

报告题目： 中国中部三峡库区附近一组厚层泥质灰岩的深度风化

报告人： 祁生文，常中华

报告人单位： 中国科学院地质与地球物理研究所，北京

摘要： 定量表征风化岩石的性质，不仅是岩石力学和地质工程领域中的一项基础工作，同时对于山区工程安全建设具有重要指导意义。已有文献中，关于风化泥质灰岩及其化学和力学性质的报道较为少见。我们对长江三峡库区奉节新县城近 20 年开发过程中发现的一组高度风化厚泥质灰岩进行了案例研究，发现边坡越陡峭，高度风化岩石的厚度越小，同时高度风化的泥质灰岩较高度风化的泥岩厚得多。厚层泥质灰岩在开挖暴露后，极易快速分解成土，从而丧失强度。这是造成新县城开发过程中边坡失稳、地面沉降及地面塌陷等现象的主要原因。泥质灰岩中节理普遍发育，且贯通性较好，加深了化学风化的作用。考虑未发现的高度风化泥质灰岩可能诱发地质灾害，在新城镇开发过程中，应采取相应的经济或环境措施预防或减轻化学风化作用。本研究提供了化学风化作用下风化泥质灰岩发生化学成分和力学性质变化的实测数据，建立了碳酸钙含量与其单轴抗压强度和变形模量的量化经验关系，可以为风化泥质石灰岩分布地区的工程建设提供数据和参考。

Deep Weathering of a Group of Thick Argillaceous Limestone Rocks near Three Gorges Reservoir, Central China

QI Sheng Wen, CHANG Zhong Hua

Key Laboratory of Shale Gas and Geoengineering, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing

Abstract: Rock mass characterization is one of the most basic and important tasks in rock mechanics and engineering. Literature review indicates that although there are many publications on weathered rocks, few reports are available on weathered argillaceous limestone rocks and their chemical and mechanical properties. This paper presents a case study of characterizing a group of highly weathered thick argillaceous limestone rocks. Most importantly, they can be easily and quickly decomposed into soils after they are exposed due to excavation. Consequently, they would substantially lose their mechanical strengths. Geohazards such as landslides and sinkholes could occur in uncovered highly weathered argillaceous limestone rocks. The problematic weathered rocks were found during the development of a new town in upper mountains above the Three Gorges Reservoir on Yangtze River in Central China in the past 20 years. The factual data are presented on the changes of chemical compositions and mechanical properties of the weathered argillaceous limestone rocks due to chemical weathering. Some empirical correlations are given to quantify the changes in their uniaxial compressive strength and deformation moduli in terms of their contents of calcium carbonate. The data and findings presented in the paper can be useful to future urban development in geologically poor mountainous environments occupied by highly weathered argillaceous limestone rocks in the world.