



## Workplace Safety Induction



## Generic Underground Induction

### Victoria

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## **TERMS & DEFINITIONS**

Air Door	An air tight door in a drive or plat.
Air Pipe	A pipe along the backs or walls containing compressed air.
Air Hose	Generally 25mm high pressure rubber or plastic hose.
Air Leg	Holds the handheld drill machine against the face. A staged air ram.
ANFO	An explosive made by mixing Ammonium Nitrate and Fuel Oil.
Backs	The roof of an underground opening.
Backcut	Explosive used in back and side holes to reduce overbreak and has less blast energy. Similar to Scalelite.
Barring down	Using a scaling bar to remove loose rocks and scats, particularly after blasting. To make the area safe.
Bearers	Steel or heavy timbers placed across an opening to support decking, ladders, pipes, skipways etc.
Bells (shaft)	Used for signals to winder driver.
Bin	Where ore or mullock is tipped for hoisting/transport to the surface.
Blast hole	A hole drilled into rock to accommodate an explosive charge.
Blow Pipe	A short pipe up to 1.8 metres, attached to an air hose.
Bogger	A modified front-end loader for use underground, also known as a Mucker or LHD – Load Haul Dump.
Bogging	To move broken rock with a loader. To shovel ore or mullock.
Brace	Area at surface where personnel enter cage or skip.
Braceman	Worker who sends material from surface brace to underground plats.
Brattice	A temporary Barricade to restrict airflow.
Break Through	The end of a hole, or opening which has broken through rock into a drive, stope or other opening.
Bunton	Steel beams bolted North and South horizontally in the shaft.
Burden	The volume of rock which is broken by a blast between blast holes.
Butt	The part of a hole that remains after the charge has been fired.
Bulkhead	A structure or barricade closing off an opening.
Cage	Transports men and material in a shaft.
Camlock Fittings	Camlock couplings are secure fittings for hoses which are quick to use eg Kamlok® brand for air hoses.
Catenary Cable	Multiple strand plastic coated wire used to hang ventilation ducting and electrical cables.
Charge	The explosive or blasting agent used in a blast hole.
Collar	The start of a hole bored in a rock, also the top of a shaft or raise.
Collaring	The process of starting a drill hole using a rock drill.
Contact Ore	Mineral ore body adjacent to a rock formation that caused it; i.e. basalt.
Cordex / Det cord	Explosive detonating cord for exploding several charges at the same time.
Country	The barren or low grade rock formation that surrounds a mineral deposit.
Crib Room	Where miners eat their meals. Can also be a refuge.

Crosscut	Horizontal heading running across to the orebody.
Crowbar	Used to bend nails.
Cut	An initial void created in a face to provide expansion room for the remainder of the blast.
Cut and Fill	A stope which is filled with waste rock or sand / cuttings after a miner takes a cut. He then works off the sand or fill.
Detonator	A cap or capsule of sensitive explosive material used to initiate a charge of high explosive.
Development	To open up an ore body by mining drives, crosscuts and shafts as well as installing the requisite equipment.
Dip	The angle from horizontal that the ore body lies.
Disc (tag)	Aluminium or copper discs, issued for personal identification.
Disseminated Ore	Ore spread out in the country rock. Not as rich as main orebody.
Draw Bar	Used for towing vehicles.
Drive	A tunnel in rock. Usually follows ore. Horizontal heading running along the direction of the ore body.
Easers	The blast holes which break out the free face formed by the cut holes in a mining face.
ESO	Emergency Services Officers.
Face	The end of a development heading.
Fault	A natural discontinuity in rock bedding. The layers don't meet up. A fracture in the rock that has moved in geological terms.
Firing	Exploding charged holes.
Footwall	The underside of an orebody. The side leaning away from a person as they stand with their foot next to it.
Fracture	A cartridge of high explosive. Gelatinous Explosive e.g. Gelignite, Plastergel.
Fresh Air Intake	Fresh air drawn from the surface.
Grizzly	Rails or heavy steel beams placed evenly apart over a bin to prevent large rocks being tipped in.
Gympie	A small sledge hammer.
Hanging Wall	The side leaning over you as you stand next to it. The opposite to Footwall.
Hitch	A shallow hole or ledge in rock to accommodate the end of a large piece of timber.
Hoe	A scraper blade - scrapes the ore down a stope.
Hoist	A small electric winder used to raise ore and waste rock from a mine, or for lowering and raising men and materials.
House Keeping	Keeping materials and work area clean, tidy and safe.
Initiate	Act of detonating high explosive by means of detonator or by detonating cord - (Cordex).
Initiation Cord	Explosive detonating cord used to initiate nonel detonators.
Isanol	An explosive containing ammonium nitrate, polystyrene and vegetable oil.
Jumbo	Mobile drilling rig.

