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Structures for mine shafts —

Part 1: Vocabulary

Structures de puits de mine —

Partie 1: Vocabulaire

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Foreword

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

A list of all parts in the ISO 19426 series can be found on the ISO website.

Introduction

Many mining companies, and many of the engineering companies that provide designs for mines, operate globally so ISO 19426 was developed in response to a desire for a unified global approach to the safe and robust design of structures for mine shafts. The characteristics of ore bodies, such as their depth and shape, vary in different areas so different design approaches have been developed and proven with use over time in different countries. Bringing these approaches together in ISO 19426 will facilitate improved safety and operational reliability.

The majority of the material in ISO 19426 deals with the loads to be applied in the design of structures for mine shafts. Some principles for structural design are given, but for the most part it is assumed that local standards will be used for the structural design.

Structures for mine shafts —

Part 1:
Vocabulary

1 Scope

This document specifies the terms and definitions related to the structures for mine shafts, used throughout ISO 19426.

Terms used in mining can vary from conventional engineering usage, and they vary quite considerably between different countries. For this reason, alternative terms are provided in many of the entries. The preferred terms, given in bold type, are those used throughout ISO 19426.

It is assumed that users of this document are familiar with mining, so common terms with normal dictionary usage are not defined. Also, no definitions are provided for terms that can be widely used in mining but are not explicitly used in ISO 19426.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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 http://www.iso.org/obp

— IEC Electropedia : available at http://www.electropedia.org

3.1
bank level
shaft collar
top of the shaft

3.2
bank door
collar door
shaft door
door installed at *bank level* (3.1) that prevents personnel, equipment and material from falling down the shaft

3.3
bottom transom
structural member, or group of members, located at the bottom of the *bridle* (3.7) and used to transfer *underslung loads* (3.85) or tail-rope loads to the *bridle hangers* (3.8)

Note 1 to entry: See Figures 1, 2 and 3.

3.4
box front
gate
structure located at the lower end of a *rock pass* (3.62) used to control *rock* (3.61) flow

3.5
brattice screen
screen to partition off a portion of the shaft to prevent falling objects or spillage moving from one area of the shaft to another

Note 1 to entry: This is usually placed around personnel hoisting compartments to ensure safe hoisting conditions.

3.6
brattice wall
airtight dividing wall partitioning a shaft into two distinct ventilation compartments, one being an upcast compartment and the other a downcast compartment

3.7
bridle
structural frame that includes the *top transom* (3.81), the *bottom transom* (3.3) and the *bridle hangers* (3.8) to form a frame that carries the *cage* (3.11) or *skip* (3.73) body

Note 1 to entry: See Figures 1, 2 and 3.

3.8
bridle hanger
structural member, or group of members, that transfers loads between the *top transom* (3.81) and *bottom transom* (3.3)

Note 1 to entry: See Figures 1, 2 and 3.

3.9
brow beam
beam that supports the concrete layer that stabilizes the hanging wall at a station

3.10
bunton
structural member (usually horizontal) that primarily provides support to the *conveyance* (3.15) *guides* (3.38)

3.11
cage
single or multiple deck *conveyance* (3.15) used for the transportation of personnel, equipment or material (or both) in the shaft

Note 1 to entry: See Figure 1.

