

Copper Concentrate Regrind at Sossego Plant using Vertical Mill – An Evaluation on the First Years of Operation

M. Bergerman¹, L. Machado², V. Alves³ and H. Delboni⁴

¹ Federal University of Alfenas – Science and Technology Institute, Rod. José Aurélio Vilela, 11999 - Poços de Caldas, MG, Brasil 37715-400 (Email: mauricio.bergerman@unifal-mg.edu.br)

² Sossego Mine – Copper Department – Vale, Vila do Sossego, s/n – Mina do Sossego – Canaã dos Carajás, PA 68537-000 (Email: luis.machado@vale.com)

³ Department of Mineral Technology – Vale, Rodovia BR 381 – Santa Luzia, MG, Brazil 33040-900 (Email: vladimir.alves@vale.com)

⁴ São Paulo University – Mining, Mineral Processing and Petroleum Department, Polytechnic School, University of São Paulo, Av. Prof. Mello Moraes, 2373 – São Paulo, SP Brazil 05508-900 (Email: hdelboni@usp.br)

At the regrind or secondary grinding stages of base metal ores, the concern about energy efficiency is usually extremely important. In general, the specific energy consumption at this stage is higher than during the primary grinding stages. In addition, a tendency of finer grinding has been observed in the new projects of metallic minerals, due to the finer mineral liberation, which leads to increasing capital and operational costs. At Vale's new copper projects in Brazil, regrind sizes with a P80 of approximately 40 to 20 m have been necessary. Conventional ball mills, adequate for primary grinding, usually bring about low energy efficiency with products below 50 m. Vale is using the vertical mill on its copper projects – Sossego and Salobo, in order to optimize the regrind of rougher concentrates and reduce energy consumption.

This paper presents the results of industrial surveys carried out on the Vertical mill circuits of Sossego plant during its initial years of operation, and compares these results with the design criteria and laboratory regrind tests used for the mill scale up.

Keywords: grinding, regrinding, copper, vertical mill, stirred mill

M. Bergerman

Mauricio Guimaraes Bergerman graduated in Mining Engineering from "Universidade de São Paulo" (2003) and did has Masters in Mineral Engineering from "Universidade de São Paulo" (2009). Currently, he is Assistant Professor at Alfenas Federal University, in Brazil. He worked for four years at the Sossego copper plant operation, one year at Pico iron ore processing plant and two years at the development of new copper projects in Brazil and Africa. Has experience in the area of process engineering, with emphasis on mineral processing, focused, mainly, in the subjects: semi-autogenous grinding, regrind, simulation, copper, circuit optimization.

