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Mining — Vocabulary —

Part 2: Geology

Exploitation minière — Vocabulaire —

Partie 2: Géologie

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Foreword

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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 2:
Geology

1 Scope

This document specifies the geologic terms commonly used in mining. 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 General terms

3.1.1
bedrock
solid rock underlying *superficial deposits* (3.4.3.16)

Note 1 to entry: See also *saddle reef* (3.13.11).

[SOURCE: BS 3618-5:1971]

3.1.2
economic geology
study and analysis of *formations* (3.7.22) and materials that can be useful or profitable to man

Note 1 to entry: These materials can be fuels, metallic *minerals* (3.13.4), nonmetallic *minerals* (3.13.4), water and geothermal resources.

Note 2 to entry: For additional terms related to economic geology, see 3.13.

3.1.3
geochemistry
study of the relative and absolute abundances of the elements and their nuclides (isotopes) in the Earth, including the distribution and migration of the individual elements or suites of elements in the various envelopes of the Earth

Note 1 to entry: The envelopes of the Earth are the atmosphere, the hydrosphere, the lithosphere, etc.

Note 2 to entry: For additional terms related to geochemistry, see 3.9.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996, modified - Note 2 to entry added.]

3.1.4
geohydrology
study of hydraulics pertinent to the flow of water and similar liquids through *soils* (3.1.19) and rocks

Note 1 to entry: For additional terms related to geohydrology, see 3.11.

[SOURCE: BS 3618-5:1971, modified - Note 1 to entry added.]

3.1.5
geology
study of the planet Earth, the materials of which it is made, the processes that act on these materials, the products formed, and the history of the planet and its life forms since its origin

Note 1 to entry: Geology considers the physical forces that act on the Earth, the chemistry of its constituent materials, and the biology of its past inhabitants as revealed by fossils. Clues on the origin of the planet are sought in a study of the Moon and other extraterrestrial bodies. The knowledge thus obtained is placed in the service of humans to aid in discovery of *minerals* (3.13.4) and fuels of value in the Earth's crust, to identify geologically stable sites for major *structures* (3.4.1.4), and to provide foreknowledge of some of the dangers associated with the mobile forces of a dynamic Earth.

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

3.1.6
geomorphology
science that treats the general configuration of the Earth's *surface* (3.1.23), specifically the study of the classification, description, nature, origin, and development of present landforms and their relationships to underlying *structures* (3.4.1.4), and of the history of geologic changes as recorded by these surface features

Note 1 to entry: For additional terms related to geomorphology, see 3.8.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996, modified - Note 1 to entry added.]

3.1.7
geophysics
branch of physics dealing with the Earth using specific physical phenomena in order to elucidate processes of dynamic *geology* (3.1.5) and physical geography

Note 1 to entry: The term "Earth" includes atmosphere and hydrosphere.

Note 2 to entry: The physical phenomena dealt with include seismic, gravitational, electric, thermal, radiometric and magnetic.

Note 3 to entry: Earth sciences such as *geodesy* (3.8.4), geology, *seismology* (3.7.10), meteorology, oceanography, and magnetism make use of physics in collecting and interpreting Earth data.

Note 4 to entry: Methods applying geophysics have been applied successfully to the identification of underground *structures* (3.4.1.4) in the Earth and to the search of structures of a particular type, for example those associated with oil bearing sands.

Note 5 to entry: For additional terms related to geophysics, see 3.10.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996, modified - Note 5 to entry added.]

3.1.8
historical geology
major branch of *geology* (3.1.5) concerned with the evolution of the Earth and its life forms from its origins to the present day, involving investigations into stratigraphy, paleontology, and geochronology, as well as the consideration of paleoenvironments, glacial periods, and plate-tectonic motions

Note 1 to entry: It is complementary to *physical geology* (3.1.15). Not to be confused with the history of geology.

Note 2 to entry: For additional terms related to historical geology, see 3.5.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996, modified - Note 2 to entry added.]

3.1.9
hydrology
study of the movement of water on and within the Earth's crust

Note 1 to entry: See also *hydrogeology* (3.11.4).

