

Given:  $\frac{1}{2}$ -13UNC-2A steel fastener

$$\mu_c = 0.4$$

$$\sigma_i = 50 \text{ ksi}$$

$$\mu_c = 0.3$$

Find: Torque call out for drawing

Solution:  $A_t = 0.1419 \text{ in}^2$

$$T = K F_i d$$

$$F_i = \sigma_i A_t = 7,095 \text{ lb}$$

$$d = \frac{1}{2} \text{ in}$$

$$k = \left( \frac{d_m}{2d} \right) \left( \frac{\tan \lambda + \mu_c \sec \alpha}{1 - \mu_c \tan \lambda \sec \alpha} \right) + 0.625 \mu_c$$

$$d_m = d - 0.649519 p$$

$$p = \frac{1}{13} = 0.077 \text{ in}$$

$$\Rightarrow d_m = 0.450 \text{ in}$$

$$\lambda = \frac{l}{\pi d_m} = \frac{0.077 \text{ in}}{\pi (0.450 \text{ in})} = 0.0545$$

$$\alpha = 30^\circ$$

$$\tan \lambda = 0.0546$$

$$\sec \alpha = 0.5$$

$$\Rightarrow k = 0.343$$

$$\Rightarrow T = (0.343)(7,095 \text{ lb})(0.5 \text{ in})$$
$$= 1,216 \text{ in-lb}$$

Specify  $T = 1200 \text{ in-lb}$  on drawing