

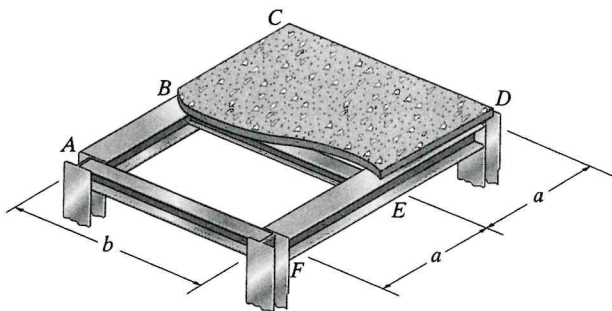
PROBLEMS

Sec. 2.1

2

2-1. The steel framework is used to support the reinforced stone concrete slab that is used for an office. The slab is 200 mm thick. Sketch the loading that acts along members BE and FED . Take $a = 2$ m, $b = 5$ m. *Hint:* See Tables 1.2 and 1.4.

2-2. Solve Prob. 2-1 with $a = 3$ m, $b = 4$ m.

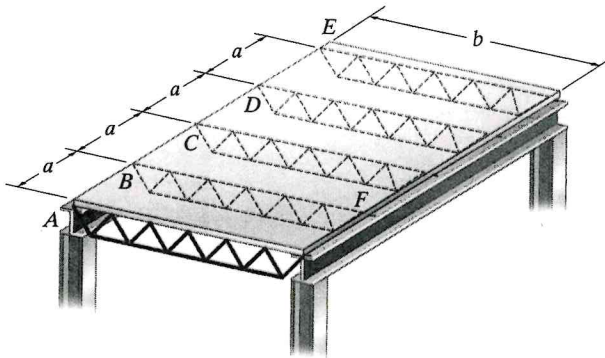


Probs. 2-1/2

2-3. The floor system used in a school classroom consists of a 4-in. reinforced stone concrete slab. Sketch the loading that acts along the joist BF and side girder $ABCDE$. Set $a = 10$ ft, $b = 30$ ft. *Hint:* See Tables 1.2 and 1.4.

***2-4.** Solve Prob. 2-3 with $a = 10$ ft, $b = 15$ ft.

2-5. Solve Prob. 2-3 with $a = 7.5$ ft, $b = 20$ ft.

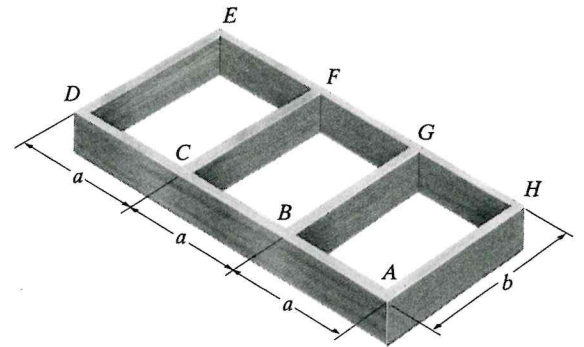


Probs. 2-3/4/5

2-6. The frame is used to support a 2-in.-thick plywood floor of a residential dwelling. Sketch the loading that acts along members BG and $ABCD$. Set $a = 6$ ft, $b = 18$ ft. *Hint:* See Tables 1.2 and 1.4.

2-7. Solve Prob. 2-6, with $a = 10$ ft, $b = 10$ ft.

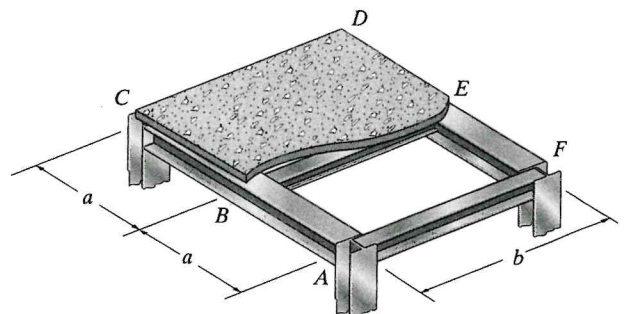
***2-8.** Solve Prob. 2-6, with $a = 10$ ft, $b = 15$ ft.



