



Processing Centers in Artisanal and Small-scale Gold Mining: Evolution or More Pollution?

M. M. Veiga

*Associate Professor, Norman B. Keevil Institute of Mining,
University of British Columbia, Vancouver, Canada
Visiting Professor, Dept Mining Engineering, Polytechnic School,
University of São Paulo, Brazil*

Abstract

This article discusses the technical evolution observed worldwide in the artisanal and small-scale gold mining (ASGM) sector. At first glance, the centralization of mineral processing activities in local centers seems to rationalize the production and reduce the dispersion of polluting tailings in rural areas. However, the rise of processing centers around the world is taking advantage of the ignorance and lack of capital of the artisanal miners. These centers receive gold ores from miners and process using poor grinding and amalgamation processes to extract less than 30% of the gold. As payment, miners leave the tailings (residues) at the centers which are processed by cyanidation to extract residual gold. The cyanidation of Hg-contaminated tailings produces mercury-cyanide complexes that are not always recovered in the process of activated carbon or zinc precipitation. As a result, tailings discharged into the local water streams carry mercury either as soluble cyanide complexes or Hg droplets. Some technologies to extract gold in small-scale to replace amalgamation are discussed and the cyanidation of concentrates in small-ball mills is highlighted as the most promising one. Any technique to replace mercury should invest in gravity or flotation concentration in order to reduce the mass of material to be leached or melted. This reduces dramatically capital and operating costs. There are a few processing centers, in particular at the South of Ecuador, doing responsible and cleaner gold extraction. They are integrating miners in the evolution process and creating a new breed of professionals in the small gold industry. The proliferation of these centers is possible but private capital is the main key factor since most Governments of developing countries do not have the understanding and the capacity to change the behavior of artisanal miners.

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