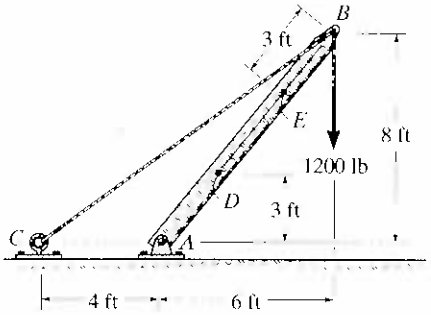
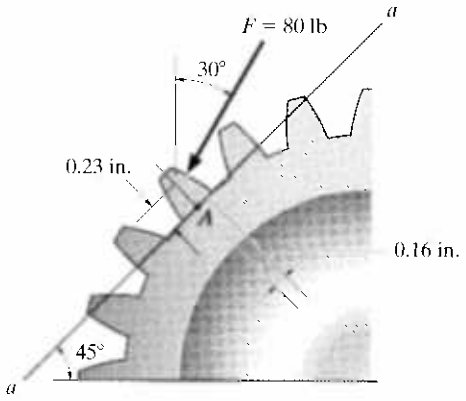
1–6. The beam AB is pin supported at A and supported by a cable BC. Determine the resultant internal loadings acting on the cross section at point D.

1–7. Solve Prob. 1–6 for the resultant internal loadings acting at point E.



Probs. 1–6/7

1–9. The force $F = 80$ lb acts on the gear tooth. Determine the resultant internal loadings on the root of the tooth, i.e., at the centroid point A of section a–a.

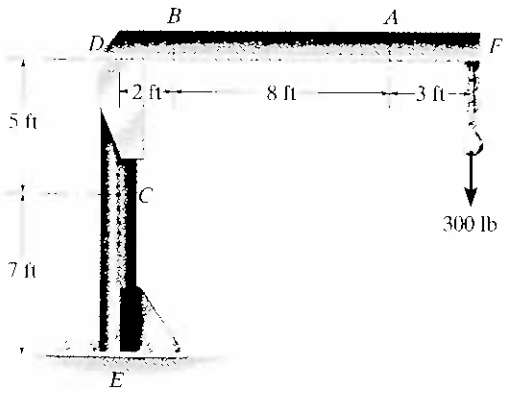


Prob. 1–9

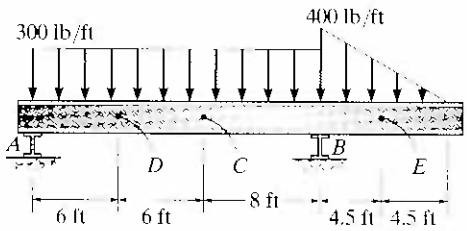
*1–8. The boom DF of the jib crane and the column DE have a uniform weight of 50 lb/ft. If the hoist and load weigh 300 lb, determine the resultant internal loadings in the crane on cross sections through points A, B, and C.

1–10. The beam supports the distributed load shown. Determine the resultant internal loadings on the cross section through point C. Assume the reactions at the supports A and B are vertical.

1–11. The beam supports the distributed load shown. Determine the resultant internal loadings on the cross sections through points D and E. Assume the reactions at the supports A and B are vertical.



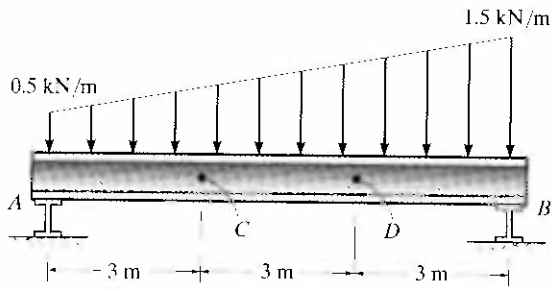
Prob. 1–8



Probs. 1–10/11

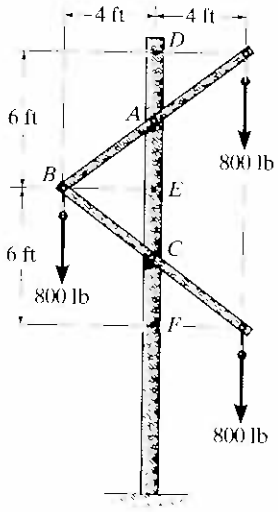
1–18. The beam supports the distributed load shown. Determine the resultant internal loadings acting on the cross section through point C. Assume the reactions at the supports A and B are vertical.

