

3M Science.
Applied to Life.™

PSD MINING Sales Playbook

2024/2025



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Introduction

Mining refers to the process of extracting valuable minerals, ores, or other geological materials, separate from the rock and refine the ore to be commercialized and use it as raw material in other industrial processes.

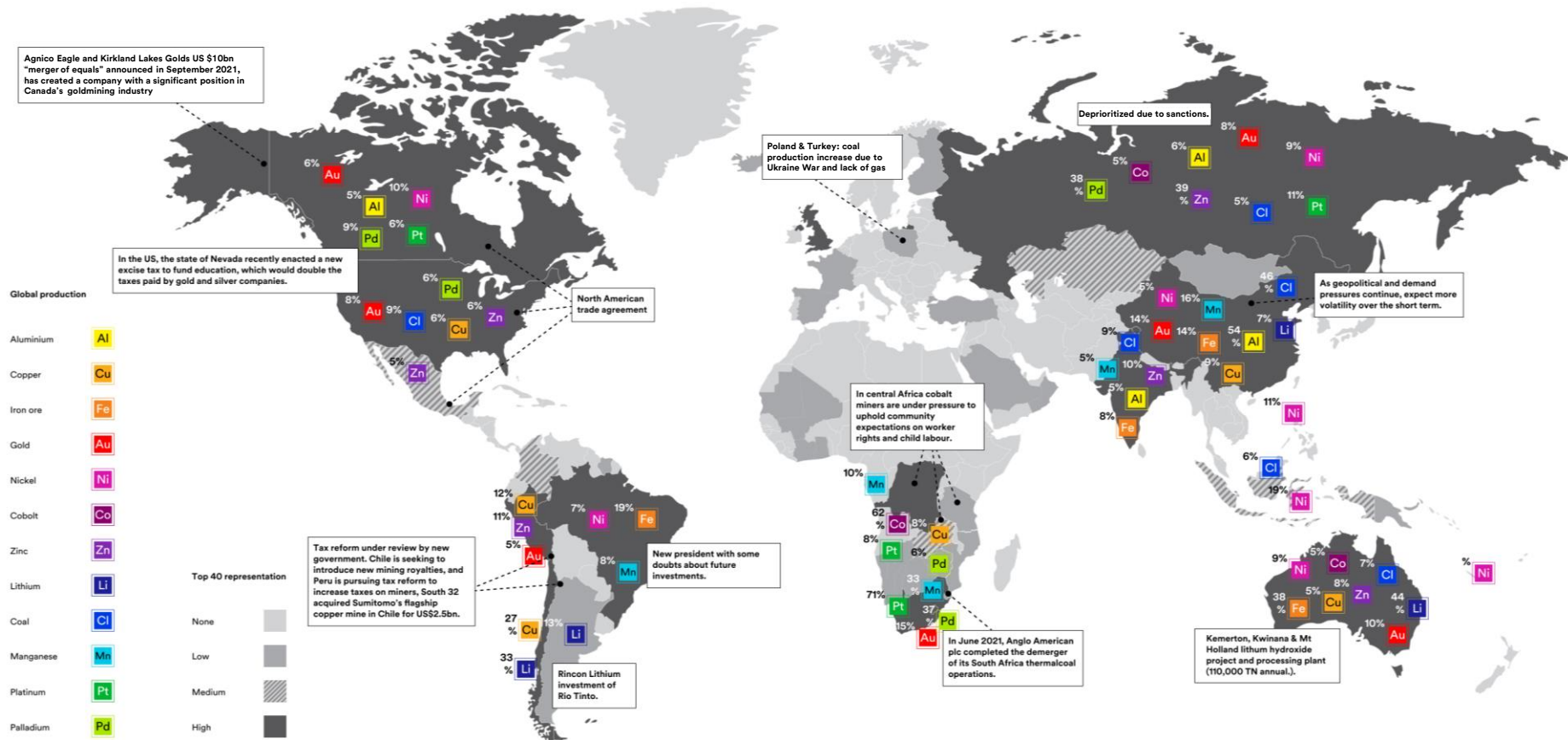
It is an essential industry that plays a significant role for several sectors, including energy, manufacturing, construction, production and technology. 45% of the world's economic activity is driven by the mining sector.*

The purpose of this Sales Guide is to help provide a better understanding of the mining process, identify some of the key hazards encountered and potential 3M PPE solutions. The guide will also provide helpful sales information to better assess sales opportunities and direct our efforts to generate new business in the mining market.

*CIM Convention 2021 (Canadian Institute of Mining, Metallurgy & Petroleum) - Mark Cutfani



Global production and market drivers



Source: World Mining Data <https://www.world-mining-data.info/>

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Customer profiles

Mining companies

Companies that received a license to mine. The commercialized product is the extracted mineral.

Core activities:

- Administration, extraction, processing and other core activities
- Responsible for employee safety and environment impact

Regulations:

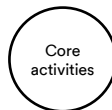
- Follow local regulations
- Global companies with operations in multiple countries may require global safety alignment

Risks:

- The mining process involves a wide variety of worker health and safety risks
- This can be an opening for a discussion on more comprehensive worker health and safety issues and technological solutions

PPE:

- Goal is compliance, worker productivity and comfort, and increased PPE use rate
- More awareness for PPE Fit Validation as a best practice opportunity. Note fit testing is required for tight fitting respiratory protection in many geographies including the US.



Regulations



Risks



PPE

Mining Contractors

Companies contracted by the mining companies to carry out services that support the production operation.

Core activities:

- Services related to construction, maintenance and other activities considered non-core

Regulations:

- Contractors sometimes view worker safety as simply meeting local compliance standards and may struggle to understand and achieve these local standards. This can provide an opportunity to help contractors better understand standards and introduce safety solutions
- Some countries may have less strict local regulations; however, mining companies may opt to maintain higher safety standards. Contractors can struggle to understand and achieve these standards which provides an opportunity to educate them with proper safety solutions

Risks:

- Contractors may have the same risks as a mining company but, because of the nature of their work, they are more exposed in high-risk activities such as confined spaces and work at height

PPE:

- Search for equipment that complies with applicable regulations and standards
- Less awareness for PPE Fit Validation as a best practice opportunity. Note fit testing is required for tight fitting respiratory protection in many geographies including the US.

Safety Manager Persona

The main stakeholder for PPE selection. Learn more about their personality:

- As safety manager I think about health and safety 24/7. My goal is to get my workers and contractors home safe after every shift, for each worker to be accountable for safety on the job site, and not to be seen as the safety cop.
- This sounds simple, but it is very complex. While no day is typical, I wear many different hats to achieve this goal – there never seems to be enough time in the day to meet the demands of ensuring my workers are safe.
- My tasks include safety and worker compliance, identification of potential on-site hazards, meeting country/local/company standards and regulations, training, inventory management, and emergency response.
- My biggest challenges are making safety a part of company culture, helping to provide a better understanding of regulations and improving compliance. A safety plan is great, but everyone needs to own safety on the job site to make their safety and the safety of others a reality.



Safety Manager Persona

Role

- Safety may not be their only responsibility, but they are often the key safety decision maker
- Feel a strong responsibility to protect employees and contractors
- Proactively look for safety solutions
- Want to be perceived as a safety expert within their organization
- In charge of budget, sourcing and human resources
- Wants to be recognized as an influencer/coach by the team and considered a pioneer of solutions

Key Drivers

- Wants to earn employee and employer trust
- Important for them to know how PPE performs and which comply with regulations
- Look for innovative solutions, design, comfort, style and value to help increase PPE usage to help support their safety program
- Want the best value for the money
- Want to minimize risk
- Willing to pay more for quality products
- Interest in staying updated on new solutions, regulations and best practices
- Values products that meet high local regulatory safety standards

Key Challenges

- Preventing the occurrence of accidents and mitigate risk
- Training employees adequately and ensuring compliance
- Keeping up to date with new standards and regulations
- Balancing worker safety, time spent training and worker productivity
- Maintaining labor organization relations

Other stakeholders

There are other important stakeholders to consider within mining companies.

