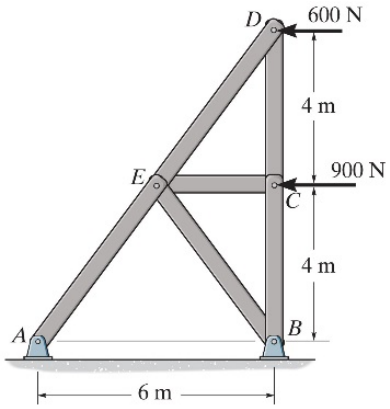
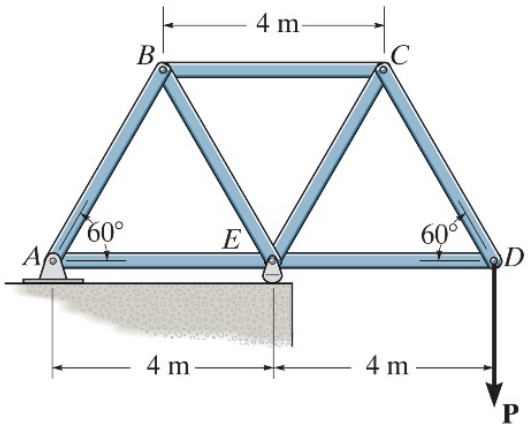
Chapter 6

(you need to draw free-body diagrams for every piece you are taking for analysis. Mark your unknown variables and their directions. Your equilibrium equations should be based on your free-body diagrams)

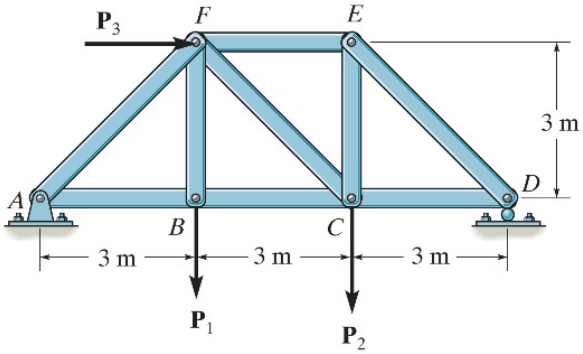
1. Use **method of joint** to determine the force on each member of the truss, and state if the member are in tension or compression. (hint: starting points from D, then C and E)



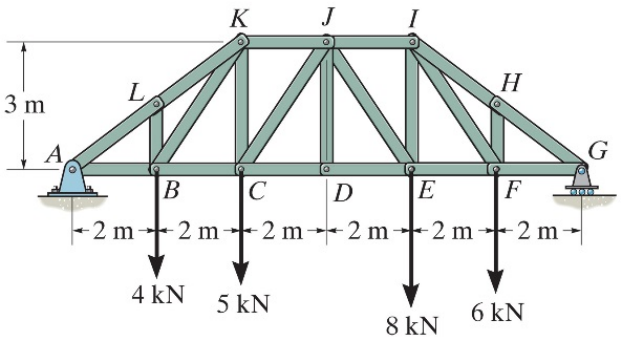
2. a) Use **method of joint** to determine the force in each member of the truss in terms of force P. Indicate the member is subjected to tension or compression. (hints: starting points from D, then C, B and E)
   b) Which members are subjected to max tension force and the max compression?
   c) If any member can support max tension of 8 kN in tension and 6 kN in compression, what will the max load P that whole truss system support?



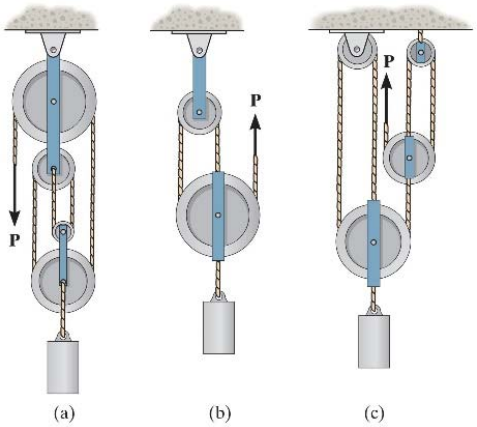
3. Use **method of section** to determine the members BC, CF and EF of the truss and state them in tension or compression. Set P_1 = 6 kN, P_2 = 9 kN and P_3 = 12 kN. (hint: find the support forces at A and/or D first)



