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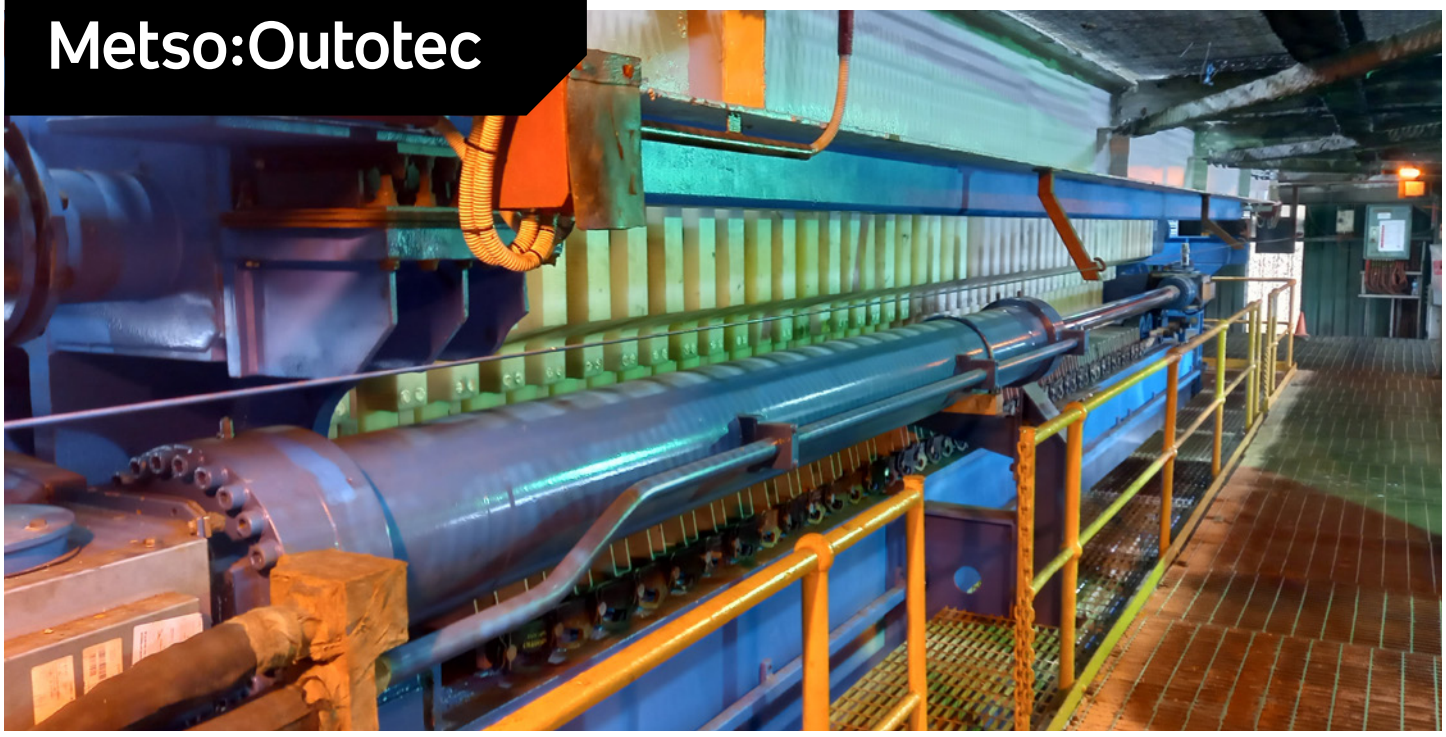


Case study

Major VPA filter upgrade delivers over 30% improved throughput for Ok Tedi in remote Papua New Guinea

Close collaboration between Ok Tedi Mining Limited (OTML) and Metso Outotec resulted in improved VPA filter performance, over 30% increase in throughput and a shift to more predictive maintenance. OTML and Metso Outotec completed this major upgrade during a challenging global pandemic.

