

AE333

Mechanics of Materials

Lecture 30 - Statically Indeterminate Beams

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17 Apr, 2019

schedule

- 17 Apr - Statically Indeterminate Beams
- 19 Apr - Statically Indeterminate Beams
- 22 Apr - Exam 3 Review, HW 10 Due
- 24 Apr - Exam 3

outline

- statically indeterminate beams
- indeterminate beams -
superposition

statically indeterminate beams

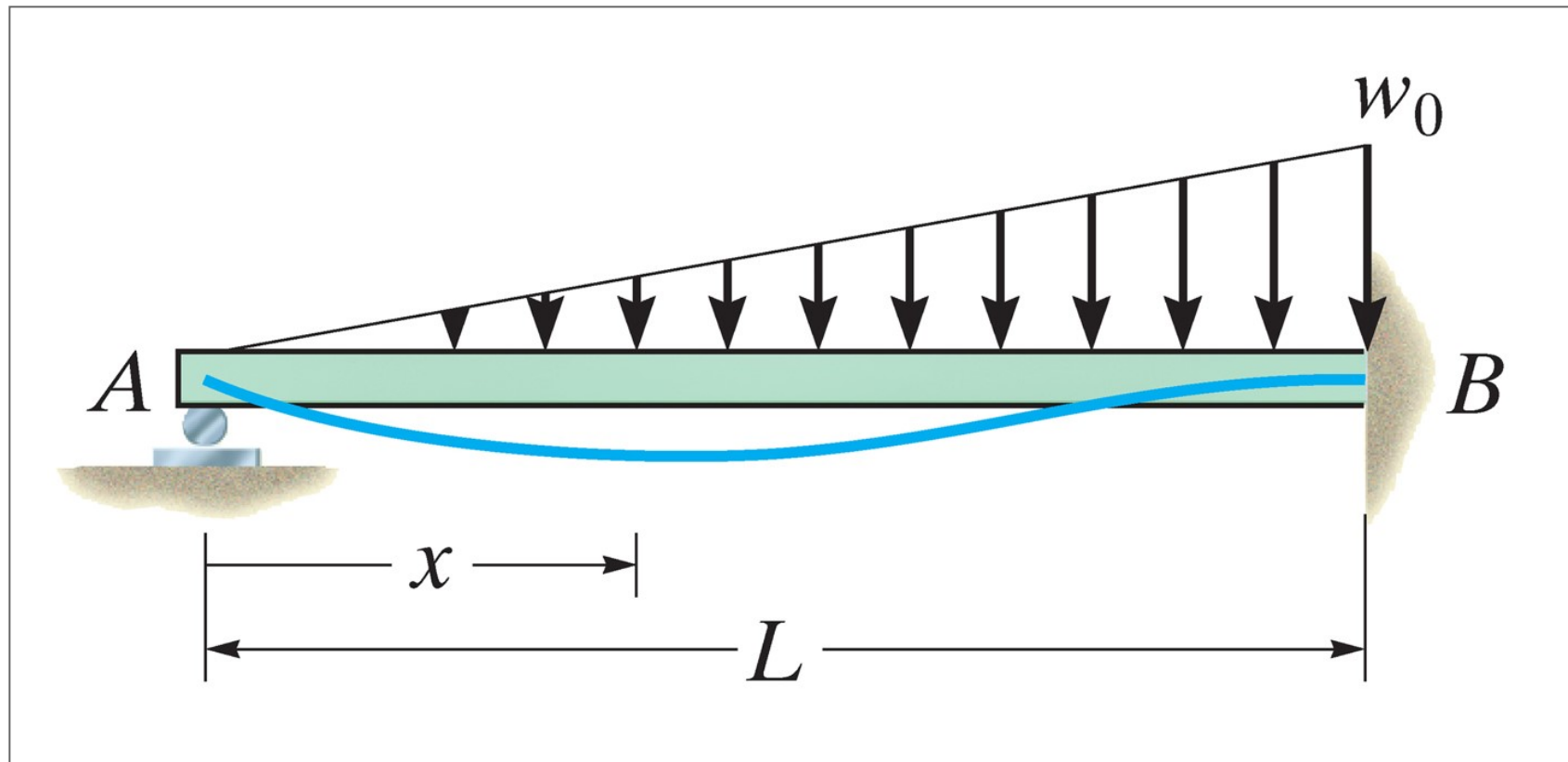
statically indeterminate

- If we have redundant supports, we can have some difficulty finding the displacement
- There are several approaches to solve these problems, we will consider direct integration and superposition