Probs. 2-6/7/8

2-9. The steel framework is used to support the 4-in. reinforced stone concrete slab that carries a uniform live loading of 400 lb/ft². Sketch the loading that acts along members BE and FED . Set $a = 9$ ft, $b = 12$ ft. *Hint:* See Table 1.2.

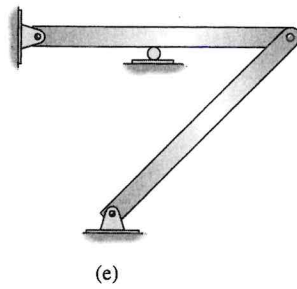
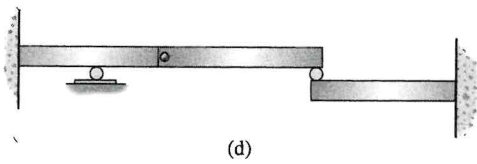
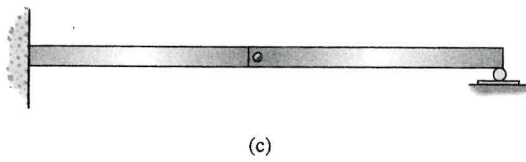
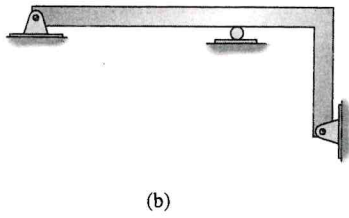
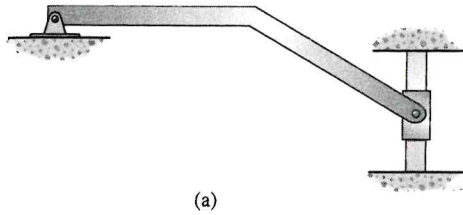
2-10. Solve Prob. 2-9, with $a = 6$ ft, $b = 18$ ft.



Probs. 2-9/10

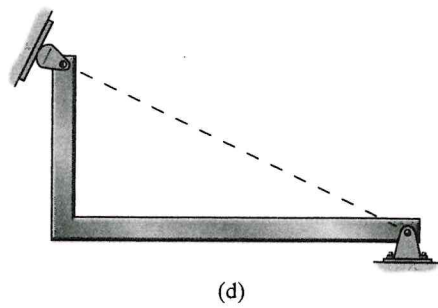
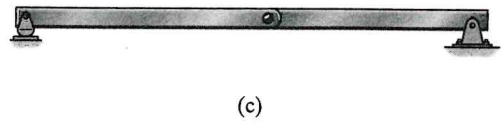
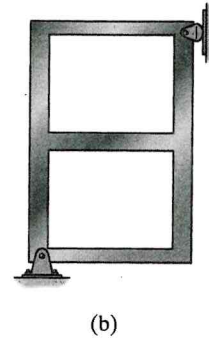
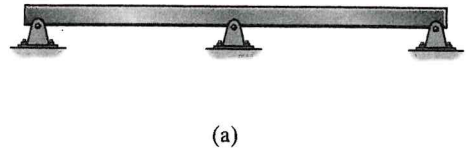
Sec. 2.2-2.5

2-11. Classify each of the structures as statically determinate or indeterminate. If indeterminate, specify the degree of indeterminacy.



Prob. 2-11

*2-12. Classify each of the frames as statically determinate or indeterminate. If indeterminate, specify the degree of indeterminacy. All internal joints are fixed connected.



Prob. 2-12

2

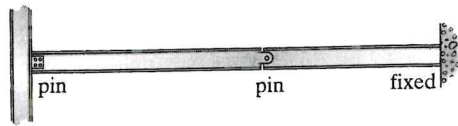
wood
acts
18 ft.

e 4-in.
uniform
at acts
= 12 ft.

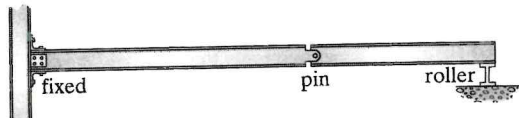
F

2-13. Classify each of the structures as statically determinate, statically indeterminate, stable, or unstable. If indeterminate, specify the degree of indeterminacy. The supports or connections are to be assumed as stated.

