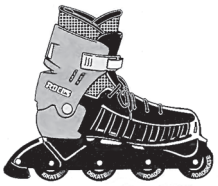

FIGURE P4-10
Problem 4-22

10-mm-dia steel pins in double shear. Find the stress in the pins for a 100-kg person landing a 0.5-m jump on one foot. (a) Assume that all four wheels land simultaneously. (b) Assume that one wheel absorbs all the landing force.

*4-23 A beam is supported and loaded as shown in Figure P4-11*a*. Find the reactions, maximum shear, maximum moment, maximum slope, maximum bending stress, and maximum deflection for the data given in the assigned row(s) in Table P4-2.

*4-24 A beam is supported and loaded as shown in Figure P4-11*b*. Find the reactions, the maximum shear, maximum moment, maximum slope, maximum bending stress, and maximum deflection for the data given in the assigned row(s) in Table P4-2.

*4-25 A beam is supported and loaded as shown in Figure P4-11*c*. Find the reactions, the maximum shear, maximum moment, maximum slope, maximum bending stress, and maximum deflection for the data given in the assigned row(s) in Table P4-2.

*4-26 A beam is supported and loaded as shown in Figure P4-11*d*. Find the reactions, maximum shear, maximum moment, maximum slope, maximum bending stress, and maximum deflection for the data given in the assigned row(s) in Table P4-2.

4-27 A storage rack is to be designed to hold the paper roll of Problem 4-8 as shown in Figure P4-12. Determine suitable values for dimensions *a* and *b* in the figure. Consider bending, shear, and bearing stresses. Assume an allowable tensile/compressive stress of 100 MPa and an allowable shear stress of 50 MPa for both stanchion and mandrel, which are steel. The mandrel is solid and inserts halfway into the paper roll. Balance the design to use all of the material strength. Calculate the deflection at the end of the roll.

†*4-28* Figure P4-13 shows a forklift truck negotiating a 15° ramp to drive onto a 4-ft-high loading platform. The truck weighs 5 000 lb and has a 42-in wheelbase. Design two (one for each side) 1-ft-wide ramps of steel to have no more than 1-in deflection in the worst case of loading as the truck travels up them. Minimize the weight of the ramps by using a sensible cross-sectional geometry.

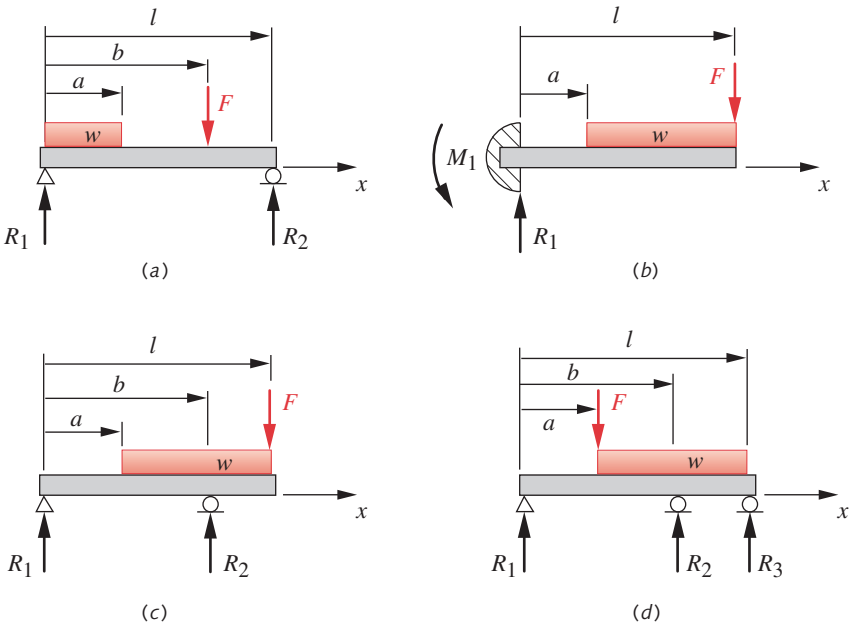

FIGURE P4-11
Beams and Beam Loadings for Problems 4-23 to 4-26 and 4-29 to 4-32 - See Table P4-2 for Data

* Answers to these problems are provided in Appendix D. Problem numbers in *italics* are design problems. Problem numbers in **boldface** are extended from similar problems in earlier chapters with the same dash number. Problems in succeeding chapters may also continue and extend these problems.