In some companies, stakeholders such as the Site Manager and Procurement Lead can have more influence on new safety solutions than the Safety Manager.

Site Manager

- Time is money!
- Having full work force is important
- PPE availability is key – can mean they will pay more if needed
- Does not drive PPE selection, instead implements decisions from the safety manager
- Can be influencer based on workers likes/dislike or if PPE helps/hinders productivity

Operator/ Owner

- Productivity and efficiency is key “Time is money!”
- Zero accidents and no citations is the priority
- PPE costs are minor part of total costs
- Limited available workforce means considering automation and technology to reduce labor needs and safety hazards
- Does not typically dictate PPE brands
- This role may also be responsible for contractors and ESG impact

Procurement/ Purchasing

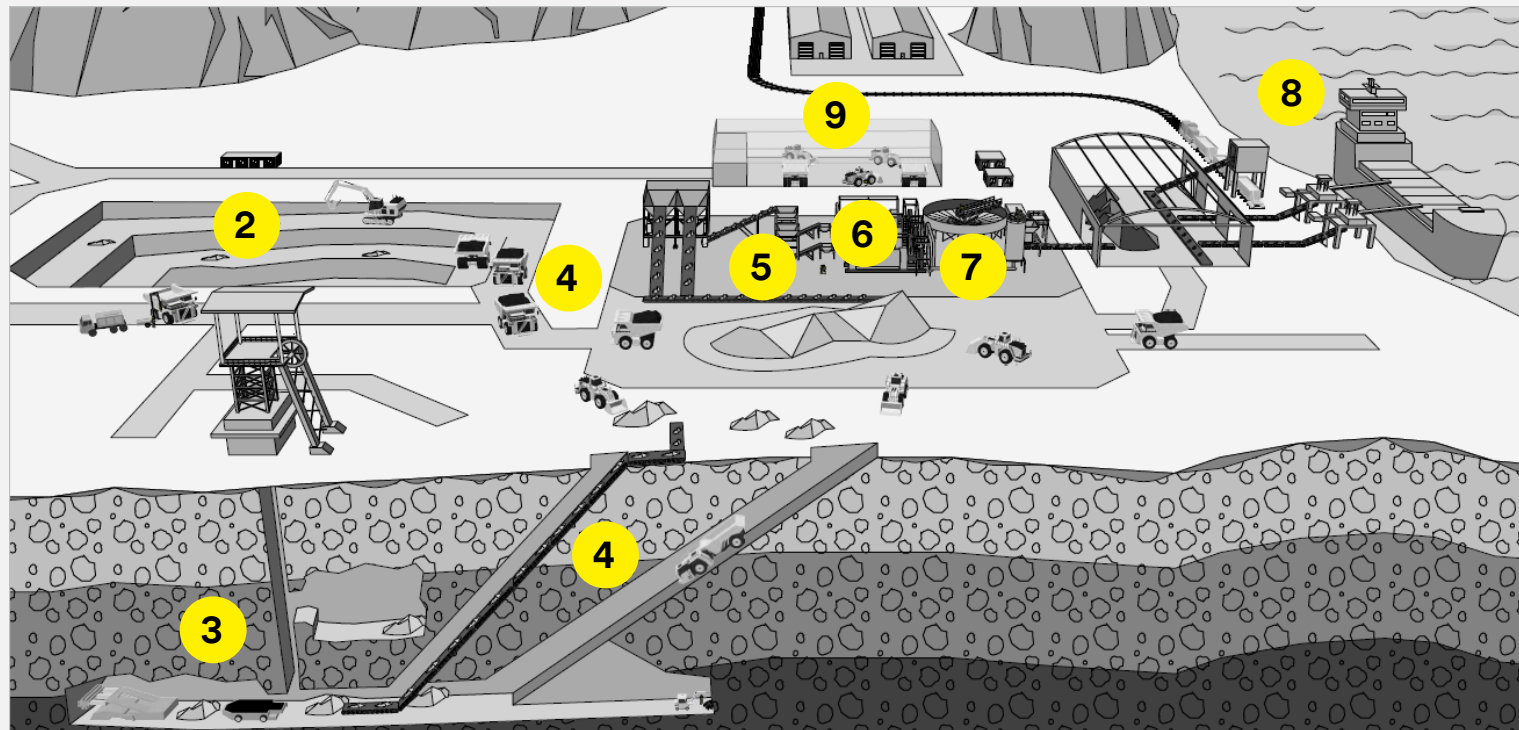
- Cares about cost, availability, & terms
- Becomes more influential in PPE decisions when asked to improve profits
- Availability of product can be top priority
- Find it challenging to identify reliable supplier networks in remote or unstable areas
- PPE may be only a small percent of their total budget responsibility

Workers

- Look to experienced workers (sometimes within family) for information
- Multi-generational worker has often seen impact to health on parents/grandparents
- Concerned about comfort more than safety and have brand loyalty

Mining process overview, risks, and worker health and safety solutions

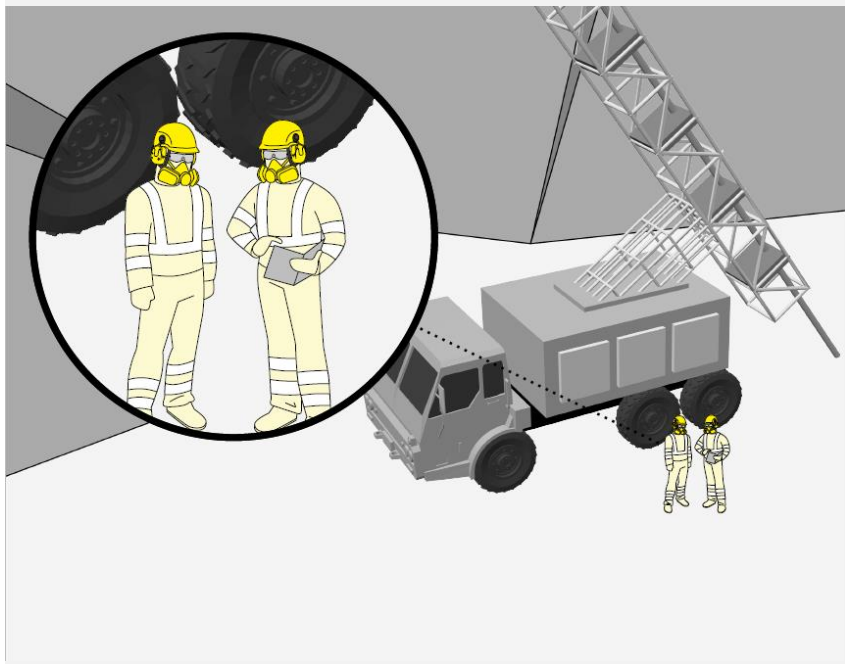




DISCLAIMER: This illustration is for demonstration purposes only. The situations depicted should not be re-enacted without supervision by an environmental, health and safety professional. Although the PPE used in this illustration are samples of products available for commercial use, many factors beyond 3M's control can affect the use and performance of products in a particular application. Potential users should not rely on this illustration to determine the suitability of the product for their intended use. All potential users should refer to 3M published specifications and warranties.

Mining planning and development is the process of determining the most efficient and cost-effective way to extract minerals from a deposit while considering various factors such as geological characteristics, economic feasibility, environmental considerations, and safety requirements.

This process involves several hazards and risks that need to be carefully assessed and managed to ensure safe and efficient operations. These include dust and respiratory hazards from drilling and blasting, hearing and communication hazards from heavy machinery and equipment and head, eye and face hazards from chemicals and debris.



