June, 2003

CANADIAN Mining Journal

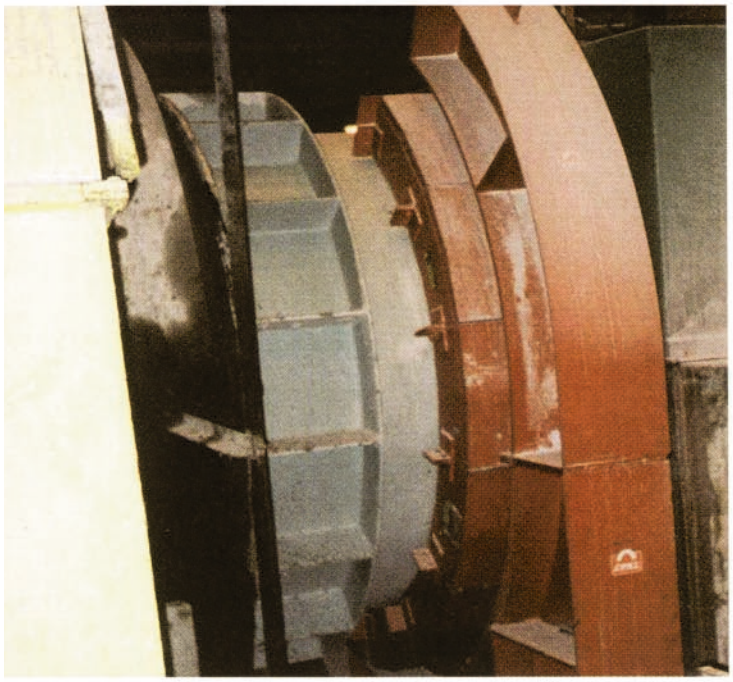
KINROSS

The new kid on the block

CANADA'S FIRST MINING PUBLICATION

Canada Post Canadian Publications Mail Sales Product Agreement No. 40069240.

Trunnion magnet eliminates grinding ball fragments



The orange trunnion magnet removes broken and worn steel ball chips from the slurry reducing wear and tear on downstream equipment

by Darrell Milton

Grinding ball fragments discharging from the ball mill of a world-class Canadian copper mining company were causing extreme wear to downstream processing equipment. These ball fragments, circulating in the milling circuit, caused excessive wear to sumps, pumps, hydrocyclones and interconnecting piping. An attempt to remove tramp metal from the discharge stream was only moderately effective, and the screens were expensive.

In 2001, Eriez Magnetics' first Canadian trunnion magnet was installed in the grinding circuit. The objective was to remove these tramp metal and ball fragments from the discharge flow. The magnet mounts to the mill's discharge trunnion, and consists of an arc of permanent magnets partially surrounding a blind trunnion. As the mill rotates, the powerful magnet attracts and holds the worn steel balls and chips to the inner surface of the trunnion extension. The ball fragments are carried to the top, where the magnetic arc terminates, and fragments fall into a discharge chute. During the first several hours of operation, the magnet removed nearly 20 tons of tramp steel. The removal rate eventually stabilized at a few tons per day.

Reduced wear and increased production

The company indicated that its decision to install a trunnion magnet would likely pay for itself in the first year of operation. By removing the steel chips that circulate in the ball mill/cyclone circuit, the wear on the feed pump, distributor and hydrocyclone parts should be greatly reduced, which, obviously, would lower maintenance costs and increase copper production. Another advantage was the lower power required, reducing operating costs with no reduction in grinding efficiency.

An improvement in cyclone efficiency will also result as the apex wear life is extended. Better cyclone performance provides a finer flotation feed and improved copper recovery. Testing of ceramic cyclone parts, which are longer wearing, can now be done due to the reduction of steel chips which otherwise fracture ceramic linings. There also should be a reduction in flotation impeller wear as well as anticipated manpower savings for the costs of cleaning steel chips out of the cells.

Tim Shuttleworth, vice-president International Operations for Eriez Magnetics, said, "Eriez appreciates the Canadian company's willingness to employ new magnetic technology in the milling circuit. Without the benefit of high-grade ore, the innovative staff is always considering new technology to improve the operation. The acceptance of this first trunnion magnet in Canada and the company's purchase of the second unit in 2002, makes a strong statement to the industry."

The copper mill's experience clearly indicates that the Eriez Trunnion Magnet, by eliminating the grinding ball fragments, reduced maintenance and energy expense while significantly expanding capacity.

Darrell Milton is sales manager of Eriez of Canada Ltd., and can be contacted at dmilton@eriez.ca, phone (905) 795-0444.