(甲組)

國立成功大學八十二學年度醫工所碩班考試(材料力學 試題)

1. A thin-walled rectangular tube has thickness t_1 on the sides and t_2 on the top and bottom. The height and width(to the median line of the cross section) are h and b, respectively. Find the torsion constant of this tube. (Fig. 1)

2. A simple beam AB having a rectangular cross section(width b and heigth h) and span length L is loaded by a force P acting at the end of an arm of length a (see Fig. 2.). Determine the maximum tensile and compressive stresses in the beam.

3. A thin semicircular bar AB of radius R and constant flexural rigidity EI is supported and loaded as shown in Fig. 3. Determine the horizontal deflection δ_b of point B.

4. For the lap joint in Fig. 4, determine the maximum safe load P which may be applied if the shearing stress in the rivets is limited to 60 MPa, the bearing stress in the plates to 110 MPa, and the average tensile stress in the plate to 140 MPa.

5. A 1000-kg homogeneous bar AB is suspended from two cables AC and BD, each with cross-sectional area 400 mm^2, as shown in Fig. 5. Determine the magnitude P and location x of the largest additional force which can be applied to the bar. The stresses in the cable AC and BD are limited to 100 MPa and 50 MPa, respectively.

6. Two cantilever beams, having the same cross section and made of the same material, jointly support a distributed load of w N/m as shown in Fig. 6. Determine the force P at the roller between them.

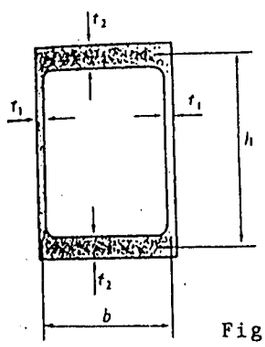

Fig. 1

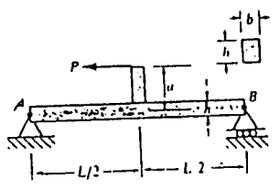

Fig. 2

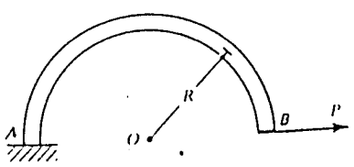

Fig. 3

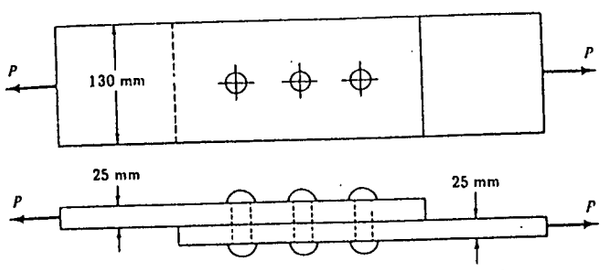

Fig. 4

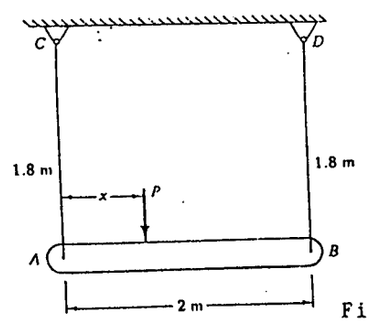

Fig. 5

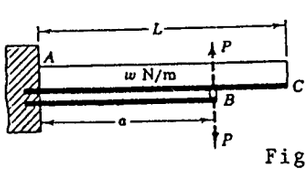

Fig. 6

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