

Numerical Study of Mechanical Characteristics and Crack Evolution Law of Coal-Rock With Different Fracture-Hole Defects By Particle Model

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Abstract: Various defects such as cracks and holes exist in coal-rock body and they have a large influence on the mechanical properties of coal-rock. Therefore, it is of great significance to study the fracture characteristics in order to understand the instability mechanism of coal body. In this study, a variety of defective coal-rock specimens with different cracks and holes were established by PFC software, and then the characteristics of stress-strain and crack evolution law of coal-rock were studied. Results show that the mechanical properties, crack propagating characteristics, propagation forms of initial crack and final crack distributions of coal-rock specimens with different fracture-hole conditions are quite different; the crack angle has a larger influence than that of the hole position. Peak strength, peak strain, peak step and the total crack number show an increasing trend with the increase of crack angle, while the initial propagation length of the crack becomes smaller and smaller. When the crack angle is constant, these parameters vary little with the change of hole position.