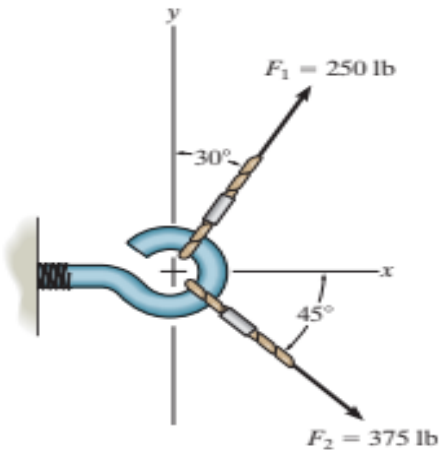
EGN 3310 Study Union – Gavin K.

1. If a car is traveling at 55 m/hr, determine its speed in kilometres per hour and meters per second.
2. What is the weight in newtons of an object that has a mass of: (a) 10 kg, (b) 0.5 g, and (c) 4.50 Mg? Express the result to three significant figures. Use an appropriate prefix.

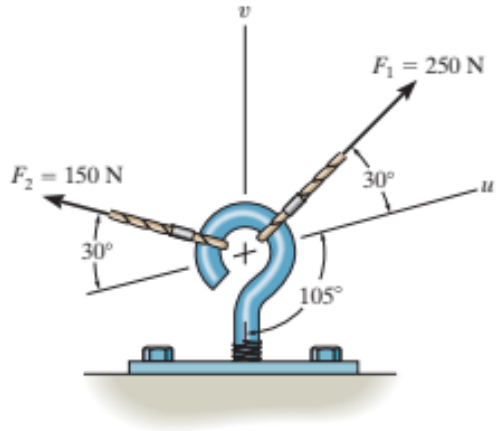
3.

Determine the magnitude of the resultant force Fr = F1 + F2 and the angle of Fr given counterclockwise from the positive x-axis.



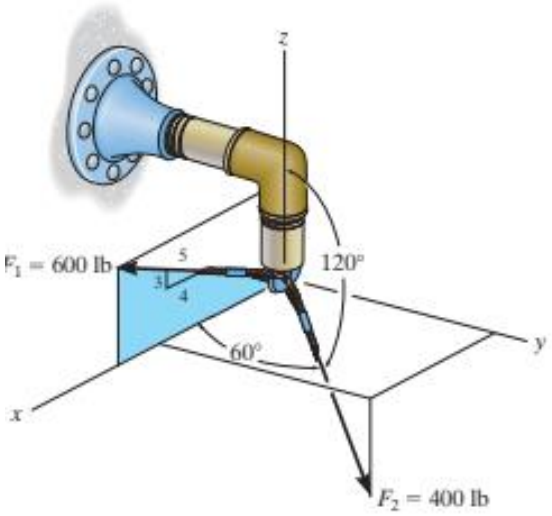
4.

Resolve F1 into components along the u and v axes and determine the magnitudes of these components.

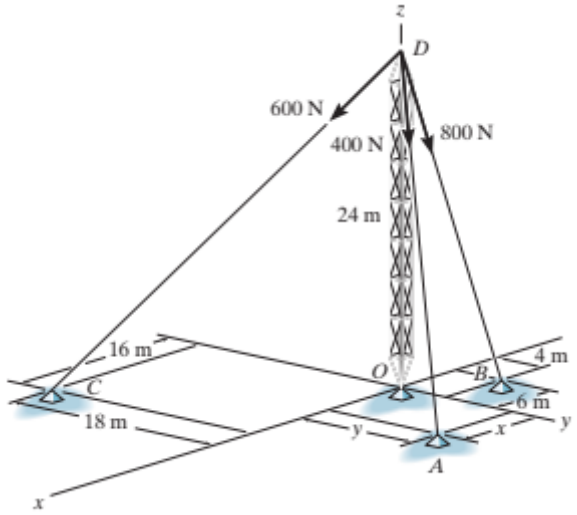


5.

Express each force acting on the pipe assembly in Cartesian vector form.

