



DPC: 25/30490671 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 22932-5

Mining — Vocabulary — Part 5: Drilling and blasting

*Exploitation minière — Vocabulaire —
Partie 5: Forage et abattage à l'explosif*

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ISO/TC 82

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This document is circulated as received from the committee secretariat.

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 82, *Mining*.

A list of all parts in the ISO 22932 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

In addition to editorial changes, the main revisions with respect to the previous edition (ISO 22932-5:2023) are the addition of terms and definitions to new and existing clauses.

Introduction

The ISO 22932 series has been prepared in order to standardize and to co-ordinate the global use of technical terms and definitions in mining, for the benefit of the experts working on different types of mining activities.

The need for the ISO 22932 series arose from the widely varying interpretation of terms used within the industry and the prevalent use of more than one synonym.

To ensure that communication in the domain of rock drill rigs is effective and that difficulties in understanding are minimized, it is essential that the various stakeholders use the same concepts and concept representations.

This document is of relevance, in particular, for the following stakeholder groups:

- machine manufacturers;
- mining companies;
- health and safety bodies (regulators, accident prevention organisations, market surveillance, etc.).

Others that can benefit from a standardised terminology are:

- machine operators;
- service providers, e.g. for maintenance;
- third party system and technology providers.

Mining — Vocabulary —

Part 5: Drilling and blasting

1 Scope

This document specifies the drilling and blasting terms used in mining. This includes defining terms relating to rock drill rigs and rock reinforcement rigs, including their intended use, working methods, types, and components.

Vocabulary for safety of rock drill rigs and rock reinforcement rigs is used in ISO 18758.

2 Normative references

This document does not contain normative references.

3 Terms and definitions

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 Rock drilling concepts

3.1.1

back-reaming

enlargement of a bore by pulling back a tool of a larger diameter than that previously used to form the bore

Note 1 to entry: See also reaming.

3.1.2

bench drilling

drilling (3.1.11) of blastholes (3.27.1) on benches (3.3.1) in mines

Note 1 to entry: See *bench blasting (3.30.2.2)*.

3.1.3

blasthole drilling

drilling (3.1.11) of holes to be charged with explosive (3.25.1.4) for blasting (3.30.1.1)

3.1.4

consolidation drilling

drilling (3.1.11) of long holes in the front or at an angle of the drift direction to be injected with consolidation fluid

EXAMPLE *Grout (3.15.4).*

3.1.5

coverage area

area that the rock drill can drill from one stationary position of the *rock drill rig* (3.8.1)

Note 1 to entry: The coverage area depends largely on the *boom* (3.13.11) configuration and if of the rock drill rig, and if there is a turn able superstructure.

Note 2 to entry: *Hole deviation* (3.4.8) is due to the *drill bit* (3.11.1) changing direction as a result of, for example, inhomogeneity in the rock or a bent *drill rod* (3.13.2) is bent. *Hole deviation* (3.4.8) can be minimised by sturdy *drill string* (3.13.1) support and proper guidance while *collaring* (3.3.3).

3.1.6

dimensional stone drilling

drilling (3.1.11) of holes for quarrying natural stone

3.1.7

drainage drilling

drilling (3.1.11) of drainage holes for methane or water

3.1.8

drifting

drilling (3.1.11), *blasting* (3.30.1.1) and excavating rock to create transportation and access openings to ore bodies in an underground mining operation

3.1.9

drill instruction

instruction for how *drilling* (3.1.11) should be carried out

3.1.10

drillability

relative speed at which a material may be penetrated by a *drill bit* (3.11.1)

Note 1 to entry: High drill-ability denotes easy penetration at a fast rate.

[SOURCE: Reference [2]]

3.1.11

drilling

process by which a *borehole* (3.3.2) is produced in any geological formation by rotary, rotary percussive, percussive or thrust methods and in any predetermined direction in relation to the drill rig

Note 1 to entry: See [figures 1](#) – 3.

