

## 苏州软弱敏感层的土体微观结构定量分析

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## EXPERIMENTAL AND DIGITAL IMAGE STUDY ON MICRO-STRUCTURE OF SOFT SOIL IN STRENGTH-SENSITIVE STRATA IN SUZHOU CITY

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- 摘要
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**摘要** 本文结合苏州城市地质调查工作,综合考虑沉积时代、成因类型、沉积环境及土性特征等要素,对东部堆积平原区进行了工程地质层组划分,并对城市地质体的关键持力层组和软弱敏感层进行了判识。采用自由活塞薄壁取样器和冷冻折断-黏贴法,制作了用于微观结构分析的土样。基于扫描电镜图像的处理分析,对苏州软弱敏感层的软土微观尺度结构特征进行了对比研究,得到了原状土天然状态下的微观结构类型,颗粒排列的定向特征,颗粒偏心率,定向概率熵等量化指标。研究表明:苏州软弱敏感层的颗粒长轴与水平x轴的夹角分布区间较为集中,土体的各向异性程度相对较低;滨浅海相沉积环境以及晚第四纪以来海侵、海退的水动力作用导致⑦层软土的定向概率熵和颗粒偏心率在(0.6, 1.0)区间内的分布概率值较高。上述工作为深入理解其基本工程性质,建立土体沉积环境、微观结构与宏观工程特性的联系提供了重要的试验依据。

**关键词:** 软弱敏感层 数字图像 微观结构 工程特性

**Abstract:** This paper takes into full account of the sedimentary age and environment, soil-type and characteristics and other factors from the geological survey in Suzhou City. It then divides the engineering geological strata groups of soil mass on the eastern plains area. It further identifies the key bearing strata group and weak-sensitive strata. A free piston thin wall sampler and frozen snapping-paste method are used to obtain undisturbed specimens for micro-structure analysis. It uses the analysis of digital images by Scanning Electron Microscope. The comparative studies on the micro-structure properties are carried out to analyze the microstructure type classification under undisturbed natural state, particles' orientation characteristics, eccentricity, orientation probability entropy and other quantitative indicators. that the following results are found. The angle distribution range between the x-axis and the horizontal long axis was relatively concentrated for particles, which means that the degree of anisotropy is relatively low. In addition, shallow marine depositional environments, as well as the transgressive and regressive hydrodynamic effects from Late Quaternary could make the seventh soft layer's distribution probability of eccentricity in(0.6, 1.0) and the orientation probability entropy relatively high. These results are useful to better understand the basic engineering properties of the soft soil in Suzhou city, and to providing important experimental data for establishing the relationship among the sedimentary environment, micro-structure and macro-engineering properties of soils.

**Key words:** Weak-sensitive strata Digital images Micro-structure Engineering property Soft soil

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