CE 330
Introduction to Structural Engineering
Homework #4
Due on Monday, 31 JAN 05

1. Work Problem 3.13 from the textbook. The 30 kN-m couple is applied at Point E on Member CDE. The rollers at Point A and Point D can provide either an upward or a downward reaction force.

2. Work Problem 3.15 from the textbook. Assume that all joints in the truss can be modeled as frictionless pins. The rollers at Point H and Point F can provide either an upward or a downward reaction force.

3. Work Problem 3.21 from the textbook.

4. Work Problem 3.28 from the textbook.

5. A corner of the floor system in a reinforced concrete building is shown in plan view. The tops of reinforced concrete columns are shown as rectangles along lines A, B, and C. Column A1 is a “corner column” at the exterior of the building. Columns B1, C1, A4, and A7 are “exterior columns” around the perimeter of the building. Columns B4, C4, B7, and C7 are “interior columns.”
   - Reinforced concrete girders (12 in. wide by 20 in. deep) span 30 ft. between columns along lines A, B, and C.
   - Reinforced concrete beams (8 in. wide by 14 in. deep) span 25 ft. between girders (or occasionally between columns) along lines 1 through 7.
   - The reinforced concrete floor slab is 5 in. thick and is supported by the concrete beams and girders.

A) Provide a FBD of a beam along line 1 (spanning between columns) and show the dead loads (including beam self-weight) acting on the beam. Label the maximum magnitude of the distributed dead load.

B) Provide a FBD of a beam along line 3 (spanning between girders) and show the dead loads (including beam self-weight) acting on the beam. Label the maximum magnitude of the distributed dead load.

C) Provide a FBD of a girder along line B (spanning between columns) and show the dead loads (including girder self-weight) acting on the girder. Label the maximum magnitudes of any distributed dead loads, and also the magnitudes of any (dead) point loads.
D) Determine the total magnitude of the dead load acting at the top of the interior column at the intersection of line B and line 4 (column B4).

E) Determine the total magnitude of the dead load acting at the top of the "corner column" at the intersection of line A and line 1 (column A1).