
Mining — Vocabulary —
Part 1:
Planning and surveying

Exploitation minière — Vocabulaire —
Partie 1: Planification et levé





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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. www.iso.org/directives

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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.

Introduction

The ISO 22932 series has been prepared in order to standardize and to co-ordinate the global use of technical terms in mining, for the benefice 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.

Mining — Vocabulary —

Part 1: Planning and surveying

1 Scope

This document specifies the commonly used terms in mine planning and surveying. Only those terms that have a specific meaning in this field are included.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

3.1 Planning

3.1.1 General terms

3.1.1.1

mining plan

integration of all information about a mining project, from geology, mining and metallurgy, to environment, security, society, etc., with the specific goal to define a project's feasibility

3.1.1.2

contingency plan

strategy and set of actions for responding to a specific situation in which something goes wrong (spill, fire, natural disaster, and other emergencies)

Note 1 to entry: Contingency plans prepare companies to respond to all possible worst-case scenarios.

[SOURCE: Guidebook for Evaluating Mining Project EIAs — Glossary, 2010]

3.1.1.3

plan

mostly large-scale drawing showing features, such as mine workings, geological structures, and outside improvements, on a horizontal plane

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

**3.1.1.4
planning**

predesign of the detailed *layout* ([3.1.4.2](#)), main *roadways* ([3.1.6.24](#)), and workings of a mine or group of mines

Note 1 to entry: The scheme usually involves the introduction of mechanical equipment for the working and transport of the coal or mineral. The selection of mining methods and machines properly adapted to the local conditions is part of planning.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

**3.1.1.5
planning engineer**

mining engineer responsible for mine *planning* ([3.1.1.4](#)), who is attached to the planning department of a large mine or a group of smaller mines and is qualified by training, experience, and technical qualifications to envisage new development work and coordinate the ideas of other experts such as a mechanization engineers, ventilation engineers, mining geologists

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

**3.1.1.6
projection**

<underground mining> *plan* ([3.1.1.3](#)) showing the proposed *direction* ([3.2.12.7](#)) and location of entries, rooms, shafts, fans, and watercourses

Note 1 to entry: Such projections commonly cover the entire property to be worked.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

**3.1.1.7
project plans**

series of plans of a proposed new colliery or *reconstruction* ([3.1.6.23](#)) which are drawn up for the purpose of obtaining approval of the project

[SOURCE: BS 3618-1:1969]

**3.1.1.8
working papers**

field and office notes and calculations relating to the plans, drawings and sections of a mine which are required by law to be preserved

Note 1 to entry: The working papers are sent to the district inspector of mines on the *abandonment* ([3.1.5.2](#)) of the mine.

[SOURCE: BS 3618-1:1969]

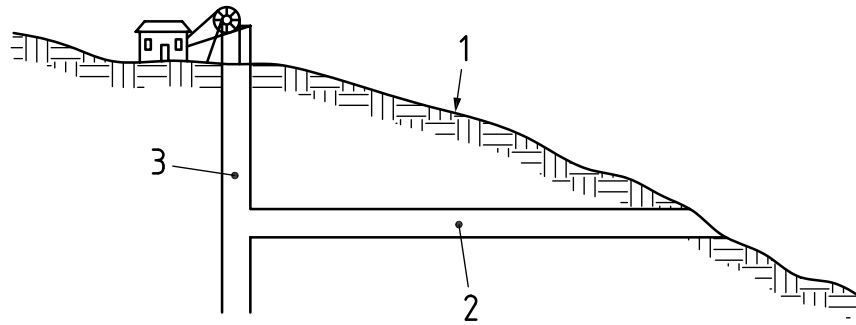
3.1.2 Prospecting

**3.1.2.1
adit**

horizontal opening to an *underground mine* ([3.1.6.32](#)) from the surface

Note 1 to entry: See [Figures 1](#) and [4](#).

[SOURCE: Glossary of Mining Terminology, Indigenous and Northern Affairs Canada, 2007]

**Key**

- 1 surface line
- 2 adit
- 3 shaft

NOTE SOURCE: Reference [22].

