

Is Mining for me?

Getting a Start in the Mining Industry

From a Underground Shift Boss's Perspective

Including Underground Training Systems units on Scaling, Ground Support & Pooled Water











Index

Topic	Page Number
Introduction	3
Getting a Start	4
Hardrock Underground Mining	5
Hardrock Open Cut Mining	6
Underground Coal Mining	7
Open Cut Coal Mining	8
Mining Construction	8
Mining Maintenance	9
Mining Shutdowns	9
Information Required	10
Mining Companies	12
Duties of Employers	13
Duties of Employees	15
Your Resume	17
The money on offer	17
Different Roster	18
Once you get to site	19
Surviving the first 12 months	20
Mine Orientation	21
Ground Support	23
Scaling	33
Pooled Water	43
Courses Available	45
Check List	50





Introduction

This book has been written in good faith as a guide to getting a start in the mining industry. It has been compiled by a group of W.A. ticketed shift bosses with over 80 years' industry experience between them. This book has been designed to be a guide and give the reader a realistic view of the different aspects of the mining industry. This book has been written to help expand your mining knowledge, using Underground Training System's (UTS) unit on scaling to provide an example of practical mining information that counts as experience. At the end of this book is a check list, if you can tick yes to the majority of these questions then we would recommend trying to pursue a career in the mining industry.

Information covered includes;

-  The information and training required
-  The best approach for getting a job
-  The different types of mines
-  Different types of mining companies
-  Different rosters worked
-  Fly in /fly out or live in jobs
-  The money on offer
-  Once onsite, how to stay onsite

There are 4 main areas of employment in the mining industry.

-  Underground mining
-  Open cut mining
-  Processing
-  Mining construction, maintenance and shut downs

So, let's start your journey into the Australian Mining Industry.

Getting a Start






Unfortunately one of the hardest things to do in Australia today is to get a start in the mining industry. At the moment it seems like the only way to get into the industry is to know someone that can help, or take pot luck and send your resume into every job available and hope for the best. It's not like you can go down to the local TAFE and enrol in a course. If you look into it online at www.tafe.gov.au you will find that the majority of the courses are only open to people who are already in the industry. The entry level courses that are left are often set up with the long term unemployed in mind, only at TAFE could a course that should take 2 days to complete be dragged out over 12 weeks. The circle starts from here. The employers only want experienced people and the only way to get experience is to get a job.

But what is experience?

It's Knowledge, the time spent doing a job or knowing how something works. This is your in, once you decide what area you want to enter in the industry. You need to understand as much about the industry and the entry level jobs as you can.

Why is this so important?

Safety is such a critical part of mining these days, that the employer will want to know how you are going to operate safely. If you do get an interview then you will need to show the Foreman or Mine Manager that you will be able to work safely. The best way to achieve this is to explain to them what the job entails and how you are going to perform those duties in a safe manner. The only real way of doing this is to understand how the mine, mill or workshop works. This then leads to the next questions.

-  **What information do I need and where can I get it from?**
-  **The different types of courses and their purpose?**
-  **What courses can help?**
-  **What is Safety in mining?**
-  **What is it really going to take to get in?**

However before we get into these questions the first thing you have to decide is what part of the mining industry do you want to get into? We have supplied some information for you about the different types of roles in mining, however this information is general and we recommend that you conduct your own research.

Different Types of Mining



Hard Rock Underground Mining

Hard rock mining has been happening for the last 150 years. From the days of hammer and tap to our current methods of drilling and blasting with explosives, it is used to mine many different minerals including copper, gold, silver, diamonds, lead, zinc, nickel and many other base metals. While this was once a very dangerous way to mine, current methods have improved safety to the point that it is no more dangerous than working in the construction industry.

Jobs: The roles underground are many and varied. Entry level roles include Nipper, Truck Operator, Drillers Offsider, Service Crew, Charge Up, Diamond Drillers, Long Hole Operators, Bogger Operators and Jumbo Operators.

Salary: \$70,000 - \$300,000 +

Rosters: Either 8 days on 6 days off; 7 nights on 7 days off; or 2 weeks on 1 week off Fly in Fly out. Live in jobs would be typically 4 days on 4 days off.

Companies involved: Rio Tinto, HWE, Barmenco, Australian Contract Mining, Newmont Asia Pacific, Newcrest Mining Limited, Barrick Gold, Lightning Nickel, Mincor Resources NL, BHP Billiton Nickel West, Byrnecut Mining, GBF Mining & Industrial Services P/L, Boart Longyear, MacMahon Mining, BHP Billiton Olympic Dam Corporation Pty Ltd.



Hard Rock Open Cut Mining

Open Cut mining has been happening for thousands of years to get different minerals out of the ground. This was done mostly through slave labour, however modern open cut mines use the latest in super trucks that can move up to 400 tonnes in one load. The iron ore industry is the largest employer of open cut miners in Australia.

Jobs: Truck Operators, Grader Operators, Shotfirers, Allround Operators, Shovel or Digger Operators, Blast Hole Drillers and Quarry Managers.

Salary: \$90,000 - \$180,000

Rosters: 2 weeks on 1 week off; 2 weeks on 2 weeks off; or 9 days on 5 days off.

Companies involved: : Rio Tinto, HWE, Fortescue, KCGM, Newmont Asia Pacific, Atlas Iron, Newcrest Mining Limited, Barrick Gold, Thiess, EDI Downer, Mincor Resources NL, BHP Billiton Nickel West, Boart Longyear, MacMahon Mining, BHP Billiton



Underground Coal Mining

Underground coal mining goes back many centuries and involved chipping the coal off with picks and bringing it to the surface in small carts or trains. Today your modern underground coal miner uses large equipment to remove the coal from the underground seams and bring it to the surface.

Jobs: Loader Operators, Long Wall Operators and Mining Deputies

Salary: \$95,000 - \$165,000

Rosters: Live-in jobs are normally 4 days on 4 days off or 1 week on 1 week off if fly in fly out

Companies involved: Alminco, Yanzhou Coal Mining, Coalroc, Centennial Coal, GUS Mining, Mastermyne Group, Anglo Coal Australia, Macarthur Coal, BHP Billiton Mitsubishi Alliance, Rio Tinto Coal Australia, Anglo Coal, Namoi Mining, Yarrabee Coal Company, Griffin Coal

Open Cut Coal Mining

Modern open cut coal mines use large scrapers and diggers to cut the coal out of the ground ready for use.

Jobs: Truck Operators, Shovel Operators, Scraper Operators and Mine Deputies.

Salary: \$90,000 - \$160,000.

Rosters: 2 weeks on 1 week off and week on week off.

Companies involved: : Alminco, Yanzhou Coal Mining, Coalroc, Centennial Coal, GUS Mining, Mastermyne Group, Anglo Coal Australia, Macarthur Coal, BHP Billiton Mitsubishi Alliance, Rio Tinto Coal Australia, Anglo Coal, Namoi Mining, Yarrabee Coal Company, Griffin Coal



Mining Construction

These are the jobs performed by tradespeople in the building of the infrastructure of the mines. They build everything including the mills, power plants, onsite accommodation and offices.

Jobs: Electricians, Scaffolders, Concreters, Boilermakers and General Labourers

Salary: \$100,000 - \$150,000

Rosters: 4 weeks on 1 week off, 5 weeks on 1 week off and 6 weeks on 1 week off.

Companies involved: Minesite Construction Services, Australian Mining Construction Operations (AMCO), Thiess, John Holland, Civil Mining & Construction Pty Ltd, MacMahon Holdings, EDI Downer

Mining Maintenance

These are the people who fix the machines when they break down. The maintenance department also known as “the fitters” work closely with the miners to keep up the maintenance on the machines through regular servicing.

Jobs: Diesel Mechanic, Light Vehicle Mechanic, Electricians, Boilermakers and Workshop Managers

Salary: \$90,000 - \$160,000

Rosters: Either 8 days on 6 days off; 7 nights on 7 days off; or 2 weeks on 1 week off Fly in Fly out. Live in jobs would be 4 days on 4 days off.

Companies involved: : Mining Maintenance Technologies, Total Energy Mining Maintenance Company (TEMMCO), ATS Mining Maintenance, HWE, Orixon, Mickala Mining Maintenance, Sandvik Mining, Eastern Mining & Construction

Mining Shut Downs & Support Roles

Tradespeople and labourers are used to perform regular maintenance to the big infrastructure machines around the mine, such as the tanks on the mill and power plant engines. Support roles include the camp staff.

You need to understand that shutdown work and camp staff roles are not mining jobs they are mining support roles and while these roles tend to pay in the \$60,000 - \$80,000 a year range and with the shutdown work it can be patchy with sometimes weeks between paying work.

Jobs: Boilermakers, Re-liners, Electricians, Scaffolders, General Labourers, chefs, cooks, cleaner’s, plumbers and other skilled trades.

Salary: \$50,000 - \$120,000

Rosters: It depends on work, however it is always fly in fly out normally for the duration of the shut down.














Companies involved : Phoenix Shutdown Services, Shutdown Solutions Australia, Sodexo & Spotless.

Information

What experience is the employer looking for a Mining Job?

How to drive a truck or front end loader is what most people think the employers want. This couldn't be further from the truth. The experience the employers are looking for is mining, they want someone who knows how a mine works and knows all the relevant terms. As an underground shift boss teaching someone to operate a truck is easy, what is hard is teaching someone about mining and operating a truck at the same time. This is the information you are looking for in order to impress the interviewer. You will make the employer more comfortable in employing you if you can show them that you have spent your time researching the job you want.

Knowing how an underground mine works is a valuable commodity these days and if you can answer these questions then you have something to sell the mining employers.



-  What do you need to do if you smell stench gas?
-  When scaling what should you do if a rock slides down the scaling bar?
-  What are the duties of employees?
-  Why is it important to water down correctly?
-  Secondary ventilation needs what to be effective?
-  If I move my cap lamp in a circular motion what do I want you to do?
-  How should you park an LV underground?
-  What are the steps involved in taking a cut?
-  What four things make a heading serviceable?
-  When scaling, where should you never scale?
-  When watering down the stope what are you looking for?
-  When extending the services what needs to be done before re-installing the headers?
-  Why is pooled water so dangerous in an underground mine?

How did you go with the question? After you finish the book come back and see how many questions you can get right. These are some of the typical questions that the mining companies should ask. This is the information you are looking for, in order to answer these questions you would have to know how the mine works and the rules they are operated under. This is the experience that the employers want.









There is information everywhere about mining and in these days of the Internet, You Tube and Facebook it is easier to learn about. However as you will see most of the information

and footage is less than best practice and this is the problem you will have. We recommend that you get a copy of the W.A. Mining Law & Regulations either in hard copy (\$70 from W.A Government) or download it from the Government web site (this way is free - best look up on Google). This tells you exactly what you should and shouldn't do in mining for all types of mining. When the OH&S laws are nationalised it will be the WA Mining Act that is used because it is an Act, not just a regulation that comes off of a Safe Work Act like other states use. We do not expect this to happen before 2020.

