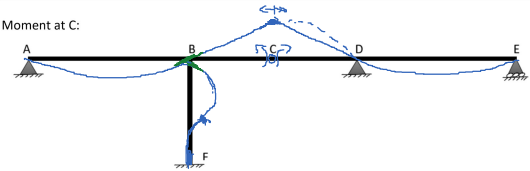
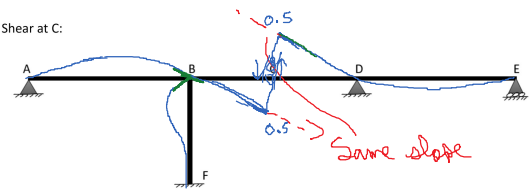
Moment at C:



Shear at C:



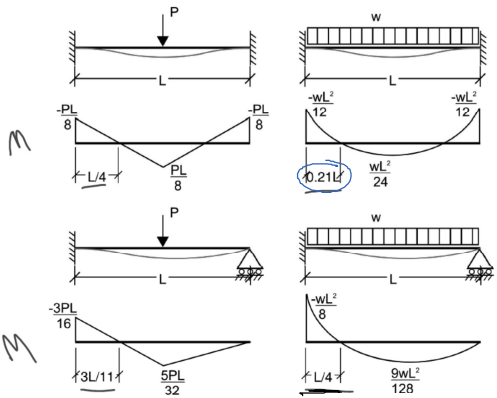
Approximate Analysis:

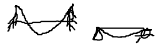
Concepts:

Factors impacting location of inflection points:

1. Frames:
    a. Column vs beam lengths
    b. Column vs beam stiffness
    c. Loading
2. Beams:
    a. Span lengths
    b. Loading

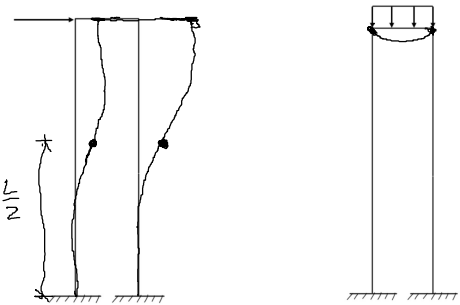
Important BMDs:





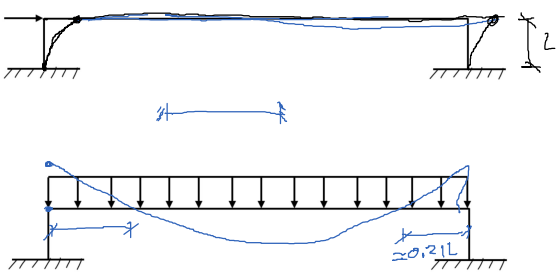
Long columns, short beams:

Beam stiffer than columns

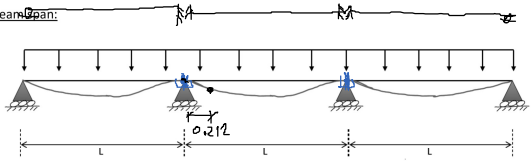


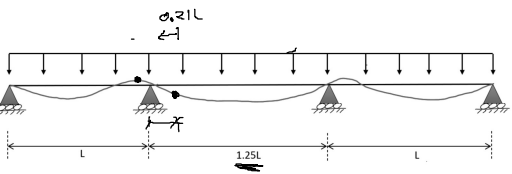
Short columns, long beams:

Columns much stiffer than beams

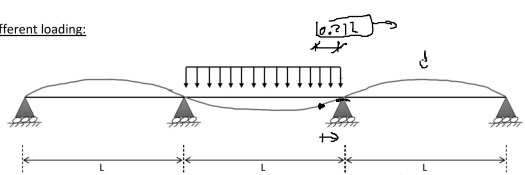


Beam span:

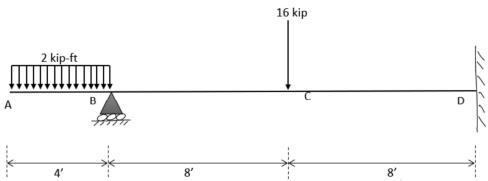




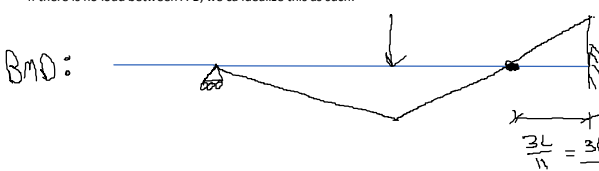
Different loading:



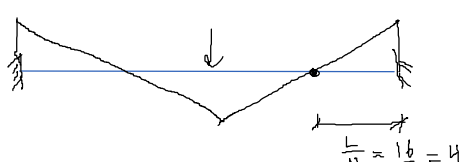
Problem 4: Find an approximate BMD.



If there is no load between A-B, we ca idealize this as such:



But, the load on segment A-B prevents some of the rotation from happening at B, so we can say that this has a similar impact as if we would fix partially fix the beam at B. Thus, to find the location of the inflection point, consider if B was fixed:



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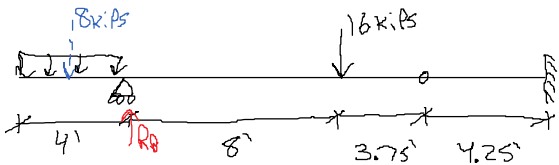
Knowing the loaded A-B segment will act as "partial fixity" at B, picking an inflection point location between the 2 calculated on the previous page would make sense.

If the load is really high on A-B, you may choose something closer to the "fixed-fixed" case. For a small load, you may choose something closer to the "fixed-pinned" case.

I've chosen the I.P. to be at 4.25' and will place a hinge at this location:

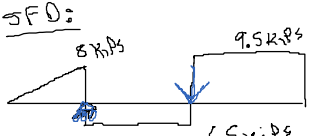


EME hinge:

$+\circlearrowleft \Sigma M = 0 = 8\,kips(2' + 8' + 3.75') - R_B \cdot (8 + 3.75') + 16\,kips(3.75')$

$\Rightarrow R_B = 14.5\,kips$

SFD:



BMD: (kips-ft)