EXAMPLES OF RISKS/NEEDS



Airborne Hazard

Chemical processes and laboratory tests during exploration and particulate matter, gases and vapors generated by welding or painting during construction.



Noise Exposure

During mining activities, noise is generated from tools, electrical equipment, grinding, welding, and metalworking processes. Also, communication (in person or using radio) is important to help avoid accidents.



Inability to Communicate



Flying Object

Dust, particles, and flying objects can cause eye injuries. Protective Eyewear can help protect worker's eyes.



Struck by

In mine construction, workers may hit their heads against pipes, structures, or equipment. Tools or other objects can fall and strike a worker on the head. For poorly lit working conditions, consider adding a lamp bracket to pair with a headlamp.



Falls

Mine construction may involve work in confined spaces, requiring means of access, air supply, gas detection and rescue.



Confined Space

Constructing mining structures may involve work at height risks.



Oxygen Deficiency

It is key to implement a systems approach, including anchors, harnesses, connectors, rescue and training.

POTENTIAL 3M SOLUTIONS



3M™ Secure Click™ HF-800*



3M™ 7500*

*Check sizes and filter and cartridge available



3M™ PELTOR™ ProTac III - MT13H221P3E



3M™ PELTOR™ X Series



3M™ SecureFit™ Protective Eyewear 400X Series



3M™ SecureFit™ Protective Eyewear 500 Series



3M™ SecureFit™ Hard Hat H-700 Series with 3M™ Lamp Bracket*

*Not available in all markets. Please consult your 3M™ Safety Specialist for more information.



DBI-SALA® NanoLok™



DBI-SALA® 5-Piece Davit Arm



DBI-SALA® Sealed-Block™



DBI-SALA® Lad-Saf™



DBI-SALA® ExoFit™ X-Series



3M™ Scott™ Ska-Pak



DBI-SALA® EZ-Line™

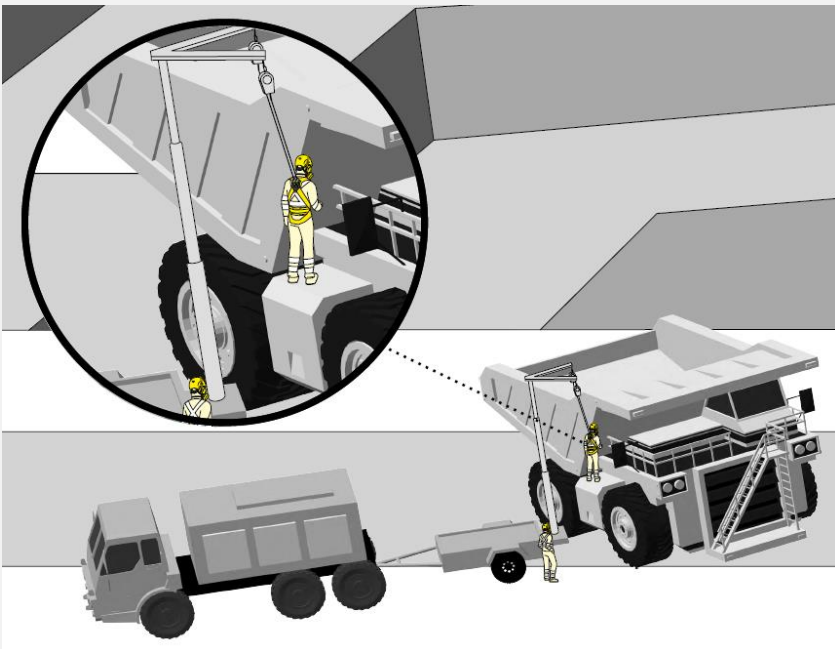


DBI-SALA® Rollgliss™ R550

Open pit extraction (Surface)





















Open-pit mining, also known as opencast mining, is a surface mining method used to extract minerals or ore deposits that are located near the surface of the Earth. It involves the excavation of an open pit or burrow in the ground, which allows access to the desired minerals or materials.

Some key safety considerations include ensuring the stability of pit walls to prevent rockfalls and collapses, implementing proper maintenance and training programs for vehicles and equipment to prevent accidents, managing traffic effectively to avoid collisions, providing fall protection measures for tasks at heights, and implementing dust control measures to protect respiratory health.



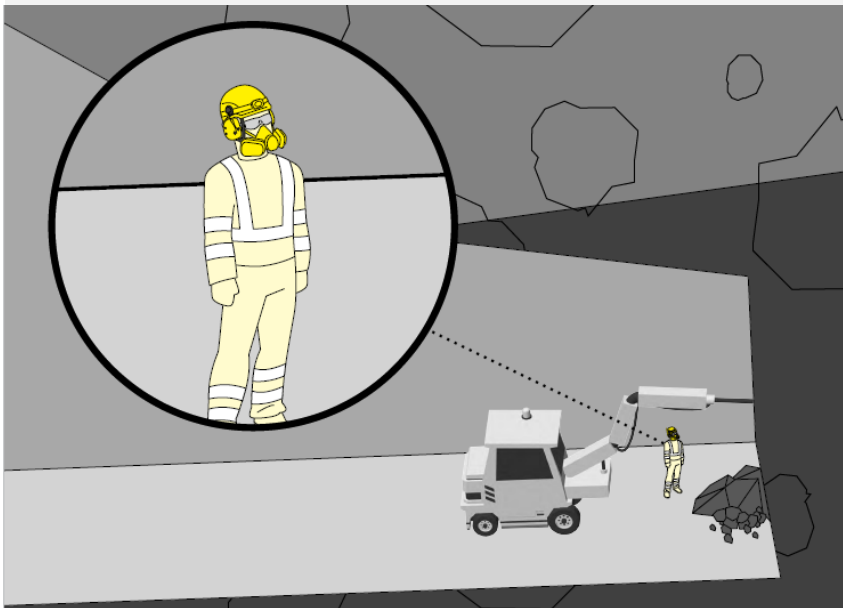
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PPE Options

EXAMPLES OF RISKS/NEEDS	POTENTIAL 3M SOLUTIONS
 <p>Airborne Hazard</p> <p>Removing ore and putting it into transportation systems creates dust. A respirator that can be worn in conjunction with a hard hat and removed without the need to remove the hard hat may be preferred.</p>	 <p>3M™ Secure Click™ HF-6500*</p>  <p>3M™ 7500*</p> <p><small>*Check sizes and filter and cartridge available</small></p>
 <p>Noise Exposure</p>  <p>Inability to Communicate</p> <p>Mining equipment and truck traffic generate noise that requires a high level of attenuation, without sacrificing comfort. Communication (in person or using radio) is important to help avoid accidents and improve usage rate.</p>	 <p>3M™ PELTOR™ ProTac III - MT13H221P3E</p>  <p>3M™ PELTOR™ X Series</p>
 <p>Flying Object</p> <p>Dust, particles, and flying objects can cause eye injuries. Protective Eyewear can help protect worker's eyes.</p>	 <p>3M™ SecureFit™ Protective Eyewear 400X Series</p>  <p>3M™ SecureFit™ Protective Eyewear 500 Series</p>
 <p>Struck by</p> <p>Stone transportation and explosions may cause debris to strike a worker on the head. For poorly lit working conditions, consider adding a lamp bracket to pair with a headlamp.</p>	  <p>3M™ SecureFit™ Hard Hat H-700 Series with 3M™ Lamp Bracket*</p> <p><small>*Not available in all markets. Please consult your 3M™ Safety Specialist for more information.</small></p>
 <p>Falls</p> <p>Maintaining trucks and other machinery in the field eliminates the need to move to a maintenance building and therefore helps improve productivity.</p> <p>During maintenance, mechanics need fall protection. Working near the edges of excavations also carries the risk of falls.</p>	 <p>DBI-SALA® NanoLok™</p>  <p>DBI-SALA® Sealed-Block™</p>  <p>DBI-SALA® ExoFit™ X-Series</p>  <p>DBI-SALA® FlexiGuard™</p>  <p>DBI-SALA® EZ-Line™</p>  <p>DBI-SALA® Rollgliss™ R550</p> <p>Trailer Mount System</p>

Underground mining is a mining method used to extract minerals or ore deposits that are located deep beneath the Earth's surface. Unlike open-pit mining, which extracts minerals from an open pit or borrow, underground mining involves accessing the mineral resources by creating tunnels and shafts.

