Course Code: ESC106A
Course Title: Construction Materials and Engineering Mechanics

Lecture No. 30:
Problems on Beams

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Lecture Intended Learning Outcomes

At the end of this lecture, students will be able to:

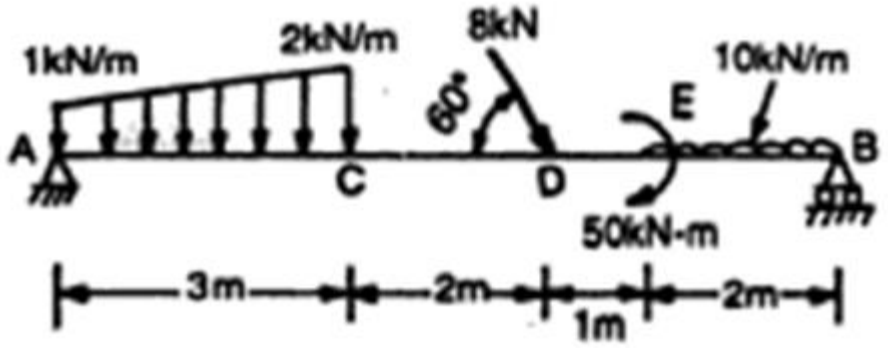
- Identify the type of support and support reactions
- Apply the conditions of equilibrium
- Calculate the reactions for the beams

