

论文

锚杆初始支护阻力的计算及预测

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摘要:

为了便于计算和预测锚杆支护的初始支护阻力, 基于锚杆及时支护时锚固区围岩处于弹塑性状态的假设, 建立锚杆受力和安装力学模型, 分析研究初始支护阻力与预紧力矩之间的关系, 得出锚杆支护螺母、托盘两种接触类型的初始支护阻力的理论解, 同时采用自制的“锚杆锚固传递及衰减规律”模拟试验台对初始支护阻力进行验证。研究结果表明: 锚杆支护材质、规格及支护间排距相同时, 其初始支护阻力与预紧力矩呈线性关系; 预紧力矩在0~300 N·m时, 初始支护阻力与预紧力矩间有准确的数学表达式, 采用预紧力矩能够量化和预测初始支护阻力。

关键词: 锚杆支护; 支护阻力; 预紧力; 预紧力矩

Calculation and prediction of initial support pressure in bolt support

Abstract:

In order to get and predict initial support pressure, mechanical models of bolt's stress and bolt's installation were established, based on the hypothesis on surrounding rock of immediate bolt support in elastic plastic status. The relationship between initial support pressure and tightening torque was analyzed, and theoretical solutions to initial support pressure were obtained for two contacts of pallet and nut. Meanwhile, verification research was carried out by "Bolt Force Transfer and Attenuating Test System". The results show that there is a linear relationship between initial support pressure and tightening torque under the same condition of bolt's material quality, specification, row & line space; when the tightening torque is among 0-300 N·m, the equations of initial support pressure and tightening torque is right; initial support pressure can be quantized and predicted by tightening torque.

Keywords: bolt support; support pressure; pre tightening force; tightening torque

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