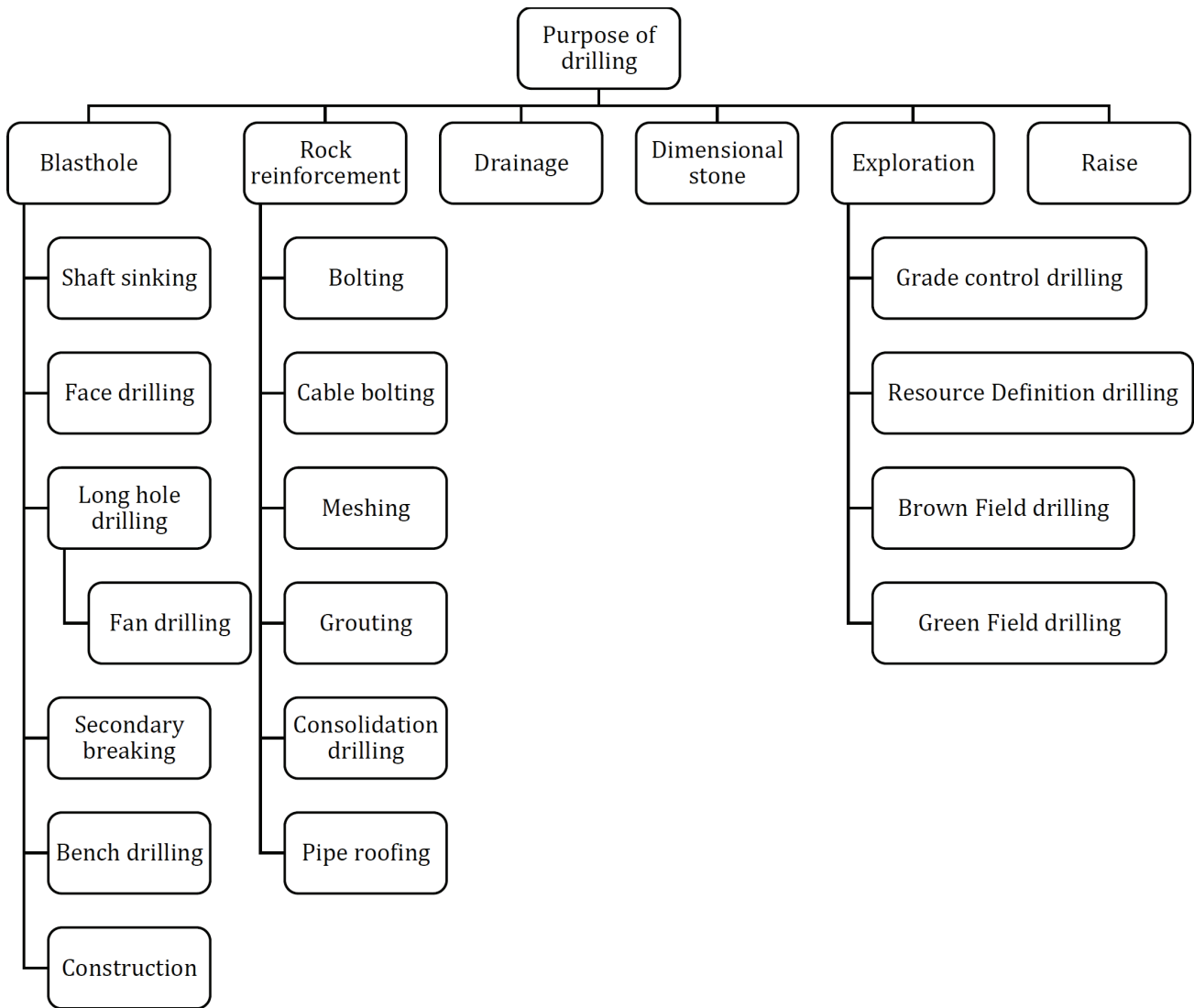


Figure 1 — Rock drilling purpose examples

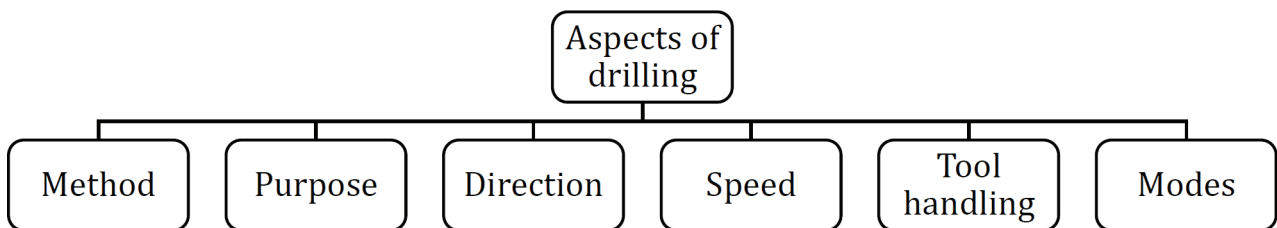


Figure 2 — Aspects of drilling

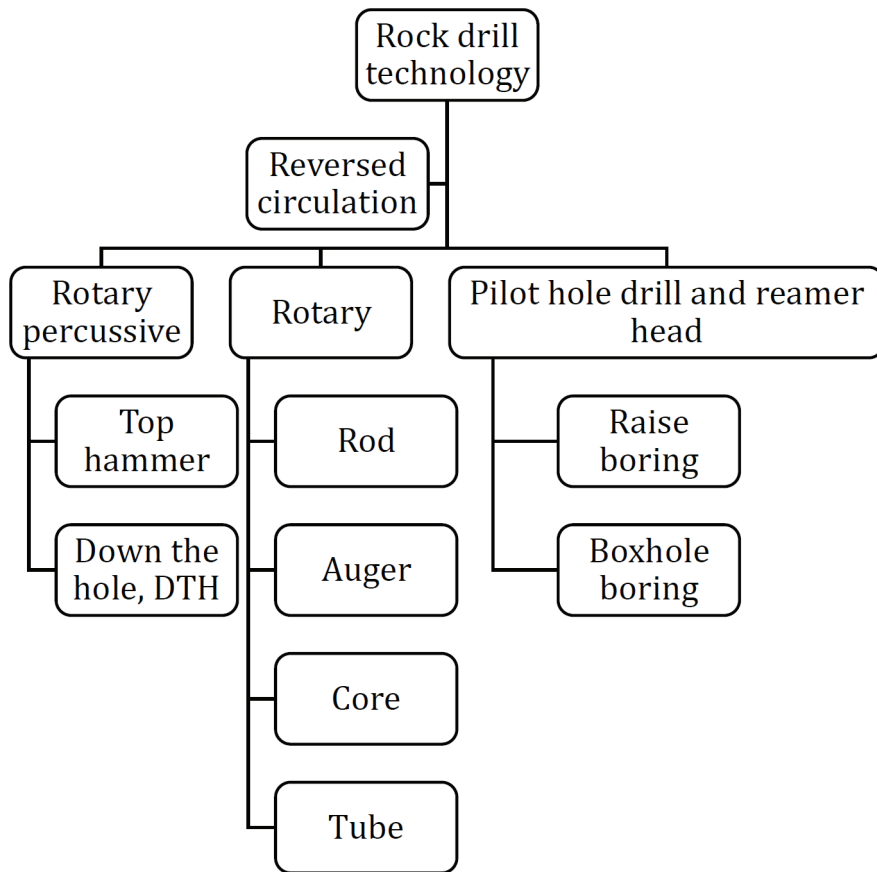


Figure 3 — Rock drilling technologies

[SOURCE: ISO 22475-1:2021, 3.1.5, figures added.]

3.1.12

drilling for secondary breaking

drilling (3.1.11) of blastholes (3.27.1) in the boulders remaining after a blast

3.1.13

exploratory drilling

exploration drilling

application of the mechanical engineering technology of deep *drilling (3.1.11)* to determine the profile of the formation and retrieve strata samples to obtain the relevant geological parameters

Note 1 to entry: For exploration drilling see also ISO 22932-4:2023, 3.4 and ISO 22475-1.

[SOURCE: IWA 33-1:2019, 5.19, alternative term added, note added.]

3.1.14

face drilling

drilling (3.1.11) of blastholes (3.27.1) in the front wall at the end of a drift, rock chamber (3.22.6) or tunnel

3.1.15

fan drilling

long-hole production drilling (3.1.17) where the holes are drilled in the same plane but at different angles, both left and right of vertical, to form a fan like array

3.1.16

line drilling

technique involving a single row of closely spaced, uncharged, small diameter holes drilled along the required excavation line, thereby providing a plane of weakness to which the primary blast can break

[SOURCE: BS 3618-6:1972]

3.1.17

long-hole production drilling

drilling ([3.1.11](#)) of *blastholes* ([3.27.1](#)) of extended length to excavate ore

3.1.18

probe drilling

drilling ([3.1.11](#)) of long holes with a *face drilling* ([3.1.14](#)) rig in the direction of the drift to examine the rock formation

3.1.19

reaming

enlargement of a drill hole by using a larger drill or *blasting* ([3.30.1.1](#))

Note 1 to entry: The term reaming also refers to widening a shaft, drift or tunnel. See also back-reaming.

3.1.20

shaft sinking drilling

drilling ([3.1.11](#)) of *blastholes* ([3.27.1](#)) for sinking a shaft

3.1.21

grade control drilling

exploration drilling ([3.1.13](#)) to provide high resolution data for short-term excavation design

Note 1 to entry: Typical grid size is 30 m x 30 m.

3.1.22

resource definition drilling

exploration drilling ([3.1.13](#)) to provide medium-term data for mine design

Note 1 to entry: Resource definition drilling uses a larger grid size than grade control to collect data. Typical grid size is 300 m x 300 m.

3.1.23

brown field drilling

exploration drilling ([3.1.13](#)) near or adjacent to an existing mine aiming to find or acquire new deposits.

3.1.24

green field drilling

exploration drilling ([3.1.13](#)) in previously unexplored or undeveloped areas aiming to find or acquire new deposits

3.2 Rock drilling technologies

3.2.1

boxhole boring

drilling ([3.1.11](#)) method where an opening upwards from a drift to a production room is achieved by boring it to its full diameter in a single pass with a machine designed specifically for the purpose

3.2.2

down-the-hole drilling

DTH

in-the-hole drilling

ITH

drilling ([3.1.11](#)) of holes using a *down-the-hole hammer rock drill* ([3.10.3](#))

3.2.3**percussive drilling**

method of *drilling* (3.1.11) whereby repeated *blows* (3.30.1.15) are applied by the *drill bit* (3.11.1), which is repositioned by intermittent rotation

[SOURCE: BS 3618-6:1972]

3.2.4**raise boring**

connection of two levels by *drilling* (3.1.11) a pilot hole down to the lower level, removing the *drill bit* (3.11.1) and replacing it by a reamer head which is then rotated and pulled back up towards the machine to create the raise

3.2.5**rotary drilling**

method of *drilling* (3.1.11) in which rotation and thrust are applied to the *drill bit* (3.11.1), producing a continuous cutting action

Note 1 to entry: The ground or rock at the bottom of the *borehole* (3.3.2) is crushed or cut by pressure, shear or tensile stress produced by the different drilling tools. The *cuttings* (3.3.4) are periodically or continuously removed out of the bore hole.

Note 2 to entry: Drill bits can be of the roller or drag types.

[SOURCE: BS 3618-6:1972, modified — Notes to entry have been added.]

3.2.6**rotary-percussive drilling**

method of *drilling* (3.1.11) in which repeated *blows* (3.30.1.15) are applied to the *drill bit* (3.11.1) which is continually rotated under power

Note 1 to entry: The piston is typically powered by either hydraulic fluid or compressed air. At the same time the drill bit is rotated either continuously or intermittently.

Note 2 to entry: The *cuttings* (3.3.4) can be continuously removed out of the *borehole* (3.3.2) by a *flushing medium* (3.18.1), which is carried to the drilling tool.

[SOURCE: BS 3618-6:1972, modified — Notes to entry have been added.]

3.2.7**tube drilling**

rotary drilling (3.2.5) method where a rotation *torque* (3.16.13) is transferred to the *drill bit* (3.11.1) through relatively thin wall tubes rather than rods, with a minimum-sized flushing fluid canal

3.2.8**core drilling**

rotary drilling (3.2.5) method where a hollow centred *drill bit* (3.11.1) is used to produce cylindrical rock cores to investigate the properties of a rock mass

Note 1 to entry: Core drilling is performed with hard cutters, usually with annular diamond rebar, and pipes for the extraction of the drill core.

Note 2 to entry: Core drilling is performed from the surface to find orebodies and in underground mines to find out how the orebody extends.

Note 3 to entry: For terms related to geotechnical investigation by core drilling see ISO 22475-1 .

3.2.9**auger drilling**

rotary drilling (3.2.5) method in which rotation and thrust are applied to the auger, producing a continuous cutting action

3.3 Bore holes, bench and cuttings

3.3.1

bench

part of the face of a large excavation which is not advanced as part of the round but as a separate operation

[SOURCE: BS 3618-6:1972]

3.3.2

borehole

hole of any predetermined diameter and length formed in any geological formation by *drilling* ([3.1.11](#))

3.3.3

collaring

operation of starting to bore a hole

[SOURCE: BS 3618-6:1972]

3.3.4

cuttings

drill collarings

particles of geological formations formed in the *borehole* ([3.3.2](#)) by the action of the *drilling* ([3.1.11](#)) tool

3.3.5

flanking hole

shothole ([3.30.1.27](#)) drilled at an acute angle to the coal face for the purpose of trimming it

[SOURCE: BS 3618-6:1972]

3.3.6

lifter

shothole ([3.30.1.27](#)) drilled at floor level

[SOURCE: BS 3618-6:1972]

3.3.7

top hole

horizontal or upwardly inclined *shothole* ([3.30.1.27](#)) placed at the foot of a face

Note 1 to entry: Top holes are placed generally in quarries.