1–19. Determine the resultant internal loadings acting on the cross section through point D in Prob. 1–18.



Probs. 1–18/19

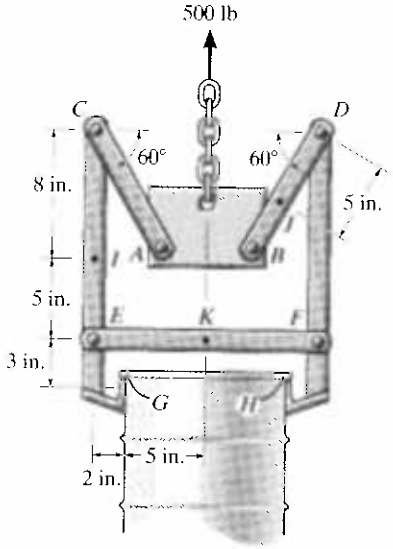
*1–20. The wishbone construction of the power pole supports the three lines, each exerting a force of 800 lb on the bracing struts. If the struts are pin connected at A, B, and C, determine the resultant internal loadings at cross sections through points D, E, and F.



Prob. 1–20

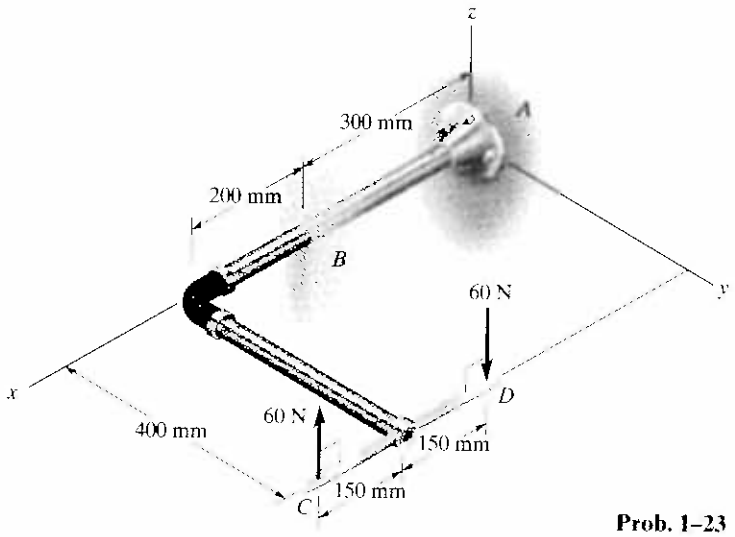
1–21. The drum lifter suspends the 500-lb drum. The linkage is pin connected to the plate at A and B. The gripping action on the drum chime is such that only horizontal and vertical forces are exerted on the drum at G and H. Determine the resultant internal loadings on the cross section through point I.

1–22. Determine the resultant internal loadings on the cross sections through points K and J on the drum lifter in Prob. 1–21.



