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American Society for Testing and Materials (ASTM) - is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.

Nature Materials - Covers a range of topics within materials science, from materials engineering to structural materials.

OneMine.Org - A collective online digital library of mining and minerals technical papers, periodicals, books, and publications from professional societies around the globe.

Science Direct - The world's largest electronic collection of science, technology and medicine full text and bibliographic information. It contains over 25% of the world's science, technology and medicine full text and bibliographic information.

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MINING ENGINEERING

PATHFINDER

Mining Engineering

- Is an engineering discipline that involves the practice, the theory, the science, the technology and application of extracting and processing minerals from a naturally occurring environment. Mining engineering also includes processing minerals for additional value.
- The need for mineral extraction and production is an essential activity of modern society. Mining activities by their nature cause a disturbance of the environment in and around which the minerals are located. Modern mining engineers must therefore be concerned not only with the production and processing of mineral commodities, but also with the mitigation of damage or to the environment as a result of that production and processing.

HISTORY

- Since the beginning of civilization people have used stone, ceramics and later metals found on or close to the Earth's surface. These were used to manufacture early tools and weapons. For example, high quality flint found in northern France and southern England were used to set fire and break rock. Flint mines have been found in chalk areas where seams of the stone were followed underground by shafts and galleries. The oldest known mine on archaeological record is the "Lion Cave" in Swaziland. At this site, which by radiocarbon dating proves the mine to be about 43,000 years old, Paleolithic humans mined mineral hermatite, which contained iron and was ground to produce the red pigment ochre.
- The ancient Romans were innovators of mining engineering. They developed large scale mining methods, especially the use of large volumes of water brought to the minehead by numerous aqueducts for hydraulic mining. The exposed rock was then attacked by fire setting where fires were used to heat the rock, which would be quenched with a stream of water.

- The thermal shock cracked the rock, enabling it to be removed. In some mines the Romans utilized water-powered machinery such as reverse overshot water-wheels. These were used extensively in the copper mines at Rio Tinto in Spain, where one sequence comprised 16 such wheels arranged in pairs and lifting water about 80 feet (24 cm).
- Black powder was first used in mining in Banska Stiavnica, Kingdom of Hungary present day Slovakia in 1627. This allowed blasting of rock and earth to loosen and reveal ore veins, which was much faster than fire setting. The Industrial Revolution saw further advances in mining technologies, including improved explosives and steam-powered pumps, lifts and drills.

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