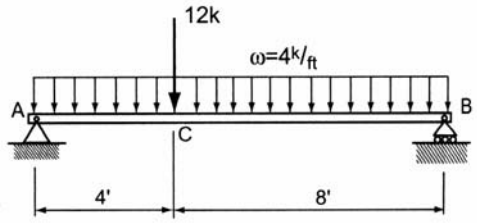
ENDS 231. Assignment #7

Date: 10/16/07, *due 10/23/07* *Pass-fail work*

Problems: from Onouye, Chapters 8 & 6.
*Note: Problems marked with a * have been altered with respect to the problem stated in the text.*

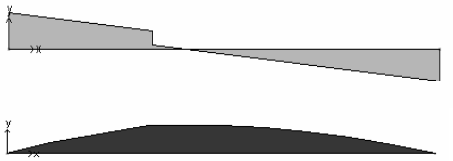
Construct the load, shear, and moment diagrams for the following beam conditions using the semi-graphical method.

(25%) **8.4.3**

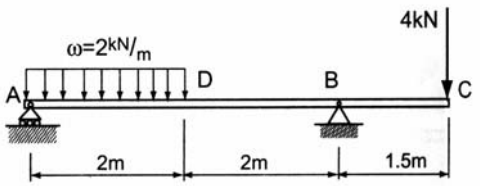


Problem 8.4.3

Partial answers to check with:
V_{max} = *+32 k*, M_{max} = *98* $^{k\text{-}ft}$

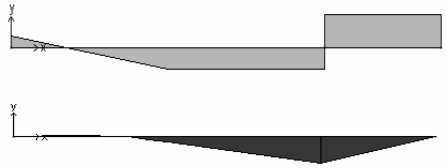


*(25%)** **8.4.5**



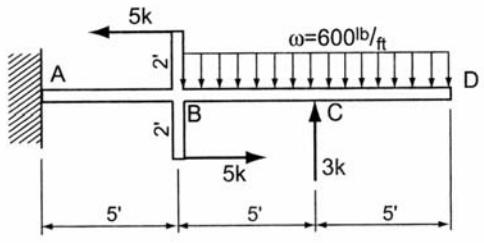
Problem 8.4.5

Partial answers to check with:
V_{max} = *+4 kN*, M_{max} = *-6* $^{kN\text{-}m}$



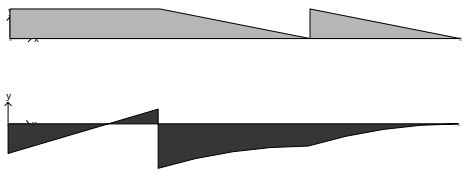
(10%) ***Also verify your work for problem 8.4.5 using Multiframe4D. <u>You will be given a standard steel section to use</u>. Submit the file to the Assignments folder in the class folder, and provide a print of the diagrams.**

(25%) **8.4.7**



Problem 8.4.7

Partial answers to check with:
V_{max} = *+3 k*, M_{max} = *-15* $^{k\text{-}ft}$



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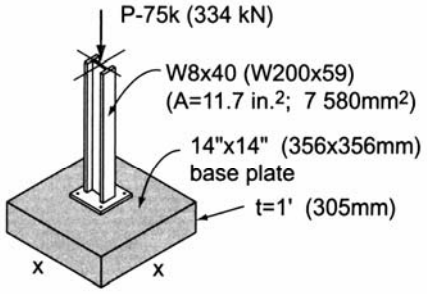
(10%) ***Use metric units.**

6.1.3 A steel column carries a building load of 75 k (334 kN) to a 14" × 14" (356 mm × 356 mm) base plate that is bolted to a concrete footing pad that measures 1 foot (305 mm) in thickness. The column has a cross-sectional area $A = 11.7$ in.^{2} ($A = 7580$ mm$^2 = 7.58 \times 10^{-3}$ m^2). Determine the following:

a. the average compressive stress developed in the W8 × 40 (W200 × 59) column
b. the bearing stress between the steel base plate and the concrete footing
c. the footing size, assuming that the allowable soil bearing pressure is $q = 4$ ksf (191 kPa) and the density of concrete is 150 pcf $\left(2400\,^{kg}/_{m^3} = 23.6\,^{kN}/_{m^3}\right)$



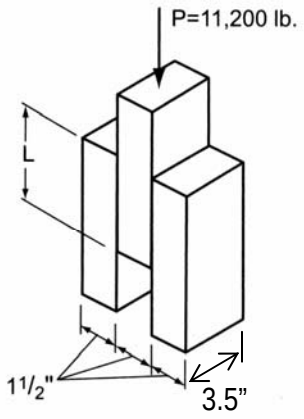
Problem 6.1.3

(axial, shear, and bearing stress)

Partial answers to check with: a) 44.1 MPa, b) 2.64 MPa, c) x = 1.35 m

(5%) **6.1.7** Three 2×4 S4S blocks are glued together as shown. Assuming the glue has a shear capacity of 80 psi, determine the minimum length L required. *(axial, shear, and bearing stress)*

Partial answers to check with: L = 20 in.



Problem 6.1.7