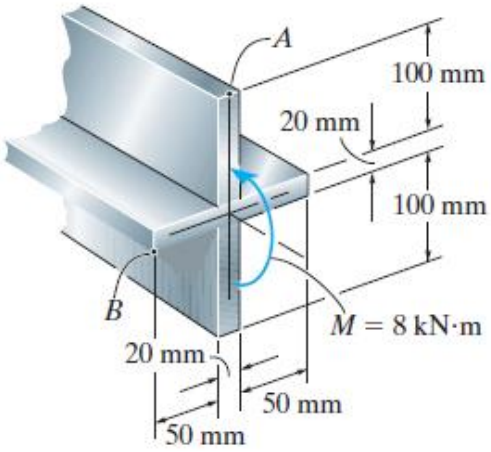
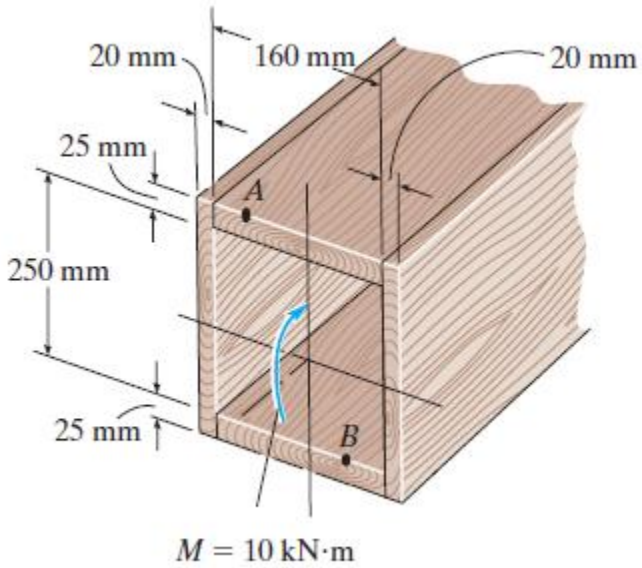
CHAPTER VI- BENDING

1- The aluminum strut has a cross-sectional area in the form of a cross. If it is subjected to the moment M=8 kN.m, determine the bending stress acting at points *A* and *B*,and show the results acting on volume elements located at these points.

(49.4 MPa, 4.49 MPa)

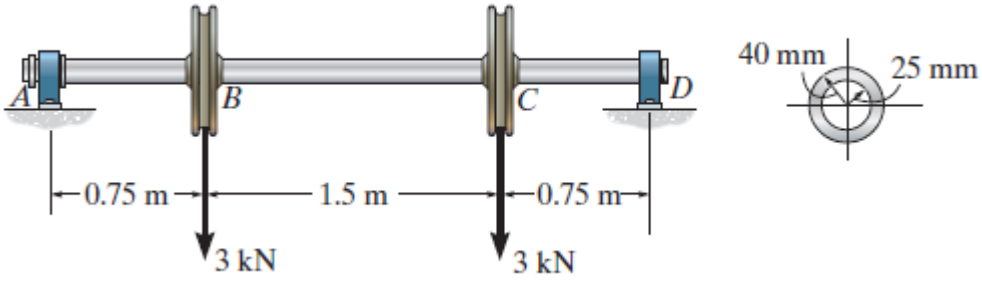


2- A box beam is constructed from four pieces of wood, glued together as shown. If the moment acting on the cross section is 10 kN m, determine the stress at points *A* and *B* and show the results acting on volume elements located at these points.
(6.21 MPa, 5.17 MPa)



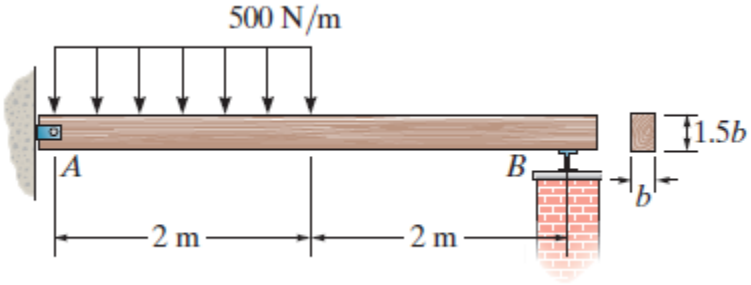
3- The shaft is supported by a smooth thrust bearing at *A* and smooth journal bearing at *D.* If the shaft has the cross section shown, determine the absolute maximum bending stress in the shaft.

(52.8 MPa)



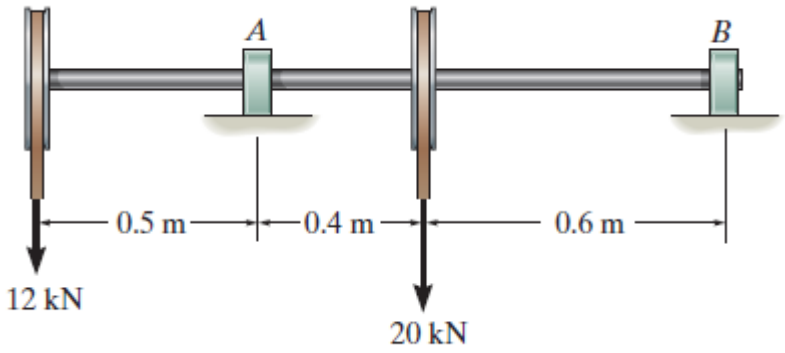
4-The wood beam has a rectangular cross section in the proportion shown. Determine its required dimension *b* if the allowable bending stress is σ_{all} = 10 MPa.

