



# A SAFE OPERATION

**SAFETY TIPS FOR  
UNDERGROUND MINING OPERATIONS**

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**W**hether you are mining gold, zinc, diamonds, coal or copper, an underground mine can be dangerous. Special precautions need to be considered and care taken to educate employees with safety best practices. Potential mining incidents can happen in a variety of ways such as mine explosions, respiratory diseases or even a mine collapse. Getting employees **Safely home. Everyone. Every day.™** is the goal everyone should have when working in an underground mine.

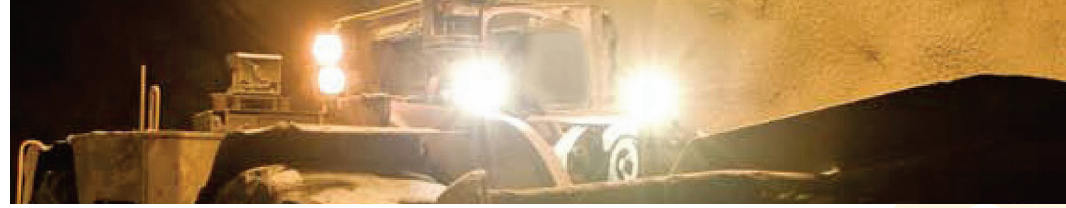
## 1. Always wear personal protective equipment.

Personal Protective Equipment (PPE) is just one of many precautions to take to help ensure your safety. PPE is designed to protect employees from workplace hazards that could cause serious injuries or illnesses. Consult with your jobsite safety coordinator or supervisor regarding the required PPE needed for your job. Common PPE for underground mining operations may include hard hats with head lamps, eye protection, high-visibility vests, steel toed or metatarsal safety boots, gloves, hearing protection and task appropriate respiratory protection (e.g. respirators or masks).



### Tips

- Inspect your PPE daily to ensure it is in proper working condition
- Know your jobsite procedures and safety equipment requirements



## 2. Ensure operator visibility.

Visibility is key in underground mines. Due to the lack of natural light underground it is difficult to see other employees, equipment and side walls which could initiate a safety hazard. Always replace any burnt out light bulbs in the mine and head lights on the equipment. If visibility is reduced or eliminated, immediately stop operating the equipment and inform the proper maintenance or management personnel of the problem. Inadequate visibility can lead to injury or death and it can cause or severe damage to the jobsite or equipment. When parking equipment for breaks or shift-end, use the designated areas where others can see the machinery. Clearly identify the “red zone” and train employees about the proper procedures and hazards when operating in or around the machine identified.

## 3. Wear your seat belt.

Underground mining applications can contain rough haul roads and a multitude of turns, inclines and declines; therefore, seat belts should be worn every time a machine is operated. When used properly, seatbelts hold operators in the seat and help contain them within the rollover protective structure (ROPS) in the event of a collision or tip-over. The seat assembly, which includes the seat belt and mounting hardware, should be inspected regularly as required during the pre-shift walk around and as instructed in the manufacturer’s operation & maintenance manual. When inspecting seat belts:

- Check the seat belt mounting hardware for wear or damage. Replace any mounting hardware that is worn or damaged. Make sure the mounting bolts are tight.
- Check the buckle for wear or for damage. If the buckle is worn or damaged, replace the seat belt.
- Inspect the seat belt for webbing that is worn or frayed. If worn or frayed webbing is found, replace the seat belt before the equipment is operated again
- Check the label for date of installation and replace after three years of service life.
- Consult your Cat dealer for the replacement of the seat belt and the mounting hardware.

If any part of the seat belt is damaged—replace it!



### Tip

- Perform seat belt and mounting hardware inspections before operating the machine
- Any damaged or worn parts should be replaced
- Check “Install By Date” when replacing a seat belt – Do not install a seat belt with an expired date
- Seat belt should be worn at all times while operating a machine



## 4. Communicate, communicate, communicate.

With the decrease in visibility in some underground mines, communication between employees is vital. Equipment operators need to know the location of other operators and employees, as well as what type of work is being performed in areas they will be passing through. Communication can come in the form of two-way radios, instructional signs, taped/roped off areas and traffic signs. Be sure to communicate the daily mine-site tasks and activities to employees before the shift begins. If hand signals are used, be sure you understand the meaning of the hand signals and that the signals are consistent throughout the entire jobsite.

