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ME >> Vol. 1 No. 2 (July 2013)

基于FLUENT的长抽短压强制通风技术数值模拟

Numerical Simulation of the Long Duct Exhaust and Short Duct Forced Ventilation Model Based on Software FLUENT

全文免费下载:(432KB) PP.10-14 DOI: 10.12677/ME.2013.12003

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关键词:

强制通风; 风流组织; 数值模拟; 参数优化; Forced Ventilation Technology; Air Flow Organization;

Numerical Simulation; Parameter Optimization

摘要:

矿山资源的枯竭, 促使老矿山努力在周边或深部探寻新的接替资源, 形成了对长掘进工作面局部强制通风技术的现实需求。本文使用前处理软件GAMBIT建立了长压短抽三维计算模型。本文采用计算流体力学的商业软件FLUENT, 模拟了长掘进工作面长抽短压局部通风方式下的工作面风流组织, 阐述了长抽短压通风方式的内部机制, 分析了经典参数模型下的通风效果。研究表明: 在长抽短压的局部通风方式下, 射流作用域明显大于吸程作用域; 根据经典的有吸射程和有吸吸程参数布置的风筒位置, 不利于掘进工作面污风的快速排出; 巷道中心位置上的速度大小波动较大, 受入口射流和风流出口双重控制; 压风量和抽风量的差值决定了整个掘进巷道内的污风排出时间和空气质量。研究成果可以为长掘进工作面局部强制通风技术参数优化提供理论依据和实践指导。

With resources depletion, part of the old mine efforts to explore the new succeed resources at the peripheral or deeper place. These situations bring about the practical needs of forced ventilation technology of the long distance heading face. Based on the pre-processing software GAMBIT, three-dimensional computational model of the long duct exhaust and short duct forced was set up. By using the commercial CFD software FLUENT, airflow organization of long heading face under the long duct exhaust and short duct forced local ventilation model was simulated. According to this, the paper has elaborated the internal mechanism of the long duct exhaust and short duct forced local ventilation model, and has analyzed the ventilation effect of the classical ventilation parameters model. Studies have shown that: in local forced ventilation mode of the long duct exhaust and short duct forced, the scope of jet was significantly greater than that of exhaust; Duct location layout according to the classical effective parameters range of forced and exhaust is not conducive to the heading face air pollution rapid discharge; The value of speed at the center of laneway was fluctuated and dual-controlled by forced and exhaust; The air volume difference of forced and exhaust determines pollution air discharge time and air quality within the entire laneway. The purpose of this study is to provide theoretical basis and practical guidance to further parameter optimization study on local forced ventilation technology of the long distance heading face.

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- [1] 程卫民, 聂文, 姚玉静. 综掘工作面旋流气幕抽吸控尘流场的数值模拟[J]. 煤炭学报, 2011, 36(8): 1342-1348.
- [2] 张红盟, 林和荣. 长距离独头掘进巷道通风技术应用研究进展[J]. 江西有色金属, 2008, 22(4): 8-10.
- [3] 周刚, 程卫民, 陈连军. 综放工作面粉尘浓度空间分布规律的数值模拟及其应用[J]. 煤炭学报, 2010, 35(12): 2094-2099.
- [4] 高建良, 郭飞鹏, 张学博. 工作面通风方式对采空区风流流场和瓦斯运移的影响[J]. 安全与环境学报, 2011, 11(5): 168-171.
- [5] 王从陆, 吴超. 基于移动参考框架的矿内运输工具活塞风数值模拟[J]. 煤炭学报, 2007, 32(8): 839-841.
- [6] 黄亚东, 吴珂, 黄志义等. 长隧道火灾烟气运动三维数值模拟[J]. 消防科学与技术, 2011, 30(9): 777-780.
- [7] 彭锦志, 徐志胜, 倪天晓等. 公路隧道集中排烟系统流速分布规律数值模拟研究[J]. 防灾减灾工程学报, 2011, 31(4): 415-422.
- [8] 赵建全, 李磊. 非对称翅片管换热器最佳管中心位置的数值分析[J]. 西安科技大学学报, 2011, 31(4): 403-407.
- [9] 张建单, 高强, 祝天送等. 矿用轴流通风机NACA翼型仿真试验[J]. 煤炭学报, 2011, 36(7): 1222-1226.
- [10] 胡文斌, 刘丽娜. 半地下变电站室内通风与气流组织分析[J]. 哈尔滨商业大学学报: 自然科学版, 2011, 11(5): 168-171.
- [11] 王松岭, 孙哲, 吴正人等. 基于流圈耦合的离心通风机叶轮强度研究[J]. 华北电力大学学报, 2011, 38(4): 81-85.
- [12] W. Marcum, B. Woods and B. Ackson. Numerical flow bench- mark model of advanced test reactor fuel element using FLU- ENT. Transactions of the American Nuclear Society, 2009, 100 (8): 683-686.
- [13] J. Y. Chen, X. Q. Fan and Z. Liu. Fluent based numerical analy- sis of eliminating ultra-limit gas in upper corner by using rotary jet fan advanced materials research. Advanced Manufacturing Systems, 2011, 201(3): 2212-2215.
- [14] O. S. Asfour, M. B. Gadi. Using CFD to investigate ventilation characteristics of vaults as wind-inducing devices in buildings. Applied Energy, 2008, 85(12): 1126-1140.
- [15] K. S. Nikas, N. Nikolopoulos and A. Nikolo-poulos. Numerical study of a naturally cross-ventilated building. Energy and Buil- dings, 2010, 42(4): 422-434.
- [16] F. Patania, A. Gagliano, F. Nocera, et al. Thermofluid-dynamic analysis of ventilated facades. Energy and Buildings, 2010, 42(7): 1148-1155.

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