Figure 1 — Adit

3.1.2.2**iso-resistivity plan**

plan (3.1.1.3) showing lines of equal resistivity at a certain selected depth

Note 1 to entry: It is prepared from data obtained by the resistivity method of geophysical prospecting.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

3.1.3 Exploration**3.1.3.1****bore journal**

tabular record of the characteristics and thicknesses of strata intersected by a borehole

[SOURCE: BS 3618-1:1969]

3.1.3.2**marketability test**

test determining whether or not a discovered mineral deposit is “valuable” under the meaning of the law, i.e. whether or not the mineral can be extracted and marketed at a profit

[SOURCE: Glossary of BLM surveying and mapping terms, 1980]

3.1.3.3**reserve**

quantity of mineral calculated to lie within given boundaries and described as the total (or gross), workable or probable working, depending on the application of certain arbitrary limits in respect of deposit thickness, depth, quality, geological conditions and contemporary economic factors

Note 1 to entry: See also *possible reserve* (3.1.3.3.1), *probable reserve* (3.1.3.3.2) and *proven reserve* (3.1.3.3.3).

[SOURCE: BS 3618-1:1969]

3.1.3.3.1**possible reserve**

valuable mineralization not sampled enough to accurately estimate its tonnage and grade, or even to verify its existence

Note 1 to entry: See Reference [20].

3.1.3.3.2

probable reserve

area of mineral believed to lie beyond the developed reserve but not yet proven by development

Note 1 to entry: See Reference [20].

3.1.3.3.3

proven reserve

reserves that have been sampled extensively by closely spaced diamond drill holes and developed by underground workings in sufficient detail to render an accurate estimation of grade and tonnage

Note 1 to entry: See Reference [20].

3.1.3.4

sterilized coal

part of a coal seam which, for various reasons, is not mined

[SOURCE: BS 3618-1:1969]

3.1.4 Construction

3.1.4.1

alignment

act of laying out or regulating by line, of adjusting to a line

Note 1 to entry: See also *co-planning* (3.2.3.8).

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

3.1.4.2

layout

<planning> design or pattern of the main *roadways* (3.1.6.24) and workings

Note 1 to entry: The proper layout of mine workings is the responsibility of the manager aided by the *planning* (3.1.1.4) department

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

3.1.4.3

layout

<disposition> diagram showing disposition of machines in a mill's flow line

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

3.1.5 Mine closure

3.1.5.1

abandoned mine

abandoned workings

area formerly used for mining or mineral processing where closure has not occurred or is incomplete

[SOURCE: ISO 20305]

3.1.5.2

abandonment

abandonment of a mining claim, that can be by failure to perform work, by conveyance, by absence, and by lapse of time

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

3.1.5.3**mine closure planning**

process that extends over the mine life cycle and that typically culminates in property relinquishment including planning for decommissioning and reclamation

[SOURCE: ISO 20305]

3.1.6 Exploitation**3.1.6.1****barrier**

mineral or ground left unworked so as to separate workings from each other or from a natural hazard

[SOURCE: BS 3618-1:1969]

3.1.6.2**colliery plan**

plan ([3.1.1.3](#)) of the mine workings, and sections of the shafts and seams being worked, which the colliery manager must keep at the pithead office in accordance with the regulations

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

3.1.6.3**composite plan**

mine *plan* ([3.1.1.3](#)) showing the working in more than one work station

Note 1 to entry: Different working activities are usually distinguished by colors.

[SOURCE: BS 3618-1:1969]

3.1.6.4**contour plan**

plan ([3.1.1.3](#)) drawn to a suitable scale showing surface contours or calculated contours of deposit seams to be developed

Note 1 to entry: These plans are important during the planning stage of a project.

