



Mining and Quarrying

High Risk Sector



Underground and open-pit mining to extract coal, ores, base metals, stones, sand, clay and uranium.

Related Sectors:

- Cement and Concrete
- Oil and Gas
- Glass and Ceramic Products
- Iron, Steel and other Metals



Production Processes

Mining is the extraction of valuable minerals or other geological materials from the earth. A quarry is a type of open-pit mine from which rock or minerals are extracted.

Materials commonly recovered by mining include bauxite, coal, copper, diamonds, iron, gold, lead, manganese, magnesium, nickel, phosphate, platinum, salt, silver, tin, titanium, uranium, zinc, clay, sand, cinder, gravel, granite, and limestone. There are three methods of mineral extraction: Open-pit (surface), underground, and fluid (solution) mining.

- **Open-pit mining** is a method of extracting rock or minerals from the earth from an open pit or borrow. Open-pit mines are used when deposits of minerals or rock are found near the surface. This method involves moving large amounts of material, as soil, rock and vegetation has to be removed to make the minerals accessible. Characteristic of open-pit mines are large holes resembling craters with "benches" (broad ledges), so that deeper ores can be accessed with heavy machinery.
- **Underground mining** involves sinking shafts and tunnels to reach mineral deposits far below the surface. Underground mines can be as much as 3,000 meters deep.
- **Fluid mining** (solution mining) is a method in which minerals are extracted by the injection of a solution into an ore deposit. The resulting mineral solution is pumped to the surface, where the mineral or metal is extracted from the solution by processes such as precipitation, ion exchange and electrolysis.

Sustainability Issues

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|--|---------------------------|
| | Energy |
| | Water Use |
| | Emissions to Water |
| | Waste |
| | Emissions to Air |
| | Ecosystems |
| | Workplace Health & Safety |
| | Disaster Risk |
| | Site Contamination |

Sector Rating

- High risk issue
- Medium risk issue
- Low risk issue

Risks & Opportunities

- **Collapsing mine structures, accidents with explosives as well as gases and dust present a high risk for mineworkers.**

Most accidents within the mining industry involve collapsing mine structures. Up-to-date technology and equipment, as well as careful procedures, are therefore essential to avoid risks for miners. Dust can lead to lung diseases among miners and quarrymen.

- **Heavy metals, acids and other pollutants may contaminate water resources.**

Heavy metals and other substances may be leached from tailings. Wastewater may contain heavy metals, acids and other pollutants. They may contaminate water resources such as rivers or groundwater as a result of accidents, intentional dumping or leaks in containment ponds.

- **Land use and the long-term effects of erosion or chemical contamination have a major impact on local ecosystems.**

Open-pit mines are often not re-vegetated after exploitation and therefore are exposed to wind and weather which leads to erosion. Mining operations sometimes require a lowering of the groundwater level or a drainage of the mining site, thus making water unavailable for other users and the environment.

- **Leaking containment ponds are the main disaster risk within the mining industry.**

Ponds containing acids and heavy metals from processing minerals or ores might burst or leak and release toxic substances into the ground and surface water.