

水泥搅拌法改良桂林红黏土力学性质试验研究

刘宝臣, 李翠娟, 潘宗源, 张炳晖

桂林理工大学土木与建筑工程学院 桂林 541004

LABORATORY TEST FOR MECHANICAL PROPERTIES OF GUILIN RED CLAY MIXED WITH CEMENT

LIU Baochen, LI Cuijuan, PAN Zongyuan, ZHANG Binghui

Department of Civil Engineering, Guilin Institute of Technology, Guilin 541004

- 摘要
- 参考文献
- 相关文章

全文: PDF (1879 KB) HTML (KB) 输出: BibTeX | EndNote (RIS) 背景资料

摘要 桂林地区分布的由碳酸盐系出露区的石灰岩经过红土化作用而成的高塑限的红黏土,孔隙比较大、含水量高,而其结构性强且存在上硬下软的成层分布特征,上部红黏土为坚硬-硬塑状态,承载力高,下部红黏土为软塑、流塑状态,为地基软弱下卧层,需进行处理。采用水泥搅拌法对桂林软弱红黏土无侧限抗压强度、抗剪强度、抗拉强度与水泥掺入比、龄期的关系等主要力学性质进行室内试验研究,得出外掺剂对无侧限抗压强度的影响以及无侧限抗压强度、抗拉强度与抗剪强度的关系。结果表明:运用水泥搅拌法对桂林地区软弱红黏土层主要力学性能的无侧限抗压强度与水泥掺入比、龄期之间以及含外掺剂和不含外掺剂水泥红黏土无侧限抗压强度之间存在较好的相关性;黏聚力、抗拉强度随水泥掺入比、龄期增大而增大;无侧限抗压强度、抗拉强度与黏聚力存在相关性。

关键词: 软弱红黏土 加固参数 强度 水泥搅拌法 桂林

Abstract: The exposed carbonate limestone area at Guilin has red clay of high plastic limit. The clay was formed by laterization from limestone. Its pores are large and have high water contents. It has the character of strong two layer structure. The upper layer is hard and the lower layer is soft. The upper clay has the rigid and hard plastic condition and high bearing capacity. The lower clay is soft plastic, has flowing plastic condition and weak bearing capacity. It needs treatment. This paper uses the soil-cement mixing method to treat the soft red clay. Laboratory tests are done on the mechanical properties of the cemented soils. The test results include the deformation character and strength of the cemented clays taking into account the effects of cement-soil ratio and age.

Key words: Soft red clay Stabilizing parameters Strength Cement mixing method Guilin

收稿日期: 2011-10-28;

基金资助:

广西自然科学基金重点项目(2010GXNSFD013011)

作者简介: 刘宝臣,主要从事土木工程测试、教学及科学研究工作. Email: bc0608@163.com

引用本文:

. 水泥搅拌法改良桂林红黏土力学性质试验研究[J]. 工程地质学报, 2012, 20(4): 633-638.

. LABORATORY TEST FOR MECHANICAL PROPERTIES OF GUILIN RED CLAY MIXED WITH CEMENT[J]. Journal of Engineering Geology, 2012, 20(4): 633-638.

[1] 王英辉, 聂庆科, 张全秀, 等. 广西靖西红黏土的变形和强度特性研究[J]. 工程地质学报, 2009, 17 (4): 550~556. 浏览

Wang Yinghui, Nie Qingke, Zhang Quanxiu, et al. Deformation and shear strength of laterite clays in Jingxi, Guangxi province. Journal of Engineering Geology, 2009, 17 (4): 550~556. 浏览

[2] 黄辉. 红黏土无侧限抗压强度试验影响因素研究[J]. 湖南工业大学学报, 2010, 24 (4): 22~26.

Huang Hui. Study on influencing factors of unconfined compressive strength of red clay. Journal of Hunan University of Technology, 2010 (4): 22~26.

[3] 邹飞, 夏怡. 红黏土平面裂纹扩展的分形特征[J]. 人民长江, 2011, 42 (15): 58~62.

