Occupations and Workplaces

Underground (Hard Rock) Mining

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What does an underground (hard rock) miner do?

Anyone working underground to mine hard minerals such as ore containing gold, silver, iron, copper, zinc, nickel, tin, and lead may be exposed to many hazards. The same processes are used for mining hard gems like diamonds. Soft rock miners excavate softer minerals like salt or coal. There are many technical services jobs required underground to support the miners. These positions include surveyors, geologists, engineers, technologists, ventilation technicians, to name a few.

Underground miners may have many roles, including:

- Production - responsible for blasting and moving the ore. These roles may include long hole blasters, narrow vein miners, load haul dump (LHD) (i.e., scoop operators), rock truck drivers, and rock breaker operators.
- Development - advance the drifts (tunnels) based on engineering and geological prints to the ore. These roles may include jumbo operators, rock bolters (mechanized and handheld), scoop operators, and development round loaders.
- Service - maintain and advance mine services such as ventilation, water lines, air lines, backfill or paste lines, restock fuel bays and powder magazines, and pick up scrap materials.
- Construction - build and install ventilation doors, grizzlies (grating over an ore pass or chute), refuge stations, and other underground infrastructure.
- Shaft - inspect and maintain shaft services, or operate the cage to bring workers to various working levels.

- Drillers - either for exploration or production and can include diamond drilling, long hole drilling (up holes and down holes), ITH (in the hole) drilling, raise bore drilling, etc.
- Maintenance - responsible for maintaining, repairing, rebuilding underground equipment.
- Electricians - advance cables for electricity, Wi-Fi, radio communications, and other means of connectivity.

The following hazards are present when anyone is required to work underground.

What are some health and safety issues for working underground in a mine?

There are many risks within the mining industry. These include, but are not limited to:

- Silica
- Diesel Particulate Matter
- Noise
- Manual Material Handling
- Whole-Body and Hand-Arm Vibration, including Raynaud's Syndrome and White Finger
- Fall of Ground (rock cave in)
- Rock bursts
- Secondary Blasting
- Working at Heights
- Crush hazards
- Pinch points
- Gases such as ammonia, carbon monoxide, methane, nitrogen dioxide
- Working with explosives
- Pain or injury from physical overexertion, repetitive manual tasks, or working in awkward positions
- Heat stress
- Electrical hazards
- Hazardous energy control including lockout/tag out
- Working with cranes, hoists, conveyors and other material handling equipment
- Struck by mobile equipment

- Fires, including underground fires
- Air quality, including oxygen deficient environment, or moulds
- Slips, trips and falls
- Working alone
- Shift work or extended workdays
- Computer work
- Stress relating to deadlines and decisions regarding health and safety as well as production
- Stress and other psychosocial hazards associated with living in isolation or away from family
- Proximity living in a camp environment may increase risk of community transmission of disease (i.e., Norwalk virus, influenza, common colds, etc.)

What are some preventive measures for working underground in a mine?

- Speak with the area supervisor before going underground to note any hazards and to let someone know where you will be working.
- Inspect the workplace for existing and potential hazards before work begins and take the appropriate actions to control the hazards. Be aware that conditions can change constantly.
- Review logs and crossover notes for any indication of seismic events, poor ground conditions, standing water, or other hazards noted between shifts.
- Inspect all equipment and machinery for any defects before work begins.
- Keep tools and equipment in good working order.
- Ensure the appropriate personal protective equipment is available and used as intended.
- If required, ensure any radios or personal gas detectors are in good working condition and understand the proper use of these tools.
- Practice good housekeeping.
- Scale the rock when entering a workplace.
- Wash down the workplace, paying special attention to areas that have been recently blasted.

- Know the location of the nearest refuge station and escape route. Know the emergency response plans before work begins.
- Use atomizers or other dust control methods as required.
- Avoid awkward body positions and take frequent breaks.
- Learn safe lifting techniques.
- Have the required training and signoffs before beginning any task or operating a piece of mobile equipment. High-risk activities such as working at heights, hazardous energy control (lockout/tag out), or confined space entry may require additional training.
- Ensure proper precautions are taken for working in extreme heat, cold, or wet conditions.
- Ensure proper footing on uneven ground. Walk on the perimeter of puddles if the ground under the water cannot be seen.
- Know how to get help in an emergency if working alone.
- Understand and follow the safe work procedures for the site.
- Take care of your mental health.

What are some good general safe work practices?

- Confined space entry
- Fall protection plan when working at heights, including working near an open hole
- Electrical safety
- Hazardous energy control, including lockout/tag out of machinery
- Prevention of diseases such as silicosis, or the spread of infections and viruses
- Protection from vibration
- Safeguarding
- Ladders
- Material handling
- Conveyors
- Hearing protection
- Working with tools and equipment, including power tools and hand tools
- Working alone
- Extreme work temperatures

- Fire safety
- Wash down the work area
- Safe scaling techniques:
    - Use the proper length steel bar, sound (listen to) the rock
    - Have good footing and a place for rock to land
    - Have a good retreat, anticipate where the rock will fall and be aware of the unexpected fall of muck
    - Scale from good ground to bad
    - Check scale frequently during the shift
- Ventilation, including management of diesel exhaust
- Knowing the signs of possible ground and support problems.
    - Fresh cracks in the rock or shotcrete
    - Bolt heads damaged or missing
    - Hollow sound when scaling
    - Bumps, or other sounds of rock failure
    - More (or less) rock noises (like snapping or cracking)
- Maintaining positive contact with mobile equipment operators. Do not approach a piece of mobile equipment until you are signalled to approach by the operator
- Participating in air sampling activities
- Checking personal protective equipment (PPE) and cap lamps (head lamp) before going underground. Use, maintain, and store PPE according to manufacturer's recommendations.
- Working with hazardous products, including WHMIS
- Office ergonomics for proper workstation set up
- Good housekeeping procedures
- Safe lifting techniques
- Psychological health
- First aid
- Reporting hazards or injuries to your employer or worker’s compensation board

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