

Client Reference

Manufacturing | Real-time Condition Based Monitoring using IIoT Technology

The real-time condition monitoring project brought health measures of critical assets within the client's plant into a single interactive real-time operational dashboard and workflow environment. This facilitated better efficiency and control supported by cross platform application, device, sensor, machine, and human integration. Proactive maintenance was also then possible using a combination of technologies.



Client Background

The client is a manufacturer of glass bottles for wine and carbonated soft drinks. Manufacturing of glass products is an energy intensive process, and the supply of electricity to the plant is critical to the operation. The plant utilises a complex system of transformers and generators to supply electricity. The client experienced downtime on some of their critical transformers and reactors because of hot (poor) connections and insulation that had deteriorated causing Medium Voltage (MV) termination failures. Two critical assets that caused significant production losses and reactive maintenance costs were the furnace line boosting transformer and the dry type reactors installed in the Rotary Uninterruptible Power Supply (RUPS) unit.

Key Challenges

The factors of each of these critical assets did not have continuous real-time monitoring linked to suitable follow-up workflow processes. Issues could not be proactively resolved and the client was therefore unable to perform predictive maintenance on the assets and avoid downtime. Furthermore, the client plans to only replace some of their boosting transformers on their furnace lines in 2020. This puts them at risk because of the current condition of some of the transformers and the close monitoring that will be needed to ensure operation within safe limits and warning of imminent failure.



Value Add

- Pragma supplied the client with a 'Digital Twin' which gave them a digital representation of their physical assets that presented data in real time.
- The Digital Twin allowed the client to take action and perform proactive maintenance because of implemented workflows that raise alarms when data exceeds thresholds.
- The client has peace of mind that their critical assets are being monitored.
- Insight into the performance of their assets was made possible by using Business Intelligence tools to perform analytics on their historical data. This allowed them to view trends to identify anomalies in advance.



Martec Intervention

Martec intervened to accomplish the following objectives:

Implement a proof of concept Industrial Internet of Things (IIoT) solution to demonstrate potential value.

Enable online monitoring of one boosting transformer and one reactor at the plant in real time.

Analyse trends of time series data that will provide a basic indication of the assets' health status.

Provide threshold detection (warning and alarm limits) of specified parameters which will raise alarms to notify relevant personnel of potential defects ahead of time before failure.

Create an extendable IIoT framework that can seamlessly integrate new devices and platforms to easily scale across the plant in the future.

Tools and Technology

- Continuous Online Monitoring of transformer condition measuring moisture and DGA hydrogen content
- Temperature sensors (PT100) and monitor to measure transformer's top oil, cooling oil system and ambient temperature
- IntelliSAW unit measuring temperature on high voltage reactor terminations, humidity and local partial discharge activity
- Raptor IoT Gateway receiving data from the sensors and devices, filtering and aggregating it to be sent to the Cloud platform
- Commander IoT Real-time platform