Construction and Safety-related Maintenance of Visitor Mines as a Follow-up Use of Abandoned Mines

Recommendation of Working Group 4.6 Abandoned Mines · Status: 23 June 2026 (Version E9)

Publisher	Working Group Abandoned Mines of DGGT e. V. (WG 4.6) and DMV e. V.
Editors	Robin Hoffmann, Matthias Bock, Christina Seidel
Contributors	Andreas Benthin, Martin Buschmann, Tobias Friedrich, Alfred Geers, Christian Grineisen, Robin Hoffmann, Jitka Kadlčakova, Dietrich Lutz, Tobias Rudolph, Stefan Schnell, Emmerich Schuscha, Falk Seliger, Jan Malte Senger, Jan Starke, Tobias Steinert, Goetz-Wolfram Thauer, Markus Troger, Daniel Wehler, Roy Wings
Advisory board	Prof. Dr.-Ing. Jörg Benndorf, Prof. Dr.-Ing. Peter Goerke-Mallet, Prof. (em.) Dr.-Ing. Herbert Klapperich, Prof. Dr.-Ing. Oliver Langefeld, Dipl.-Ing. Jens-Peter Lux, Dr. Alexander Moser-Tscharf, Dipl.-Ing. Martin Zimmerman, Dipl.-Ing. Matthias Bock

1 Preliminary remarks

Working Group 4.6 Abandoned Mines of DGGT and DMV prepares recommendations on various key aspects of abandoned mines. Abandoned mines comprise all cavities created by mining (mine workings), including boreholes, as well as open pits, spoil heaps, dumps and residual voids that are no longer used for mining purposes (DGGT WG 4.6 2004).

The recommendations are guidelines for a uniform and efficient engineering and mining-technical approach to damage-relevant legacies of abandoned mines. The differentiated mining-technical measures are applied to ensure safety, in particular at the ground surface.

This recommendation focuses on the safety requirements and the necessary technical inspection and monitoring measures for the construction and maintenance of visitor mines. Visitor mines may exhibit geotechnical hazard potentials that can be broadly comparable to situations in active or abandoned mines. This concerns, among other things, the stability of the mine workings, ventilation, the maintenance of walkways and occupational safety in general.

For visitor mines and show caves, mining law applies pursuant to Section 129(1) of the Federal Mining Act (BBergG). The recommendation is primarily geared, in technical terms, to visitor mines that have been or are being established in former, abandoned mines. From a purely technical point of view, however, these recommendations can also be applied to new artificial underground facilities or show caves.

The recommendation is based on the state of knowledge in the relevant national and international technical literature as well as recommendations of DGGT, DMV and DGGV. In particular, the recommendations of Working Group 4.6 Abandoned Mines of DGGT (DGGT WG 4.6 2020) and the recommendations of Working Group 2.10 Geotechnical Measurements of DGGT (DGGT WG

2.10 2022) are to be mentioned as a basis. Furthermore, the statutory regulations as well as the generally recognised rules of occupational safety and of technology are to be complied with for the underlying activities and installations.

2 Definition

In terms of mining law, a visitor mine comprises the mine workings of an abandoned mine in which exploration for or extraction of mineral resources was carried out underground and which are to be, or have been, made accessible to the public for organised visits.

The term visitor mine does not cover parts of a mine still in operation that are open to visitors, or replicas of mine workings created merely for demonstration purposes.

By contrast, since the reason for the visit is irrelevant, underground workings that are visited for medical reasons, such as so-called therapeutic galleries (e.g. for asthma treatment), as well as so-called association-run mines, are to be regarded as visitor mines.

3 Scope delimitation

This recommendation does not cover questions of nature conservation and water law, nor the actual operation of the respective visitor mine (under mining law), such as organisation and staff deployment.

Nor does this recommendation deal with electrical installations, dewatering systems, shaft and inclined hoisting installations or the use of machinery for demonstration purposes, for which special regulations (e.g. BVOS – mining ordinances for shaft and inclined hoisting installations) or likewise the generally recognised rules of technology apply.

4 Requirements for the construction of visitor mines

Work to establish visitor mines generally corresponds to mining activities and therefore requires certain precautions with regard to the hazards specific to mining as well as special expertise.

