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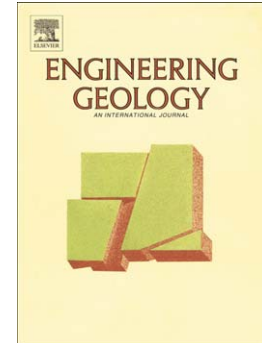
Deterministic and reliability assessment of basal heave stability for braced excavations with jet grout base slab

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## Deterministic and reliability assessment of basal heave stability for braced excavations with jet grout base slab

A. T. C. Goh<sup>1</sup>

**Abstract:** For braced excavations in deep deposits of soft clays, it is common to construct a jet grout slab (JGP) beneath the excavation in order to restrain the wall deformation, reduce the forces acting on the struts and to increase the basal heave factor of safety. In this paper, finite element analyses were carried out to assess the basal heave factor of safety for excavations in soft clays supported by JGP. The finite element analyses indicate that the interface friction between the jet grout slab and the wall is a key component contributing to the resistance of the excavation system to basal heave failure. Comparison of the factor of safety from the finite element analyses with limit equilibrium predictions based on the slip circle method and the modified Terzaghi method were then performed. Since the conventional factor of safety approach does not explicitly reflect the uncertainties of the soil and JGP properties, and the excavation geometry on the excavation system performance, a series of reliability analyses were also carried out to assess the basal heave factor of safety for excavations supported by JGP. The provided spreadsheet template can be used to estimate the probability of basal heave failure for deep excavations supported by jet grout slabs.

**KEY WORDS:** basal heave; braced excavation; clay; factor of safety; jet grout pile; structural reliability.

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