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Mining Drilling Rig Selection & Application Guide

A Practical Engineering Guide to Drilling Methods, Equipment Configurations and Mining Applications

Mining Drilling Rig Range



Hydraulic Mining Drill Rig

Conventional DTH Drilling Rig

Intelligent DTH Drilling Rig

Guide Coverage

- Hydraulic Mining Drill Rig
- Conventional DTH Drilling Rig
- Intelligent DTH Drilling Rig
- Drilling Methods
- Equipment Configurations
- Mining Applications
- Equipment Selection

Selection Focus

01 Confirm Drilling Method → 02 Check Hole Requirements → 03 Verify Working Envelope → 04 Compare DTH Configurations → 05 Review Selection Checklist

Engineering Overview

Mining drilling rig selection requires more than comparing machine specifications. The drilling method, borehole requirements, rock conditions, available working space, power supply and level of automation all influence equipment suitability. This guide explains the key differences between hydraulic rock drilling and Down-the-Hole (DTH) drilling and provides practical considerations for selecting the appropriate drilling rig for mining operations.

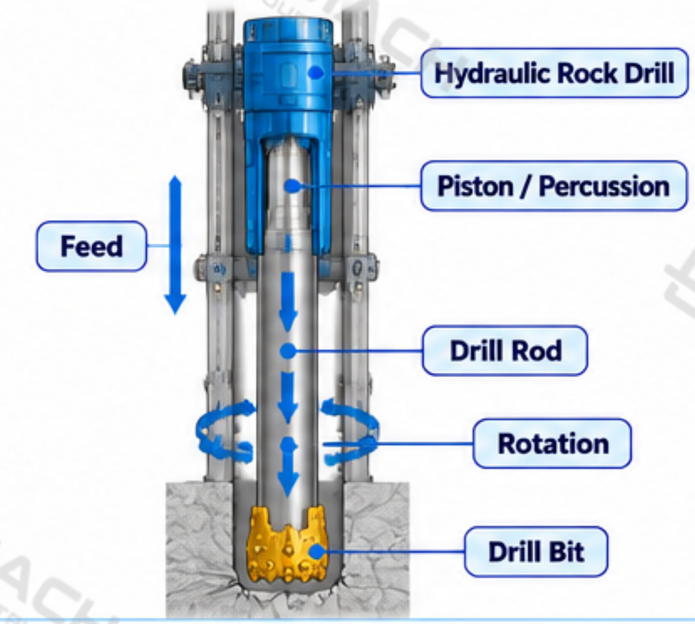
A suitable mining drilling rig should be selected by drilling method, hole requirements, working space and automation scope — not by a single specification alone.

Hydraulic vs. DTH Drilling

Two Percussion Methods, Different Impact-Transfer Paths

Mining drilling rigs use different percussion systems to break rock and form boreholes. A hydraulic mining drill rig generates impact at the drilling unit and transfers energy through the drill rod. Both DTH configurations use a pneumatic hammer positioned near the drill bit at the bottom of the borehole. The location of percussion generation determines how impact energy reaches the rock and what supporting equipment is required.

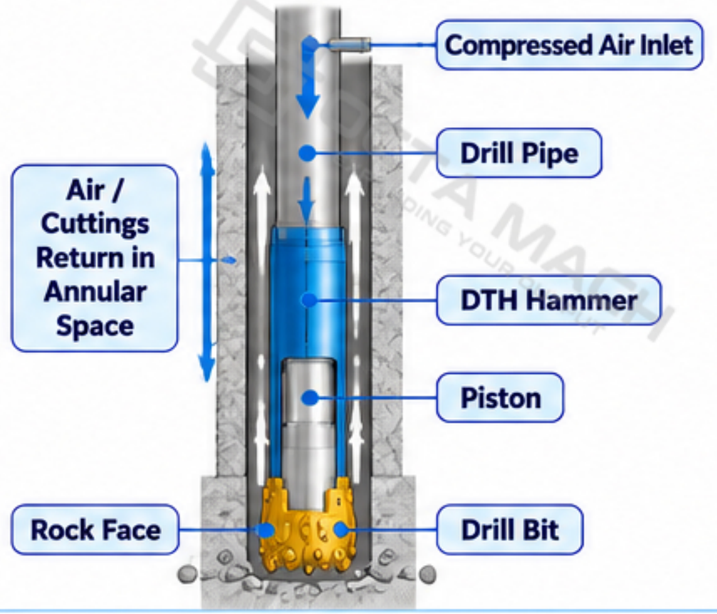
Hydraulic Top-Hammer Drilling



A hydraulic rock drill generates percussion at the drilling unit. Impact energy travels through the drill rod to the drill bit, while the rotation and feed systems advance the bit into the rock.