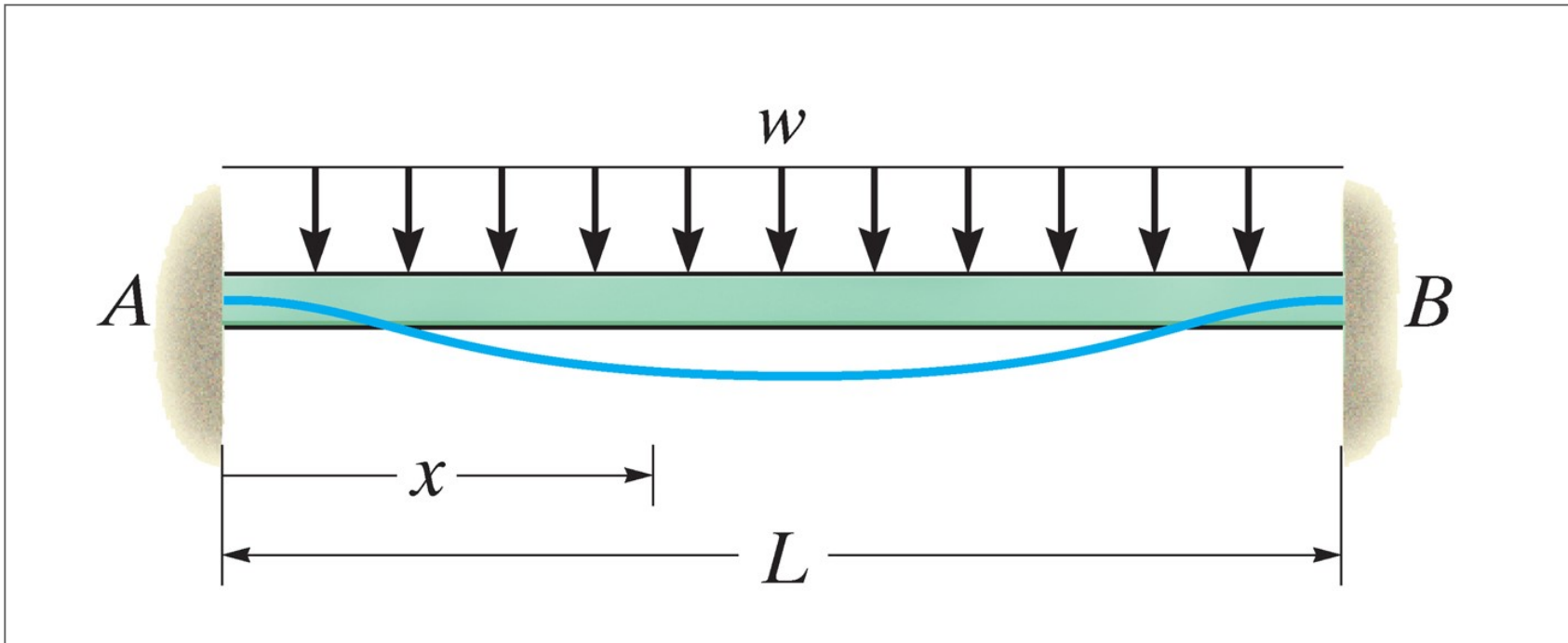
integration

- We can take the extra unknowns and include them in our formulation for $M(x)$
- They will be solved for with the extra boundary conditions applied

