ARCH 614. Assignment #5

Date: 2/18/13, *due 2/26/13* *Pass-fail work*

Problems: all but 5A & 5B from Ambrose & Tripeny, Chapter 3, pgs 130, 138, and 156.
*Note: Problems marked with a * have been altered with respect to the problem stated in the text.*

(30%) ***Problem 3.8.C.*** Find the reactions and draw the complete shear and moment diagrams for the following continuous beam with two unequal spans and uniformly distributed loading, *using the theorem of three moments.*

First Span, ft	*Second Span, ft*	*Load, lbs/ft*
12	16	2000

(15%) ***Problem 3.8.I*** **USE METRIC UNITS.** A 22-ft [6.71 m] span beam is fixed at both ends and carries a single concentrated load of 16 kips [71.2 kN] at midspan. Find the reactions and construct the complete shear and moment diagrams *using beam diagram formulas.*

(20%) 5A) USE US UNITS. Find the components of the reactions for the structure shown in Figure 3.48*b*. *(pinned frames)*

Partial answers to check with: $A_y = C_y = 2$ k, $A_x = 1.33$ k, $C_x = -1.33$ k, wrt AB: $B_x = -1.33$ k, $B_y = 0$.

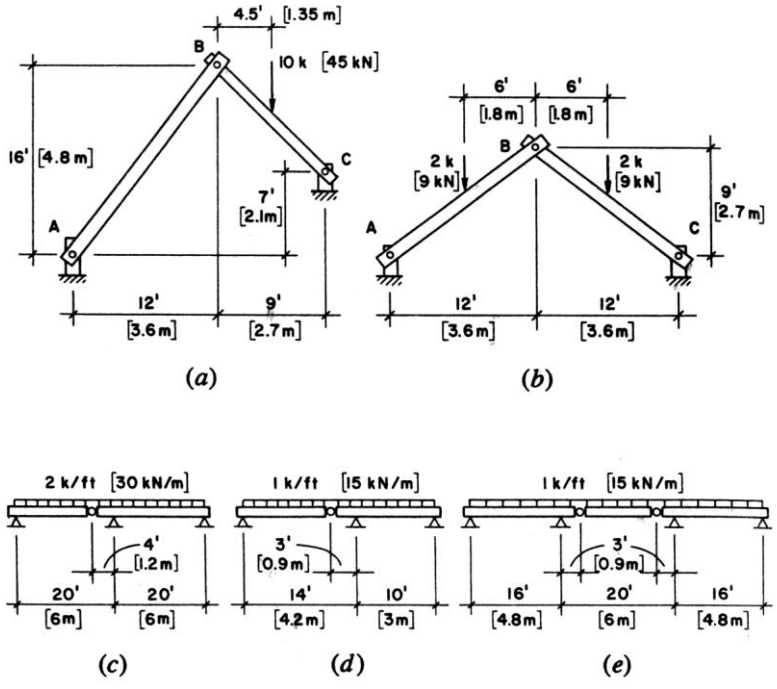

Figure 3.48 Reference for Problem 3.10.

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(20%) 5B) USE METRIC UNITS. Investigate the beam shown in Figure 3.48*c*. Find the reactions and draw the shear and moment diagrams, indicating all critical values. *(pinned frames also known as compound statically determinate beams)*

Partial answers to check with: R_1 = 72 kN, R_2 = 216 kN, V_{max} = 108 kN, M_{max} = 108 kN-m.

(15%) ***Problem 3.10.D****. Investigate the frame shown in Figure 3.61*d* for reactions and internal conditions ***using Multiframe software*** *being careful to indicate the pin at the top of the left column and left of the beam member. Use the standard steel section you have been assigned which is posted in My Grades on e-Learning. Submit the data file (.mfd) on E-learning (under Contents-Assignments) and provide a print of the shear (V) and bending moment (M) diagrams. Note: The load direction is toward the side the uniform load symbol "touches". And Multiframe plots the V diagram with respect to what it thinks the direction from the first end to the other end is. And the "Find, Given, Solution" format is not required. (statically indeterminate frames)*

Partial answers to check with: Left R = 0 k right & 4.5 k up, right R = 12 k left & 4.5 k down, V_{max} = - 12 k , M_{max} = 72 k-ft.

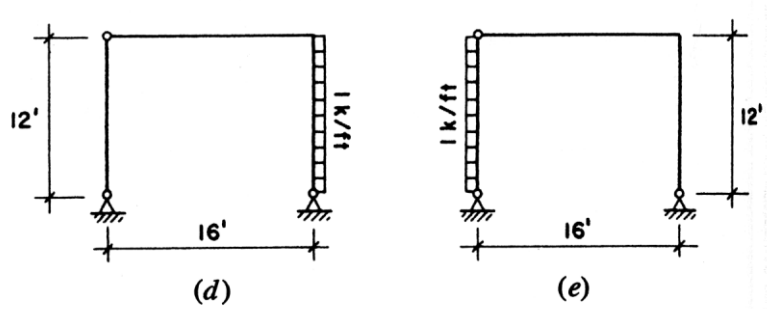

Figure 3.46 Reference for Problem 3.10, part 2.