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论文

泥岩损伤特性试验研究

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摘要：

以南京长江三桥地基中的泥岩为对象,对泥岩进行三轴试验。试验结果表明：随着侧压的增大,破坏荷载增大,塑性变形明显增大,岩石破坏后,残余强度随侧压增大而提高。在此基础上研究分析了泥岩微元强度服从Weibull分布,泥岩微元体破坏服从莫尔-库仑岩石强度判据时的损伤软化参数与围压的关系特征。结合岩石破裂过程应力 应变全过程曲线,讨论了初始损伤特性,分析结果表明：泥岩初始损伤时的主应力差对数随围压增大而增大,两者呈线性关系；分析了泥岩损伤变量随主应力差变化关系,结果表明泥岩损伤变量与主应力差呈双曲线数学关系,通过对双曲线模型作线性化处理,结合试验数据采用回归分析法确定模型参数,分析结果发现 F_0 随围压的增大而增大,而 m 则随压的增大而减小,反映泥岩随围压的增大,脆性度降低。

关键词： 泥岩〓损伤特性〓试验研究

TRIAXIAL TESTING STUDY ON DAMAGE CHARACTERISTICS OF MUDSTONE

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Abstract:

This paper presents the triaxial test results of mudstone from the foundation of the Nanjing third bridge on Yangtse River. It is found that the failure pressure,the plastic deformation and the residual strength of the mudstone after subversion increase as the confining pressure increases. Then,it studies and analyses the relation between the damage soften parameters and the confining pressure,when the strength of rock s micro—unit is of the Weibull distribution and the strength of rock s micro—unit conformed to the Mohr Coulomb strength criterion. Connecting with the stress strain full procedure curves,the initial damage characteristic is discussed. The results indicate that the relation of logarithm of pressure and confining pressure of initial damage is linear. By studying on the relation between damage variable and main stress,it is found the relation of damage variable and main stress submits to a hyperbola model. The hyperbola model can be transformed into a linear equation. So the model parameters can be gotten by regressive analysis based on the test results. The results indicate ‘ F_0 ’ increases as the confining pressure increases,but ‘ m ’ declines,which reflects the brittleness tolerance of the mudstone declines as the confining pressure increases.

Keywords: Mudstone,Damage characteristic,Triaxial test,Rock mechanics

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