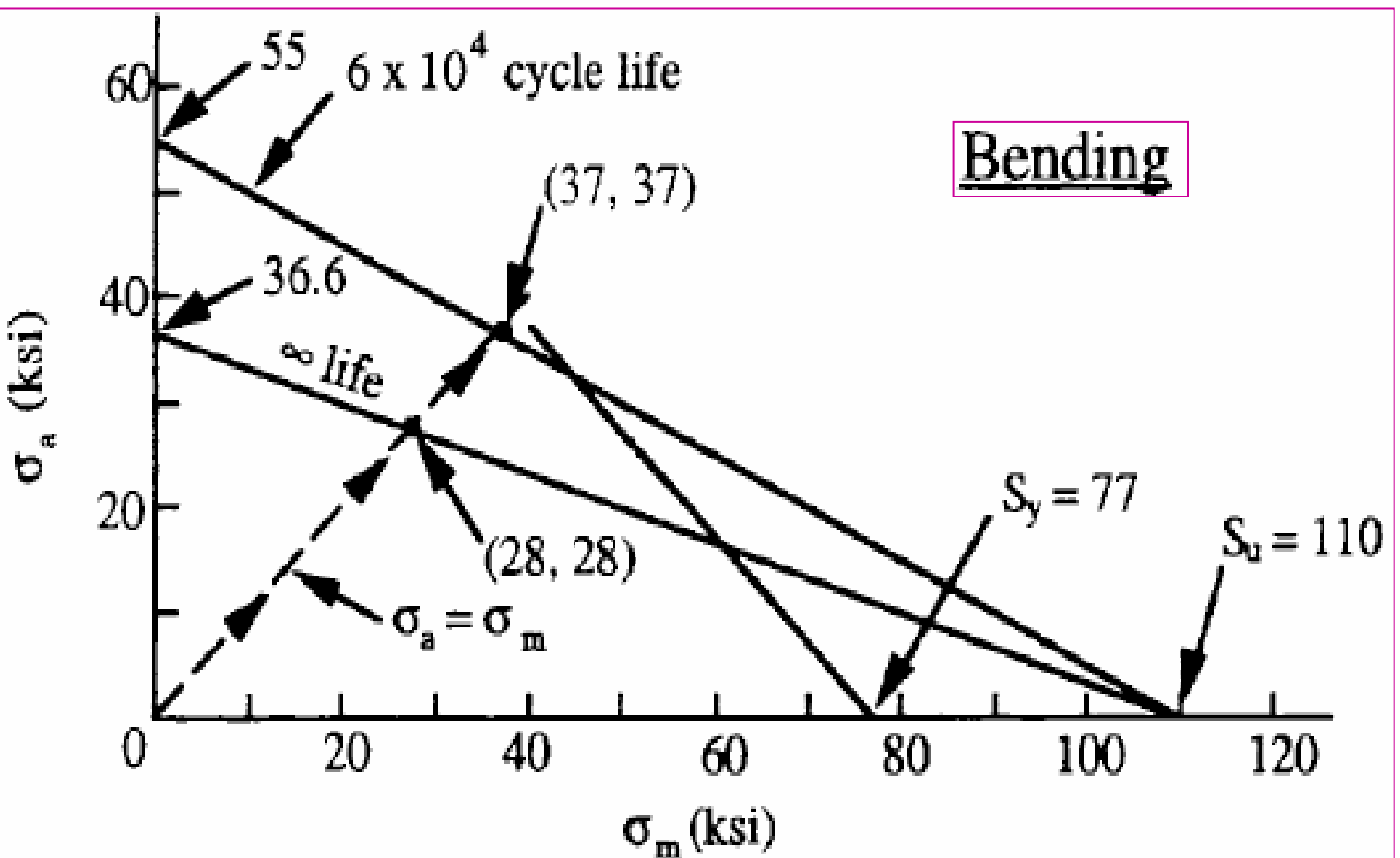