When converting old mine workings into visitor mines, the focus is to be placed on the stability of the rock mass, protection against rock fall, the elimination or securing of fall hazards, ensuring adequate ventilation and the safe drainage of mine water, as well as the load-bearing capacity of the support and securing structures.

For the future operation of a visitor mine, the aforementioned requirements must be ensured at all times.

Unused areas of visitor mines as well as parts of them in which persons may be endangered when entering are to be effectively closed off. The barrier must be designed in such a way that the closed-off areas are clearly recognisable to visitors and cannot be entered by visitors without hindrance (cf. inter alia DIN 18065). In principle, these duties arise from the general duty to maintain safety (civil law). Typical traffic safety requirements apply to visitor routes:

- Securing of edges with a fall hazard and of vertical mine workings
- Creation and maintenance of non-slip paths and of stable adits and drifts
- Ensuring adequate lighting and the provision of escape routes
- Warning signs in the case of unavoidable hazards
- Regular inspection of the paths

The Federal Mining Act applies to visitor mines. With regard to their design, however, requirements from the state building codes, the technical rules for workplaces and accident prevention regulations are also frequently applied or demanded by insurers (e.g. liability insurance).

The following guide values and measures have often proved successful in practice in visitor mines:

- Path width approx. 1.0 m; 1.5 m or more where visitors pass in both directions
- Railing height in accordance with DIN 18065
- Avoid openings through which persons could climb or fall
- Slip-resistant walkways (e.g. gratings, textured concrete paths, profiled timber planks, etc.)
- Gratings or load-bearing cover plates over shafts
- Lockable access doors or grilles
- Lighting 50 to 100 lx

The operator must also take the necessary precautions against hazards for persons who stay or work outside the visitor routes but within the boundaries of the visitor mine. This means that traffic safety and sure footing underground are ensured by a prescribed, paved route.

Tour routes are to be clearly marked. Securing measures within the scope of the duty to maintain safety (e.g. railings, condition of the floor, etc.) are to be taken. Exits and escape routes, as well as closed-off mine areas, are to be clearly signposted.

As a matter of principle, a second accessible exit is to be provided when establishing visitor mines originating from abandoned mines. Deviations from this principle are subject to a strict standard. Prerequisites for this are, in particular, competent rock and the lowest possible fire load.

Tour routes must be illuminated independently of any lighting of exhibits. The spacing of the lights should be chosen so that the illuminated areas adjoin one another. The installation of emergency lighting is recommended. As a rule, a stationary lighting circuit should be installed as emergency lighting. If the mine is supplied with electricity from the public grid, an emergency power supply must be ensured which automatically takes over the supply, in particular of the emergency lighting, in the event of a power failure. Except for repair and maintenance purposes, this must be

kept ready for operation during operating hours. Stationary lighting and emergency lighting may be dispensed with in special individual cases if every visitor is equipped with a personal lamp and the guide(s) with at least two personal lamps.

Before guided tours begin, any existing natural ventilation is to be assessed and, if necessary, supported by artificial (mechanical) ventilation. During guided tours, the supply of sufficient fresh air to the visitor mine must be guaranteed. Rules for the use of fans are to be drawn up.

Many visitor mines are located in areas with elevated radon exposure. Here, the aspects of radiation protection for employees must always be observed. In particular, it should be noted that visitor mines are workplaces pursuant to Annex 8, item 1, in conjunction with Section 127(1) no. 2 of the Radiation Protection Act (StrlSchG). Consequently, a measurement of the radon concentration (radon-222 activity concentration in the air or in the mine air) must be carried out within 18 months of the commencement of activities in the mine workings. Consultation with the competent radiation protection authority is advisable. The person responsible for the workplace is the operator of the respective visitor mine.

Flammable liquids, flammable lubricants and cleaning agents as well as technical oils required as operating materials may only be stored in visitor mines in closed, non-combustible containers. Used lubricants and cleaning agents as well as technical oils are to be removed from the visitor mine without delay.

Fire extinguishing equipment must be kept available in proportion to the existing fire load.

An emergency and alarm plan is to be drawn up for possible accidents or emergencies. This emergency and alarm plan is a mandatory part of the operating plan for operations under mining supervision and is also to be taken into account when drawing up operating instructions. The aforementioned plan must regulate, among other things, the conduct of staff in rescuing persons and containing hazardous situations.

5 Requirements for the maintenance of visitor mines

Work to maintain visitor mines likewise largely corresponds to mining activities and the associated principles.