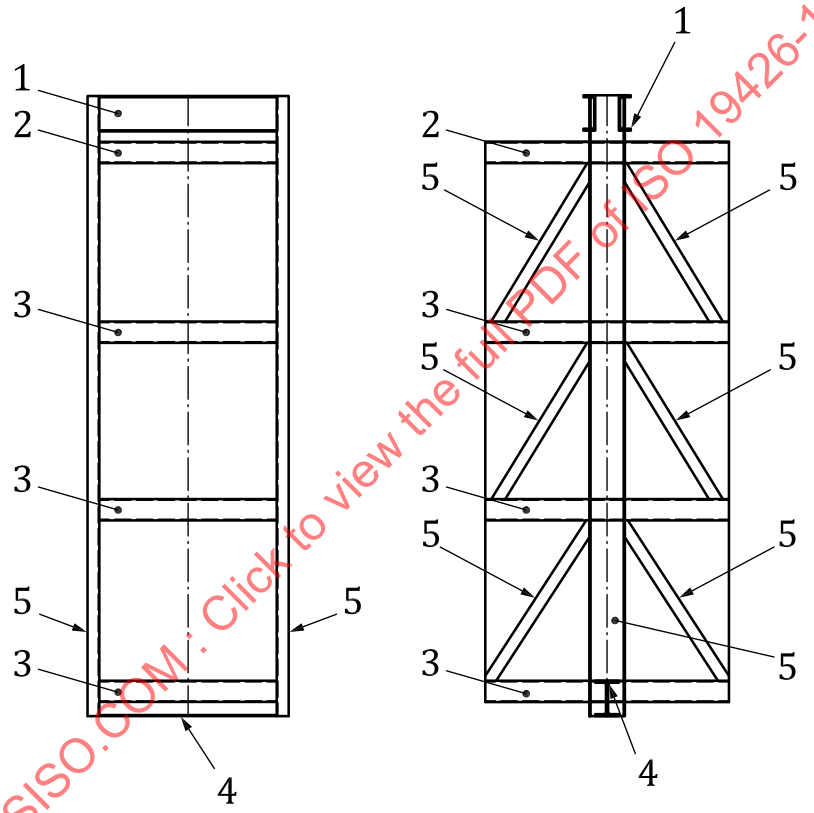
3.12
camelback
raised portion of the path traversed by a roller, used for tipping hoppers in *decline shafts* (3.21) or for providing a gravity locking mechanism on *skips* (3.73) in vertical shafts

3.13
canopy
cover or roof structure, offering protection to persons on the top deck of the *stage* (3.75) or on a *conveyance* (3.15)

3.14
catch plate
spectacle plate
device for operating and supporting the rope-detaching hook in a final *overwind* (3.56) condition, and that subsequently prevents the detached *conveyance* (3.15) from running back down the shaft

3.15
conveyance
container or structure used in a mine shaft to transport a load or perform a task, that includes *counterweight* (3.17), *equipping skeleton* (3.31) cage, inspection platform, *kibble* (3.47), personnel or material cage, *skip* (3.73), sinking cross-head, material cars, hoppers, or cradle

Note 1 to entry: Some typical conveyances are illustrated in Figures 1, 2 and 3.

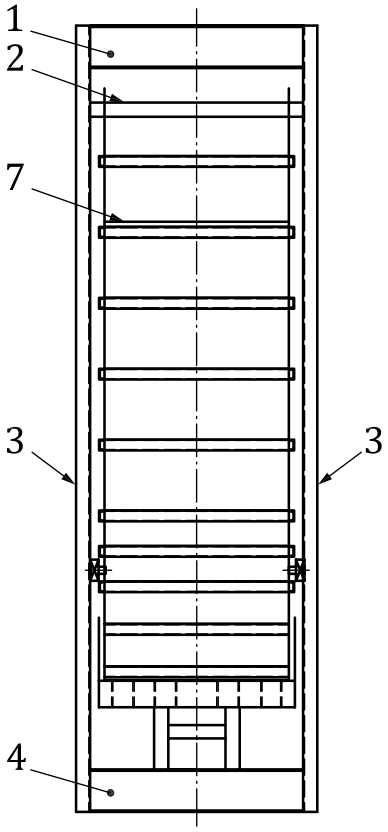


a) Front view **b) Side view**

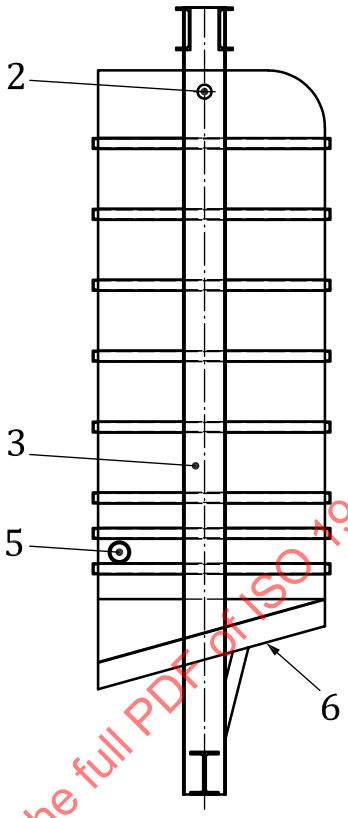
Key

1 top transom (3.81)
2 roof beam
3 floor beam
4 bottom transom (3.3)
5 bridle hanger (3.8)