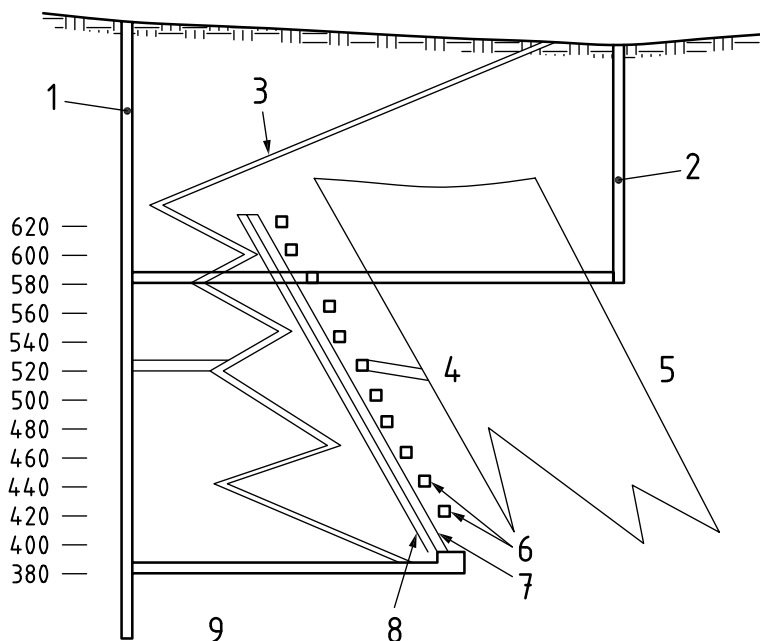
[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

3.1.6.5**crosscut**

small passageway driven at right angles to the main entry to connect it with a parallel entry or air *course* ([3.2.12.4](#))

Note 1 to entry: See [Figures 2](#) and [3](#).

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]



Key

1	main shaft	4	crosscut	7	ore pass
2	ventilation shaft	5	ore body	8	waste pass
3	ramp	6	drifts	9	main level

NOTE SOURCE: Reference [23], reproduced with the permission of the authors.

Figure 2 — Crosscut

3.1.6.6

density

<seam spacing> *indication* (3.2.3.3) of the spacing of seams in the strata

Note 1 to entry: The seam density is said to be high if the seams are close together, or low if they are widely separated.

[SOURCE: BS 3618-1:1969]

3.1.6.7

density

<seam thicknesses> ratio of the sum of the thicknesses of a number of adjacent seams to the thickness of an arbitrarily chosen sequence of strata

[SOURCE: BS 3618-1:1969]

3.1.6.8

deputy's district plan

plan (3.1.1.3) required by law showing the limits of each deputy's district and the meeting stations

[SOURCE: BS 3618-1:1969]

3.1.6.9

development plan

plan (3.1.1.3) showing the proposed development of the mine workings, kept for operational purposes

[SOURCE: BS 3618-1:1969]

3.1.6.10 disused working

working which is no longer in operation but which is not classified as abandoned

[SOURCE: BS 3618-1:1969]