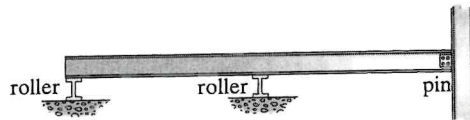
2



(a)



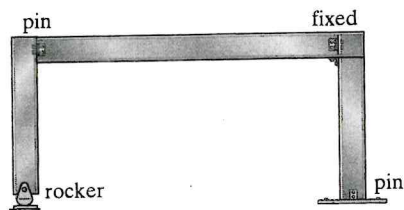
pin (b)



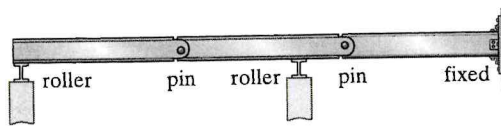
(c)

Prob. 2-13

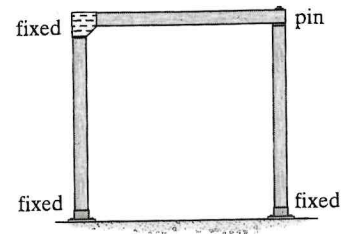
2-14. Classify each of the structures as statically determinate, statically indeterminate, stable, or unstable. If indeterminate, specify the degree of indeterminacy. The supports or connections are to be assumed as stated.



(a)



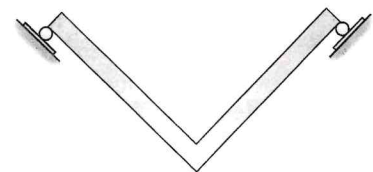
(b)



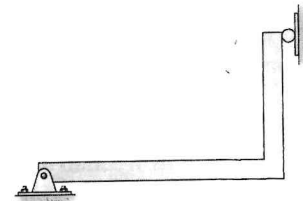
(c)

Prob. 2-14

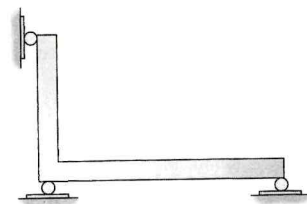
2-15. Classify each of the structures as statically determinate, statically indeterminate, stable, or unstable.



(a)



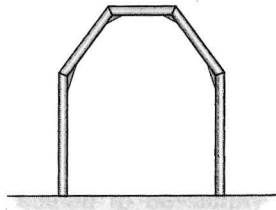
(b)



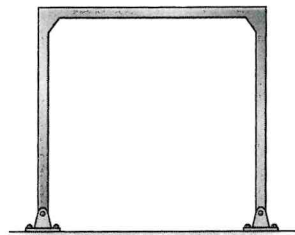
(c)

Prob. 2-15

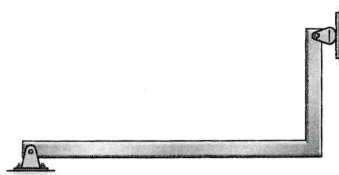
*2-16. Classify each of the structures as statically determinate, statically indeterminate, or unstable. If indeterminate, specify the degree of indeterminacy.



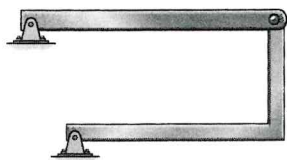
(a)



(b)



(c)

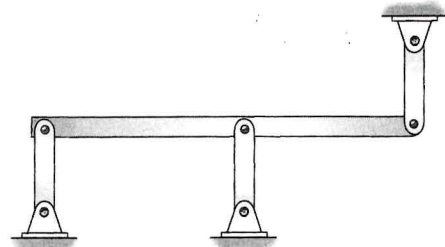


(d)

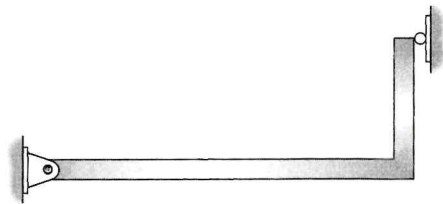
Prob. 2-16



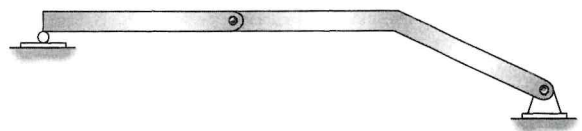
(a)



