

## **Risk Assessment of Groundwater Inrush from Coal Seam Floor Using Finite Element Strength Reduction Method**

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**Abstract** Each coal seam in Huaibei coalfield had been formed in neritic facies or marine-terrigenous facies sedimentary environment, Mud, sand almost all developed in the area and drop off in shallow coal seams, most of the lower Carboniferous coal mines have been mined. Due to rich groundwater in the thick Ordovician limestone that would bring water inrush hazards when digging underlying Carboniferous coal seams. With the development of computing technology, numerical simulation technology was gradually applied on coal mining water inrush research. And the finite element strength reduction method was introduced to make risk assessment for groundwater inrush from coal seam floor. On the basis of analyzing the groundwater inrush criterion of finite element calculation, the meaning of coal floor safety coefficient  $Fs_1$  was clarified. And the implementation approach of finite element strength reduction method in FLAC3D was introduced briefly. Finally, calculation of a case was used to prove the feasibility of this method, the ratio of the actual rock mechanical parameters to breaking mechanical parameters after strength reduction can be seen as the safety coefficient.

**Keywords** finite element method, strength-reduction, water inrush, risk assessment