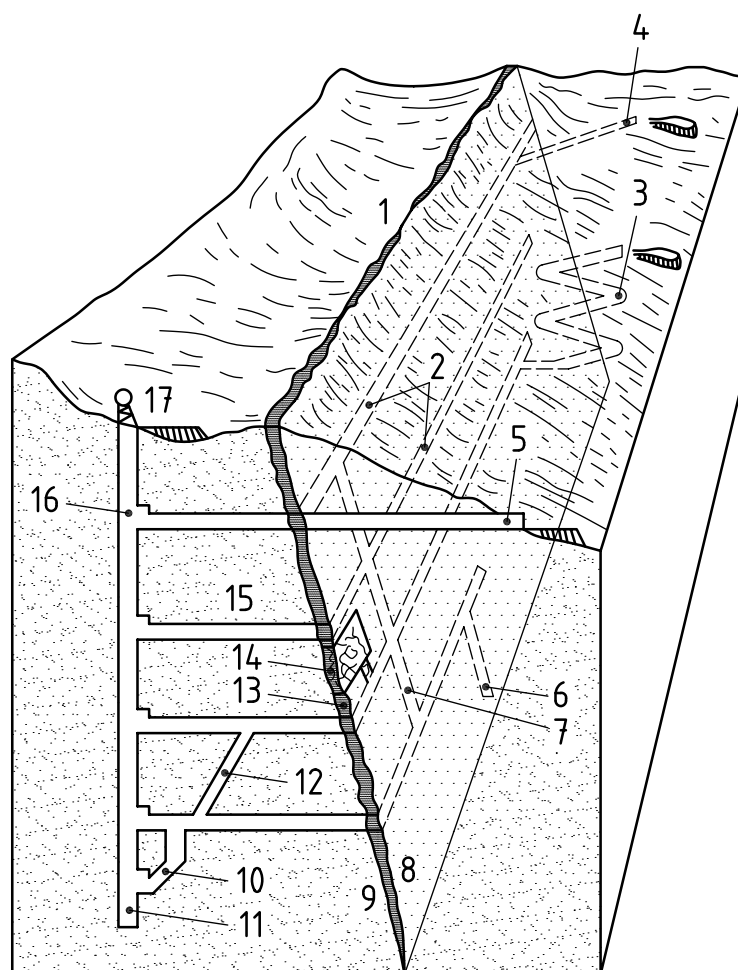
3.1.6.11 drift

horizontal opening in or near a mineral deposit and parallel to the *course* (3.2.12.4) of the vein or long dimension of the deposit

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

Note 2 to entry: Also an inclined haulage road to the surface^[1].

[SOURCE: Surveying, theory and practice, Chapter 20: Mining surveys, 1966]



Key

1 vein outcrop	7 raise	13 pillar
2 drifts	8 hanging wall	14 stope
3 decline spiral (ramp)	9 footwall	15 crosscut
4 incline	10 loading pocket	16 shaft station
5 adit	11 sump	17 shaft collar
6 winze	12 ore pass	

Figure 3 — Drift

3.1.6.12

dust plan

plan ([3.1.1.3](#)) kept with the book in which stone-dust samples are recorded

Note 1 to entry: It shows the sampling zones in each *roadway* ([3.1.6.24](#)), distinguished by color, letter, number, or mark, and identified with that roadway.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

3.1.6.13

electrical plan

plan ([3.1.1.3](#)) required by law showing the position and details of certain electrical apparatus in the mine

[SOURCE: BS 3618-1:1969]

3.1.6.14

end line

<mining law> end lines of a claim, as platted or laid down on the ground, that mark its boundaries on the shorter dimension, where it crosses the vein

Note 1 to entry: If the claim as a whole crosses the vein, instead of following its *course* ([3.2.12.4](#)), the end lines are still the boundaries of the shorter dimension, even though they are along the course of the vein.

[SOURCE: Glossary of BLM surveying and mapping terms, 1980]

3.1.6.15.1

entry

coal heading

underground horizontal or near-horizontal passage used for haulage, ventilation, or as a main way

[SOURCE: Glossary of Mining Terms. Kentucky Mining Institute]

3.1.6.15.2

entry

gate

working place where the coal is extracted from the seam in the initial mining

Note 1 to entry: It is not in an ore to be removed.

[SOURCE: Glossary of Mining Terms. Kentucky Mining Institute]

3.1.6.16

heading

<coal mining> passage leading from the gangway, commonly at right angles

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

3.1.6.17

holing

thirling

meeting of two *roadways* ([3.1.6.24](#)) driven expressly to intersect each other

[SOURCE: BS 3618-1:1969]

3.1.6.18

location plan

map ([3.3.9.1](#)), drawn to a suitable scale, showing the proposed mine development, shafts, works, etc., in relation to existing surface features

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

3.1.6.19**manager's plan**

plan (3.1.1.3) of the workings kept at the office of the mine, in addition to the *working plan* (3.1.6.33), for everyday use by the manager

[SOURCE: BS 3618-1:1969]

3.1.6.20**pumping plan**

plan (3.1.1.3) showing, in addition to the workings of a mine and the *seam contours* (3.1.6.25), the position of pumps, dams and waterlogged areas

[SOURCE: BS 3618-1:1969]

3.1.6.21**raise**

secondary or tertiary inclined opening, vertical or near-vertical, driven upward from a level to connect with the level above, or to explore the ground for a limited distance above one level

Note 1 to entry: See [Figure 4](#).