This leads nicely into Safety in mining. There are two things to remember in regards to safety when working in a hazardous work place. These are:

-  Your own personal safety is the most important thing to you. This is not always the same as the people you are going to work with. Your safety may not be their number one priority, these people are commonly referred to as "cowboys" in the industry. To combat this you need to make it your "safety mission" to learn as much about the jobs you will be doing once we get to site. By learning as much as you can about each job the safer you will perform each job. Simple as that.
-  If you think that something is unsafe have the guts to say so. You have to have the confidence to stop the work when the hazard cannot be controlled. It is as simple as that. Please remember that there is a world of people who didn't say something when they should have. I have seen what it can do to lives first hand. So once more for those in the back if you can't control the hazard then stop the job.

Lets start building your mining knowledge by discussing the following topics;

-  The different mining companies
-  Getting in
-  Your Resume
-  The money on offer
-  The duties of employers & employees
-  The different rosters worked
-  Getting to site
-  Surviving the first 12 months

Mining Companies

Owner Operators

Companies that not only own the mining lease but also use their own workforce to mine it. These are run normally by big multinational companies that have mines worldwide. It should be noted at this point that all persons working on a mine site are the responsibility of the mine owner and no contract can be written to say otherwise.

This means that even if you are working for a contractor on a mine site you are still the responsibility of the people that own and run the mine. Owner operators typically pay less but have better benefits such as company health insurance and extra super.

Contractors

Contractors are used by mining companies to carry out the work of the mine. A contractor is normally paid by the metreage developed or by the tonnage moved.

This is also how they pay their employee's, by how much they do. The contractor will pay you a base rate and a bonus on top. Normal rule of thumb is the bonus normally comes in at around the 50% mark. Keep in mind that contractors are replaced from time to time, however they normally retain the services of the existing miners.

Labour Hire Companies

The labour hire companies find the right people for the employers. If their candidate is considered they will be placed onsite working as part of the crew for 3 months. After that time if the employer is happy with you they will sign you over at which time the labour hire company may be paid a placement bonus. It is very important to sign over into the companies employment as soon as possible because while you remain working for the labour hire company you can be asked to leave site and the job by the company at any time. This is the attraction for the companies doing the hiring it is easy to get rid of people if they need to.

Duties of Employers

This is what the W.A. Government expects from the people that own and operate in their state.

9. Duties of employers

- (1) An employer must, so far as is practicable, provide and maintain at a mine a working environment in which that employer's employees are not exposed to hazards and, in particular, but without limiting the generality of that general obligation, an employer must —
 - (a) provide and maintain workplaces, plant, and systems of work of a kind that, so far as is practicable, the employer's employees are not exposed to hazards; and
 - (b) provide such information, instructions and training to and supervision of employees as is necessary to enable them to perform their work in such a manner that they are not exposed to hazards; and
 - (c) consult and cooperate with safety and health representatives, if any, and other employees at the mine where that employer's employees work, regarding occupational safety and health at the mine; and
 - (d) where it is not practicable to avoid the presence of hazards at the mine, provide employees with, or otherwise provide for the employees to have, such adequate personal protective clothing and equipment as is practicable to protect them against those hazards, without any cost to the employees; and
 - (e) make arrangements for ensuring, so far as is practicable, that —
 - (i) the use, cleaning, maintenance, transportation, and disposal of plant; and
 - (ii) the use, handling, processing, storage, transportation, and disposal of substances,at the mine is carried out in such a manner that the employer's employees are not exposed to hazards.
- (2) In determining the training required to be provided in accordance with subsection (1)(b), regard must be had to the functions performed by employees and the capacities in which they are employed.

[(3)-(4) deleted]

- (5) The duties imposed under subsection (1) on an employer who is the principal employer at a mine are not taken to be carried out only by the appointment of a manager for the mine.
- (6) Notwithstanding subsection (1), any duty imposed under that subsection on an employer who is not the principal employer at the mine applies only in relation to matters over which the employer who is not the principal employer has control, or but for an agreement between the 2 employers, would have had control.

Source: WA Mining Act 1994

Did you get through all that .

What does all this mean? What does 'practicable' mean? It means that if something goes wrong then the employer has to be able to prove that they have made every effort to train and supervise their employee's (you) to the satisfaction of a court of law.

What does it mean for you?

Lots and lots of paperwork. This is done so the company can prove they have fulfilled their "Duty of Care" to you the employee. Companies achieve this by using site inductions, site tickets and procedures that will have to be completed and signed off APMS (As Per Mine Standard) before the company will let you start working on site. Each mine owner will not let you start work on site until all the paper work is complete.

Please always complete the paperwork provided by the company. It is there to cover you as much as the company, if it is not filled out correctly then it helps no one. The company wants it to be complete for the Government inspectors and the insurance companies. We advise that you keep a log of your daily duties, this can be done by using an A5 diary that you can buy at your local newsagency

A Jumbo Drill



A Twin Boom Jumbo boring the face

Duties of Employees

This is what the W.A. Government expects from the people that work on the mine sites in their state.

10. Duties of employees

- (1) An employee at a mine must take reasonable care —
 - (a) to ensure his or her own safety and health at work; and
 - (b) to avoid adversely affecting the safety or health of any other person through any act or omission at work.
- (2) Without limiting the generality of subsection (1), an employee contravenes that subsection if that employee —
 - (a) fails to comply, so far as the employee is reasonably able, with instructions given by that employee's employer or the manager of the mine for the employee's own safety or health or for the safety or health of other persons; or
 - (b) fails to use such protective clothing and equipment as is provided, or provided for, by the employer as mentioned in section 9(1)(d) in a manner in which the employee has been properly instructed to use it; or
 - (c) misuses or damages any equipment provided in the interests of safety or health; or
 - (d) being an underground worker, fails on leaving work at the end of a shift to report to the person in immediate authority over that employee and, where practicable, the person relieving that employee, on the state of that part of the works where the employee has been working.
- (3) An employee must cooperate with his or her employer and the manager of the mine in the carrying out by those persons of the obligations imposed on those persons under this Act.







Source: WA Mining Act 1994



The portal to the underground mine

What does this mean to you?

It means that you as the employee:

-  Must follow supervisors' instructions unless you feel it is dangerous to do so
-  Must not do anything to endanger your own personal safety
-  Must not do anything to endanger anyone else's safety
-  Must use all personal protective equipment or P.P.E. supplied
-  Can't deliberately damage any P.P.E. or safety equipment
-  Must talk to the worker coming onto the shift to replace yourself (also known as your X shift) about the state of the equipment, its location, any hazards and any other information you may feel necessary to pass onto your X shift . If you can't talk to your X shift then you need to pass the information onto the shift boss on duty.

Communication is the key to safety when working in a mine. The more you know about the job the safer you will perform that job.

Getting in

In order to understand the best place to get a start in mining you need to understand the flow of experienced people in the industry. After having gained the required experience (normally 12 months), people start looking for new jobs. The reasons they are looking is for better money (which is always on offer) or a mine closer to home.

This shows that in order to get a start, you have to be prepared to relocate.

There are only 3 places that you can get an entry level job in mining today due to the downturn in coal and iron ore prices

1. Shutdown, Construction & Support Workers. If you want shut down work you have to go to the labour hire companies
2. Drillers offsidars. If you want to be a driller offsider you need to see recruitment companies
3. Hardrock Underground Miner. If you want to be a Hardrock Underground miner get your mining knowledge up to speed then go straight to the companies doing the mining.

It is not unusual for some mines to turn over 50% of their staff in a 12 month period. As Shift Bosses we have all worked on these sites, there is a story of one site in the middle of the desert, which turned over 300 people in 12 months out of a workforce of 160. That works out to being over 150% turn over, apparently it was a very long hot summer.

Your Resume

What happens when you send your resume into a mining job? If you are lucky it will be printed and read, however the reality of the situation is that the mining companies get 1000's of resumes when they run job adverts in the newspapers. As an example, one company that ran a full crew advert (Shift Boss to Nipper) got over 10,000 resumes. Out of those only 130 had mining experience. Where do you start with 9870 resume? What do you think happens to most of them? That's right they get "kept on file" with the HR Department. Normally using their circular filing system.

If you feel you have a special skill or trade that could transfer into the industry then you need to let the company know. Because you have no mining experience make sure all the important information is on the front page and the resume is no more than 3-4 pages long.

The jobs on offer are normally in The West Australian and Kalgoorlie Miner on Wednesday and Saturday. We post these jobs weekly at [weekly jobs](#) . You can try to get copies of the papers in hardcopy, it is very hard to find the jobs that have appeared in the paper on the paper's website. The best places to look online are the Seek or Career One websites.

How long will the companies take to get back to you? It can take from 2 weeks to 6 months to get a response. A good rule of thumb is the bigger the company the longer it takes.

The money on offer

The different money on offer depends on which of the mining companies you work for and the roster you work. Whichever type of mining you decide to get into, it will pay well over \$100,000 a year. Support Jobs will be paid around the \$70,000 mark.

However if you are after the best paying job in the mining industry then you want to be a Hard Rock Underground Jumbo Operator. These are the people who earn \$1000 to \$1500 a day. That works out to be over \$300,000 a year on a 2 & 1 roster. This is not an entry level position, it should take between 5 and 10 years to reach this position for someone who has some go in them.

Have a plan of what you are going to do with the money from mining, often people can get lost in the industry lifestyle and the money they make is spent on having a really good time instead of thinking about their future.

Different Rosters

Fly in fly out



8 days on 6 days off; 7 nights on 7 days off



2 weeks on 1 week off



4 weeks on 1 week off; 5 weeks on 1 week off and 6 weeks on 1 week off

The thing to remember about working fly in fly out is that when you do 2 & 1, while it pays more money, it's very hard to work your personal life around. People have trouble working out dates when working in a 3 week cycle and after a period of time you will find that it becomes all too hard to organise things and you end up hanging out with the crew on your week off. The best family option in our view is 8 days on 6 days off or 7 nights on 7 days off. This gives you an excellent work/life balance. Once you get over the 2 & 1 mark it needs to be short term. 6 weeks on and 1 week off your work is your life. You go on holiday once every 6 weeks and that the truth, some people can make it work however most can't.



Looking out of the portal

Live in work



4 days on 4 days off



8 days on 6 days off; 7 nights on 7 days off



4 days on/24hours off/ 3 nights on/ 3 days off/ 3days on/ 24 hours off/ 4 nights on/ 4 days off

There is not that much live-in work going, however it is definately worth giving it a go if you have the opportunity. Life is what you make it and some of the smaller communities are very nice places to achieve an excellent work/life balance for families.



All jobs that are full time, the companies provide your standard 20 days annual leave and 10 days sick leave. These days are taken around your rostered days off, so if you work week on week off and take 7 days annual leave then you end up with 21 days off.

Once you get to site


The Safety & Training Manager should meet you at the plane. No one at the plane to meet you? Don't be surprised, a mine is a busy place. If no one is there to meet you, get on the bus and head to camp. Once at camp go to the camp office and introduce yourself. Ask if they could call the mine to see what you need to do next.