4. a) Use **method of section** to determine the force in members HI, FI and EF of the truss, and state if the members are in tension or compression. (hint: find the supports at A and/or G first)

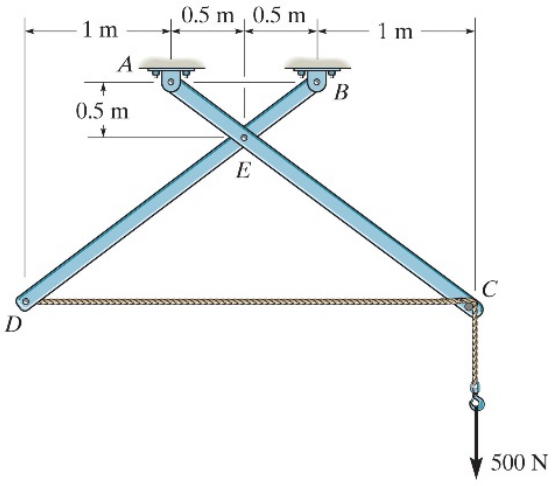


5. In each case, determine the force P required to maintain equilibrium. The block weighs 100 lb.

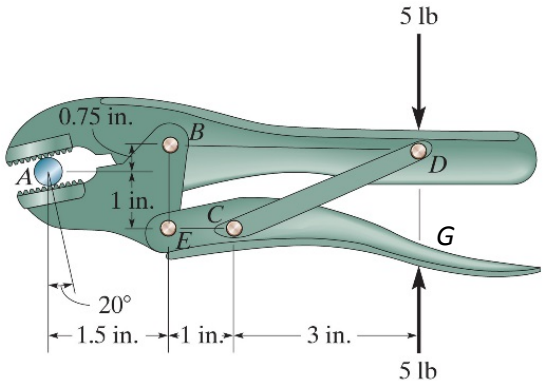


6. The two members frame is pin connected at E. The cable is attached to D, passes over the smooth peg at C, and support the 500 N load. Determine the horizontal and vertical reactions at each pin.

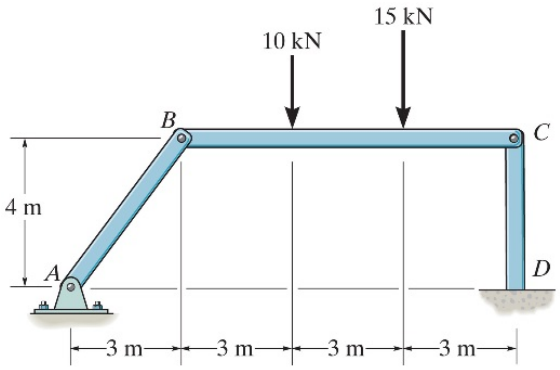
a) Draw free-body diagrams of BED and AEC.
b) Use FBD of member BED to setup moment equation at B. Use FBD of member AEC and setup moment equation at A. Find the forces at pin E.
c) Use FBD of members BED and AEC to find forces at A and B.



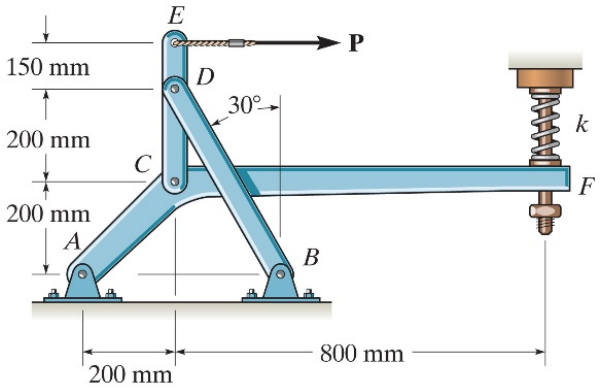
7. A 5 lb force is applied to the handles of the vise grip. Determine the compressive force developed on the smooth bolt shank A at jaws.
   a) Draw free-body diagrams of members ABD, ABE, ECG and CD.
   b) Use FBD of member ECG to find force on member CD and force at joint E.
   c) Use FBD of member ABE to determine the forces at A and joint B.



