Lab 3. GeoExplorer lab

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Methods

The sites that were analyzed in the GeoExplorer virtual environment were the Farmland and Coastal Land Reclamation sites. For the Farmland site a CPT test was used to evaluate the foundation soils for a storage facility and joint farmhouse. The entire structure on the site will be energy-efficient and will guarantee a natural freshness to the products. The Coastal Land reclamation site a CPT test was conducted because the Mayor of the city had announced he wanted to expand the city and will be building a wind farm on the site. The purpose of this is to have coastal erosion protection which will make the city more erosion resistant and boost the sustainable energy for the city as well. In order to do these CPT test a truck would be driven to the location and once arrived the worker inside the truck have had to follow the correct set up to do a proper CPT test. The worker would have to put on the work clothes and proceed to level the truck and pre-dig the hole to begin with. After this was done, the worker would then clean the proper cone for the CPT test and raise the tower while ensuring that the cable isn't broken. After all these checks have been completed he can insert the correct cone into the tower and confirm the computer data calibration is correct and if it isn't to recheck all the equipment before conducting the CPT test.

Results

Farmland

From the CPT test that was conducted on the Farmland site the following data has been collected. The tip resistance, sleeve friction, friction ratio, inclination, and Pore Pressure can all be found from figure 1 below as the depth increases. Based on the information given from the CPT test, the soil type can be found underneath 6.5 meters is sand. This is know because of the I_{sbt} value that has been calculated in figure 3 below and using the chart in figure 5 which gives you the type of soil based on the I_{sbt} value. Since the value is 1.4 it lands in zone 6 which is a sand. The CPT test had to go a minimum of 10 meters because the foundation of the new building was 5 meters into the soil so going at least 10 meters would enough soil information for the foundation.

Figure 1 data collection of farmland CPT test

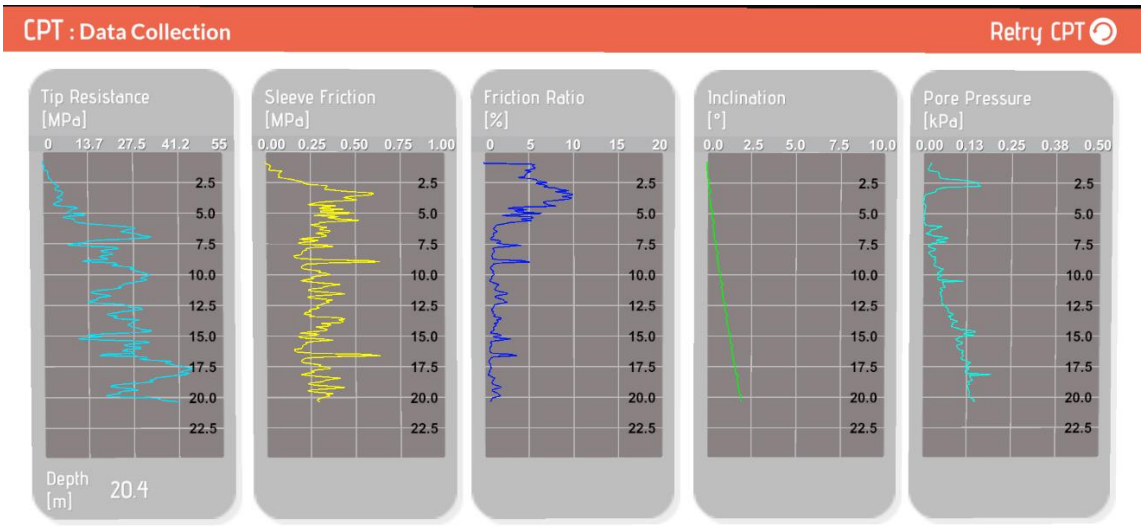


Table 1 data collected at soil depth 6.5m CPT test

Depth	Tip resistance (MPa)	Friction Ratio (%)	Pore pressure (KPa)	I_{sbt} Value	
6.5 m	26.4635	0.732	0.0196	1.4	

Figure 3 sample calculations for Isbt value farmland

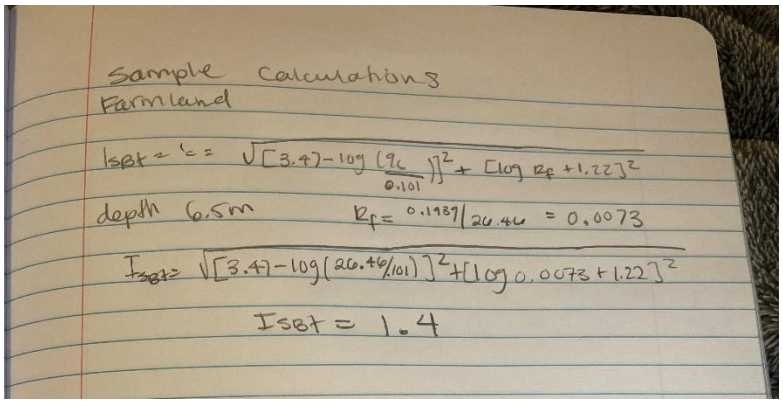
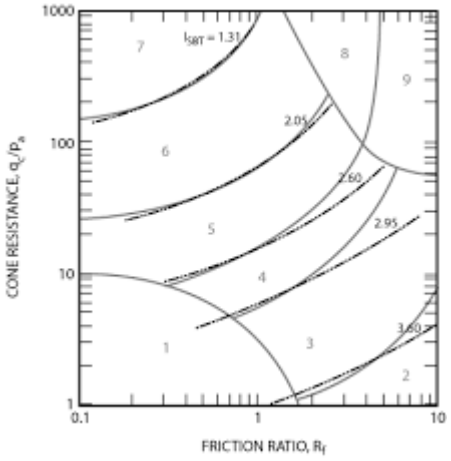