Underground mining poses unique safety challenges due to working in noisy environments, confined spaces, potential exposure to hazardous gases, heat stress, fogging and the risk of rockfalls or cave-ins. In potentially explosive environments, Intrinsically safe PPE may be required in battery powered PPE. Proper ventilation, rock support systems, cementation, clear communication, reducing heat stress, monitoring for gas accumulation, and safety training are essential to ensure worker safety.



EXAMPLES OF RISKS/NEEDS



Airborne Hazard

Dust is generated by ore extraction equipment, vehicle traffic, drilling, loading processes and material transportation.



Inability to Communicate

Clear communication is key for safety in mining processes. Typically, workers need to use a radio, talk with partners and be able to hear alarms. Tools, motors for ventilation systems, and vehicle traffic generate noise levels requiring hearing protection.



Noise Exposure

Dust, particles, and flying objects can cause eye injuries. Humidity can cause fogging, which can impede workers ability to see clearly through their eye protection



Flying Object



Struck by

Stone transportation and explosions may cause debris to strike a worker on the head.

For poorly lit working conditions, consider adding a lamp bracket to pair with a headlamp.



Falls

Cementation is an important process for underground mining and during this process several work at height scenarios are carried out.

In cementation, access to transportation and machinery as well as mine locations such as ramps and ventilation ducts creates risk of falls for workers or their tools.

POTENTIAL 3M SOLUTIONS



3M™ Secure Click™ HF-800*



3M™ 7500*

*Check sizes and filter and cartridge available



3M™ PELTOR™ X Series



3M™ SecureFit™ Protective Eyewear 400X Series



3M™ SecureFit™ Protective Eyewear 500 Series



3M™ SecureFit™ Hard Hat H-700 Series with 3M™ Lamp Bracket*



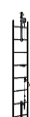
*Not available in all markets. Please consult your 3M™ Safety Specialist for more information.



DBI-SALA® NanoLok™



DBI-SALA® Sealed-Block™



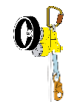
DBI-SALA® Lad-Saf™



DBI-SALA® ExoFit™ X-Series



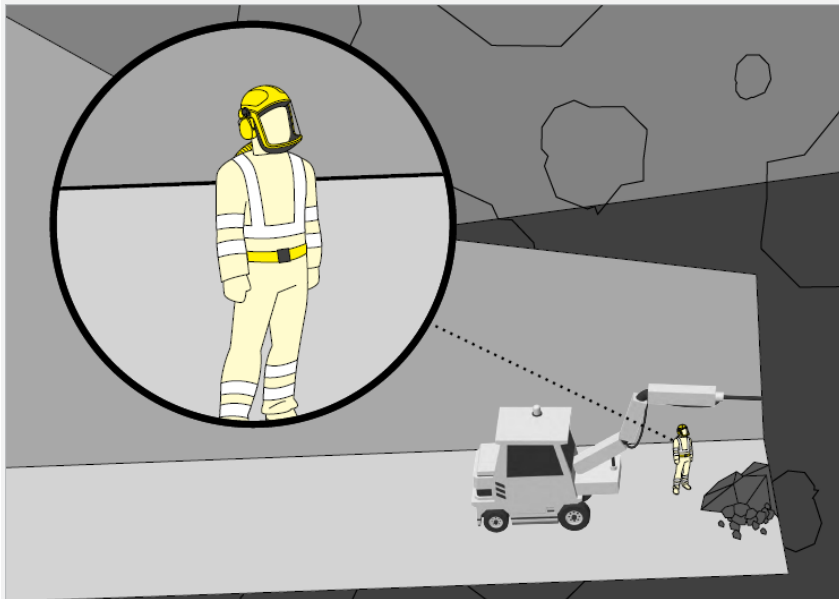
DBI-SALA® EZ-Line™



DBI-SALA® Rollgliss™ R550

Underground mining is a mining method used to extract minerals or ore deposits that are located deep beneath the Earth's surface. Unlike open-pit mining, which extracts minerals from an open pit or borrow, underground mining involves accessing the mineral resources by creating tunnels and shafts.

Underground mining poses unique safety challenges due to working in noisy environments, confined spaces, potential exposure to hazardous gases, heat stress, fogging and the risk of rockfalls or cave-ins. Intrinsically safe PPE may be required in potentially explosive environments. Proper ventilation, rock support systems, cementation, clear communication, reducing heat stress, monitoring for gas accumulation, and safety training are essential to ensure worker safety.



* MSHA approval is required for electronic PPE in underground mining in the US. Customers can request approval for PPE used at their worksite through the MSHA Petition for Modification process.

EXAMPLES OF RISKS/NEEDS



Airborne Hazard

Dust is generated by ore extraction equipment, vehicle traffic, drilling, loading processes and material transportation.



Inability to Communicate

Clear communication is key for safety in mining processes. Typically, workers need to use a radio, talk with partners and be able to hear alarms. Tools, motors for ventilation systems, and vehicle traffic generate noise levels requiring hearing protection.



Noise Exposure



Flying Object

Dust, particles, and flying objects can cause eye injuries. Humidity can cause fogging, which can impede workers ability to see clearly through their eye protection.



Struck by

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For poorly lit working conditions, consider adding a lamp bracket to pair with a headlamp.



Falls

Cementation is an important process for underground mining and during this process several work at height scenarios are carried out.

In cementation, access to transportation and machinery as well as mine locations such as ramps and ventilation ducts creates risk of falls for workers or their tools.

POTENTIAL 3M SOLUTIONS

TR-800 IS PAPR
Intrinsically safe motor/blower
with HEPA filter plus multiple
chemical cartridges



3M™ Secure Click™
HF-800*

*Check sizes and filter and cartridge available



3M™ PELTOR™
MT72H540P3E-50



3M™ PELTOR™ X Series



3M™ SecureFit™
Protective Eyewear 500 Series



M-307 Helmet
M-940 Lamp Bracket



3M™ SecureFit™ Hard Hat H-700
Series with 3M™ Lamp Bracket*

*Not available in all markets. Please consult your 3M™ Safety Specialist for more information.



DBI-SALA®
NanoLok™



DBI-SALA®
Sealed-Block™



DBI-SALA®
Lad-Saf™



DBI-SALA®
ExoFit™ X-Series



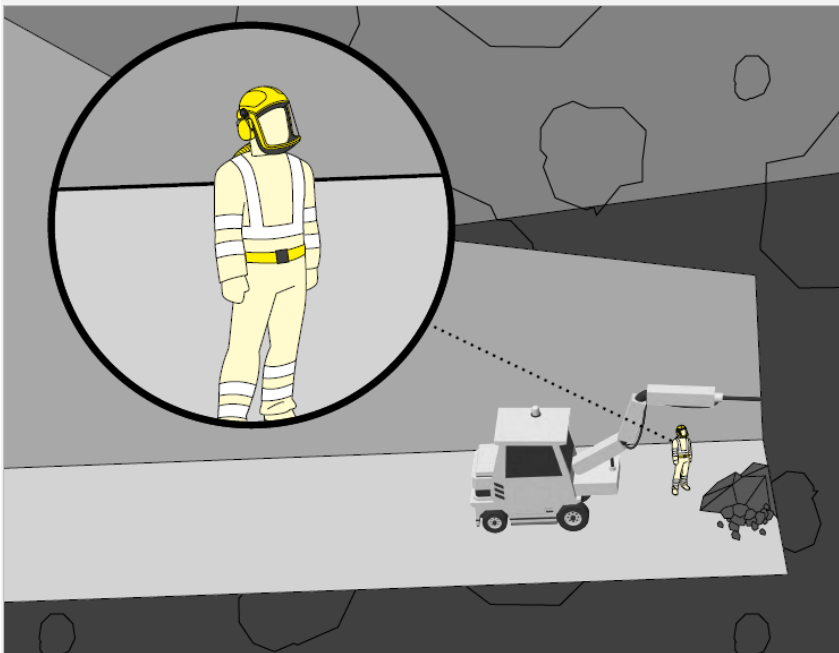
DBI-SALA®
EZ-Line™



DBI-SALA®
Rollgliss™ R550

Underground mining is a mining method used to extract minerals or ore deposits that are located deep beneath the Earth's surface. Unlike open-pit mining, which extracts minerals from an open pit or borrow, underground mining involves accessing the mineral resources by creating tunnels and shafts.

