Surface Ground Control Checklist

§ 56.2 Definitions.

Authorized person means a person approved or assigned by mine management to perform a specific type of duty or duties or to be at a specific location or locations in the mine.

Barricaded means obstructed to prevent the passage of persons, vehicles, or flying materials.

Barrier means a material object, or objects that separates, keeps apart, or demarcates in a conspicuous manner such as cones, a warning sign, or tape.

Berm means a pile or mound of material along an elevated roadway capable of moderating or limiting the force of a vehicle in order to impede the vehicle's passage over the bank of the roadway.

Competent person means a person having abilities and experience that fully qualify him to perform the duty to which he is assigned.

High potential means more than 650 volts.

Highway means any public street, public alley, or public road.

Mobile equipment means wheeled, skid-mounted, track-mounted, or rail-mounted equipment capable of moving or being moved.

Overburden means material of any nature, consolidated or unconsolidated, that overlies a deposit of useful materials or ores that are to be mined.

Scaling means removal of insecure material from a face or highwall.

Travelway means a passage, walk or way regularly used and designated for persons to go from one place to another.

Working place means any place in or about a mine where work is being performed.

Subpart B—Ground Control

§ 56.3000 Definitions.

The following definitions apply in this subpart.

Travelway. A passage, walk, or way regularly used or designated for persons to go from one place to another.

§ 56.3130 Wall, bank, and slope stability.

Mining methods shall be used that will maintain wall, bank, and slope stability in places where persons work or travel in performing their assigned tasks. When benching is necessary, the width and height shall be based on the type of equipment used for cleaning of benches or for scaling of walls, banks, and slopes.

🛠️ Purpose of the Regulation

This rule is designed to **protect miners** by ensuring that the terrain they work around—walls, banks, and slopes—is stable and safe. Unstable ground can lead to serious hazards like rockfalls, landslides, or collapses.

📌 Key Requirements

- **Stability Maintenance**: Mining methods must ensure that any wall, bank, or slope where people work or travel remains stable.
- **Benching Guidelines**:
    - If benching (creating horizontal steps or ledges) is needed, its **width and height** must be tailored to the **type of equipment** used.
    - This includes equipment for **cleaning benches** or **scaling** (removing loose material) from walls and slopes.

🧠 Practical Implications

- **Engineering & Planning**: Mine operators must assess geological conditions and design benches accordingly.
- **Safety Protocols**: Regular inspections and scaling operations are crucial to prevent hazardous conditions.
- **Equipment Consideration**: Larger equipment may require wider benches for safe maneuvering and effective scaling.

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56.3130 Wall, Bank, and Slope Stability

This standard requires that mining methods that will maintain wall, bank, and slope stability shall be used in places where persons work or travel in performing their assigned tasks.

Consistent with this standard, MSHA requires that a bench located immediately above the area where miners work or travel be maintained in a condition adequate to retain material that may slide, ravel, or slough onto the bench from the wall, bank, or slope. However, there may be instances in which the ground conditions at a mine present a particular hazard. In such situations, more than one bench above the area where miners work or travel must be maintained in a condition adequate to retain material that may come onto the bench from the wall, bank, or slope. It is normally expected that one bench will be so maintained, but if more than one bench above the area where miners work or travel is necessary, only the number of benches necessary to provide adequate protection will be required to be maintained.

A bench may be considered adequate even if material has accumulated on the bench. In determining whether a bench with material accumulated on it is adequate, consideration shall be given, but not limited to the following factors: (a) the method of mining; (2) the amount of material on the bench; (3) the amount and rate of material coming onto the bench; (4) the angle of the bank, wall, or slope, particularly if it is close to the angle of repose; (5) the composition of the wall, bank, or slope; and (6) the configuration of the bench.

If the bench immediately above an area where miners work or travel is no longer adequate to catch material, and sending miners and equipment onto the bench to clean it presents a greater hazard than raveling or sloughing, cleaning is not appropriate. Examples of such circumstances may be where there are concerns about the stability of the bench itself, concerns that removal of material from the bench would destabilize the slope immediately above the bench, or concerns that the equipment could overtravel the edge of the bench. Where the bench cannot be safely cleaned, other measures shall be taken to protect miners. Other measures may include placing a berm at the base of the wall, bank, or slope to prevent the overtravel of material into the area where miners work or travel or ceasing mining in the affected area.

§ 56.3131 Pit or quarry wall perimeter.

In places where persons work or travel in performing their assigned tasks, loose or unconsolidated material shall be sloped to the angle of repose or stripped back for at least 10 feet from the top of the pit or quarry wall. Other conditions at or near the perimeter of the pit or quarry wall which create a fall-of-material hazard to persons shall be corrected.