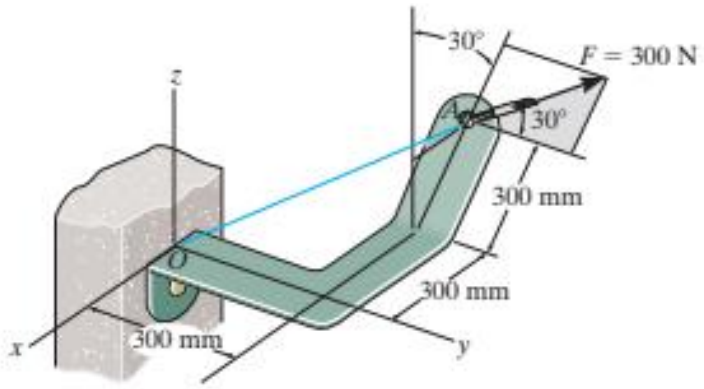


6. The tower is held in place by three cables. If the force of each cable acting on the tower is shown, determine the magnitude and coordinate direction angles α, β, γ of the resultant force. Take x = 20 m y = 15 m



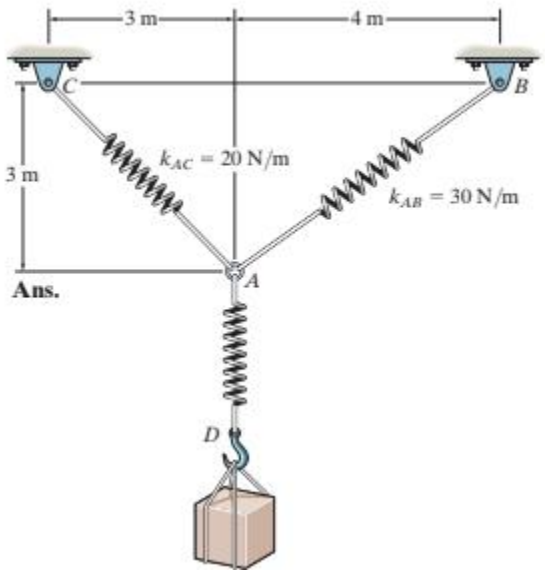
7.

Determine the magnitude of the projected component of the force F = 300 N acting along line OA.

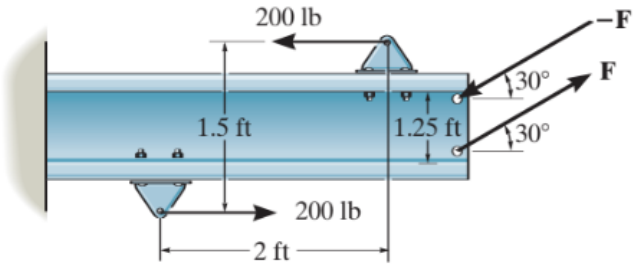


8.

The unstretched length of spring AB is 3 m. If the block is held in the equilibrium position shown, determine the mass of the block at D.

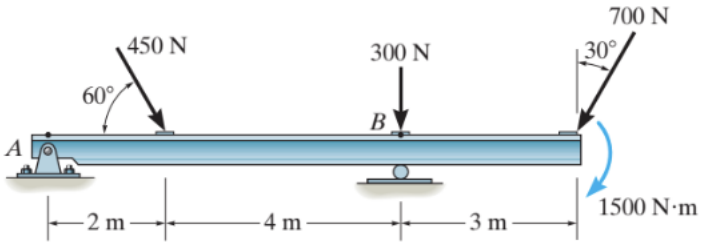


9. Two couples act on the beam. Determine the magnitude of F so that the resultant couple moment is 450 lb*ft counterclockwise. Where on the beam does the resultant couple moment act?



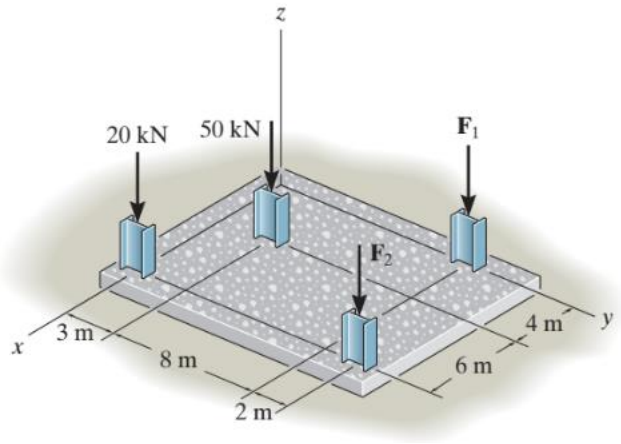
10.