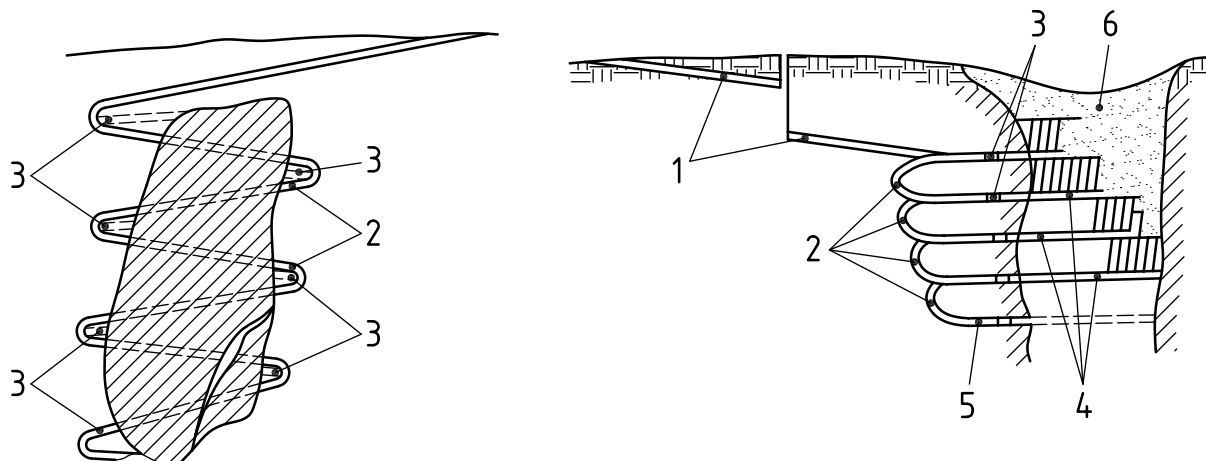
[SOURCE: Glossary of Mining Terms. Kentucky Mining Institute]

3.1.6.22**ramp**

secondary or tertiary inclined opening, driven to connect levels, usually driven in a downward *direction* (3.2.12.7), and used for haulage

Note 1 to entry: See [Figure 4](#).

[SOURCE: Glossary of Mining Terms. Kentucky Mining Institute]

**Key**

1	decline	4	haulage drift
2	ramp	5	drifting
3	crosscut	6	caved rock

NOTE SOURCE: Reference [23], reproduced with the permission of the authors.

Figure 4 — Ramp

3.1.6.23

reconstruction

re-organization of the underground workings, improvement of surface facilities and/or re-equipment of an existing colliery to improve its efficiency and/or increase output

[SOURCE: BS 3618-1:1969]

3.1.6.24

roadway

road

gallery

underground passage driven and maintained to provide access to the mineral deposit or for haulage or ventilation purposes, or for men to travel in the mine

[SOURCE: BS 3618-8:1974]

3.1.6.25

seam contour

line, drawn on a *plan* ([3.1.1.3](#)), joining points on the floor of a seam which have the same height above a prescribed *datum* ([3.2.2.12](#))

[SOURCE: BS 3618-1:1969]

3.1.6.26

sketch plan

plan ([3.1.1.3](#)), required by law to be posted in covered accommodation at the mine, showing telephone stations, means of egress from the workings to the surface, and the main roads

[SOURCE: BS 3618-1:1969]

3.1.6.27

supplementary plans

plans that can be required by law to show in greater detail information not easily depicted on the *working plans* ([3.1.6.33](#))

[SOURCE: BS 3618-1:1969]

3.1.6.28

surface mine

mine in which the ore lies near the surface and can be extracted by removing the covering layers of rock and soil

[SOURCE: Guidebook for Evaluating Mining Project EIAs — Glossary, 2010]

3.1.6.29

surface plan

plan ([3.1.1.3](#)) of the surface *layout* ([3.1.4.2](#)) of a mine

[SOURCE: BS 3618-1:1969]

3.1.6.30

take

parcel

mineral *bearing* ([3.2.8.6.1](#)) area which a mine is permitted to work

[SOURCE: BS 3618-1:1969]

3.1.6.31

unconsolidated surface deposits

surface deposits such as moss, peat, sand, gravel, silt or mud

[SOURCE: BS 3618-1:1969]