example 12.17



example 12.18

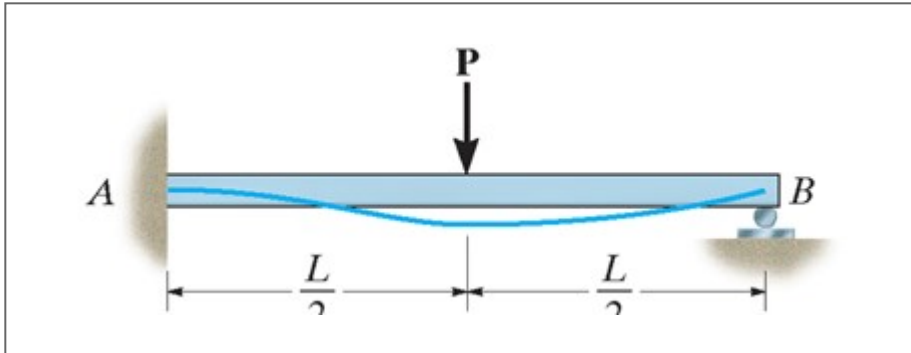


indeterminate beams - superposition

superposition

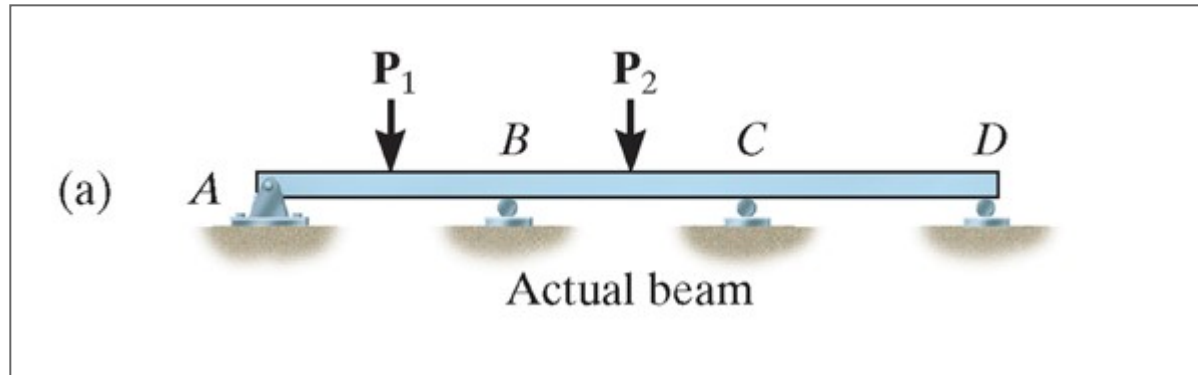
- To use superposition for finding deflection of statically indeterminate beams, we must first identify redundant reactions
- We initially remove these, then superpose them back such that the deflection at that point is 0
- The choice of which reaction(s) is redundant is arbitrary, we can choose whatever we are most comfortable with
- We use Appendix C to find deflection and slope

superposition



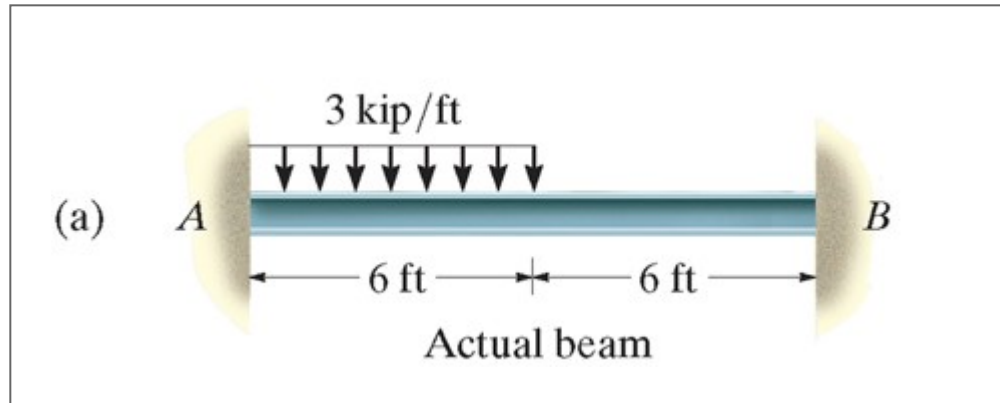
We can consider any reaction to be redundant.

higher order indeterminacy



We need to treat each reaction separately to match Appendix C.

example 12.22



Determine the moment at B.