Take the opportunity to talk to the Camp Manager and get your room. Ask for a camp map, this will tell you the facilities that the camp has including.



Your Room

-  The room will have a single bed, desk & chair, small fridge and an ensuite(if you are a miner) which includes towels and toilet paper
-  Most sites have 8 Foxtel channels. 4 or 5 of which are normally sport channels



Dry Mess

-  This is the food hall that supplies breakfast and dinner daily with take away crib available in the morning. It is only open at certain times so make sure you are on time.







Wet Mess

-  It's the bar, open in the morning as well as night, it also has limited opening times and limits on take away alcohol.
-  Don't let the wet mess suck you in, if you are still drinking at 10pm you are going to have a problem passing a breathalyzer test at 5.30am before work the next day.

The Gym & Sporting Facilities

-  An onsite fully equipped gym that is normally staffed by personal trainers to help with your daily workouts.
-  Most sites have a swimming pool, tennis court, basketball court, TV room, internet room and some sites even have squash courts, a movie theatre and golf driving range

Ok so the rest of the info for the next 20 or so pages is for people that what to be miners. When you arrive on the mine site you will be required to undertake a:

-  Site induction
-  Underground induction or Surface Induction
-  LV Ticket
-  Explosives Handling Ticket if working with blast crew
-  Scaling Ticket
-  Truck Training Ticket if working with the haulage crew

Surviving The First 12 Months

The unfortunate reality is that out of every 5 people that get a start, 2 have left after 12 months. Mining is a hard job and is not for everyone.

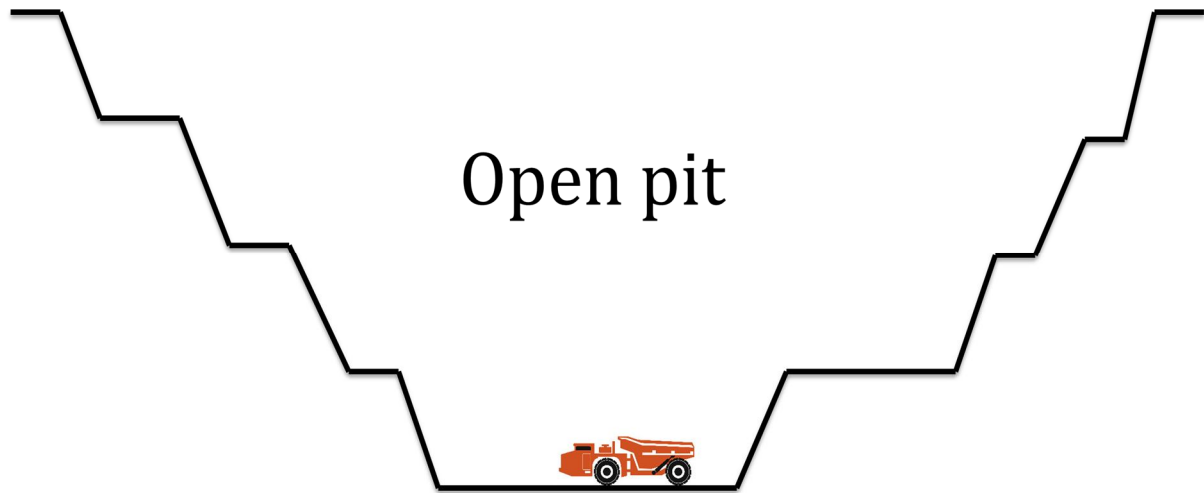
Here are some tips:

- Listen to the miners and take the feedback
- Don't be a smart arse. If someone tells you something and you respond with "oh I already know that", that will be the last thing that person will ever tell you.
- Ask for help if you don't know something
- Don't fail a Drugs & Alcohol test for obvious reasons.
- Don't blow shifts.
- If you have been hired by a labour hire company, as soon as your time is up get your contract signed over to the owner operator.
- If something goes wrong be straight up with people.
- Be eager to do the job, you need to show a sense of urgency with everything you do. Having a sense of urgency doesn't mean you have to run, it means you need to put energy into the things you are doing.
- Remember wherever you are and whatever you are doing someone will be watching you. Not only your own supervisor but all the other people around the mine will be watching you as well.
- If after some time underground you decide that the job is not for you tell someone, they will understand. You're not letting anyone down.

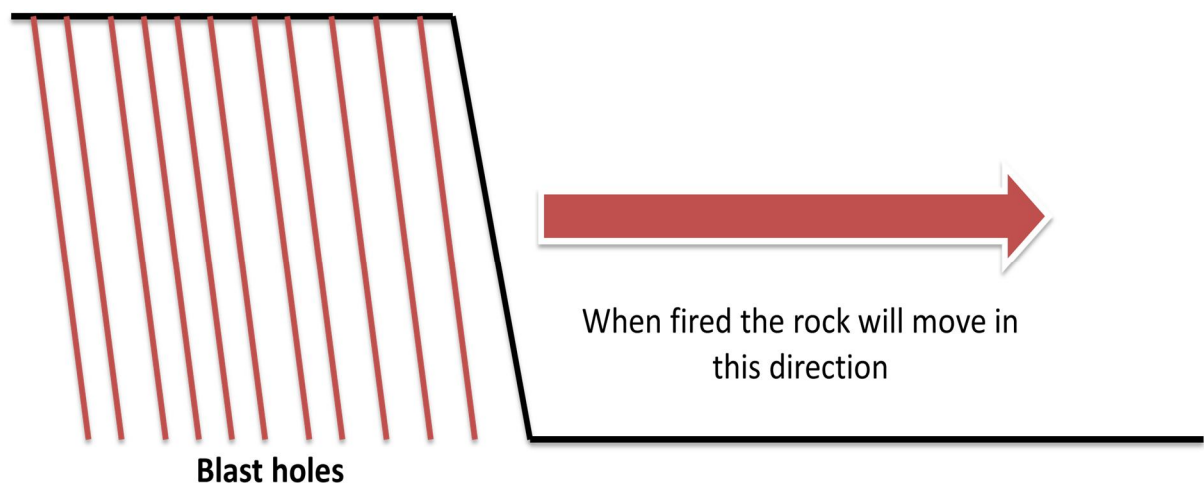
Now you have this information on how to get a start the real question is do you still want to, how do you know you are going to like it? This is why the next section of the book contains information on the environment you will be required to work in and how the industry deals with the hazards involved with mining.

Mine Orientation

There are 3 main types of mines, open cut, decline and shaft. An open pit mine works on the principle that the deeper it goes the wider it has to be at the top.

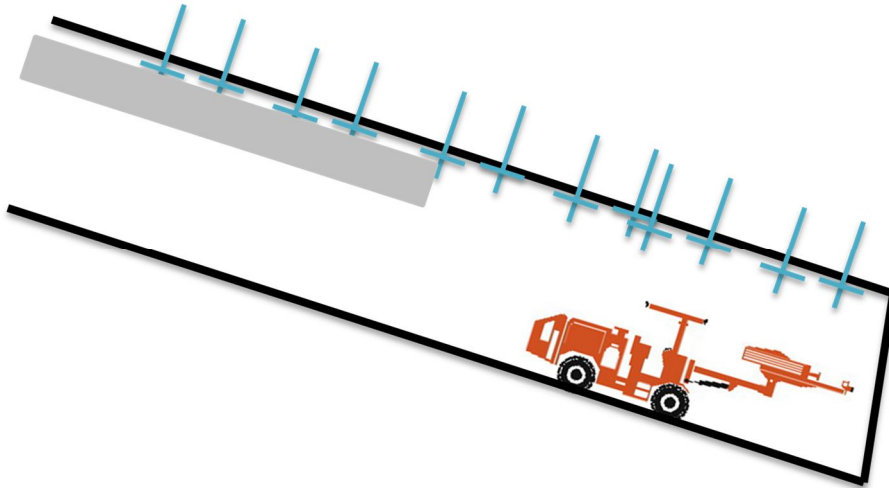


A drill rig will drill blast holes into the ground which are then filled with explosives and fired. Once the rock has been fired the rock is then loaded onto the back of a truck then taken to the mill for processing.



As each row of holes goes off it strips away the rock one layer at a time. The holes are timed to go off using detonators that are placed at the bottom of the blast holes before the explosive or ANFO is added. The engineers can control the size of the rock by the distance between the blast holes.

Once the pit has reached its maximum depth the underground mining starts. This is when we start a tunnel called a “decline” the entrance is called the “portal” and goes at 1 in 7 down. That is, for every 7 metres across we go 1 metre down.



We then access the mine through the portal using approved light and heavy vehicles. Once the rock is broken it is loaded onto the back of a truck and brought to the surface where it can be milled and processed. An underground mine can also be on flat ground, these are called shaft mines. If you end up working in one of these mines you will have to go to work in the “cage”, which is lowered into the ground like a lift in a building. Once the miners are at work they use this same shaft to extract the rock. Below is a picture of a “head frame” this is the structure that holds the cage as it’s lowered.