Challenges

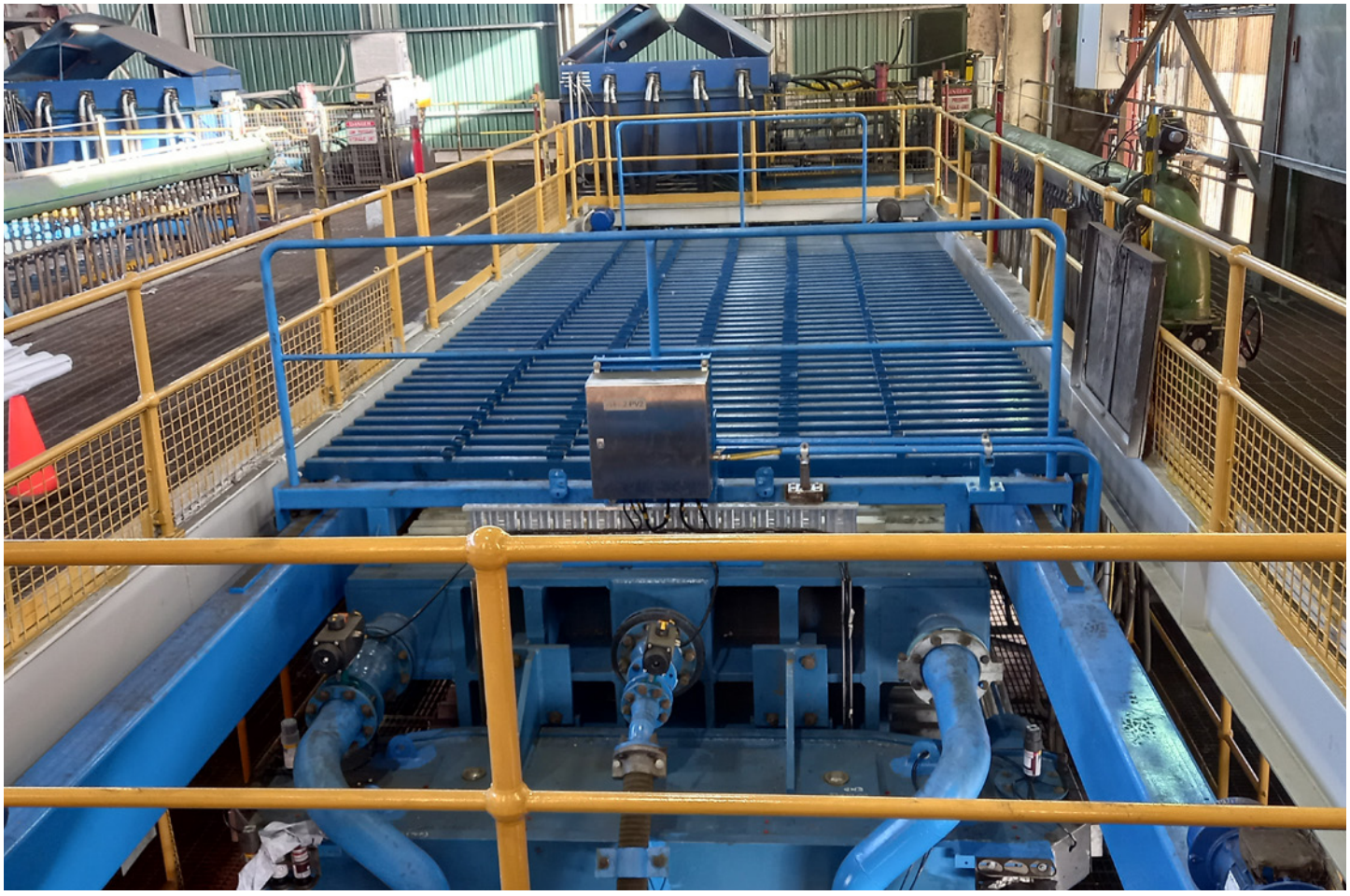
- Ageing equipment in a tropical environment
- Unscheduled maintenance, reduced reliability, and throughput
- Major upgrade at remote site during pandemic

Solution

- Overhaul of VPA filters to OEM specification
- Upgraded control system
- Remote project management and upskill workforce

Results

- Throughput increased by more than 30%
- Filters future-proofed for stage 2 and subsequent upgrades
- New skillset for the workforce with latest industry practices and procedures
- Predictive maintenance now possible



Completed VPA upgrade, back to OEM specifications, now delivering 30%+ throughput increase

The Ok Tedi mine is an open-pit copper and gold mine located in the Star Mountains in the Western Province of Papua New Guinea (PNG). The site was first drilled in 1968 and OTML is proud to be 100% PNG owned, with a 67% shareholding by the Government of Papua New Guinea while the people of Western Province hold the remaining 33% interest.

Current mining exploration data indicates that there is nearly 800 Mt of reserves available at the site. The processing plant consists of two large parallel circuits where ore is milled through a series of stages before minerals are extracted through conventional flotation. The copper plant produces a copper-gold concentrate which is then sent by pipeline to Kiunga Port where it is dewatered and loaded into barges.

Two of the main pieces of equipment at the Kiunga plant are the pair of Metso Outotec VPA (Vertical Plate Airblow) dewatering filters. First installed in 2007 and workhorses in the process, by 2015 these two large machines were showing wear-and-tear, resulting in reduced performance and throughput, potential safety risks and requiring increased maintenance and spare parts.

