

二维应力场作用下岩体弹性波速与衰减特性研究

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摘要 基于岩体在二维应力场作用下的节理变形分析, 运用节理变形对岩体中节理体积率的变化, 建立节理对岩体中弹性波传播影响的等效模型, 从而推导节理岩体在应力场作用下的弹性波传播速度和衰减随应力的变化关系。为检验理论公式的可靠性, 对2组含裂缝的石膏模型进行弹性波测试, 试验测试结果表明, 理论计算结果与试验结果具有较好的一致性。

关键词 [岩石力学](#); [节理岩体](#); [波速](#); [衰减](#)

分类号

STUDY ON WAVE VELOCITY AND ATTENUATION OF ROCK MASS IN 2D STRESSES FIELD

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Abstract

The results of elastic wave velocity from site testing of engineering rock masses indicated that elastic wave propagation velocity was influenced by stresses field. In order to study the stresses influence to velocity and attenuation of rock masses, the wave velocity and attenuation properties of rock masses in 2D stresses field were theoretically researched; and the theoretical relationships between elastic wave velocity and attenuation and stresses in jointed rock mass suffering 2D stresses field were proposed. At first, based on the deformation analysis of joints in rock mass under 2D loading, the volume changes of jointed rock mass was derived. Then according to the relationship between wave velocity and volume changes of jointed rock masses, an equivalent model analyzing the propagation of elastic wave in jointed rock mass was developed. The calculating formula of elastic wave velocity and attenuation of rock masses in 2D stresses field were proposed by using the equivalent analyzing model of the elastic wave propagation in jointed rock masses. In order to check the theoretical model and calculating formulae, an experimental research was performed on the samples of gypsum include cracks in the laboratory. The experimental results show that the elastic wave velocity and attenuation change distinctly with stresses in jointed rock mass in 2D uniform stresses field; and the testing results agree well with the theoretical model prediction.

Key words [rock mechanics](#); [jointed rock mass](#); [wave velocity](#); [attenuation](#)

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