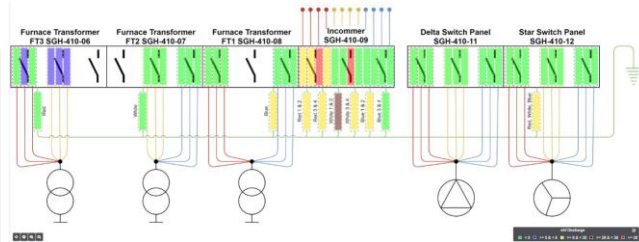


Client Reference

Manufacturing | Smelter Operations | Termination Defects Detected with IIoT Continuous Monitoring

Realtime monitoring of critical assets proved to be a very good investment. This has saved significant downtime and production losses and helped to detect failures before they could happen. Repairs could be scheduled timeously during planned maintenance shutdowns with no loss in production time.



Client background

Our client operates a PGM group smelter situated outside of Polokwane. The current infrastructure comprises a 68MW furnace fed by 33kV single-core cables. The concentrate is melted by energy generated when an electric current passes through the electrodes and resistive slag layer. On melting, two immiscible phases form: slag and matte. The furnace matte, containing the bulk of the base metal sulphides and PGMs, is denser than slag and collects naturally at the bottom of the furnace. Electricity is the single most significant input cost for smelting platinum concentrate in the electric furnace and, therefore, must have a reliable power supply. This requires that all the electrical assets are available 100% of the time and that these are monitored 24/7 to ensure reliability

Key challenges

- Premature failure of terminations**
 - The challenge was to identify the defect using IIoT realtime condition monitoring and predict how big the risk of failure was. Not identifying this will lead to termination failure, which will lead to unplanned downtime and loss of production time.
- Investigation during shutdown**
 - The next challenge was being under pressure to do this investigation as thoroughly and quickly as possible while staying safe. Strict isolation and lockout procedures were implemented to open up panels identified for the investigation.
- Eliminating costly failures**
 - Not only is a failure costly to repair, but it leads to unwanted and costly downtime. An unwanted failure can lead to significant production losses, especially on this plant, where a repair can take from three days up to a week, creating massive losses.

Value add

- Reducing risk of failure
- Ensuring more reliable plant
- Restoration of a safe electrical system
- Ensuring safe working conditions within substations
- Saving millions in unwanted production losses

Tools and technology

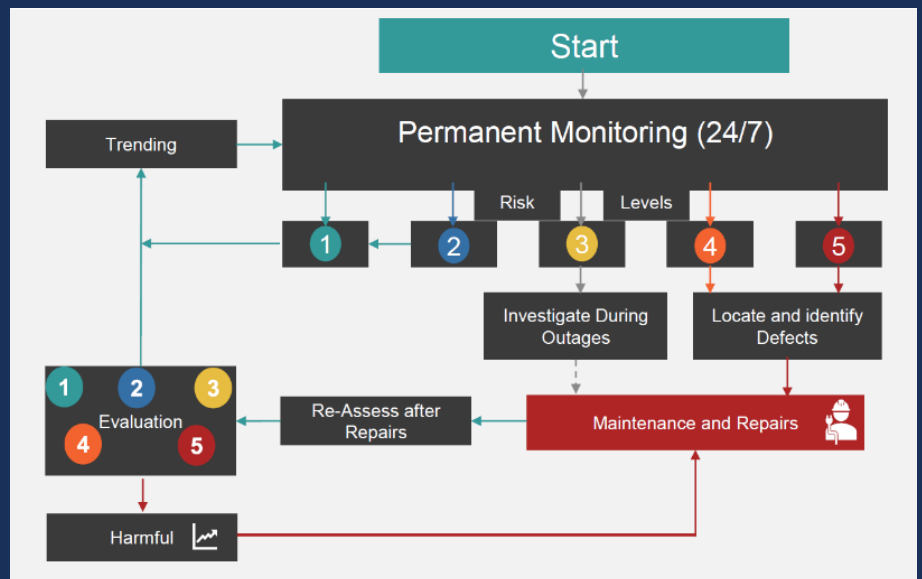
- IIoT Realtime Partial Discharge Monitoring
- Visual inspections
- Investigations