🧱 What the Regulation Requires

- **Loose or Unconsolidated Material**:
  - Must be **sloped to the angle of repose** (the steepest angle at which material remains stable without sliding), **or**
  - **Stripped back at least 10 feet** from the top edge of the pit or quarry wall.
- **Fall-of-Material Hazards**:
  - Any other conditions near the wall perimeter that could cause material to fall and endanger workers must be **identified and corrected**.

⚠️ Why This Matters

This rule is all about **preventing rockfalls, landslides, and other ground control hazards** that could injure workers operating near highwalls or pit edges. It's especially critical in areas where:

- Equipment is operating near the edge
- Workers are scaling, inspecting, or maintaining benches
- Natural erosion or blasting may destabilize material

🛡️ Safety Measures You Might See

- **Benching and Scaling**: Creating horizontal steps and removing loose rock
- **Protective Berms**: Barriers to catch falling debris
- **Regular Inspections**: Monitoring for erosion, overhangs, or water accumulation
- **Engineering Controls**: Adjusting slope angles or reinforcing walls

§ 56.3200 Correction of hazardous conditions.

Ground conditions that create a hazard to persons shall be taken down or supported before other work or travel is permitted in the affected area. Until corrective work is completed, the area shall be posted with a warning against entry and, when left unattended, a barrier shall be installed to impede unauthorized entry.

⚠️ What the Regulation Requires

- **Immediate Action**: If ground conditions pose a hazard to workers, they must be either:
  - **Taken down** (e.g., removing loose rock or unstable material), or
  - **Supported** (e.g., installing bolts, mesh, or other structural reinforcements)
- **Restricted Access**:
  - No work or travel is allowed in the affected area **until it's made safe**
  - The area must be **posted with warning signs**
  - If the area is **left unattended**, a **physical barrier** must be installed to prevent unauthorized entry

🛠️ Why This Matters

This rule is all about **preventing injuries from rockfalls, collapses, or unstable ground**. It ensures that:

- Workers aren't exposed to unsafe conditions
- Hazards are clearly marked and physically blocked off
- Corrective actions are taken **before** resuming operations

🧰 Common Safety Practices

- **Scaling operations** to remove loose material
- **Installing ground support systems** like rock bolts or mesh
- **Using barricades and signage** to secure hazardous zones
- **Routine inspections** by qualified personnel

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56/57.3200 Correction of Hazardous Conditions

This standard prohibits work or travel, other than corrective work, in areas where hazardous ground conditions exist. Posting of a warning against entry is required until corrective work is completed if workers could enter the area inadvertently. In addition, barriers are required if the area is left unattended prior to the completion of the corrective work. The mode of travel in the area must be evaluated to determine what type of barrier is appropriate to "impede" unauthorized entry. Examples of barriers would be piles of muck, piles of large boulders or a timber barricade. These barriers would have openings to allow access for persons who are correcting the hazardous conditions. These posting and barrier requirements do not apply to underground face areas under development where the corrective work is performed on a continuing basis as a part of the mining cycle, and the only workers exposed are those engaged in the corrective activity.

§ 56.3201 Location for performing scaling.

Scaling shall be performed from a location which will not expose persons to injury from falling material, or other protection from falling material shall be provided.

🪨 What Is Scaling?

Scaling is the removal of loose or unstable material—like rocks or debris—from mine walls, ceilings, or slopes to prevent it from falling unexpectedly. It's a critical safety procedure in mining operations.

⚠️ What the Regulation Requires

- **Safe Positioning**: Workers must perform scaling from a location that does **not expose them to falling material**.
- **Alternative Protection**: If a safe location isn't possible, then **other protective measures** must be provided. This could include:
    - Protective barriers or screens
    - Remote-controlled equipment
    - Personal protective equipment (PPE)

🛠️ Practical Safety Measures

- **Use of Mechanical Scalers**: These allow scaling from a distance, reducing exposure.
- **Scaling from Above or the Side**: Avoid working directly beneath loose material.
- **Installing Catchment Systems**: Nets or barriers to intercept falling debris.
- **Training and Supervision**: Workers must be trained to recognize hazardous conditions and use equipment properly.

📚 Why It Matters

Scaling is inherently risky. This regulation ensures that miners are either **physically removed from danger zones** or **shielded from falling hazards**, dramatically reducing the risk of injury or fatality.

§ 56.3202 Scaling tools.

Where manual scaling is performed, a scaling bar shall be provided. This bar shall be of a length and design that will allow the removal of loose material without exposing the person performing this work to injury.

