

Mining Industry Workers



Occupational Brief Title Codes:

- D.O.T.: 93
- G.O.E.: 05.11
- S.O.C.: 47-
- O*NET™ 3.1: 47-
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Occupational Subtitles:

- Blasters
- Bulldozer Operators
- Continuous Mining Machine Operators
- Crushed Stone Workers
- Cutter Operators
- Drilling Machine Operators
- Loading Machine Operators
- Long-Wall Mining Machine Operators
- Mechanical Saw Operators
- Miners
- Power Shovel Operators
- Shift Bosses
- Tailers

Work Classification Based Related

D.O.T. Occupations:

- Dispatchers
- Jackhammer Operators
- Laborers
- Prospecting Drillers

Interests Based Related

G.O.E. Occupations:

- Highway-Maintenance Supervisors
- Irrigation system Installers
- Sanitary Landfill Operators
- Septic-Tank Installers

Skills Based Related

O*NET Occupations:

- Geological Data Technicians
- Paving, Surfacing, and Tamping Equipment Operators
- Pipelayers
- Riggers

Mining industry workers ('min-ing 'in-dus-try 'work-ers) use heavy equipment to remove ores, minerals, stone, and other materials from surface mines and underground mines.

The earth contains thousands of materials useful to people. Some examples are: coal, petroleum, metallic ores, minerals, stone, sand, gravel, potash, phosphate, salt, and natural gas. Mining workers remove solid minerals such as coal, metal ores, stone, gravel, sand, sulfur, or salt from the earth. They also mine precious metals such as gold and silver. These substances may lie on or near the surface of the earth or deep within the earth. Mining methods depend on where the ores and minerals are and on whether mining them would be feasible. The two basic kinds of mines are underground mines and surface mines.

Underground mines may be shaft mines or drift mines. Shaft mines are usually deep. To reach the tunnels where they work the ores or minerals, miners take elevators deep into the earth. Drift mines are mines driven nearly horizontally into the side of a hill. Underground mines yield coal and ores such as iron.

Surface mines are quarries, open pits, and strip mines. In quarries workers take out nonmetallic minerals (stone and gravel, for instance) from the earth. In open pit mining they recover metallic ores such as copper and industrial minerals such as boron. Strip mines are large tracts of ground from which workers have stripped a small area at a time of the topsoil or rock to expose seams of coal or phosphate ore. Strip mines may (over the years) cover many square miles; however, as mining advances, the mined land is increasingly redesigned and returned to its original use. Land reclamation plays a large part in today's mining industry.

Mining is really harvesting part of the earth. When the minerals are gone, however, the earth will not yield a second crop or replace what people take away.

Work Performed

The mining industry employs many different types of workers from sales to transport. Over half, however, are employed in extraction—taking materials from the earth. **Miners**, as they are most commonly referred to, may perform any of a number of duties. The kind of work depends on the kind of mine.

Underground coal mining uses three techniques to remove coal, metals, minerals, and other materials that are found deep in the ground. They are continuous, long-wall, and conventional mining.

Continuous mining is the method most used in coal mining. In this operation, an electric, hydraulically operated machine mines and loads coal in one step. **Continuous mining machine operators** lie or sit in the cab of the machine. They manipulate levers to position the cutting wheels against the coal face. Cutting wheels attached to hydraulic lifts split coal from the surrounding rock. Mechanical arms gather coal from the floor and load it on a conveyor, which moves the coal to a shuttle car or to another conveyor for transport to the surface. These operators and their helpers may adjust, repair, and change the cutting teeth. In some continuous mining, remote control devices do the mining.

In long-wall mining, coal is also split and loaded in one operation. Steel canopies support the roof above the work area. The machinery moves along a wall that may be from 300 to 1,000 feet long. A plow blade or cutting wheel splits the coal off the wall and loads it onto a conveyor. **Long-wall mining machine operators** at a control panel advance the cutter. Assistants called **tailers** may adjust the depth of the cutting tool and signal the operator when it is in position. As the equipment splits the wall away from the surrounding rock, operators monitor lights and gauges on the control panel and listen for unusual sounds that might signal a malfunction in the equipment. As the wall in front of the long-wall mining machine is removed, the operators move the canopy supports and the conveyor forward.

Standard or conventional mining takes place in separate steps. First, operators undercut, drill, and blast coal from the seam. Then the coal is picked up and loaded. Of the three underground methods, conventional mining requires the largest number of workers. **Cutter operators** use a self-propelled machine like a chain saw to cut a trench along the bottom and sides of the coal face. This procedure makes the blast more effective because it relieves pressure created by the explosion. The workers may shovel debris from the trench. **Drilling machine operators** use mobile machines to bore blast holes in predetermined spots in the coal face. **Shot firers** place and detonate explosives to shatter the coal. **Loading machine operators** drive loading machines to the area and manipulate levers that make the mechanical arms gather up the coal and load it onto shuttle cars.

