

混凝土-膠結不良砂岩界面 於固定正向勁度下之直剪行為

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中文摘要

軟弱岩石與傳統上之硬岩、土壤的性質不同，因此影響軟岩邊坡破壞的機制與工程行為亦不相同。欲於此類地層內構築結構基礎或進行邊坡整治，若以樁基礎加以處理，主要基於土壤力學理論，根據軟岩單壓強度與界面粗糙度等參數套入經驗公式求得樁身之剪力強度；較大型工程通常也使用現場基樁載重試驗直接求得加載荷重下之應力-應變曲線來驗證其設計之安全性。若能採用固定正向勁度直剪試驗，考慮樁身與軟岩界面勁度的影響，探討岩鎖基樁之剪力行為，將可用於檢討軟岩岩鎖基樁的分析合理性。

本研究以混凝土-膠結不良砂岩界面於固定正向勁度直剪試驗下模擬岩鎖基樁側壁阻抗之剪力行為，探討不同正向勁度、不同初始正向應力與不同界面粗糙度下剪力行為的差異，並由試驗結果估計現地岩鎖基樁側壁阻抗剪力強度。實驗結果顯示，正向勁度及初始正向應力影響混凝土-膠結不良砂岩界面的抗剪行為甚大，而粗糙度的影響則較不明顯。經由實驗結果及由多功能孔內實驗所得的E值推估的現地岩鎖基樁界面抗剪強度比較得，本研究所採用的膠結不良砂岩其混凝土-膠結不良砂岩界面抗剪強度折減係數(α)約為 0.18。

關鍵詞：軟岩，正向勁度，直剪，界面

The Mechanical Behavior of Concrete-Poorly Cemented Sandstone Interface under Constant Normal Stiffness

Direct Shear Test

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Abstract

The mechanical properties of soft rock are distinct those of hard rock or soil, so the failure mechanism of soft rock slope may be different. The existing study of the pile behavior is based on the experience of pile foundation and the theory of soil mechanics with the safety factor according to the uniaxial compressive strength and the interface roughness ; Therefore, for large scale constructions, it is required for the Pile-load test results to get the more reliable pile-rock interaction. To estimate the shear strength of the interface of rock and concrete, it is more appropriate to adopt the results of constant normal stiffness direct shear test and the stiffness between pile shaft and soft rock. Hence, Direct shear test under constant normal stiffness is valuable to perform on the interface of concrete-soft rock.

This thesis aims to investigate the mechanical behavior of Concrete-Poorly Cemented Sandstone Interface by direct shear test under constant normal stiffness. The experimental results show that normal stiffness and initial normal stress strongly influence the behavior. However, the influence of roughness of interface can be neglected in this study.

Keywords : soft rock, normal stiffness, direct shear, interface.