CE 3213 Structural Analysis & Design –II

Lecture: 3 hrs/week Credits: 3.00

Prereq. CE 3111

Approximate analysis of statically indeterminate structures, deflection of beams, frames and trusses by virtual work method, two hinged arches, influence line for indeterminate structures, wind and earth-quake analysis. ~~composite structures~~.

Approximate analysis of statically indeterminate structures

1. **Approximate analysis due to vertical load**
2. **Portal Method**
3. **Cantilever Method**

The approx. analysis of a statically determinate structure dose not depend on the elastic properties of its members. For

Approximate analysis due to vertical load

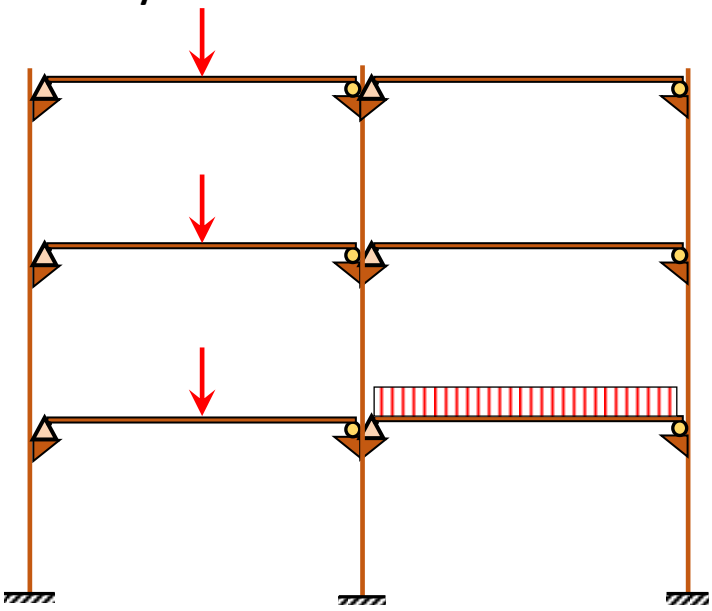


Fig. b

Rigid Frame in which the girders are rigidly connected to the columns so that all members can carry bending moment, shear force, and axial force.

DOI = (3M+R)-3j = (3*15+3*3)-3(12) = 18

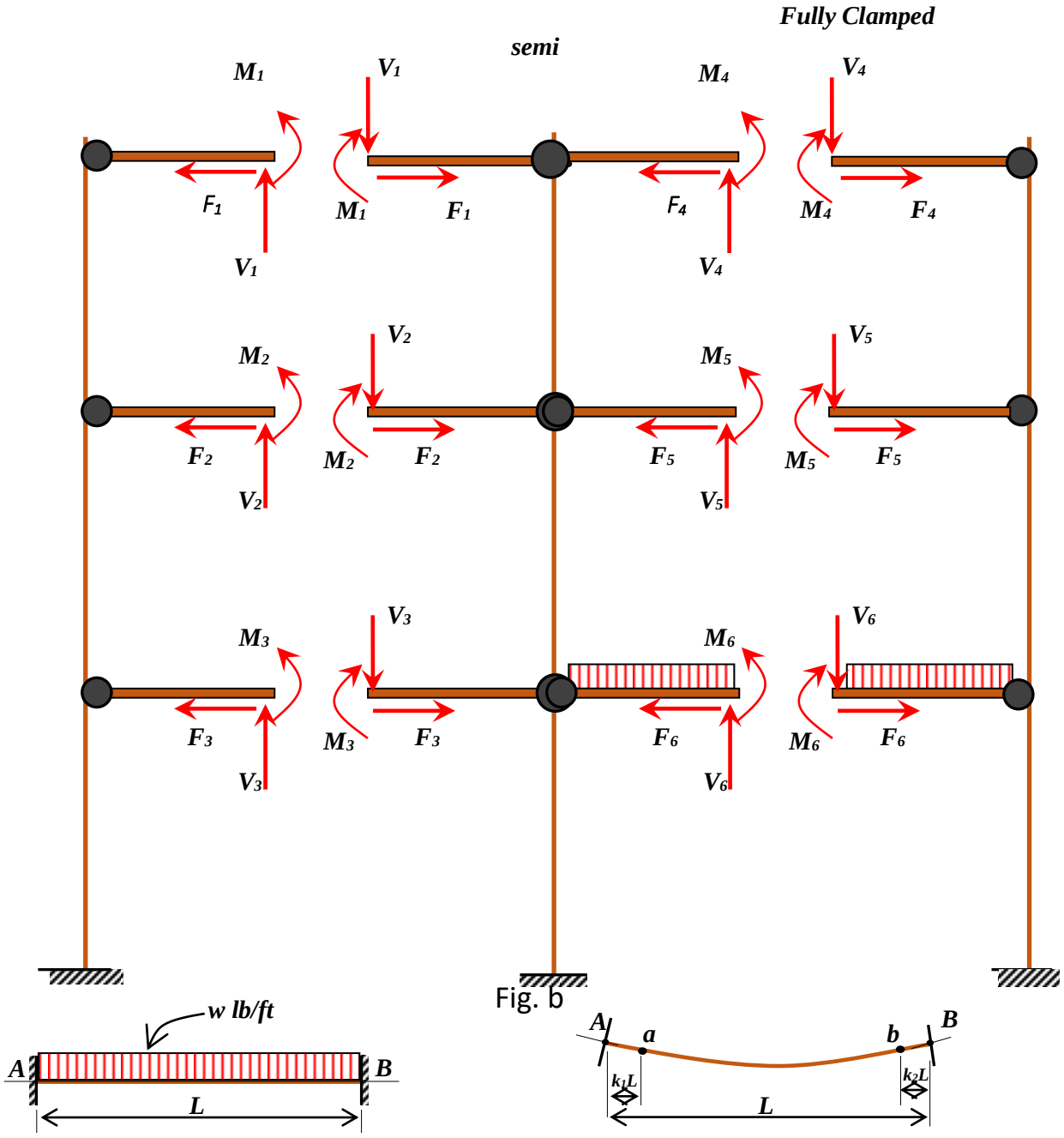
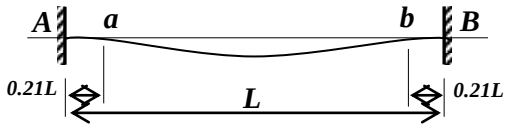
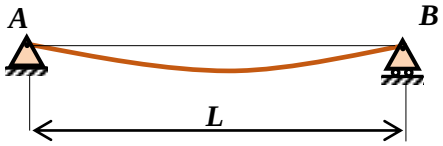


