

C-37: Behaviour of laterally loaded piles in sand

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The use of piles is man's oldest method of overcoming the difficulties of founding in soft soils. Piles experience lateral loads in situations like offshore structures, communication towers, etc. under wave or wind loading. In many practical cases the design of piles for lateral loading will depend on satisfying a lateral deflection requirement that may result in the specification of allowable lateral loads which should be less than the ultimate load carrying capacity of the piles. In practice, it is difficult to predict the load-deflection behaviour of a laterally loaded pile by doing model tests. However, for a safe design, lateral load-deflection behaviour is very important.

The main objectives of the present study were to find out the behaviour of laterally loaded piles in a fine-grained medium dense sand; to compare the theoretical and experimental load-deflection curves, and the predicted and observed failure loads of the piles.

Initially model piles of different length were cast and cured in the water bath for 28 days. Then a uniform sand bed was prepared in a specially designed container and the piles were driven using a pile-driving unit. The lateral loads were applied on each pile until the failure occurred and the load-deflection behaviour observed.

For the same piles, the theoretical lateral load-deflection behaviour was found by using methods given in the literature. The experimental results were compared with the theoretical predictions and it was found that within the elastic limit of response, the predicted loads are on the safe side.