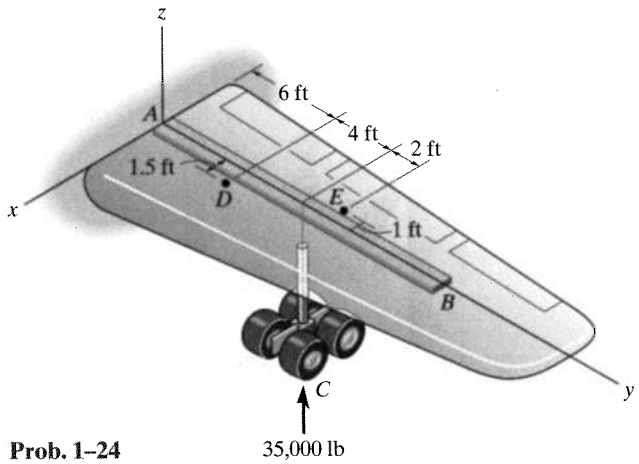
Probs. 1–21/22

1–23. The pipe has a mass of 12 kg/m. If it is fixed to the wall at A, determine the resultant internal loadings acting on the cross section at B. Neglect the weight of the wrench CD.



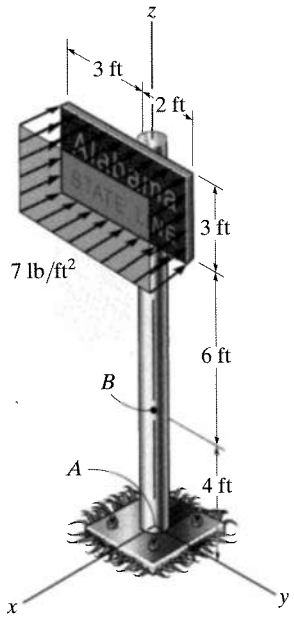
Prob. 1–23

***1–24.** The main beam AB supports the load on the wing of the airplane. The loads consist of the wheel reaction of 35,000 lb at C, the 1200-lb weight of fuel in the tank of the wing, having a center of gravity at D, and the 400-lb weight of the wing, having a center of gravity at E. If it is fixed to the fuselage at A, determine the resultant internal loadings on the beam at this point. Assume that the wing does not transfer any of the loads to the fuselage, except through the beam.



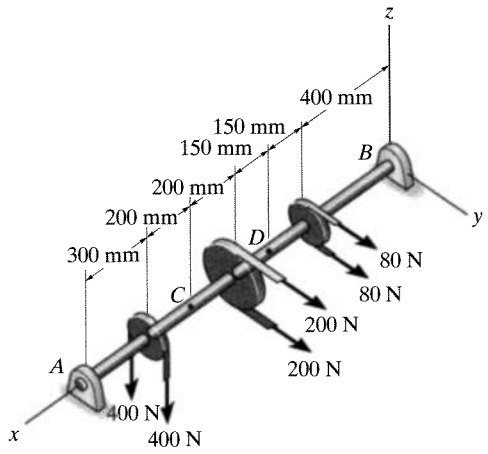
Prob. 1–24

1–25. Determine the resultant internal loadings acting on the cross section through point B of the signpost. The post is fixed to the ground and a uniform pressure of 7 lb/ft^2 acts perpendicular to the face of the sign.



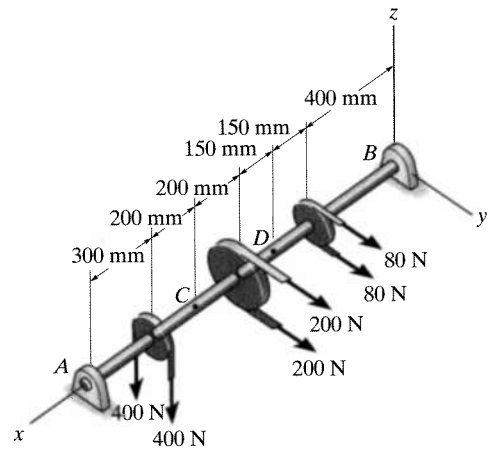
Prob. 1–25

1–26. The shaft is supported at its ends by two bearings A and B and is subjected to the forces applied to the pulleys fixed to the shaft. Determine the resultant internal loadings acting on the cross section through point D. The 400-N forces act in the $-z$ direction and the 200-N and 80-N forces act in the $+y$ direction. The journal bearings at A and B exert only y and z components of force on the shaft.