Note 2 to entry: For additional terms related to hydrology, see 3.12.

[SOURCE: BS 3618-5:1971, modified - Note 2 to entry added.]

3.1.10
ironstone
rock containing a substantial proportion of an iron compound, or any iron ore from which the metal can be smelted commercially; specifically, an iron-rich *sedimentary rock* (3.4.3), either deposited directly as a ferruginous sediment or resulting from chemical replacement

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

3.1.11
mineralogy
study of *minerals* (3.13.4), including their formation, occurrence, use, properties, composition, and classification

Note 1 to entry: For additional terms related to mineralogy, see 3.3.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996, modified - Note 1 to entry added.]

3.1.12
mining geology
geological aspects of *mineral* (3.13.4) deposits related to mining activities

Note 1 to entry: Its objectives, besides studying the geologic *structures* (3.4.1.4) in place and their continuity in space, are the modes of formation and the occurrence of mineral deposits and their discovery, in particular.

3.1.13
nongraded sediment
bed (3.4.1.1) detrital sediment, loose or cemented, containing notable amounts of more than one grade, e.g. loam or boulder *clay* (3.14.2)

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

3.1.14
petrology
study of the origin, chemical and *mineral* (3.13.4) composition, *structure* (3.4.1.4), and *alteration* (3.4.4.1) of rocks

Note 1 to entry: For additional terms related to petrology, see 3.4.

[SOURCE: BS 3618-5:1971, modified - Note 1 to entry added.]

3.1.15
physical geology
broad division of *geology* (3.1.5) concerned with the processes and forces involved in the inorganic evolution of the Earth and its morphology, and with its constituent *minerals* (3.13.4), rocks, magmas, and core materials

Note 1 to entry: For additional terms related to physical geology, see 3.2.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996, modified - Note 1 to entry added.]

3.1.16
rank
position of a *coal* (3.4.3.1) relative to other coals in the coalification series from brown coal (low rank) to *anthracite* (3.4.4.2) (high rank), indicating its maturity in terms of its general chemical and physical properties

[SOURCE: BS 3618-5:1971]

3.1.17
seam
layer or *bed* (3.4.1.1) of *mineral* (3.13.4)

Note 1 to entry: This term can also be used for minerals.

3.1.18
segregate
to separate from the general mass, and collect together or become concentrated at a particular place or in a certain region

Note 1 to entry: Particles can segregate such as in the process of crystallization or solidification.

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

3.1.19
soil
all unconsolidated materials above *bedrock* (3.1.1)

Note 1 to entry: For additional terms related to soils, see 3.14.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996, modified - Note 1 to entry added.]

3.1.20
subsurface geology
underground geology
geology (3.1.5) and *correlation* (3.5.2) of rock *formations* (3.7.22), *structures* (3.4.1.4), and other features beneath the land or sea-floor *surface* (3.1.23) as revealed or inferred by exploratory drilling, underground workings, and geophysical methods

Note 1 to entry: Usually implies direct evidence derived from shafts, wells, and borings, or obtained by geophysical methods.

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

3.1.21
smut
thin band of soft, inferior *coal* (3.4.3.1)

[SOURCE: BS 3618-5:1971]

3.1.22
structural geology
branch of *geology* (3.1.5) that deals with the form, arrangement, and internal *structure* (3.4.1.4) of the rocks, and especially with the description, representation, and analysis of structures, chiefly on a moderate to small scale

Note 1 to entry: The subject is similar to *tectonics* (3.1.26), but the latter is generally used for the broader regional or historical phases.

Note 2 to entry: For additional terms related to structural geology, see 3.7.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996, modified - Note 2 to entry added.]

3.1.23
surface
boundary surface between one *bed* (3.4.1.1) or mass of rock and another immediately adjacent

EXAMPLE Bedding surface, *fault* (3.7.17) surface, surface of *unconformity* (3.5.8), surface of igneous compact.

Note 1 to entry: This term can also designate an imaginary surface, such as the axial surface of a *fold* (3.7.21).

