

Minerals processing solutions

From run-of-mine to tailings

MechChem Africa talks to Weir Minerals Africa's Process Director, JD Singleton, about the extensive range of products, services, solutions and technical expertise the company offers to help process plant operators reduce bottlenecks, improve uptime and optimise plant performance.

“While Weir Minerals' core strength lies in the traditional mill circuit – Warman pumps, Enduron screens and Cavex hydrocyclones – we have spent the last decade systematically expanding our offering to also include critical aspects of other aspects of the minerals processing circuit,” begins Singleton.

The acquisition of the Trio crushing and screening business in 2014 enables Weir Minerals to offer solutions starting directly from the run-of-mine tip. “We can drop ore from a mine directly onto Trio grizzly feeders and into Trio jaw crushers. We can pass that ore through Trio apron feeders onto conveyors, through Enduron linear motion screens for classification and into Trio cone crushers – all to feed the milling stockpile.

“Following this process, we offer the mill circuit equipment as a solution. We install our

Vulco mill liners to protect the SAG/ball mill and our Isogate knife gate isolation valves that connect to Warman centrifugal mill circuit slurry pumps, which feed our Cavex hydrocyclones. We also supply hydrocyclones further up the line to improve efficiencies, as well as to provide maximum density return lines for material going back to the mill. Finally we use our Linatex hose and Linatex premium rubber lining solutions, which are also critical circuit components,” he tells *MechChem Africa*.

Upstream and downstream from the mill circuit, Weir Minerals Africa has also expanded its equipment range and expertise in order to improve media separation processes. “Whatever the process being used: be it flotation, leaching or dense media separation (DMS), our expertise and technology is extensive in slurry transportation and dewatering. We have suitable solutions for all minerals, including gold, platinum, copper, coal, iron and



diamonds. We have equipment, technologies, wear solutions and spares that cut right across the commodities being mined and processed in Africa,” Singleton says.

In addition to its product range, he notes that Weir Minerals has the knowledge and experience to supply various applicable solutions for minerals processing needs. “We specialise in all applications that involve the processing and transportation of slurries and liquids, all the way from the mine to the tailings dams, where our pumps, valves and hoses are used to safely and reliably transport waste to the dump sites,” he says.



Weir Minerals works with customers to provide integrated solutions for their complete plant.

Debottlenecking and plant optimisation

“All of our efforts over the past ten years have been directed at becoming a preferred partner on the minerals processing side of mining operations. Weir Minerals has been adding and continues to add more and more technologies to improve specific processing applications and solutions.

“For media separation circuits, for example, we have developed robust Cavex DMS hydrocyclones that can withstand the high abrasion rates associated with DMS media. Our DMS hydrocyclones are either all-metal or ceramic tile-lined and the construction materials and range of cone angles have been optimised to give the best possible wear life in different applications.

“This is the way we go about things. We strive to develop pockets of excellence for specific needs, improving recovery rates and uptime. The idea is to enable our partners to become more profitable, sustainable and successful. We know that our business depends on the success of our partners,” Singleton informs *MechChem Africa*.

“My role as process director is to look after all product management, application engineering and process engineering issues, with a key focus on uptime,” he continues. “We support our sales network, service and process engineers by supplying integrated solutions to improve recovery, reduce bottlenecks and increase uptime.”

To further advance its partnership approach, Weir Minerals Africa is using its extensive network of 18 branches across Africa to work very closely with its customers. “Through partnerships, we are proactive in preventative maintenance and back this up with process engineering. Through on-going engagement with a plant, we can systematically debottleneck processing circuits, which very quickly improves productivity,” Singleton says.

Explaining further, he says: “If there is a breakdown on a mill pump every second week, then this is a cause of a productivity bottleneck for the plant. If we can modify the mill pump to run for 2 000 hours instead of 400, not only does this save money on servicing the pump, but the whole line's availability improves, making the plant more productive.

“By balancing the wear life of each individual product on a processing line, overall plant uptime can be maximised. We can successfully optimise a mill discharge screen to last up to six months as opposed to two months with the operating parameters, geology and/or throughput changes over life of mine. The same goes for replacing replicated or competitor equipment that was incorrectly specified for the application. Similarly we can achieve better reliability and recovery rates by optimising the hydrocyclone cluster feed-



Above: Cavex 500CVX hydrocyclones discharging onto an Enduron dewatering screen.

Right: The Warman AHF froth and paste pump used in a concentrate thickener underflow application.

Below: The new generation Warman WBH slurry pump.

ing, the leaching or flotation plants, which have a direct impact on overall plant recovery. We can get the crusher plants and critical pump applications to run for longer in the same manner. With our expertise and experience in bespoke process trouble shooting and debottlenecking, we can reduce refurbishing times, not only through equipment design, but also by having the right spares and service support on site at the right time.

“In a host of problem areas on a plant, we can help,” Singleton assures.

By systematically tackling problem areas one by one and/or holistically, steady and significant overall plant improvements and optimisation can be achieved. “This is our integrated solutions approach to optimisation. If one section of a plant is achieving 90% availability, but another section only achieves 60%, then we start by getting the 60% section up to 85-90%. Then we look for the next worst performing section. Initial improvements can be significant and in the longer term, the approach can lead to continuously improving reliability levels, which can ultimately lead to low costs of ownership and best-possible production costs per tonne,” Singleton states.

“We understand that the mining industry is going through challenging times at present and that cost containment is critical. At Weir Minerals we are willing and able to go the extra mile to help. Typically, we will identify a problem and trial a customised solution.



We subsequently justify its implementation based on a strong business case that accurately numerates the cost of ownership benefits, the savings that will accrue and the payback period.

“We are achieving anything between three-day and nine month paybacks on focused capital projects – and we tend not to implement solutions that have investment returns of longer than a year. Our current record is three days for a R2-million investment,” he reveals.

“If our customers tell us what their bottlenecks or downtime problems are, we will work with them to find solutions – and we can almost always find solutions with rapid payback periods on the investment costs,” Singleton concludes. □