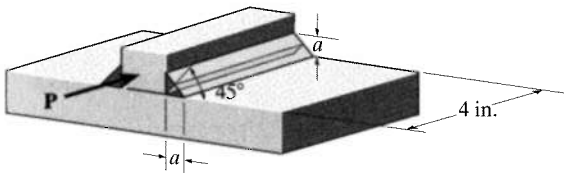
Prob. 1–26

1–27. The shaft is supported at its ends by two bearings A and B and is subjected to the forces applied to the pulleys fixed to the shaft. Determine the resultant internal loadings acting on the cross section through point C. The 400-N forces act in the $-z$ direction and the 200-N and 80-N forces act in the $+y$ direction. The journal bearings at A and B exert only y and z components of force on the shaft.



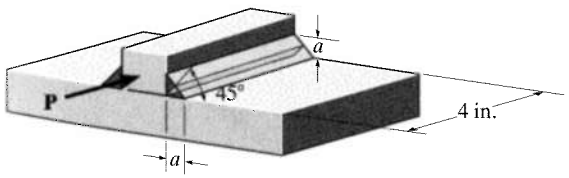
Prob. 1–27

*1–84. The fillet weld size a is determined by computing the average shear stress along the shaded plane, which has the smallest cross section. Determine the smallest size a of the two welds if the force applied to the plate is $P = 20$ kip. The allowable shear stress for the weld material is $\tau_{allow} = 14$ ksi.



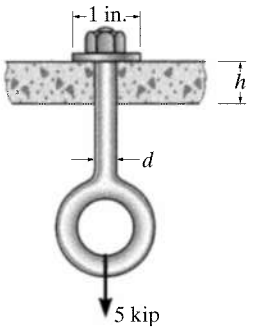
Prob. 1–84

1–85. The fillet weld size $a = 0.25$ in. If the joint is assumed to fail by shear on both sides of the block along the shaded plane, which is the smallest cross section, determine the largest force P that can be applied to the plate. The allowable shear stress for the weld material is $\tau_{allow} = 14$ ksi.



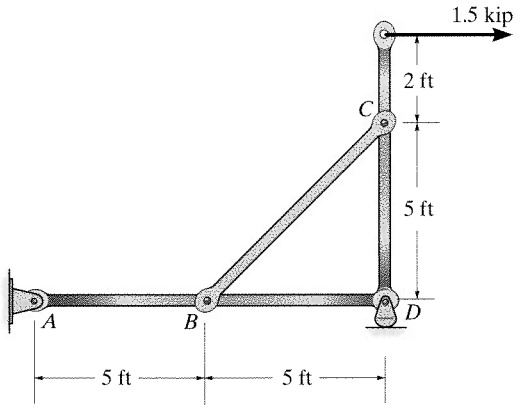
Prob. 1–85

1–86. The eye bolt is used to support the load of 5 kip. Determine its diameter d to the nearest $\frac{1}{8}$ in. and the required thickness h to the nearest $\frac{1}{8}$ in. of the support so that the washer will not penetrate or shear through it. The allowable normal stress for the bolt is $\sigma_{allow} = 21$ ksi and the allowable shear stress for the supporting material is $\tau_{allow} = 5$ ksi.



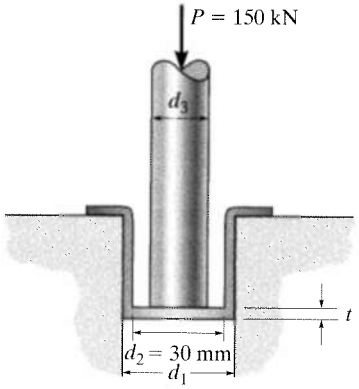
Prob. 1–86

1–87. The frame is subjected to the load of 1.5 kip. Determine the required diameter of the pins at A and B if the allowable shear stress for the material is $\tau_{allow} = 6$ ksi. Pin A is subjected to double shear, whereas pin B is subjected to single shear.