Lagging Boards Lagging	Timber lining between the wall plates and end plates in the shaft. Light timber put behind heavy timber to hold back rocks and or fill.
Lead Wires	Insulated wires connected to an electric detonator.
Leading Stope Level	A drive that has had its “backs” mined out. A main underground roadway or series of passages driven along a level (horizontal) course.
Lifters	The bottom holes of a drilling pattern for a development heading.
Long Hole Winze	A vertical or steeply inclined opening.
Machine Magazine	A rock drill that bores holes. An approved storage area for explosives.
Manifold Manway	A metal cylinder that has either air or water valves attached to it. Usually a small rise for access into a stope. Also used as a second access for air and emergencies.
Misfire	A charge or part of a charge that has not exploded.
Mucking Mullock	To move broken rock with a loader. To shovel ore or mullock. Waste rock. I.e. contains no gold or other valuable minerals.
Nonel	A tube type non-electric detonator.
Ore Ore bins Ore pass Orebody	Rock containing minerals which can be mined profitably. A bin into which ore is tipped or stored. A near vertical rise through which ore falls. The mass of rock containing minerals to be mined.
Pass	A vertical or steeply inclined heading through which ore or mullock is tipped/passed.
Pattern Pelican Pick	A series of holes drilled in rock to blast a face. Hand held device combining pick and shovel functions. Shaped like a Pelicans beak.
Pillar	Solid rock which is left to support the backs or hanging wall of an opening.
Pin	Any steel bar which is placed in a hole in rock. There are many types.
Plat PLOD	The area near the shaft on each level. Personal List of Duties (or Time Card) to record work to be performed and/or work done.
Prills Primer Popping Powergel Primer	Small balls of ammonium nitrate. A cartridge of high explosives used to initiate a bigger charge. Light charges of explosives in holes to break rocks. Emulsion type cartridge explosive. A plug of packaged explosive (powergel) with a detonator inserted.
Quartz Raise	Silica rock. Our ore body is the quartz vein material. A vertical or steeply inclined opening, developed upwards to connects levels and sub-levels.
Recovery Red Cord	The percentage of extraction of the metal contained in ore. Explosive detonating cord used to explode several charges at the same time. Commonly known as cordex.
Return Air Rise	Rise through which “dirty” air is drawn from the mine.

Rill	The natural slope of the side of a heap of broken rock.
Rise	A “tunnel” in rock which is more vertical than horizontal. More than 15 degrees above horizontal.
Rising Feed	Rock drill for drilling holes in the back.
Roadheader	Mechanical rock excavation machine for tunnelling in soft rock.
Rock Bolt	A long bolt inserted and fixed into the rock to make the backs safe.
Rock Drill	A compressed air driven machine for drilling holes in rocks.
Round	A series of blast holes drilled to advance in a development heading or other face.
Scaling Bar	Steel or aluminium bar with chisel ends used for barring down.
Scats	Small loose rock that may fall and injure.
Scraper	A double drum hoist which is used to pull a hoe or blade to move ore.
Services	The pipes, cables, communication lines and ducting that is hung in the drive, shaft or decline to provide air, water, power, communication and detonate explosives.
Service Raise	A raise equipped with ladders and skipway, for servicing and travelling between levels and sub-levels.
Sequential Firing	A system in which the holes with least resistance are detonated progressively, reducing the burden on each subsequent hole fired.
Skip	The container which transports ore / waste to the surface and is usually at the bottom of the cage.
Slot	A particular type of stope. Usually a void taken prior to a large blast.
Spacing	The distance between adjacent shot holes parallel to the free face.
Spalder	A large hammer for breaking rocks.
Steel	The drill steel used to bore holes in rock. Carries the bit.
Stemming	Clay or gravel material used for sealing a blast hole after the charge has been placed.
Stope	An excavation made as a result of extracting ore.
Strike	The horizontal direction of the ore body.
Sub Level	Horizontal working connected to the main decline.
Tag- Out of Service	Danger or Warning label attached to faulty equipment.
Tagboard	The system used to monitor the presence of personnel in an underground mine.
Tamping	Pushing explosives into a hole with a length of wooden dowel.
Trickle Pipe	A pipe used to blow air into blind openings or rises.
Turtle	An oil bottle connected to an air supply to lubricate air tools and machinery.
Ventilating Ducting	Tubing through which ventilating air is blown by fans.
Vein	Small quartz lode.

## **TAG BOARDS**

You will be issued with tags with your name and number on them and are required to complete the tag board procedure prior to going underground.

Before going underground at the start of shift you must place one of your tags on the IN side of the surface tag board.

When you come out, even for a short time such as for crib you MUST tag yourself OUT, then tag IN again before re-entering the workings.

At the end of shift ensure that you have tagged yourself to the OUT side of the tag board.

**Each person must move only his/her own tag.**

**WARNING:** Never remove or replace another person's tag as this may cause a hazardous situation.

If a "Firing or No Entry" sign is fitted to the tag board, DO NOT tag IN or enter the underground workings.

These procedures are for the safety of all persons in the workings.

If a person is tagged in and cannot be located on the surface at firing time then firing CANNOT proceed.

If a tagged-in person cannot be located the Shift Supervisor will organise a thorough search of the underground workings, barricading or guarding areas to prohibit entry to areas being searched or already searched.

If a thorough underground search fails to locate the tagged-in person, the Shift Supervisor and Underground Manager will endeavour to contact the person by phone (home, another site etc) and verify the whereabouts of the tag owner.

Only then can the Supervisor, with authorization of the underground manager, remove the tag and fire at the next convenient time.

## **UNDERGROUND TAG BOARDS**

Some mines operate additional tag boards underground.

For example before proceeding past a determined level there is a tag board that personnel must use.