🔧 What the Rule Requires

- **Manual Scaling**: When workers are manually removing loose rock or debris from mine walls or ceilings (a process known as scaling), they must be provided with a **scaling bar**.
- **Tool Design**: The scaling bar must be:
  - **Long enough** to allow the worker to stay at a safe distance
  - **Designed properly** to effectively remove material **without exposing the worker to injury**

🛡️ Why It Matters

This regulation is all about **minimizing risk from falling material** during scaling operations. Using the right tool helps:

- Keep workers out of the fall zone
- Prevent injuries from sudden rock dislodgement
- Improve control and efficiency during scaling

🧰 Common Features of a Safe Scaling Bar

- **Lightweight but durable** (often made of aluminum or steel)
- **Textured grip** for better handling
- **Curved or pointed ends** to pry loose material
- **Shock-absorbing design** to reduce vibration

§ 56.3203 Rock fixtures.

(a) For rock bolts and accessories addressed in ASTM F432-95, “Standard Specification for Roof and Rock Bolts and Accessories,” the mine operator shall—

(1) Obtain a manufacturer's certification that the material was manufactured and tested in accordance with the specifications of ASTM F432-95; and

(2) Make this certification available to an authorized representative of the Secretary and to the representative of miners.

(b) Fixtures and accessories not addressed in ASTM F432-95 may be used for ground support provided they—

(1) Have been successful in supporting the ground in an area with similar strata, opening dimensions and ground stresses in any mine; or

(2) Have been tested and shown to be effective in supporting ground in an area of the affected mine which has similar strata, opening dimensions, and ground stresses as the area where the fixtures are expected to be used. During the test process, access to the test area shall be limited to persons necessary to conduct the test.

(c) Bearing plates shall be used with fixtures when necessary for effective ground support.

(d) The diameter of finishing bits shall be within a tolerance of plus or minus 0.030 inch of the manufacturer's recommended hole diameter for the anchor used. When separate finishing bits are used, they shall be distinguishable from other bits.

(e) Damaged or deteriorated cartridges of grouting material shall not be used.

(f) When rock bolts tensioned by torquing are used as a means of ground support,

(1) Selected tension level shall be—

(i) At least 50 percent of either the yield point of the bolt or anchorage capacity of the rock, whichever is less; and

(ii) No greater than the yield point of the bolt or anchorage capacity of the rock.

(2) The torque of the first bolt, every tenth bolt, and the last bolt installed in each work area during the shift shall be accurately determined immediately after installation. If the torque of any fixture tested does not fall within the installation torque range, corrective action shall be taken.

(g) When grouted fixtures can be tested by applying torque, the first fixture installed in each work place shall be tested to withstand 150 foot-pounds of torque. Should it rotate in the hole, a second fixture shall be tested in the same manner. If the second fixture also turns, corrective action shall be taken.

(h) When other tensioned and nontensioned fixtures are used, test methods shall be established to verify their effectiveness.

(i) The mine operator shall certify that tests were conducted and make the certification available to an authorized representative of the Secretary.

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56/57.3203 Rock Fixtures
This standard contains the requirements for installation and testing of all rock fixtures and accessories used for ground support. In all cases where rock fixtures are selected as the method used to support ground, they must meet the requirements of 56/57.3203.

All bolts tensioned by torquing must be within the torque range set out in paragraph (f)(1). Mine operators are required to test the first, tenth and last bolt installed in each work area during the shift as a check on whether or not the torquing requirements are being achieved. When the testing process reveals that a fixture is not properly torqued, steps must be taken to determine the extent of defective installation and to correct all improperly installed fixtures.

The ground conditions in many active face areas require the installation of only a few bolts during each blasting cycle. Testing of the first and last bolts in each work area will help ensure the integrity of the ground in these instances. Where large numbers of bolts are installed on a continuing basis, testing of the first, tenth and last bolt in each work area would normally provide the frequency of testing necessary to identify a bolting problem and enable the operator to take corrective action.

The mine operator must certify that all tests required by this standard have been conducted. In the case of testing of the ASTM bolts and accessories by the manufacturer of the devices, the mine operator's certification responsibility is satisfied by obtaining a copy of the manufacturer's certification and making it available to the inspector.

The correction of improperly installed fixtures will also help to ensure compliance with standard 56.3130 which requires that wall, bank and slope stability be maintained at surface mines where miners are exposed, and standard 57.3360, which requires that ground support systems at underground mines be designed, installed and maintained to control the ground where miners are exposed.

§ 56.3400 Secondary breakage.