Contents

Type of support, support reactions, problems on support reactions

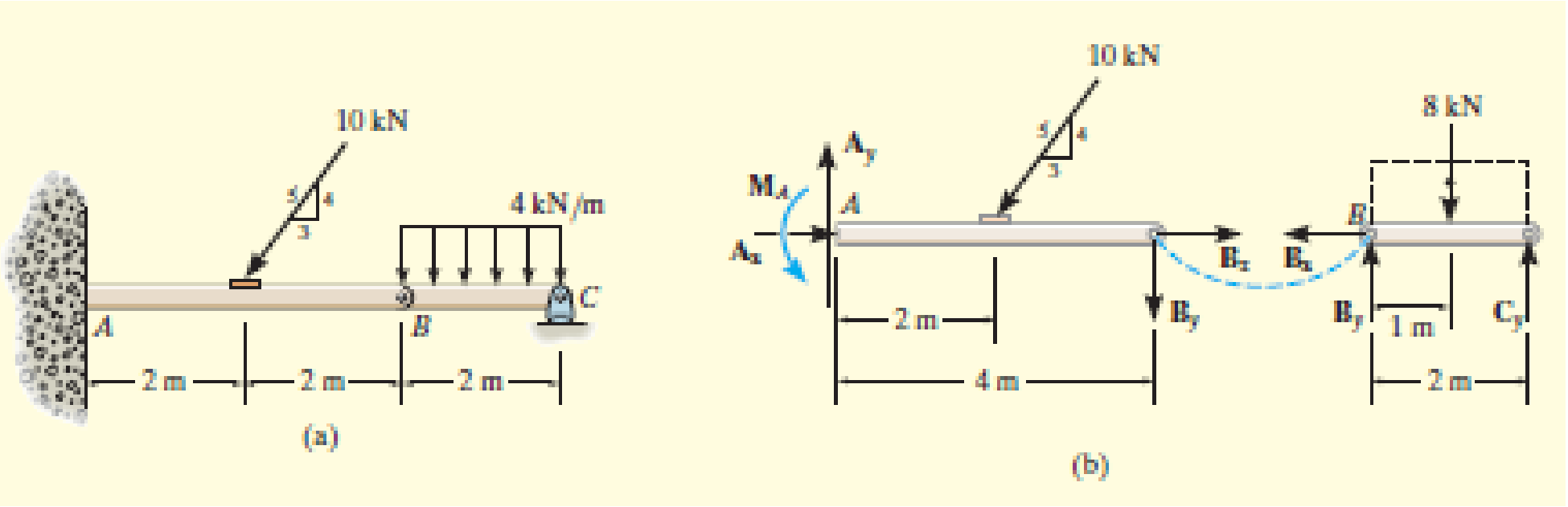
Problems on Beams

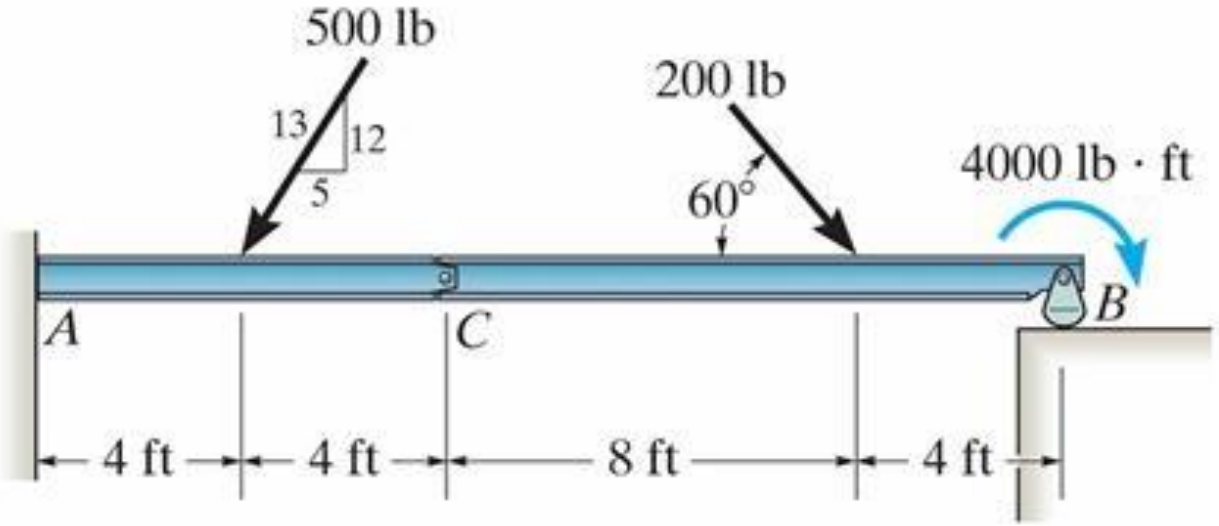
1.In the fig, the beam AB supports different types of loads. Determine the reactions at the hinge support and at the roller support



