RALF SCHLUETER

Potential and Applications of Underground In situ Bioleaching of Sulfide Ores in Crystalline Hardrock Formations


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One promising approach to dealing with low-grade ores is bioleaching in the form of heap and dump operations. Especially for the extraction of copper from sulfide ores, bioleaching is already state-of-the-art. The next step in the development of this technology will be the application of in situ technology. First attempts to adapt this technology to underground mining in the form of stoping and block caving have already been made. Both methods are adjacent to conventional mining operations and, therefore, require much more effort regarding drift development, extraction and transport. The adaption of bioleaching as a borehole mining method is the next step to establishing an innovative, in situ method to meet future challenges.

Ralf Schlueter is a research assistant and Ph.D. candidate at TU Bergakademie Freiberg (Freiberg University of Mining and Technology) focusing on biohydrometallurgical extraction methods in mining and processing technologies. He received his mining engineering diploma in 2014 (equivalent to the Master of Engineering) from TU Bergakademie Freiberg. Additionally, he was a participant in the European Geotechnical and Environmental Course, 2012-2013, a master rotation course at different European universities with a geo-engineering profile. He is project manager of an in situ underground testing facility in the research and educational mine at Freiberg dealing with the in situ bioleaching of sulfide ores. ■

The people behind the awards

Over the next few months, SME will briefly profile the engineers and miners who are remembered by the AIME-founded awards presented to SME members.


HARDINGE

Established in 1958 and funded by AIME, the **Hal Williams Hardinge Award** recognizes outstanding achievement that has benefited the field of industrial minerals.

Hardinge was born in 1855. During his college years at the Colorado School of Mines, he worked as a prospector and, upon graduation, he founded a consulting practice that took him to most mining areas in the western United States and Canada. During World War I, Hardinge worked without remuneration for the U.S. Bureau of Mines. His experience in mining and milling operations enabled him to develop new devices to improve the industry. Eventually, he held more than 60 patents that ranged from firedamp detectors to his best known invention, the cylindrical/conical grinding mill that bears his name. It took nine years to overcome the skepticism and opposition to the Hardinge mill, but the evidence of its superiority silenced opposition. He founded the Hardinge Company to manufacture his grinding mill, as well as other inventions and was active in the operation and management of that company until he was 84. He died in 1943.


JACKLING

The **Daniel C. Jackling Award**, established in 1953 and funded by AIME, is presented for significant contributions to technical progress in mining, geology and geophysics.

Jackling graduated in 1892 from the Missouri School of Mines with a degree in metallurgy and started his career in an assay office in Cripple Creek, CO. Working in an experimental mill with Charles MacNeill, Jackling solved the milling problems of the Cripple Creek ore. While working at the Mercur Mine in Utah, he began investigating the low grade ore from Bingham Canyon. Based on his tests of the ore and the development of improved methods of concentration, Jackling proposed to mine the Bingham Canyon deposit as an openpit mine using steam shovels and railroads. Working with Seeley Mudd and the Guggenheim Exploration Co. consultants, Jackling finally proved 45 Mt (50 million st) of ore grading 1.93 percent copper. The Guggenheim Co. agreed to finance the development of Utah Copper Co. Jackling served as general manager, managing director and president of Utah Copper Co., developing Bingham as the first, large-scale openpit mine and concentrators complex in the United States. Jackling later applied these same principles of large-scale operations to develop the Chino and Ray mines in the Southwest.