

JKTech Specialist Consulting

Flotation Modelling & Simulation



Increase recovery and final concentrate grade using JKTech's flotation modelling and simulation method.

Flotation Modelling

The JKTech flotation modelling methodology has been developed using the research outcomes from the AMIRA P9 Project. The main aim of the modelling analysis is to determine the ore floatability distribution of the feed to the flotation circuit.

The shape of the ore floatability distribution can be estimated by observing the response of the ore to flotation. This is achieved by measuring the flotation performance across a flotation circuit (recovery and grade) in terms of the directly measurable model parameters.

The AMIRA P9 flotation model incorporates both ore characteristics (described by the ore floatability P) and machine characteristics (described by the gas dispersion, froth recovery, entrainment, water recovery and residence time).

Simultaneously, steady-state circuit sampling (surveys) and laboratory batch flotation tests are performed on streams across the circuit. The surveys are used to determine plant performance (recovery and grade).

The laboratory batch flotation tests are performed to determine the kinetic response of the ore to flotation changes such as regrind and reagent addition.

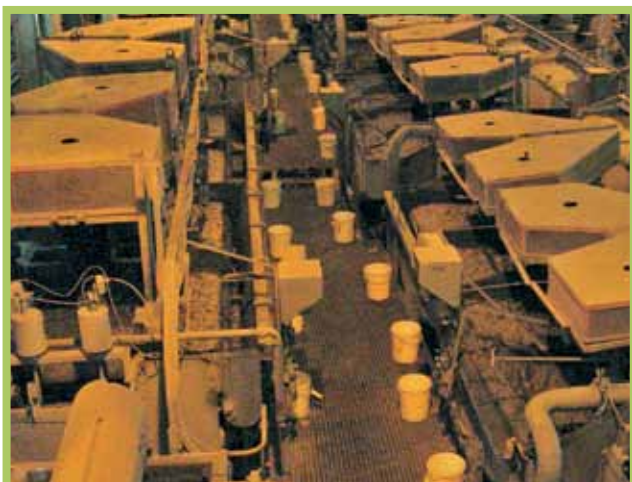


The batch flotation recoveries achieved are a function of the ore floatability distribution, the proportion of each floatability component in the particular stream being tested and the operating variables used in the batch cell.

The model fitted mineral recoveries across the circuit and for the batch flotation tests are then determined using the measured model parameters in conjunction with the flotation model.

The ore floatability parameters are varied until the sum of the squares of the differences between the experimental stream and batch flotation test recoveries, and the model fitted recoveries, are minimised.

After the "best-fit" ore floatability parameters have been determined, these parameters are combined with the measurable model parameters to obtain the calibrated flotation model.



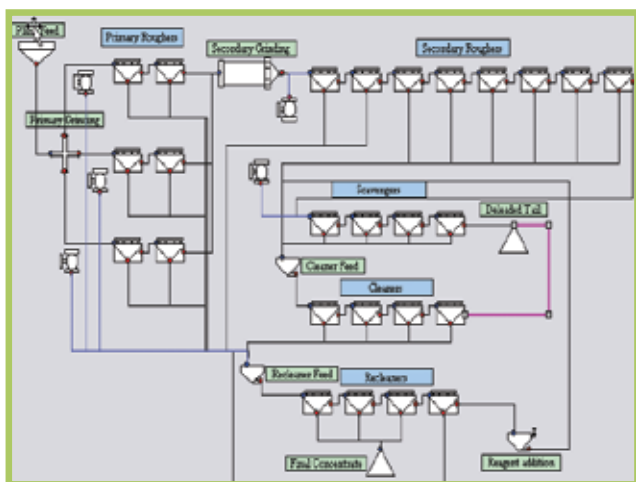
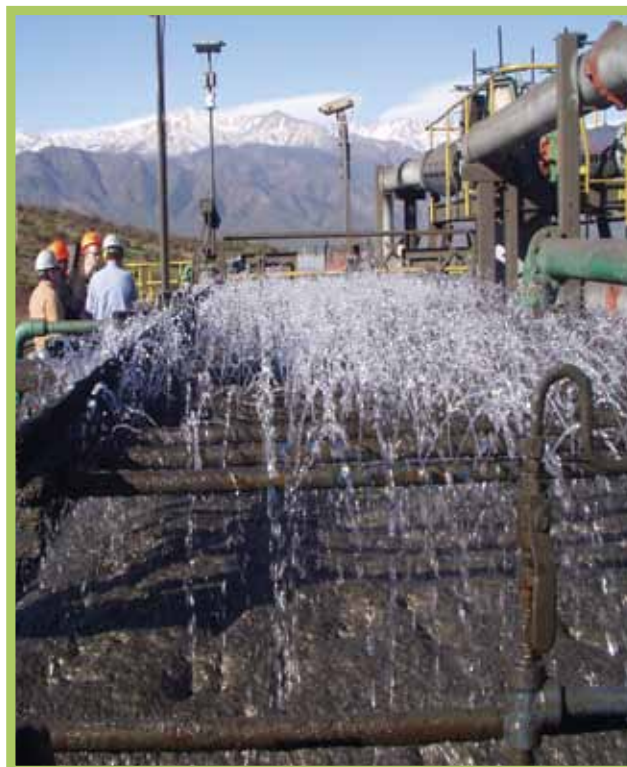
Simulation Using **JK SimFloat**

Once the flotation model has been calibrated for a particular feed stream the model parameters are used in the flotation simulation software package, JKSimFloat, to assist both JKTech and site personnel in understanding and optimising the flotation process.

The JKSimFloat simulator is calibrated so as to predict as closely as possible the operating results of the plant during the survey and measurement campaign.

The calibrated simulator has the capabilities of predicting the flotation metallurgical performance with changes in feed throughput, cell and bank residence time, cell operating parameters, eg air flow rate, froth depth, etc and circuit stream destination.

A series of "what-if" scenarios can be quickly and easily performed to identify areas of the operation that may be improved so that flotation performance can be optimised.



JKTech Can:

- Perform the required measurements around the flotation circuit to determine the flotation model parameters.
- Calibrate the flotation model and determine the floatability characteristics of a given ore.
- Simulate changes in circuit operation to optimise flotation circuit performance.
- Provide recommendations to assist in improving circuit performance.

JKTech Services

- Consulting (comminution, flotation, mineralogy, mining & geometallurgy)
- Process Mineralogy and In-House Instrument Analysis
- Specialist Software (JKSimMet, JKSimFloat, JKMultiBal, JKSimBlast)
- Specialist Equipment (ore breakage characterisation, flotation characterisation)
- Metallurgical Laboratory Services
- SMI Knowledge Transfer

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