Coarse Vertical Stirred Mill Applications

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ABSTRACT

Vertical stirred mills are more frequently being applied at coarser grinding duties as a replacement for ball milling. This trend is being driven by reductions in footprint and operating costs such as power and media consumption that counter the increased capital cost. Vertical stirred mills can use 35% less energy (decreasing to 20% for coarser applications P_{80}>200 µm) and 20% less media than equivalent ball mills. However, in some cases this reduction is simply due to the circuit creating a sharper product size distribution, and the evaluation technique using P_{80} figures. Although benefits are well established in regrind and tertiary duties, they have not been clearly proven in coarser applications following autogenous (AG) or semi-autogenous (SAG) mills and high pressure grinding rolls (HPGR). This paper will bring together data from a number of operating sites to better evaluate the performance of vertical stirred mills in coarse duties.

There are many applications where vertical stirred mills have been installed in coarse duties. Morenci conducted a long-term trial of a VertiMill (VTM) in secondary duty following an HPGR closed with an 8 mm wet screen. Boungou have recently commissioned a milling circuit with VTM following a SAG mill closed with a 7 mm scalping screen. Tambomayo have an open circuit VTM following a single stage SAG circuit closed with hydrocyclones. Cannington have employed a VTM in closed circuit following a single stage AG mill circuit. Finally, Cadia, New Afton, Chino and Raglan have employed VTM in a tertiary application to debottleneck the ball mills and stabilise the float feed. The efficiencies of these plants will be evaluated to better define when and where VTMs are best employed.