



## CMCE 2415 Elements of Structural Design - Concrete Assignment 2: Slab Design as a part of floor system

Purpose: To apply techniques learned to the design of a reinforced concrete slab for moment.

Directions:

The proposed building is a two-story commercial office building. At this stage as an engineer, you should design a one-way slab as a part of floor system at roof for just one span, according to the information provided in the following:

Design Criteria:

- Roof area is 60'x80'.
- In 60' direction, there are 4 columns, which have divided the width of the roof to 3 equal spans.
- In 80' direction, there is just one span (No column in between).
- There are beams at 80' direction; therefore, the slab is supported at all sides!
- Concrete construction is normal weight concrete with  $f'c = 4000$  psi.
- Reinforcing steel is new and conforming to ASTM A615 grade 60 ( $f_y=60,000$  psi).
- Assume that each span is separate from others, and simply supported.
- You can ignore the width of columns, in order to find the L of span.
- The slab is supported in all four sides.
- Roof Loads: 390 lb/ft<sup>2</sup> dead load, 480 lb/ft<sup>2</sup> service live load. Include weight of the slab as a dead load in design for moment.

Submission: Each student is required to submit the following:

- Design the flexural reinforcing for the slab according to ACI code provisions (slab thickness and arrangement of the main and shrinkage & temperature bars).
- Estimate volume of concrete and the weight of reinforcing steel needed for the slab.
- Cover Sheet – include your name, course number and name, title of assignment and. The cover is to be typed on white 8.5" x 11" paper.
- Calculations – are to be done by hand on 8.5" x 11" engineering paper. Please provide a final sketch of your design (ex: beam height, width, reinforcement, and cover).

Due: This project is DUE on Nov 15, 2012. NO LATE!