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

3.1.24
surface geology
geology (3.1.5) and *correlation* (3.5.2) of rock *formations* (3.7.22), *structures* (3.4.1.4), and other features as seen at the Earth's *surface* (3.1.23)

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

3.1.25
surficial geology
geology (3.1.5) of surficial deposits, including *soils* (3.1.19)

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

3.1.26
tectonics
branch of *geology* (3.1.5) dealing with the broad architecture of the outer part of the Earth, i.e., the regional assembling of structural or deformational features, the study of their mutual relations, origin, and historical evolution

Note 1 to entry: It is closely related to *structural geology* (3.1.22), with which it overlaps, although tectonics generally deals with larger features.

Note 2 to entry: For additional terms related to tectonics, see 3.7.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996, modified - Note 2 to entry added.]

3.1.27
topography
general configuration of a land *surface* (3.1.23) or any part of the Earth's surface, including its relief and the position of its natural and manmade features

Note 1 to entry: The natural or physical surface features of a region, considered collectively as to form the features revealed by the *contour* (3.6.3) lines of a map. In nongeologic usage, the term includes manmade features (such as are shown on a topographic map).

Note 2 to entry: For additional terms related to topography, see 3.6.

[SOURCE: Dictionary of Mining, Mineral and Related Terms, U.S. Bureau of Mines, 1996, modified - Note2 to entry added.]

3.1.28
transportation
shifting of material from one place to another on the Earth's *surface* (3.1.23) by moving water, ice, or air

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

3.2 Physical geology

3.2.1
catastrophe
sudden, violent change in the physical conditions of the Earth's *surface* (3.1.23)

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

3.2.2
contact bed
bed (3.4.1.1) lying next to or in contact with a *formation* (3.7.22) of different character

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

3.2.3
field geology
field work
geology (3.1.5) as practiced by direct observation in the field; original, primary reconnaissance

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

3.2.4
geologic drilling
drilling done primarily to obtain information from which the *geology* (3.1.5) of the *formations* (3.7.22) penetrated can be determined

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

3.2.5
geological province
area throughout which geological history has been essentially the same or one that is characterized by particular structural or physiographic features

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

3.2.6
measures
series of beds or strata, nowadays generally limited to rock within the *coal* (3.4.3.1) measures

[SOURCE: BS 3618-5:1971]

3.2.7
rake vein
steeply inclined metalliferous *lode* (3.13.3) or *vein* (3.13.13)

[SOURCE: BS 3618-5:1971]

3.2.8
rider
<physical geology> mass of *country rock* (3.3.5) enclosed in a *lode* (3.13.3)

Note 1 to entry: Compare with 3.4.1.3 and 3.13.9.

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

3.2.9
shell bed
bed (3.4.1.1) containing abundant fossil shells

[SOURCE: BS 3618-5:1971]

3.2.10
slump bedding
disturbed bedding, specifically deformed bedding produced by subaqueous slumping or lateral movement of newly deposited sediment

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

3.2.11
stringer
mineral (3.13.4) veinlet or filament, usually one of a number, occurring in a discontinuous subparallel pattern in host rock

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

3.3 Mineralogy

3.3.1
barren ground
unmineralised strata

3.3.2
blackband ironstone
bed (3.4.1.1) of *ironstone* (3.1.10) containing sufficient *carbonaceous* (3.4.3.14) matter to make it self-calcining

[SOURCE: BS 3618-5:1971]

3.3.3
clay band ironstone
impure *argillaceous* (3.14.1) carbonate of iron occurring in sand stones and *shales* (3.4.3.34), either as definite layers or as nodules

[SOURCE: BS 3618-5:1971]

3.3.4
cleavage
in a crystalline *mineral* (3.13.4), one or more series of parallel planes along which the mineral tends to split

[SOURCE: BS 3618-5:1971]

3.3.5
country rock
rock adjacent to a *mineral* (3.13.4) deposit or igneous *intrusion* (3.4.2.7) or other geologic features

[SOURCE: BS 3618-5:1971]

3.3.6
exsolution
process whereby an initially homogeneous solid solution separates into two (or possibly more) distinct crystalline phases without addition or removal of material, i.e., without change in the bulk composition

Note 1 to entry: It generally, though not necessarily, occurs on cooling.