## CAP LAMPS

**Always take good care of your own lamp as it can be very hazardous if your light fails underground.**

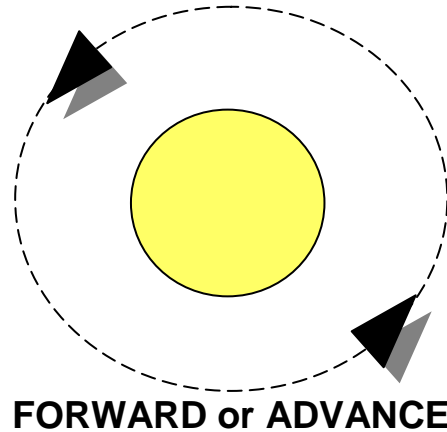


- Check your cap lamp at the start of every shift by ensuring both globes are functioning, the cord is intact, the battery is not leaking sulphuric acid solution and the charging rack position is not damaged.
- If the battery is leaking sulphuric acid solution and you do not identify this, then the acid could burn through your clothing and cause skin problems when it contacts the skin.  
You should wash the area thoroughly with water and report the burn to the Supervisor/ First Aid Officer as soon as possible after contact.
- Wherever possible make sure your cap lamp battery stands up and is not left laying flat.
- **DO NOT** shine your cap lamp in the eyes of other persons and especially not in the eyes of persons operating machinery.
- **DO NOT** move around the underground workings of the mine without your cap lamp and it is essential to leave your cap lamp in the holders provided on your belt and hard hat whenever underground.  
Carrying the light part in your hand reduces your visibility to others.
- If your cap lamp fails whilst underground and you are alone, then remain in the place you are, until someone comes to find you. If someone is with you, then they can lead you out to a place of safety.
- Always use your own cap lamp. **DO NOT** take another person's cap lamp.
- Report all faults to the surface day electrician and replace your lamp in its cap lamp holder.  
If there is work to be done on your cap lamp then report this to the Supervisor for further action to be taken. Also place an Out of Service tag on the cord (filled out correctly) and tie a knot in the cord to identify it as non-operational.
- If you require another cap lamp then a spare "contractor" light can be used.
- Always put your cap lamp back on the rack at the end of each shift to allow full recharge, ensuring it is clipped in correctly.

## CAP LAMP SIGNALS

The cap lamp can be used for signalling vehicles or personnel. **The following basic Cap Lamp Signals are primarily for use in underground situations where voice contact is not possible but specific directions must be given:**

**Circular motion of cap lamp – move towards the person signalling**



**Up and down movement of cap lamp – move away from the person signalling.**



**Side to side movement of cap lamp – stop.**



Any object including a cap lamp, waved vigorously on or near a vehicle must be observed as a signal to stop.

**NOTE:** All personnel must fully understand the operation of the cap lamp signals. The signals are an important part of the underground communication system.

## **PERSONAL PROTECTIVE EQUIPMENT / CLOTHING**

Where the climate inside the mine is usually moderate light layers of clothing such as cotton undershirts, underwear and woollen socks underneath overalls, are recommended. For wet conditions, waterproof clothing is to be worn over the overalls.

### **REFLECTIVE TAPE**

The use of the reflective tape on your helmet and on the front, back and arms of your shirt or overalls is required as it makes you much more visible underground, particularly to operators of mobile equipment.

Ask your Shift Boss for replacement of worn or damaged reflective clothing. It is your responsibility to maintain your clothes and tape in good condition. Clothing is replaced on a fair wear and tear basis.

Reflective fluoro vests must be worn if your reflective tape is missing.

If wearing a coat over protective clothing then the coat must have reflective stripes to current standards.

### **HEAD PROTECTION**

An approved helmet is provided for head protection. It must be worn as required in the protective clothing policy. **Take note of the following:**

- Do not ignore “hard hat area” signs.
- Keep your helmet clean;
- Make sure the harness is in good condition and correctly adjusted;
- Do not paint your helmet or write on it with permanent marker pen, as the solvents in the paint will make it brittle and therefore reduce its effectiveness;
- Personnel working underground should have a hat with reflector tape and lamp bracket;
- If your helmet becomes damaged in any way, report it to your supervisor who will issue you with a new one;
- Replace your hard hat every three - (3) years (from the date of issue). Check the manufacturer’s date stamped into the inside brim of the hard hat. When booking new helmet from the store, write your name and the issue date on the sticker provided inside the helmet.
- Generally stickers from mining components companies are suitable for hard hats. The glue used on these is not detrimental to the plastic.

### **PERSONAL WATCH**

A watch or time piece must be worn by each person working underground.

## **CONDITIONS FOR VISITORS**

- No visitor may proceed underground without the approval of the Underground Manager or his/her designate.
- Any person who is deemed to be incapacitated and not be able to climb the escape ladderway or under the influence of alcohol or drugs will be refused entry to the underground workings. In addition, no alcohol or drugs are to be taken underground.
- All visitors must remain with their guide at all times whilst underground. However, if you should become separated from your guide, remain where you are and wait for help.
- All visitors must agree to wear all personal protective equipment issued to them for the purpose of their visit underground.
- Visitors must wear reflective clothing or a fluoro vest and have completed the Visitors Induction, understand the use of the Self Rescuer (e.g. Oxyboks) and sign in the Visitors book.

## **MINE GENERAL VENTILATION**

Underground workings require continuous ventilation to prevent a hazardous build up of dust, fumes, heat and gases.

### **REMEMBER:**

- Every effort must be made to reduce dust generation.
- Keep muckpiles moist.
- When collaring drill holes, always ensure your water feed is turned on.
- Make sure your water lines are placed in safe areas where machinery will not damage them.
- If dust is still present after taking all possible preventive measures, and you have to enter the area, use a dust mask to protect your lungs.
- Always ensure that the diesel equipment scrubber/converter are working.
- Keep vent bag within the specified distance (of the particular mine you are working at) from the face.
- Report/ repair damaged vent bag immediately to your Shift Boss.
- Move vent bag from path of high or unusual loads to prevent damage and loss of ventilation.
- If dusty conditions still prevail, use a dust mask and report the condition to your Shift Supervisor.
- Before working underground, training must be conducted on how to clean and maintain a dust mask or respirator. Further training is required for underground workers at 6 monthly intervals. Ask if you have not been shown these procedures.
- Always keep your hoses, sprays, vent bag etc. in good condition.
- Store them correctly preventing any damage. Place them in such a way that they will not be damaged by mobile equipment.