Figure 5 I_{sbt} value chart



Land Reclamation

From the CPT test that was conducted on the Farmland site the following data has been collected. The tip resistance, sleeve friction, friction ratio, inclination, and Pore Pressure can all be found from figure 2 below as the depth increases. Based on the information given from the CPT test, the soil type can be found underneath 25 meters is a gravelly sand. This is know because of the I_{sbt} value that has been calculated in figure 4 below and using the chart in figure 5 above which gives you the type of soil based on the I_{sbt} value. Since the value is 1.25 it lands in zone 7 which is a Gravelly sand. During the CPT test the cone was manually pushed to about 40 meters where a stiff layer was encountered as shown on figure 2 on the inclination section with the sudden change because the soil properties had changed. This data was taken from the coastal land reclamation site where the city is trying to have the reclaimed land which is land that was in poor condition, but the land has been improved so that it can used for farming or building. For this sites purpose was to build a wind farm for more sustainable energy for the city and reduce the coastal erosion on the city.

Figure 2 data collection from CPT test land reclamation

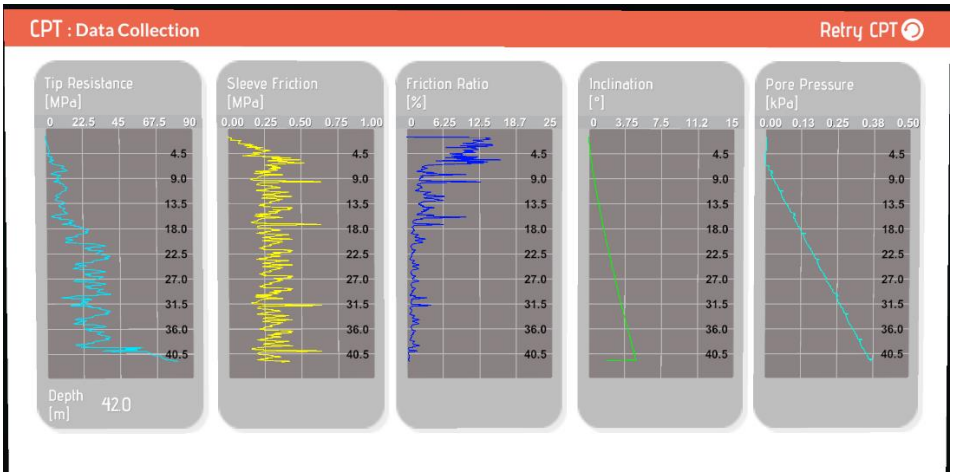
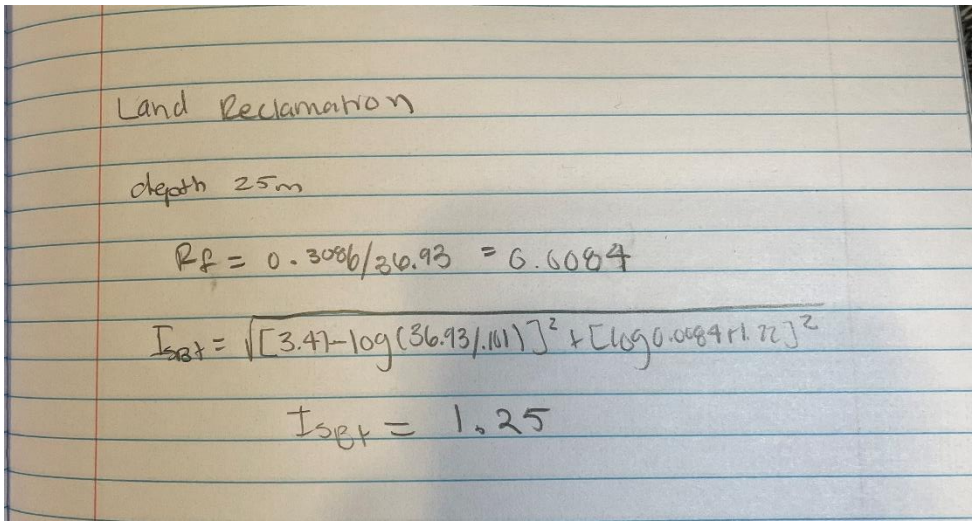


Table 2 data collected at soil depth 25m CPT test

Depth	Tip resistance (MPa)	Friction ratio (%)	Pore Pressure (KPa)	I_{sbt} Value	
25m	36.9321	0.8355	0.2019	1.25	

Figure 4 sample calculations for Isbt value land Reclamation



Appendix

Farmland_2022-11-02_10-33-50.csv

Land Reclamation_2022-11