Replace the loading acting on the beam by a single resultant force. Specify where the force acts, measured from end A.



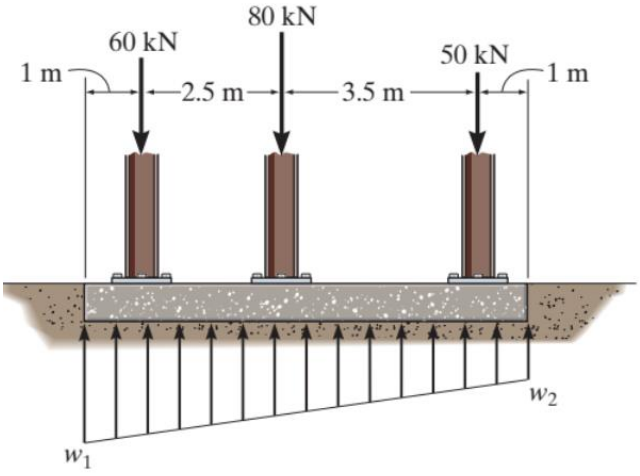
11.

The building slab is subjected to four parallel column loadings. Determine the equivalent resultant force and specify its location (x, y) on the slab. Take F1 = 20 kN, F2 = 50 kN.



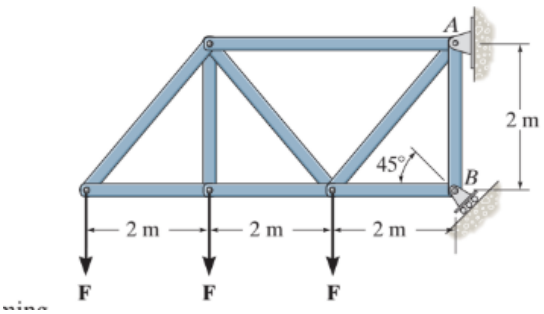
12.

If the soil exerts a trapezoidal distribution of load on the bottom of the footing, determine the intensities w1 and w2 of this distribution needed to support the column loadings.



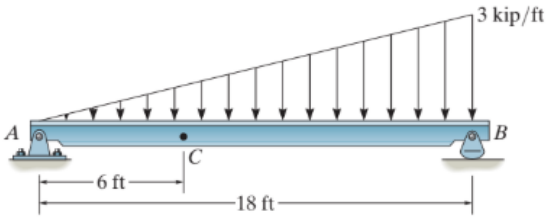
13.

If the roller at B can sustain a maximum load of 3 kN, determine the largest magnitude of each of the three forces F that can be supported by the truss.



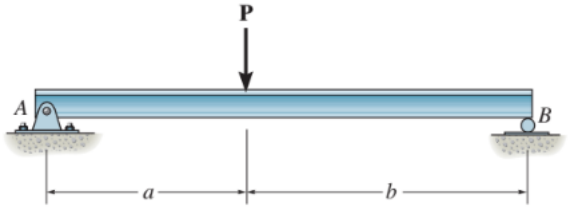
14.

Determine the shear force and moment acting at a section passing through point C in the beam.



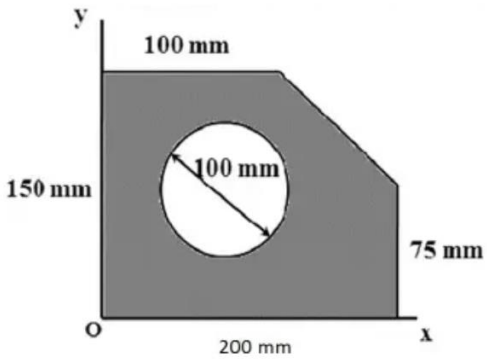
15.

Draw the shear and moment diagrams for the beam (a) in terms of the parameters shown; (b) set P = 600 lb, a = 5 ft, b = 7 ft.



16.

Referring to the Figure, determine the coordinates xc and yc of the center of a 100mm diameter, circular hole cut in a thin plate so that this point will be the centroid of the remaining shaded area.



17.

Determine the coordinates Xc and Yc of the centroid 'C' of the area between the parabola y = x2/a and the straight line y = x .

