



CAIRO UNIVERSITY
FACULTY OF ENGINEERING
Soil Mechanics and Foundation Engineering Division

FOUNDATIONS

4th Year Civil

EXERCISE (9)

2016-2017

SUBSURFACE EXPLORATION

- 1) Estimate S_u , OCR using CPT, VST, SPT given in table 1, and comment on results.
(Note: for VST, a blade diameter = 3.63 inches and a blade height = 7.25 inches)
- 2) Estimate ϕ , E using CPT, SPT given in table 2, and comment on results.
- 3) Estimate soil parameters to calculate bearing capacity and settlement under given foundation using CPT, SPT given in table 3, and comment on results.

In above 3 situations, consider groundwater table is at 1m below ground surface.

Table 1

Layer	Depth (m)	q_c (Mpa)	f_s (MPa)	VST T (ft.lb)	SPT
Clay Layer	0.0	0.80	0.03	-	-
	1.0	0.74	0.03	75	4
	2.0	0.85	0.03	78	4
	3.0	0.94	0.04	75	5
	4.0	0.65	0.03	80	6
	5.0	0.60	0.03	79	4
	6.0	0.77	0.03	83	7
	7.0	0.88	0.04	82	6
	8.0	0.90	0.04	83	8
	9.0	1.00	0.04	80	7
	10.0	0.98	0.05	79	8

Table 2

Layer	Depth (m)	q_c (Mpa)	f_s (MPa)	SPT
Sand Layer	0.0	0.40	0.00	-
	1.0	0.80	0.01	4
	2.0	0.60	0.01	5
	3.0	1.00	0.01	4
	4.0	4.00	0.07	8
	5.0	3.00	0.05	6
	6.0	5.00	0.08	7
	7.0	8.00	0.15	10
	8.0	6.00	0.12	9
	9.0	7.5	0.14	10
	10.0	8.20	0.16	9

Table 3

Layer	Depth (m)	q_c (Mpa)	f_s (MPa)	SPT
Sand Layer	0.0	15.00	0.15	-
	1.0	22.00	0.33	14
	2.0	20.00	0.24	16
	3.0	25.00	0.43	20
	4.0	28.00	0.45	25
Clay Layer	5.0	1.00	0.07	7
	6.0	1.10	0.07	8
	7.0	1.20	0.08	8
	8.0	1.00	0.06	9
	9.0	1.30	0.09	11
	10.0	1.25	0.10	10