R_{AH}=4kN
R_{AV}=2.4kN
R_{BV}=29.02kN

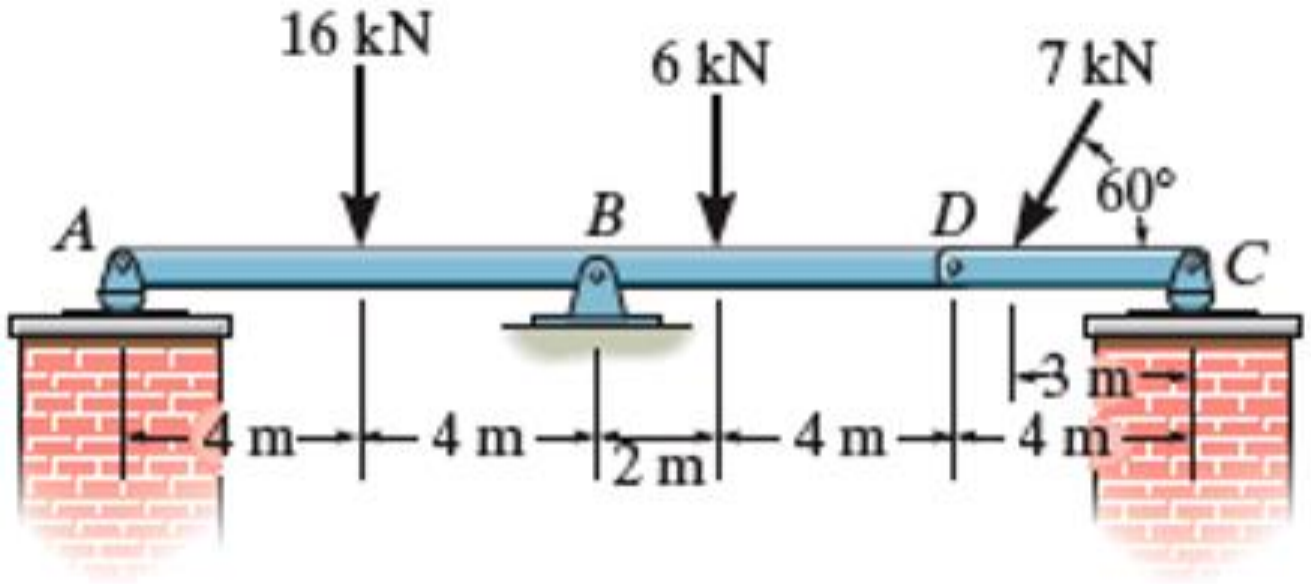
Compound Beams



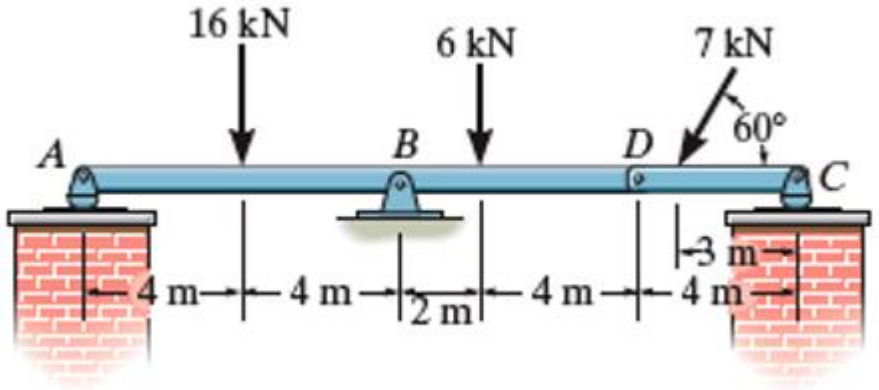


Problems on Beams

2. The compound beam is pin-supported at B and supported by rockers at A and C. There is a hinge (pin) at D. Determine the reactions at support.

