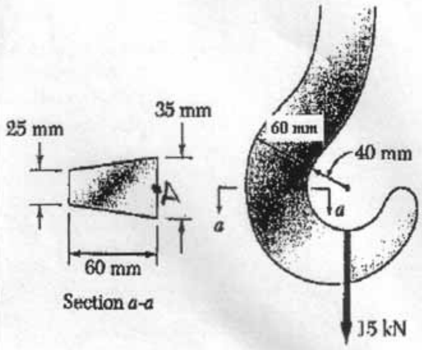
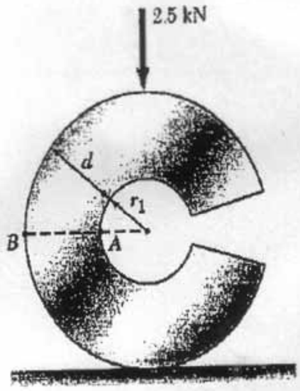


For the crane hook shown, determine the largest tensile stress in section a-a

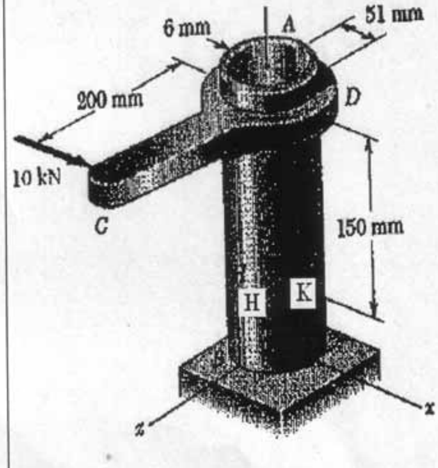
Ans: 84.7 Mpa



The split ring shown has an inner radius $r_1 = 16$ mm and a circular cross section of diameter $d = 32$ mm. For the loading shown, determine the stress at (*a*) point *A*, (*b*) point *B*.

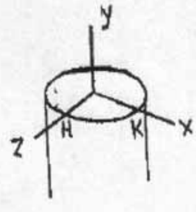
Ans: a) -43.3 Mpa b) 14.43 Mpa

The steel pipe *AB* has a 102-mm outer diameter and a 6-mm wall thickness. Knowing that arm *CD* is rigidly attached to the pipe, determine the principal stresses and the maximum shearing stress at point *H* and *K*



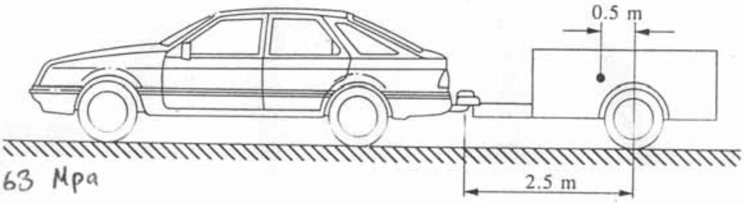
B) If the pipe is made of St37 (σy=240Mpa), determine the safety factor for two methods of Tresca and VonMises.

C) If the pipe is made of a typical cast-iron (Sut=100Mpa, Suc=300Mpa), determine the safety factor for two methods of Coulomb-Mohr and modified Coulomb-Mohr.



6.11 A small trailer has a suspension system as shown in Fig. 6.52. If the weight of the trailer is 4 kN and its centre of gravity is 0.5 m forward of the wheels, calculate the bending moments and torques in sections AB and BC. Calculate also the maximum bending and shear stresses in these sections. Ignore any effects at corners or changes in section.

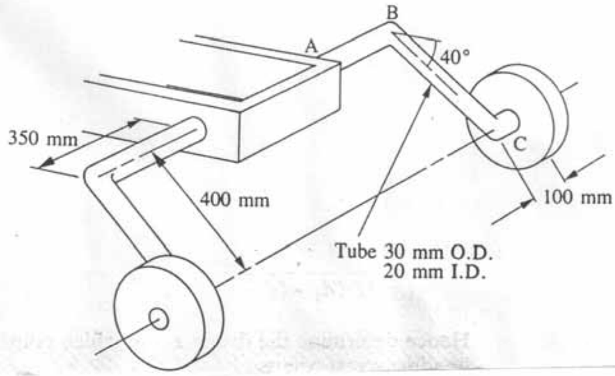
Fig. 6.52



Ans:

$\sigma_{AB} = 263$ Mpa

$\tau_{AB} = 115$ Mpa



11.60. [11.7] Find the maximum tensile stress τ_{xx} and the extreme vertical and horizontal shear stresses on the cross section at the midspan of the beam shown in Fig. P11.60 supported at the end with ball joints.