(b)



(c)

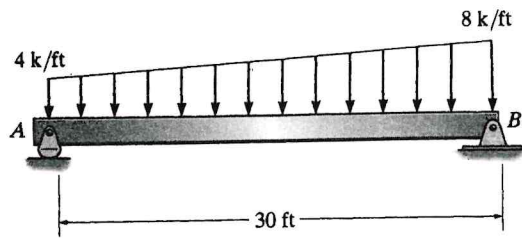


(d)

Prob. 2-17

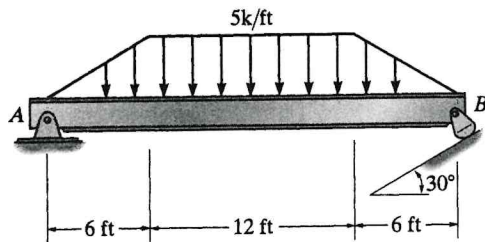
Sec. 2.6

*2-18. Determine the reactions on the beam.



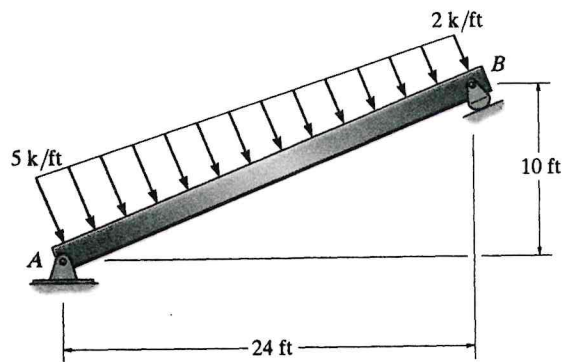
Prob. 2-18

2-19. Determine the reactions at the supports.



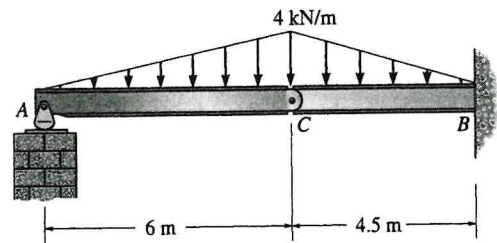
Prob. 2-19

*2-20. Determine the reactions on the beam.



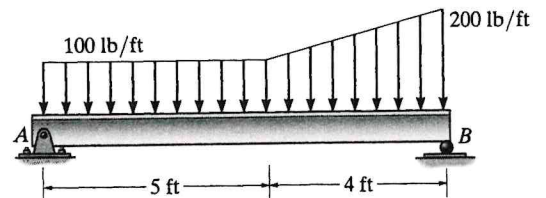
Prob. 2-20

2-21. Determine the reactions at the supports *A* and *B* of the compound beam. There is a pin at *C*.



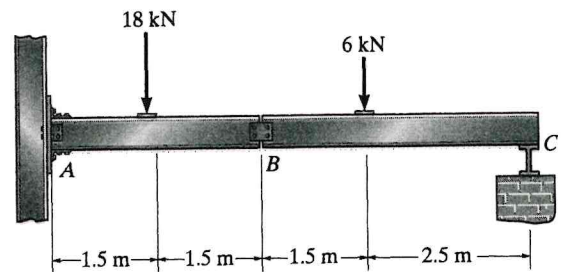
Prob. 2-21

2-22. Determine the reactions at the supports.



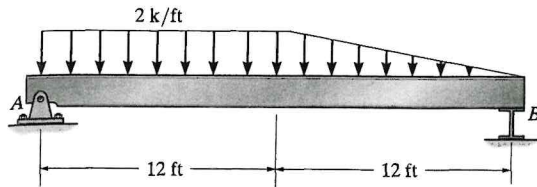
Prob. 2-22

2-23. Determine the reactions at the supports *A* and *C* of the compound beam. Assume *A* is fixed, *B* is a pin, and *C* is a roller.



