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### Analysis on relationship between stress and drill cutting weight using numerical modeling – A case study in Jinjiazhuang coal mine ☆

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#### Abstract

The relationship between stress and drill cutting weight (DCW) is studied with numerical modeling and field testing. Jinjiazhuang coal mine 110403 workface is used as a case study. Stress analysis of the workface is carried out with numerical modeling, with input parameters obtained from laboratory experiments. The stress of workface is examined at one section along the mining direction in terms of the stress distribution. Comparing simulating results of stress and field testing drill cutting weight, the stress and drill cutting weight has good agreement and one formulation is derived in this case.

#### Highlights

- The relationship between stress and DCW is studied.
- Stress analysis of the workface is carried out with numerical modeling.
- The stress of workface is examined at one section along the mining direction.
- The stress and drill cutting weight has good agreement.

#### Keywords

Stress; Drill cutting weight; Numerical modeling

#### Figures and tables from this article:



Fig. 1. Vertical section of location relationship between No. 3 coal seam and No. 4 coal seam.

Figure options

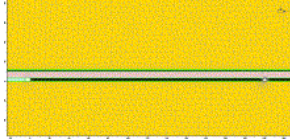


Fig. 2. Modeling model of Nos. 3 and 4 coal seam based on Phase2 software.

Figure options

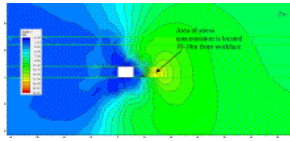


Fig. 3. Stress distribution result after mining 6 m.

Figure options

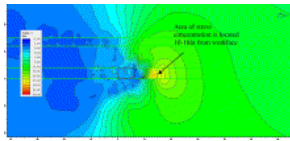


Fig. 4. Stress distribution result after backfilled.

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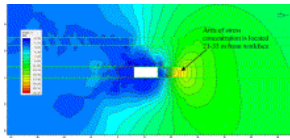


Fig. 5. Stress distribution result after mining 12 m.

Figure options

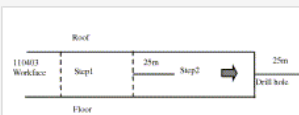


Fig. 6. Stress distribution result after mining 12 m.

Figure options

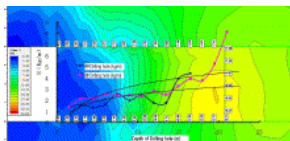


Fig. 7. Comparison diagram between stress and DCW in 110403 workface.

Figure options

Table 1. Mechanics property of coal and rock for the characteristic model.


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institutes, professional associations and large enterprises. The topics will focus on mines safety field: theory on mine safety science and engineering technology, coal mine safety science & engineering technology, metal and nonmetal mines safety science & engineering technology, petroleum and natural gas exploitation safety science & engineering technology, mine safety management and safety standardization science & technology, occupational health and safety in mine, emergent rescue engineering technology in mine, etc.



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