

Discussion

Discussion on Paper, "Studies on Skin Friction in Piles under Tensile and Compressive Load"

Authored by G. Ramasamy, B. Day and E. Indrawan, IGJ, Vol.34, No.3, July 2004, pp.276-289.

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The authors have presented useful model investigation in the paper. However, the paper lacks in useful basic technical details and clarity for understanding. For the completeness and use of investigation, the authors may provide the data/results in the closure of the paper.

The sand has been used as a foundation medium. However, the nature of sand grains, specific gravity, uniformity coefficient, maximum and minimum voids ratio and corresponding unit weights are missing in the paper. Also the relative density of sand bed at testing condition is not given.

The sand bed was prepared by rainfall technique using sieve of diameter equal to the diameter of tank with sieve openings uniformly distributed over the area. The aperture or the sieve size is not mentioned. It is stated that homogeneous sand bed was prepared by gradually filling the sand in the tank in 5 cm layers with the height of fall of 100 cm. The density of sand directly affects the parameters such as Φ and δ , which have direct influence on the capacity of a pile. Therefore, there should be some verification and control on the density of sand in lateral as well as vertical direction. How can the author justify that the homogeneous sand bed was prepared in all the tests carried out in their investigation?

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Moist condition of test bed was prepared by draining submerged sand through an outlet connected at the base. This may affect the homogeneity of sand in vertical direction and initial placement density. This effect is not discussed.

The pile-soil friction angle (δ) is one of the important pile-soil interaction parameter, which affects the pile capacity. The effect of δ on the uplift capacity is well established by Chattopadhyay and Pise (1985, 1986, 1987). Important relevant reference regarding the effects of installation of Levacher and Sieffert (1984) is not mentioned by the authors. The values of δ suggested by Potyondy (1961) for various construction material, surface condition and moisture content are given here in Table 1.

TABLE 1 : Values of δ for Steel with Sand for Different Surface Condition, by Potyondy (1961)

Sand Bed	Dry		Saturated	
Surface condition	Smooth	Rough	Smooth	Rough
δ/Φ	0.55	0.765	0.64	—

Comparison of δ values observed by the authors with those suggested by Potyondy is given in Table 2.

TABLE 2 : Comparison of Values

Parameter	Bed condition	
	Dry	Saturated
ϕ	31°	29°
δ (Authors)	11°	12°
δ (Potyondy)	17°	18.5°

The reported values of δ by the authors are much less. How did the authors determine the δ -values for moist and submerged condition of sand in direct shear test apparatus at the condition of model test carried out? The technical details are very useful to the profession.

The authors state that to represent driven pile the sand bed was

prepared first and then the pile was driven vertically. But, the above installation method adopted will represent jacked pile and not the driven pile.

In the analysis criteria the method for determining the ultimate skin resistance value from the graph is not mentioned.

It is necessary for understanding about the shape of the failure surface under tensile loading. How did the author determine it? It is not clear.

Conclusion 2 cannot be arrived at unless the authors have made observation about the failure surface (three dimensional) and capillary phenomenon. It is superficial observation.

References

CHATTOPADHYAY B.C. and PISE P.J. (1985) : "Design Charts for Uplift Capacity of Piles in Sand", *Proc. IGC*, Roorkee, Vol.1, pp.243-248.

CHATTOPADHYAY B.C. and PISE P.J. (1986) : "Uplift Capacity of Piles in Sand", *Journal of Geotechnical Engg. Div.*, ASCE, Vol.112, No.9, pp.888-903.

CHATTOPADHYAY B.C. and PISE P.J. (1987) : "Uplift Capacity of Driven Piles in Sand", *Journal of Institution of Engineers, India*, Vol.68, Part CI-2, UDC-624.154, pp.89-91.

LEVACHER D.R. and SIEFFERT J. (1984) : "Tests on Model Tension Piles", *Journal of GTE Div.*, ASCE, Vol.110, No.12, pp.1735-1748.

POTYONDY (1961) : "Skin Friction between Various Soils and Construction Materials", *Geotechnique*, Vol.11, No.4, pp.339-345.