HOMEWORK 2

Design the beams on third floor assuming that the slab is supported in one direction on beams along axes 1, 2, 3, and 4.

Required

1. Determine the slab thickness by approximation and determine the dead load.

2. Determine the load on the beams by “tributary area” method.

3. Determine the design moments and shears in critical sections according to the approximate ACI 318-05 requirements (and comments) for all beams.

4. Determine the moment and shear envelopes of one beam only (i.e., along axis 2 using the computer (STRAND, STAAD, or equivalent)).

5. Adjust negative and positive moments determined in Step #4 by “redistribution” (where it applies). Compare results here with those in Step #3. [Do not redistribute moments from Step #3]

6. Determine the dimensions of the cross sections of beams and the reinforcement for bending [and shear]. Consider all beams to have T sections or inverted L’s.

7. [Determine graphically or analytically the length of the reinforcement for proper (bond) development and lab splices where applies (show on diagrams) based on cover of moment envelope.]

8. Show the reinforcement on a sketch with all the required details – bars and cross sections.

9. Prepare a list of materials: Show in a table all necessary materials, i.e., concrete volume and reinforcement sizes, length and number. Determine the total weight of (i) concrete and (ii) steel

Note: If the material presented in class did not cover a subject, do not complete the requirement for the initial submittal but complete it for the submittal with the next homework.