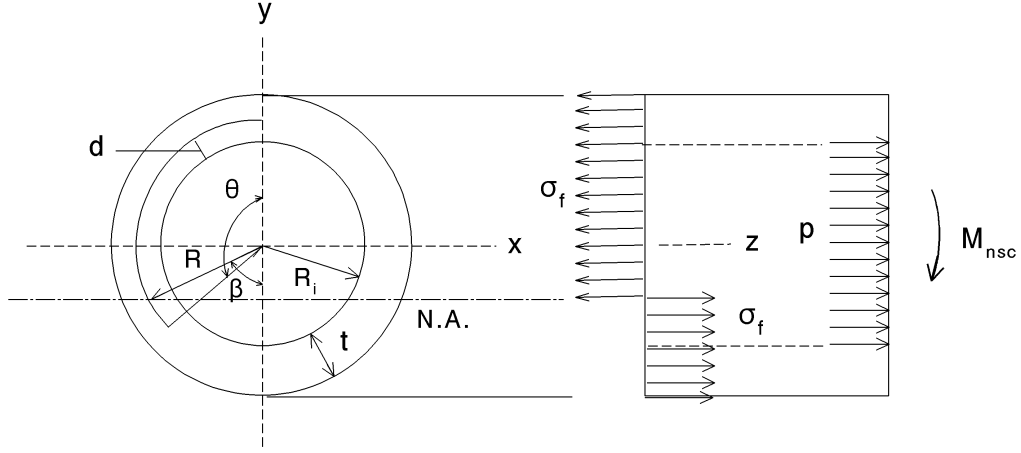


(b) For $\theta \geq \pi - \beta$ (Part of Crack in Compression Zone)



$$\sum F_z = 0 \Rightarrow 2R(\pi - \beta)(t - d)\sigma_f - 2R\beta t\sigma_f = \pi R_i^2 p$$

$$\Rightarrow (\pi - \beta)(1 - d/t) - \beta = \frac{\pi R_i^2 p}{2R\sigma_f t}$$

$$\Rightarrow \beta(2 - d/t) = \pi \left[1 - d/t - \frac{R_i^2 p}{2R\sigma_f t} \right]$$

$$\Rightarrow \beta = \frac{\pi}{2 - d/t} \left[1 - d/t - \frac{R_i^2 p}{2R\sigma_f t} \right]$$

$$\sum M_x = 0 \Rightarrow M_{nsc} = 2\sigma_f R^2 (t - d) \int_0^{\pi - \beta} \cos \phi d\phi + 2\sigma_f R^2 t \int_0^{\beta} \cos \phi d\phi$$

$$\Rightarrow M_{nsc} = 2\sigma_f R^2 [(t - d) \sin \beta + t \sin \beta]$$

$$\Rightarrow M_{nsc} = 2\sigma_f R^2 t [2 - (d/t)] \sin \beta$$