[SOURCE: BS 3618-6:1972]

3.4 Hole properties

3.4.1

alignment deviation

difference of actual and intended alignment of drilled hole

3.4.2

bolt hole

drilled hole where *rock bolts* ([3.15.7](#)) can be anchored

3.4.3

drill pattern

pattern of holes drilled to excavate a specified size of opening in mining and construction

3.4.4

hole depth

length of the hole in the vertical/horizontal direction

3.4.5

hole depth measurement

function for automatic measuring of drill depth

3.4.6

hole length

length of the hole, parallel to the *drilling* (3.1.11) direction

Note 1 to entry: Drilling directions are shown in Figure 4.

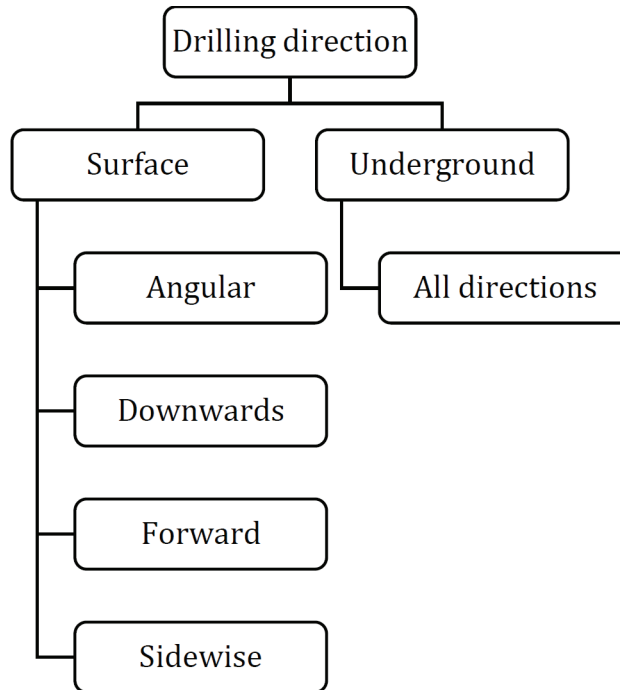


Figure 4 — Drilling directions

3.4.7

hole length measurement

function for automatic measuring of drill length

3.4.8

hole deviation

difference of actual and intended position of drill holes that occurs during *drilling* (3.1.11)

3.4.9

look-out angle

angle between the practical (drilled) and the theoretical tunnel profile

Note 1 to entry: See figure Figure 5 — Pipe roofing.

3.5 Rock reinforcement methods

3.5.1

cable bolting

process of fixing cables with *cement grout* (3.15.3) or chemical compounds to stabilize the rock mass, in long holes being drilled in rock

3.5.2

grouting injection

input of material (which normally hardens) in joints and voids of the rock for sealing or reinforcement

EXAMPLE Cement, resin, and plastic.

Note 1 to entry: See ISO 14824 and ISO 16311.

3.5.3

meshing netting

installing a net as rock support on ceiling or walls

3.5.4

pipe roofing

pre-reinforcement of the ground ahead of the tunnel face with steel pipes, arranged like an umbrella or canopy around the excavation line, to ensure that the excavation can proceed safely

Note 1 to entry: See [figure 5](#).

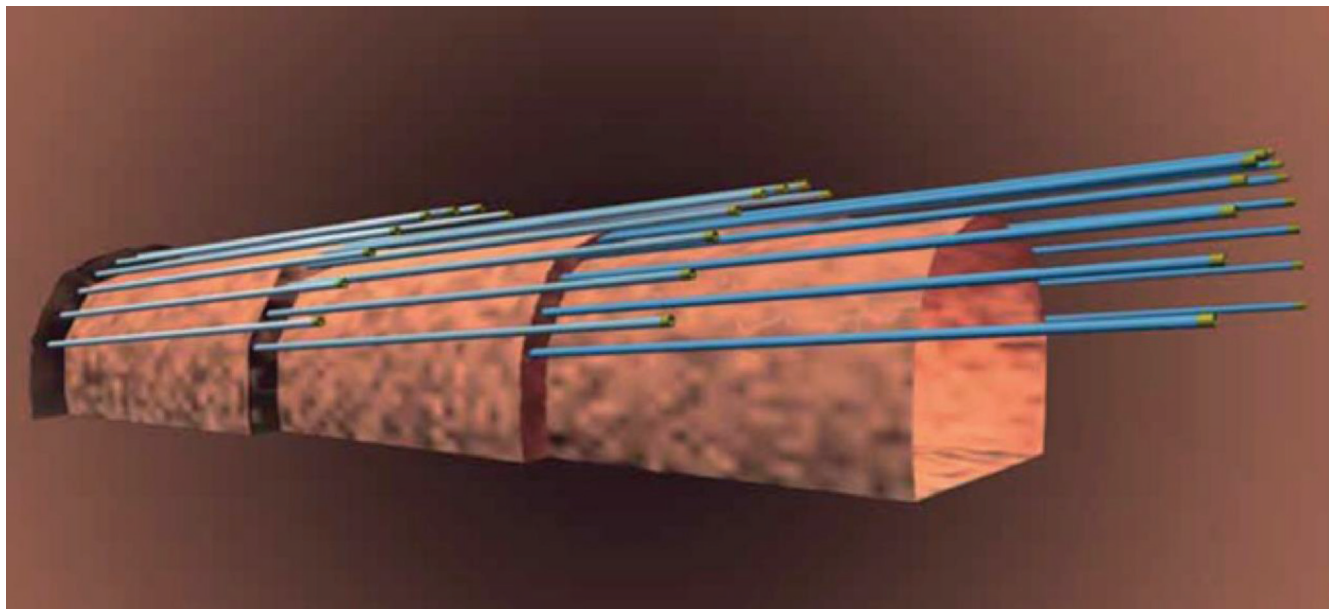


Figure 5 — Pipe roofing

3.5.5

rock bolting bolting

method of securing or strengthening closely jointed or highly fissured rocks by inserting and firmly anchoring *rock bolts* ([3.15.7](#)) oriented perpendicular to the rock face or mine opening, in mine workings, tunnels, or rock abutments

3.5.6

selective bolting

bolting ([3.5.5](#)) of weak sections or loose rock

3.5.7

systematic bolting

bolting ([3.5.5](#)) in a pre-determined pattern

3.6 Hand-held machines

3.6.1

airleg

device, incorporating a pneumatic cylinder, providing support and thrust for a *jackhammer* ([3.6.5](#))

[SOURCE: BS 3618-6:1972]

3.6.2

burster

hydraulic mechanism which, when inserted into a large diameter *shothole* ([3.30.1.27](#)), breaks down the strata by means of pistons operating transversely

[SOURCE: BS 3618-6:1972]

3.6.3

hammer drill

percussive drill

Note 1 to entry: See also ISO 3857, ISO 5391, ISO 11148-5, ISO 17066.

[SOURCE: BS 3618-6:1972]

3.6.4

hydraleg

device, incorporating a hydraulic cylinder, providing support and thrust for a *jackhammer* ([3.6.5](#))

[SOURCE: BS 3618-6:1972]

3.6.5

jackhammer

light percussive drill used by hand or with some light support

[SOURCE: BS 3618-6:1972]

3.6.6

stoper

light percussive drill incorporating a pneumatic cylinder to provide support and thrust when *drilling* ([3.1.11](#)) steeply upward

[SOURCE: BS 3618-6:1972]

3.7 Equipment mainly for hand-held machines

3.7.1

hollow drill rod

hollow drill steel

hollow drill stem

drill rod ([3.13.2](#)) or *stem* ([3.7.5](#)) having an air to remove *cuttings* ([3.3.4](#)) from a drill hole, or for the extraction of *cuttings* ([3.3.4](#)) by suction

Note 1 to entry: See ISO 722, ISO 3551, ISO 3552, ISO 8866, ISO 10097, ISO 10098.

[SOURCE: BS 3618 6:1972, note added.]

3.7.2

line oiler

device for lubricating a drill by feeding oil gradually into the compressed air supply

[SOURCE: BS 3618-6:1972]

3.7.3

scroll

helical projection on a *drill rod* (3.13.2) or *stem* (3.7.5) to remove the *cuttings* (3.3.4) from the hole

[SOURCE: BS 3618-6:1972]

3.7.4

shank

end of the rod that engages with the *chuck* (3.12.1) of the *drilling* (3.1.11) machine

Note 1 to entry: See ISO 723.

[SOURCE: BS 3618-6:1972, note added.]

3.7.5

stem

drill steel

integral steel

<drilling> round or hexagonal steel rod for boring

Note 1 to entry: Compare with 3.22.18.2.

Note 2 to entry: See ISO 721, ISO 722, ISO 1717, ISO 1718, ISO 1721, ISO 1722, ISO 10207, ISO 10208.

[SOURCE: BS 3618-6:1972, notes added.]