Underground mining poses unique safety challenges due to working in noising environment, confined spaces, potential exposure to hazardous gases, heat stress, fogging and the risk of rockfalls or cave-ins. Proper ventilation, rock support systems, cementation, clear communication, reduce heat stress, monitoring for gas accumulation, and safety training are essential to ensure worker safety.



EXAMPLES OF RISKS/NEEDS



Airborne Hazard

Dust is generated by ore extraction equipment, vehicle traffic, drilling, loading processes and material transportation.



Inability to Communicate

Clear communication is key for safety in mining processes. Typically, workers need to use a radio, talk with partners and be able to hear alarms. Tools, motors for ventilation systems, and vehicle traffic generate noise levels requiring hearing protection.



Noise Exposure

Dust, particles, and flying objects can cause eye injuries. Humidity can cause fogging, which can impede workers ability to see clearly through their eye protection.



Flying Object

Stone transportation and explosions may cause debris to strike a worker on the head.



Struck by

For poorly lit working conditions, consider adding a lamp bracket to pair with a headlamp.



Falls

Cementation is an important process for underground mining and during this process several work at height scenarios are carried out.

In cementation, access to transportation and machinery as well as mine locations such as ramps and ventilation ducts creates risk of falls for workers or their tools.

POTENTIAL 3M SOLUTIONS

TR-300+ PAPR
High Efficiency (HEPA)
Filter only



TR-600 PAPR
HEPA Filter plus multiple
chemical cartridges



3M™ Secure Click™
HF-800*

*Check sizes and filter and cartridge available



3M™ PELTOR™
WS ProTac™ XPI
w/ MT7V/1



3M™ PELTOR™ X Series



3M™ SecureFit™
Protective Eyewear 500 Series



M-307 Helmet
M-940 Lamp Bracket



3M™ SecureFit™ Hard Hat H-700
Series with 3M™ Lamp Bracket*

*Not available in all markets. Please consult your 3M™ Safety Specialist for more information.



DBI-SALA®
NanoLok™



DBI-SALA®
Sealed-Block™



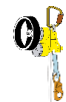
DBI-SALA®
Lad-Saf™



DBI-SALA®
ExoFit™ X-Series



DBI-SALA®
EZ-Line™

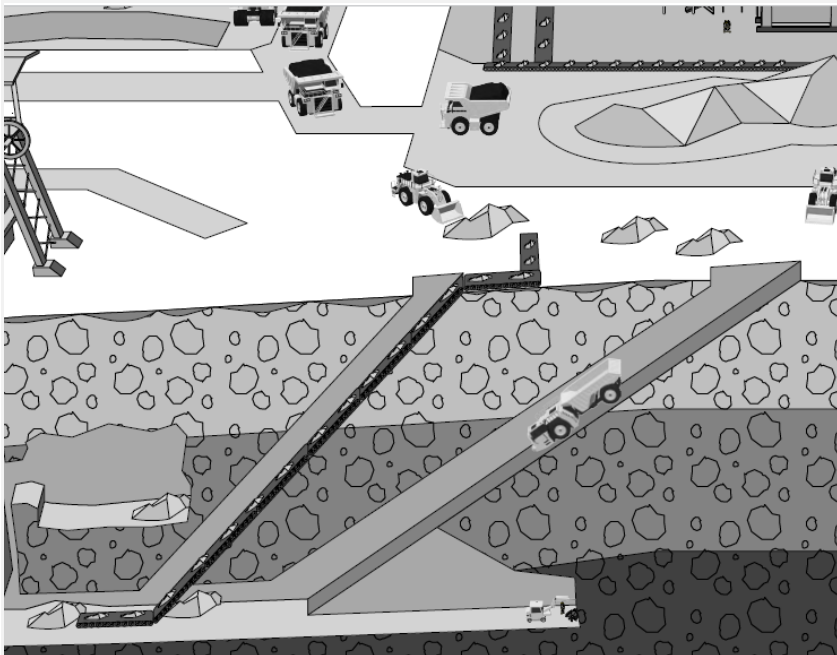


DBI-SALA®
Rollgliss™ R550

Internal transportation













Mining internal transportation refers to the movement of materials, equipment, and personnel within a mining operation. It involves the logistics and infrastructure required to transport various resources and personnel efficiently and safely within the mining site.

Efficient and safe internal transportation systems are crucial for optimizing mining operations, ensuring timely delivery of materials, maintaining productivity, and minimizing downtime. Proper planning, maintenance, and adherence to safety protocols are essential to ensure the smooth and safe movement of resources and personnel within a mining operation.



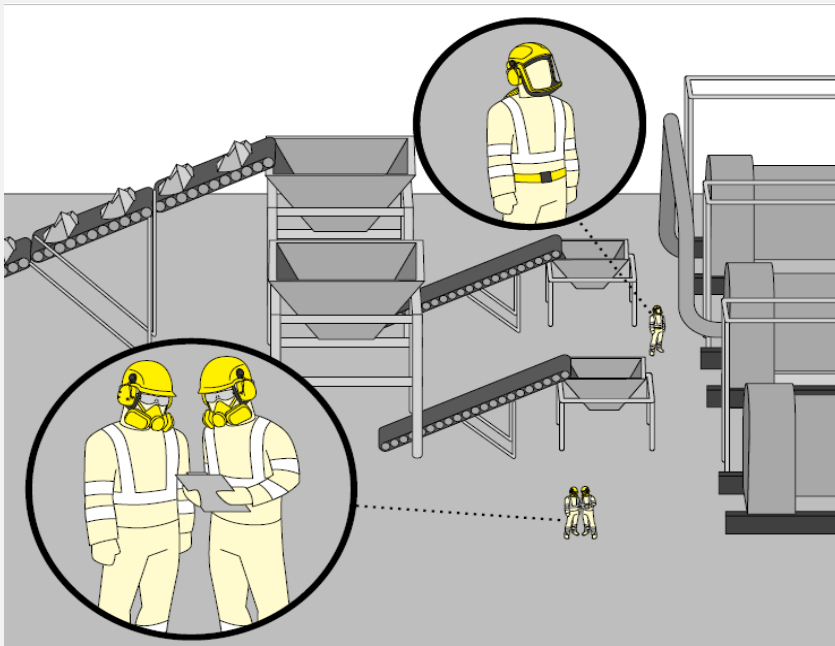
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PPE Options