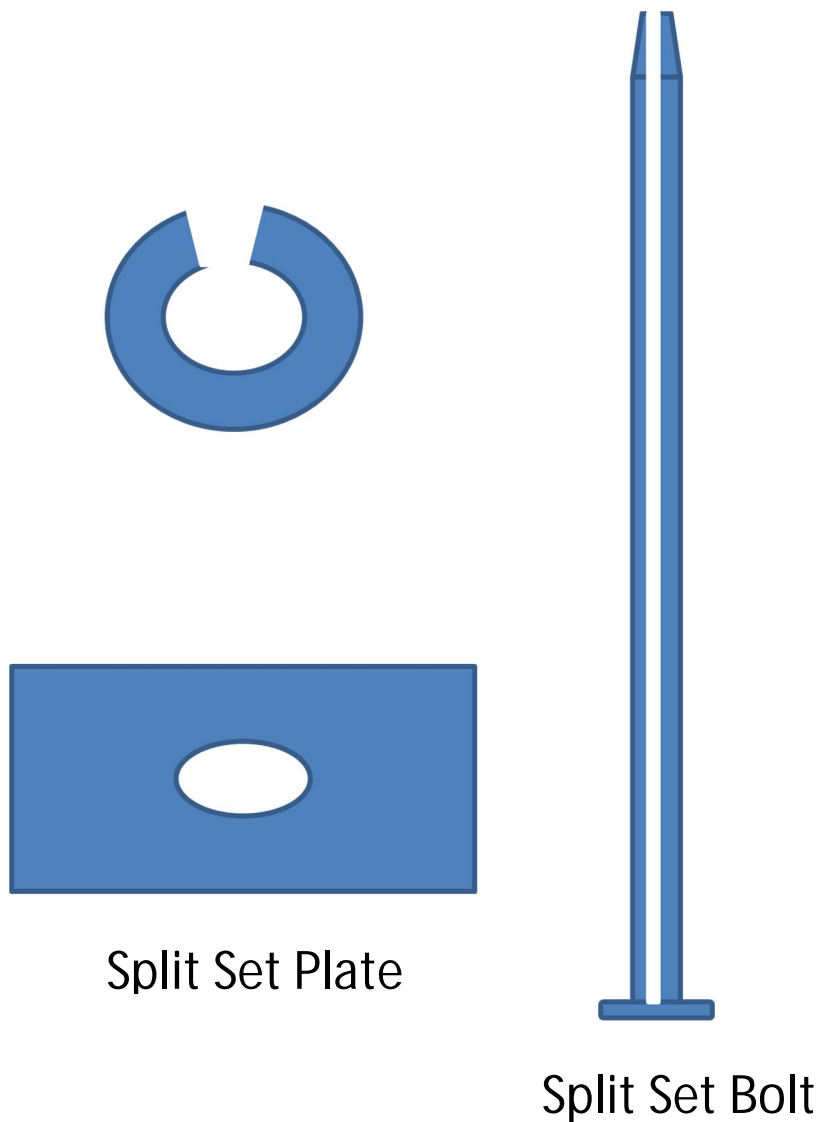
Head Frame

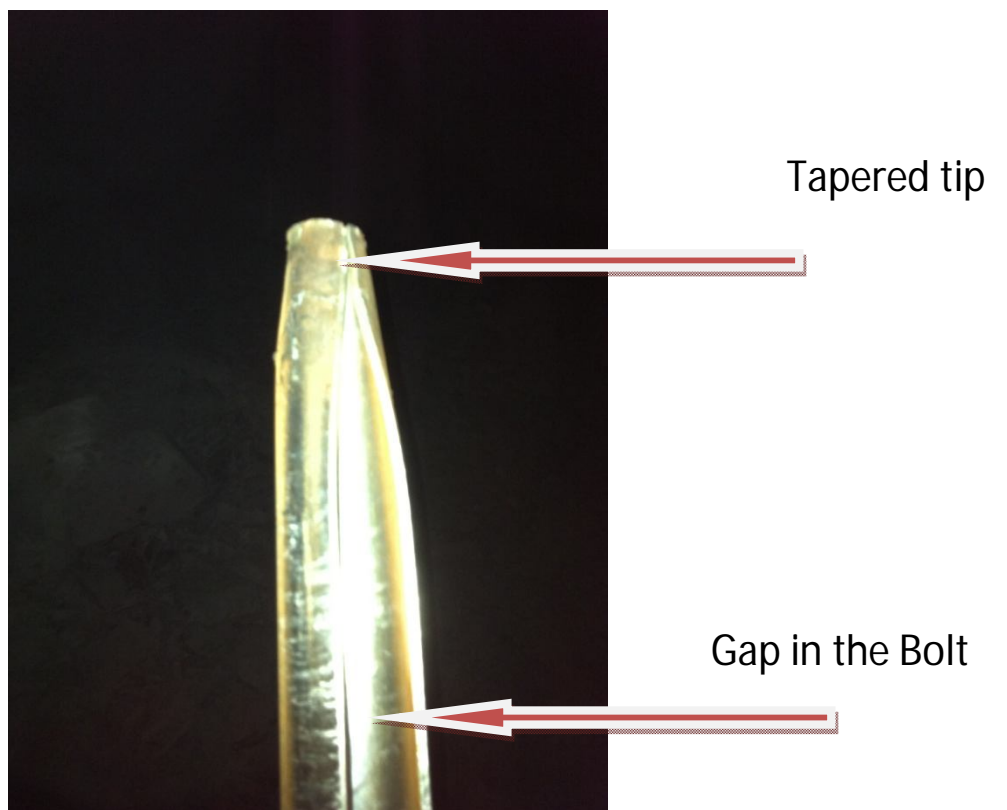
Ground Support

After rattling down the loose rocks with the jumbo, the ground support will be installed. Ground support consists of rock bolts, mesh and or shotcrete. Using a combination of the 3, underground mines manage the different ground conditions encountered in the mine. There are 3 types of bolts that are used in an underground mine, these are Split Sets, Chemical Bolts and Cable Bolts.

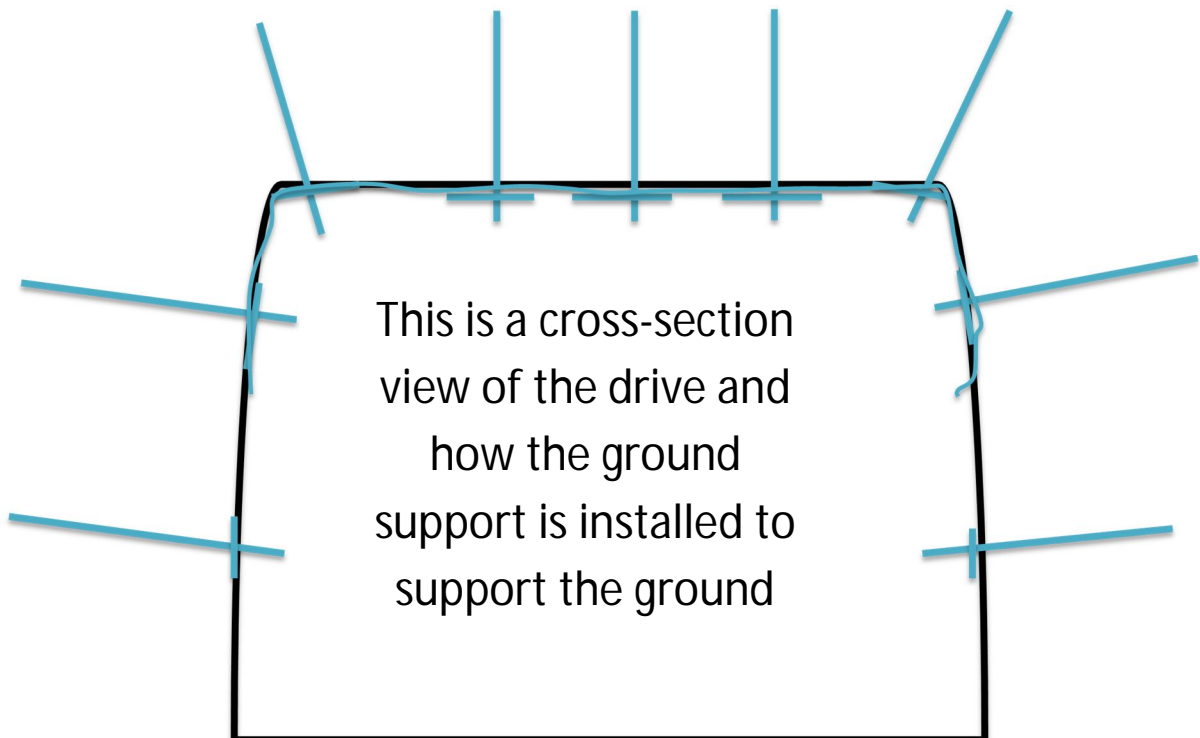
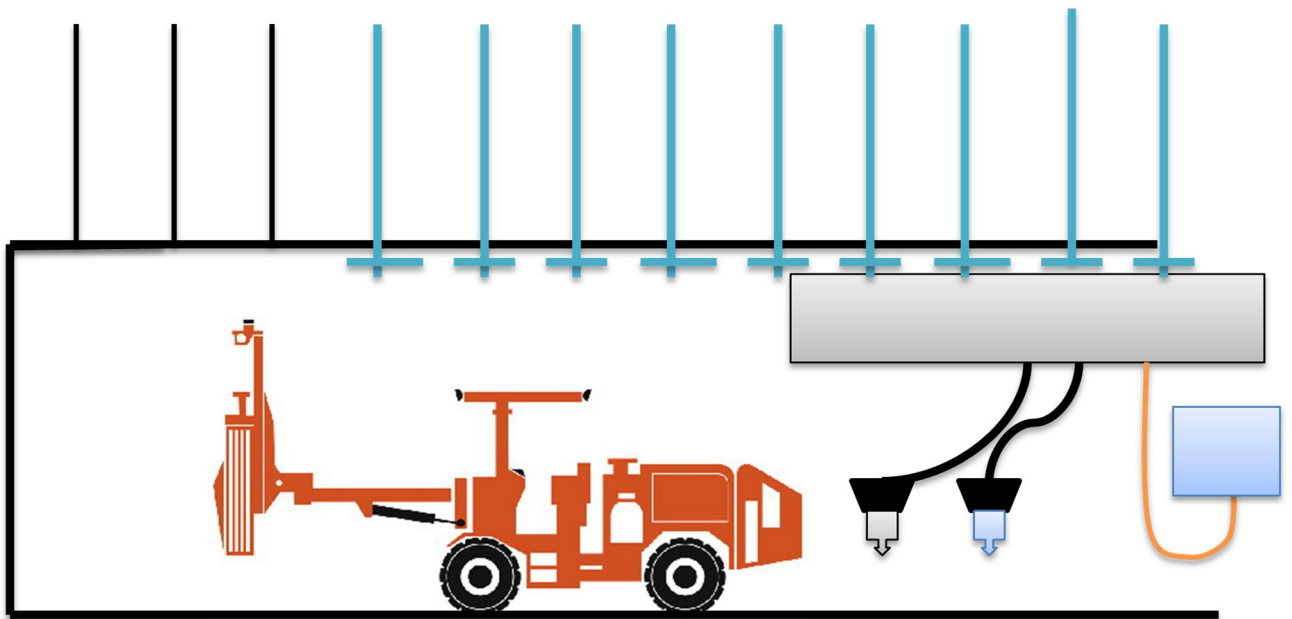
Split Set bolts come in different lengths (1m, 1.8m, 3m), are round with a strip of metal missing up the side. They are tapered at one end, with a full ring at the other, which holds a metal plate about 30cm x 20cm, all have the same diameter (around 60mm).

The bolt with plate is loaded onto the jumbo boom then pushed into a predrilled hole, the bolt works by squishing the metal into the smaller diameter hole (no bigger than 43mm) and holds about 3 ton of ground.

