4GCU-M8

Shallow foundation data

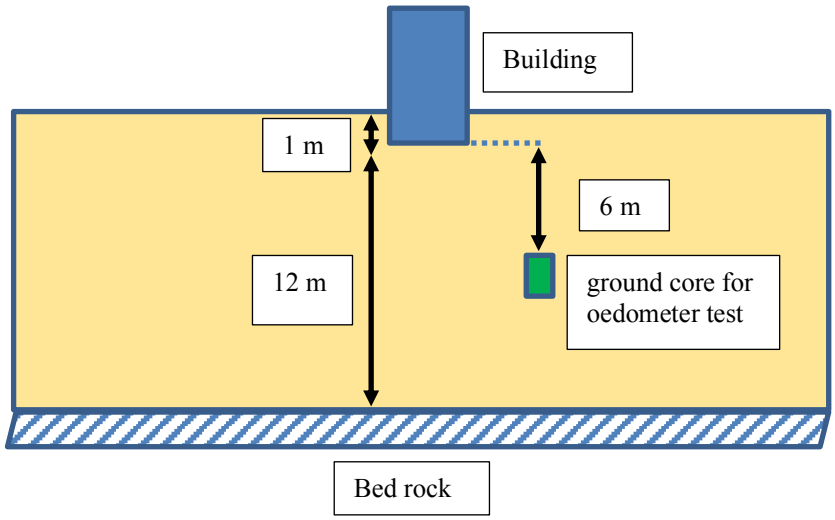

Figure 1: Site section scheme

Tableau 1: Oedometer test results

	Compressibility index Cc	Swelling index Cs	Preconsolidation stress $\sigma'_{p(eodo)}$ KPa	K0	Void ratio $e_{p(eodo)}$	Solid grain density	Water content
Alluvium (gravel)	**0,045**	**0,006**	**130**	**0,5**	**0,540**	**2,65**	**8,5%**

1) Give an estimation of the elasticity parameters E and ν.

Hypothesis: initialy, $e=e_p$ over the all layer

To do so, first determinate if soil is over consolidated or normally consolidated. Then, establish the relationship between E_{oed}, C_c or C_s and σ' (the current vertical stress). Make the link between $E_{oed,}$ E and ν. Using the value of K0, gives an estimation of ν.

You will assume that the elasticity parameters you find at 6m depth remain constant over the all layer.

2) Using the finite element code that you have developed for plain strain assumption, propose a simulation of the problem. First explicit, the boundary conditions as well as the loads you impose.

hypothesis: the width of the continuous footing is 2m.

3) Assuming that the strength parameters of the soil are: C=5 kPa and φ=30°, find the relationship that gives the ratio between the actual radius of the bigger Morh circle and the maximal admissible radius at a given point of the mesh (at each Gauss points).

$$\tau_{rel}=R/R_{max}$$

Plot the isovalues map of this data and conclude about the pertinence of your simulation performed under linear elastic conditions.

4) For the groups who still get bugs in their own, use the code given in the file "matlab_code.zip".

1. open the "input_4_students.m" file.
2. use the command "ctrl+f" to find the comment "`4 students`" and change the command below as requested in the code.
3. run the m-file
4. open the "outpu_4_students.m" file
5. repeat points 2 and 3.

In your report, explain and justify:

- why only half of the geometry is modelled
- why the first one-meter soil layer is not modelled and replaced by its resulting acting force (self-weight of this meter of soil)

Then you can change or customize the input and the output file at your convenience to change the modeling hypotheses or plot any other results.