In both continuous and conventional mining, supports hold up the roof over the mined-out area. Roof bolts, long rods driven into the roof, bind several layers of strata together forming a strong support.

Metal miners working in, underground, open pit, and surface mines use different methods to get ores. When a mineral—copper, for instance—lies near the surface, workers remove overlying rock and dirt. **Bulldozer operators** use tractors equipped with a concave blade to remove trees, rocks, soil, and other barriers from the mining area.

Blasters study the rock formation to decide where to place the explosives, what kind to use, and how much. They instruct machine drillers, who use drilling machines to bore the holes. Then they set the explosives and detonate them to break loose material made up of either waste rock or ore. **Power shovel operators** load the material into railroad cars or trucks. Workers may work for several days moving the ore and rock from one blast.

Surface mines for coal are called strip mines. They are shallow (generally less than 200 feet deep) and extend over large areas. Shovel, **dragline operators**, or **scraper operators** move the earth to expose the coal. After workers drill and blast the coal and load it in trucks, **truck drivers** take the coal to preparation plants or directly to power plants.

After workers finish mining at a site, bulldozer and scraper operators and other workers reclaim the land.

Another form of surface mining is called quarrying and may be one of two kinds. One produces sand, stone, and gravel for construction, as well as limestone for the manufacture of cement. The other yields large blocks of building stone such as slabs of granite or marble.

Crushed stone workers or gravel workers use power shovels, front-end loaders, bulldozers, draglines, and other earthmoving equipment to dig the stone and gravel from the earth. They load the stone or gravel in trucks that take it to plants where workers crush, sort for size, wash, and prepare it for use.

In some stone quarries, workers use wedges and hammers to split the stone along a natural weakness called a cleavage plain. In other quarries, workers drill blast holes for explosives. When the blast occurs, big blocks of stone break loose. In flame cutting or flame channeling, workers use the heat from a flame to break a stone. **Mechanical saw operators** cut and shape stone slabs and blocks.

Directing the day-to-day operations in mines and quarries are **shift bosses**. They check reports that contain information on mine and quarry conditions such as oxygen, draining, supplies, and production of ore. The reports list ground conditions in working places, the state of the equipment, and estimates of production in the next twenty-four hours. After analyzing the reports, the bosses issue orders to accomplish the work.

Working Conditions

The work is challenging, sometimes under hazardous conditions. Underground miners sometimes work in tunnels that are dark and damp (much like a subway or road tunnels). Workers in surface mines are outdoors in all kinds of weather.

The Mine Safety and Health Administration in the U.S. Department of Labor, state governments, mining companies, and unions cooperate to make working conditions safer for miners. Rules on safety, health, and sanitation are rigidly enforced. Regulations cover exposure to noise, vibration from machines, and pollution of air. Use of hard hats, safety glasses, safety shoes, special work clothing, and other mandatory equipment helps insure worker safety. Careful engineering reduces the risks of flooding, cave-ins, or explosions.

Hours and Earnings

The hours miners work vary with the kind of mining they do, but most work a forty- to fifty-hour work week. Some mines have different shift schedules. Overtime is common. In 2000, the average worker worked 44.9 hours a week in the coal mining industry; 43.7 hours in metal mining; and 46.2 hours in nonmetallic minerals (except fuels).

Earnings for mining industry workers vary with the type of work performed, experience, education, and size and type of employer. In 2001, according to the National Mining Association (NMA), the average wage overall in the mining industry was \$48,602 a year, not including overtime, bonuses, and benefits.

According to the Bureau of Labor Statistics, in 2000, the average earnings of non-supervisory workers in mining and quarrying was \$770 a week. Workers in coal mining averaged \$871 a week. Those in metal mining averaged \$832 a week, while those in nonmetallic mineral mining averaged \$722 a week.

First-line supervisors/managers of extraction workers in metal mining earned a median of \$26.03 an hour. Those in coal mining earned \$25.83 an hour. Those in nonmetallic minerals (except fuels) earned \$20.59 an hour.

Workers who operate heavy equipment such as bulldozers and continuous mining machines earned medians of \$18.97 and \$18.32 an hour, respectively, in metal mining. In coal mining they earned \$17.04 and \$16.16 an hour. In nonmetallic mineral mining they earned \$13.44 and \$13.62 an hour. Blasters and other explosives workers in metal mining earned a median of \$18.95 an hour. Those in coal mining earned \$16.08 an hour, while those in nonmetallic mineral mining earned \$14.02 an hour.

Earth drillers in metal mining earned a median of \$17.34 an hour. Those in coal mining earned \$15.67 an hour, and \$13.75 in nonmetallic minerals. Excavating and loading machine, and dragline operators earned \$16.05 an hour in metal mining and coal mining, and \$13.24 an hour in nonmetallic minerals. General laborers, including crushed stone and gravel workers and tailers, earned a median of \$16.04 an hour in metal mining; \$14.70 in coal mining; and \$11.28 in nonmetallic minerals.

