



Experimental Study of Silty Clay Plane Strain Tri-axial Test under RTC Path and Modified Cam-clay Model

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Abstract

The character of geomaterials is affected by stress path remarkably. Under different stress paths, the stress-strain characteristics of geomaterials are difference. For the unloading path in existing engineering situation, the physical parameters and constitutive model is usually determined by loading test. The path to uninstall the actual project conditions which may be a larger error. Therefore, this work proceeding from the actual project, deep excavation of the lateral unloading condition is analysed. The tests of CTC path and RTC path on silty clay in Huangshi city of china by multi-path tri-axial plane strain are carried on in the geotechnical Engineering Laboratory of Huangshi Institute of Technology. Then, the phenomenon under the two stress paths are compared with each other and describing the differences between them. The mechanical properties in the RTC stress path is analyzed mainly. Based on the Cam-Clay model framework, then derived this material yield equation based on Cam-clay model, Laiding the foundation for the numerical analysis.

Keywords: Silty Clay; RTC Stress Path; Plane Strain Test; Modified Cam-Clay Model.

1. Introduction

Soil is a complex material, its properties depends not only on the nature of the current stress state, but also the soil type, stress history and follow-up on the loading direction. Lamber [1, 2] put forward the stress path method of soil, which provide a reasonable method for the study on strength and deformation characteristics of soil under different loading conditions. In recent years, since the concept of stress path has been proposed, researchers have begun to consider the influence of stress path in soil analysis. In recent years, Qin et al. [3] use large-scale tri-axial testing machine, the silk mica schist coarse aggregate for consolidation under constant confining pressure, drainage and consolidation undrained tri-axial test and consolidation test under conventional loading stress path (Increasing P stress path). Zhao et al. [4] use GCTS hollow cylindrical torsional shear apparatus such as the first marine sedimentary soft soil in Binhai new area of Tianjin was carried out under unloading stress path tri-axial test, such as increasing P, reducing P stress path soils samples of stress and strain, pore water pressure and effective stress path, strain rate and other characteristics. Li [5] use GDS tri-axial apparatus to five types of stress path tri-axial tests were conducted on K₀-consolidated Wenzhou saturated soft clay under undrained conditions, analysis of different stress - strain relationship of soil mass under the stress path, the path of development of pore pressure and effective stress. These research results show that stress path has a significant influence on the stress and strain relationship of geotechnical materials [19-23].

The change of stress field of soil in the pit caused by unloading pit excavation depends on the location, different

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