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

3.3.7
fluid inclusion
cavity, with or without negative crystal faces, containing one or two fluid phases, and possibly one or more minute crystals, in a host crystal

Note 1 to entry: If two fluid phases are present, the vapor phase (bubble) can show Brownian motion.

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

3.3.8
matrix
finer grained material between the larger particles of a rock or the material surrounding a fossil or *mineral* (3.13.4)

[SOURCE: BS 3618-5:1971]

3.3.9
polymorph
minerals (3.13.4) that have the same chemical composition, but different crystal *structures* (3.4.1.4)

EXAMPLE 1 Kyanite, andalusite, and sillimanite.

EXAMPLE 2 Quartz, tridymite, cristobalite, coesite, and stishovite.

3.3.10
polymorphism
characteristic of a chemical compound to crystallize in more than one crystal class

Note 1 to entry: See *polymorph* (3.3.9).

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

3.4 Petrology

3.4.1 General terms

3.4.1.1
bed
layer of rock or *mineral* (3.13.4)

[SOURCE: BS 3618-5:1971]

3.4.1.2
lithology
character of a rock expressed in terms of its *mineral* (3.13.4) composition, *structure* (3.4.1.4), grain size, color and arrangement of its component parts

[SOURCE: BS 3618 -5:1971, modified - definition reworded.]

3.4.1.3
rider
<petrology> *bed* (3.4.1.1) in a *coal* (3.4.3.1) *seam* (3.1.17)

Note 1 to entry: Compare with 3.2.8 and 3.13.9.

EXAMPLE *Shale* (3.4.3.34) or *mudstone* (3.4.3.30).

3.4.1.4
structure
larger feature of a rock mass and total sum of such features

EXAMPLE Bedding, flow banding, jointing, *cleavage* (3.7.8), shear, *fault* (3.7.17) and brecciation.

3.4.1.5
texture
general physical appearance or character of a rock, including the geometric aspects of, and the mutual relations among, its component particles or crystals

EXAMPLE 1 Size, shape, and arrangement of the constituent elements of a *sedimentary rock* (3.4.3).

EXAMPLE 2 Crystallinity, granularity, and fabric of the constituent elements of an *igneous rock* (3.4.2).

Note 1 to entry: The term is applied to the smaller (megascopic or microscopic) features as seen on a smooth *surface* (3.1.23) of a homogeneous rock or *mineral* (3.13.4) aggregate. The term *structure* (3.4.1.4) is generally used for the larger features of a rock. The two terms should not be used synonymously, although certain textural features can parallel major structural features.

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

3.4.2
igneous rock
rock formed by the solidification of molten material that originated within the Earth

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

3.4.2.1
agglomerate
naturally cemented unstratified mass of coarse volcanic fragments

[SOURCE: BS 3618-5:1971]

3.4.2.2
volcanic ash
fine loose debris ejected in volcanic eruptions

Note 1 to entry: It gives rise to *tuff* (3.4.2.17) when compacted.

[SOURCE: BS 3618-5:1971]

3.4.2.3
batholith
bathylith
large, generally *discordant* (3.5.3) plutonic mass that has more than 104 km^2 of *surface* (3.1.23) exposure and no known floor

Note 1 to entry: Its *formation* (3.7.22) is believed by most investigators to involve magmatic processes.

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

3.4.2.4
dolerite
whin
dark crystalline *igneous rock* (3.4.2) forming *intrusions* (3.4.2.7) such as *dykes* (3.4.2.5) and *sills* (3.4.2.16)

[SOURCE: BS 3618-5:1971]

3.4.2.5
dyke
more or less perpendicular wall-like igneous mass intruded into other rocks

[SOURCE: BS 3618-5:1971]

3.4.2.6
hard-rock geology
colloquial term for *geology* (3.1.5) of *igneous rocks* (3.4.2) and *metamorphic rocks* (3.4.4), as opposed to *soft-rock geology* (3.4.3.37)

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