Figure 1 — Typical 3 deck cage components



a) Front view

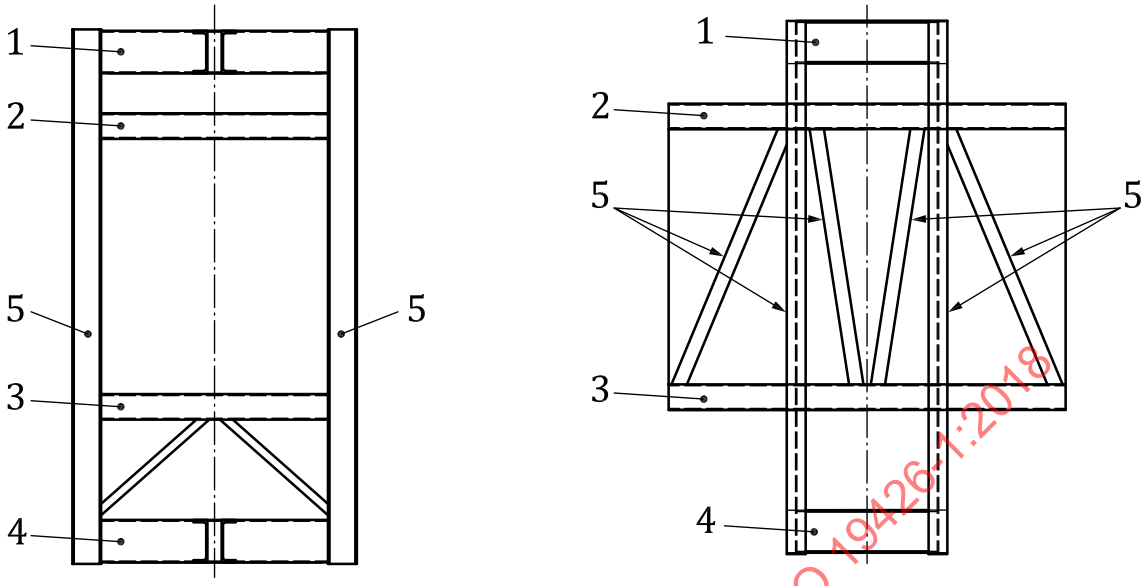


b) Side view

Key

1 top transom (3.81)
2 pivot bar
3 bridle hanger (3.8)
4 bottom transom (3.3)
5 tipping roller
6 door
7 loading lip

Figure 2 — Typical skip components



a) Front view **b) Side view**

Key

1 top transom (3.81)
2 roof beam
3 floor beam
4 bottom transom (3.3)
5 bridle hanger (3.8)

Figure 3 — Typical single deck cage components

3.16
control conveyance
pilot car
conveyance (3.15) in a *decline shaft* (3.21), attached to the haulage rope or the *winding rope* (3.88), that can contain an operator who is in communication with the haulage engine or *winder* (3.87) and that controls the operation of the train

3.17
counterweight
balance mass in a *conveyance* (3.15) winding system

3.18
crash beam
beam intended to stop the *conveyance* (3.15) in the event of a final *overwind* (3.56)

3.19
critical load bearing component
structural components, failure of which would be catastrophic

Note 1 to entry: For *conveyances* (3.15), this includes all *top transoms* (3.81) and *bottom transoms* (3.3), *bridle hangers* (3.8), floor beams and their immediate connecting elements.

3.20
cross beam
beam spanning between the *shaft walls* (3.69) for the purposes of suspending a *stage* (3.75)

3.21
decline shaft
incline shaft
inclined excavation equipped with tracks where people, material or *rock* (3.61) are regularly transported by means of a *winder* (3.87)

Note 1 to entry: The term incline shaft is used if the shaft was excavated from the lower end upwards.