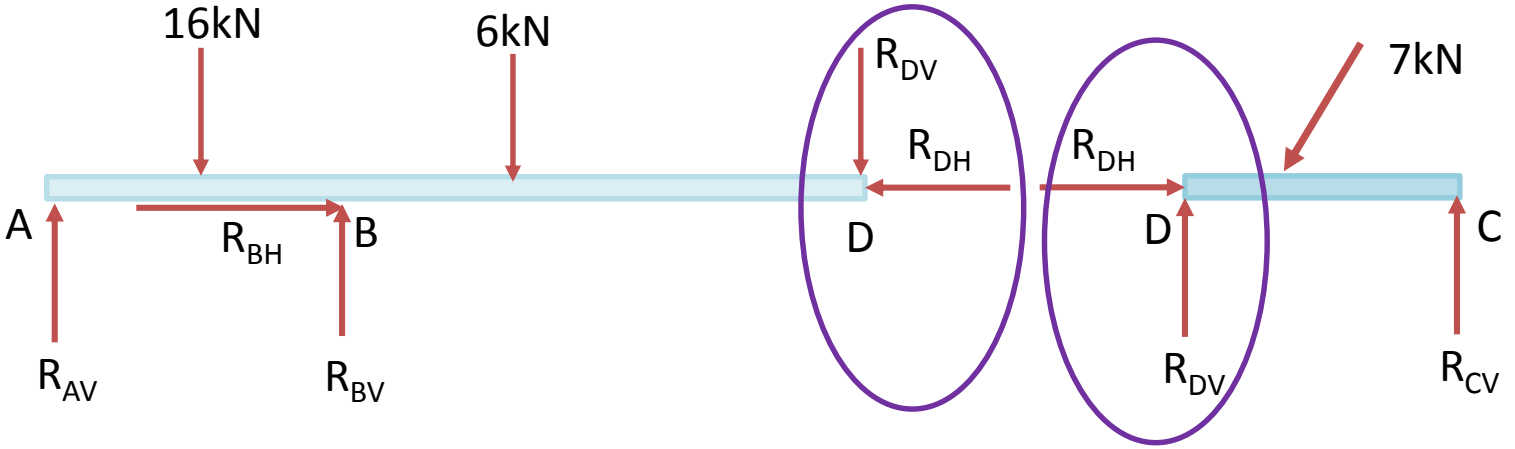


Problems on Beams



Consider beam DC:
Apply equilibrium conditions to DC

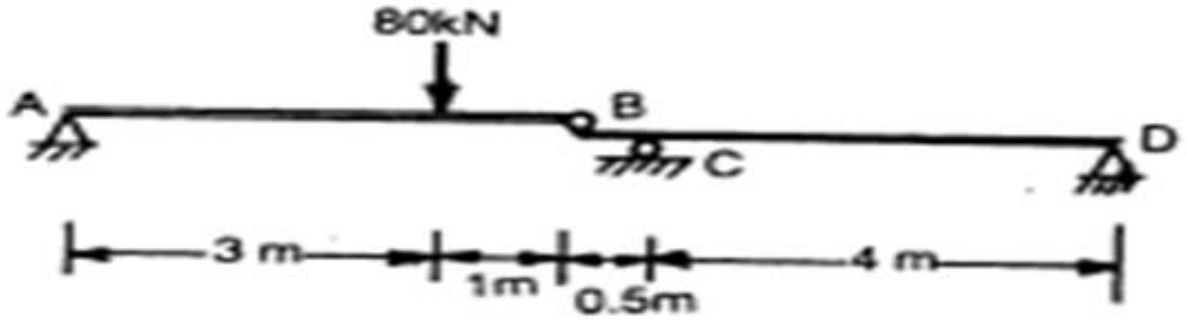
Consider beam ABD
Apply equilibrium conditions to ABD



R_C=1.52kN; R_{DV}=4.55kN; R_{DH}=3.5kN
R_{AV}=3.1kN
R_{BH}=3.5kN; R_{BV}=23.5kN

Problems on Beams

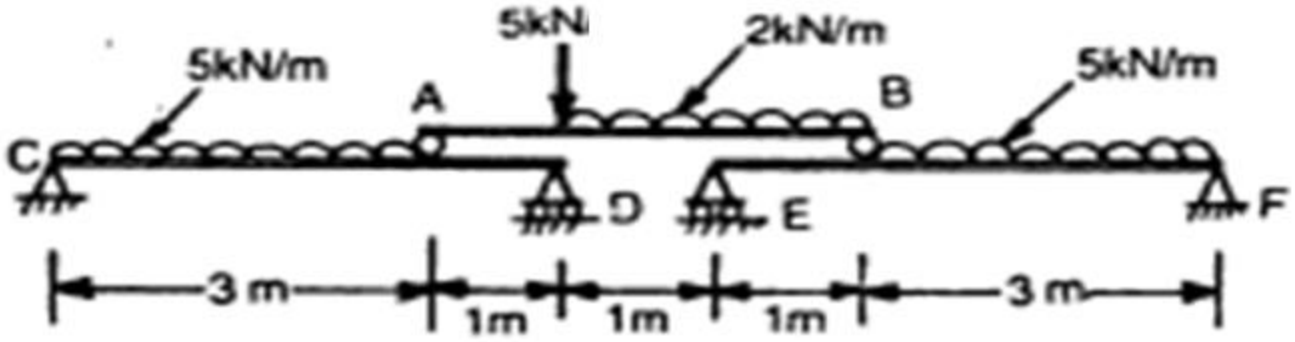
3.Determine the reactions at supports A,B,C and D in the structure shown in the following fig



R_A=20kN
R_B=60kN
R_C=67.5kN
R_D=-7.5kN

Problems on Beams

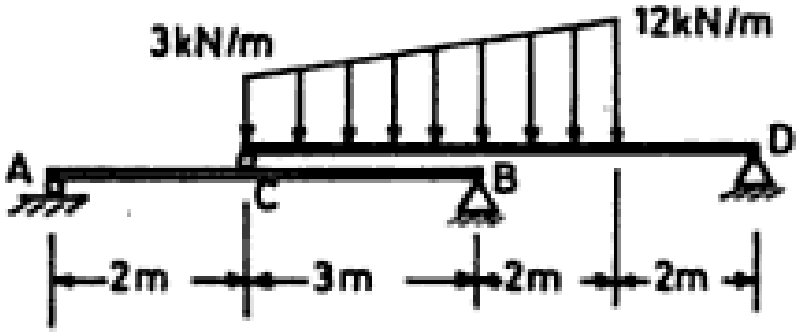
4.A compound beam is loaded as shown in fig. Determine the reaction at A,B,C,D,E and F.



R_A=4.67kN
R_B=4.33kN
R_C=10.545kN
R_D=9.125kN
R_E=8.87kN
R_F=10.457kN

Problems on Beams

5.Determine the reactions at A,B,C and D in the beam shown below



R_A=12.85kN
R_B=8.57kN
R_C=21.42kN
R_D=16.07kN

Summary

- Based on the types of supports and the type of loads, the reactions developed in each support can be calculated