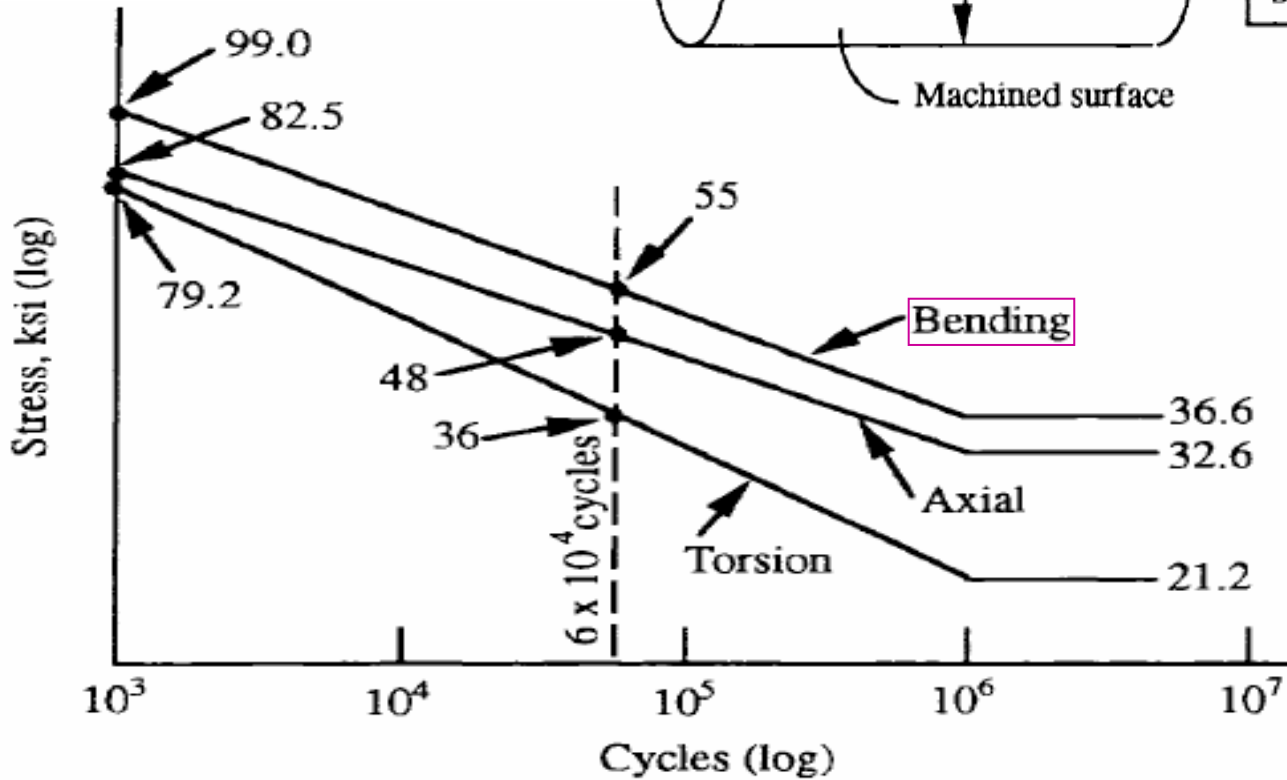
Homework

