Indian Institute of Technology Bhubaneswar

School of Infrastructure

Subject Name : Solid Mechanics	Subject Code: CE2L001

Tutorial No. 7   Date: November 06, 2025

1. Consider a simply supported beam of length L subjected to a point load P applied at the center. Calculate the reaction forces, the shear force and the bending moment at any point along the beam.
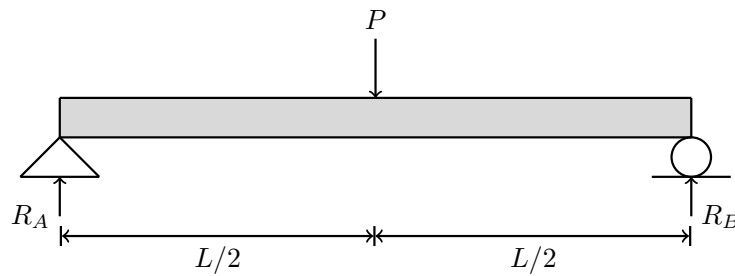

Figure 1: Simply Supported Beam with Center Load

2. Consider a simply supported beam of length L subjected to two equal point loads P applied at $L/4$ and $3L/4$. Calculate the reaction forces, shear force, and bending moment at any point along the beam.
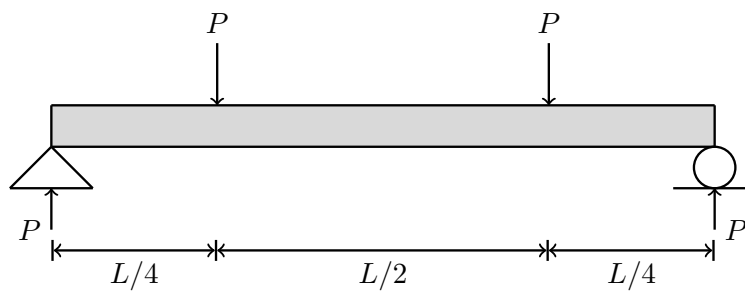

Figure 2: Simply Supported Beam with Four-Point Loads

3. Consider a simply supported beam of length L subjected to applied load as shown in Fig. 3. Calculate the reaction forces, shear force, and bending moment at any point along the beam.
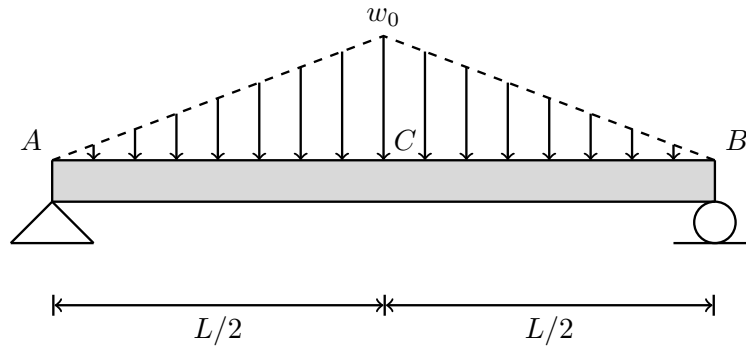

Figure 3

4. Consider a simply supported beam of length L subjected to applied load as shown in Fig. 4. Calculate the reaction forces, shear force, and bending moment at any point along the beam.
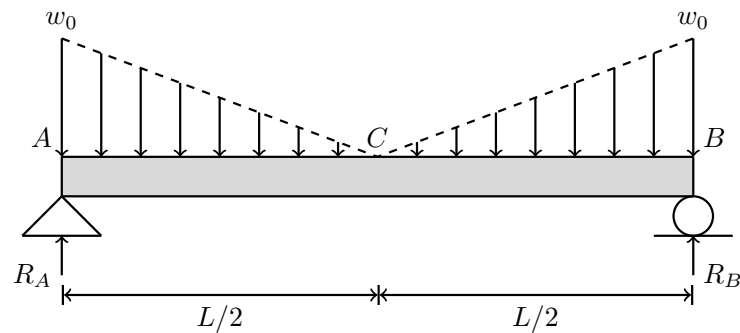

Figure 4

5. Consider a simply supported beam of length L subjected to applied load as shown in Fig. 5. Calculate the reaction forces, shear force, and bending moment at any point along the beam.
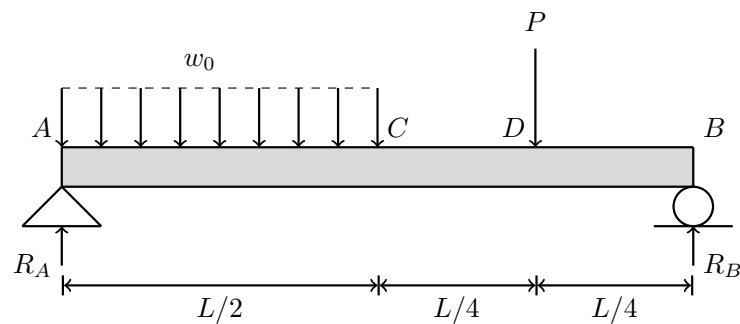