Ans:

8.921 Mpa

2.738 Kpa

0.6137 Mpa

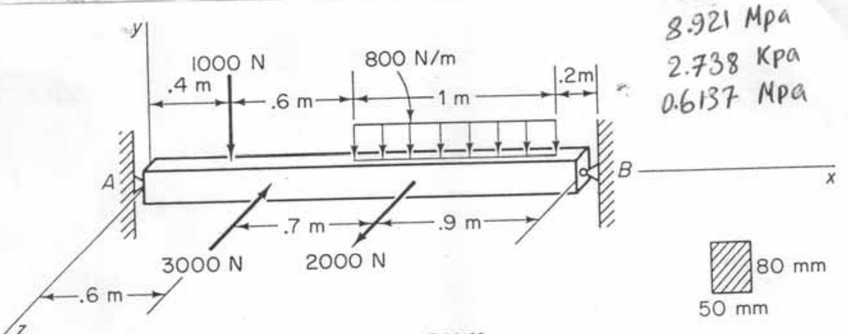
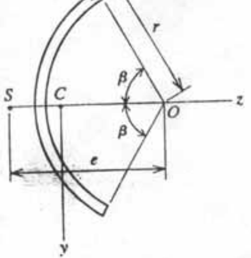


Figure P11.60

8.5-3. Locate the shear centre S for a thin walled section in the shape of an arc of a circle (see figure). Plot a graph showing how the distance e varies as β goes from 0 to π.

Ans:

$$\frac{2r(\sin\beta - \beta\cos\beta)}{\beta - \sin\beta \cdot \cos\beta}$$

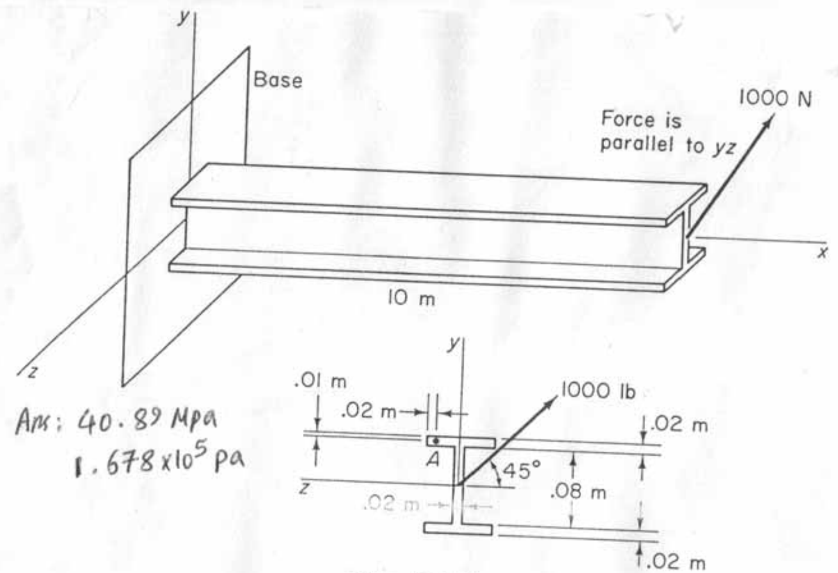


Prob. 8.5-3

11.58. [11.7]

(a) Compute the stress τ_{xx} at A at the base of the cantilever in Fig. P11.58 from bending about y and z axes. Do formally and then via common sense.

(b) Compute the total shear stress τ in the cross section at point A. Consider V_y and V_z.



Ans: 40.89 MPa
1.678 x 10^5 pa

Figure P11.58

11.62. [11.8] Find the shear stress at position A and at position B as shown in Fig. P11.62 for a shear force $V_y = 10{,}000$ lb. The following data are given:

$$I_{zz} = 2.509 \text{ in.}^4$$
$$I_{yy} = 5.16 \text{ in.}^4$$
$$I_{zy} = -.566 \text{ in.}^4$$

The shear loading is at a position such that there is no twisting.

Ans:
9840 psi
106.1 psi

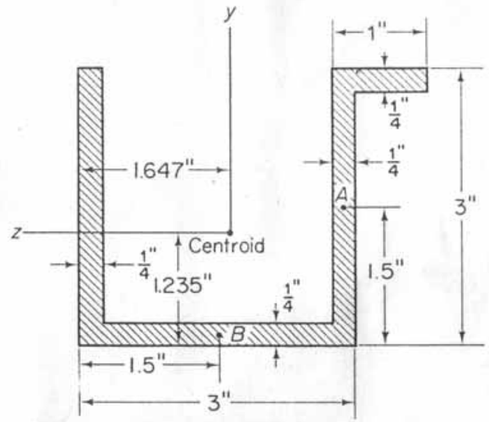


Figure P11.62

13.15. Determine the shear center of the thin-walled section in Fig. 13-36.
Ans. $e = 5.87$ mm

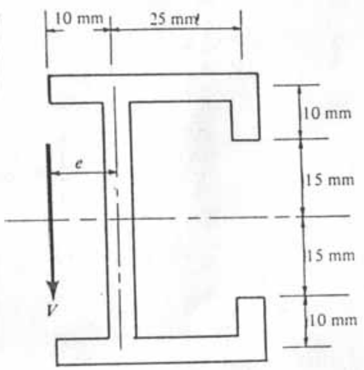
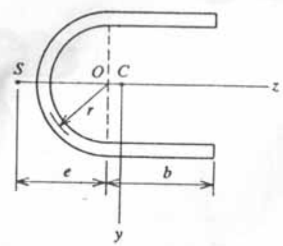


Fig. 13-36

8.5-5. Locate the shear centre S for the thin-walled section shown in the figure. Assume that the thickness is constant.

Ans:

$$e = \frac{4r^2 + 2b^2 + 2\pi br}{4b + \pi r}$$



Prob. 8.5-5