Similarity Theory Rock Drill

Do real-time drilling parameters reflect changes in rock strength?
The findings suggest that variations in these real-time drilling parameters during the rock drilling process can effectively reflect changes in rock strength.

Does drill bit interaction affect rock fragmentation and drilling?
The finite element model of interaction was established to simulate the dynamic interaction between drill bit and rock, and the effects of different influencing factors on rock fragmentation and drilling were analyzed.

Is a drilling experiment platform capable of real-time collection of drilling parameters?
To further substantiate the reasoning presented previously,this study developed a drilling experiment platform that is capable of real-time collection of drilling parameters. This platform is designed to accommodate various parameter sensors,enabling the execution of drilling experiments on diferent rock specimens.

How does the interaction between tools and rock affect drilling results?
The interaction between tools and rock in the drilling process directly affects the piston stroke and velocity, the impact frequency, and the rock breaking results.

What is the difference between elastic drilling and elastic brittle drilling?
There are two modes of drill bit penetration into rock: elastic drilling and elastic-brittle drilling. The main distinction between these two modes is observed during the initial penetration of the drill bit. Elastic drilling leads to the formation of Hertz cracks,whereas elastic-brittle drilling results in the creation of a dense core.

Can numerical simulation improve rock drilling performance?
Therefore,numerical simulation has emerged as an effective approach to evaluate rock drilling performanceand obtain the penetration coefficient,with the key being the development of accurate rock models that represent real-world characteristics.

A representative example is the model for wear flat increase of drill bit buttons, with rock strength and abrasive character, with drilling parameters ...

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Thus, the similarity theory has formed a relatively complete theoretical system. In modern science and technology, the similarity theory is mainly used for guidance on the model experiment. ...

Download scientific diagram | Structure of rock-drill drifter from publication: A percussion performance analysis for rock-drill drifter through simulation modeling and experimental ...

Similarity Theory. The knowledge gained from similarity theory is applied in many fields of natural and engineering science, among others in fluid mechanics. In this field, similarity ...

A novel drilling tool, the passive Vibration Assisted Rotary Drilling (pVARD) tool, was designed and fabricated at Memorial University of Newfoundland, Canada. Field tests of ...

The drilling theory of air reverse circulation is similar with the theory of drawing water with air compressor. The air flows down the annulus between ...

Based on this, scholars have explored and identified the characteristics of rock mass structural planes using drilling parameters. Tan et al. (2009) proposed a method for identifying ...

In the production and manufacturing process of hydraulic rock drill, there are small impact energy and low impact frequency, and a fault diagnosis method based on the internal mechanism ...

In the rotary crushing method, a three-cone bit similar to that employed in oil well drilling is used. The bit is constructed of three cones covered in variously shaped teeth or buttons that rotate ...

Abstract Rock drilling is widely used in various types of rock engineering. Rock boring is often used in tunneling, underground mining, and nuclear waste depository. This ...

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This simulation necessitates addressing similarity theory challenges inherent in this domain, encompassing coal-rock dynamic similarity theory and multi-field, multi-phase coupled disaster ...

This paper aims to determine the optimal design parameters for percussive drilling systems considering the bit-rock interaction. First, the motion dynamics of a bit impacted by a dropped ...

In this study, based on the abnormal similarity theory, we derived the similarity coefficients of mechanical parameters with different horizontal ...

Drilling, in the field of rock excavation by drilling and blasting, even for excavation by non-blasting method, is the first and essential operation. The ...

Based on similarity theory, the similarity criterion of simulation test was derived and the experimental

apparatus was established in accordance with the similarity criterion. The ...

Abstract--Similarity theory is used in determining the tractional resistance of a seed drill. Formulas for the machine"s tractional resistance in different operating conditions are derived. ...

Semantic Scholar extracted view of "Determining the Tractional Resistance of a Seed Drill by Similarity Theory" by V. M. Turdaliyev et al.

October 1997 Keywords: Indentation, Rock, Indentation depth, Crack length, Similarity analysis, Numerical Analysis, Rock drilling, Tunnel boring This report concerns a study which was ...

This paper takes the treatment of multi-mined-out areas of Paishanlou Gold Mine as the research background, based on similarity theory, and uses VIC-3D (noncontact full-field ...

Considering the stratum anti-drilling ability, drill bit working conditions, drill bit application effect and drill bit economic benefits, the similarity of stratum anti-drilling ability was ...

The penetration coefficient can represent the relationship between force and depth in the rock drilling process, but its understanding is limited. Therefore, based on the rock ...

An impact system is the core part of the hydraulic rock drill. The dynamic simulation model of the hydraulic impact system is established based on the system simulation platform ...

This document discusses principles of surface rock drilling used for excavating rock through blasting. It describes the main drilling methods of rotary and ...

1. The current status of similarity theory research on kinetic physical simulation of coal rock is summarized and discussed in terms of both static similarity theory and dynamic ...

Many scholars have researched the mechanism of rock-breaking by drilling in the drilling process. As early as 1881, H.R. Hertz studied the elastomer contact theory and carried out the ...

Abstract: With the continuous development of society, science and technology, mechanical engineering industry in our country is making progress, in which similarity theory has played a ...

Considering the stratum anti-drilling ability, drill bit working conditions, drill bit application effect and drill bit economic benefits, the similarity of stratum anti-drilling ability was evaluated by ...

The theory of drilling to break rock emphasizes that during the drilling process, the drill bit is subjected to the action of the rock mass will produce a series of feedback signals, ...

We have reviewed the development and the analysis of the coupled two degrees-of-freedom model of drill-string vibration, which assumes a state-dependent time delay and a ...

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