

Behaviour of Laterally Loaded Pile Groups in Cohesionless Soil

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Abstract : Pile foundations are provided to transfer the vertical and horizontal loads of superstructures like high rise buildings, bridges, offshore structures etc. to the deep strata in the soil. These vertical and horizontal loads are due to the loads coming from the superstructure and wind, water thrust, earthquake, and earth pressure, respectively. In a pile foundation, piles are used in groups. Vertical piles in a group of piles are more efficient to take vertical loads as compared to horizontal loads and when the horizontal load per pile exceeds the bearing capacity of the vertical piles in that case batter piles are used with vertical piles because batter piles can take more lateral loads than vertical piles. In this paper, a model study was conducted on three vertical pile group with single positive and negative battered pile subjected to lateral loads. The batter angle for battered piles was $\pm 35^\circ$ with the vertical axis. Piles were spaced at $2.5d$ (d =diameter of pile) to each other. The soil used for model test was cohesionless soil. Lateral loads were applied in three stages on all the pile groups individually and it was found that under the repeated action of lateral loading, the deflection of the piles increased under the same loading. After comparing the results, it was found that the pile group with positive batter pile fails at 28 kgf and the pile group with negative batter pile fails at 24 kgf so it shows that positive battered piles are stronger than the negative battered piles.

Keywords : vertical piles, positive battered piles, negative battered piles, cohesionless soil, lateral loads, model test

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