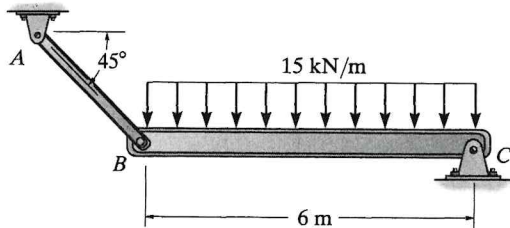
Prob. 2-23

*2-24. Determine the reactions on the beam. The support at B can be assumed to be a roller.



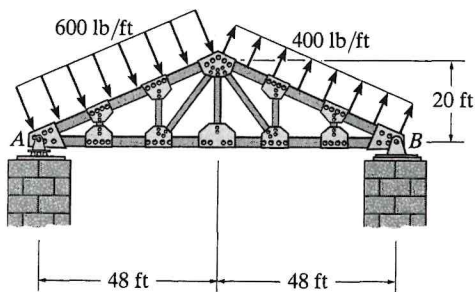
Prob. 2-24

2-25. Determine the horizontal and vertical components of reaction at the pins A and C .



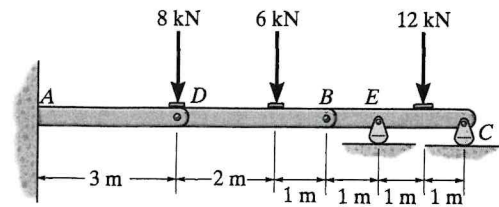
Prob. 2-25

2-26. Determine the reactions at the truss supports A and B . The distributed loading is caused by wind.



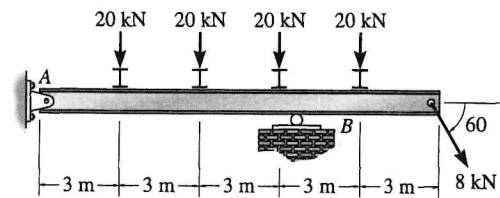
Prob. 2-26

2-27. The compound beam is fixed at A and supported by a rocker at E and C . There are hinges (pins) at D and B . Determine the reactions at the supports.



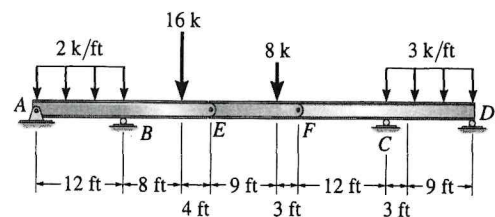
Prob. 2-27

*2-28. Determine the reactions on the beam. The support at B can be assumed as a roller.



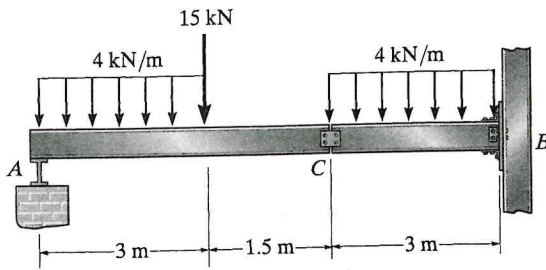
Prob. 2-28

2-29. Determine the reactions at the supports A , B , C , and D .



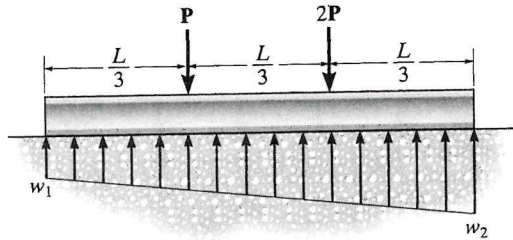
Prob. 2-29

2-30. Determine the reactions at the supports A and B of the compound beam. Assume A is a roller, C is a pin, and B is fixed.



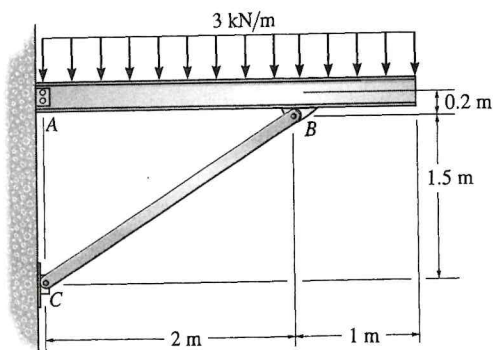
Prob. 2-30

2-31. The beam is subjected to the two concentrated loads as shown. Assuming that the foundation exerts a linearly varying load distribution on its bottom, determine the load intensities w_1 and w_2 for equilibrium (a) in terms of the parameters shown; (b) set $P = 500$ lb, $L = 12$ ft.