EXAMPLES OF RISKS/NEEDS	POTENTIAL 3M SOLUTIONS
 <p>By depositing and transporting ore in bands and railcars, work environments have a high amount of airborne particulate matter.</p>	 <p>TR-300+ PAPR High Efficiency (HEPA) filter only</p> <p>TR-600 PAPR HEPA filter plus multiple chemical cartridges</p> <p>3M™ Secure Click™ HF-800*</p> <p>*Check sizes and filter and cartridge available</p>
 <p>Vibrations due to transport of material and vehicle traffic can generate high levels of noise. Clear communication is key for safety in mining processes. Typically, workers need to use a radio, talk with partners and be able to hear alarms.</p>	 <p>3M™ PELTOR™ WS ProTac™ XPI w/ MT7V/1</p> <p>3M™ PELTOR™ X Series</p>
 <p>Dust, particles and flying objects can cause eye injuries. Humidity can cause fogging, which can impede workers ability to see clearly through their eye protection.</p>	 <p>3M™ SecureFit™ Protective Eyewear 500 Series</p>
 <p>Stone transportation and explosions may cause debris to strike a worker on the head.</p> <p>For poorly lit working conditions, consider adding a lamp bracket to pair with a headlamp.</p>	 <p>M-307/407 Helmet M-940 Lamp Bracket</p> <p>3M™ SecureFit™ Hard Hat H-700 Series with 3M™ Lamp Bracket*</p> <p>*Not available in all markets. Please consult your 3M™ Safety Specialist for more information.</p>
 <p>Trucks, wagons and conveyors require worker intervention or maintenance. During these operations workers need fall protection..</p> <p>It is key to implement a systems approach, including anchors, harnesses, connectors, rescue and training.</p>	 <p>DBI-SALA® NanoLok™</p> <p>DBI-SALA® Flexiguard™ Trailer Mounted Adjustable Height Anchor System</p> <p>DBI-SALA® Sealed-Block™</p>
	 <p>DBI-SALA® ExoFit™ X-Series</p> <p>3M™ Scott™ Ska-Pak</p> <p>DBI-SALA® EZ-Line™</p> <p>DBI-SALA® Rollgliss™ R550</p>

Mining crushing and grinding are essential processes in the mineral processing industry, aimed at reducing the size of ore or rock particles to facilitate the extraction of valuable minerals. These processes involve breaking down the ore or rock into smaller, more manageable sizes, which can then be further processed or concentrated.

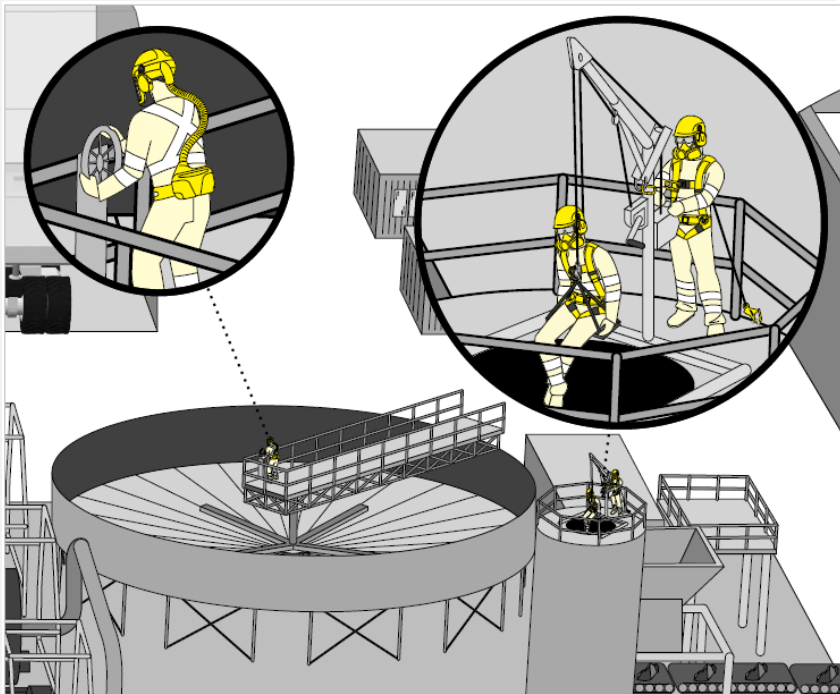
Hazards include falling objects, equipment malfunctions, dust and silica exposure, noise exposure, slips, trips, and falls, manual handling and ergonomic risks, as well as electrical hazards.



EXAMPLES OF RISKS/NEEDS	POTENTIAL 3M SOLUTIONS
 <p>Dust is generated by ore extraction equipment, vehicle traffic, drilling, loading process and material transportation.</p>	 <p>TR-300+ PAPR High Efficiency (HEPA) filter only</p> <p>TR-600 PAPR HEPA filter plus multiple chemical cartridges</p>  <p>3M™ Secure Click™ HF-800*</p> <p>*Check sizes and filter and cartridge available</p>
  <p>Clear communication is key for safety in mining processes. Typically, workers need to use a radio, talk with partners and be able to hear alarms. In grinding, the friction and impact of the metal balls against the rocks generate high noise levels that requires hearing protection.</p>	 <p>3M™ PELTOR™ WS ProTac™ XPI w/ MT7V/1</p> <p>3M™ PELTOR™ X Series</p>
 <p>Dust, particles and flying objects can cause eye injuries. Humidity can cause fogging, which can impede workers ability to see clearly through their eye protection.</p>	 <p>3M™ SecureFit™ Protective Eyewear 500 Series</p>
 <p>Workers can strike their head against pipes or other protruding parts of the structure. Objects and debris can also fall and strike a worker on the head.</p> <p>For poorly lit working conditions, consider adding a lamp bracket to pair with a headlamp.</p>	 <p>M-307/407 Helmet M-940 Lamp Bracket</p> <p>3M™ SecureFit™ Hard Hat H-700 Series with 3M™ Lamp Bracket*</p> <p>*Not available in all markets. Please consult your 3M™ Safety Specialist for more information.</p>
 <p>The common means of access for platforms or machines are stairs, this transit and work at height implies the risk of people and tools falling.</p>	 <p>DBI-SALA® NanoLok™</p> <p>DBI-SALA® 5-Piece Davit Arm</p> <p>DBI-SALA® Sealed-Block™</p> <p>DBI-SALA® Lad-Saf™</p>
 <p>The ore process involves work in confined spaces that need means of access, air supply, gas detection and rescue.</p> 	 <p>DBI-SALA® ExoFit™ X-Series</p> <p>3M™ Scott™ Ska-Pak</p> <p>DBI-SALA® EZ-Line™</p> <p>DBI-SALA® Rollgliss™ R550</p>

Mining ore separation, also known as mineral processing or beneficiation, refers to the process of separating valuable minerals from the surrounding gangue (unwanted material) in an ore deposit. The goal is to extract and concentrate the valuable minerals, such as metals or industrial minerals, for further use or refining.

Mining ore separation processes involve potential hazards that need to be managed for worker safety. Hazards include chemical exposure from handling chemicals, dust and particulate hazards from crushing and grinding operations, noise hazards, risks associated with moving machinery and equipment, slips, trips, and falls due to uneven surfaces, and heat and chemical exposure during certain separation methods.



EXAMPLES OF RISKS/NEEDS



Airborne Hazard

Some separation processes use chemical substances that generate gases or vapors that can affect the worker; the movement of the material also generates dust.



Inability to Communicate

Clear communication is key for safety in mining processes. Typically, workers need to use a radio, talk with partners and be able to hear alarms. The equipment used for ore separation can generate noise due to vibration or movement of motors.



Noise Exposure

Dust, particles and flying objects can cause eye injuries. Humidity can cause fogging, which can impede workers ability to see clearly through their eye protection.



Flying Object



Struck by

Workers can strike their head against pipes or other protruding parts of the structure. Objects and debris can also fall and strike a worker on the head. For poorly lit working conditions, consider adding a lamp bracket to pair with a headlamp.



Falls

The common means of access for platforms or machines are stairs, this transit and work at height implies the risk of people and tools falling.



Confined Space

Ore separation involves work in confined spaces requiring means of access, air supply, gas detection and rescue.



Oxygen Deficiency

It is key to implement a systems approach, including anchors, harnesses, connectors, rescue, training, etc.

