Parametric Study and Design on under Reamed Pile - An Experimental and Numerical Study

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Abstract : Abstract: Under reamed piles are piles which are of different types like bored cast in-situ pile or bored compaction concrete piles where one or more bulbs are provided. In this paper, the design procedure of under reamed pile by both experimental study and numerical study using PLAXIS 3D Foundation software was studied. The soil chosen for study was M Sand. The Single and double under reamed pile modelling was made using mild steel. The pile load test experiment was conducted in the laboratory and the ultimate compression load for 25 mm settlement on single and double under reamed pile was observed and finally the result was compared with conventional pile (pile without bulb). The parametric influence on under reamed pile was studied by varying the geometrical parameters like diameter of bulbs, spacing between bulbs, position of bulbs and number of bulbs. The results of the numerical model showed that when the diameter of bulb D u =2.5D, the ultimate compression load for an under-reamed pile with a single bulb increased by 55 % compared to a pile without a bulb. It was observed that when the spacing between the bulbs was S=6D u with three different positions of bulb from bottom of pile as D u , 2D u and 3D u , the ultimate compression load increased by 88%, 94% and 73 % respectively, compared to the ultimate compression load for 25 mm settlement on conventional pile and if spacing was more than 6D u , ultimate compression load for 25 mm settlement started to decrease. It was observed that when the bucket length was more than 2D u , the ultimate compression

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