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"Gheorghe Asachi" Technical University of Iasi, Romania

PRINCIPLES AND TECHNOLOGY FOR THE SUBSTITUTION OF STRIP COAL PILLARS WITH COAL REFUSE

Qiang-ling Yao[1,2], Xue-hua Li[1,2*], Fan Pan[1,2], Xue-jiu Wang[3], Jian Zhou[1,2], Hong-min Yang[1,2]

[1] State Key Laboratory of Coal Resources and Safe Mining, China University of Mining and Technology, Xuzhou 221008, PR China
[2]School of Mines, China University of Mining and Technology, Xuzhou 22116, PR China
[3]Henan Electric Power Survey and Design Institute, Zhengzhou 450007, PR China

Abstract

This paper analyzes the fundamental principles of the substitution of strip coal pillars with coal refuse through the combination of theoretical analysis, physical simulation and numerical calculation with engineering practice. We propose to lay out roadways through strip coal pillars in a reasonable manner so as to produce a "coal-rock bearing mass" consisting of stowboards (i.e., roadways backfilled with coal refuse) and coal pillars that substitute the original strip coal pillars. The bearing mass bears the roof pressure and preserves the stable structure of overlying strata during extraction. This paper systematically studies the process of the substitution of strip coal pillars with coal refuse, mainly focusing on the selection of the position of the roadway for backfilling, excavation and support of the roadway, haulage of the coal refuse, design of the coal refuse bin and the backfilling and compacting technology of the coal refuse. Engineering application shows that surface deformation is controlled within the Level I deformation band of national regulations, and the proposed technology yields remarkable economic benefits at the experiment site.

Key words: coal refuse, strip extraction, strip coal pillar, substitution extraction, surface deformation

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[*] Author to whom all correspondence should be addressed: e-mail: xuehua_cumt@163.com; Phone: +86 13952196864