Figure 5

6. Consider a simply supported beam of length L subjected to applied load as shown in Fig. 6. Calculate the reaction forces, shear force, and bending moment at any point along the beam.
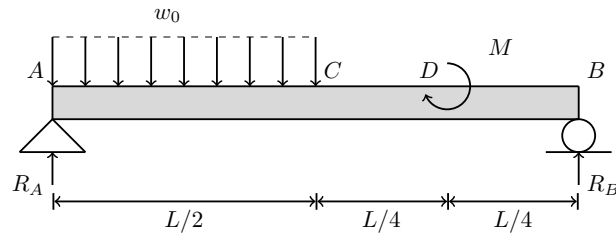

Figure 6

7. Members ABC and BD of the counter chair are rigidly connected at B and the smooth collar at D is allowed to move freely along the vertical slot as shown in Fig. 7. Draw the shear and moment diagrams for member ABC.
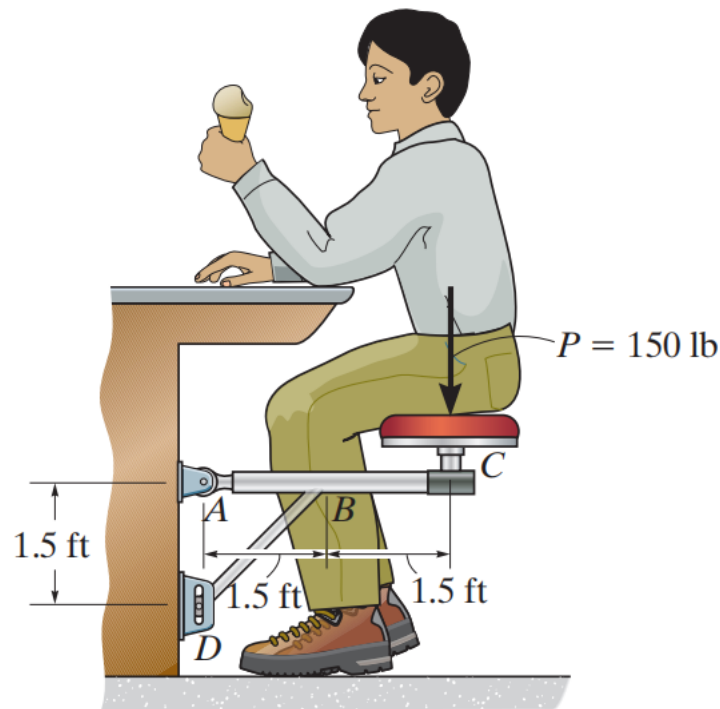

Figure 7

8. The beam is subjected to the uniform distributed load shown in Fig. 8. Draw the shear and moment diagrams for the beam.
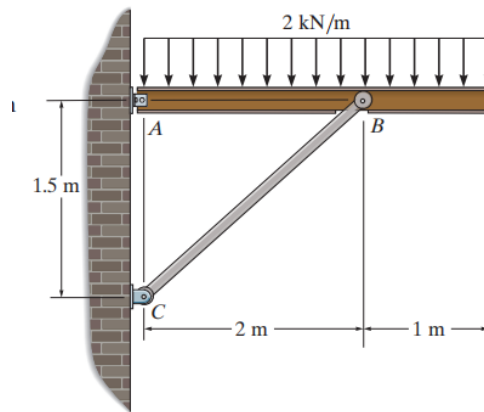

Figure 8

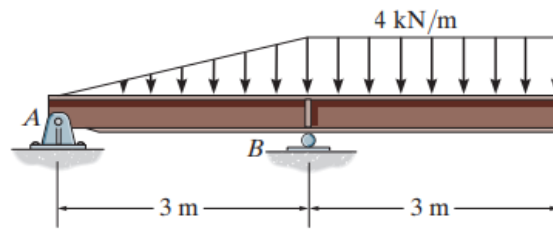9. Draw the shear and moment diagrams for the overhang beam shown in Fig. 9.

Figure 9

10. The dead-weight loading along the centerline of the airplane wing is shown in Fig. 10. If the wing is fixed to the fuselage at A, determine the reactions at A, and then draw the shear and moment diagram for the wing.
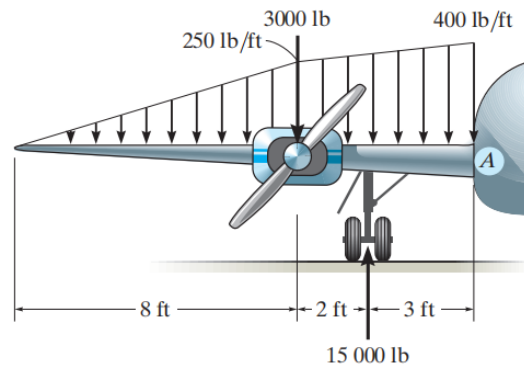

Figure 10