(53.1 mm)



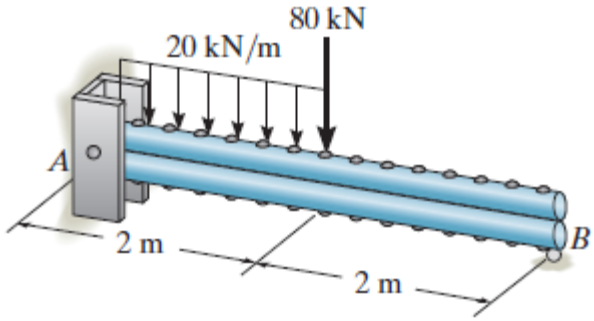
5- Determine the absolute maximum bending stress in the 80-mm-diameter shaft which is subjected to the concentrated forces. The journal bearings at *A* and *B* only support vertical forces.

(119 MPa)



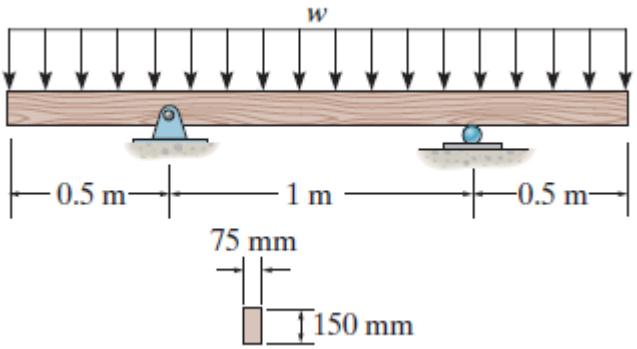
6- The two solid steel rods are bolted together along their length and support the loading shown. Assume the support at *A* is a pin and *B* is a roller. Determine the required diameter *d* of each of the rods if the allowable bending stress is σ_{all} = 130 MPa.

(116 mm)



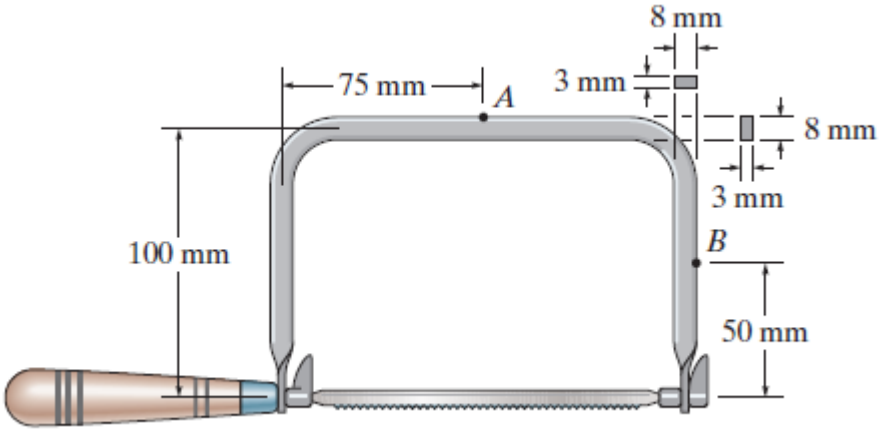
7- Determine the largest uniform distributed load *w* that can be supported so that the bending stress in the beam does not exceed σ_{all} = 5 MPa.

(11.25 kN/m)



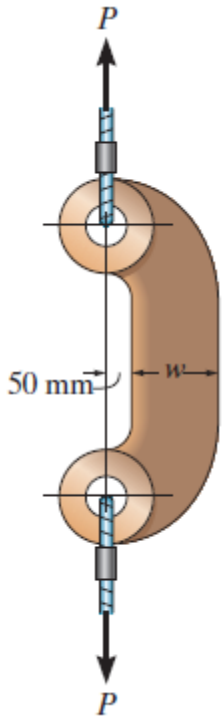
8- The coping saw has an adjustable blade that is tightened with a tension of 40 N. Determine the state of stress in the frame at points *A* and *B*.

(123 MPa, 62.5 MPa)



9- The offset link supports the loading of P=30 KN. Determine its required width *w* if the allowable normal stress is σ_{all} = 73 MPa. The link has a thickness of 40 mm.

(79.7 mm)



10- The masonry pier is subjected to the 800-kN load. If x = 0.25 m y = 0.5 m, and determine the normal stress at each corner *A*, *B*, *C*, *D* (not shown) and plot the stress distribution over the cross section. Neglect the weight of the pier.

(9.88 kPa (T), 49.4 kPa (C), 128 kPa (C), 69.1 kPa (C))