Ageing VPA filters a critical part of production

The VPA filters at the Kiunga plant are a critical part of the production process. Their purpose is to dewater the copper concentrate slurry and produce material that does not exceed the safe moisture level limit for shipping.

OTML chose Metso Outotec to undertake a major audit of the equipment, covering key areas of the mechanical operation and automation of the VPA presses. Both units showed evidence of wear-and-tear that subsequently decreased the performance and reliability of the equipment and increased the demand for routine maintenance and spare parts.

"We were having plant reliability issues since the filter units were ageing and the refurbishment project was timely,"

Dexter Wagambie,
Kiunga Operations Manager

Significant investment in the plant's future from OTML

The Metso Outotec audit identified key elements in upgrading the VPA filters to optimize their performance. OTML decided to proceed with the refurbishment of the units as part of its Plant Asset Renewal (PAR) Project. The PAR project is a progressive replacement and refurbishment program of the processing, dewatering and ship loading facilities. It represents a significant investment by OTML into the future of the plant, to be implemented over two years.

The audit identified the key elements in developing the next level of sustainable and economical upgrades and refurbishments. The upgrade was divided into two distinct stages.

Stage 1 of the upgrade was to bring the VPA presses back to OEM specifications. This included dismantling and removing the original equipment and releveling the presses sole plates. Certain items, such as the fixed press head end and rear frame, were refurbished and reinstalled. Some new items were required, such as the main beams, yokes, cylinders and supports, which were then installed. The final upgrade component was the inclusion of a K1 panel which added next level control and human-machine interface to the plant. The OTML and the Metso Outotec team worked very closely together, with OTML responsible for the complex workaround preparation for additional cabling and other in-field components, necessary to facilitate this next level control system at the site.

Stage 2 of the upgrade is planned to occur in the future and will upgrade the Hydraulic Power Units (HPUs) to NextGen HPUs, thereby future proofing the plant, reducing the HPU cycle time by an estimated 10% and further increasing throughput.

OTML upskills staff during pandemic

The first VPA unit was upgraded in January 2021, and the astounding results prompted OTML to bring forward the second VPA upgrade to July 2021. The second upgrade was hampered by travel challenges brought on by the COVID -19 pandemic. With the Metso Outotec team unable to travel to site, the work was performed by the OTML staff under guidance from Metso Outotec staff in Australia, South Africa, and Finland.

Fortunately, there had been extensive skills transfer during the first VPA upgrade, thereby familiarising the OTML staff with the upgrade process. Weekly meetings were also held to collaborate on planning and to make sure requirements were met for the shutdown. Additional ad-hoc meetings were also held, dependent on the project stage and whatever expertise was required from the Metso Outotec team. Metso Outotec remotely guided the OTML team in the step-by-step procedure for the removal of the older components and installation of the new ones. Extensive procedure documents were provided for OTML to reference, with further support from Metso Outotec experts on the phone to talk through the procedures.

"It is one of the most extensive projects in terms of input from Metso Outotec I have ever been involved with," said James Walton, Site Account Manager of Metso Outotec.

Following a request from OTML, a training package was also developed for a face-to-face training to be delivered in due course. This is a significant commitment by OTML in developing their site competencies to industry-leading skills in VPA filter operation.

OTML team celebration after successfully completing the second upgrade. The Ok Tedi "A" team.

“These units are now processing 125 tons per hour with more than 24 hours’ slurry and no downtime. The units can produce 2,850 tons per day (tpd). Prior to the overhaul we were averaging 2,152 tpd,”

Dexter Wagambie, Kiunga Operations Manager

Future-proofed and performing well

The upgrade process brought the two VPA units back to OEM specification and fully equipped them with the latest in Metso Outotec’s VPA technologies. This included an upgraded control system and HMI features that would future-proof the units in anticipation of further upgrades.

By resolving the continuing maintenance issues, and providing the latest technology, OTML now implements proactive and predictive maintenance for the filters, enabling reliable operations with the current set-up and into the future. Since the upgrade, Metso Outotec’s training and ongoing filter support have also helped with embedding the latest industry practices and procedures on-site.

Kiunga Operations Manager, Dexter Wagambie discussed the project and explained, “We were having plant reliability issues since the filter units were ageing and the refurbishment project was timely.”

He said immediate results were visible since the completion of the refurbishment.

“These units are now processing 125 tons per hour with more than 24 hours’ slurry and no downtime. The units can produce 2,850 tons per day (tpd). Prior to the overhaul we were averaging 2,152 tpd,” Dexter Wagambie said.

K1 panel which added next level control and human-machine interface

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