POTENTIAL 3M SOLUTIONS

TR-300+ PAPR
High Efficiency (HEPA)
Filter only



TR-600 PAPR
HEPA Filter plus multiple
chemical cartridges



3M™ Secure Click™
HF-800*

*Check sizes and filter and cartridge available



3M™ PELTOR™
WS ProTac™ XPI
w/ MT7V/1



3M™ PELTOR™ X Series



3M™ SecureFit™
Protective Eyewear 500 Series



M-307/407 Helmet
M-940 Lamp Bracket



3M™ SecureFit™ Hard Hat H-700
Series with 3M™ Lamp Bracket*

*Not available in all markets. Please consult your 3M™ Safety Specialist for more information.



DBI-SALA®
NanoLok™



DBI-SALA®
5-Piece
Davit Arm



DBI-SALA®
Sealed-Block™



DBI-SALA®
Lad-Saf™



DBI-SALA®
ExoFit™ X-Series



DBI-SALA®
EZ-Line™



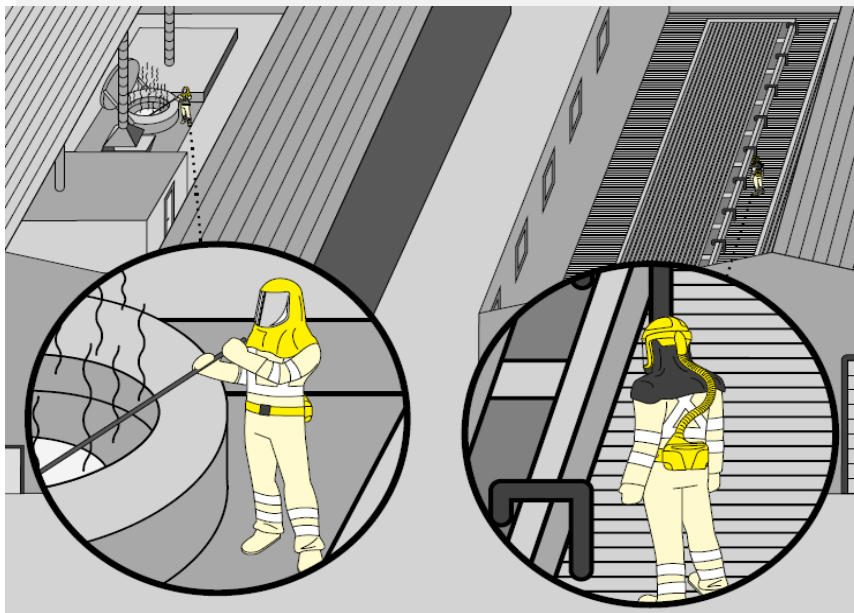
DBI-SALA®
Rollgliss™ R550

Refining (Smelting, Roasting & Electrowining)

























Ore refining is the last process before be commercialized. The process finishes with ore refined that then will be used to manufacture other thing, as well as raw material for other industries, for example:

- Aluminum (cans, airplane, furniture, etc)
- Copper (electrical cables, coins, jeweler's, musical instruments, etc)
- Gold (coins, jeweler's)
- Iron (steel manufacture, pipes, machines, with Ni+Cr+Mo stainless, etc)
- Potash (agriculture fertilizer)
- Lithium (ion batteries)

Several different refining processes could take place during mining process, but most common are smelting, roasting, acid dissolution and electrowinning (electro deposition of metals).

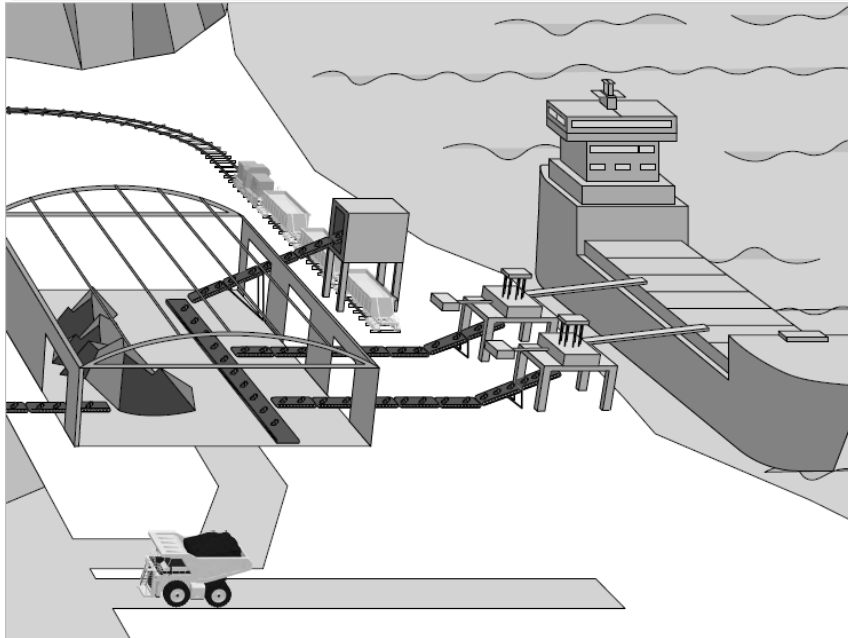


















PPE Options

EXAMPLES OF RISKS/NEEDS	POTENTIAL 3M SOLUTIONS
 <p>Airborne Hazard</p> <p>During refinery process several respiratory hazard are present. Fumes and some acid gases are the most important in smelting process. In electrowinning acid mist is key issue.</p>	 <p>TR-600 PAPR HEPA filter plus multiple chemical cartridges</p>  <p>3M™ Secure Click™ FF-800*</p> <p>*Check sizes and filter and cartridge available</p>
 <p>Inability to Communicate</p>  <p>Noise Exposure</p> <p>Clear communication is key for safety in mining processes. Typically, workers need to use a radio, talk with partners and be able to hear alarms. When a head cover is needed due to high level of acid mist or dust, an earplug may be a preferred option.</p>	 <p>3M™ PELTOR™ PIC-100</p>  <p>3m™PELTOR™ EEP-100</p>
 <p>Flying Object</p> <p>Refining is a special environment with acid mist, smelting projection, dust, radiant heat and Infra-red light.</p>	 <p>3M™ Versaflo™ M-973/975 Radiant Heat Cover.</p>  <p>Secure Click™ FF-800*</p>
 <p>Struck by</p> <p>Workers can strike their head against pipes or other protruding parts of the structure. Objects and debris can also fall and strike a worker on the head.</p> <p>For poorly lit working conditions, consider adding a lamp bracket to pair with a headlamp.</p>	 <p>M-407 Helmet</p>  <p>3M™ SecureFit™ Hard Hat H-700 Series with 3M™ Lamp Bracket*</p> <p>*Not available in all markets. Please consult your 3M™ Safety Specialist for more information.</p>
 <p>Falls</p>  <p>Confined Space</p> <p>The common means of access for platforms or machines are stairs, this transit and work at height implies the risk of people and tools falling.</p> <p>The ore process involves work in confined spaces that need means of access, air supply, gas detection and rescue.</p>	 <p>DBI-SALA® NanoLok™</p>  <p>DBI-SALA® 5-Piece Davit Arm</p>  <p>DBI-SALA® Sealed-Block™</p>  <p>DBI-SALA® Lad-Saf™</p>
 <p>Oxygen Deficiency</p>	 <p>DBI-SALA® X-Series</p>  <p>3M™ Scott™ Ska-Pak</p>  <p>DBI-SALA® EZ-Line™</p>  <p>DBI-SALA® Rollgliss™ R550</p>

Mining outbound storage and transportation refers to the processes involved in storing and transporting mined materials or products from the mining site to their intended destinations. Once minerals or ore have been extracted and processed, they need to be stored and transported efficiently and safely to reach customers, processing facilities, or distribution centers.

