

煤样三轴压缩下变形和强度分析

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摘要 基于在伺服试验机对煤样的常规三轴压缩和三轴卸围压试验, 分析了煤样在不同应力条件下的强度和变形特征。煤样在围压作用下裂隙闭合后利用摩擦仍可以承载, 并且所有煤样峰前变形特性基本一致。三轴卸围压试验峰值处出现屈服平台, 与常规三轴相比峰后塑性明显增强, 煤样破坏时的轴向应变受常规三轴压缩全程应力-应变曲线控制。常规三轴压缩和三轴卸围压试验的峰值强度与围压均成线性关系, 围压影响系数基本相同, 内摩擦角能够表征材料力学性质, 与加载方式没有关系, 但相同围压下三轴卸围压时试样的承载能力比常规三轴加载时明显偏低, 表明煤样经历较高轴向载荷作用后存在局部损伤。

关键词 [岩石力学](#); [三轴压缩试验](#); [卸围压](#); [变形](#); [强度准则](#)

分类号

STUDY ON DEFORMATION AND STRENGTH OF COAL SAMPLES IN TRIAXIAL COMPRESSION

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Abstract

The pseudo-triaxial compression tests and confining pressure reduction tests were carried out for coal specimen strengths in different stress on servo-controlled testing machine. Under the action of confining pressure, coal specimens with fissures closed can bear the weight through fissure friction. The deformation properties of coal specimens before peak stress are basically similar. Yield terraces in the peak of the stress-strain curve of coal specimens occurred in confining pressure reduction tests, and the post-peak plastic properties are more enhanced than that in pseudo-triaxial compression tests. Axial deformation value while coal specimens damaged are dominated by their pseudo-triaxial compression stress-strain curves. The strengths of coal specimen under pseudo-triaxial compression and confining pressure reduction tests are both linear relation with their confining pressure, and the confining pressure influence coefficients are basically the same. The internal friction angle of coal specimens having no relation with loaded type can be used to represent mechanic property of material. The compression strengths of coal specimens in confining pressure reduction tests are lower than those in pseudo-triaxial compression tests at the same confining compression. The reason is that coal specimens have inner damage under the action of higher-axial compression.

Key words [rock mechanics](#); [triaxial compression test](#); [confining pressure reduction](#); [deformation](#); [strength criterion](#)

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