The drill rod is part of the impact-energy transmission path, so rod length, hole geometry and tool compatibility affect drilling performance.

Down-the-Hole (DTH) Drilling



A compressed-air-powered hammer operates close to the drill bit at the bottom of the borehole. The hammer delivers impact energy directly to the bit, while the rotation system advances the drill string.

Compressed air powers the hammer and carries drilled rock cuttings back through the annular space between the drill string and borehole wall.

Key Selection Considerations

Selection Factor	Hydraulic Top-Hammer	DTH Drilling
Percussion Location	Hydraulic rock drill at the drilling unit	Pneumatic hammer near the bit
Impact Transmission	Through the drill rod	Directly at the bottom of the borehole
Main Supporting System	Hydraulic drilling and rotation systems	Compressor, air lines and DTH hammer
Tool Compatibility	Rock drill, rods, bits and connections	Hammer, drill pipes, bits and connections

Neither method is universally suitable. Select the drilling system according to hole diameter and depth, rock conditions, drilling tools and available supporting systems.

Match the Rig to Rock Conditions and Hole Requirements

Rock mass characteristics and borehole geometry must be assessed together before selecting a drilling system.

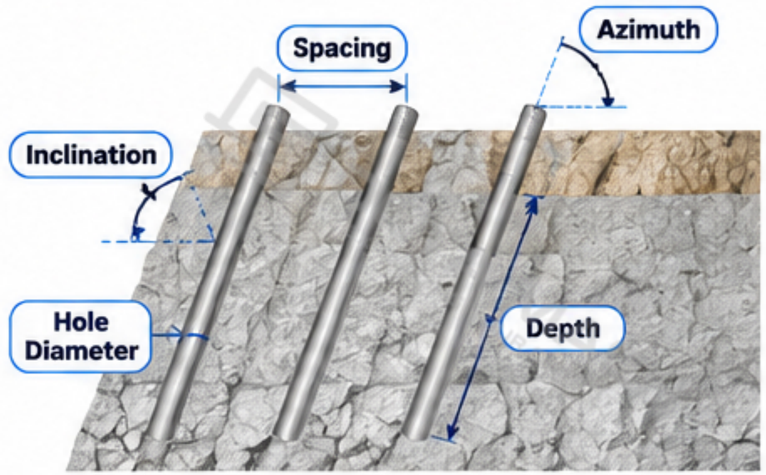
Mining drilling rig suitability depends on the required borehole dimensions, rock mass characteristics and equipment capabilities. Review the drilling plan alongside geological conditions, hole arrangement and expected drilling performance before choosing a machine.

Rock Properties to Evaluate



Geological Factor	What to Consider	Engineering Relevance
Rock Strength	Rock strength and formation variability	Influences bit selection, impact requirements and penetration performance
Abrasivity	Mineral composition and abrasive characteristics	Affects bit wear and drilling tool consumption
Fractures and Joints	Joint orientation, fracture frequency and broken zones	May affect hole stability, deviation and drilling response
Groundwater	Water inflow and wet-hole conditions	Affects cuttings removal and flushing arrangements

Borehole Geometry & Drilling Pattern



Define hole diameter, depth, inclination, azimuth and spacing between adjacent holes in the drilling plan. These parameters determine the required drilling configuration, feed assembly and tooling arrangement.

Where multiple holes must follow a defined pattern, check hole deviation and parallel-hole requirements.

Catalogue Reference Ranges

Drilling Rig	Hole Diameter	Stated Drilling Depth
Hydraulic Mining Drill Rig	64–102 mm	16–42 m
Conventional DTH Drilling Rig	76–165 mm	0–100 m
Intelligent DTH Drilling Rig	76–165 mm	0–60 m

Ranges shown are catalogue values across available configurations. Actual drilling results depend on rock conditions, drilling tools and operating parameters.

Typical Drilling Applications



Hydraulic Mining Drill Rig

For medium- and deep-hole production blast-hole drilling where hydraulic rock drilling and flexible hole positioning are required.



Conventional DTH Drilling Rig

For larger-diameter mining holes where DTH drilling and standard or low-profile machine arrangements suit site access.



Intelligent DTH Drilling Rig

For repeated DTH drilling where automated rod handling, positioning functions and integrated air supply are required.

Select the drilling method and machine configuration together. The rig must suit the planned hole pattern and geological conditions—not just the nominal hole diameter or depth.