服务

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ E-mail Alert
- ▶ RSS

作者相关文章

- Zou Fei,Xia Yi.Fractal characteristics of plane crack propagation of red clay.Yangtze River, 2011, 42 (15): 58~62.
- [4] 赵颖文,孔令伟,郭爱国,等.典型红黏土与膨胀土的对比试验研究[J].岩石力学与工程学报,2004,23(15):2593~2598.
Zhao Yingwen,Kong Lingwei,Guo Aiguo,et al.Comparative laboratory study on typical red clay and expansive soil.Chinese Journal of Rock Mechanics and Engineering, 2004, 23 (15): 2593~2598.
- [5] 杨松,卢廷浩.非饱和和红黏土的不排气、不排水三轴剪切试验研究[J].岩土力学,2011,32(增1):356~359.
- [6] Yang Song,Lu Tinghao.Research on unventilated-undrained triaxial shear test of red cohesive soil.Rock and Soil Mechanics, 2011, 32 (S) 356~359.
- [7] 唐益群,余恬钰,张晓晖,杨坪,王建秀.贵州石漠化地区降雨条件下红黏土剪切强度特性随含水量变化关系探讨[J].工程地质学报,2009,17(2):249~252. 浏览
Tang Yiqun,She Tianyu,Zhang Xiaohui,Yang Ping,Wang Jianxiu.Changing of red clay shear strength with water content under rainfall in karst rocky desertification areas,Guizhou province.Journal of Engineering Geology, 2009, 17 (2): 249~252. 浏览
- [8] 李培勇,杨庆,栾茂田,等.非饱和膨胀土裂隙开展深度影响因素研究[J].岩石力学与工程学报,2008,27(增1):2967~2972.
- [9] Li Peiyong,Yang Qing,Luan Maotian,et al.Research on influential factors of crack propagation depth of unsaturated expansive soils.Chinese Journal of Rock Mechanics and Engineering, 2008, 27 (S.1): 2967~2972.
- [10] 陈开圣,胡鑫.高液限红黏土变形特性研究[J].公路交通科技,2010,27(3):49~58.
Chen Kaisheng,Hu Xin.Study of deformation characteristic for high liquid limit red clay.Journal of Highway and Transportation Research & Development, 2010, 27 (3): 49~58.
- [11] 张麒麟.高液限红黏土路基修筑技术探讨[J].水利与建筑工程学报,2007,5(7):83~85.
Zhang Qizhe.Discussion on construction techniques of red clay subgrade with high liquid limit.Journal of Water Resources and Architectural Engineering, 2007, 5 (7): 83~85.
- [12] 周丽萍,申向东,李学斌,等.天然浮石粉水泥土力学性质的试验研究[J].吉林大学学报(地球科学版),2009,39(3):492~497.
Zhou Liping,Shen Xiangdong,Li Xuebin,et al.Experiment study of mechanical properties of natural pumice powder cement-soil.Journal of Jilin University(Earth Science Edition), 2009, 39 (3): 492~497.
- [13] 王珊珊,卢成原,孟凡丽.水泥土抗剪强度试验研究[J].浙江工业大学学报,2008,36(4):456~460.
Wang Shanshan,Lu Chengyuan,Meng Fanli.An experimental study of shear strength of cement soil.Journal of Zhejiang University of Technology, 2008, 36 (4): 456~460.
- [14] 马军庆,王有熙,李红梅,等.水泥土参数的估算[J].建筑科学,2009,25(3):65~67.
Ma Junqing,Wang Youxi,Li Hongmei,et al.Study on the relations of cement-soil parameters with compressive strength.Building Science, 2009, 25 (3): 65~67.
- [15] 肖武权,冷伍明,律文田.深层搅拌法加固软弱土层的室内实验研究[J].中南大学学报(自然科学版),2004,35(3):490~494.
Xiao Wuquan,Leng Wuming,Lv Wentian. Laboratory test for treatment of the poor soil using deep mixing method.Journal of Central South University(Science and Technology), 2004, 35 (3): 490~494.
- [16] 刘宝臣,牟春梅.有机质污染红黏土地基加固效果的力学效应分析[J].工业建筑,2010,40(2):128~131.
Liu Baochen,Mu Chunmei.Study on mechanical effect of red clay polluted by organic matter during strengthening foundation.Industrial Construction, 2010, 40 (2): 128~131.
- [1] 张清照,沈明荣,丁文其.结构面的剪切蠕变特性研究[J].工程地质学报,2012,20(4):564-569.
- [2] 范礼彬,章定文,邓永锋,刘松玉.氯盐对水泥固化土应力应变特性影响分析[J].工程地质学报,2012,20(4):621-626.
- [3] 唐良琴,聂德新,刘东燕,余先华.软弱夹层强度参数的主要影响因素分析[J].工程地质学报,2012,(2):289-295.
- [4] 丁树云,毕庆涛.地震强度对堆石坝变形的影响[J].工程地质学报,2012,20(1):30-36.
- [5] 闫亚景,文宝萍,计博勋.基质吸力对非饱和重塑黄土抗剪强度的贡献[J].工程地质学报,2011,19(6):865-874.
- [6] 李国权,闫长斌,齐菊梅,秦建甫.南水北调西线工程板岩强度的各向异性特征[J].工程地质学报,2011,19(6):917-921.