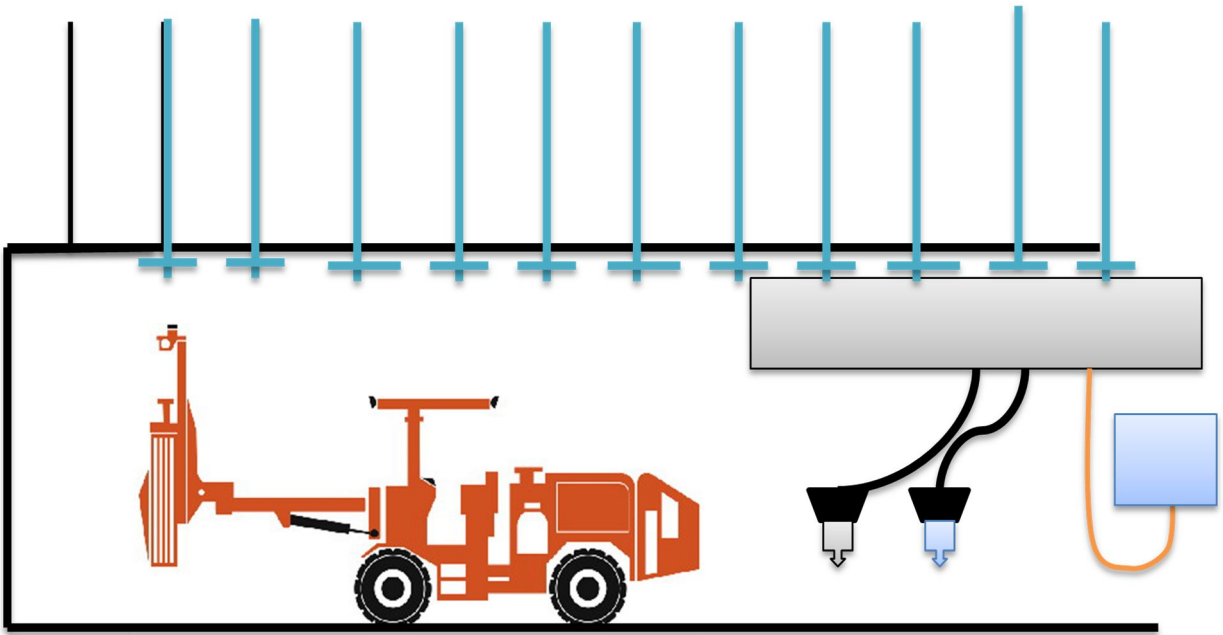




The bolts are installed in rows normally 1.5 metres apart.



The rows are installed 1.5 metres apart and go all the way to the end of the drive. If there are no bolts in place then this is classed as unsupported ground, never ever go under unsupported ground for any reason.



Twin Boom Jumbo installing the Ground support through shotcrete

Chemical bolts use a cartridge of chemical placed into the pre-drilled hole, then the jumbo load's the correct bolt with a plate that is then pushed into the pre-drilled hole, once set (normally takes 45 seconds to a minute) a locking nut to tighten it to the backs.



The bolt is solid and spiralled like a masonry bit to mix the chemical as the bolt is installed.



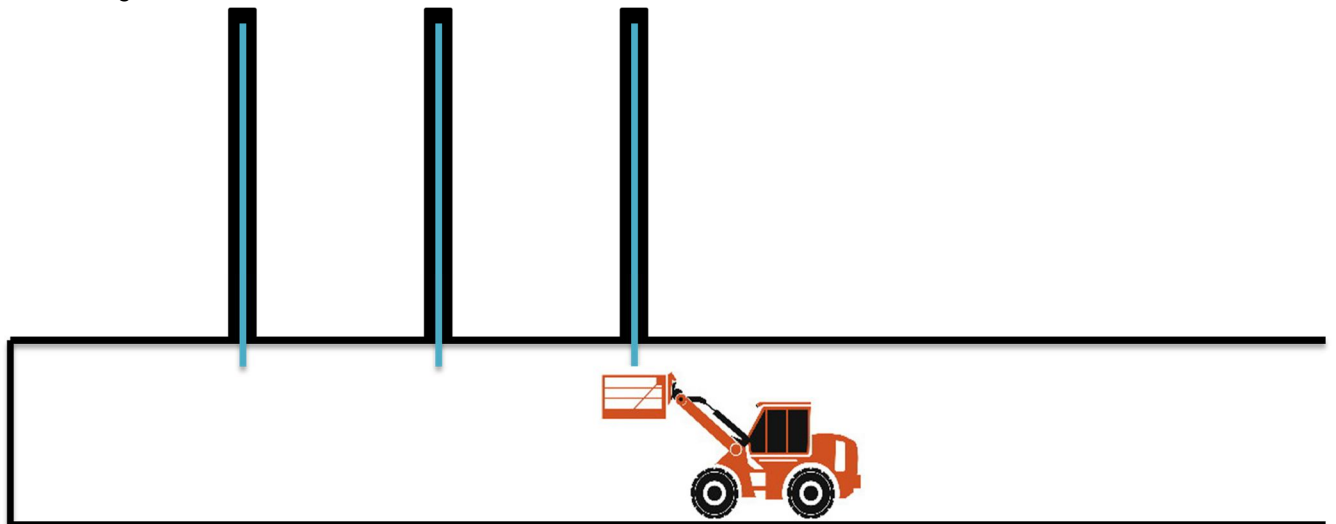
These bolts are classed as long term ground support and hold up to 7 tonnes of ground per bolt, these bolts are mainly used in the decline.



Single strand
Cable Bolt 10m
in length



A cable bolt is stranded steel wire that is fed into a pre-drilled hole that can be up to 30m or more long.

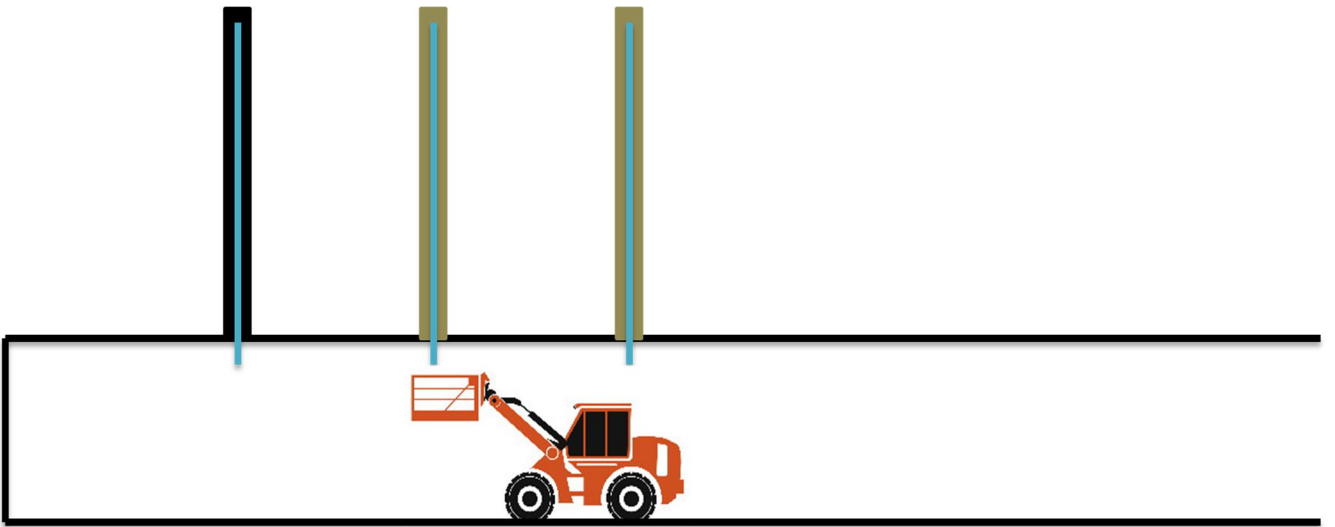


This is done using either single or multiple stranded cables that are then secured into place with grout and left to set for 12hours.



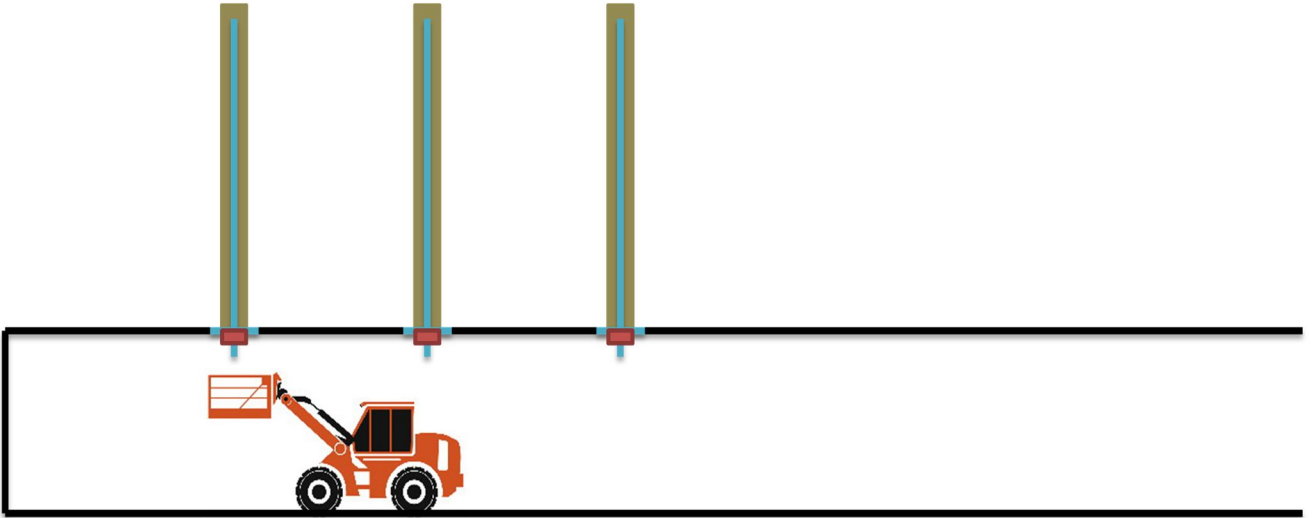
The cable strand
is made up of
braided metal
wire



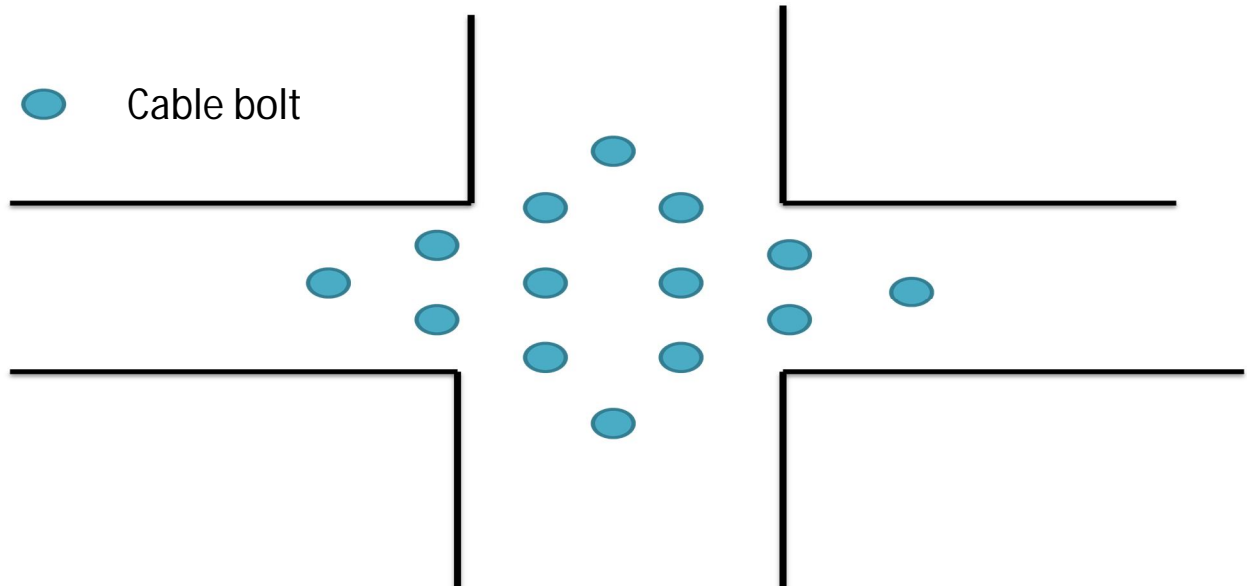


After this time the cable can be plated and tensioned.