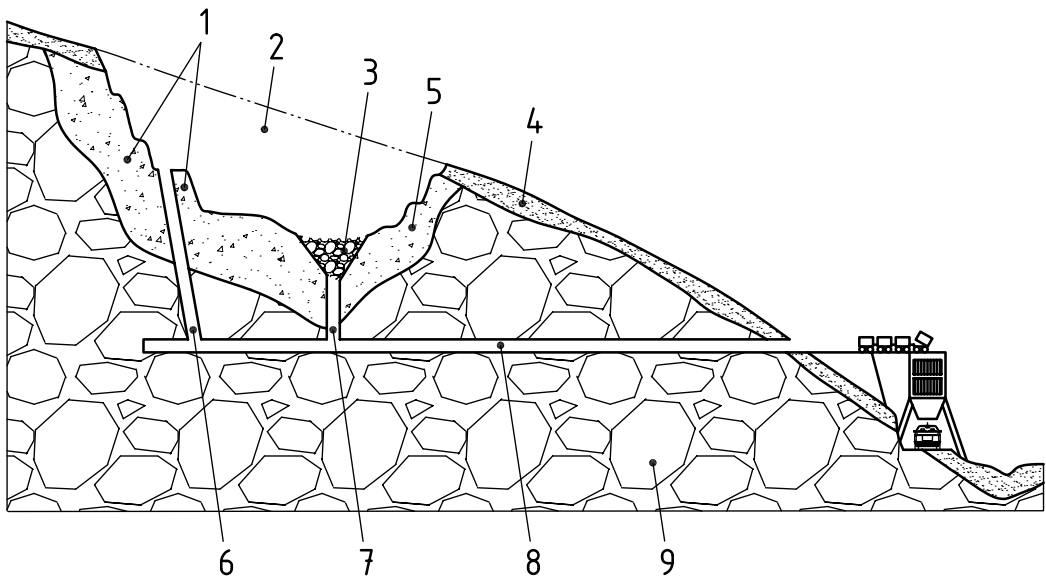
3.1.6.32
underground mine

mineral extraction project where ore is extracted from the subsurface via underground mine workings such as *adits* (3.1.2.1), shafts, *drifts* (3.1.6.11), stopes.

Note 1 to entry: See Figure 5.

Note 2 to entry: An underground mine's ore is removed mechanically and transferred by shuttle car or conveyor to the surface.

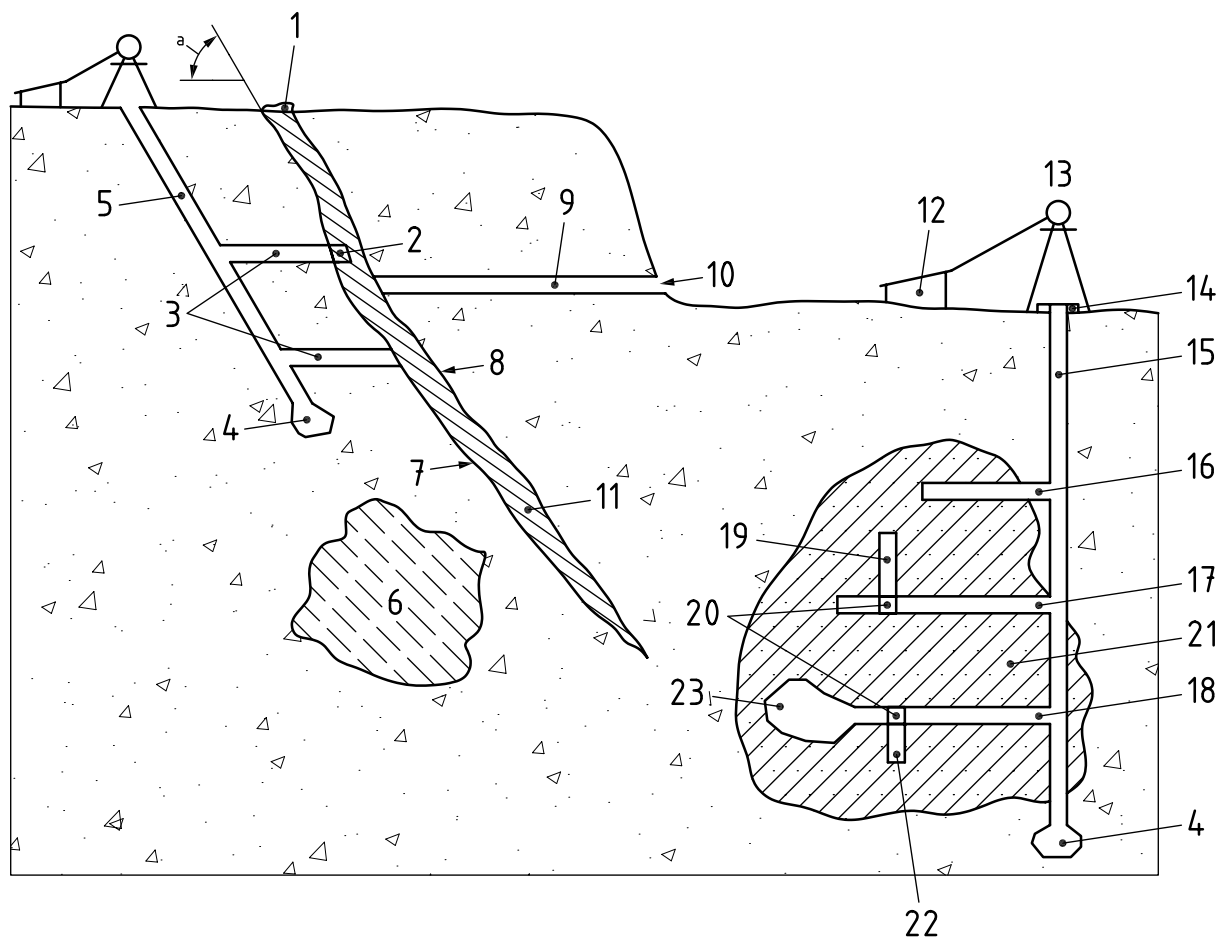
[SOURCE: Guidebook for Evaluating Mining Project EIAs — Glossary, 2010]