3.8 Rock drill rigs

3.8.1

rock drill rig

rock drill machine

self-propelled or towed machine on wheels, *crawlers* (3.9.8) or legs, having equipment to drill rock

Note 1 to entry: Rock drill rigs are designed to provide one or more of the rock *drilling* (3.1.11) concepts of [Clause 3.1](#), using one or more of the rock drilling technologies of [Clause 3.2](#). They can be designed for use on the surface or underground or both. Rock drill rigs normally consist of a carrier carrying one or more rock drills and the supporting systems needed to carry out the drilling. See [figure 6](#).

Note 2 to entry: Machinery can be of a type either directly controlled by an *operator* (3.34.1) riding or not riding on the machine, or can be remotely controlled by wired or wireless means with or without direct view on the *working area* (3.20.14). See [figure 44](#) for types of operator control configurations.

Note 3 to entry: In general, rock drill rigs can be broadly identified by combining specifications from each of the characteristics mentioned in this document. This allows the unique identification of machines not explicitly referenced in this document.

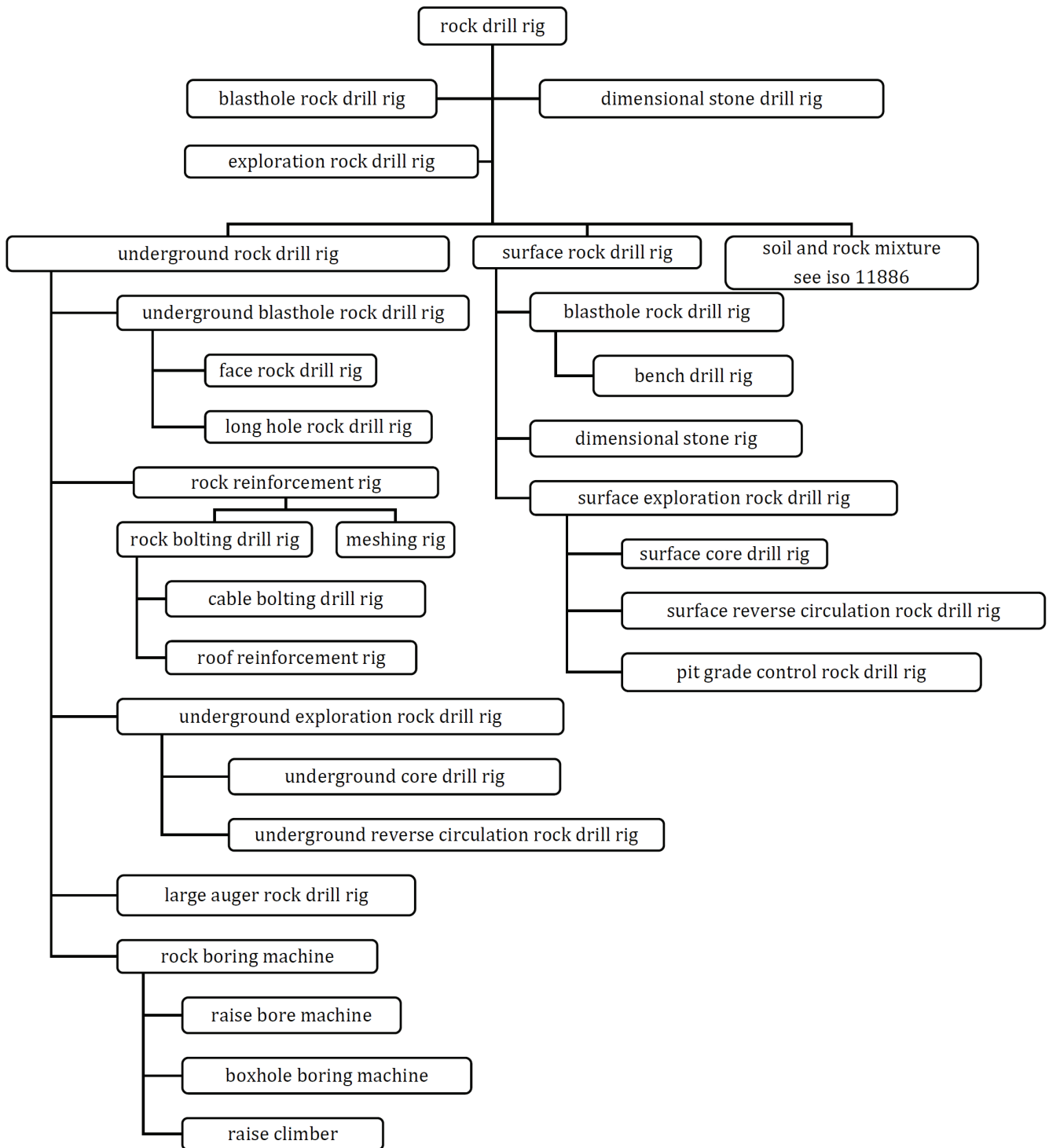


Figure 6 — Rock drill rig types classified in accordance with environment and drilling

3.8.2

blasthole drill rig

rock drill rig (3.8.1) designed to drill blastholes (3.27.1)

3.8.3

dimensional stone drill rig

rock drill rig (3.8.1) designed for drilling (3.1.11) holes for quarrying of natural stone

3.8.4

underground rock drill rig

rock drill rig (3.8.1) designed for the underground working environment

3.8.4.1

underground blasthole drill rig

underground rock drill rig (3.8.4) designed to drill blastholes (3.27.1)

3.8.4.1.1

face rock drill rig

rock drill rig (3.8.1) for underground drilling of blastholes in the front wall at the end of a drift, rock chamber or tunnel

Note 1 to entry: See [figures 7 – 11](#).

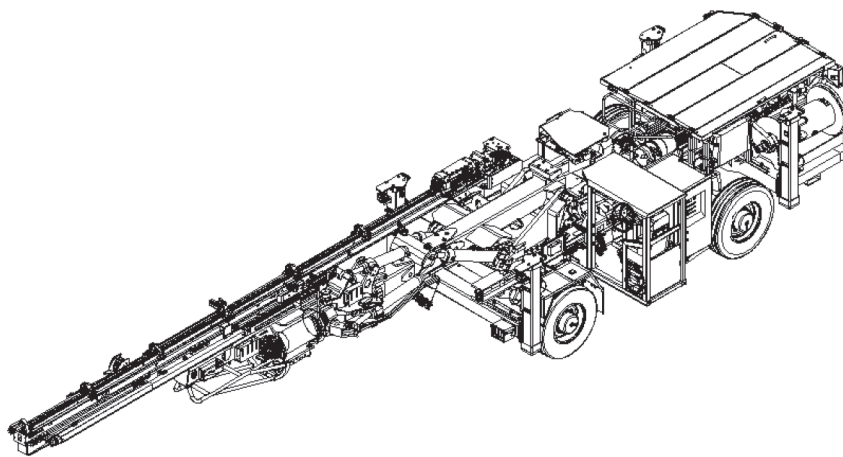


Figure 7 — Rubber-tired single boom face rock drill rig for drilling blastholes underground

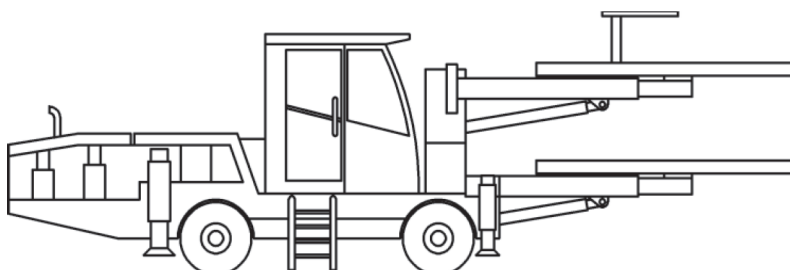


Figure 8 — Rubber-tired multiple boom face rock drill rig for drilling blastholes underground

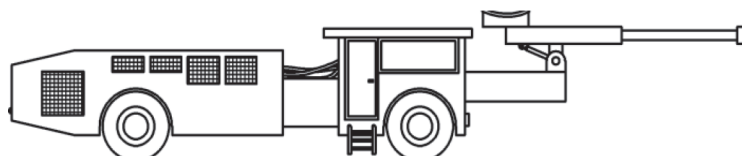


Figure 9 — Low profile rubber-tired face rock drill rig for drilling blastholes underground

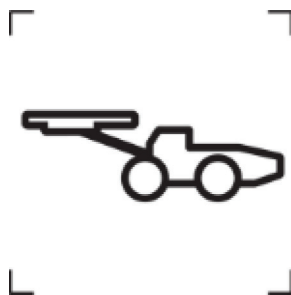


Figure 10 — Symbol ISO 7000-3734 Underground face rock drill rig (side view of machine)