## DUST CONTROL

Different forms of dust can have different health effects. If you make dust everybody underground can be affected. **Dust can be significantly reduced by:**

- Hosing down rock before and during bogging/mucking operations.
- Hosing down the backs and walls after firing.
- Using water sprays.
- Using water when boring holes.
- Keeping ventilation duct close to the face of the heading.
- Hosing down all machinery each shift. Cabs and floors of vehicles also need washing out.

## UNDERGROUND GASES

Some Hazardous Gases that may be found underground are listed below along with their effect. In sufficient concentration they are all deadly.

<b>GAS</b>	<b>SYMBOL</b>	<b>INDICATION OF ITS PRESENCE</b>	<b>WHERE FOUND</b>
Carbon Monoxide	CO	Headache and nausea (produced by fires and explosives - very poisonous)	Backs
Carbon Dioxide	CO <sub>2</sub>	Match will not burn, feeling of warmth around legs. Difficulty in breathing (exhausts, old workings and dead ends). Combustion.	Floor
Sulphur Dioxide	SO <sub>2</sub>	Biting, irritating smell. Makes eyes water, causes coughing. (Occurs after Sulphide dust explosions.)	Floor
Hydrogen Sulphide	H <sub>2</sub> S	Strong smell like rotten eggs. (Occurs after Sulphide dust explosions.)	Floor
Nitrous Fumes	(NO + NO <sub>2</sub> )	Irritates throat, eyes. (Produced by diesel engines and explosives.)	Floor
Ammonia	NH <sub>3</sub>	Irritates throat, eyes. (Produced by cement mixing with Ammonium Nitrate explosives)	Backs

Different mines will have issues with different gases. Your site inductions at these mines will need to familiarize you with:

- Types of gases and their health effects.
- Detection and monitoring.
- Warning procedures if gases are at unsafe levels.
- Emergency procedures, including use of rescuers.

## **ACCESS TO UNDERGROUND MINE**

Access to an underground mine is by either shaft or decline. Access by either method requires site specific training before entry is permitted.

For shaft only access – you would require site-specific training before entering the shaft.

For decline access – site specific training and induction for light vehicle access would be required before entry to the mine.

## **WATER HAZARDS**

When uncontrolled in a mine, water can be a hazard. It also costs a lot to pump from the mine.

- Do not use leaking hoses. Repair them.
- Do not allow water to build up in your work area.
- Keep all drains clear. Allow water to continually drain.
- Do not allow water to run into ore passes. A build up of water above material in the pass can cause a rush of fines and rock material which could lead to a serious injury.
- Report any leaking services to your supervisor.
- If you damage services with your vehicle or loader, report this immediately.
- Always inspect dam walls at pump stations and bund walls. Look for leakage and weeping. Report if noticed, as drowning may be the end result from water inrush.
- Turn off valves and manifolds before leaving your workplace.

**If water is noticed from drill holes and you suspect the risk of an inrush of water:**

- Report to shift Boss immediately.
- Under Shift Boss's guidance, drill probe holes at floor level or along wall.

**NEVER DRILL IN CENTRE OF FACE AS THIS COULD LEAD TO AN INRUSH.  
LEAVE AREA AND BARRICADE. GEOLOGIST TO REVIEW**

## **BEFORE COMMENCING WORK**

- Check the condition of the entrance and travel way to the place of work and review what is necessary to make these safe.
- Check that the working place and equipment are in good condition. Take any corrective action necessary.
- You are responsible for making your working place safe at all times.
- Where ventilation equipment is provided for the job, use it.
- Check for loose rock and bar it down each time you enter your working area and at regular intervals while working there.
- If you are short of gear in your job, consult your supervisor.
- At every working face there must be a scaling bar (or bars) of proper length and in a good condition.
- Before leaving any job, make sure it is safe. If for any reason you cannot make your working place safe, guard or barricade the area and report it immediately to your supervisor.
- A tidy job is a safe job. Keep your working place tidy and keep gear clear of travelling ways.

## **BARRING & SCALING DOWN**

**DO NOT** bar down unless you have been trained!

Bar down every time you enter your working area and at regular intervals while working there. "Remember - Yesterday is not good enough".

**NOTE:** Always water down new areas before starting to bar down. It exposes any cracks, removes dust and dislodges any loose scats.

Bar down any loose rocks as you work your way into the work area. A rock that is loose will make a dull drum-like (drummy) sound when hit with a scaling bar. Solid rock causes a ringing sound. Your scaling bar must be long enough for use. It must be sharp, straight and be fitted with a rubber rock/scat deflector.

**The following rules for barring down must be observed:**

- Check the entrance, back, walls and face of your workplace each time you enter, particularly after a firing. Bring down all loose rocks. Check these areas frequently whilst working there.
- Do not allow any person to pass under drummy or dangerous ground until it has been made safe. If the area cannot be made safe by you, barricade it off and report it to your supervisor.

