

论文

磁化水降低喷射混凝土粉尘浓度与减少回弹的试验研究

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摘要:

为降低矿山巷道掘进工作面喷射混凝土粉尘浓度、减少喷射混凝土回弹量, 并同时提高其强度, 减轻三者带来的损失和灾害, 采取在混凝土喷射机供水管中直接串入磁水器, 用不同磁感应强度磁化后的磁化水拌制喷射混凝土, 在施工现场进行了磁化水改善喷射混凝土强度的试验、磁化水降低喷射混凝土粉尘浓度试验和磁化水减少喷射混凝土回弹率的试验, 并对磁化水能够提升喷射混凝土强度、降低喷射混凝土粉尘浓度及改善回弹量的作用机理进行了全面分析。研究表明: 与普通水喷射混凝土相比, 用磁化水拌制的喷射混凝土其强度平均提高幅度在10%左右; 磁化水喷射混凝土所产生的粉尘浓度均比普通水喷射混凝土粉尘浓度低50%以上; 磁化水能一定程度地减少喷射混凝土的回弹量, 在磁水器磁感应强度355 mT后效果较为明显。磁化水能有效提高喷射混凝土强度, 降低施工作业时的粉尘浓度, 改善回弹量。

关键词: 磁化水; 喷射混凝土; 粉尘浓度; 回弹量

Experimental investigations on reducing the dust density and the rebound rate of shotcrete by using magnetized water

Abstract:

In order to decrease the dust density and the rebound rate of shotcrete and at the same time to improve its strength and the loss and damage reduced by the three elements in the mining worksite.The shotcrete mixed with magnetized water treated with different magnetic induction intensity by directly strung the magnetic water device into the water supply pipe of concrete sprayer was acquired and the strength test, dust density test and rebound ratio test of the shotcrete were researched in the mining worksite.The researches show that the magnetized water can enhance the strength of shotcrete by 10% or so, and reduce the dust density by 50% in comparison with the ordinary shotcrete, the rebound rate of shotcrete mixed with magnetized water is certainly improved compared with that of ordinary water shotcrete and obviously improved when the magnetic induction intensity of the magnetic water device is over 355 mT.The microstructure of ordinary shotcrete and magnetized water shotcrete with the same mixture ratio were analyzed by scanning through electron microscope.By observing the difference of the microstructure, the mechanism on enhancing strength of magnetized water shotcrete was studied, and emphasis was laid on discussing the principle of magnetized water reducing dust density and rebound rate.

Keywords: Research

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