



Equivalent-material model analysis of the coal seam floor failure depth in Handan-Xingtai coal mines, China

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1. Introduction

Coal is main energy in China. Shallow and simple regional geological conditions of the coalfields are becoming scarce along with the further development of coal resources, the production of coal toward to deeper is the inevitable trend, The threat of water burst from bed bottom of coal mine is becoming more and more serious.

Based on the information of geological exploration and mining projects in handan-xingtai region, the test simulated the stress change and the destruction rule of the 9th coal seam floor by usage of equivalent-material model. According to the data of xiandewang mine (Guan *et al.*, 2003), the article bring forward the experiential formula of destruction depth in the 9th coal seam floor ,this also provide the scientific guidance for the safe exploitation of coal mining and mine water control in Handan-Xingtai coal mine.

2. The model design and the test

The undergroup coal seam can not be mined normally in handan-xingtai coal mine because of the threat from the under water of Ordovician limestone . For almost 30 years, the bigger pouring water has appeared for

twenty-four times, the loss amount to about billions. Based on analysis the borehole data,the generalized weighted mean values of water layer thickness between the 9th coal seam bottom and the Ordovician limestone is 20 m, the mean deep of the 9th coal seam is 326.77 m.

According to the design requirements,the equivalent-material model test is operated on the CM250/18 Platform about 2.5 m long, 0.18 m wide, 2 m high, the maximal simulation high is 1.8 meter, because the top of equivalent-material need to load about 0.95 m. The model and the prototype simulation scale-up factor is 1: 100, simulation coal bed thickness is 2.9m, working surface advancement length is 150m.

The similar material aggregate selects the river sand, the mica, the cementing material selects the gypsum and may the low-grade silver, with the special water ampule (Guan *et al.*, 2005) buries in the simulation material base, with increasing the pressure of the water ampule to simulate the flood peak pressure in the mining process.

3. The change rule of the coal seam floor's stress distribution

3. 1. *The initial stress state of the rock*

The components of ground stress is complex, the