- Wear eye protection and gloves.
- Have a good firm footing before starting to bar down. Stand on a flat surface if possible and in such a position that falling rocks cannot roll towards you.
- Have a good retreat. Check that the area behind you is clear so that you can move back quickly if necessary.
- Work from good ground to bad ground and make the ground safe before advancing under it. Starting with the backs and working down the walls if possible and safe to do so.
- Be wary of unexpected rock falls.
- Drop the bar if a rock slides down it or falls towards you.
- Never stand under the area being barred down. Ensure your scaling bar is of sufficient length to stand out from the danger area.
- Check the bar is straight, the ends are sharp, it is in good condition and of correct length.
- It is better to push up rather than pull down on the bar when levering a rock from the roof, as there is less chance of losing your balance and stumbling forward into the danger area if the rock falls suddenly.
- Hold the bar to the side of your body -not in front of you - in order to avoid the bar penetrating the body due to an unexpected rock fall.
- Do not use any tool other than a scaling bar for barring down.
- Keep well away from a person who is barring down. If you must approach them, give adequate warning and wait to be acknowledged.
- If a rock sounds loose but cannot be brought down, mark it up with white paint, barricade and notify your supervisor.
- Make sure the ground being barred down does not endanger any person, machine, equipment or services (air, water, electrical).

# **ENTRY INTO OLD MINE WORKINGS**

## **PROCEDURE FOR ENTRY INTO OLD WORKINGS**

- **Authority is required from the Mine Manager and a JSA completed prior to entry.**
- **Do Not** enter alone.
- Person to be stationed at the entry point.
- Give time of entry and planned return time. Radios should be used to maintain contact.
- Any person entering old mine workings must be accompanied by experienced mine personnel.

## **STALE AIR**

- Possible toxic concentrations of gases and possible oxygen depletion. The stale air can be denser than normal atmosphere and can be accumulated behind falls of ground or in winzes.
- When entering workings for the first time carry an O<sub>2</sub> monitor and gas detection equipment for the identified possible gases (e.g. CO<sub>2</sub>, CO, H<sub>2</sub>S etc). Carry out continual gas monitoring.
- If a low oxygen concentration or high gas concentration is indicated, immediately retreat to fresh air.
- If the atmosphere in the old workings is suspected of being irrespirable, the area must be sealed off, or vented out, and rehabilitation carried out by trained personnel.

## **GROUND COLLAPSE**

- Special attention must be paid to the condition of the backs. In un-timbered openings blocks of rock may have become loosened and are ready to fall if disturbed.
- In timbered areas the timber may have rotted and is no longer capable of supporting ground. Before entering timbered areas the timber should be inspected for rot.

## **NEVER ENTER AREAS “SUPPORTED” BY ROTTEN TIMBER**

(Such areas will have to be rehabilitated prior to entry)

## **WINZES**

- Special attention must be paid to the floor, particularly if there is water on the floor. A puddle of water may be hiding an open winze. Probe those areas with a stick.
- Also watch out for winzes which may be boarded over by timber which has rotted.

## **RISES AND SHAFTS**

- Never climb up old rises or shafts from the bottom. The ladders must be presumed to be insecure and should only be rehabilitated from the top unless special precautions are taken.

## **UNDERGROUND VEHICLES – GENERAL SAFETY**

- Only those certified and authorised to operate are permitted to move or operate any vehicle.
- Inspect your vehicle before starting it up. Refer to pre-operating checks for that vehicle.
- Light vehicles must give way to heavy and loaded mining equipment.
- All vehicles being driven underground must not exceed the site limit (which is generally 25kph), and drive to road conditions.
- Do not attempt to overtake any vehicle underground.
- Use the recesses in the decline to allow mining vehicles to move freely.
- A vehicle must not travel closer than 30m to another vehicle travelling on the decline.
- Secure all loads in the tray of the vehicles. Gear could fall off going up the incline. This could be a hazard to others.
- Loader operators must trim their buckets before travelling.
- When parking a vehicle underground, turn your wheels so either the front or rear is turned into the wall and you do not have a runaway situation. Where ever possible have the front of the vehicle facing downhill.  
Let other people who are working in that area know where your vehicle is parked.  
Keys **must** be left in the ignition switch. Turn off all lights (except the orange/amber beacon) so that the battery is not drained.

### **Haul truck operators are responsible for their load:**

Can the truck carry the load safely?

Is the load going to damage overhead pipes, cables, vent tubing?

Is any of the load going to fall off and cause injury/damage to people and equipment?

Trucks are to be slightly under-loaded rather than overloaded to prevent spillage, tyre cuts and cleanup work.

**Do not operate defective equipment. Faulty equipment must be treated as follows:**

- If the fault will cause a dangerous situation or serious equipment damage by further operation, the equipment must be stopped immediately. If in doubt, park up immediately. Make safe and apply an “Out of Service” tag (yellow/black).
- If reasonable to move the machine a short distance the vehicle should be parked in the nearest cuddy. Make safe and apply an “Out of Service” tag (yellow/black).
- If the equipment can be driven to the Underground Workshop without causing a dangerous situation or equipment damage, the machine must be taken to the workshop for repair. Hand over to maintenance personnel.
- If you are in a vehicle which has seatbelts fitted you must wear those seatbelts and need to be properly adjusted.
- Diesel engine vehicles must not be left running when parked up. Vehicle must be turned into the wall and bucket on ground if loader.
- When operating equipment with a bucket or suspended load you must not allow the bucket or load to pass over any person or over the driver’s cab of a vehicle during loading operations.
- Keep the operator’s cab of your machine tidy and free of loose gear.
- If you are operating equipment beware of overhead power cables and services.
- Except when being towed, mobile equipment must only be operated under power. Downhill “coasting” is not allowed.
- Do not carry passengers unless a proper seat is fitted.