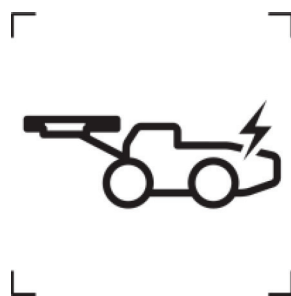


Figure 11 — Symbol ISO 7000-3911 Electric underground face rock drill rig (side view of machine)

3.8.4.1.2

long-hole rock drill rig

rock drill rig (3.8.1) designed for *drilling* (3.1.11) long vertical or tilted production *blastholes* (3.27.1) upwards, downwards and sidewise in a mine

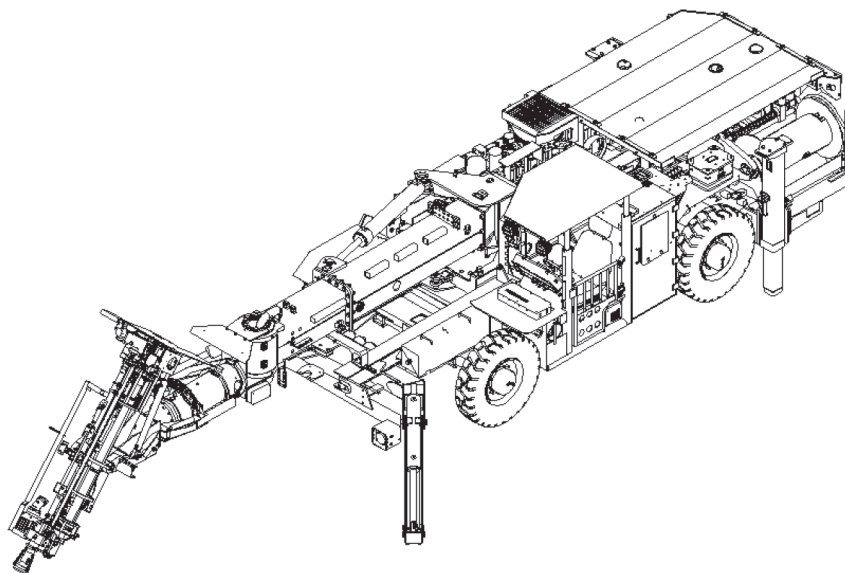


Figure 12 — Long-hole rock drill rig for bench drilling

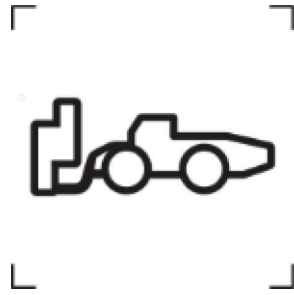


Figure 13 — Symbol ISO 7000-3735 Underground mining long hole production rock drill rig (side view of machine)

3.8.4.2

rock reinforcement rig

rock drill rig (3.8.1) equipped for *bolting* (3.5.5), *meshing* (3.5.3) or *grouting* (3.5.2) or a combination of them

3.8.4.2.1

rock bolting drill rig

rock drill rig (3.8.1) designed for *drilling* (3.1.11) holes and installing *rock bolt* (3.15.7)

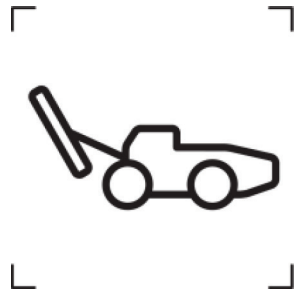


Figure 14 — Symbol ISO 7000-3912 Bolting rock drill rig (side view of machine)

3.8.4.2.1.1

roof reinforcement rig

rock drill rig (3.8.1) for drilling upwards vertical or upwards tilted holes in the roof of a drift, rock chamber or tunnel for setting anchor bolts.

Note 1 to entry: See [figure 15](#). Immediately after drilling the holes, the rig sets anchor bolts into the prepared hole for stabilizing the roof structure.

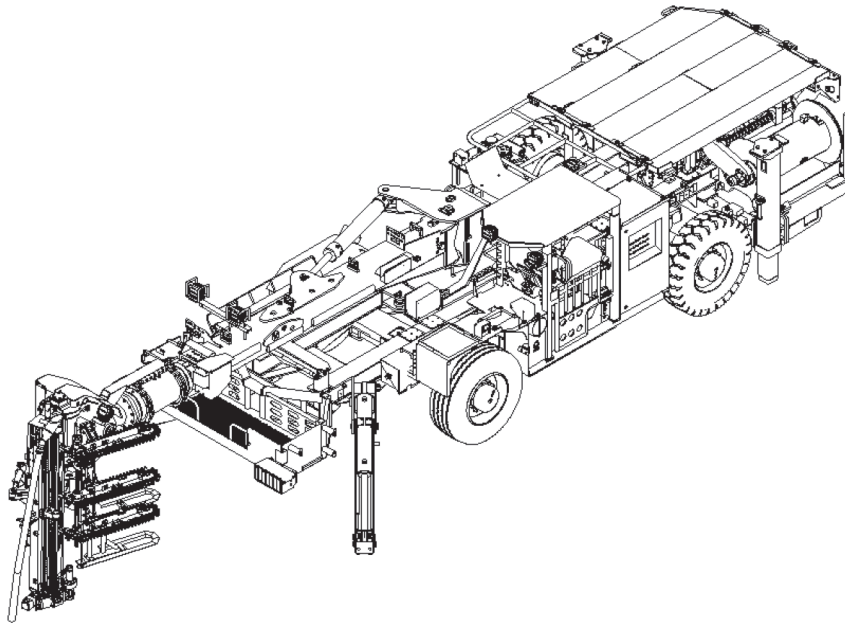


Figure 15 — Rubber-tyred single boom roof reinforcement rig

3.8.4.2.1.2

cable bolting drill rig

rock drill rig (3.8.1) for drilling (3.1.11) long holes in rock and fixing cables in them with cement grout (3.15.3) to stabilize the rock mass

3.8.4.2.2

meshing rig

netting rig

rock drill rig (3.8.1) for installing net (mesh)

3.8.4.3

underground exploration drill rig

underground rock drill rig (3.8.4) designed for exploratory drilling (3.1.13)

3.8.4.3.1

underground core drill rig

rock drill rig (3.8.1) for the drilling of rock core underground

3.8.4.4

large auger drill rig

rock drill rig (3.8.1) for drilling one or more large holes in the front wall at the end of a drift, rock chamber or tunnel to enable rock to evade during blasting process

Note 1 to entry: See [figure 16](#).

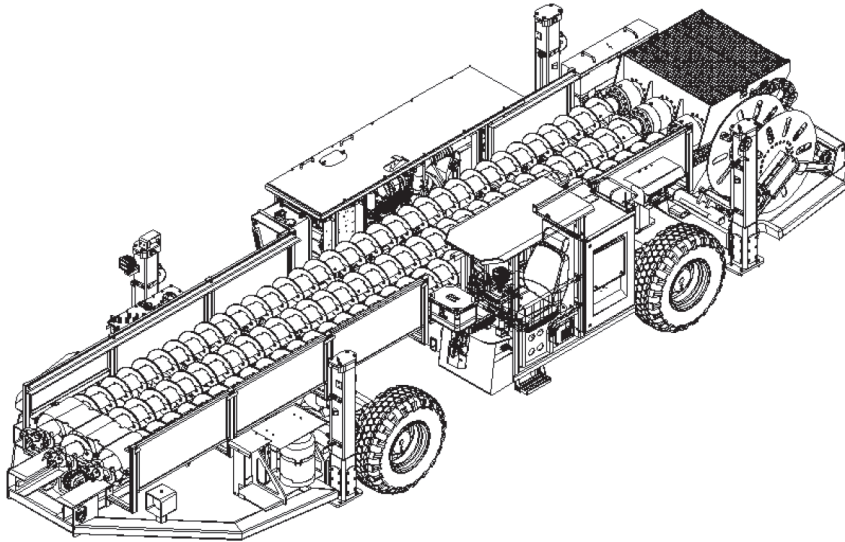


Figure 16 — Large auger drill rig

3.8.4.5 rock boring machine

rock drill rig (3.8.1) used to create an underground opening, drift or tunnel by mechanically boring out the rock

3.8.4.5.1 raise bore machine

RBM

rock drill rig (3.8.1) for *raise boring* (3.2.4) or *boxhole boring* (3.2.1)

Note 1 to entry: See [figure 17](#).

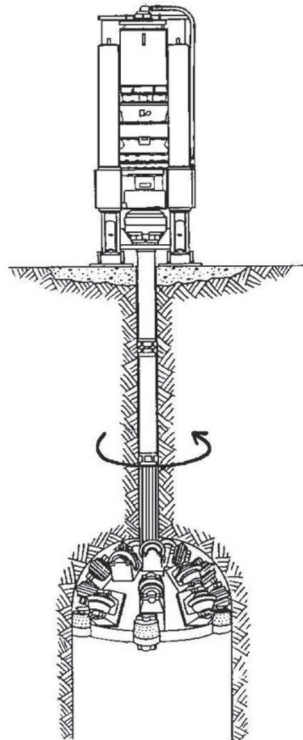


Figure 17 — Raise bore machine

3.8.4.5.2

raise climber

rock drill rig (3.8.1) on rails, designed for drilling (3.1.11) and blasting (3.30.1.1) vertical or near vertical shaft or raise

3.8.5

surface rock drill rig

rock drill rig (3.8.1) designed for the surface working environment

3.8.5.1

surface blasthole rock drill rig

blasthole drill rig (3.8.2) design for open pit mining and similar

Note 1 to entry: See [figures 18 – 20](#).

