



“Gheorghe Asachi” Technical University of Iasi, Romania



SIMULATION STUDY ON WATER-PRESERVED MINING IN MULTI-EXCAVATION DISTURBED ZONE IN CLOSE-DISTANCE SEAMS

Liqiang Ma^{1,2,3*}, Xinqi Cao^{1,2,3}, Quan Liu^{1,2,3}, Tao Zhou^{1,2,3}

¹ School of Mines, China University of Mining & Technology, Xuzhou, 221116 Jiangsu, China

² Key Laboratory of Deep Coal Resource Mining, Ministry of Education of China, Xuzhou, 221116 Jiangsu, China

³ State Key Laboratory of Coal Resources & Safe Mining, Xuzhou, 221116 Jiangsu, China

Abstract

With the adoption of lab physical simulation, this paper has studied the moving characteristics of overlying strata and the development rules of water-flowing fractured zone in multi-excavation disturbed zone in close-distance seams, and analyzed the feasibility of water-preserved mining in multi-excavation disturbed zone. The experiment result has showed that under the geological conditions of Suancigou Coal Mine, after the upper slicing mining of upper-6 coal seam, the development height of water-flowing fractured zone of underlying strata is 50.2m, and the No.3 mudstone (water-resisting layer) is kept in good condition, thus, the water-preserved mining can be adopted in this area. After the lower slicing mining of upper-6 coal seam, the development height of water-flowing fractured zone reaches to 73.4m, and the No.3 mudstone (water-resisting layer) remains intact, thus, the water-preserved mining can be achieved in this area. After the excavation of No.6 coal seam, the water-flowing fracture penetrates No.3 mudstone and connects with the aquifer of Shanxi formation of lower Permian series, causing the loss of water resources, thus, the water-preserved mining cannot be adopted in this area. Meanwhile, although the water-flowing fracture of underlying strata in the middle of gob is gradually closed under compression after excavation, the fracture development of underlying strata around the gob is difficult to be closed, especially at the vicinity of the mining terminal line where has strike advanced fracture with obvious development. Therefore, to adopt water-preserved mining in No.6 coal seam, relevant technical measures of excavation must be adopted, such as lowering the mining height, filling the surrounding areas of the gob, adopting coordinated excavation to avoid overlaps in the boundaries of the upper and lower parts of gob, and practicing strip mining or short wall mining etc. The research results provide reference for water-preserved mining in close-distance seams.

Key words: close-distance seams, disturbed zone, multi-excavation, water-flowing fractured zone, water-preserved mining

Received: August, 2012; *Revised final:* July, 2013; *Accepted:* August, 2013

*Author to whom all correspondence should be addressed: E-mail: horsema175@163.com; Phone: +86 13645201296