Prior to secondary breakage operations, material to be broken, other than hanging material, shall be positioned or blocked to prevent movement which would endanger

persons in the work area. Secondary breakage shall be performed from a location which would not expose persons to danger.

⚠️ What the Regulation Requires

- **Stabilize the Material**: Before breaking begins, any material (except hanging material) must be:
    - **Positioned or blocked** to prevent movement that could endanger workers.
- **Safe Work Location**: The operation must be performed from a location that does **not expose workers to danger**—meaning:
    - No one should be in the potential path of falling, rolling, or shifting rock.
    - Remote or shielded methods should be used when necessary.

🛠️ Practical Safety Measures

- **Use of Barriers or Chocks**: To prevent rocks from shifting during breakage.
- **Remote-Controlled Equipment**: Keeps operators at a safe distance.
- **Spotters and Communication**: Ensures no one enters the danger zone.
- **Pre-Operation Inspections**: Identifies unstable material or terrain.

📚 Why It Matters

Secondary breakage is one of the most hazardous phases in mining. This regulation ensures that:

- Workers are protected from unexpected rock movement
- Operations are planned with safety as the top priority
- Risk of injury or fatality is minimized

§ 56.3401 Examination of ground conditions.

Persons experienced in examining and testing for loose ground shall be designated by the mine operator. Appropriate supervisors or other designated persons shall examine and, where applicable, test ground conditions in areas where work is to be performed prior to work commencing, after blasting, and as ground conditions warrant during the work shift. Highwalls and banks adjoining travelways shall be examined weekly or more often if changing ground conditions warrant.

🧠 Purpose of the Regulation

This rule is designed to **prevent accidents caused by unstable ground**, such as rockfalls, collapses, or slides. It ensures that qualified personnel regularly assess the safety of work areas and travelways.

📋 Key Requirements

- **Qualified Personnel**:
  - The mine operator must designate individuals **experienced in examining and testing for loose ground**.
- **Timing of Examinations**:
  - **Before work begins** in any area
  - **After blasting**
  - **During the shift**, if conditions change or warrant reinspection
- **Travelway Safety**:
  - **Highwalls and banks** next to travelways must be examined **weekly**
  - More frequent checks are required if **ground conditions are changing**

🛠️ Practical Safety Measures

- **Visual inspections** for cracks, loose rock, or water seepage
- **Scaling tests** to detect unstable material
- **Documentation** of inspections and corrective actions
- **Training** for designated examiners on hazard recognition

📚 Why It Matters

This regulation ensures that:

- Workers are protected from unexpected ground failures
- Mines maintain a proactive approach to ground control
- Safety is embedded into daily operations

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56/57.3401 Examination of Ground Conditions

Under this standard the mine operator must designate the persons experienced in ground control who will examine and test the ground. These persons may be supervisors or miners. Mine management retains the responsibility for examination and testing of ground conditions. The standard also specifies when examinations and tests must be made.

§ 56.3430 Activity between machinery or equipment and the highwall or bank.

Persons shall not work or travel between machinery or equipment and the highwall or bank where the machinery or equipment may hinder escape from falls or slides of the highwall or bank. Travel is permitted when necessary for persons to dismount.

🧱 What the Regulation Requires

- **Restricted Movement**: Workers must **not work or travel** between machinery/equipment and a **highwall or bank** if the machinery could **block their escape** in the event of a fall or slide.
- **Exception**: Travel is allowed **only when necessary to dismount** from the equipment.

⚠️ Why This Matters

Highwalls and banks can be unstable due to:

- Loose or unconsolidated material
- Recent blasting
- Weathering or erosion

If a person is caught between a machine and a collapsing wall, their escape route may be blocked—this rule is designed to **prevent entrapment and injury**.

🛠️ Practical Safety Measures

- **Positioning Equipment Safely**: Keep machinery away from highwalls unless absolutely necessary.
- **Use of Spotters**: Ensure visibility and communication when operating near highwalls.
- **Training**: Workers should be trained to recognize hazardous zones and follow safe dismount procedures.
- **Ground Condition Monitoring**: Regular inspections to assess wall stability.

56/57.3430 Activity Between Machinery or Equipment and the Highwall or Bank
This standard is applicable to surface mines and surface areas of underground mines. It addresses the hazards which exist when persons work or travel near a highwall or bank and their escape from a fall or slide of material could be hindered by the machinery and equipment in their escape path.

If escape could be hindered, no work or travel is permitted. If, however, the machinery or equipment poses no hindrance, the standard is not applicable. Consideration must be given to: the height of the wall or bank; the distance between the equipment and wall or bank; the size and positioning of the equipment; the location of the worker in relation to the escape route; and any surrounding noise levels or distractions which could prevent the detection of falling ground.