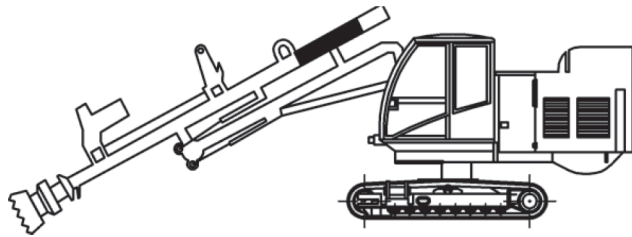


Figure 18 — Crawler based variable reach rock drill rig normally used to drill blastholes on the surface



Figure 19 — Symbol ISO 7000-3736 Surface blasthole rock drill rig (side view of machine)



Figure 20 — Symbol ISO 7000-3737 Surface blasthole variable reach rock drill rig (side view of machine)

3.8.5.2

surface blasthole rotary rock drill rig

rock drill rig (3.8.1) for rotary drilling (3.2.5) of blastholes (3.27.1)

3.8.5.3

platform rock drill rig

surface blasthole rock drill rig (3.8.5.1) with working platform and mast (3.13.20)

Note 1 to entry: See figure 21 – 22.

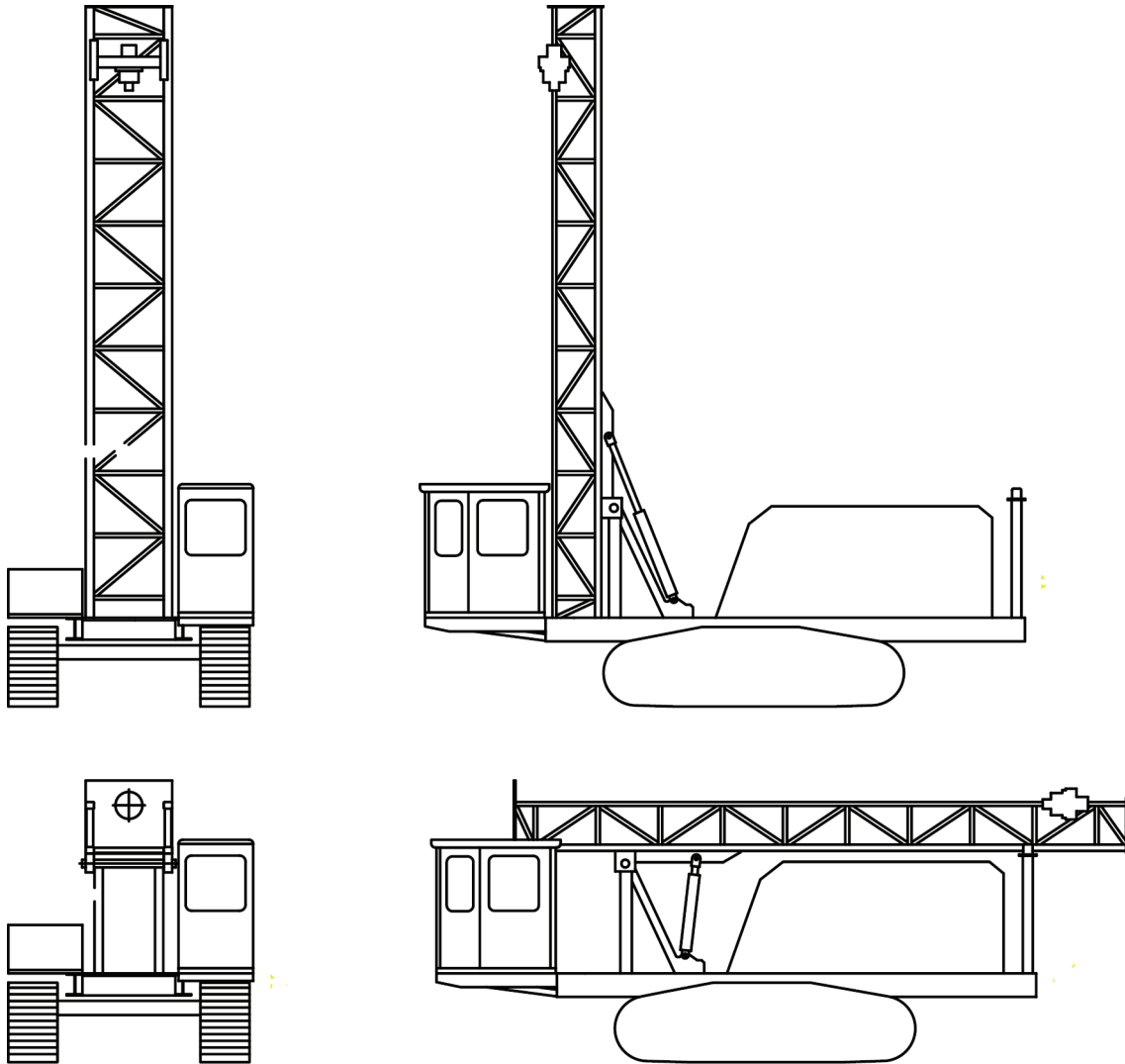


Figure 21 — Platform rock drill rig



Figure 22 — Symbol ISO 7000-3738 Surface blasthole rotary rock drill rig (side view of machine)

3.8.5.3.1

bench drill rig

rock drill rig (3.8.1) designed to drill blastholes (3.27.1) on benches (3.3.1)

3.8.5.4**surface core drill rig**

rock drill rig (3.8.1) for the drilling of rock core on surface

Note 1 to entry: See [figure 23](#) – [24](#).



Figure 23 — Symbol ISO 7000-3914 Surface core drill rig, trailer-mounted (side view of machine)



Figure 24 — Symbol ISO 7000-3917 Drill rig, truck-mounted (side view of machine)

3.8.6**reversed circulation rock drill rig**

rock drill rig (3.8.1) using a method of *core drilling* (3.2.8) in which the *circulating fluid* (ISO 22932-4:2023, 3.4.3) passes down the *borehole* (3.3.2) and returns up the inside of the rods, providing continuous recovery of the *core* (ISO 22932-4:2023, 3.4.4)

[SOURCE: ISO 22932-4:2023, 3.4.6 – modified to describe the machine.]

3.8.7**scaling machine**

self-propelled or towed machine on wheels, *crawlers* (3.9.8) or legs, having equipment to scale rock

Note 1 to entry: See ISO 19296.

3.8.8**drill rig for soil and rock mixture**

self-propelled or towed machine on wheels, *crawlers* (3.9.8) or legs, having equipment to drill soil and a mixture of soil and rock, such as: geothermal drill rig, water well drill rig, water jet drill rig, micro pile drill rig, surface horizontal directional drill rig

3.9 Support components and systems**3.9.1****carrier machine**

machine that provides mobility for, and supports, the mass of a *rock drill rig* (3.8.1)

Note 1 to entry: See [Figure 25](#) — [figures 25](#) – [26](#).



Figure 25 — Symbol ISO 7000-3909 Carrier for crawler-based drill rig (side view of machine)

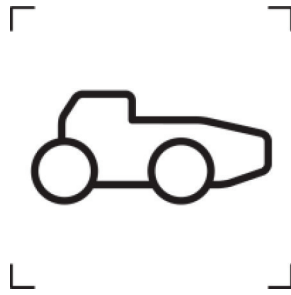


Figure 26 — Symbol ISO 7000-3910 Carrier for underground rock drill rig (side view of machine)

Note 2 to entry: See [figure 27](#) for different types of mobility of the carrier machine, and [figure 28](#) for propulsion energy sources.

