

Civil

College of Engineering, Pune End Semester Exam – May 2013

T.Y . B. Tech. (Civil)
(CE-314)- (Foundation Engineering)

Day & Date- May 2013
Maximum Marks: 50

Time: - to
Duration – 3 hrs.

Instructions:

1. All questions are compulsory
2. Assume suitable data, if necessary

		Max. Marks
Q. 1	A. Explain the major differences between bearing capacity theories given by (a) Terzaghi and Mayerhoff (b) Terzaghi and Vesic	5
	B. How do you estimate the safe bearing capacity and safe bearing pressure of a footing on sand using the results of a plate load test?	5
Q. 2	A. How do you decide the depth and spacing of bore holes for a geotechnical site exploration?	5
	B. Describe in brief about the types of well foundations and there construction methodologies.	5
Q. 3	A. A square footing is situated over a fine sandy stratum at a depth of 1m below the ground surface. From the SPT test at the site, measured SPT values were found as shown in the Table 1. Water table is at 1.5 m below the ground surface. Unit weight of sand (γ_d and γ_{sat}) can be taken as 18 kN/m ³ . Determine safe bearing capacity of the foundation. Take FS=3.	10

Table 1: Measured SPT values at the site

Depth below footing (m)	0	1.0	2.0	3.0
N	10	15	20	22

For the overburden correction of N values, following equations given by Bazaraa can be used.

$$C_N = 4/(1+0.04p) \text{ for } p \leq 75 \text{ kN/m}^2$$

$$C_N = 4/(3.25+0.01p) \text{ for } p > 75 \text{ kN/m}^2$$

For the dilatancy correction of N values, following equations given by Terzaghi and Peck can be used. $N'' = 15 + 0.5(N' - 15)$.

For the assessment of the Φ value, chart given in Fig. 1(a) can be used.

Q.3 B. Determine safe bearing pressure of the foundation described in Q-3 A, if permissible settlement is 25 mm. Use IS code chart as given in Fig. 1(b). 5

Q.4 A. A group of four piles are constructed as driven precast piles in a sand stratum, as shown in Fig. 2(a). The water table is at a distance of 1 m below the ground level. Estimate the safe pile capacity for this pile group. The value of N_q can be found using the chart shown in Fig. 2(b). Assume $K = 2.0$ and $\delta = 0.75\Phi$ 10

B. Estimate the vertical settlement of this pile system, under the load of 1000kN if the load test on a single pile gives following data. The settlement ratio, R according to Skempton (1953), can be taken as, 5

$$R = \left(\frac{4B + 2.7}{B + 3.6} \right)^2$$

Load on pile (kN)	150	250	400	600	800	1000
Settlement (mm)	1.45	2.75	5.75	16.0	30.75	40.50

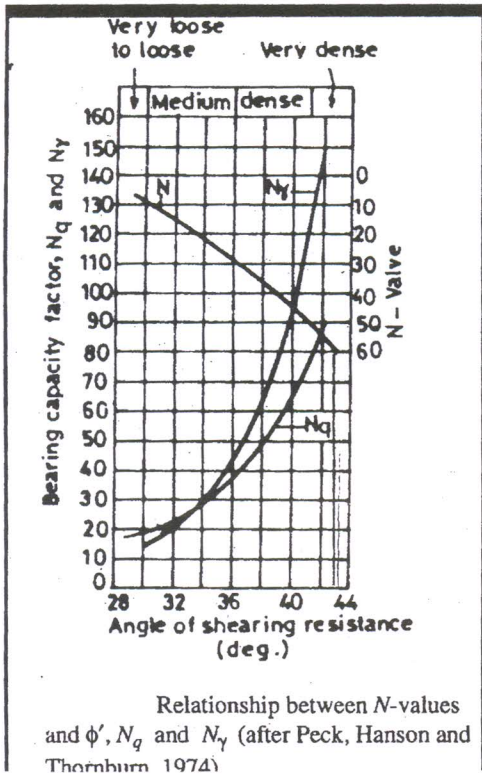
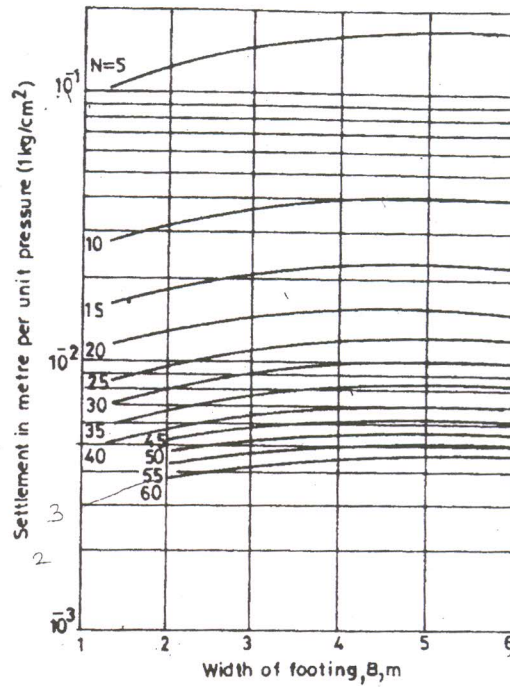


