uOttawa
L'Université canadienne
Canada's university

CVG 3109 Fall – 2017
SOIL MECHANICS I
ASSIGNMENT #3
Due on 31st Oct 2017
(18:00)

Chapter 3: Stress Distribution in Soils (Elasticity Theory)

Question 1: The plan of a flexible rectangular loaded area is shown in **Figure 1**. The uniformly distributed load on flexible area, *q is 100 kN/m²*. Determine the vertical stress increase, $\Delta\sigma_z$, at a depth of *z = 5 m* below Point *A, B* and *C*. Comment on the calculated stress values.

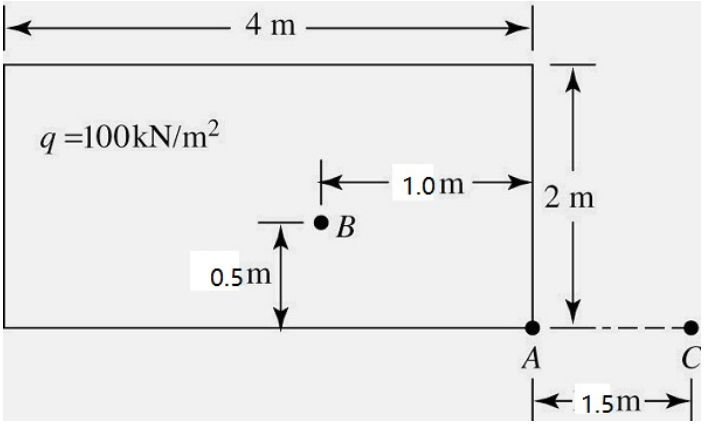

Figure 1

Question 2:
The circular flexible area given in **Figure 2** is uniformly loaded with *q = 400 kN/m²*
Using Newmark's chart, determine the vertical stress increase, $\Delta\sigma_z$, at point A.

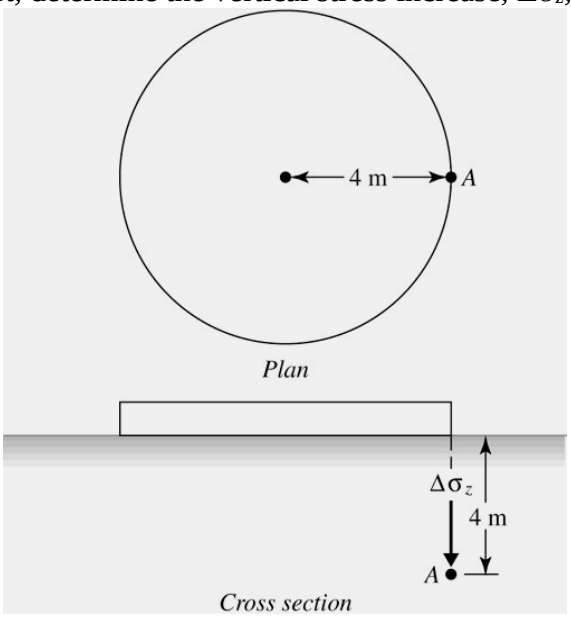

Figure 2

Question 3:

The plan of a flexible strip area loaded area is shown in **Figure 3**. The uniformly distributed load on flexible area, *q is 200 kN/m²*. B=6m. (1) Determine the vertical stress increase at z=3m and x = 0m, ±3m, ± 6m, ± 9m; (2) Determine the vertical stress below the center at z=0, 2m, 4m, 6m, 8m, 10m, 12m. (3) Plot the variation of vertical stress increase along the distance and depth respectively. (4) Discuss the distribution of vertical stress increase in the soil mass.

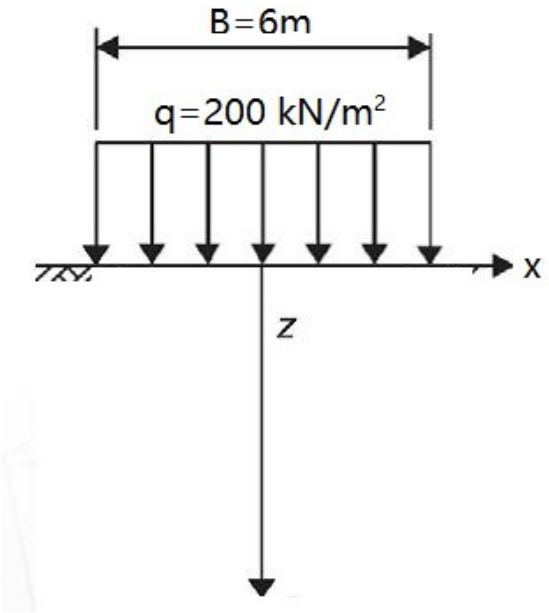

Figure 3

Question 4:

A square spread footing (B=2m, L=8m) is placed on the ground surface (shown in **Figure 4**). The profile of soils is also shown in **Figure 4**. The water table is 1.0m below the ground surface. A point load P=820.8 kN is applied on the footing. Calculate and plot the variation of in situ effective stress and vertical stress increase along depth below the center of the footing. (Assume that the pressure applied on the ground surface by the footing is uniform).

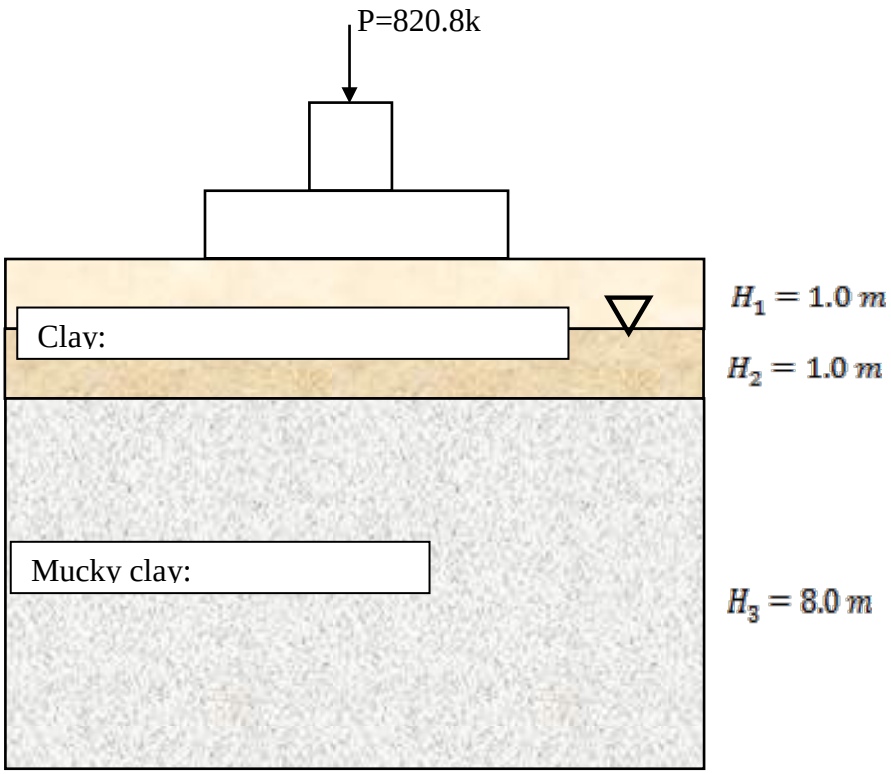

Figure 4