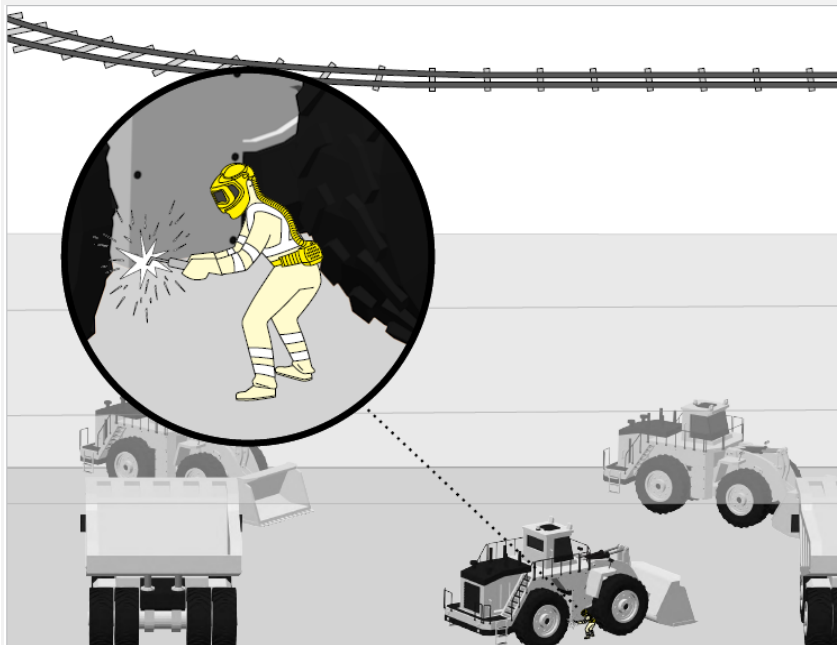
Mining outbound storage and transportation involve hazards that must be managed to ensure safety. Hazards include material handling injuries, vehicle accidents, spillage and environmental contamination, dust and particulate hazards, fire and explosion risks, and security concerns.



























EXAMPLES OF RISKS/NEEDS	POTENTIAL 3M SOLUTIONS
 <p>Unloading materials from trucks and storage in piles generates dust. The ore contains chemicals from the process, so respiratory protection is often required.</p>	 <p>TR-300+ PAPR High Efficiency (HEPA) Filter only</p> <p>TR-600 PAPR HEPA Filter plus multiple chemical cartridges</p>  <p>3M™ Secure Click™ HF-800*</p> <p>*Check sizes and filter and cartridge available</p>
 <p>Inability to Communicate</p>  <p>Water Exposure</p> <p>Clear communication is key for safety in mining processes. Typically, workers need to use a radio, talk with partners and be able to hear alarms. The vibrations when the ore is transported by belts, or by trucks and loading and unloading operations can generate moderate to high noise levels.</p>	 <p>3M™ PELTOR™ WS ProTac™ XPI w/ MT7V/1</p> <p>3M™ PELTOR™ X Series</p>
 <p>Flying Object</p> <p>Dust, particles and flying objects can cause eye injuries. Humidity can cause fogging, which can impede workers ability to see clearly through their eye protection.</p>	 <p>3M™ SecureFit™ Protective Eyewear 500 Series</p>
 <p>Struck by</p> <p>Workers can strike their head against pipes or other protruding parts of the structure. Objects and debris can also fall and strike a worker on the head. For poorly lit working conditions, consider adding a lamp bracket to pair with a headlamp.</p>	 <p>M-307/407 Helmet M-940 Lamp Bracket</p>  <p>3M™ SecureFit™ Hard Hat H-700 Series with 3M™ Lamp Bracket*</p> <p>*Not available in all markets. Please consult your 3M™ Safety Specialist for more information.</p>
 <p>Falls</p>  <p>Confined Space</p> <p>Climbing stairs, working on machinery or overseeing the transport process creates a risk of falling (worker and tools) and needs protection systems. Ore storage and transportation involves work in confined spaces that require means of access, air supply, gas detection and rescue.</p>	 <p>DBI-SALA® NanoLok™</p> <p>DBI-SALA® 5-Piece Davit Arm</p> <p>DBI-SALA® Sealed-Block™</p>
 <p>Oxygen Deficiency</p> <p>It is key to implement a systems approach, including anchors, harnesses, connectors, rescue and training.</p>	 <p>DBI-SALA® ExoFit™ X-Series</p> <p>3M™ Scott™ Ska-Pak</p> <p>DBI-SALA® EZ-Line™</p> <p>DBI-SALA® Rollgliss™ R550</p>

Mining maintenance refers to the activities and processes carried out to ensure the proper functioning, reliability, and longevity of mining equipment, machinery, infrastructure, and facilities. It involves regular inspections, repairs, servicing, and upkeep of mining assets to prevent breakdowns, optimize performance, and minimize downtime. Maintenance tasks can range from routine preventive maintenance, such as lubrication and filter replacement, to more extensive repairs or overhauls of equipment components.

Maintenance operations could often be the largest consumers of PPE. Crushing, grinding, separation, refining and pelletizing processes are very hard on equipment and the equipment requires frequent maintenance.



EXAMPLES OF RISKS/NEEDS	POTENTIAL 3M SOLUTIONS
 <p>Airborne Hazard</p> <p>Dust, gases and vapors from abrasive processes, paint mists, welding and cutting fumes, are generated during maintenance and may require protection for workers.</p>	<p>TR-300+ PAPR High Efficiency (HEPA) filter only</p>  <p>TR-600 PAPR HEPA filter plus multiple chemical cartridges</p>   <p>3M™ Secure Click™ HF-800*</p> <p>*Check sizes and filter and cartridge available</p>
 <p>Inability to Communicate</p>  <p>Noise Exposure</p> <p>Clear communication is key for safety in mining processes. Typically, workers need to use a radio, talk with partners and be able to hear alarms. Various sources of noise are generated during maintenance activities such as abrasive processes, painting, welding, cutting, and pressurized air.</p>	 <p>3M™ PELTOR™ PIC-100</p>  <p>3m™ PELTOR™ EEP-100</p>
 <p>Flying Object</p> <p>Dust, particles and flying objects can cause eye injuries. Humidity can cause fogging, which can impede workers ability to see clearly through their eye protection.</p>	 <p>Speedglas™</p>  <p>3M™ SecureFit™ Protective Eyewear 500 Series</p>
 <p>Struck by</p> <p>Workers can strike their head against pipes or other protruding parts of the structure. Objects and debris can also fall and strike a worker on the head.</p> <p>For poorly lit working conditions, consider adding a lamp bracket to pair with a headlamp.</p>	 <p>Speedglas™ 9100MP</p>  <p>3M™ SecureFit™ Hard Hat H-700 Series with 3M™ Lamp Bracket*</p> <p>*Not available in all markets. Please consult your 3M™ Safety Specialist for more information.</p>
 <p>Falls</p>  <p>Confined Space</p> <p>Mining equipment and process structures require maintenance that involves the risk of falls, other factors such as hot work or falls on sharp edges are associated.</p> <p>The maintenance process involves work in confined spaces that need means of access, air supply, gas detection and rescue.</p>	 <p>DBI-SALA® NanoLok™</p>  <p>DBI-SALA® Flexiguard™ Trailer Mounted Anchor System</p>  <p>DBI-SALA® Sealed-Block™</p>
 <p>Oxygen Deficiency</p> <p>It is key to implement a systems approach, including anchors, harnesses, connectors, rescue and training.</p>	 <p>DBI-SALA® ExoFit™ X-Series</p>  <p>3M™ Scott™ Ska-Pak</p>  <p>DBI-SALA® EZ-Line™</p>  <p>DBI-SALA® Rollgliss™ R550</p>

3M Science.
Applied to Life.™

Thank You

3M PSD Mining Team