Fig. b

If the girder subjected to UDL *w* lb/ft, both the joints A and B will rotate as shown above.

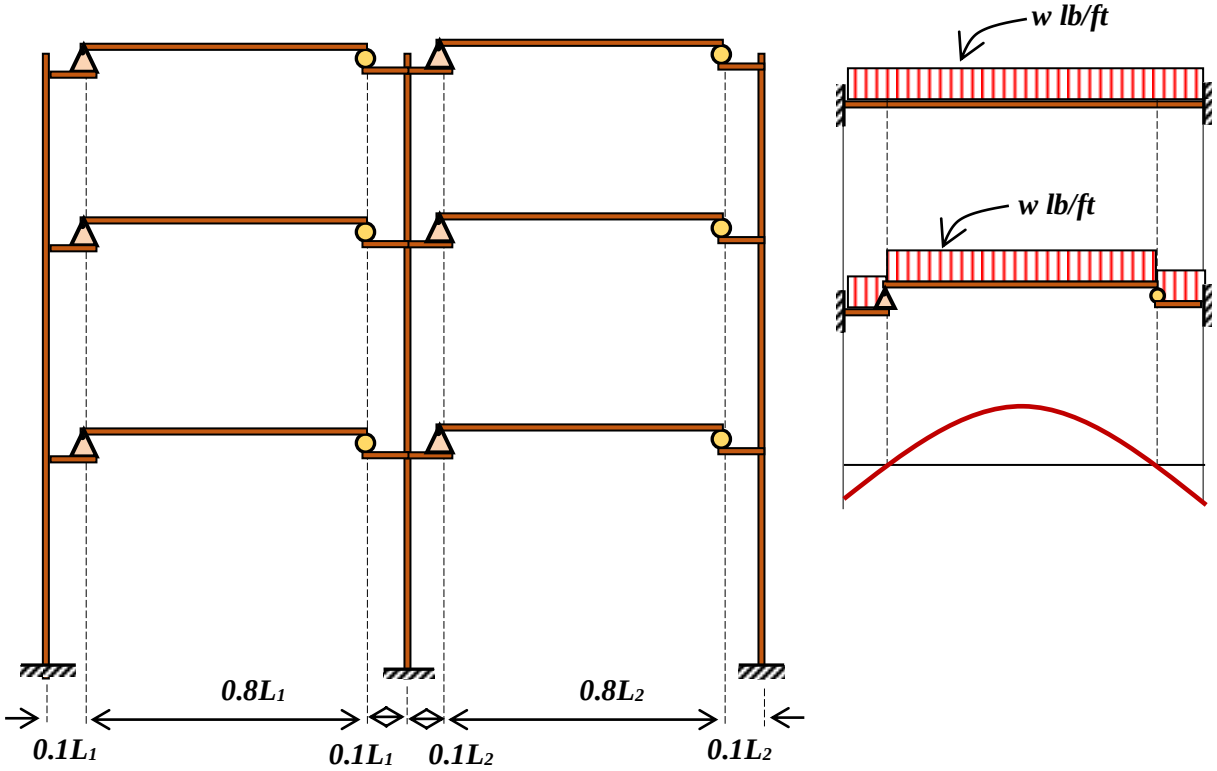


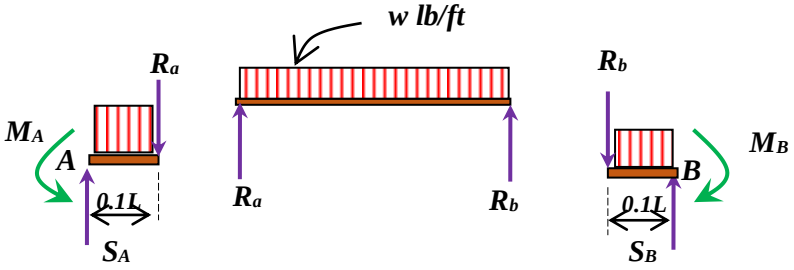


Points of inflection are at points *a* and *b*.

Assumptions

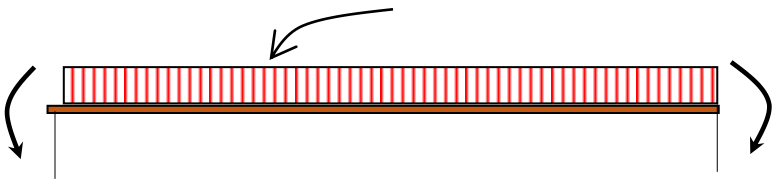
i. The axial force in the girder zero.
ii. A point of inflection occurs at the one-tenth point measure along the span from the left support.