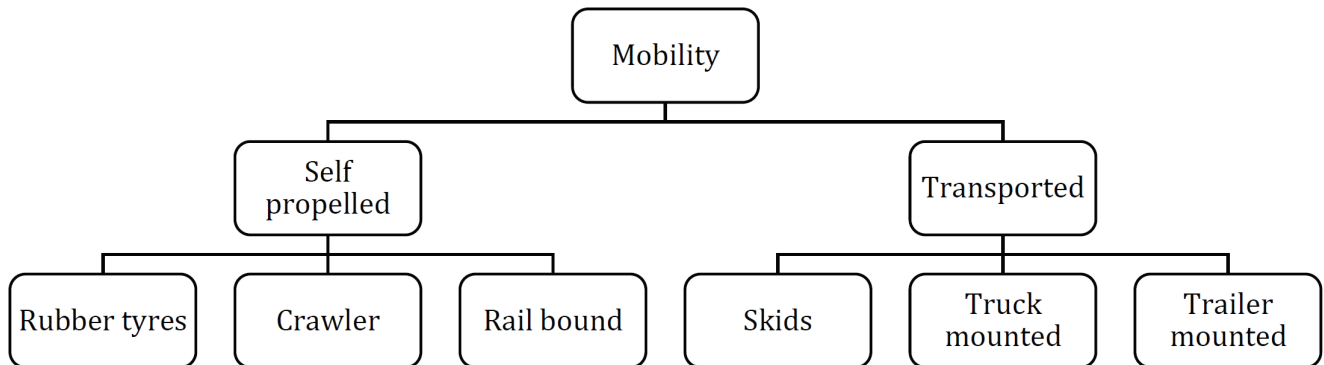


Figure 27 — Mobility

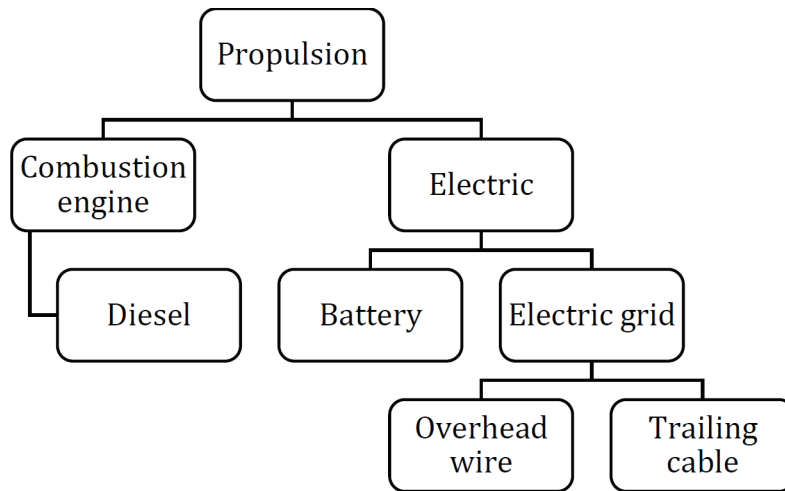


Figure 28 — Carrier machine propulsion energy source

Note 3 to entry: For determination of ground speed see ISO 6014, for determination of turning dimensions of wheeled machines see ISO 7457. For definitions of dimensions see ISO 6746. For machine-mounted retrieval device see ISO 10532.

[SOURCE: ISO 11886:2002, 3.2, modified — “piling equipment, together with the pile” has been replaced by “rock drill rig”. Notes and figures added.]

3.9.2

articulated carrier machine

carrier machine (3.9.1) with an articulated frame which accomplishes the steering of the machine

Note 1 to entry: For articulated frame lock, see ISO 10570.

[SOURCE: ISO 6165:2022, 3.2.6.2, modified — “dumper” has been replaced with “carrier machine”.]

3.9.3

hose reel

drum-like structure around which the hose is wrapped when *tramming* (3.16.15) the machine, on a *rock drill rig* (3.8.1),

Note 1 to entry: On a rock drill rig, the winding mechanism of the reel is powered.

3.9.4

power pack

unit consisting of a power source and a means of transmitting that power to one or more functions on a machine

Note 1 to entry: Typical power sources are *diesel engine* (3.9.9) and electric motors. The typical output is hydraulic or pneumatic, or mechanical gear coupling.

3.9.5

cable reel

device comprising a flexible cable or cord attached to a reel, so constructed that the cord can be wound onto the reel

Note 1 to entry: On a *rock drill rig* (3.8.1), the winding mechanism of the reel is usually powered. The cable reel stores the cable while the machine is *travelling* (3.16.17). During tramming (drilling conditions), the reel can spool/unspool the cable automatically.

3.9.6

load holding valve

valve which is normally closed and is opened by an external force to enable flow of fluid out of a hydraulic actuator

[SOURCE: ISO 15442:2012, 3.1.18]

3.9.7

differential

gear assembly connected to the drive shaft that permits the wheels to turn at different speeds when going around a corner, while transmitting power from the drive shaft to the wheel axles

3.9.8

crawler

closed, articulated belt, driven by *sprocket* ([3.13.35](#)), which steer the machine by their *differential* ([3.9.7](#)) speed

Note 1 to entry: For part names see SAE J727.

3.9.8.1

crawler track roller

intermediate small wheel against one side of the belt or track, transmitting the machine weight to the ground, bearing the heaviest load compared with carrier rollers, idler, and *sprocket* ([3.13.35](#))

3.9.9

diesel engine

internal combustion engine that uses the heat of highly compressed air to ignite a spray of diesel fuel introduced after the start of the compression stroke

Note 1 to entry: For reciprocating internal combustion engines see ISO 2710, ISO 3046, ISO 7967, ISO 9249, ISO 14396, ISO 16147, CISPR 12, EN 1679-1.

[SOURCE: ISO 16147:2020, 3.3, note added.]

3.9.10

electric starter motor

device using electrical energy (electric motor) to rotate the main engine up to firing speed

Note 1 to entry: For auxiliary starting aid electrical connector see ISO 11862.

[SOURCE: ISO 7967-8:2005, 3.18, note added.]

3.9.11

starter battery

electrical energy source connected to the starter motor

Note 1 to entry: The starter battery often powers lights, circuits and systems that are on when the combustion engine is shut off.

[SOURCE: ISO 24195:2022, 3.2, “starter” added. Note added.]

3.10 Rock drilling and rock reinforcement units

3.10.1

bolting unit

rock bolting ([3.5.5](#)) equipment on the machine

3.10.2

drifter

heavy percussive drill requiring some form of rigid mounting

[SOURCE: BS 3618-6:1972]

3.10.3**down-the-hole hammer rock drill****DTH hammer**

down-the-hole drill

cylindrical pneumatic percussive rock drill, fitted with a *drill bit* (3.11.1) and attached directly to the bottom of the *drill string* (3.13.1) so that it can be inserted into the hole as it drills

Note 1 to entry: See [figure 29](#).



Figure 29 — Down-the-hole hammer rock drill

3.10.4**front head**

forward housing of a *top hammer rock drill* (3.10.9)

3.10.5**grouting unit**

unit for mixing, pumping or injecting *grout* (3.15.4), cement, concrete or *drilling* (3.1.11) fluids, on a *rock reinforcement rig* (3.8.4.2)

3.10.6**piston rod**

element transmitting mechanical force and motion from the piston

3.10.7**rotation unit**

set of gears enclosed in a housing, with a protruding threaded spindle that attaches to the *drill pipes* (3.13.2), that is rotated by a hydraulic, electric or pneumatic motor

Note 1 to entry: Rotation units are used on *down-the-hole drilling (DTH)* (3.2.2) and some explorations drill rigs.

Note 2 to entry: Alternatively, the drill pipes are held by a chuck

3.10.8**shank**

internal part of a *top hammer rock drill* (3.10.9) to transfer energy, rotation and impact

Note 1 to entry: It is normally equipped with one threaded end and one end with splines for transfer of rotation and percussion energy.

3.10.9**top hammer rock drill**

machine that transforms hydraulic or pneumatic energy into percussive and rotary energy and transfers it to the *drill bit* (3.11.1) through one or more *drill rods* (3.13.2), is mounted on a *rock drill cradle* (3.13.21) and fed forward by a *drill feed* (3.13.6) along a *feed beam* (3.13.5)

Note 1 to entry: See [figure 30](#).

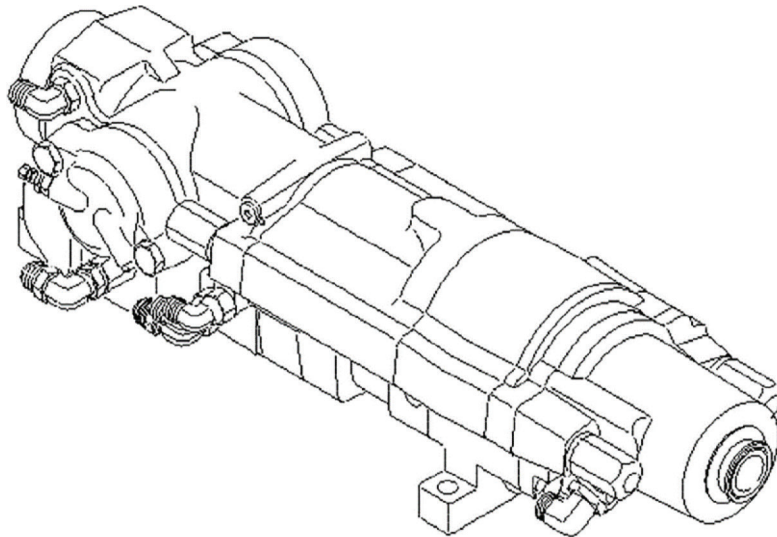


Figure 30 — Top hammer rock drill

3.10.10

top sub

short threaded tube forming the upper part of a *DTH hammer* ([3.10.3](#))

3.11 Drill bits

NOTE For exploration drilling see also ISO 22932-4:2023, 3.5.