Fig. 1 (a)



Settlement of footings on sand from N -values (IS: 8009-Part I -1976)

Fig. 1 (b)

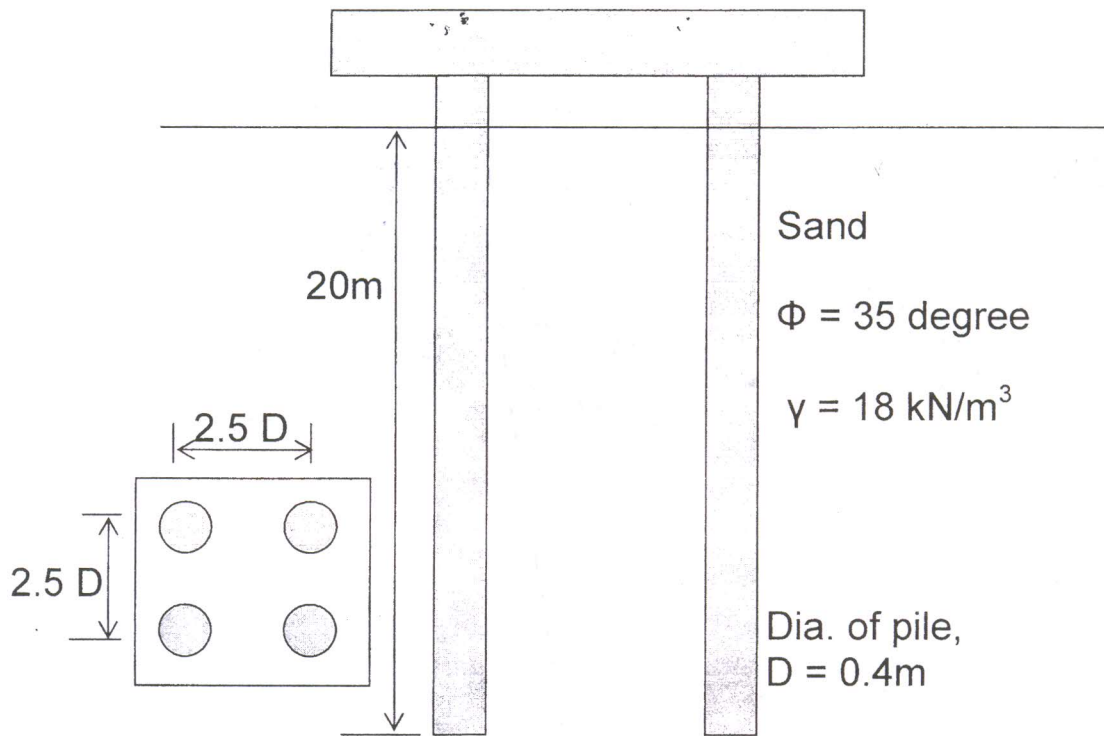
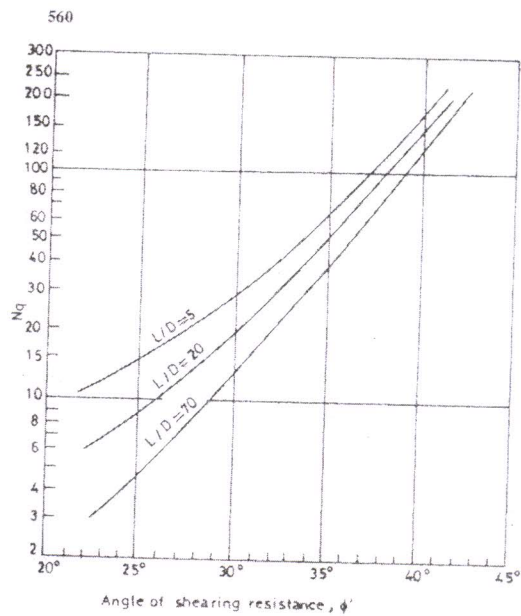


Fig.2 (a) Pile group on a sandy stratum



Values of N_q for pile formula (After
 Berezantzev *et al.* 1961)

Fig.2 (b) Value of N_q for pile foundation