Known: $D=1\text{in}$, $S_u = 110\text{ksi}$, $S_y = 77\text{ksi}$,
 reversed bending, axial, torsional loading, steel, machined
 surface

Find: $S_n(6 \times 10^4 \text{ life cycles})$



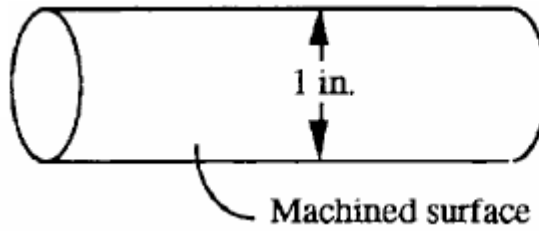
$S_u = 110 \text{ ksi}$
 $S_y = 77 \text{ ksi}$



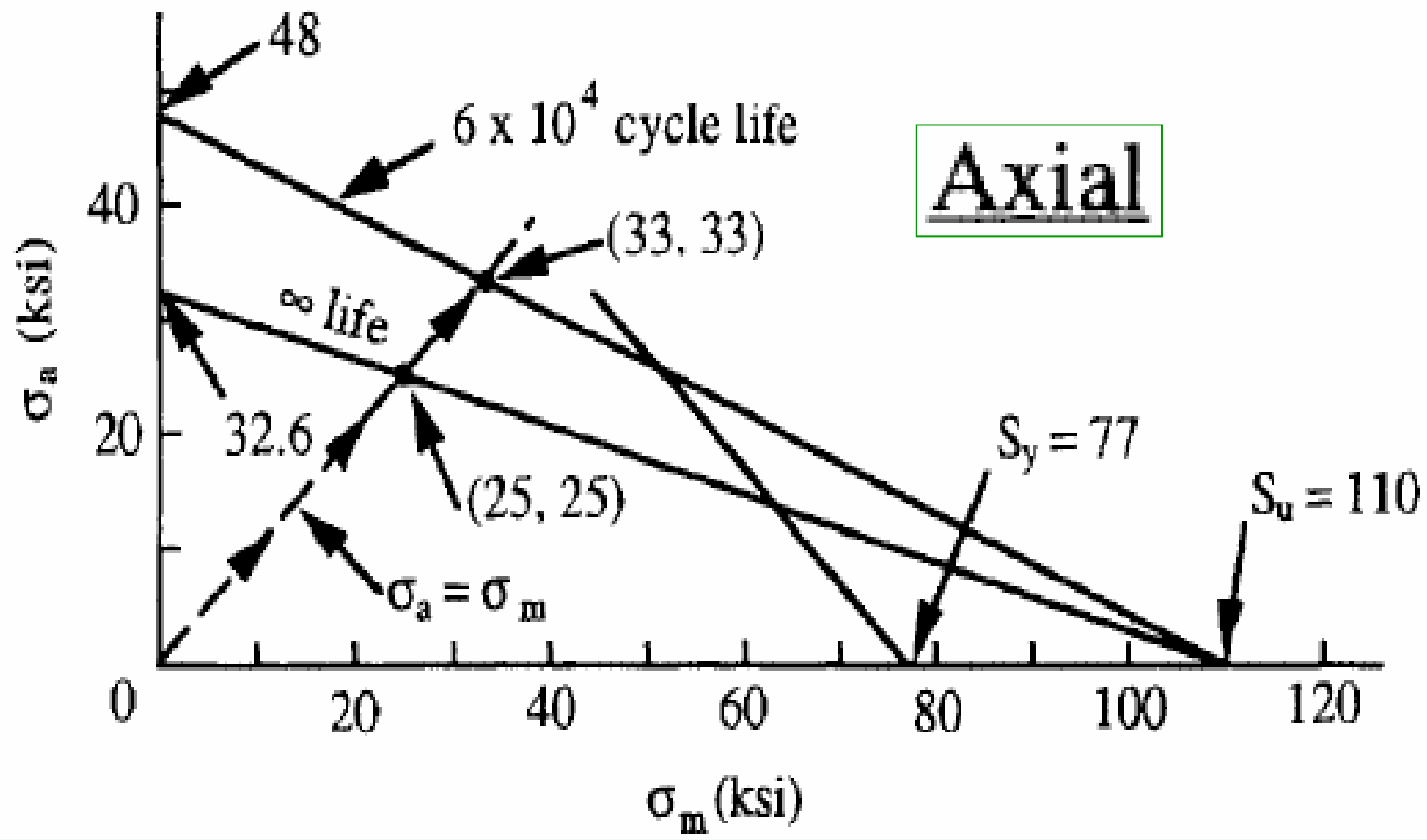
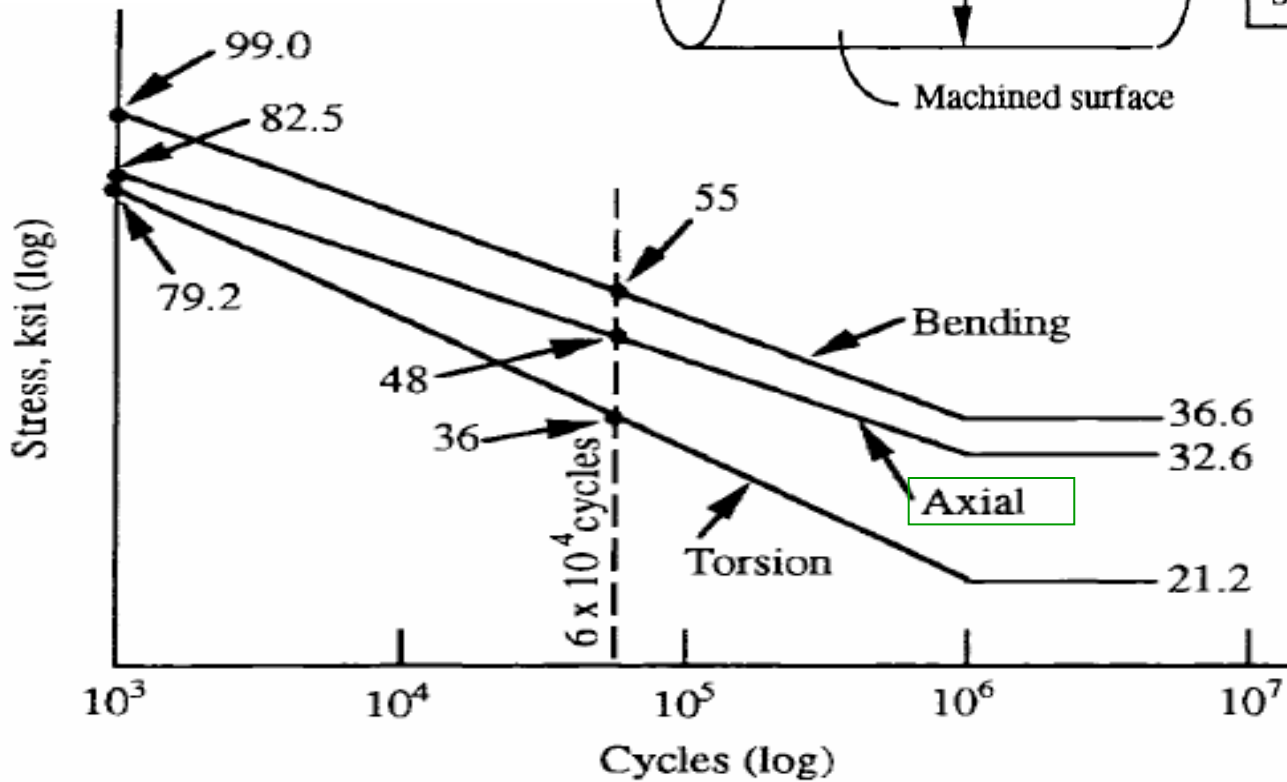
Homework

Known: $D=1\text{in}$, $S_u = 110\text{ksi}$, $S_y = 77\text{ksi}$,
 reversed bending, axial, torsional loading, steel, machined
 surface

Find: $S_n(6 \times 10^4 \text{ life cycles})$



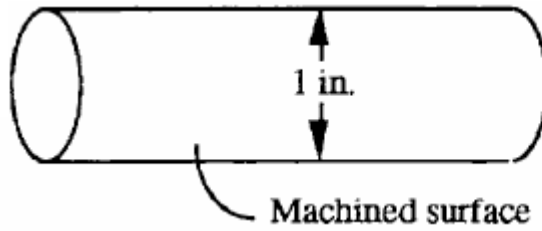
$S_u = 110 \text{ ksi}$
 $S_y = 77 \text{ ksi}$



Homework

Known: $D=1\text{in}$, $S_u = 110\text{ksi}$, $S_y = 77\text{ksi}$,
 reversed bending, axial, torsional loading, steel, machined
 surface

Find: $S_n(6 \times 10^4 \text{ life cycles})$



$S_u = 110 \text{ ksi}$
 $S_y = 77 \text{ ksi}$

