基于三维形态空间分析和仿真试验的岩体结构面剪切强度参数研究

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RESEARCH ON SHEAR STRENGTH PARAMETERS OF STRUCTURAL PLANES IN ROCK MASS BASED ON THREE-DIMENSIONAL MORPHOLOGY SPATIAL ANALYSIS AND SIMULATION TESTS

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摘要 获取结构面可靠的强度指标是研究岩体强度的重要基础。因不同结构面样本的巨大差异，以及剪切测试难以重复进行的实际情况，直接通过试验获取剪切参数通常难度较大且结果不理想。以具有定向变形特征的岩体剪切结构面为研究对象，探索性提出采用结构面剪切测试－结构面表面形态三维空间分析－数值仿真试验相结合方法，获取真实可靠的结构面强度参数。该方法优势表现为：岩体结构面摩擦角的2个组成部分即基本摩擦角和爬坡角完全分离，且能考虑结构面形态三维特性及剪切变形方向特征；同时，力学测试和数值试验结合，克服了单纯依靠剪切测试无法重复的重大难题。

关键词： 岩石力学   岩体结构面   剪切强度参数   结构面剪切测试   三维空间分析   数值试验

Abstract： How to obtain the actual and reliable shear strength parameters of rock structural plane is the essential precondition for studying the strength of whole rock mass. The characteristics of one structural plane sample are quite different from those of another structural plane；and the mechanical tests also can?t be repeated easily. So it is very hard to obtain the reliable shear strength parameters only by mechanical test directly，or the test results are not available. Taking the rock structural plane samples with oriented deformation character for objective，a new method，which combines shear tests on rock structural planes，three-dimensional spatial analysis of rock discontinuities morphology and numerical simulation，was put forward. It was proved to be effective in obtaining actual and reliable shear strength parameters of structural plane. The advantages of this method can be described as follows：For rock structural plane，the two parts of friction angle，i.e. basic friction angle and climbing angle，can be separated completely；and three-dimensional morphology characteristic and shear deformation direction can be considered. Meanwhile，the combination of mechanical test and numerical test can solve the question that the shear mechanical test can?t be repeated.

Keywords： rock mechanics   structural planes in rock mass   shear strength parameters   shear test for structural plane   three-dimensional spatial analysis   numerical test

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