



Experimental study on the steady-state methane gas diffusion in gob

Y. C. Yang, Z. B. Cheng and B. Yin

*Hebei University of Engineering, Hebei Key Laboratory of Resource Survey and Research
Handan 056038, Hebei, China, E-mail: yangyongchen@hebeu.edu.cn Tel: 0310-8579059*

Abstract

Using the method with combining simulation experiments and theoretical analysis, the paper studied the methane gas dispersion laws under the steady-state condition in gob. Through the studies we could get the following conclusions: 1. methane gas gathering phenomenon in gob does not exist, but with time growing, the methane gas shows a uniform dispersion state; 2. the methane gas concentration balanced speed has a connection with direction: Rising speed is the fast, falling speed is slow, horizontal speed is the middle. The results gave a great contribution to further study on distribution law of methane gas explosion concentration.

Key words: *Steady-state, Methane gas dispersion, The methane gas concentration balanced speed, Experimental study*

1. Introduction

Methane gas explosion was one of the most serious coal mine accident in China. According to the statistics data of coal mine accident, the number of deaths caused by methane gas explosion has been raised. In all major accidents (including methane gas explosions, coal and methane gas outburst, methane gas suffocation), methane gas accidents has occupied first place for many years. From building up our country, there are 19 mine's particularly serious accidents in which the number of death exceeds one hundred, of which 18 accidents is caused by the methane gas explosion. Though our researches for several years we found that the methane gas bearing in gob is the energy depot for methane gas explosion and

spontaneous combustion is the fire source of lighting the methane gas. (Yang, 2007) Based on the above theoretical breakthrough, it is very essential to study clearly how to reach the explosion concentration? In order to solve this problem, we must study the methane gas diffusion law in the gob, and through it we can master further the distribution law of methane gas location, then the exact explosion location which establish the theoretical basis for the prevention and control methane gas explosion.

2. Experimental process and results

2.1. Experimental device and equipment

The experimental device used in the experiment is made by our purpose, as shown in Figure 1. The main