Where machinery or equipment becomes disabled near a highwall or bank, the equipment operator can often safely exit on the side away from the hazard. If this is not possible, exit on the wall side is permitted. Remounting on the wall side may also become necessary in order to reposition or move the equipment to a safe location for repairs. When the equipment is not removed for repair, it must be repositioned at the site so that workers will not be exposed to fall of ground hazards from which their escape is hindered.

Subpart H—Loading, Hauling, and Dumping

Traffic Safety

§ 56.9100 Traffic control.

To provide for the safe movement of self-propelled mobile equipment—

(a) Rules governing speed, right-of-way, direction of movement, and the use of headlights to assure appropriate visibility, shall be established and followed at each mine; and

(b) Signs or signals that warn of hazardous conditions shall be placed at appropriate locations at each mine.

§ 56.9101 Operating speeds and control of equipment.

Operators of self-propelled mobile equipment shall maintain control of the equipment while it is in motion. Operating speeds shall be consistent with conditions of roadways, tracks, grades, clearance, visibility, and traffic, and the type of equipment used.

§ 56.9201 Loading, hauling, and unloading of equipment or supplies.

Equipment and supplies shall be loaded, transported, and unloaded in a manner which does not create a hazard to persons from falling or shifting equipment or supplies.

§ 56.9202 Loading and hauling large rocks.

Large rocks shall be broken before loading if they could endanger persons or affect the stability of mobile equipment. Mobile equipment used for haulage of mined material shall be loaded to minimize spillage where a hazard to persons could be created.

§ 56.9300 Berms or guardrails.

(a) Berms or guardrails shall be provided and maintained on the banks of roadways where a drop-off exists of sufficient grade or depth to cause a vehicle to overturn or endanger persons in equipment.

(b) Berms or guardrails shall be at least mid-axle height of the largest self-propelled mobile equipment which usually travels the roadway.

(c) Berms may have openings to the extent necessary for roadway drainage.

§ 56.9301 Dump site restraints.

Berms, bumper blocks, safety hooks, or similar impeding devices shall be provided at dumping locations where there is a hazard of overtravel or overturning.

§ 56.9303 Construction of ramps and dumping facilities.

Ramps and dumping facilities shall be designed and constructed of materials capable of supporting the loads to which they will be subjected. The ramps and dumping facilities

shall provide width, clearance, and headroom to safely accommodate the mobile equipment using the facilities.

§ 56.9304 Unstable ground.

(a) Dumping locations shall be visually inspected prior to work commencing and as ground conditions warrant.

(b) Where there is evidence that the ground at a dumping location may fail to support the mobile equipment, loads shall be dumped a safe distance back from the edge of the unstable area of the bank.

§ 56.9306 Warning devices for restricted clearances.

Where restricted clearance creates a hazard to persons on mobile equipment, warning devices shall be installed in advance of the restricted area, and the restricted area shall be conspicuously marked.

§ 56.9311 Anchoring stationary sizing devices.

Grizzlies and other stationary sizing devices shall be securely anchored.

§ 56.9313 Roadway maintenance.

Water, debris, or spilled material on roadways which creates hazards to the operation of mobile equipment shall be removed.

§ 56.9314 Trimming stockpile and muck pile faces.

Stockpile and muck pile faces shall be trimmed to prevent hazards to persons.

§ 56.9315 Dust control.

Dust shall be controlled at muck piles, material transfer points, crushers, and on haulage roads where hazards to persons would be created as a result of impaired visibility.

§ 56.9316 Notifying the equipment operator.

When an operator of self-propelled mobile equipment is present, persons shall notify the equipment operator before getting on or off that equipment.

§ 56.11001 Safe access.

Safe means of access shall be provided and maintained to all working places.

IV.G-12 Operator Responsibility Over Customer Vehicles

It is the responsibility of the operator of a mine to enforce mandatory safety standards on all vehicles entering the mine property. In the area of backup alarms on customer trucks, the requirement could be met in several ways, including the following:

1. Traffic patterns can be established to eliminate the need to backup.
2. Operator personnel can act as observers where trucks are required to backup.

If the loading of customer trucks is being done in a hard hat area, it is the responsibility of the operator to see that all persons in the area wear hard hats. If hard hats are not available to the customer personnel, the following options will meet the requirement of the standard:

1. Rules can be established that while loading, the customer truck drivers must stay in their truck cabs if the cabs are protected by canopies; or
2. If the customer truck drivers must get out of their cabs, designated safe areas must be provided.