CIVL 551 Foundation Engineering Fall 2009

PS #7 Due: 11/11/09

Objectives

To study combined footings using hand methods, using Winkler foundations and commercial software.

The Problem

The combined footing shown below will carry the vertical loads as indicated. The loads are delivered to the footing with square columns.

1. To determine by hand calculation the required length and width of a combined footing that will carry two column loads. Determine the extreme values for shear and bending for a comparison with 2 below.

2. To repeat the procedure using a Winkler foundation and the Finite Element Method. Determine the required length, width, thickness and reinforcing of the combined footing.

3. Compare to F2K, at class website filename: "CSUCDemo.exe"

Column Data:

Column Size = 18" x 18"
Column Steel = 4-#11bars
C1 = 24" x 24"
C2 = 24" x 24"
DL1 = 60k
LL1 = 90k
DL2 = 130k
LL2 = 160k
f'c = 4,000 psi
fy = 60,000 psi

Footing Data:

f'c = 3,000 psi
fy = 60,000 psi
A = 4'
B = 25'

Soil Data:

q-allow = 3.0 ksf