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巴东组非饱和红土强度与变形特性试验研究

祝艳波, 余宏明, 高建伟, 钱玉智

中国地质大学工程学院 武汉 430074

EXPERIMENTAL STUDY ON DEFORMATION AND STRENGTH CHARACTERISTICS OF BADONG UNSATURATED RED CLAY

ZHU Yanbo, YU Hongming, GAO Jianwei, QIAN Yuzhi

Faculty of Engineering, China University of Geosciences, Wuhan 430074

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全文: PDF (2176 KB) HTML (KB) 输出: BibTeX | EndNote (RIS) 背景资料

摘要 宜昌-巴东段高速公路修建中形成了大量的路堑边坡,上覆为巴东组红层残坡积红土。降雨条件下,土体强度急剧下降,导致大量路堑边坡失稳。目前针对巴东组残坡积红土强度与变形特性开展非饱和试验的研究较少,为探索基质吸力对红土强度的影响,对红土进行了土水特征曲线、三轴强度试验,采用GDS三轴系统对红土进行了饱和及非饱和剪切试验,非饱和三轴试验采用了常含水量试验方法。结果表明:基质吸力对巴东红土强度影响很大。土体强度随吸力增大而呈非线性增长; 而基质吸力随着含水量增大而减小,即巴东组非饱和红土强度特性随土体含水量增大而变差。最后拟合出巴东非饱和红土的经验抗剪强度公式。研究成果对该区域工程实践具有一定的参考意义。

关键词: 巴东红土 基质吸力 GDS三轴仪 三轴试验 变形 非饱和土强度

Abstract: Lots of cutting slopes were developed in building along the highway from Yichang to Badong, where the ground was covered by the residual unsaturated red clay. The soil strength fell sharply under rainfall, which caused a large number of cutting slopes to lose stability. Currently there was little experimental study in strength and deformation characteristics of Badong unsaturated red clay. To investigate the effect of matrix suction to the shear strength of red clay, the soil-water characteristic curve and triaxial strength test of the red soil were conducted. The triaxial shear test was conducted by using GDS triaxial system with double pressure chamber. The results show that the matrix suction has a major influence on soil strength. When the matrix suction is controlled, the soil strength has a nonlinear growth with the matrix suction increasing; the matrix suction gets lower as the soil water content increases. That's to say, the strength characteristics of Badong unsaturated red clay can get worse with soil water content increasing. Finally, the shear strength formula of Badong unsaturated red clay was fitted. The research results can be used for engineering practice in this region.

Key words: Badong unsaturated red clay Matrix suction GDS triaxial system Triaxial test Deformation Strength of unsaturated soil

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通讯作者: 余宏明,主要从事地质灾害分析与防治及岩土工程领域的教学与科研工作

作者简介: 祝艳波,主要从事岩土体的工程稳定性及地质灾害防治研究.Email:342948684@qq.com

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地址：北京9825信箱 邮政编码：100029

电话：010－82998121 ，82998124 传真：010－82998121 Email：gcdz@mail.igcas.ac.cn