8. Determine the reactions at D.
   a) Draw free-body diagrams of members AB, BC and CD.
   b) Use FBD of member BC to calculate the force on the member AB and joint C.
   c) Use FBD of member CD to find the supports at fixed end D.

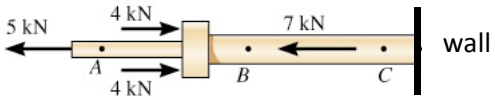


9. Determine force on the spring F if the force P is 200 N.
   a) Draw free-body diagrams of members ACF, CDE and BD.
   b) Use FBD of member CDE to find forces on member BD and joint C.
   c) Use FBD of member ACF to find forces on the spring F and joint A.



Chapter 7

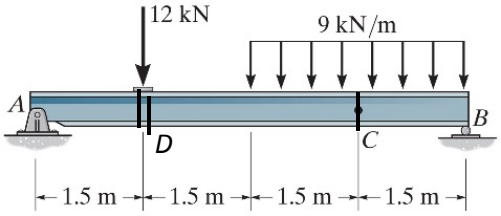
1. Draw the free-body diagram necessary to calculate the normal forces (N) on the cross sections passing through points A, B and C.



2. Draw the free-body diagram necessary to determine the normal force (N), shear force (V) and bending moment (M_b) on the cross section

a) passing point C.

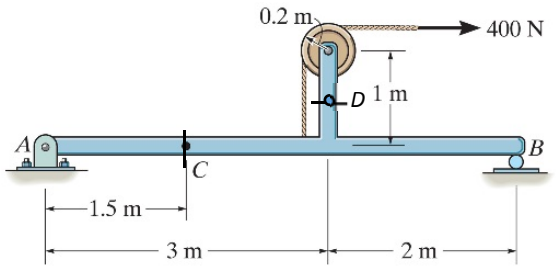
b) on the right side of point D and left side of point D.



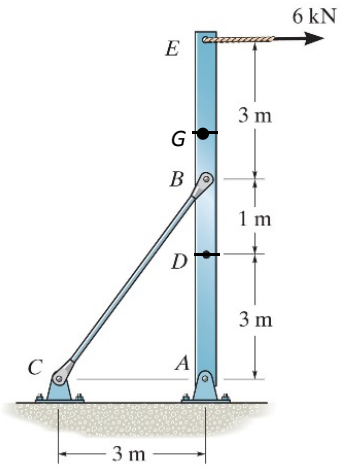
3. Draw the free-body diagram necessary to determine the internal normal force (N), shear force (V), and bending moment (M_b) on the cross-section

a) passing point C

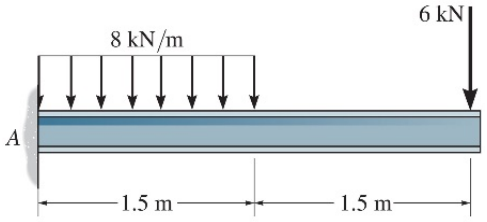
b) passing point D. (D is 0.5 m above beam)



4. Draw the free-body diagram necessary to determine the internal force (N), shear force (V) and bending moment (Mb) on the cross section a) passing point D and b) passing point G. (G is 1 m above point B)



5. a) Draw free-body diagram and develop the shear force V(x) and bending moment $M_b(x)$ functions for $0 < x < 1.5$ m. Choose point A as origin.
   b) Draw free-body diagram and develop the shear force V(x) and bending moment $M_b(x)$ functions for $1.5 < x < 3$ m. Choose point A as origin.
   c) Draw shear and bending moment diagram for the beam.



6. a) Draw free-body diagram and develop the shear force V(x) and bending moment $M_b(x)$ functions for $0 < x < 20$ ft. Choose point A as origin.
   b) Draw free-body diagram and develop the shear force V(x) and bending moment $M_b(x)$ functions for $20 < x < 30$ ft. Choose point A as origin.

   c) Draw shear and bending moment diagram for the beam.