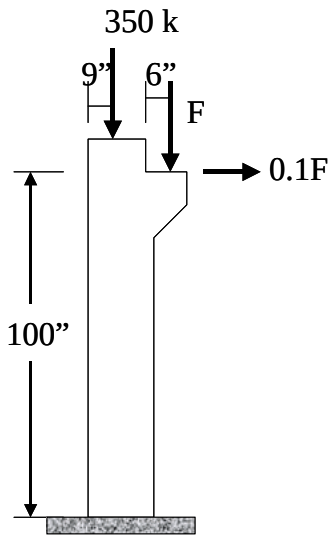
CE243A- Behavior and Design of RC Structural Elements

Assignment #4: P-M Interaction Diagrams and Column Design
Due date: 10 November 2004

4.1 Generation and Use of P-M interaction Diagrams.

Use the BIAX program to compute P-M diagram for the 18-inch square column with a total of 6 - #9 bars (3" cover to bar centerline, 3 bars on each of two faces) shown below. Assume f'_c = 4000 psi and f_y = 60 ksi. Generate two P-M curves, for extreme fiber strain levels of 0.002 and 0.003, and use sufficient points to define each curve with some detail.

Determine (within +/- 10 kips) the magnitude of the force F that results in failure of the column (for a strain of 0.003).



4.2 Column Design

Design a square column cross section for: P_u = 500 kips, M_{ux} = 300 ft-kips (uniaxial bending). Use ACI 318-02 requirements (i.e., apply capacity reduction factors). You may use the CRSI design aid to assist if you desire.

4.3 $P - M_x - M_y$ Column Interaction

Determine the moment M_{uy} , in combination with P_u = 300 kips and M_{ux} = 250 ft-kips, that will cause failure of the column section designed in Problem 4.2 Use the BIAX program.