a) Underground mine

Key

- | | | |
|--------------|---------|--------------------|
| 1 bench | 4 soil | 7 ore pass |
| 2 glory hole | 5 ore | 8 adit haulage way |
| 3 broken ore | 6 raise | 9 wall rock |



b) Cross section of an underground mine

Key

1	outcrop	9	adit	17	level 2
2	drift	10	portal	18	level 3
3	crosscut	11	vein	19	raise
4	sump	12	hoist house	20	drift
5	inclined shaft	13	head frame	21	massive or deposit
6	undiscovered ore	14	collar of shaft	22	winze
7	footwall	15	vertical shaft	23	stope
8	hanging wall	16	level 1	^a	Dip.

NOTE SOURCE: Reference [14].

Figure 5 — Underground mine

3.1.6.33 working plan

plan (3.1.1.3) required by law showing all the current, disused or *abandoned workings* (3.1.5.1) within the boundaries of the mine and within a stipulated zone adjacent thereto

[SOURCE: BS 3618-1:1969]

3.1.7 Safety and rescue

3.1.7.1

cautionary zone

zone in which unworked coal lies at a specified distance or less from unconsolidated deposits or other sources of danger

[SOURCE: BS 3618-1:1969]

3.1.7.2

firefighting plan

plan ([3.1.1.3](#)) or chart showing the positions of items of firefighting equipment

Note 1 to entry: Separate plans are used for surface buildings and underground workings.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

3.1.7.3

rescue plans

sets of plans required by law that are suitable for use by rescue workers

[SOURCE: BS 3618-1:1969]

3.1.7.4

warning line

line drawn on *working plans* ([3.1.6.33](#)) to indicate the limit beyond which workings should not extend, e.g. because of the proximity of disused or *abandoned workings* ([3.1.5.1](#))

[SOURCE: BS 3618-1:1969]

3.1.8 Ventilation

3.1.8.1

ventilation plan

plan ([3.1.1.3](#)) or drawing required by law showing the ventilation air currents in a mine and the means of controlling them

[SOURCE: BS 3618-1:1969]

3.1.8.2

ventilation planning

plans for a new projected mine or a new seam to be worked from an existing mine, showing the proposed ventilating system, including the quantities of air and pressures and the principal appliances to control and distribute the air

Note 1 to entry: Investigations and calculations are made to select a fan of the necessary type and size for the ventilation required.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

3.2 Surveying

3.2.1 General terms

3.2.1.1

approved survey

survey ([3.2.1.31.1](#)) that has the *field notes* ([3.2.1.11](#)) approved and the *plat* ([3.2.1.20](#)) accepted by the organization official that has been delegated the authority for such action

Note 1 to entry: The terms “*approved survey*” and “*official survey*” are often incorrectly used as being synonymous with “*accepted survey*.”