3.22
distributor
kettle
reservoir supported on the *stage* (3.75), that contains the concrete before it is placed in the shaft formwork

3.23
dogging system
device mounted on a *conveyance* (3.15) and intended to stop the conveyance by engaging onto the *guides* (3.38) in the event of loss of *head rope* (3.42) tension

3.24
doubling-down
procedure where a rope is doubled by use of a sheave temporarily attached to the *conveyance* (3.15) to carry out any of the following:

a) installation and changing of *winding ropes* (3.88);

b) cutting of winding rope back ends;

c) lowering of abnormal loads; or

d) tightening of winding rope coils on the *winder* (3.87) drum

3.25 Dropsets

3.25.1
emergency arresting dropset
dropbeam
hinged beam or beams installed in a *decline shaft* (3.21) to arrest a runaway *conveyance* (3.15)

3.25.2
station dropset
pair of hinged beams and tracks that is used to divert a *conveyance* (3.15) from its inclined plane of travel to a horizontal plane at a station

3.26
drop test
test performed by dropping a *conveyance* (3.15) to confirm the adequate performance of the *dogging system* (3.23)

Note 1 to entry: Where the conveyance falls a specified distance before dogging activates, this can be referred to as a free fall test.

3.27
ducksfoot support
<piping system> support fitted to the bend at the bottom of a pipe to permit the direct load of the pipework, fittings and pipe contents to be transferred to the floor, foundation, or associated installations

3.28
ductile material
material where the tensile strength exceeds the yield strength by not less than 20 % and the elongation at rupture is not less than 15 %

3.29
emergency arresting structure
structure mounted in a shaft or headframe for preventing a vehicle from plunging down a shaft, or to arrest a *conveyance* (3.15) in the event of an *overwind* (3.56), or mounted at a station or *bank level* (3.1) for preventing a vehicle plunging into the shaft

3.30
emergency stopping device
device mounted on a *conveyance* (3.15) to slow and stop a conveyance in the event of loss of *winding rope* (3.88) tension, that includes *dogging systems* (3.23) in vertical shafts and emergency braking systems in *decline shafts* (3.21)

3.31
equipping skeleton
conveyance (3.15) used for the equipping and maintenance of a shaft

3.32
fall back arrestor
jack catch
device that prevents a *conveyance* (3.15) from falling back into the shaft after detaching from the rope in a final *overwind* (3.56)

3.33
fall back arrestor lug
component that, during fall back after an *overwind* (3.56), engages on *fall back arrestors* (3.32) installed in the headframe

3.34
fall back arrestor support
conveyance (3.15) element to which a *fall back arrestor lug* (3.33) is attached

3.35
fixed rope winder
single drum or multi-drum *winder* (3.87) in which one end of a rope is fixed to the drum(s)

3.36
formwork winch
winch on the *stage* (3.75), used for the handling of formwork

3.37
friction winder
winder (3.87) that drives a rope (or ropes) by friction between the rope and the drum

Note 1 to entry: The rope is not attached to the winder drum.

3.38
guide
vertical structural member or suspended steel wire rope located in a mine shaft to limit lateral movement of a *conveyance* (3.15)

3.38.1
guide backer
vertical structural member located behind the *guide* (3.38) and serving to improve the strength of the guide, particularly when timber guides are used

3.38.2
flare guide
guide (3.38) that tapers outwards to a larger size towards one end to receive a *conveyance* (3.15) from *rope guides* (3.65) onto fixed guides

3.38.3
spear guide
guide (3.38) that tapers inwards to a smaller size towards one end to receive a *conveyance* (3.15) from *rope guides* (3.65) onto fixed guides

3.39
guide roller
roller that guides a *conveyance* (3.15) on the shaft *guides* (3.38)

3.40
guide shoe
housing for *slipper plates* (3.72) or *rubbing blocks* (3.66), that prevents a *conveyance* (3.15) from disengaging from the *guides* (3.38)

3.41
guide tower
structure that forms part of the headframe, and supports the *conveyance* (3.15) *guides* (3.38), loading, unloading, and tipping arrangements

Note 1 to entry: The guide tower often houses the arresting and detaching devices.

3.42
head rope
rope attached to the *top transom* (3.81), that runs over the *winder* (3.87) or sheaves to safely lift and lower the *conveyance* (3.15) in a friction winder system

3.43
holding device
chairing device
device used to hold the *conveyance* (3.15) in position during loading and unloading and maintenance

3.44
inspection basket
conveyance (3.15) that can be slung underneath or mounted on top of the main conveyance, used for the inspection of, and minor repairs to, the shaft and shaft equipment

3.45
intermediate platform
flat area provided in a long ladder or stair, to ensure that the ladder or stair is not too long from a safety perspective and allows personnel to rest when using the ladder or stair

