- load factors

for yielding of bolt

(limiting stress in bolt → S_p; tensile stress area → A_t)

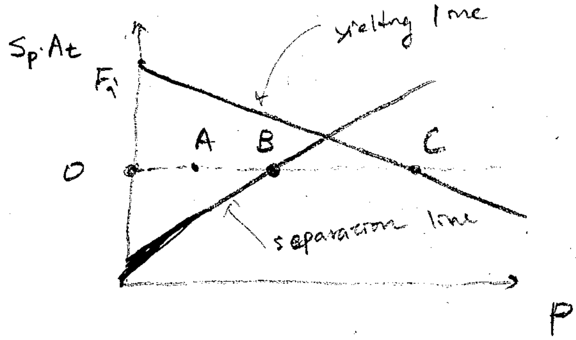
no yielding if $F_i + cP < S_p A_t$

define n (load factor) by $F_i + n_y cP = S_p \cdot A_t \rightarrow n_y = \frac{S_p A_t - F_i}{cP}$ guarding against yield

for seperation of joint

no seperation if $P(1-c) < F_i$

define n by $n_s P(1-c) = F_i \Rightarrow n_s = \frac{F_i}{(1-c)P}$ guarding against seperation



bolt yielding $n_y = \frac{OC}{OA}$

joint separation $n_s = \frac{OB}{OA}$

In this particular case separation before yielding

where comes A ?

→ { preload F_i, loading P }

→ n_y, n_s

- hand out #2 steps to determine k_b

- Torque requirement (Sec. 8.8)

wrench torque required to develop the specific preload

preload F_i ① ↑ → better
② must < $F_{p,critical}$

how to determine ?

→ you may be millionare if you can design an easy way

currently
① pneumatic - impact wrenching
(preset the pressure)
→ " " torque
② turn-of-nut
→ nut turns = torques
③ dimples ?

Torque factor → bolt conditions { plated ...

$$T = (K) F_i \cdot d$$

$$= \left[\frac{d_m}{2d} \left(\frac{\tan\lambda + \mu \sec\alpha}{1 - \mu \tan\lambda \sec\alpha} \right) + \frac{\mu_c d_c}{2d} \right] F_i d \qquad \text{— 8-19}$$

≈ 0.2

TABLE 8-15

K values for different bolt condition

if bolt conditions are not specified

⟹ $K = 0.2$ in this course

- Preload recommended

$$F_i = \begin{cases} 0.75\ F_p & \text{reused connections} \\ 0.9\ F_p & \text{permanent connections} \end{cases}$$

see ex 8-2 yourself

$$T = \frac{F_i d_m}{2} \left[\frac{\tan\lambda + \mu \sec\alpha}{1 - \mu \tan\lambda \sec\alpha} \right] + \frac{F_i \mu_c d_c}{2}$$