Outside tour hours, the secure closure of the visitor mine is to be ensured. For example, adit portals can be closed with a steel gate or grille. The lower the security of the closure method, the higher the inspection obligation for the closure, and vice versa.

In the maintenance and operation of visitor mines, permanent and periodic inspection obligations as well as event-related and periodic securing and maintenance measures must be complied with or carried out. The scope and intervals of inspections are determined by the requirements of the competent mining authority, of any experts involved or of the operator.

Depending on the size and condition of the facility, regular inspections of the visitor routes and of the rock mass are to be carried out or commissioned. Such inspections should be documented in a suitable form, e.g. in the operations log or adit log.

The rock mass, the support, existing securing structures and installations serving visitor traffic are to be inspected by a competent person at intervals to be specified.

Where mine workings have been driven in rock that is competent but prone to weathering or loosening, periodic scaling work is to be carried out. For this purpose, the affected areas are first to be identified by competent personnel, so that these sections can then be specifically checked for loose rock and this can be removed ("scaling"). The frequency of these scaling rounds is to be adapted to the respective conditions of the visitor mine, and the scaling rounds are to be documented in the operations log.

Regular monitoring of the mine air is to be provided where necessary. When specifying the intervals for monitoring the mine air, operational conditions and seasonal fluctuations are to be taken into account. A strict smoking ban should apply underground.

Furthermore, dust exposure is to be determined where necessary and, if appropriate, dust control measures are to be taken.

6 Selected references

DGGT AK 4.6 (2004): Empfehlung „Geotechnisch-markscheiderische Untersuchung und Bewertung von Altbergbau" – Veröffentlichung 4. Altbergbaukolloquium 04. bis 06.11.2004 in Leoben, Anhang, S. 1–23, Verlag Glückauf Essen. [Recommendation "Geotechnical and mine-surveying investigation and assessment of abandoned mines"]

DGGT AK 4.6 (2020): Geotechnisch-markscheiderische Untersuchung, Bewertung und Sanierung von altbergbaulichen Anlagen – Empfehlungen des Arbeitskreises 4.6 „Altbergbau". [Geotechnical and mine-surveying investigation, assessment and remediation of abandoned mine facilities – Recommendations of Working Group 4.6 "Abandoned Mines"]

DGGT AK 2.10 (2022): Empfehlungen des Arbeitskreises 2.10 – Geomesstechnik der DGGT. [Recommendations of Working Group 2.10 – Geotechnical Measurements of DGGT]

Sächsisches Oberbergamt: Richtlinie für den Betrieb von Besucherbergwerken und Besucherhöhlen (Richtlinie Besucherbergwerke – RL BesBergw), 06.09.2009. [Saxon Mining Authority: Guideline for the operation of visitor mines and show caves]

Bayerisches Staatsministerium für Wirtschaft, Verkehr und Technologie: Hinweise zur Handhabung des Betriebsplanverfahrens für Besucherbergwerke und Besucherhöhlen (Nr. 6139b – VI/6a – 5137), 05.02.1998. [Bavarian State Ministry: Notes on the operating plan procedure for visitor mines and show caves]

Oberbergamt Clausthal: Hinweise zur Handhabung des Betriebsplanverfahrens für Besucherbergwerke und Besucherhöhlen (AZ: 10.2–6/86 III B VI f 2.5.3–I), 26.11.1986. [Clausthal Mining Authority: Notes on the operating plan procedure for visitor mines and show caves]

Regierungspräsidium Freiburg: Merkblatt für die Errichtung und den Betrieb von Besucherbergwerken und -höhlen, 30.06.2005. [Freiburg Regional Council: Information sheet on the construction and operation of visitor mines and show caves]

Länderausschuss Bergbau: Reichweite der bergaufsichtlichen Befugnisse bei der Nutzung von Besucherbergwerken und Besucherhöhlen für Sonderveranstaltungen (AZ: 01/05–B II f 5.6–II), 26.04.2005. [Federal States' Committee on Mining: Scope of mining supervisory powers when visitor mines and show caves are used for special events]

Kühne / von Hammerstein / Keienburg / Kappes / Wiesendahl: Bundesberggesetz (BBergG), Kommentar, 3. Auflage, Walter de Gruyter GmbH, Berlin, 2023. [Federal Mining Act, commentary, 3rd edition]