

### ENDS 231. Assignment #6

Date: 2/26/08, due 3/4/08

Pass-fail work

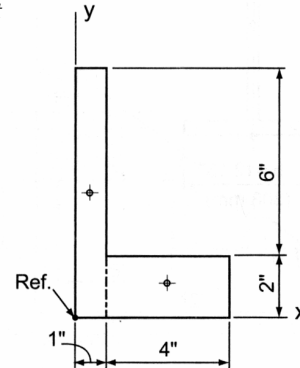
**Problems:** from Onouye, Chapters 7 & 8.

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

(20%) \*7.3.2 Find the  $I_x$  and  $I_y$  for the L-shaped cross-section shown. (moment of inertia)

\*Use the negative area method.

Partial answers to check with:  $\hat{x} = 1.75 \text{ in}$ ,  $\hat{y} = 2.5 \text{ in}$ ,  
 $I_x = 81.33 \text{ in}^4$ ,  $I_y = 36.33 \text{ in}^4$

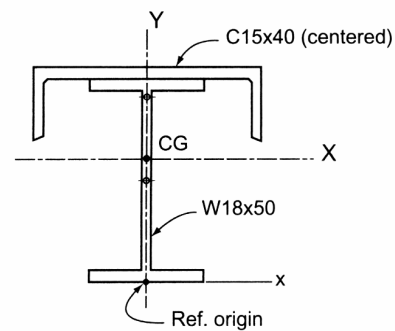


Problem 7.3.2

(20%) \*7.3.4 A heavily loaded floor system uses a composite steel section as shown. A C15 x 40 channel section is attached to the top flange of the W18 x 50. Determine the  $I_x$  and  $I_y$  about the major centroidal axes using the cross-sectional properties given in the steel tables for standard rolled shapes (see Appendix). (moment of inertia)

\*Also calculate radius of gyration,  $r_x$  and  $r_y$ .

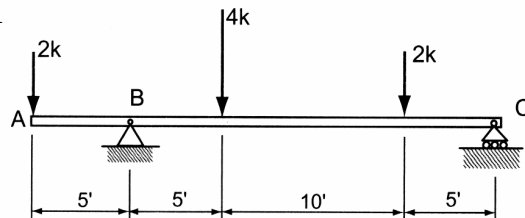
Partial answers to check with:  $\hat{x} = 0$ ,  $\hat{y} = 12.9 \text{ in}$ ,  
 $I_x = 1309 \text{ in}^4$ ,  $I_y = 389 \text{ in}^4$   
 $r_x = 7.03 \text{ in}$ ,  $r_y = 3.83 \text{ in}$



Problem 7.3.4

\*Construct the load, shear and bending moment diagram for the following using the SEMIGRAPHICAL method, and verifying key values with the EQUILIBRIUM method. Identify maximum quantities and locations of shear and bending moment. Multiframe4D may be used *only* to verify calculations.

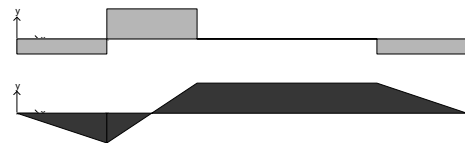
(30%) \*8.4.1



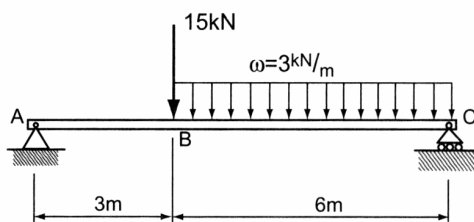
Problem 8.4.1

Partial answers to check with:

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



(30%) \*8.4.4



Problem 8.4.4

Partial answers to check with:

$$V_{max} = -17 \text{ kN}, M_{max} = 48.2 \text{ kN-m}$$