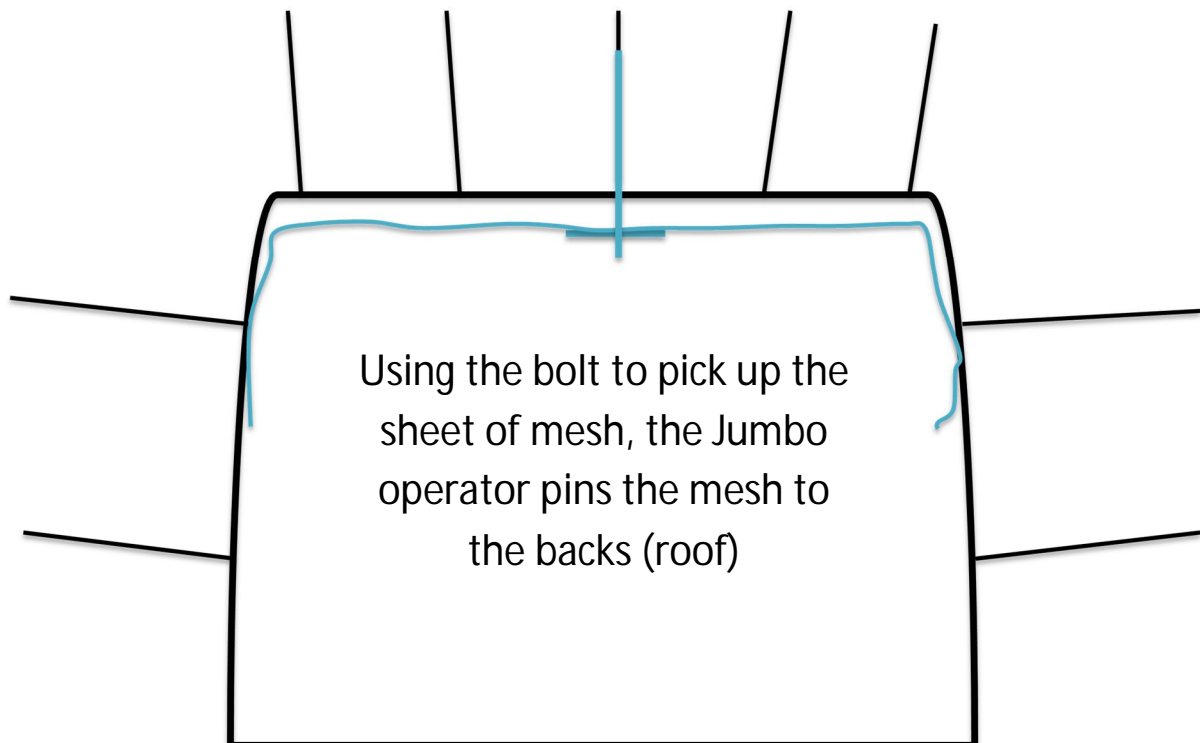
End of the cable
bolt

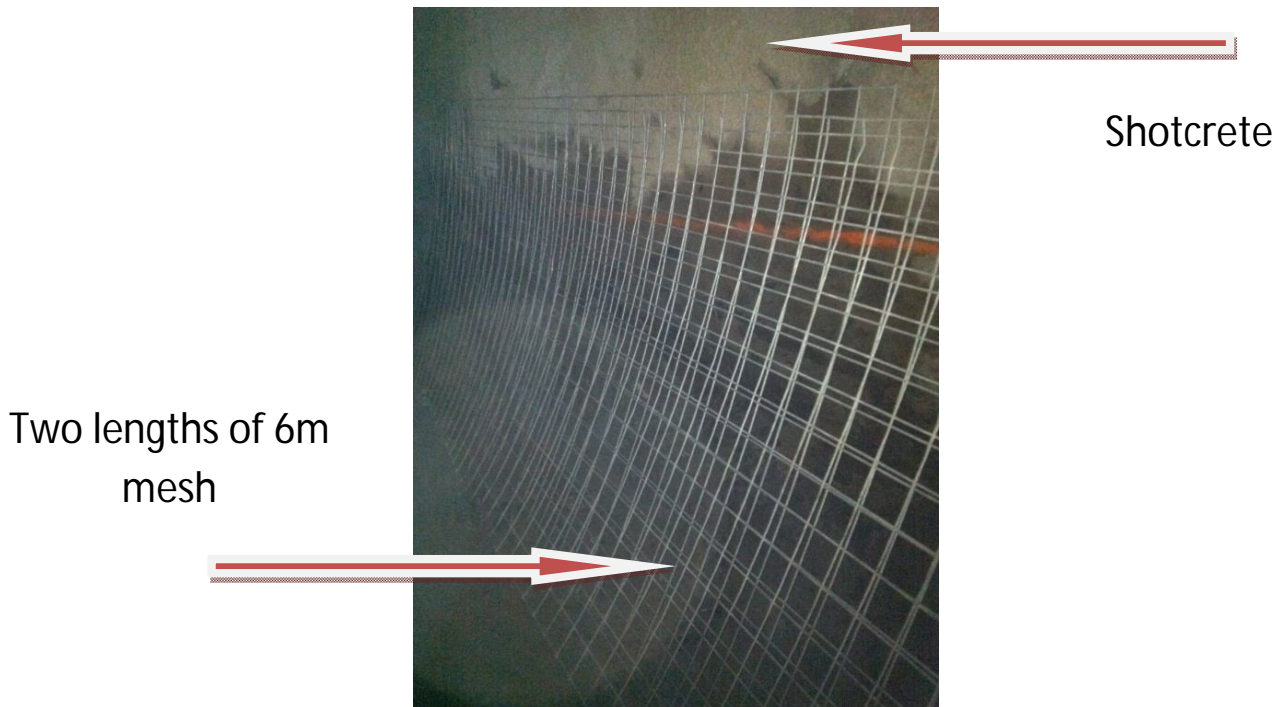


These are the same bolts that are used to anchor high rise buildings to the ground and hold up the hillsides that motorways are cut through. In an underground mine they are used in spans larger than 6m such as intersections as the bolting plan below shows. Cable bolts can hold in excess of 20 tonnes.



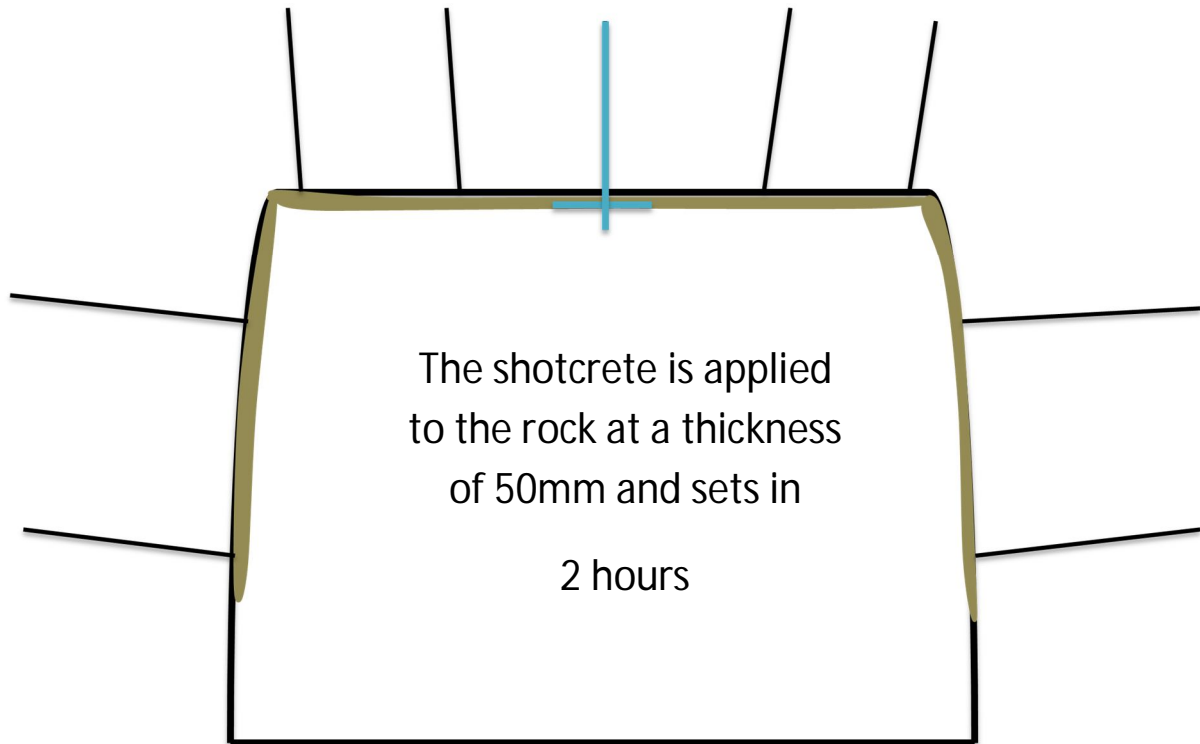
Mesh is used against the rock to hold smaller rocks in place and hold areas of subsidence. The idea is that if something falls then the mesh will catch it only letting the smallest of rocks through. Mesh is pinned to the backs (roof) using the bolts to pin the mesh in place. This work is carried out by a twin boom Jumbo.





Shotcrete is used to reduce the chances of any rock falling, it does this by covering the exposed rock with a mixture of concrete, small plastic covered strips of metal and chemicals to speed up setting time. This forms shotcrete and is sprayed on to a thickness of 50mm. Once set, this forms a protective shell that is then bolted. You can see examples of shotcrete on roadways and in tunnels.





The deeper we go into the earth, the more levels we go down and it is for this reason that the industry uses a numbering system that is determined on the meterage above or below sea level. The distance between levels will be around 20m, so as you go down the decline the levels will be numbered 780, 760, 740, 720 and so on.



An escape way between levels

OK you have learned a little about mining in general. You will know if you go underground how deep you are by the level numbers and what your responsibilities are as an employee in a mine. So with that in mind we will now discuss one of the “must knows” in mining, Scaling.

Scaling Bar
Grip



Bent Tip



Straight Tip



Scaling is the act of knocking loose rock off the walls and backs (the roof of an underground mine is known as the backs). Using a scaling bar, you put the tip of the bar behind the rock and lever it off, thus taking away the risk of that rock falling by itself onto someone or something. This is a vital job in maintaining the mine and all mines should have a scaling program.