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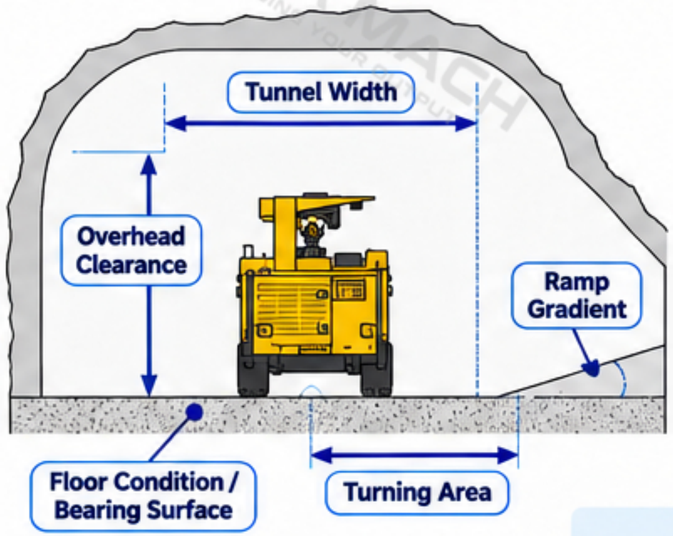
Check Machine Access and Working Envelope

Machine dimensions and working-envelope requirements must be checked before equipment selection and site deployment.

A mining drilling rig must fit both the transportation route and the actual drilling position. Even when a machine meets the required drilling specification, restricted access, insufficient clearance or limited working space may prevent it from reaching the drilling position or completing the planned hole pattern.

Access & Transportation

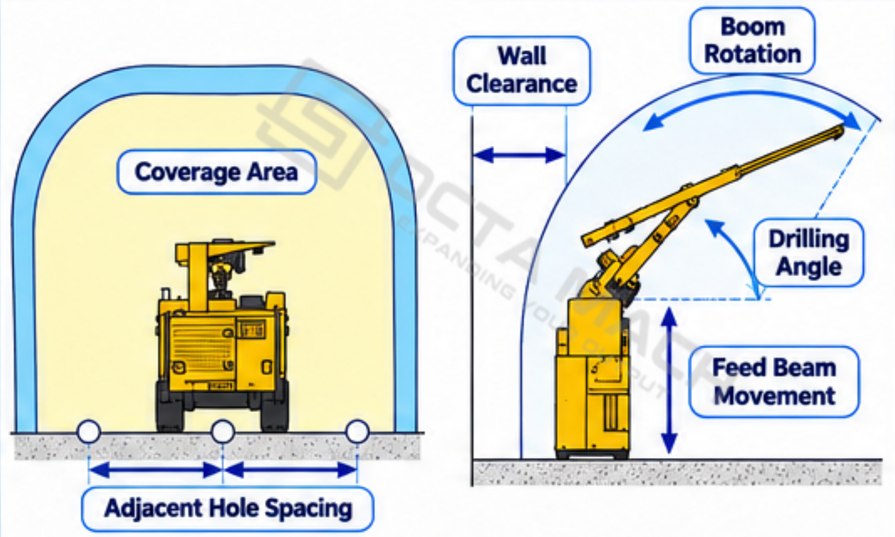


Schematic — not to scale

Access Route Requirements

- Check the narrowest route sections, including tunnel width, overhead clearance and turning areas.
- Confirm the machine's overall dimensions, weight and turning radius.
- Verify the transport arrangement and floor conditions (e.g., ramp gradient and surface condition).
- Confirm compatibility with the available access route.

Drilling Working Envelope



The drilling envelope must account for feed-beam movement, boom rotation, drilling angles, wall clearance and spacing between adjacent holes.

Restricted spaces must allow both machine positioning and full drilling movement.

Site Requirements Checklist

Item	What Should Be Checked
Electrical Supply	Available voltage, frequency, connection and site power capacity
Diesel Power	Fuel supply, ventilation and exhaust arrangements where applicable
Compressed Air	Required pressure, flow rate, air-line length and pressure losses
Ventilation	Air circulation, dust removal and operating environment
Maintenance Access	Space for replacing drill rods, bits, hoses and service components
Ground Conditions	Floor stability, bearing capacity and machine positioning conditions

Engineering Note

Machine transport dimensions and drilling working dimensions are not interchangeable. A rig may pass through an access route but still lack sufficient space to raise the feed assembly, rotate the drilling boom or complete the required hole pattern.

The final assessment should use the selected configuration's dimensioned drawings together with the actual mine layout and working-section dimensions.

A rig may fit the access route but still be unable to complete the drilling movement — evaluate transportation access and working envelope separately.

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Compare Conventional and Intelligent DTH Configurations

Both rigs use the same DTH drilling method, but differ in rod handling, machine integration and air-supply arrangement.

The appropriate configuration depends on the required drilling workflow, level of automation and available operating support.