**No hitching of rides on machines is allowed! This includes in a bucket or on the man basket!**

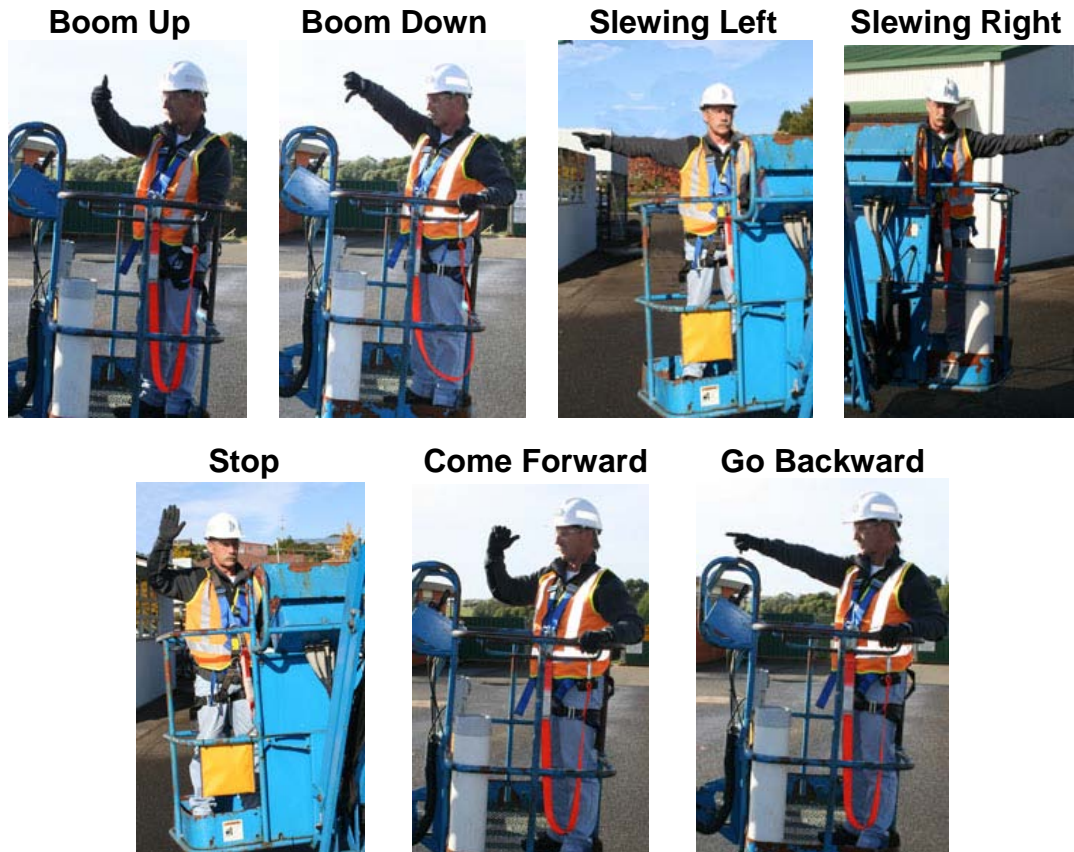
**A proper seat with handholds, footrests and seat belt must be provided.**

## WORKING FROM A MAN PLATFORM

You may work from a man platform only if it is fitted with lanyards and attaching points and you are wearing a full body harness.

### HAND SIGNALS

Know your hand signals. Prior to starting any task, the operator and the person working from the basket must clearly define and understand the signals to be used (one designated signalman).



## PEDESTRIAN SAFETY AROUND MOBILE EQUIPMENT

**Machinery must give way to pedestrians; however it is the responsibility of the pedestrian to make their presence known to the vehicle driver.**

One of the major causes of serious injury underground is crushing by heavy equipment due to the pedestrian not being seen by the operator. **You must take the following action to prevent being crushed or run over:**

- The truck and loader operators have blind spots in front and back of the machine and on the operator's off-side.
- REMEMBER THAT THE OPERATOR'S VISIBILITY IS LIMITED, ESPECIALLY CLOSE TO THE MACHINE. THEY MAY NEVER HEAR YOU YELL OUT.
- Use your cap lamp light to communicate and ensure that you get a response. Never assume that somebody has actually received the signal.

### **When you are on foot:**

- Always indicate your presence to the operator to make sure that he/ she has seen you. (A quick flash of your cap lamp to the operator is normally sufficient.)
- When a machine is approaching, stand in the nearest cuddy or if there are no cuddies close by, stand on the OPERATOR'S SIDE OF THE MACHINE so they can see you. The operator will stop and indicate for you to walk past. Then signal the operator that you are clear.
- Walk to the outside arc of the corner. This extends your visibility.
- Do not walk down the decline in front of vehicles. Walk behind.
- Do not walk up the decline behind vehicles. Walk in front.

## **AIR TOOLS**

Only trained operators are permitted to use air tools.

- Be alert - avoid operating any tool when you are fatigued.
- Avoid loose fitting clothing.
- Good footing is most important in all hand tool work. Always maintain a firm balanced footing. Wear safety boots, gloves, eye protection, hard hat and ear protection.
- A high impact face shield and safety glasses are required when using grinders or disc cutters. Your shift supervisor and the workshop have these.
- Before commencing any work involving air tools always inspect them for damage, leaks or defects. If there is any doubt regarding the safety or effectiveness of the air tool do not operate it. Report it to your supervisor.

**Never remove, deactivate or tamper with any safety device fitted to an air tool!**

## **COMPRESSED AIR**

Never blow compressed air at any person or endeavour to clean off personal clothing as the air, or contaminants, may penetrate the skin causing injury or death.

Before connecting compressed air or water hoses to equipment, always blow the hoses out to prevent dirt getting into equipment and causing damage.

Always use safety clips on snap couplings on compressed air hoses and always tie down the arms of camlock (e.g. Kamlock® brand) couplings with wire.