For overtime, unsalaried workers get time and a half or double time. Pay for underground miners covers actual hours of work as well as the time they spend traveling back and forth from the mine entrance to the work site underground. Some miners earn profit-sharing bonuses based on productivity. Miners generally have paid holidays and vacations, and other fringe benefits, which vary with employers and unions.

Education and Training

Although workers need not have a high school diploma, high school and college graduates have an advantage. Formal schooling has become more important as mining technology advances. Modern machinery and methods require special skills.

Some employees start as trainees. After a training period they become general workers doing routine tasks. As they learn mining operations they may help experienced workers. Gradually, they learn how to operate the equipment and become machine operators.

Most companies not only give new workers on-the-job training but also offer class instruction. Some companies have training mines where they teach new workers mining skills and safety practices. Subjects include health and safety procedures, machinery repair and maintenance, and mining techniques.

Federal law requires all mine workers to take both initial and yearly training sessions from their employers. The Mine Safety and Health Administration helps employers offer instruction. Blasters in both surface and underground mines must be certified in the use of explosives.

Unions

Unions help to ensure safe workplaces, good wages and benefits, and fair representation of the workers concerns. Miners may be members of any of several unions but it is not required for employment. Among the unions representing mining workers are the United Mine Workers of America, the International Brotherhood of Teamsters, the International Union of Operating Engineers, and the United Steelworkers of America.

Personal Qualifications

Coal miners must be at least 18 years old. Miners must not fear closed or small, narrow spaces. Workers in surface mines, on the other hand, must not fear working in high places such as near the edge of the pit.

Mine workers must be careful and alert to avoid accidents. They must observe safety precautions at all times. They should be good team workers, both in work production and in the observation of safety procedures to avoid accidents and injuries. They should have good communications skills. Miners should be able to tolerate noise, dirt, and strenuous work.

Occupations can be adapted for workers with disabilities. Persons should contact their school or employment counselors, their state office of vocational rehabilitation, or their state department of labor to explore fully their individual needs and requirements as well as the requirements of the occupation.

Where Employed

Every state has mining or quarrying operations. In 2001, just under 270,000 people worked directly in mining at nearly 14,000 mines located throughout the United States. About half work in nonmetallic mineral mining, followed by coal, with metal mining employing the smallest percentage of workers. The top five coal producing states include Wyoming, West Virginia, Kentucky, Pennsylvania, and Texas. The top ten mineral producing states are California, Nevada, Texas, Arizona, Florida, Michigan, Georgia, Minnesota, Utah, and Missouri.

Silver is mined in Idaho, Montana, and Colorado. Gold is mined in Nevada, Montana, Utah, Colorado, and California.

States that produce copper include Arizona, Utah, and New Mexico. New York, Tennessee, and Missouri produce zinc and lead. Minnesota and Michigan are the main sources of domestic iron ore. The New England States produce marble and granite. Stone is mined in every state except Delaware and North Dakota. All states produce sand and gravel. Mining opportunities are also growing overseas.

Employment Outlook

It is projected that by the year 2010 employment in this occupation will decline by 14 percent. This continuing decline is due to several factors. Technological advances in mining operations have increased productivity, requiring fewer workers. Stringent environmental regulations require investments in new and expensive technology, increasing production costs. New powerplants are being built to run on cleaner burning fuel such as natural gas instead of coal. International competition has lowered mining commodity prices, lowering profit, and forcing many mines to downsize and merge with one another to cut costs and expand business. Overall, most openings will become available due to employee turnover.

Entry Methods

Both skilled and unskilled workers may apply directly to mining companies for work. State employment agencies may assist individuals seeking entry into the industry. Union locals may be able to advise job seekers on how to enter the work force in this industry. In general, mining operators start as trainees. They do not go directly to higher paying work as machine or equipment operators.

Advancement

As workers get more experience and education they may advance to more skilled, higher paying jobs. Jobs are posted when openings occur. Laborers may bid for machine operator jobs. Promotions to supervisory work go to workers with leadership skills, a good performance record, ability, experience, and a broad knowledge of company procedures. Individuals interested in mining and related work might consider occupations similar to those in mining that occur in the construction of highways, dams, and tunnels and in other industries that use heavy equipment. Persons might look into the jobs of operating engineers (heavy equipment operators), water well drillers, and air hammer operators.

For Further Research

National Mining Association, 101 Constitution Avenue, N.W., Suite 500 East, Washington, DC 20001-2133. Web Site: www.nma.org

United Mine Workers of America, 8315 Lee Highway, Fairfax, VA 22031. Web Site: www.umwa.org

Acknowledgments

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Edward E. Hollop, Mining Engineer and Consultant,
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Noteworthy Quote

“‘Mine worker’ is too general a description to categorize everyone who works in mines. There are many different jobs of mine worker, from blasters to drivers, and while each works in a mine, they have different responsibilities. Some things are the same for them, like working conditions, hazards of the job, and the mining lifestyle.”

**Danny Johnson, Mining Shift
Manager, Montana**

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