原状Q2黄土三轴剪切特性

方祥位1，陈正汉1，申春妮1，王和文1，刘厚健2

(1. 后勤工程学院 建筑工程系，重庆 400041；2. 西北电力设计院，西安 陕西 710032)

摘要　　探讨陕西蒲城电厂原状Q2黄土的变形、强度和屈服特性，并研究吸力对非饱和原状Q2黄土性质的影响。共进行2种12个原状Q2黄土试样的三轴剪切试验，即控制吸力和净围压为常数的非饱和土三轴排水剪切试验与控制初始含水量和围压为常数的三轴剪切试验。研究结果表明，非饱和原状Q2黄土控制吸力为100，300，450 kPa的试验试样呈塑性破坏，而控制初始含水量为4.78%和7.64%的试验试样则呈脆性破坏。原状Q2黄土随着吸力降低(或含水量增大)和固结围压的增大，应力－应变曲线由软化型逐渐向理想塑性及硬化型发展。在试验给出的吸力范围(100～450 kPa)内，非饱和原状Q2黄土的黏聚力随吸力线性增加，而内摩擦角随吸力的变化很小，基本上可以认为是一常数。建议一种确定原状Q2黄土三轴剪切条件下屈服应力的方法，得到的屈服净平均应力和屈服偏应力随吸力增大而增大；同一吸力或含水量下屈服偏应力和屈服净平均应力则呈线性关系。

关键词　　土力学；Q2黄土；三轴剪切；吸力；强度；屈服

分类号

TRIAXIAL SHEAR PROPERTIES OF UNDISTURBED LOESS Q2

FANG Xiangwei1，CHEN Zhenghan1，SHEN Chunni1，WANG Hewen1，LIU Houjian2

(1. Department of Architectural Engineering，Logistical Engineering University of PLA，Chongqing 400041，China；
2. Northwest Electric Power Design Institute，Xi¢an，Shaanxi 710032，China)

Abstract

  A series of triaxial shear tests with controlled suction and net constant confining pressure and the tests with controlled water content and constant confining pressure were conducted to study the effects of deformation，strength and yield properties of unsaturated undisturbed loess Q2 with suctions or initial water contents. The test results show that the failure model of unsaturated undisturbed loess Q2 with controlled suctions equaling 100，300 and 450 kPa is shown with plastic failure；but the failure model of unsaturated undisturbed loess Q2 with controlled initial water contents equaling 4.78% and 7.64%，respectively，is displayed with brittle failure. The stress-strain curves of undisturbed loess Q2 will change from strain softening to strain hardening with the decrease of suction(or the increase of water content) and the increase of consolidation cell pressure. The cohesion of unsaturated undisturbed loess Q2 has a linear increase with the increase of suction within research suction range(100–450 kPa)，but the friction angle is found to have little change with the change of suction. A new method to identify the field stress of undisturbed loess Q2 under triaxial shear condition is suggested. The net mean yield stress and deviatoric yield stress both increase with suction，where the deviatoric yield stress has a linear increase with net mean yield stress under the same suction or water content.

Key words　soil mechanics；loess Q2；triaxial shear；suction；strength；yield

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