MINING ENGINEERING

Mining in the engineering discipline is the extraction of minerals from underneath, above or on the ground. **Mining engineering** is associated with many other disciplines, such as mineral processing, exploration, excavation, geology, and metallurgy, geotechnical engineering and surveying. A mining engineer may manage any phase of mining operations, from exploration and discovery of the mineral resources, through feasibility study, mine design, development of plans, production and operations to mine closure.

With the process of Mineral extraction, some amount of waste and uneconomic material are generated which are the primary source of pollution in the vicinity of mines. Mining activities by their nature cause a disturbance of the natural environment in and around which the minerals are located. Mining engineers must therefore be concerned not only with the production and processing of mineral commodities, but also with the mitigation of damage to the environment both during and after mining as a result of the change in the mining area. Such Industries go through stringent laws to control the pollution and damage caused to the environment and are periodically governed by the concerned departments.

From prehistoric times to the present, mining has played a significant role in the existence of the human race. Since the beginning of civilization people have used stone and 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.[1] 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 radiocarbon dating indicates to be about 43,000 years old, paleolithic humans mined mineral hematite, which contained iron and was ground to produce the red pigment ochre.[2][3]

The ancient Romans were innovators of mining engineering. They developed large scale mining methods, such as 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, lifting water about 80 feet (24 m).[4]

Black powder was first used in mining in Banská Štiavnica, Kingdom of Hungary (present-day Slovakia) in 1627.[5] 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 as long as they remained safe.