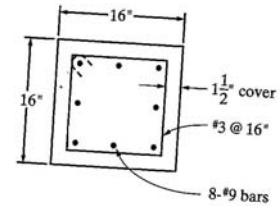


Homework #9 – Columns

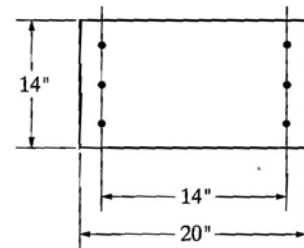
CVEN 4359: Dr. Lamanna

1. Find the maximum design axial load strength for the tied column of cross section shown in the Figure. Check the ties. Assume a short column. Use $f'_c = 4,000$ psi and $f_y = 60,000$ psi for both longitudinal steel and ties.



2. Design a square tied column to carry axial service loads of 320 kips dead load and 190 kips live load. There is no identified applied moment. Assume that the column is short. Use ρ_g of about 0.03, $f'_c = 4,000$ psi and $f_y = 60,000$ psi.

3. Find the axial load strength ϕP_n and the moment strength ϕM_n for the column cross section with six No. 9 bars, as shown in the Figure. Eccentricity $e = 5$ in., and use $f'_c = 4,000$ psi and $f_y = 60,000$ psi.



4. Design a square-tied reinforced concrete column to support a design load $P_u = 1,300$ kips and a design moment $M_u = 550$ ft-kips. Use $f'_c = 4,000$ psi and $f_y = 60,000$ psi.