

Performance Evaluation of the Indigenous Commercial Flotation Columns for Zinc Cleaning at Rajpura Dariba Plant of HZL in Rajasthan

G.V. Rao, K.K. Rao and S.R.S. Sastri*

Regional Research Laboratory, Bhubaneswar, India-751013

* Ex- Scientists of RRL.

Abstract

Hindustan Zinc limited operates a Pb-Zn beneficiation plant having a capacity of around 3000 tpd at Rajpura Dariba mine. The beneficiation circuit consists of 3 parallel streams each of 800 tpd capacity and produces lead and zinc concentrates. The ore from this mine is reported to be complex in nature. The sulphides of lead-zinc from this deposit are hosted by calc-silicate (CS) and graphite mica schist (GSM) rock types. The extreme variability of the physico-chemical properties of the ore and wide variations in the grade of mill feed created metallurgical problems due to which the desired products could not be obtained on sustained basis.

The zinc concentrate produced at this plant after 3 stage cleaning contained 46-50% Zn, 5-10% insoluble matter (ISM), 4-7% silica and 2-3% graphitic carbon. The excessive presence of insoluble matter (mainly silica) in the zinc concentrate is reported to cause problems in the downstream smelting operation.

At the instance of HZL, investigations were carried out at Regional Research Laboratory, Bhubaneswar to study the feasibility of obtaining Zn concentrate of desired grade by column flotation technique using a 50 mm glass column flotation unit during 1991. Subsequently additional tests were carried out at HZL during 1996-97 using a Diester column to check reproducibility of the results obtained earlier at RRL and HZL. These studies established that it is possible to produce a concentrate containing silica < 3% and ~ 53% Zn with appreciable recovery by single stage column flotation. Based on these findings, a project funded by HZL/DST/DOM was initiated for the installation of flotation columns in the Zinc cleaning circuit utilizing the technical and engineering expertise of EIL and RRL for precise sizing and installation of the commercial columns followed by commissioning and optimization of the operating parameters to handle a feed of 12 to 15 tph of zinc rougher concentrate containing ~ 35% Zn.

Details about the sizing of the commercial columns and results of subsequent studies for optimization and performance evaluation are outlined in this paper. Installation of two 1.75 M dia X 10 M tall commercial columns in series resulted in achieving the objective of reducing the silica content to < 3 %. Zinc recovery of around 60% at the column with the overall Zn recovery of around 80% was achieved. These results are in perfect agreement with those projected by RRL(Bhu) at the time of sizing.