## **HYDRAULIC SAFETY**

To do their work, hydraulic systems must store fluid under high pressure, typically 2,000 pounds or more per square inch. One hazard comes from removing or adjusting components without releasing the pressure. The fluid, under tremendous pressure, is also hot. The worker then is exposed to three kinds of hazards: burns from hot, high-pressure fluid; bruises, cuts or abrasions from flailing hydraulic lines and hydraulic injection of fluid into the skin.

Many systems store hydraulic energy in accumulators. These accumulators are designed to store oil under pressure when the hydraulic pump cannot keep up with demand, when the engine is shut down, or when the hydraulic pump malfunctions. Even though the pump may be stopped or an implement disconnected, the system is still under pressure. To work on the system safely, relieve the pressure before the work begins.

## **PINHOLE LEAK INJURIES**

Probably the most common injury associated with hydraulic systems is the result of pinhole leaks in hoses. These leaks are difficult to locate.

A person may notice a damp, oily, dirty place near a hydraulic line. Not seeing the leak, the person runs a hand or finger along the line to find it.

When the pinhole is reached, the fluid easily can be injected into the skin as if from a hypodermic syringe.

Another hazard is improper coupling of low-and high-pressure hydraulic components.

**Do not** connect a high-pressure pump to a low-pressure system.

A low-pressure component, hose or fitting should not be incorporated into a high-pressure system.

Component, hose or fitting ruptures are likely to occur.

Pressure relief valves incorporated into the hydraulic system will avoid pressure buildups during use.

Keep these valves clean and test them periodically to ensure correct operation.

## **DANGERS OF HYDRAULIC PRESSURE**

- Injection Injuries.
- Dangerous properties of fluid (toxic).
- Contact with hot fluid.
- Other material movement (explosion, whipping hose, etc.).

Immediately after the injection, the person experiences only a slight stinging sensation and may not think much about it. Several hours later however, the wound begins to throb and severe pain begins. By the time a doctor is seen, it is often too late, and the individual loses a finger or entire arm. Unfortunately, this kind of accident is not uncommon. To reduce the chances of this type of injury, run a piece of wood or cardboard along the hose (rather than fingers) to detect the leak.

## **WHERE DO YOU FIND HYDRAULIC HAZARDS?**

Hydraulic lines, airless paint sprayers, fluid 100 psi or above, high-pressure fuel injection, high-pressure air lines, high-pressure grease guns, general work shop air, high pressure grease and paint guns are the most common cause.

## **TIMBERING & SERVICES**

Eye protection must be worn when using an air saw or an air driven auger. Relevant procedures must be completed.

Gloves must be worn when handling timber or when handling and mixing cement. Barrier cream should be considered for use on hands and should be applied before handling cement.

Before and while using axes, bars, hammers, picks and other tools, ensure that no one is in danger from their movement.

As with all chemicals read the Material Safety Data Sheet prior to using cement products and follow all warnings and directions.

## **FULL BODY HARNESSSES**

**Note: A miner's belt is no longer acceptable as a fall restraint device.**

**A full body harness (preferably with a rear dorsal D ring) must be worn when:**

- Within 3 metres of any unguarded downward opening. (hole, shaft or stope)
- There is a danger of falling.
- Working in a rise.
- Working on a ladderway.
- Working in a shaft.
- Working on the cage maintenance platform.

Where the hazard is a "fall" then **fall arrest** equipment must be used rather than **fall restraint** equipment.

Keep your safety devices in good condition. If in doubt have it checked out. Safety ropes or lanyards shall not be used to secure or lift equipment. Lifting equipment is to be used.

## **BARRICADES**

Barricades are structures that are erected to prevent access where a potential hazard may exist. A barricade may be a suspended rope, chain, wire, fence, mesh or ventbag across an opening. Treat them all as solid impenetrable fences.

Safety signs must be placed on all erected barricades and have to be strictly obeyed. These signs can only be removed if permission has been obtained from your supervisor. The ground or air quality may be dangerous or for any other reason that you may not be able to identify.

If a "No Entry" sign has been placed on a barricade, it may only be removed with the permission of the Underground Manager, and no person or machinery is allowed entry without authorisation.

If you see an unsafe situation, report the matter to your shift supervisor. Whenever possible erect a barricade to protect your fellow workers before you leave the area.

## **ENTRAPMENT PROCEDURE**

The following procedures have been designed to assist you, or a group, of personnel who find themselves trapped by smoke or gas with no escape route available.

If a fire or gas inflow occurs immediately don your self rescuer. If you are unable to access a Fresh Air Base, head for the nearest compressed air manifold, turn the air valve on slowly and take off your shirt or overalls. Secure a sleeve onto the manifold then place your head in the garment.

If necessary several people may share the garment. A section of Ventbag can be pulled or cut down and also tied on to the air outlet. Turn the air on and climb inside or cut a hole for each persons head every one (1) metre.

## **ENTRAPMENT CONDUCT**

**An orderly evacuation process can only be achieved through training and practice. General rules of conduct include:**

- Keep Your Head - Avoid panic and confusion.
- Know the Location of the Exits - Be sure you know the safest way out of the work place, no matter where you are.
- Know the Location of nearby Fire Extinguishers - Learn the proper way to use all types of extinguishers.
- Know How to Report an Emergency - Initiate the alarm without delay.
- Follow Exit Instructions - Complete all emergency duties assigned to you and be ready to walk out rapidly according to plan.
- Walk to Your Assigned Exit or Refuge Station - Maintain order and quiet.
- Take each drill seriously - it may be “the real thing”.

