

静态和动态载荷作用下岩石劈裂破坏模式的数值模拟

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摘要 简单介绍了岩石破裂过程分析程序模拟岩石在动载荷作用下破裂过程的原理和功能, 并用该程序研究岩石试样在静态和动态载荷作用下的劈裂破坏过程。数值模拟再现了岩石在静态和动态应力作用下破裂模式的差异, 给出了在不同冲击应力波幅值条件下岩石试样的3种典型的破裂模式。数值模拟表明, 在动态加载时, 应力波幅值较低时试样表现出与静态加载时类似的破裂模式, 随着应力波幅值的增加, 其他2种典型破裂模式就表现出来。

关键词 [岩石力学](#); [数值模拟](#); [破裂过程](#); [动态载荷](#)

分类号

NUMERICAL SIMULATION ON SPLITTING FAILURE MODE OF ROCK UNDER STATIC AND DYNAMIC LOADINGS

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Abstract

The program, rock failure process analysis(RFPA), is developed and the principle of RFPA to simulate the static and dynamic failures of rock are briefly summarized. RFPA is used to study the failure process of rock specimens under static and dynamic loadings. The numerical simulation reproduces the different failure characteristics of rock under static and dynamic loadings, and three typical failure patterns are found under the action of stress wave with different amplitudes. Numerical results indicate that the failure pattern is similar to those under static loading when the amplitude of stress wave is relatively low. With increment of amplitude of stress wave, the other two different failure patterns are also achieved. By contrast to static loading condition, more cracks initiate and propagate under dynamic loading, which cause the damage and fracture of whole rock specimen.

Key words [rock mechanics](#); [numerical simulation](#); [failure process](#); [dynamic loading](#)

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