

## **Predictive Simulation of Weak Rock Mass Behavior: A Constitutive Model Approach**

Due to difficulties of fracture mechanics in dealing with multi cracks and weak rock masses problems, a numerical based model method solves mathematical problems while simulating rock masses. This research presents a comprehensive approach to simulate the behavior of weak rock masses in response to ground control measures using advanced constitutive models. The primary objective is to enhance our understanding of the mechanical behavior of weak rock masses under various ground control strategies and to predict their response accurately. Furthermore, the study employs a constitutive model that captures the inherent anisotropy and non-linear stress-strain relationship characteristic of weak rock masses. The model is calibrated using extensive laboratory testing data and validated through comparison with field observations. The simulation results provide valuable insights into the deformation mechanisms of weak rock masses and the effectiveness of different ground control measures. The findings have significant implications for the design of safer and more efficient ground control strategies in mining engineering projects involving weak rock masses. As a result, this study highlights the potential of constitutive models as potent tools for simulating and comprehending the intricate behavior of fragile rock masses, thus paving the way for forthcoming advancements in this field.