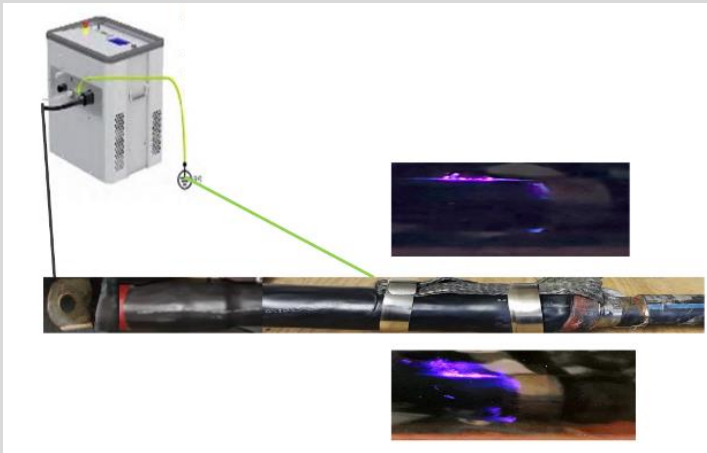
Martec Intervention

“Intime” condition monitoring proved itself to be very effective in preventing catastrophic failure.

We use the process to the right to implement a monitoring solution to ensure failures are “seen” before they occur.

Assets are ranked from a level 1 – 5.

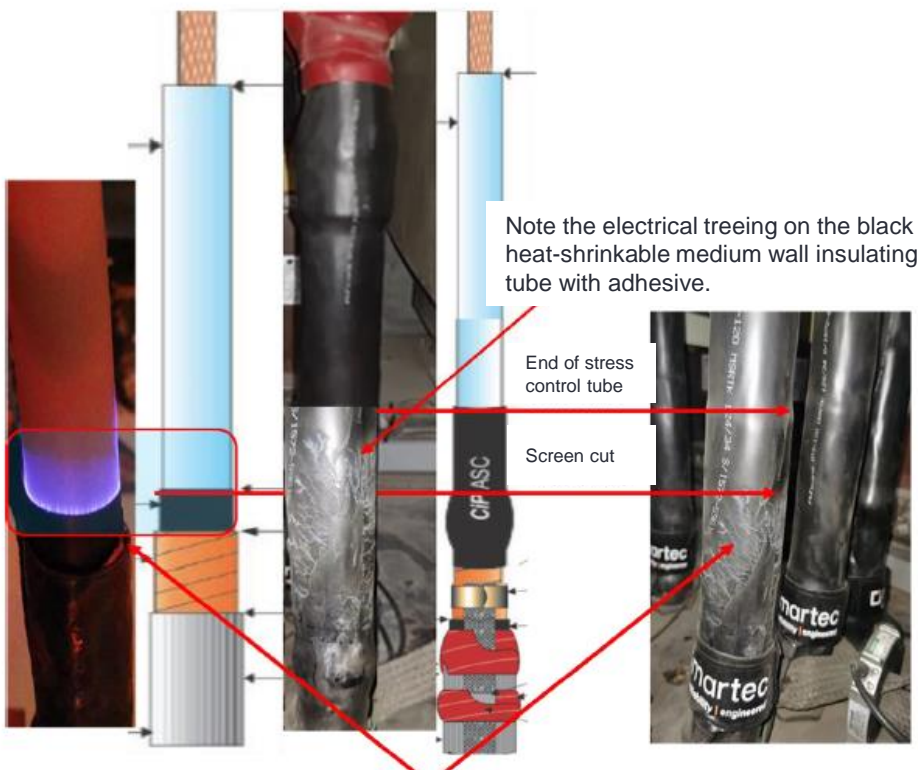




Findings on cable terminations

A high voltage 50hz test set was connected to the termination. The positive lead to the termination lug and the high voltage earth connected to the termination earth strap.

The termination earth strap was folded over the black tube and secured with roll-springs. This setup is to prove the tracking that will take place on the black tube, causing the electrical trees.



HV test findings of the yellow 3 termination

Black heat-shrinkable medium wall insulating tube with adhesive. These tubes must not be used on 33kV terminations.



- Screen cut done incorrectly
- Causes discharges as shown



Discharges will be created if the screen cut is damaged or badly cut during installations