[SOURCE: Glossary of BLM surveying and mapping terms, 1980]

3.2.1.2

check survey

verification survey

survey ([3.2.1.31.1](#)) made to confirm the positions of established survey stations

[SOURCE: BS 3618-1:1969]

3.2.1.3

colliery surveyor

surveyor appointed to carry out *surveying* ([3.2.1.32](#)) work and to prepare plans and sections of a mine, but who is not the surveyor for the mine

[SOURCE: BS 3618-1:1969]

3.2.1.4

compass survey

survey ([3.2.1.31.1](#)) executed using the magnetic compass

[SOURCE: Glossary of BLM surveying and mapping terms, 1980]

3.2.1.5

conflicting evidence

contradiction or disagreement of the actual ground conditions compared to the record, usually regarding topographic calls or characteristics of *corner* ([3.2.2.8](#)) monumentation

[SOURCE: Glossary of BLM surveying and mapping terms, 1980]

3.2.1.6

control lines

primary control of the surveys consisting of *baselines* ([3.2.11.1](#)), standard parallels, principal *meridians* ([3.2.2.31.1](#)) and guide meridians

Note 1 to entry: Among field surveyors a control line is a *survey* ([3.2.1.31.1](#)) line to the nearest identified *corner* ([3.2.2.8](#)) in *directions* ([3.2.12.7](#)) necessary for restoration of a corner.

[SOURCE: Glossary of BLM surveying and mapping terms, 1980]

3.2.1.7

control survey

survey ([3.2.1.31.1](#)) that provides horizontal or vertical position data for subordinate surveys or mapping

[SOURCE: Glossary of BLM surveying and mapping terms, 1980]

3.2.1.8

coordinates

one of a set of numbers designating linear and/or angular quantities that specify the position of a point on a line, in space, or on a given plane or other surface in relation to a given reference system

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]

3.2.1.9

coordinate system

mathematically defined method for specifying the locations of points

Note 1 to entry: Distances or angles from suitable references locate the points within the system.

[SOURCE: Glossary of BLM surveying and mapping terms, 1980]

3.2.1.10**corrective resurvey**

survey ([3.2.1.31.1](#)) made to correct an erroneous omission of original *corner* ([3.2.2.8](#)) evidence discovered after a survey has been approved

[SOURCE: Glossary of BLM surveying and mapping terms, 1980]

3.2.1.11**field notes**

official written record of the survey, certified by the field surveyor and approved by proper authority

Note 1 to entry: Originally, field notes were prepared by hand, but they are now typewritten.

[SOURCE: Glossary of BLM surveying and mapping terms, 1980]

3.2.1.12**field returns**

field notes ([3.2.1.11](#)), reports and plats submitted for acceptance or approval

[SOURCE: Glossary of BLM surveying and mapping terms, 1980]

3.2.1.13**floor station**

survey ([3.2.1.31.1](#)) station secured in the floor of a mine roadway or working face

[SOURCE: BS 3618-1:1969]

3.2.1.14**geodesy**

science of *measurement* ([3.2.3.10](#)) on or in the vicinity of the ground to determine form, dimensions and the distribution of mass and fields of gravity on the Earth or parts of it

Note 1 to entry: Surveying is the science of measurements necessary to determine the locations of points (features) on or beneath the surface of the Earth.

Note 2 to entry: Where measurements cover such a large part of the Earth's surface that the curvature cannot be ignored, then the operations are termed *geodetic surveying* ([3.2.13.2](#)) or measuring.

[SOURCE: ISO 7078:1985, 1.4]

3.2.1.15**global positioning system****GPS**

satellite-based navigational system permitting the determination of any point on the Earth with high accuracy

Note 1 to entry: See Reference [\[20\]](#).

3.2.1.16**linesman**

assistant to a surveyor

[SOURCE: BS 3618-1:1969]

3.2.1.17**meander**

one of a series of regular, freely developing sinuous curves, bends, or loops in the *course* ([3.2.12.4](#)) of a stream

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996]