

STRESS VARIATION DURING INSTALLATION OF MONO-HELIX HELICAL PILE

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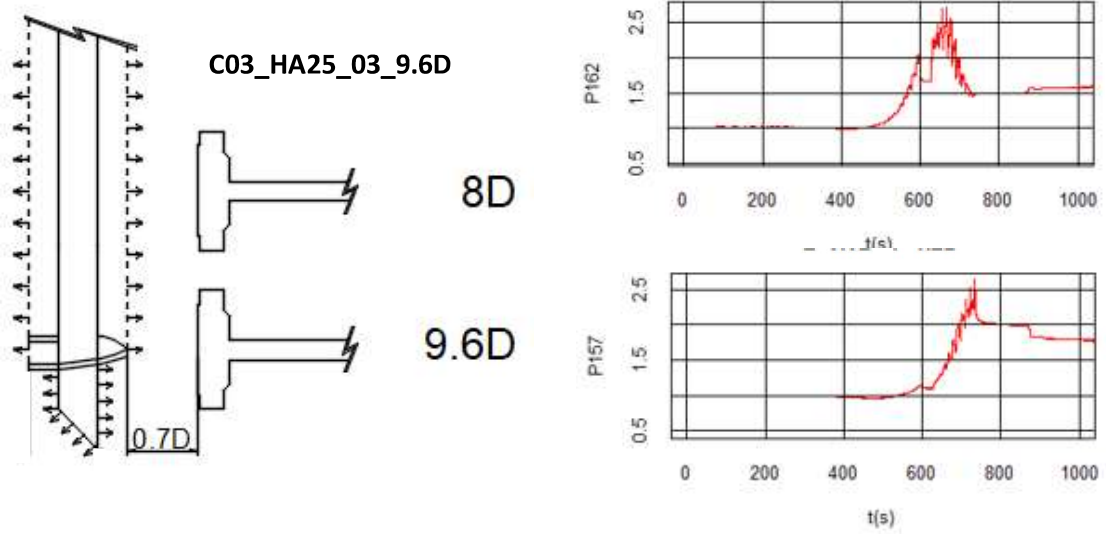
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SUMMARY: When a mono-helix helical pile is installed in a dense sand, the progressive screwing of the pile generates displacement of the sand grains. A cylindrical volume of sand is remoulded above the helix, as it has been shown previously¹.

A series of centrifuge tests has been performed in saturated sand in order to study the behaviour of helical pile. In the vicinity of mono helix piles, stress and pore pressure sensors have been pre-installed in order to follow the variation of stresses during the installation, the monotonic loading and the cyclic loading.

During the installation, performed at an angular velocity of 5.3 RPM, on an helix of $D = 25$ mm of diameter and with a pitch of 7 mm, the remoulding process generates dilatancy, and so an increase of the horizontal stresses.

The results show that the stress field is modified both vertically and horizontally during the phases of installation. On the figure below, the total stresses, measured with Kyowa sensors located at an horizontal distance of $0.7 D$ from the disturbed cylinder of soil, and at depth respectively of $8 D$ and $9.6 D$, are presented as normalised by the initial stress. It is shown that the horizontal stress is increased by about 2.5, and maintained at least at a ratio of 1.5, even after the helix has moved deeper.



REFERENCES

1. Schiavon J.A., Tsuha C.H.C., Thorel L. 2016. Scale effect in centrifuge tests of helical anchors in sand. *Int. J. Physical Modelling in Geotechnics* ISSN 1346-213X <http://dx.doi.org/10.1680/jphmg.15.00047>