

深井特厚煤层综放工作面区段煤柱合理宽度研究

刘金海1, 姜福兴1, 王乃国2, 李志深2, 张治高2*

(1. 北京科技大学 土木与环境工程学院, 北京 100083; 2. 山东新巨龙能源有限责任公司, 山东 菏泽 274918)

RESEARCH ON REASONABLE WIDTH OF SEGMENT PILLAR OF FULLY MECHANIZED CAVING FACE IN EXTRA-THICK COAL SEAM OF DEEP SHAFT

LIU Jinhai1, JIANG Fuxing1, WANG Naiguo2, LI Zhishen2, ZHANG Zhigao2*

(1. School of Civil and Environmental Engineering, University of Science and Technology Beijing, Beijing 100083, China;

2. Shandong Xinjulong Energy Limited Company, Heze, Shandong 274918, China)

摘要

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摘要 留设合理宽度的区段煤柱是确保深井特厚煤层综放工作面顺利接续和安全回采的关键。以新巨龙矿井一采区区段煤柱宽度的确定为工程背景, 首先采用微地震监测、应力动态监测和理论计算等方法确定深井特厚煤层综放工作面侧向支承压力分布特征, 得出低应力区宽度约为20 m; 其次, 采用工程类比、数值模拟等方法确定深井特厚煤层综放工作面侧向煤体不完整区宽度约为3 m; 最后, 综合考虑资源回收、冲击地压防治、次生灾害控制和巷道支护等因素, 确定深井特厚煤层综放工作面区段煤柱合理宽度为5.0~7.2 m。应用沿空巷道表面位移观测结果验证区段煤柱宽度的合理性。该研究结果对类似开采条件下的区段煤柱宽度确定具有参考意义。

关键词: 采矿工程 区段煤柱 特厚煤层 综放工作面 深井 应力监测 微地震监测

Abstract: Setting reasonable segment pillar is key for ensuring successful replacement and safety production of fully mechanized caving face in extra-thick coal seam of deep shaft. Taking the determination of segment pillar width in the first mining area of Xinjulong mine as the engineering background, firstly, the side abutment pressure distribution of fully mechanized caving face in extra-thick coal seam of deep shaft was studied by using microseismic monitoring, stress monitoring and theoretical calculation, and 20 m in width of low stress zone was realized. Secondly, the width of fractured zone in side coal mass of fully mechanized caving face in extra-thick coal seam of deep shaft was determined by using engineering analogy and numerical modelling, and about 3 m in width of fractured zone was found. Finally, various elements such as resources recovery, rockburst prevention and control, secondary disaster control and roadway support were considered comprehensively, and the reasonable width of segment pillar of fully mechanized caving face in extra-thick coal seam of deep shaft was determined as 5.0 - 7.2 m. Furthermore, the reasonableness of the segment pillar width was verified by using observation results of surface displacement of the gob-side entry. The results can provide a reference for segment pillar setting in other mines having similar mining conditions.

Keywords: mining engineering segment pillar extra-thick coal seam fully mechanized caving face; deep shaft stress monitoring microseismic monitoring

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