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Ground Improvement Using Granular Pile Anchor Foundation

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Abstract

The use of granular pile is one of the effective and efficient methods of ground improvement because of its ability in improving the bearing capacity and reducing the settlement of different soft soils. Conventional granular piles cannot be used as tension members to offer resistance under pull out loads. Granular Pile Anchor (GPA) is one of the recent ground improvement technique in devised for resisting pull out forces. In a granular pile anchor, the footing is anchored to a mild steel plate placed at the bottom of the granular pile through a reinforcing rod or a cable.

The main objective of the present study is to investigate the effect of relative density of fill material, granular pile diameter on the pull capacity of the granular pile anchor and the comparison of encased and non-encased granular pile has been done. The laboratory model tests using GPAF system revealed that the pull-out capacity of the granular pile anchor increased with increasing relative density of the granular material. There was a maximum percentage increase of 35% in the ultimate load when the relative density was increased from 50 to 70% for 50mm diameter pile. It was also revealed that the pull-out capacity of the granular pile anchor increased with increasing diameter of the granular pile anchor. The increase of 35% was also obtained when the diameter was increased from 30mm to 50mm at a relative density of 70%. For the encased pile, maximum increase in the percentage ultimate pullout load was obtained for pile diameter of 30mm and it was about of 13.2%.

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