Proceedings of the International Seminar on Mineral Processing Technology - 2006, Chennai, India. pp. 29.

Design and Optimisation of Flotation Circuits with Large Cells

B.K. Gorain

Barrick Gold Corporation, Suite 3700-161 Bay Street, Toronto, Ontario: Canada V1R 4S4
bgorain@barrick.com

Abstract

The recent trend of flotation plant design with cells as large as 300 m^3 is mainly driven by economic considerations such as lower capital, operating and maintenance costs. Large cells offer distinct economic advantages, but poses major challenges as flotation plant design considerations are significantly different from that of the traditional circuits with small cells. The conventional empirical scale-up relationships are not applicable for circuits with large cells. This is mainly due to the lack of understanding of metallurgical and design scale-up principles of large cells. In addition, large cell operation is not well understood. The present trend of installation of fewer cells in a bank requires each cell to be operated very efficiently and tolerance for cell inefficiencies is very low.

In the recent years significant advancements have been made with better understanding of large cell operation viz. cell mixing and hydrodynamics, gas dispersion and froth transportation behavior in large cells. This has resulted in a more scientific approach to the design and optimization of flotation circuits. Optimization of large cell operation provides an opportunity for significant metallurgical improvements in a flotation circuit with minimal capital expenditure. This paper will present some these major advances and their applicability in flotation plant design and circuit optimization.

Keywords: *Flotation plant design, flotation cell optimization, flotation scale-up, froth residence time, bubble surface area flux, bank operating profile*