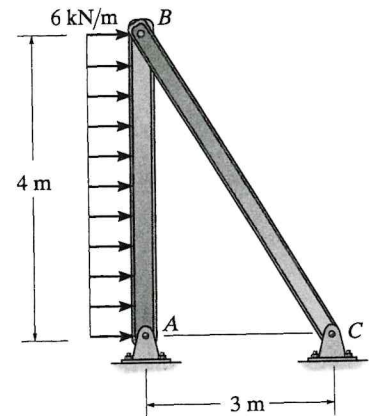
Prob. 2-31

*2-32. Determine the horizontal and vertical components of reaction at the supports A and C . Assume the members are pin connected at A , B , and C .



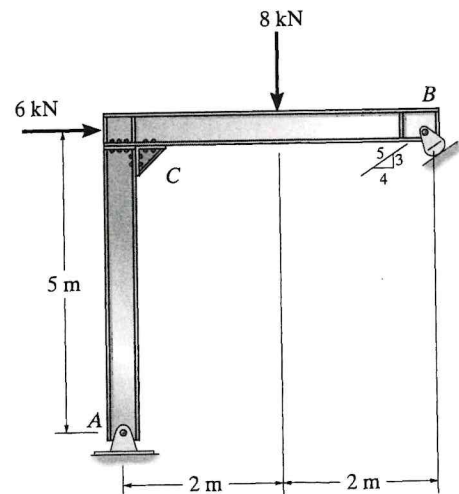
Prob. 2-32

2-33. Determine the horizontal and vertical components of reaction at the supports A and C .



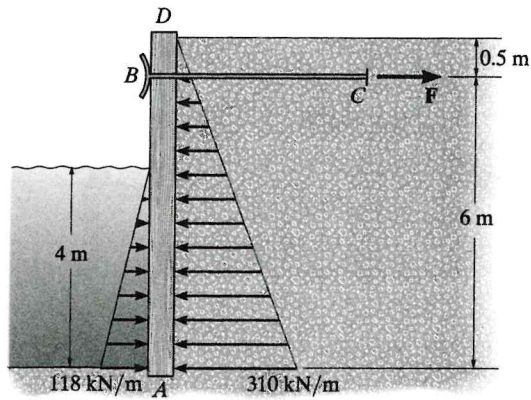
Prob. 2-33

2-34. Determine the components of reaction at the supports. Joint C is a rigid connection.



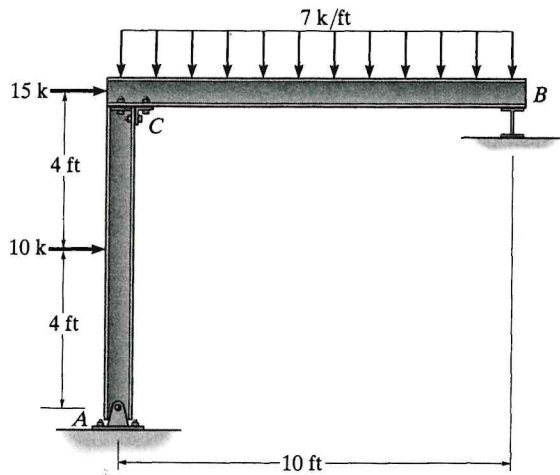
Prob. 2-34

2-35. The bulkhead AD is subjected to both water and soil-backfill pressures. Assuming AD is "pinned" to the ground at A , determine the horizontal and vertical reactions there and also the required tension in the ground anchor BC necessary for equilibrium. The bulkhead has a mass of 800 kg.



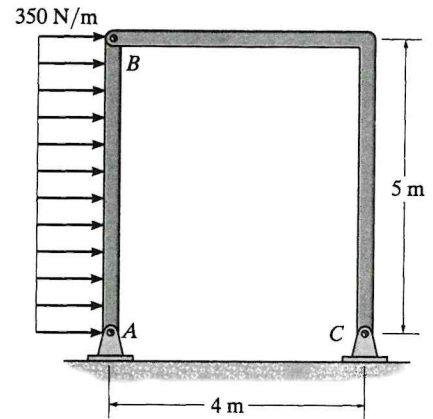
Prob. 2-35

*2-36. Determine the reactions at the supports A and B . Assume the support at B is a roller. C is a fixed-connected joint.