This program allows for one section of the mine at a time to be scaled until the whole mine has been scaled. This is usually done over a 6 month period, and then repeated. We always tell the class to think of what happens with the painting of the Sydney Harbour Bridge. As soon as they finish at one end they start painting at the other the very next day. It is the same with a scaling program it must be restarted straight away.

Scaling is about managing the ground around the mine, making your workplace safe. As we advance the mine with more blasting and as time goes by the joints between the rock can fail.

This can cause areas of rock from the backs, to the walls to start to peel away creating a dangerous situation around the mine for employees and equipment. So why do we scale?

Safety

When scaling there are some basic rules to follow:



Always make a visual inspection of the area to be scaled.



Always have a plan of escape from the area being scaled.



Always scale from good ground to bad.



Always sound the ground as you go.



Always scale in front of yourself.

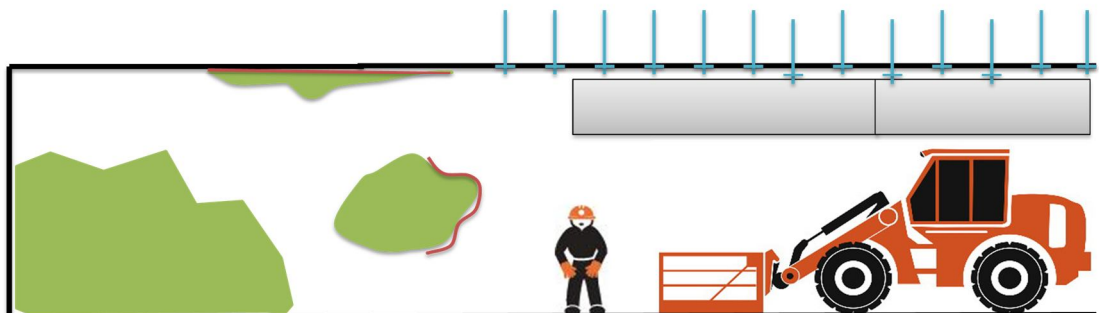


Never scale above your head.

Inspecting the ground

When you arrive, take your time and have a good look around.

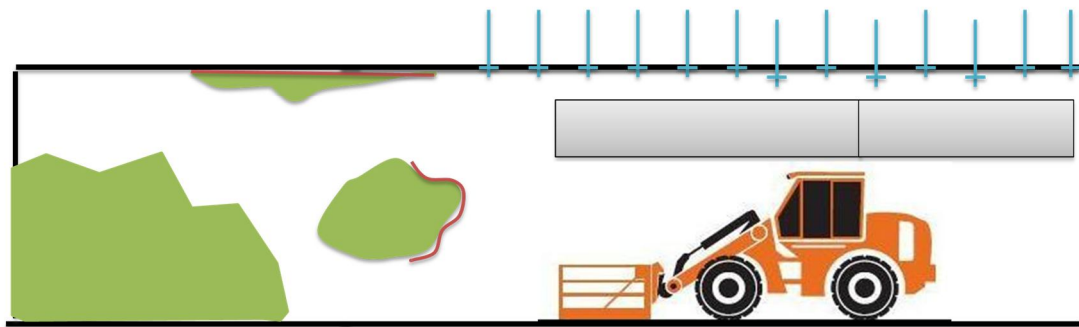
Once you find the areas to be scaled, check that you have a clear escape path from that area.



Always take 2-3 minutes to look around before you start the job.

Always scale from good ground to bad

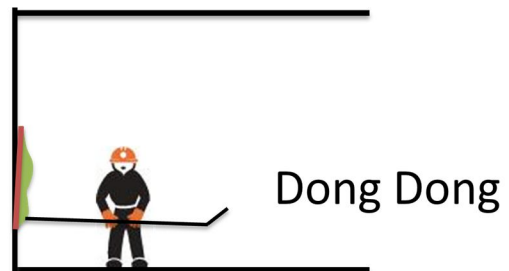
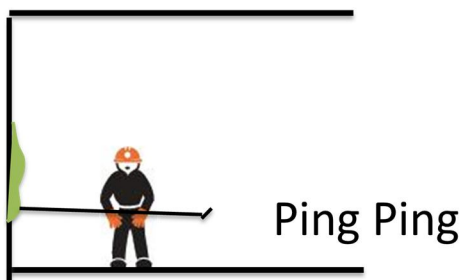
Where is the good ground and where is the bad ground ?



That's right the good ground is under the ground support on the right and the bad ground is on the left.

When the ground is struck with a scaling bar and the bar makes a high pitched 'ping' sound then the rock joint is fine. However if the rock makes a low 'thud' sound or the bar makes a low 'dong' sound then the joint is failing and the rock needs to come down .

If it makes a thud sound from the rock this means the rock could come down at any time so be careful.



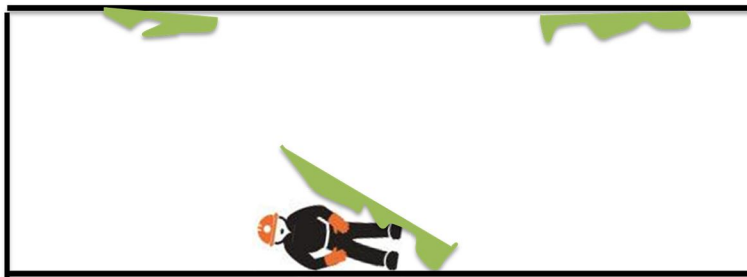
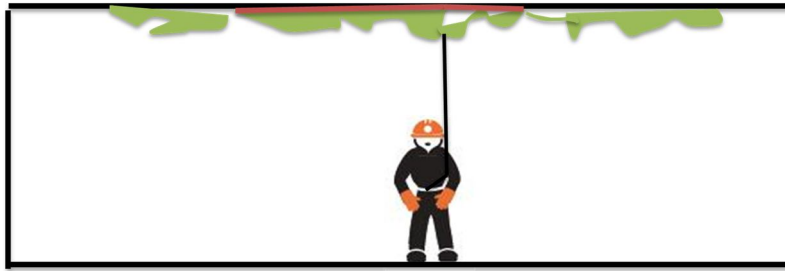
Always scale in front of yourself



- 🛑 Always have a clear means of escape out of the area being scaled.
- 🛑 Only one person to scale in one area (unless 2 bars are required for a large rock, if it won't come down with 2 bars it's not ready yet and should be painted up for next time).
- 🛑 If scaling out of an IT basket at height (all fall equipment must be used in accordance with mine standards) always scale from the front of the basket. Never scale back over towards the IT as a rock may damage the machine.
Always think about what will happen when you remove a rock.
- 🛑 When scaling, always stand with your foot pointed towards the rock you intend to scale with the other foot a shoulder width apart at 90 degrees to your front foot.
This stance will keep you balanced and allow you to push off backwards if needed.
- 🛑 Hold the bar with both hands keeping the bar at a 45 degree angle.
- 🛑 From this position you are ready to scale in front of yourself.

Unfortunately over the years, rock falls have been responsible for over 100 deaths. We make this point because scaling is a very necessary part of mining and needs to be treated with respect and the rules followed.

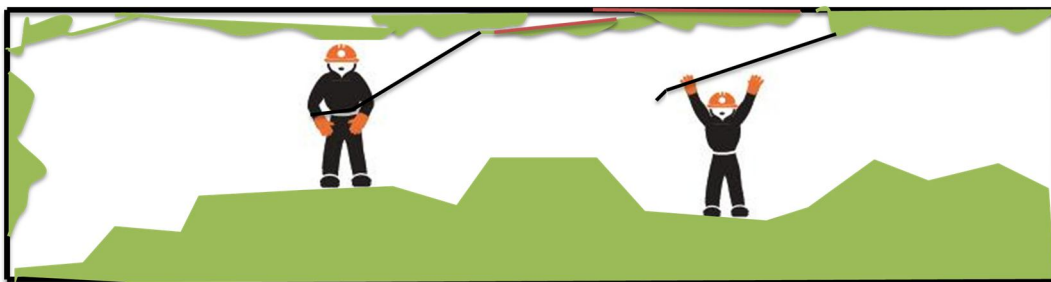
Never scale above your head



Scaling is always required around a diamond drill rig

What can go wrong?

Scaling on to someone else



This happens more than you think

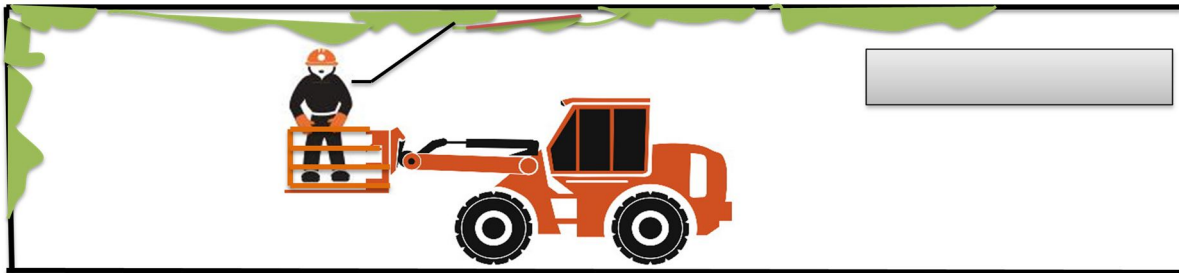


So the moral to this story is have a good look around before you start scaling and if you do join someone that is already scaling, stop the job, and talk to the other person about the job happening and where you both should start.

When scaling people sometimes get what we call "white line fever". This happens to people when they scale, all they can see is the rock that needs to come down and they don't think about the consequences of bringing the rock down. Always check to see where the rock is going to fall, before scaling the rock down. There has been no end of electrical cable, pump, services and electrical boxes destroyed by people with white line fever.

Scaling onto a Machine

When working from an IT basket never scale over the back of the basket



This can cause damage to the machine.

Rocks on the bar

Sometimes when scaling, a rock will slide down the bar. This can happen for a number reasons including:

Scaling a key stone.

The rock breaking up when it comes down.

Scaling the wrong way (using the tip the wrong way round).

