

论文

无烟煤在冲击载荷下破坏模式与强度特性

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摘要:

大直径单轴分离式霍普金森压杆试验表明:无烟煤在冲击载荷作用下,存在一个门槛速度4.3 m/s。这个门槛值为提高无烟煤块率,进行生产系统、储运系统改造优化等方面提供了可参考数量依据。根据试验曲线的特征,无烟煤具有显著的应变软化和应变硬化特征,初始弹性模量、屈服强度与极限强度都随着应变率的增加而提高,屈服强度最为显著。无烟煤在冲击载荷作用下破坏分为4种类型:压剪破坏、拉应力破坏、张应变破坏和卸载破坏,并以拉应力破坏、张应变破坏和卸载破坏为主要破坏形式。

关键词: 岩石动力学;无烟煤;SHPB装置;强度特性;破坏模式

Failure pattern and strength properties of anthracite under impact loading

Abstract:

The experiments performed on split Hopkinson pressure bar (SHPB) with a large diameter show that the anthracite has a threshold speed 4.3 m/s under impact loading. The threshold value provided the number basis of reference in order to improve anthracite coal lump ratio, and reform the optimization of production system and storage transportation system. Based on the characteristics of measured dynamic curves, anthracite is of distinct plastic yield and strengthen properties, and the initial elastic modulus, yield strength, as well as the ultimate strength go up with strain rate; but there is the best correlation between yield strength and the strain rate. Anthracite failure under impact loading is classified into four patterns: compress shearing damage, tensile stress damage, extensible strain damage and unloading damage, among them, tensile stress destruction, tensile strain damage and uninstal damage are the main destroy forms.

Keywords: rock dynamics; anthracite; SHPB device; strength property; failure pattern

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