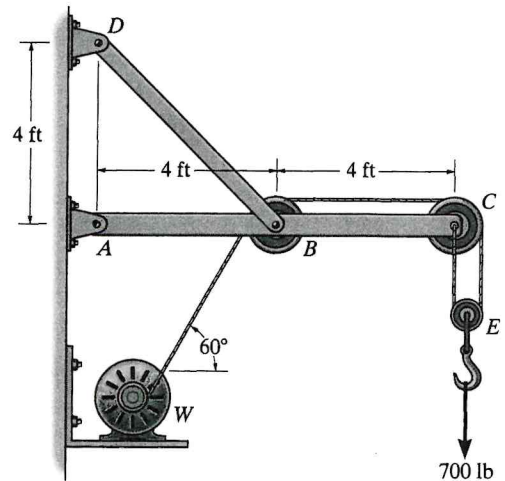
Prob. 2-36

2-37. Determine the horizontal and vertical reactions at A and C of the two-member frame.



Prob. 2-37

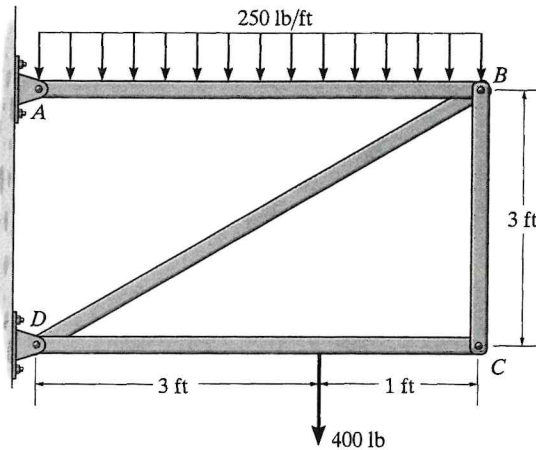
2-38. The wall crane supports a load of 700 lb. Determine the horizontal and vertical components of reaction at the pins A and D . Also, what is the force in the cable at the winch W ?



Prob. 2-38

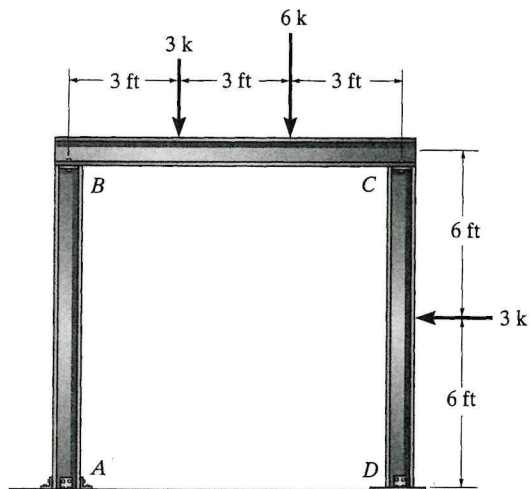
2-39. Determine the horizontal and vertical force components that the pins support at A and D exert on the four-member frame.

2



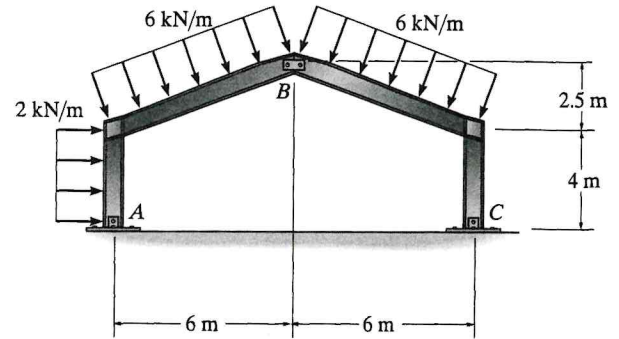
Prob. 2-39

*2-40. Determine the reactions at the supports A and D . Assume A is fixed and B , C and D are pins.



