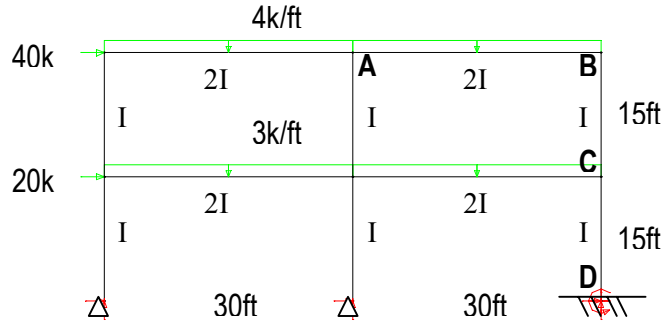


Exam 2

18 March 2001

Name: _____

Preliminary results of a first order elastic analysis of a two bay, two story, frame are given below, in the form of axial, shear, and moment diagrams for the no sway and sway case. All the given demands are factored loads. The beams and columns are oriented such that in-plane bending is about the strong axis. Applied lateral loads are permanent and not reversible. The frame is braced in the out-of-plane direction at all of the beam to column intersections. (relative beam and column moments of inertia (I) are given on the frame.)



No Sway Analysis Results (Factored Demands)	Sway Analysis Results (Factored Demands)
<p>Axial</p> <p><small>Axial Force: 1st-Order Elastic, Incr # 1, Applied Load Ratio = 1</small></p>	<p>Axial</p> <p><small>Axial Force: 1st-Order Elastic, Incr # 1, Applied Load Ratio = 1</small></p>
<p>Shear</p> <p><small>Shear Y: 1st-Order Elastic, Incr # 1, Applied Load Ratio = 1</small></p>	<p>Shear</p> <p><small>Shear Y: 1st-Order Elastic, Incr # 1, Applied Load Ratio = 1</small></p>
<p>Moment</p> <p><small>Moment Z: 1st-Order Elastic, Incr # 1, Applied Load Ratio = 1</small></p>	<p>Moment</p> <p><small>Moment Z: 1st-Order Elastic, Incr # 1, Applied Load Ratio = 1</small></p>

1. A W14x68 Gr. 50 has been selected for all of the first floor columns. You are asked to examine the adequacy of this selection for member CD.

- (a) Axial demand on CD (P_u)?
- (b) Maximum amplified moment demand on CD (M_u)?
- (c) Axial capacity of CD (ϕP_n)?
- (d) Bending capacity of CD (ϕM_n)?
- (e) Interaction check?

2. Select an efficient Gr. 50 beam for AB, assume the axial load is zero. (i.e., it is a beam not a beam-column)

3. The preliminary design for this frame consists of:

- selecting a member for column CD and using that member for all 6 columns, and
- selecting a member for beam AB and using that member for all 4 beams.

Why is this preliminary design not complete?