Case Study

Ultrasound Condition Monitoring Technology to Improve Plant Reliability

"If you always do what you have always done, you will always get the same result. We wanted to look at other technologies, not just vibration and infrared technologies. Not all of our assets rotate, so we wanted other technologies to help us improve overall plant reliability and looked at ultrasound technology as an additional tool."

Client background

The client operates the largest copper mine in Africa. The mine has undergone several expansions since it began operating in 2005. From an initial production capacity of 110,000 tonnes of copper, the mine is now capable of producing 340,000 tonnes of copper and more than 120,000 ounces of gold per year.

As part of their asset management and reliability drive and due to the remote location of the mine, they have invested significantly in upskilling their staff to perform condition monitoring.
The client identified some critical assets that were not being monitored by regular CM practices such as vibration, infrared, NDT and tribology samples.
The client identified SDT ultrasound technology to monitor a bigger range of their assets.

Key challenges

- Due to their remote location impacting on cost and availability, the client could no longer use outsourced services.
- The client was successfully using their own traditional condition monitoring technologies for mechanical applications including pumps, fans, bearings, etc. However, MV electrical substations, compressed air leaks, lubrication control, and reliability issues on non-rotating assets were identified as areas where enhancements could improve performance and reliability.
- The client's employees required training as they lacked sufficient skills and expertise to improve their long term condition monitoring programme without the help of outsourced services.

Value add

- A broader range of assets are covered by the new technologies that we introduced.
- Time is saved on essential bearing defect identification
- A new condition-based lubrication programme which will gradually result in cost reduction on the lubricant (grease) used.
- The quantification of compressed air leaks to reduce energy spend and compressor utilisation.
- The identification of electrical defects in medium voltage switchgear reducing potential production losses and insurance claims.
- The increased safety of engineering and maintenance staff entering or maintaining medium voltage equipment in substations.
- Detect the presence of bypass valves in process lines.

Martec intervention

As the sole distributor for SDT Ultrasound in Sub-Saharan Africa, First Quantum Minerals approached us to assist with the selection and supply of SDT technologies.
Assessment | our team reviewed all the condition monitoring (CM) technologies and asset types that the mine was using.
Recommendation | we identified and proposed the best suited CM hardware, software, and sensors.
Training | As part of the implementation, we trained four employees to currently use the technology and software, set up route based inspections and to analyse ultrasound results. After seeing the benefit of the effective use of ultrasound in their CM programme, we were invited to conduct ISO Level 1 Ultrasound training for six additional employees at the mine.

With our intervention, the client extended their Ultrasound programme to also include:

- MV Electrical substation scanning for arcing tracking and corona discharge in medium voltage equipment and plant,
- Condition based lubrication programme,
- Compressed air leak detection, and quantification,
- Airborne and structure-borne condition monitoring on valves, steam traps, and hydraulic equipment.

Tools and technology

- SDT 270 Ultrasound detection technology
- Air Borne Sensors | Electrical applications MV switchgear and overhead transmission lines
- Structure Borne Sensors | Mechanical applications including lubrication control, bearing monitoring, steam trap Inspections, valve testing
- UAS4.0 Software
- Compressed air leak quantification application
- ISO Level 1 Ultrasound training.