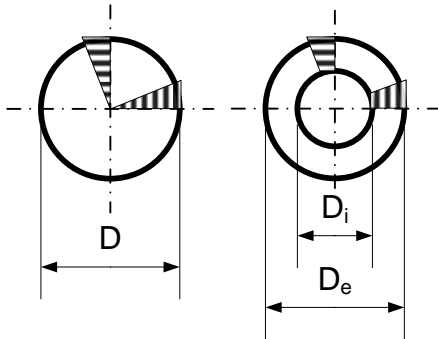


SEZIONE TRAVE

$\tau_{\max}$

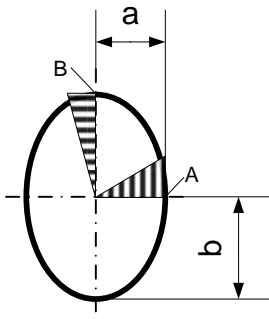
Angolo di rotazione  $d\theta$   
tra due sezioni distanti  $dx$



$$\tau_{\max} = \frac{M_t D}{J_p 2}$$

$$\tau_{\max} = \frac{M_t D_e}{J_p 2}$$

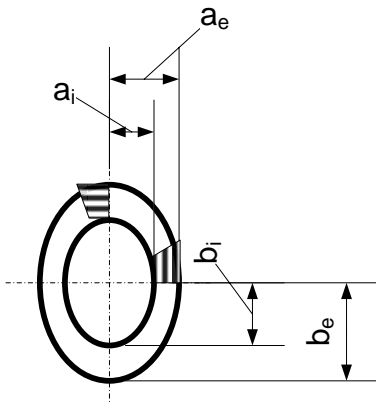
$$d\theta = \frac{M_t}{GJ_p} dx$$



$$\tau_{\max} = \tau_A = \frac{2M_t}{\pi a^2 b}$$

$$\tau_B = \frac{2M_t}{\pi a b^2}$$

$$d\theta = \frac{M_t (a^2 + b^2)}{G\pi a^3 b^3} dx$$

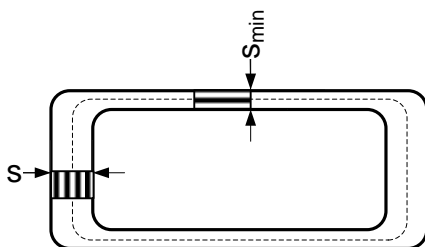


$$\tau_{\max} = \tau_A = \frac{2M_t}{\pi a_e^2 b_e (1 - m^4)}$$

$$\tau_B = m \tau_A$$

$$\text{dove } m = \frac{a_i}{a_e} = \frac{b_i}{b_e}$$

$$d\theta = \frac{M_t (a_e^2 + b_e^2)}{G\pi a_e^3 b_e^3 (1 - m^4)} dx$$



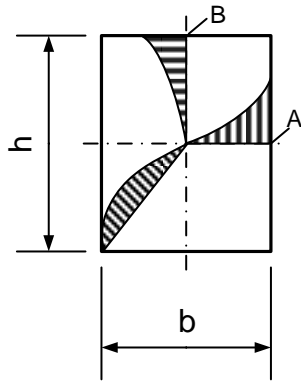
$$\tau_{\max} \approx \frac{M_t}{2 A_m s_{\min}}$$

dove  $A_m = (A_e + A_i)/2$  è l'area media (area racchiusa dal perimetro medio della sezione)

$$d\theta \approx \frac{M_t l}{4 G A_m^2 s} dx$$

dove  $l$  = perimetro medio

(valida per spessore  $s$  circa costante nella sezione)



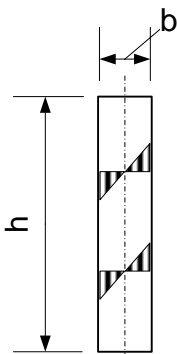
$$\tau_{\max} = \tau_A = \psi \frac{M_t}{h b^2}$$

(per  $b < h$ )

$$\tau_B = \gamma \tau_{\max}$$

$$d\vartheta = \phi \frac{M_t}{G h b^3} dx$$

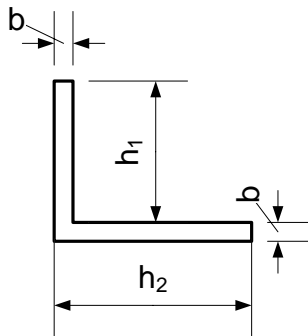
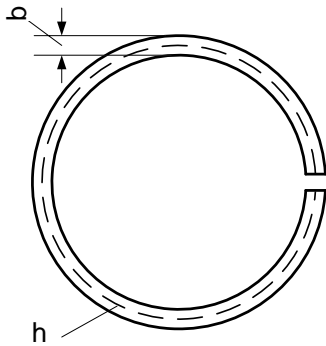
|               |      |      |      |      |      |
|---------------|------|------|------|------|------|
| $\frac{b}{h}$ | 1    | 0.66 | 0.5  | 0.25 | 0.1  |
| $\psi$        | 4.81 | 4.33 | 4.06 | 3.55 | 3.19 |
| $\phi$        | 7.09 | 5.08 | 4.37 | 3.56 | 3.20 |
| $\gamma$      | 1    | 0.86 | 0.80 | 0.75 | 0.74 |



$$\tau_{\max} \approx \frac{3M_t}{h b^2}$$

(per  $h \gg b$ )

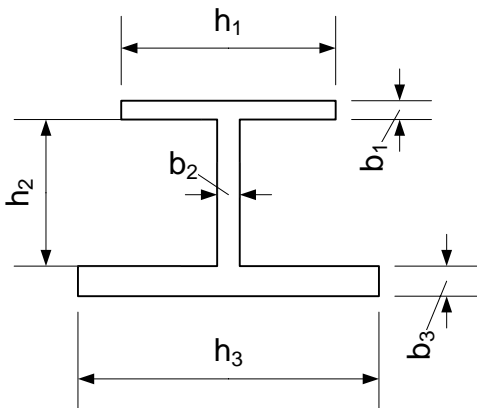
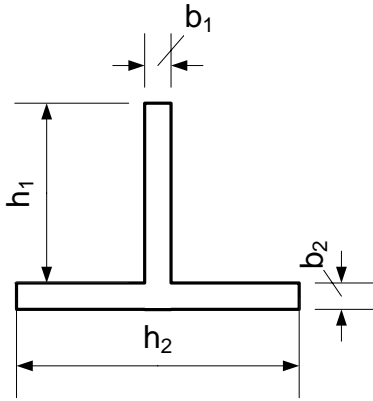
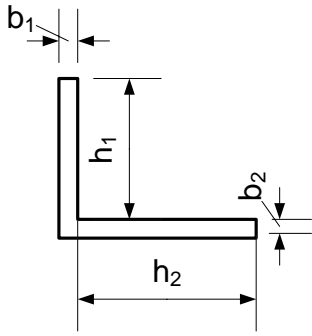
$$d\vartheta \approx \frac{3M_t}{G h b^3} dx$$



$$\tau_{\max} \approx \frac{3M_t}{h_t b^2}$$

dove  $h_t = h_1 + h_2$

$$d\vartheta \approx \frac{3M_t}{G h_t b^3} dx$$



$$b_3 \geq b_2 \geq b_1$$

$$\tau_{\max} \approx \frac{3M_t b_3}{h_1 b_1^3 + h_2 b_2^3 + h_3 b_3^3}$$

$$d\theta \approx \frac{3M_t}{G(h_1 b_1^3 + h_2 b_2^3 + h_3 b_3^3)} dx$$