iii. A point of inflection occurs at the one-tenth point measure along the span from the right support.



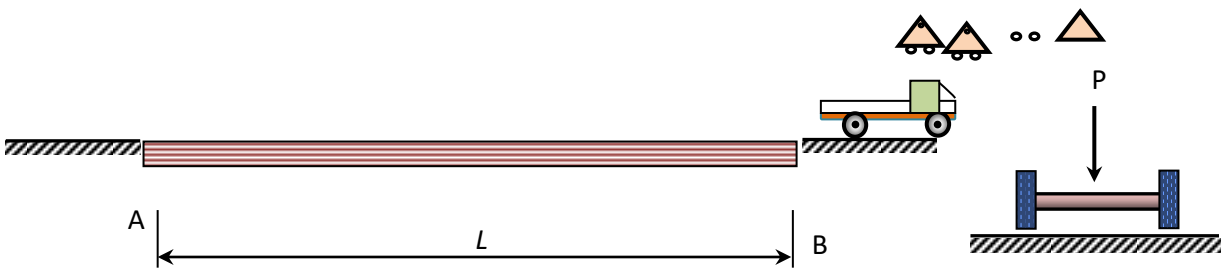


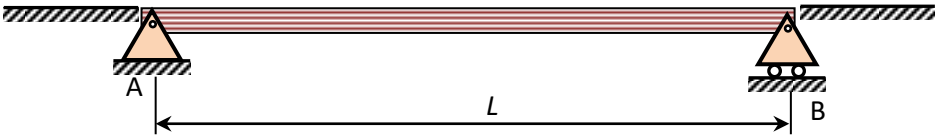
Determine points of inflection.

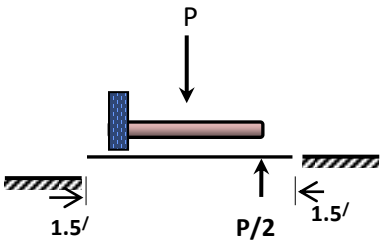
$M_{FEM} = wl^2/12$

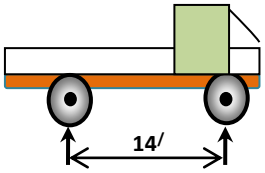


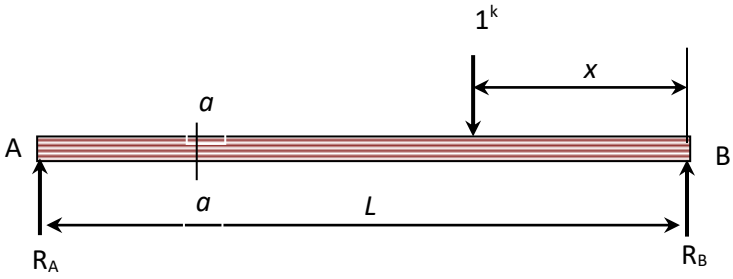
w lb/ft











$R_A = x/L$