

The systematic experimental design scheme for mini-pilot beneficiation plant

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Abstract: The newly-established mini-pilot beneficiation plant of Oulu Mining School is constructed for the education and research purposes of flotation-based beneficiation and its environmental effects is introduced in this paper. The mini-pilot will be used for different kind of purposes; in academic research, research projects in cooperation with mining and technology companies and in the education. A wide variety of research themes will be covered, for example the optimization of beneficiation process, process routes, plant wide control, environmental effects, measurements, chemical dosage and the development of a monitoring system based on the on-line measurement of the properties of crushed ore and slurry. The planning of experimental design scheme is especially based on the mineralogical analyses of the ore and bench scale test results. The on-line measurements and analyses are collected into history database in order to be utilized in upcoming researches.

In this paper the procedure for the execution of different kind of researches is introduced. The variables can be for example the purpose of research, ore type, amount of raw material, etc. The dynamic changes during the experimental test runs are also discussed. The changes can be among others in the mineralogy of the feed, slurry or flow rates. The purpose of experimental design scheme is to guarantee the repeatability, robustness and quality of the research. The systematic approach in test runs is seen as a key factor to be able to execute successful research.

Keywords: Mini-pilot beneficiation plant, control, monitoring, systematic experimental design