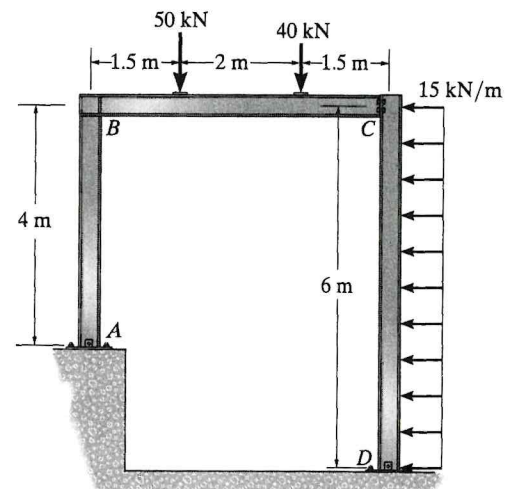
Prob. 2-40

2-41. Determine the components of reaction at the pinned supports A and C of the two-member frame. Neglect the thickness of the members. Assume B is a pin.



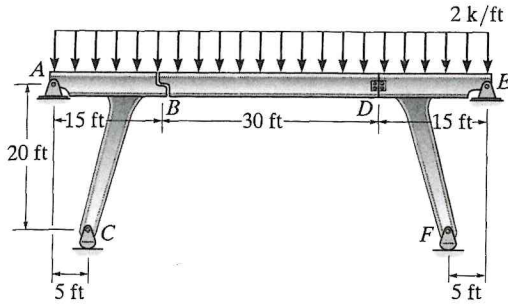
Prob. 2-41

2-42. Determine the horizontal and vertical components of reaction at A , C , and D . Assume the frame is pin connected at A , C , and D , and there is a fixed-connected joint at B .



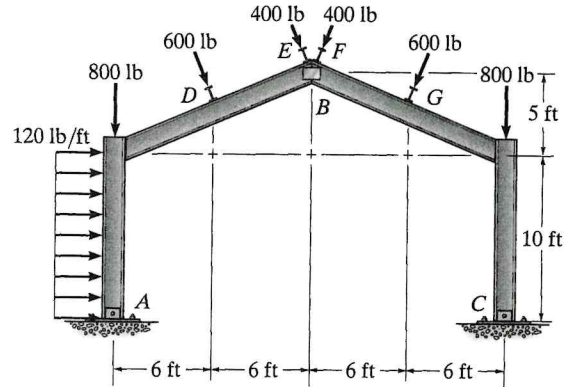
Prob. 2-42

2-43. The bridge frame consists of three segments which can be considered pinned at A , D , and E , rocker supported at C and F , and roller supported at B . Determine the horizontal and vertical components of reaction at all these supports due to the loading shown.



Prob. 2-43

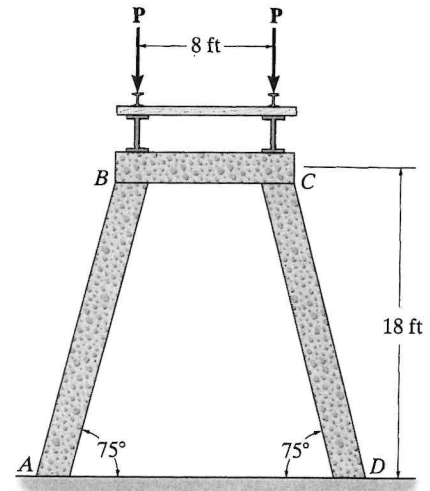
*2-44. Determine the horizontal and vertical reactions at the connections A and C of the gable frame. Assume that A , B , and C are pin connections. The purlin loads such as D and E are applied perpendicular to the center line of each girder.



Prob. 2-44

PROJECT PROBLEM

2-1P. The railroad trestle bridge shown in the photo is supported by reinforced concrete bents. Assume the two simply supported side girders, track bed, and two rails have a weight of 0.5 k/ft and the load imposed by a train is 72 k/ft . Each girder is 20 ft long. Apply the load over the entire bridge and determine the compressive force in the columns of each bent. For the analysis assume all joints are pin connected and neglect the weight of the bent. Are these realistic assumptions?



Project Prob. 2-1P