## 5. Know the respiratory hazards.

Airborne particles pose many safety risks in underground mines. The particles can create a visibility hazard if the dust is not contained or haul roads are not kept damp. Additionally, coal, asbestos and silica dust are considered respiratory hazards at varying levels. These particles and fibers have the potential to cause serious lung complications, disabilities or fatalities. Ensure you wear the proper respiratory protection needed for your job and have the worksite areas tested regularly to determine the amount of respiratory protection needed.

### REDUCING RESPIRATORY HAZARDS MAY INCLUDE:

- ✓ Employee training
- ✓ Respirators or masks
- ✓ Regular medical screening
- ✓ Regular work area sampling

## 6. Inspect machinery and equipment.

Walk around inspections only take a few minutes and are one of the best ways to identify mechanical problems and avoid safety hazards. Details are provided in the manufacturer's operation & maintenance manual, which should be kept in the cab of the machine. Operators must understand the importance of completing the inspections and supervisors must allow enough time for a thorough evaluation. Look for equipment damage, leaks, cuts, cracks, rubbing, debris and excessive wear. Do not limit the examinations to the start of the day. At the very least, perform a walk around at the beginning and end of every shift and when you dismount equipment for breaks or lunch. Pass along all relevant information to other operators and ensure new observations are clearly communicated to a supervisor for proper maintenance.



## 7. Reduce or eliminate operator fatigue.

An underground mine site is a difficult environment to work in; reduced visibility/lighting, repetitive tasks and long hours tend to cause fatigue. Some common effects of fatigue can be: sleepiness, irritability, depression or loss of appetite. The results of fatigued employees can be disastrous and might include damage to vehicles or the mine site, injuries or fatalities. All potential safety risks that can cause a distraction to any jobsite performance should be prevented. Ensure all operators are fully prepared to operate machinery before each shift.



## 8. Maintain a safe travel distance between machines.

Operators running equipment on the jobsite should remain a safe traveling distance from other machines. The lack of natural light, as well as dust from loading/dumping can affect visibility. Having additional space between machines is recommended to avoid accidents. Any number of variables can cause a person to brake, turn, stop or lose control of a vehicle. Uphill and downhill slopes are areas of special concern. Ensure a safe travel distance is maintained at all times on haul roads. Train all employees and visitors on the jobsite traffic flow and abide by all rules set forth by the site. Right of way determines which vehicle moves first when two or more pieces of equipment are in the same area at the same time. The right of way should be pre-determined by the site management and communicated to all individuals using the haul roads. **Do not risk safety for production!**

## 9. Stay alert to changing conditions.

Conditions on an underground mine site are constantly changing. From the amount of lighting, to the weather or work being performed, there is always a potential for safety hazards. Employees must always be alert and continually look for hazards that may occur. Remember to communicate the daily activities to employees at the start of the shift. If a hazard or risk has occurred during the shift, employees should report these conditions to the supervisor or safety representative. Hazards should be eliminated when possible through administrative or engineering controls.



## 10. Employee training must be a priority.

Practice makes perfect. New operators should be properly trained before starting work on a jobsite. An operator who is not properly trained is a hazard to everyone on the mine site. Operators must understand the manufacturer's operation & maintenance manual before putting machines to work.

To create a safe work zone, it is important all employees understand the common communication practices used on the jobsite. Train employees on jobsite communication, including:

- Keeping track of others in the work zone and letting them know where you are at all times
- Establishing eye contact before entering a work zone
- Creating two-way communication before entering a work zone
- Informing coworkers when leaving a work zone



## SAFETY.CAT.COM™

The equipment training and safety teams at Caterpillar have spent decades working with customers around the world, across a wide spectrum of equipment applications and jobsite conditions. The key lesson learned is, when it comes to jobsite safety, no amount of equipment technology or advanced machine design can replace caution and good safety practices.

The primary contributors to jobsite safety are awareness, proper training and attention to detail on the part of business owners and their employees. Safety must be a priority and an ongoing part of your company culture. We hope this booklet is helpful as you strive to safely operate your business.

### SAFETY AND EQUIPMENT GO HAND IN HAND.

Learn more about both at <http://cat.com/safetraining>

This pamphlet is not intended to be a comprehensive analysis of all hazards related to Cat® products or to your specific application and does not supersede any state, federal, or local statutes or regulations. More complete information regarding Cat products is provided in the Operation & Maintenance Manual (OMM) for specific models. Caterpillar recommends you and your employees read and understand the OMM before operating or working on any machine.

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