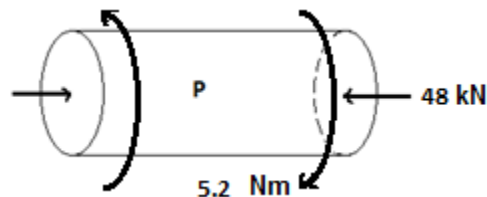
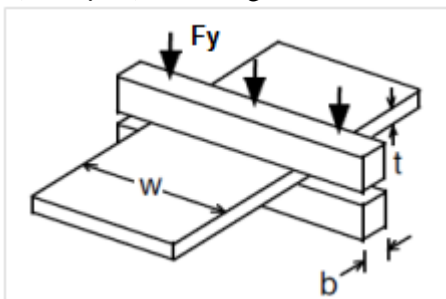


1. Consider a 12-cm diameter thin wall tube with 2 mm thick wall with closed ends made from steel with a tensile yield strength of 280 MPa. Apply a compressive load of 48 kN and a torque of 5.2 N.m to the ends. What internal pressure is required to cause yielding according to (a) the Tresca criterion and (b) the von Mises criterion? What is the percentage of difference?



2. A thin-wall tube is subjected to combined tensile and torsional loading. Find the relationship between the axial stress σ , the shear stress τ , and the tensile yield stress Y to cause yielding according to (a) the Tresca criterion, (b) the von Mises criterion.
3. Consider a plane-strain compression test with a compressive load F_y , a strip width W , an indenter width b , and a strip thickness t . Using the von Mises criterion, find
- $\bar{\epsilon}$ as a function of ϵ_y ,
 - $\bar{\sigma}$ as a function of σ_y ,
 - an expression for the work per volume in terms of ϵ_y and σ_y ,
 - an expression in the form of $\sigma_y = f(K, \epsilon_y, n)$ assuming $\bar{\sigma} = K \bar{\epsilon}^n$.



4. A material yields under a biaxial stress state, $\sigma_1 = -(1/2)\sigma_2$, $\sigma_3 = 0$.
- Assuming the von Mises criterion, find $d\epsilon_2/d\epsilon_3$.
 - What is the ratio of τ_{max}/σ_Y at yielding?
5. A material is subjected to stresses in the ratio σ_1 , $\sigma_2 = 0.4 \sigma_1$, and $\sigma_3 = -0.7 \sigma_1$. Find the ratio of σ_1/Y , ($Y = \sigma_Y$) at yielding using (a) the Tresca criterion and (b) the von Mises criterion.

۶- برای حالات تنش زیر نسبت تنش موثر ($\bar{\sigma}$) را به تنش برشی ماکزیمم (τ_{max}) با فرض اینکه ماده در شرایط تسلیم فن میزز قرار دارد بدست آورید. (با استفاده از حالت تنشهای اصلی در هر حالت)

الف- کشش تک محوری

ب- کشش کرنش صفحه ای

ج- برش خالص

د- تنش ۲ بعدی بصورت $\sigma_3 = 1/4 \sigma_1$ و $\sigma_2 = 0$

ه- تنش ۳ بعدی بصورت $\sigma_3 = -1/2 \sigma_1$ و $\sigma_2 = 1/2 \sigma_1$