3.46
jumbo unit
drilling rig suspended below a *stage* (3.75) and used for drilling holes to contain explosives for blasting during shaft sinking

3.47
kibble
bucket
large cylindrical bucket supported by detachable chains, that serves as a means of conveying personnel, equipment, material, *rock* (3.61) and water during the sinking of a shaft

3.48
kibble cross-head
frame that guides the *kibble* (3.47) on the *stage* (3.75) ropes

3.49
kibble cross-head support
structure located on the top deck of the *stage* (3.75) to support the cross-head while the *kibble* (3.47) is in, or below, the stage

3.50
lashing unit
mucking unit
mechanical equipment mounted below the bottom deck of a *stage* (3.75) and equipped with a cactus grab used for loading broken *rock* (3.61) into the *kibble* (3.47)

3.51
ladderway
means of ascent or descent consisting of two stringers with an inclination to the horizontal of between 65° and 90° and connected together by rungs or steps

3.52
ledge
opening in the shaft lining used for purposes of supporting the *cross beams* (3.20) from which a *stage* (3.75) is suspended

3.53
moving beam misalignment of a guide
lateral displacement of a *guide* (3.38) at a *bunton* (3.10), measured from a straight line that connects the guide position at the bunton above the one in question to the guide position at the bunton below the one in question

3.54
operational arresting structure
structure that prevents a *conveyance* (3.15) from moving below a specific level, or beyond a specific point in a *decline shaft* (3.21)

3.55
overspeed device
device mounted on a *conveyance* (3.15) [usually the *control conveyance* (3.16) in a *decline shaft* (3.21)] intended to register if the conveyance, or train, is in an overspeed condition, and activate a brake or other device to stop the conveyance

3.56
overwind
unintentional travel of either an ascending or a descending *conveyance* (3.15) beyond its normal operating limits

3.57
payload
maximum load a *conveyance* (3.15) is designed to carry during normal use

3.58
pipe anchor supports
pipe supports that resist all static, dynamic, thermal, stability and transient loads at the point of support and include loads that react in three dimensions

3.59
protective platform
bulkhead
platform constructed across the entire shaft cross section to provide protection for workers in the shaft below the platform whilst hoisting operations proceed in the shaft above the platform

3.60
replaceable members
structural members of the *stage* (3.75), where mechanical damage is acceptable to the parties concerned, and that are replaced as necessary, as part of the normal maintenance routine for the stage

Note 1 to entry: Replaceable members can include the *kibble* (3.47) *guides* (3.38) through the stage, the bell mouth, the stage deck plates, and the *stage skids* (3.78).

3.61
rock
muck
material transported in *skips* (3.73) or *kibbles* (3.47), including ore and waste, of whatever size from fines up to large pieces

3.62
rock pass
steeply inclined or vertical excavation serving to transfer *rock* (3.61) from a mining level to a lower level

Note 1 to entry: This may also be referred to more specifically as an ore pass or a waste pass.

3.63
rope attachments
element or assembly of elements that transfer loads between the transom and the *winding rope* (3.88) or balance rope, including, where appropriate, thimble, cappel, detaching hook, draw bar, dead eyes and compensating sheaves

3.64 Rope breaking loads

3.64.1
actual rope breaking load
load obtained by testing to destruction a specimen of the unused rope

3.64.2
estimated rope breaking load
minimum strength of the rope calculated by wire rope manufacturers to ensure that the a*ctual rope breaking load* (3.64.1) for 99 % of ropes equals or exceeds this value

3.64.3
nominal aggregate rope breaking load
calculated product of the total nominal cross sectional areas and the nominal tensile strength of all the wires in the rope

3.65
rope guide
tensioned rope that guides the *conveyance* (3.15) in the shaft

3.66
rubbing block
wearing material on the *conveyance* (3.15), located at the *rope guide* (3.65) contact area, used to protect the *guide shoe* (3.40) and *guide* (3.38) rope

3.67
rubbing rope
tensioned rope that prevents collisions between *conveyances* (3.15) guided by *rope guides* (3.65)

3.68
shaft
vertical or inclined excavation equipped with a *winder* (3.87) and intended to provide access to an underground mine

3.69
shaft wall
rock or lining that forms the perimeter of a shaft

3.70
shaft zone
segment of the shaft in which the rock strain is within a given range

Note 1 to entry: See Annex A of ISO 19426-5:2018.