3.11.1

bit

drill bit

device attached to, or forming an integral part of, the *drill string* ([3.13.1](#)), used as a cutting tool to penetrate the formation being drilled by the *drilling* ([3.1.11](#)) method employed

[SOURCE: ISO 22475-1:2021, 3.2.2, modified — "bit" has been added as a term and "being drilled by the drilling method employed" in the definition has been added.]

3.11.1.1

chisel bit

percussive *bit* ([3.11.1](#)) having a single cutting edge

[SOURCE: BS 3618-6:1972]

3.11.1.2

cruciform bit

cross bit

percussive *bit* ([3.11.1](#)) having two cutting edges intersecting at right angles

Note 1 to entry: See ISO 1721:1974 for standardised dimensions.

[SOURCE: BS 3618-6:1972]

3.11.1.3

fir tree bit

rotary *bit* ([3.11.1](#)) in which a number of cutting edges are arranged behind a pilot bit to enlarge the hole to the required diameter

Note 1 to entry: See [figure 31](#).



Figure 31 — Fir tree bit

[SOURCE: BS 3618-6:1972]

3.11.1.4

tipped bit

drill bit (3.11.1) in which the cutting edge is made of especially hard material

[SOURCE: BS 3618-6:1972]

3.11.1.5

button bit

drill bit (3.11.1) having button-like spherical, cemented carbide inserts that engage and remove the rock during *drilling* (3.1.11)

Note 1 to entry: See ISO 10207:1991, Figure 7, button type, and ISO 22475-1:2021, Figure C.12.

3.11.1.6

eccentric drill bit

drill bit (3.11.1) where the cutting surfaces are positioned in a non-symmetrical pattern, over the bit face

3.11.1.7

roller bit

drill bit (3.11.1) that breaks rock by creating a shear force that fragments it as it rolls over the rock

Note 1 to entry: See ISO 22475-1:2021, Figures C.11 and C.12.

3.11.2

bit magazine

storage device on a drill rig used to hold and supply the machine with *drill bits* (3.11.1)

3.11.3

cutter wheel

rotating wheel with cutters mounted on its outer diameter surface

3.11.4

backreamer

cutting head attached to the leading end of a *drill string* (3.13.1) to enlarge the pilot bore during a pull-back operation

Note 1 to entry: See *back-reaming* (3.1.1).

3.11.5**drill collar**

thick-walled pipe or tube designed to provide stiffness and concentration of mass at or near *the bit* (3.13.1)

[SOURCE: ISO 10407-2:2008, 3.18]

3.11.6**drill grinding**

grinding of worn *drill bit* (3.11.1)

3.11.7**gauge wear**

wear on the *drill bit* (3.11.1) diameter

3.12 Chuck**3.12.1****chuck**

component of the *drill string* (3.13.1) that provides the connection to the *drill rod* (3.13.2) to transmit *torque* (3.16.13) and thrust from the rock drill or *shank* (3.7.4) to the drill rod

3.12.2**deep chuck**

chuck (3.12.1) type to provide overlapping connection to a *drill rod* (3.13.2) of 75 mm minimum

Note 1 to entry: This is typical for roof *bolting* (3.5.5).

3.13 Drill string**3.13.1****drill string**

all components, such as *drill rods* (3.13.2), bit, stabilizers, etc., that are coupled together for transforming the rotation and/or percussion energy from the drill or rotation unit (3.10.7) and are inserted into the hole when *drilling* (3.1.11)

Note 1 to entry: See [figure 32](#). Drilling tools and rock support are shown in [figure 33](#).

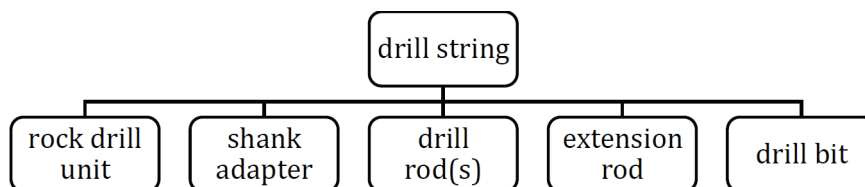


Figure 32 — Drill string

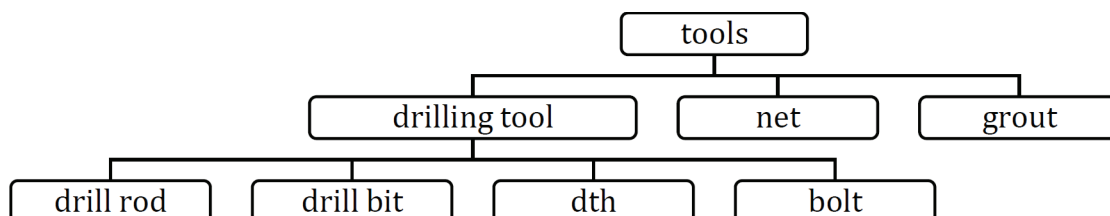


Figure 33 — Drilling tools and rock support

3.13.1.1**drifting drill string**

arrangement of *bit* ([3.13.1](#)), rod and adapter used to drill holes when excavating horizontal transport openings or drifts in underground mining

3.13.2**rill rod****drill pipe**

rod (bar) designed to transfer flushing media, rotation and percussion energy from the rock drill to the *drill bit* ([3.11.1](#))

Note 1 to entry: It can have either threaded or tapered ends, or integral with a drill bit at one end and a striking surface at the other.

3.13.2.1**drifter rod**

robust hexagon-shaped *drill rod* ([3.13.2](#)) used for *drilling* ([3.1.11](#)) *blastholes* ([3.27.1](#)) in tunnels and mining drifts

3.13.2.2**drill rod thread**

thread on a *drill rod* ([3.13.2](#))

Note 1 to entry: For some standardized dimensions see ISO 10208.

3.13.3**extension rod**

threaded or tapered rod that transfers flushing media, rotation and percussion energy between the rock drill and the *drill bit* ([3.11.1](#))

Note 1 to entry: For some standardized dimensions see ISO 1721:1974, Clause 6.

3.13.4**shank adapter**

rod that connects the *drill string* ([3.13.1](#)) to a rock drill

3.13.4.1**crossover adapter**

threaded sleeve (adapter) used to connect two dissimilar threads

3.13.4.2**crossover sub**

short threaded drill tube used to connect to dissimilar threads

3.13.5**feed beam**

structure on which a rock drill is mounted providing linear movement to the rock drill, with all its attachments and parts, and fitted with a rock *drill cradle* ([3.13.21](#)) that is connected to a hydraulic cylinder or motor by pulleys and a cable, or by chains and *sprockets* ([3.13.35](#)), or by rack and pinion

3.13.6**drill feed**

mechanism for advancing the rock drill along the *feed beam* ([3.13.5](#))

3.13.7**feed holder**

device on which the *drill feed* ([3.16.7](#)) is mounted that allows it to move forwards and back to position it against the rock

3.13.8**feed inclination**

angle of *drill feed* ([3.13.6](#)) relative to horizontal plane

3.13.9

chain feed

rock *drill feed* ([3.13.6](#)) where the force applied to move the drill forwards and back is transmitted through a roller chain

3.13.10

chain tensioner

threaded arrangement used to apply tension to the chain of a *chain feed* ([3.13.9](#))

3.13.11

boom

drill boom

structure for positioning of the *mast* ([3.13.20](#)) or *feed beam* ([3.13.5](#)) or *boom-mounted working platform* ([3.20.6](#))

3.13.12

boom beam

main ridged portion of a drill rig *boom* ([3.13.11](#))

3.13.13

boom extension

part of the *boom* ([3.13.11](#)) which is capable of telescopic movement to vary its length

3.13.14

boom bracket

fabricated structure, attached to the rig frame in such a way as to form an attachment for the *boom* ([3.13.11](#))

3.13.15

boom head

structure at the front end of the *boom* ([3.13.11](#)) having attachment points for hydraulic cylinders and the rock *drill feed* ([3.13.6](#))

3.13.16

boom link

device forming an articulation point in the *boom* ([3.13.11](#))

3.13.17

boom support

attachment structure for the *boom* ([3.13.11](#))

3.13.18

boom system

boom ([3.13.11](#)) with all its components and controls

3.13.19

boom walkway

walkway used mainly on long *booms* ([3.13.11](#))

3.13.20

mast

structure for supporting and guiding the *drilling* ([3.1.11](#)) tools on *platform rock drill rigs* ([3.8.5.3](#))

3.13.21

drill cradle

metal channel on which a heavy rock drill is fed forward along the *feed beam* ([3.13.5](#)) or along the *mast* ([3.13.20](#)) as *drilling* ([3.1.11](#)) proceeds

3.13.21.1

cradle indexer

device used to move the rock *drill cradle* ([3.13.21](#))