Equipment Configuration Comparison



Conventional DTH Drilling Rig



Intelligent DTH Drilling Rig

Selection Factor Comparison

Selection Factor	Conventional DTH	Intelligent DTH
Drill Rod Handling	Conventional rod-handling arrangement	Robotic hydraulic manipulator and onboard automatic rod magazine
Positioning & Control	Conventional drilling control arrangement	Intelligent positioning, anti-jamming and automated drilling functions
Air Supply	Confirm compatible external compressor and air-line arrangement	Integrated onboard air compressor
Machine Configuration	Standard, low-profile and self-propelled arrangements	Integrated robotic handling and air-supply system
Operating Requirements	Suitable where conventional DTH operation meets project needs	Suitable where automated rod handling and integrated operating functions are required
Maintenance Scope	Hammer, rods, bits, vibration-damping assembly and dust hood	Additional attention to robot, rod magazine, control system and onboard compressor

How to Make the Choice

When to Consider Conventional DTH

Select the conventional configuration when the drilling operation can be adequately supported by standard DTH equipment and the project does not require integrated robotic rod handling.

When to Consider Intelligent DTH

Select the intelligent configuration when repeated drilling cycles, frequent rod connections, automated positioning and integrated air supply are important parts of the operating plan.

Integrated Air Supply

160 kW	18 m³/min	18 bar
Rated Power	Nominal Volumetric Flow Rate	Rated Discharge Pressure

Values are based on supplied product specifications. Actual air delivery at the DTH hammer should be verified against operating conditions and pressure losses.

Intelligent Drill Rod Handling Process

Drill Rod Magazine → Robotic Hydraulic Manipulator → Rod Positioning and Connection → DTH Drilling Operation

Select the intelligent configuration only when the drilling workflow, site conditions, operating support and automation requirements justify the added system integration.

Mining Drilling Rig Pre-Selection Checklist

Prepare drilling, geological and site data before requesting a mining drilling rig quotation.

Before requesting a mining drilling rig quotation, the project team should prepare the drilling plan, geological information, working-space dimensions, and available power and air-supply conditions. These details help determine whether the hydraulic or DTH drilling method is appropriate and which equipment configuration can meet the actual operating requirements.

Equipment Selection Checklist

Selection Item	Information to Prepare	What to Confirm
Drilling Requirements	Hole diameter, depth, inclination, azimuth and spacing	Whether the selected drilling method and rig can meet the drilling plan
Geological Conditions	Rock strength, abrasivity, fractures, joints and groundwater	Compatibility of drilling method, bit and hammer selection
Drilling Tools	Drill rods, drill pipes, bits, hammer and connection specifications	Compatibility between drilling tools and drilling assembly
Working Space	Mine layout, access dimensions, turning space and drilling clearance	Whether the machine can enter, position and complete the drilling pattern
Power and Air Supply	Electrical capacity, diesel requirements and compressed-air conditions	Whether the available site utilities can support the selected configuration
Automation Requirements	Drill rod handling, positioning, operating controls and reporting	Whether conventional or intelligent DTH equipment is more suitable
Maintenance and Service	Spare parts, consumables, maintenance access and technical support	Whether the equipment can be maintained under actual site conditions
Safety and Site Approval	Mine operating restrictions, ventilation, dust control and applicable safety requirements	Whether the selected machine and configuration are approved for the intended application

Information Required for Equipment Quotation

1. Mine layout drawings and working-section dimensions.
2. Required borehole diameter, depth, angle and drilling pattern.
3. Available geological information and rock conditions.
4. Drilling tools and connection requirements, where specified.
5. Available electrical power, diesel and compressed-air conditions.
6. Equipment transportation restrictions and required level of automation.

Final Selection Principle

The most suitable mining drilling rig is the one that matches the required drilling method, borehole specifications, geological conditions and actual site constraints. Equipment selection should consider the complete drilling system, including the machine, drilling tools, power supply, air supply and supporting maintenance arrangements. Maximum drilling depth or machine power alone is not sufficient to determine suitability.

Mining Drilling Rig Solutions from OCTA MACH

OCTA MACH provides hydraulic and DTH mining drilling rig solutions for different drilling requirements. The equipment range includes hydraulic mining drill rigs, conventional DTH drilling rigs and intelligent DTH drilling rigs with automated drill rod handling and integrated air supply.

By reviewing the drilling plan, geological conditions, equipment access requirements and operating environment, OCTA MACH can help customers identify suitable equipment configurations for mining projects.

Contact OCTA MACH to discuss your mining drilling requirements and equipment selection.



Hydraulic Mining Drill Rig



Conventional DTH Drilling Rig



Intelligent DTH Drilling Rig

Technical note: Final equipment selection is subject to project-specific engineering review, confirmation of the selected configuration and applicable site safety requirements.