## **EVACUATION PROCEDURES**

Depending on the mine site, evacuation procedures can be initiated by the winder driver, ESO, underground manager or shift boss.

**Evacuation may be considered necessary under the following conditions:**

- Fire underground.
- CO<sub>2</sub> > 1.0 % underground.

- Any crew member collapses - medical emergency or severe injury.
- Explosion underground.
- Water (H<sub>2</sub>O) inundation and flooding from old workings.
- Electricity failure.
- Bomb threat.

Activate personnel warning system, (e.g. stench gas located at the Fresh Air Intake shaft) released into ventilation downcasts, radio warning to personnel).

## **STENCH GAS**

Stench gas (Ethyl Mercaptan) is the odourising agent that is used in LPG or natural gas to give it a smell. Many mines use it to warn workers of many types of emergencies.

When released in a concentrated form, it smells like “rotten eggs or onions” or horrible decomposing material. Its smell is unique and can be smelled in very small concentrations, so is ideal as a warning gas.

**If you smell stench gas immediately stop work** and travel to your nearest refuge, chamber or fresh air base. If you are unsure of the danger put on your self-rescuer.

***Stench Gas = Emergency Warning Gas***

## **SELF RESCUER**

A Self Rescuer must be carried on the miners belt at **ALL** times while working underground.

Self Rescuer units are small personal breathing sets that can be easily carried throughout the mine.

A Self Rescuer is a closed circuit breathing apparatus that produces its own oxygen by reacting with the water vapour and carbon dioxide in the exhaled breath.

In the event of a build up of poisonous gases or if the oxygen in the air drops to a dangerous level they can be quickly put on and will provide 30 minutes or more of breathable oxygen.

The duration of breathable air available from the Oxy-Bok-K self rescuer can be dramatically reduced if climbing ladder-ways, walking uphill, or by being a smoker (poor health).



## Before starting work underground check your self rescuer for:

- Physical damage
- Moisture leakage.

On the back of the rescuer there is a small round window that shows whether moisture has entered the unit and reduced its ability to produce oxygen.

The crystals seen in this window must remain dark **blue**. If they have changed colour (to pink) or faded, the unit must be handed to your supervisor and replaced.



## OPENING THE CONTAINER for OxyBoks (Refer diagram on last page)

- Pull lever up with forefinger or thumb as far as it will go until the fixing straps loosen and fall off
- Remove lid and place in the middle of the drive (provides a “sign” for anyone looking for you).

## PULLING THE DEVICE OUT

- Get hold of the red loop on the exposed part and pull the device out of the housing smoothly in one go; doing so will automatically activate the starter cartridge and the yellow breathing bag will fill with oxygen after about 6 seconds. The loose packaging will fall off or may be removed.
- Ease out any folds in the breathing bag by hand.
- Proceed without any interruption to fit device completely within 20 seconds, following the instructions below.

## PREPARING AND INSERTING THE MOUTH-PIECE

- Remove plug from the mouthpiece.
- Hold the device with the breathing bag pointing away from your body.
- Put mouthpiece in your mouth. The rubber gum plate must be inserted between your teeth and lips.
- Tightly seal round the mouthpiece with your lips.

## FITTING THE NOSE CLIP

- Pull nose clip apart and fit over your nostrils so that your nose is completely sealed.

## IF THE BREATHING BAG HAS NOT INFLATED

- Clear lungs first (by breathing into your chest or shoulder) to remove toxic gases from the lungs.
- Exhale (into breathing bag) deeply several times in order to fill the breathing bag. The humidity and CO<sub>2</sub> content in the expired air will increase oxygen production.
- Breathe steadily.

## FITTING AND TIGHTENING HEAD STRAPS

- Take off your helmet.
- Untangle headstraps and pull over your head
- Pull ends of the red band evenly towards the headstraps until tight.
- Put your helmet on again
- Commence escape calmly; do not rush.

## IMPORTANT ESCAPE RULES

- Plan your escape using the shortest route to safety.
- Do not rush. Proceed calmly. Hurrying uses more oxygen.
- Make sure that the mouthpiece fits firmly between teeth and lips and is completely sealed by your lips at all times.
- The air from the Oxyboks will be warm and dry, a sign that the device is functioning correctly. A salty or dusty taste is quite normal and is not dangerous.
- If, for some overriding reason the mouthpiece has to be removed (eg., a need to vomit): **Keep the mouthpiece closed with thumb.** After re-fitting in the mouth breathe in again.
- Do not waste life-saving oxygen by damaging or squashing the breathing bag.
- If you feel you are going to be sick, remove the mouthpiece but keep it closed with the thumb. Do not vomit into the device.

As the oxygen is released heat is produced. To then cool it down the air supply is passed through a heat exchanger. The air you breathe through the unit may become warm. This is normal and shows it is working. Do not remove it from your mouth. The Oxybok will provide approximately 30-45 minutes of oxygen with active exercise by the wearer. It can provide 150 minutes (2.5 hours) of oxygen at complete rest.

- ❖ **Place the lid and clips in the centre of the drive where they can be seen by the mines rescue team, with the nodules or arrow on the lid facing in the direction you have travelled off in.**

# O<sub>2</sub> supply starts automatically



OPEN CONTAINER



AND



REMOVE LID



PULL OUT  
INNER CARTRIDGE  
(O<sub>2</sub>-Supply starts  
automatically)



PULL OUT  
MOUTHPIECE PLUG



PUT MOUTHPIECE  
INTO MOUTH



FIT NOSE CLIP



FIT AND TIGHTEN  
HEADSTRAPS