Prob. 1–87

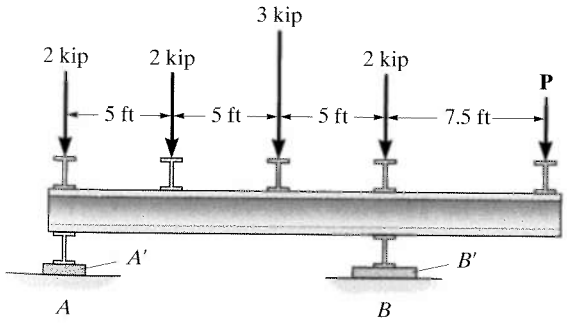
1–93. Determine the smallest dimensions of the circular shaft and circular end cap if the load it is required to support is $P = 150$ kN. The allowable tensile stress, bearing stress, and shear stress is $(\sigma_t)_{\text{allow}} = 175$ MPa, $(\sigma_b)_{\text{allow}} = 275$ MPa, and $\tau_{\text{allow}} = 115$ MPa.



Prob. 1–93

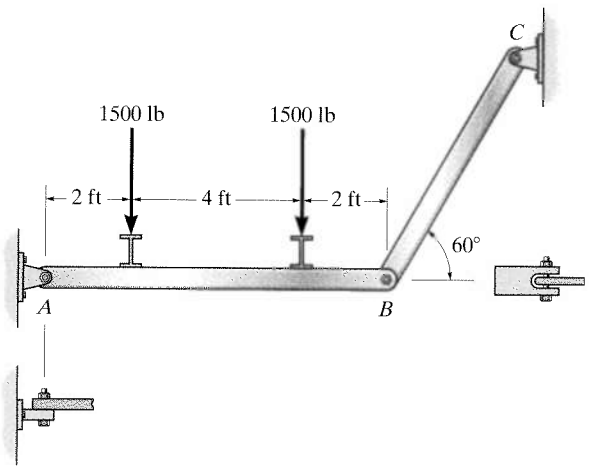
1–94. If the allowable bearing stress for the material under the supports at A and B is $(\sigma_b)_{\text{allow}} = 400$ psi, determine the size of *square* bearing plates A' and B' required to support the loading. Take $P = 1.5$ kip. Dimension the plates to the nearest $\frac{1}{2}$ in. The reactions at the supports are vertical.

1–95. If the allowable bearing stress for the material under the supports at A and B is $(\sigma_b)_{\text{allow}} = 400$ psi, determine the maximum load **P** that can be applied to the beam. The bearing plates A' and B' have square cross sections of 2 in. × 2 in. and 4 in. × 4 in., respectively.



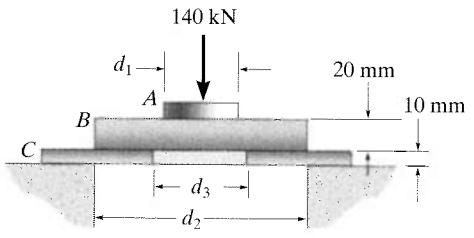
Probs. 1–94/95

***1–96.** Determine the required cross-sectional area of member BC and the diameter of the pins at A and B if the allowable normal stress is $\sigma_{\text{allow}} = 3$ ksi and the allowable shear stress is $\tau_{\text{allow}} = 4$ ksi.



Prob. 1–96

1–97. The assembly consists of three disks A, B, and C that are used to support the load of 140 kN. Determine the smallest diameter d_1 of the top disk, the diameter d_2 within the support space, and the diameter d_3 of the hole in the bottom disk. The allowable bearing stress for the material is $(\sigma_{\text{allow}})_b = 350$ MPa and allowable shear stress is $\tau_{\text{allow}} = 125$ MPa.



Prob. 1–97