RY TEST ON BORING

ION - THANH DA

BORING No : UT - 02

0.005	Natural water content w (%)	Unit weight: Natural γ (g/cm³)	Unit weight: Dry γd (g/cm³)	Specific gravity Gs	Porosity n (%)	Void ratio e0	Degree saturation S (%)	Atterberg limit: Liquid limit LL (%)	Atterberg limit: Plastic limit PL (%)	Atterberg limit: Plastic index PI (%)	Liquidity index B	Unconfined compression qu (Kg/cm²)	Consolidation: Compression index Cc	Consolidation: Coefficient of consolidation Cv (cm²/s)	Consolidation: Preconsolidation pressure Pc (Kg/cm²)	Consolidation: Coefficient of volume compressibility mv (cm²/g)	Consolidation: Coefficient of permeability k20 (cm/s)	REMARK
(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(29)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)
60.2	90.21	1.387	0.729	2.598	0.72	2.563	91.4											
58.4	85.04	1.366	0.738	2.583	0.71	2.499	87.9	74.2	38.6	35.6	1.30	0.151	1.1309	2.44E-04	0.931	1.61E-04	5.04E-08	
70.2	86.91	1.428	0.764	2.598	0.71	2.401	94.1											
69.6	87.72	1.471	0.784	2.581	0.70	2.294	98.7	76.2	43.6	32.6	1.35	0.112	1.0460	2.74E-04	0.870	1.61E-04	5.83E-08	
65.3	85.69	1.427	0.768	2.591	0.70	2.372	93.6											
62.5	89.29	1.395	0.737	2.584	0.71	2.506	92.1	78.6	42.8	35.8	1.30							
68.1	88.92	1.429	0.756	2.593	0.71	2.428	95.0											
80.7	91.37	1.455	0.760	2.579	0.71	2.392	98.5	85.3	44.2	41.1	1.15	0.111	1.2271	2.85E-04	1.277	1.33E-04	3.73E-08	
75.7	86.94	1.461	0.782	2.604	0.70	2.332	97.1											
19.5	19.81	2.080	1.736	2.664	0.35	0.534	98.7	24.7	17.9	6.8	0.28	0.336	0.0785	7.15E-04	0.691	2.42E-05	1.46E-08	
16.9	20.21	2.051	1.706	2.663	0.36	0.561	96.0											
51.7	21.40	1.959	1.614	2.692	0.40	0.668	86.2	36.1	23.3	12.8	-0.15							
53.8	20.91	1.964	1.624	2.695	0.40	0.659	85.5											
50.8	21.35	1.950	1.607	2.694	0.40	0.676	85.0	29.6	18.1	11.5	0.28							
52.3	22.19	1.961	1.605	2.697	0.40	0.681	87.9											

4.2 BEARING CAPACITY OF FOUNDATION

For example , a concrete pile with the dimensions 0.4 x 0.4 x 25.0 m is taken, the calculation is as follows :

P = 1.6 m

As = 0.16 m^2

Applying formula

Qult = C Ncs As + C_A 2 π R L

and formula Qult = q As + ((K_H/2) γsub L^2 tg δ) * P

where q = γsub R Nγ + K_B * γsub * L * Nq - γsub * L

At the borehole UT-01, with following parameters :

- Layer 1 + layer 2 :

L = 19.0 m.

C = 0.0605 kg/cm^2 = 0.605 T/m^2

C_A = 0.605 T/m^2

γsub = 0.460 T/m^3

- Layer 3 :

L = 4.0 m

ϕ = 30°

ϕ' = 35°

γsub = 0.993 T/m^3

K_H = 0.5

tan δ = 0.25

- Layer 4 :

L = 2.0 m .

C = 4.882 T/m^2

γsub = 1.033 T/m^3

CA = 3.661 T/m^2

Ncs = 9

Because the pile gets through 4 layers so the total bearing capacity is the sum of skin friction through all layers (layer 1 + layer 2, layer 3 and layer 4) and bearing capacity of tip in layer 4 :

Calculation :

Layer 1 + 2 : Q = C_A 2 π R L

Q_{1+2} = 0.605 T/m^2 x 1.6m x 19.0 m = 18.392 T .

Layer 3 :

Q_3 = Po x K_H x tan δ x L x P

Po = 0.460 x 19.0 + 0.993 x 4.0/2 = 10.726 T/m^2

Q_3 = 10.726 x 0.5 x 0.25 x 4.0 x 1.6 = 8.581 T

Layer 4 :

Q_4 = C Ncs As + C_A 2 π R L

Q_{4-1} = C_A 2 π R L

Q_{4-1} = 3.661 T/m^2 x 1.6m x 2.0 m = 11.715 T .

Q_{4-2} = C Ncs π As

Q_{4-2} = 4.882 x 9 x 0.4^2 = 34.321 T.

Q_{total} = Q_{1+2} + Q_3 + Q_{4-1} + Q_{4-2} =

Q_{total} = 18.392T + 8.581 T + 11.715 T + 34.321 = 73.009 T

Choosing safety factor Fs = 3 Qult = 24.336 T .

Conclusion

With the above mentions, some following remarks can be made :

- Up to 30.0 m deep, the foundation is constructed by Holocene and Pleistocene deposit layers. The Holocene have low bearing capacity.

- According to load of construction, foundation can be put on the layer 2 after improving, may be to use cajeput pile foundation, sand pile foundation or draining plastic stripes (for small load construction) or use concrete pile foundation to transmit the construction load to Pleistocene deposit soil layers (layer 4)

Calculation for a concrete pile at borehole UT-01 with section (0.4 x 0.4m) and length of 25.0m has following results :

Qult = 24.336 T .