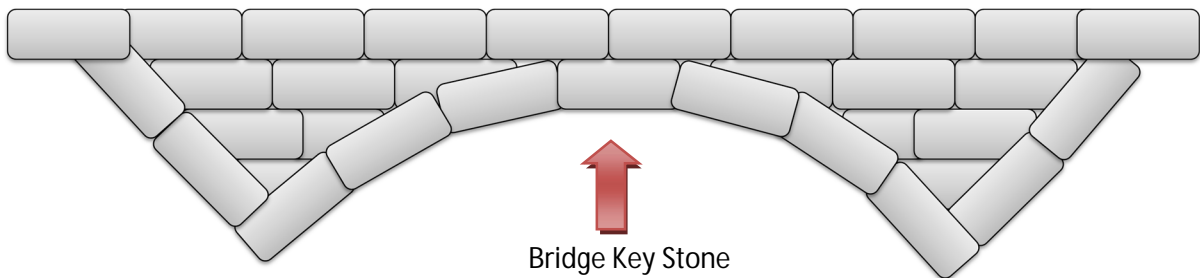
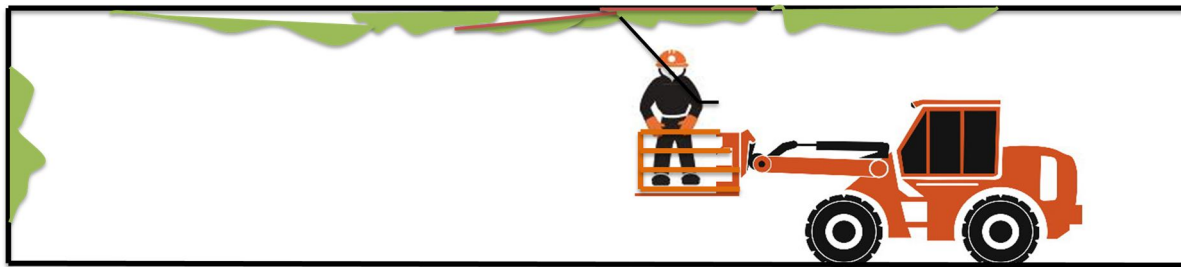


Drop the bar

Once you drop the bar the rock will fall with the bar. This avoids the rock sliding down the bar and collecting your hands and legs.

Removing a Key Stone

A key stone is a rock holding in other rocks behind it.
Once removed everything else falls with it

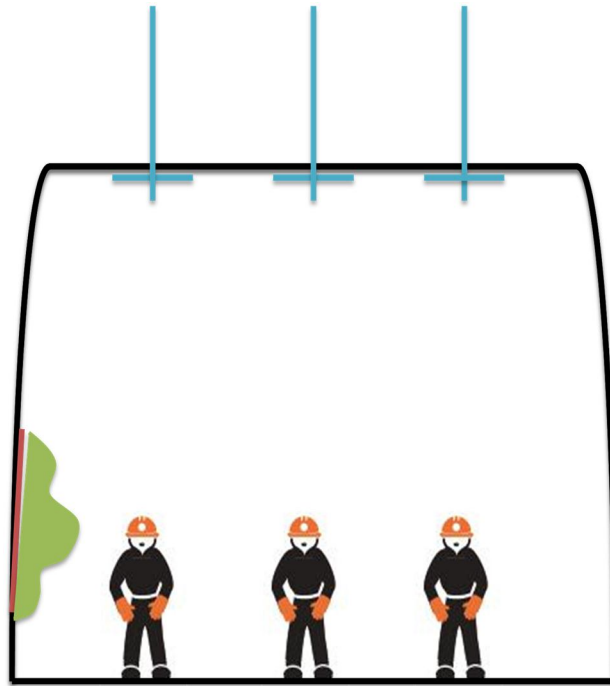


A key stone is a rock holding several other rocks in place the same way a keystone works in a stone bridge. The easiest way to avoid a key stone is always work from good ground to bad.

Rocks that just fall

In some cases, even the best scaling programs can miss things and the ground is always moving, so how can we minimise our risk ?


Wherever you are in an underground mine always think about where you are standing. Where do you think is the safest place to stand?





Away from the walls under a rock bolt or any form of ground support if possible.


When we do this unit with UTS at this point after reading the information we would do the review on the next page. Can you complete the review? The answers are in the back.

Review

 What is scaling?

 Where is the best place to stand in the drive?

 What should you never do when scaling?

 How long does a normal scaling program take to complete and when should it be restarted?

 If a rock slides down the bar?

Next we would like to talk to you about something that some people consider a trivial matter. This, however could not be further from the truth. We consider it **VERY** important for you to know about the dangers of “pooled water”.

When working in an unventilated confined space on a mine site, any pooled water can cause serious problem. In time the water will eat up all the available oxygen in the confined space. The following is what happens in an underground mine with pooled water.

Pooled water

Any large amount of water around an underground mine is dangerous. It will use up all the available air in an un-ventilated area to the point that you will fall over and die.



Do not enter an area of the mine that is unventilated, no matter who tells you. This happened in a mine in W.A in the late 1960's and 3 miners died. One of the miners went into an old disused area that had pooled water in it, he felt dizzy then nothing, because he was dead. After a time the miner's co-workers came looking for him and two more people both felt a little bit dizzy then nothing.

This is what happens when you run out of oxygen, all you feel is a little dizzy then nothing because you are dead. So what happens if you find a co-worker in this position? Whatever you do, don't go into the area. Report it to your supervisor and follow the mine site instructions. This normally involves trying to turn on the ventilation, if there is no ventilation grab some hose and connect it to the compressed air line. Then throw the hose in as far as you can and turn the air on. This will start to slowly ventilate the area.

Pooled water

The other reason is people can fall and drown.



People can and do drown on mine sites, so be careful of pooled water, respect the environment you are working in.

This completes the practical information part of the book. The rest of the book is about the different courses that you can do and the check list you can go through to see if you meet the general requirements of the companies.



Courses Available

The last question that most people have after reading this book is “if I do some of these courses will I get a job in the mining industry” to which we would say:

If it helps you build your mining knowledge then yes the course will help you with employment. The course will help with mining knowledge but if you aren't prepared to commit the time and resources to pursuing a start then the course will have been a failure and a waste of money. Make sure you do your research into the type of mining you want to do, try to have a plan of what you will do to get into the industry and once in how long you are going to stay.

As has already been discussed, please find out exactly what information you are going to get out of a course before you sign up. A plant course teaches you about that piece of equipment, it may not include information about mining.

It should also be noted that the general induction courses may only be recognised in certain states and by certain employers. There is no Australian wide industry standard rather each state has its own rules that the states run these mines by.

Unfortunately, as we have already discussed, the entry level TAFE courses on offer are limited to mill processing and their 12 week drillers offsider course. The GI Safety and S11 Inductions will be required if you want to work in coal in QLD. You need to be careful as some people try to sell this course as a magic bullet course. It is only for coal and only in QLD. It is a very frustrating thing looking for entry level mining courses online as it seems the only way you can get a Cert 2 in Metaliferous Underground Mining (this is for nippers and truck drivers which are entry level positions) is to be in the industry. This illustrates the point of how important mining knowledge is in getting a start in the mining industry. If you can answer our list of mining questions then you know how a mine works and an employer would be mad not to hire you, with the lack of experienced people in the industry. The best course we can recommend before all others is your Senior Fist Aid ticket. This is normally a two day course and if you are going to work in a hazardous work place then your direct supervisor is going to want to know that you can render first aid if required.

First Aid Course

Many different training companies offer first aid courses.

[St John](#) is the industry leader in mining specific first aid training and can be contacted online or phone on 1300 360 455

Introduction to Underground Mining (Hardrock)

3 Day Course

This course has been designed and is presented by a shift supervisor (our consultant) with 15 years+ underground experience. The course outlines to the participants their responsibilities and tasks working in an underground mine. Topics discussed are:

- Duties and responsibilities of both employees and employers.
- Safety in a Hazardous Workplace including our positive tips for safety.
- How an underground mine works and who performs what duties.
- Entry level jobs including, scaling, watering down and basic service crew work including connecting poly, hanging ventilation and installing services.
- What happens at the medical and how to conduct yourself in the interview including questions that may be asked.
- The conditions, rosters and expectations once the candidate gets to site.
- Life on a mine site.
- Truck operation including driving up and down the decline, getting a load and dumping the load.
- A method of operating a truck in a confined space including reversing around blind corners without a reverse camera.
- How the IT is used around the mine with service crew and the different attachments used.

At the completion of the course the participant is left with a real understanding of underground mining allowing a highly successful placement program to operate. This is now our "Safe from day one" program. As part of the program your resume will be redone and sent to you in both hard & soft copy. A dedicated staff member will then assist you with getting the interviews required to get into the industry by advocating on your behalf to our many contacts with in the industry.

To enrol phone 08 9300 0544

www.undergroundtraining.com.au

Basic Underground Mine Operation Course 1 day

This full day course including morning tea and lunch (crib) allows you to make an informed decision on whether or not mining is going to be for you and talk to someone that is going to be able to help you make a plan to achieve what you want in the industry. By completing the day you will know how an underground Hardrock mine works the structure to the mine. Topics covered will be

Duties of Employers and Employees on a mine site

How to work Safely on a mine site (Working in the Hazardous Work Place)

Personnel & Their Duties (Who Does What in the Mine)

How the Underground Mine Works (Headings, Stopes, Ground Support, Paste, Escape Ways, Firing Explosives and Bogging)

Scaling (Removing the Loose Rocks off the Walls)

The Different Mining Companies including mock interview (Talking about the mining companies and conduction of a mock interview)

During the course of the day you will be able to talk with the shift boss running the course about the best way to achieve your goals in the mining industry. Allowing you to have a plan of what you have to do to get the job you want in the mining industry. This personal guidance can only be given on a face to face basis.

To enrol call 08 9300 0455

www.undergroundtraining.com.au

MARCSTA

MARCSTA is a safety induction can be required in WA, SA & NT (this is needed mostly for shutdown work) and can be sourced from many different companies as advised online or directly at MARCSTA.

Generic Mining Induction or S11

The GI Safety Induction is a mining awareness course that teaches you how to work safely on a mine site. Only persons that have gained employment in the coal industry in QLD will have to do this induction and in our experience if the company wants you it will pay for this induction.

Working at Heights ticket

The one day working at heights course is a requirement on most mine sites. As a lot of work takes place more than 2m above the ground.

HR licences

You will need a HR licence if you want to work in an open cut or surface mine.

Answers for the Scaling Review



What is scaling?

The act of knocking loose rocks off the walls and backs (the roof of an underground mine).



Where is the best place to stand in the drive?

Stand away from the walls and under a rock bolt or ground support if possible.



What should you never do when scaling?

Scale above your head.



How long does a normal scaling program take to complete and when should it be restarted?

The scaling program can last up to 6 months and should be restarted straight away.



If a rock slides down the bar?

Drop the bar.

Check list

Standard Requirements

All positions of employment on mine sites within Australia have some standard requirements and conditions to be met. These include:

- Able to pass a full coal board medical
- Able to pass a pre-employment drug test
- Able to provide a police clearance
- Have a drivers licence for underground mining
- Have a HR licence for open cut mining
- Be prepared to get a Senior First Aid Ticket
- Able to work 12 hour shifts
- Able to work night shift
- Able to fly on small planes
- Able to work in a hazardous environment
- Able to work at heights
- Able to relocate for work
- Be committed to working safely

We would like to wish you well in all your mining endeavours and please remember that safety comes from doing the job the right way and the skill of the worker in the work place, show me a professional work force and I will show you a safe work force.

Regards,

Shift Boss Ticket A682

Shift Boss Ticket A1815

Shift Boss Ticket A452



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