Fluid simulation of rock drill

High-temperature geothermal wells frequently employ foam drilling fluids and Polycrystalline Diamond Compact (PDC) drill bits. Understanding ...

In response to the issues of overheating of the shell and insufficient impact energy of the hydraulic rock drill, this paper focuses on the hydraulic rock drill ...

Abstract The drilling fluid invasion into hydrate-bearing sediments (HBS) would trigger geological risks. However, invasion mechanisms and formation responses during ...

The steel particles arrive at the particle impact bit through the drill string, and are ejected by the bit nozzle at a speed of (25-500) m/s along with the drilling fluid, which impacts ...

The simulation results indicate that the non-Newtonian behavior of the drilling fluid has an non-negligible effect on the transport efficiency of both cuttings and core. An increase ...

Drilling Fluid Life Cycle Drilling fluid design and maintenance are iterative processes affected by surface and downhole conditions. These conditions ...

The rock drill model has hydraulic feed and rotation circuits, and drill string is modeled as a finite element beam having three degrees of freedom per node and two nodes per element. A total ...

To get an accurate rock failure simulation, the model must take into account the complexity of rock characteristics and the interaction between the drilling tool and the rock, ...

Water jet drilling (WJD) is an effective technique for drilling micro-holes in the subsurface for reservoir stimulation. This study aims to investigate numerically the failure ...

OpenLab Drilling OpenLab Drilling is a simulation software used for virtual drilling and well operations that combines a web-based online drilling ...

Article Open access Published: 25 April 2025 Simulation and experimental research on drilling and rock breaking mechanisms of anchor drill rigs with analysis of drilling ...

References Fundamental research on percussion drilling: improved rock mechanics analysis, advanced simulation technology, and full-scale laboratory investigations Theoretical ...

In response to the issues of overheating of the shell and insufficient impact energy of the hydraulic rock drill,

this paper focuses on the ...

In this research, the non-linear dynamics of the drill string system model, considering the influence of fluid--structure coupling and the effect of ...

Most of the polar drilling is permafrost rock samples [4]. Permafrost is a tempera-ture-sensitive porous elastic-plastic material and when the low temperature drilling fluid in-vades the ...

Open Source Drill-string Dynamics Modeling: Why?? Drilling Industry has substantially improved performance based on knowledge from physics-based, statistical, and empirical models of ...

Since the 1950s, some institutes began to develop high-temperature and high-pressure simulation devices for the unnatural bottom-hole rock environment and the full-size ...

Download Citation | On Mar 18, 2025, Guoliang Tian and others published Numerical Simulation of Thermo-Hydro-Mechanical Coupling in the Drilling Process of Diamond-Impregnated Bits ...

Abstract: Accurate prediction of wellbore temperature is essential to avoid potential drilling fluid/drillstring overheating and wellbore stability problems. A new model is proposed to predict ...

Rotary-percussion drilling technology was used to improve drilling efficiency in marine deep hard rock formations, but the compatibility among the engineering & tool ...

In the actual drilling operation, the impact frequency and the final impact velocity will change when the drilling fluid displacement changes ...

The specific coring process and drilling environment were not considered in most of former numerical simulation studies on core discing, especially the drilling fluid pressure, which has a ...

The industry standard for helping mitigate drilling problems, Virtual Hydraulics(TM) drilling fluid simulation software gives you a virtual snapshot of downhole fluid ...

To address the issue of the performance testing of hydraulic rock drills under specific working conditions, a stiffness-damping multi-stage adjustable rock simulation system ...

The rock simulation system is of great significance for the development of high-frequency high-power hydraulic rock drills. It can simulate different rock drilling conditions in ...

Thermal spallation drilling is a contact-less means of borehole excavation that works by exposing a rock surface to a high-temperature jet flame. In this study, we investigate ...

In this section, firstly, we characterized the invasion behaviors of drilling fluid by using the reservoir-scale numerical simulation; we quantified ...

Variations in the downhole temperature and pressure of formations, rock heterogeneities, inputs into and out of the drilled well and a host of other factors contribute to ...

We propose a method for the simulation of the nonlinear dynamics of drill-string systems and the assessment of the stresses to which the pipe is subject under realistic ...

In deep and ultradeep well drilling operations, the coolant flow of the drill bit directly impacts bit life and drilling efficiency. To improve the ...

Based on a simulation model for rock drill built by AMESim, JY Oh et al.14studied the dynamic performance of per-cussion system and effects of rock hardness on it.

In view of the lost circulation in fractured formations, a two-dimensional transient model for describing a power-law drilling fluid loss in an arbitrarily-oriented, compressible, ...

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