

ARCH 331. Assignment #4

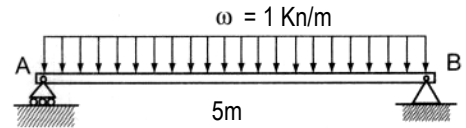
Date: 2/8/18, due 2/15/18

Pass-fail work

Problems: supplemental problems (4A, etc.) and from Onouye & Kane, Chapter 7

Notes: Problems marked with a * have been altered with respect to the problem stated in the text.

- (8%) 4A) Using the equilibrium method, write the equation for the shear, $V(x)$, and bending moment, $M(x)$ with respect to x that starts at A and extends to B. Verify that the Beam Diagrams and Formulas give the same equations when the values for w and L are substituted at midspan.
(equilibrium method, Beam Diagrams and Formulas)

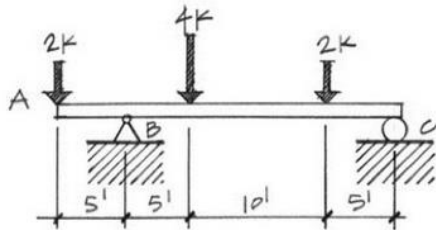


Partial answers to check with: $V(2.5) = 0 \text{ kN}$,
 $M(2.5) = 3.125 \text{ kN-m}$

Construct the load, shear, and moment diagrams for the following beam conditions using the semi-graphical approach.

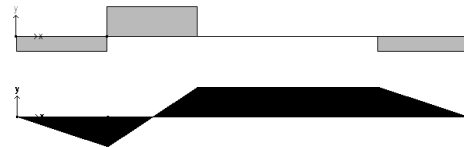
*Indicate maximum design values and sketch the deflected shape.

(16%) * 7.5

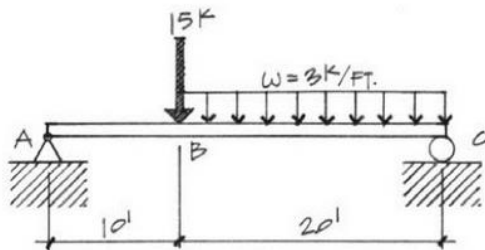


Partial answers to check with:

$$V_{max} = +4 \text{ k}, M_{max} = +10 \text{ k-ft}$$

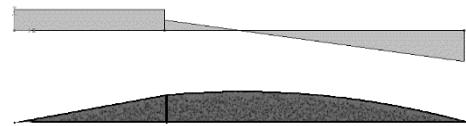


(16%) * 7.6

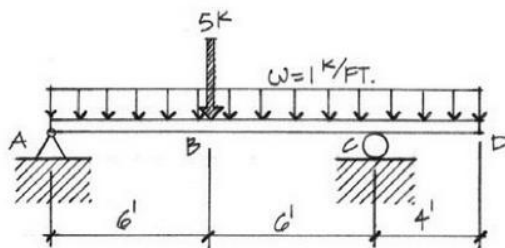


Partial answers to check with:

$$V_{max} = -45 \text{ k}, M_{max} = 337.5 \text{ k-ft}$$

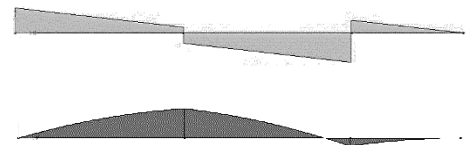


(16%) * 7.10



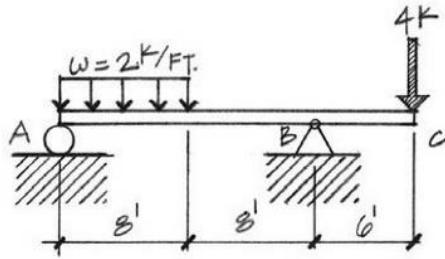
Partial answers to check with:

$$V_{max} = -9.17, M_{max} = 29 \text{ k-ft}$$



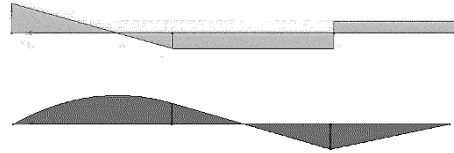
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(16%) * 7.7



Partial answers to check with:

$$V_{max} = +10.5 \text{ k}, M_{max} = 27.6 \text{ k-ft}$$



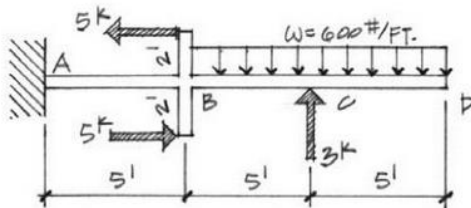
(6%) 4B) For the beam of problem 7.7, use Multiframe software to find the shear and bending moment values to verify your work from the semigraphical method. Use the standard steel section you have been assigned which is posted in My Grades on eCampus. Submit the data file (.mfd) on eCampus (under Assignments: Assignment 4) and provide a print of the shear diagram (V), bending moment diagram (M), and deflected shape (δ).

Note: The "Find, Given, Solution" format is not required.

Construct the load, shear, and moment diagrams for the following beam conditions using the semi-graphical approach.

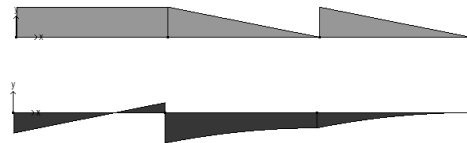
***Indicate maximum design values and sketch the deflected shape.**

(16%) * 7.9



Partial answers to check with:

$$V_{max} = +3 \text{ k}, M_{max} = -15 \text{ k-ft}$$



Note: The horizontal loads at B are a moment couple which can be replaced with an equivalent moment at B.

(6%) 4C) For the beam of problem 7.9, use Multiframe software to find the shear and bending moment values to verify your work from the semigraphical method. Use the standard steel section you have been assigned which is posted in My Grades on eCampus. Submit the data file (.mfd) on eCampus (under Assignments: Assignment 4) and provide a print of the shear diagram (V), bending moment diagram (M), and deflected shape (δ).

Note: The "Find, Given, Solution" format is not required.