

### Improving Reliability through Real Time Online Machine Health Monitoring

**Summary of Outcomes:**

- Introduction of fixed full time condition monitoring regime for two compressors within the refrigeration plant
- Real time reporting on developing faults allowing timely intervention and prevention of breakdown
- Improved maintenance and operations decision making
- Introduction of data driven operator checks on the plant
- Reduction of unplanned downtime and improved reliability of the system
- Introduction of increased lubrication regime based on the reported deviations.

**Value Add Outcomes:**

- The project has demonstrated how the correct gathering and use of real time data can reduce maintenance and operational spend while also reducing the possibility of batch loss in a production process through machine failure
- Provided client with an audit trail through fault development, allowing for planning in prevention of a recurrence
- Provided client with library access for RCM based tactics
- Provided a strong basis for continued maintenance reviews in other areas of the plant using refrigeration plant as the blueprint of implementing real time online monitoring
- The project has been run entirely remotely, representing added achievement in a project which would normally have required localised discussions and equipment sourcing spanning multiple site visits, as opposed to the streamlined survey and installation process demonstrated.

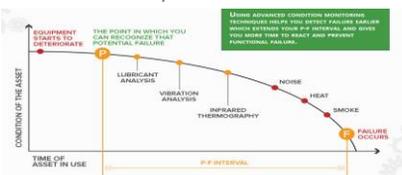


Optimal were engaged by a Food Processing company to assist with improving its refrigeration plant reliability. One of the two compressors located within the plant have been identified as a ‘bad actor’ in the system, leading to frequent and costly breakdowns and subsequent unplanned downtime affecting the performance, reliability and availability of the overall production line. Real time online monitoring regime has been introduced for the two compressors to demonstrate how continuous monitoring can assist in preventing unplanned outages and breakdown failures during batch processing to prevent the loss of the batch leading to lengthy (costly) interruptions to production.

Prior to the installation of vibration and temperature sensors on the two compressors, client used to get a monthly snapshot of system breakdown data from the periodic vendor visits, which did not allow for timely interventions to prevent unplanned downtime. As a result of the implementation of the real time online monitoring regime Optimal was able to achieve the following:

- Compressor 2 – between 10-12 of raised temperature and vibration instances on the motor drive-end reported within the first few months
- Trending data against compressor 1 it was determined and advised that compressor 2 is experiencing intermittent condition and requires intervention to prevent eventual breakdown.

As a result of this insight, client’s maintenance crew were able to take timely action and intervene by increasing bearing lubrication frequency on the occasions where deviation from predetermined temperature and vibration parameters was reported. The monthly vendor snapshot had been unable to detect this, and not dealing with it promptly would have eventually lead to a bearing failure as indicated by the PF curve.



Monthly data collection and analysis can miss developing faults, online monitoring gives real time data demonstrating deviations from set parameters.



The successful execution of this project is a demonstration of Optimal’s capabilities in the Enterprise Asset Performance Management field for provision of condition based asset maintenance management tailored to the clients specific requirements.

**Project**  
Real Time Machine Health Awareness

**Location**  
Johannesburg, South Africa

**Business Line**  
Asset Management and Diagnostics

**Timeframe**  
August to December 2021

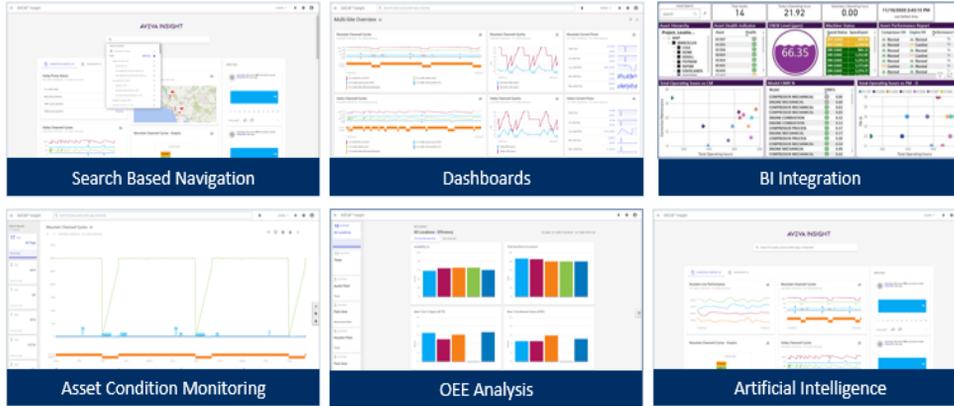
**Contract type**  
Reliability and CBM

Optimal is a worldwide specialist Physical Asset Management Strategy implementation partner and solution provider that focuses on delivering bespoke solutions aligned to the principles of ISO 55000 by utilising innovative technology to improve performance across the entire lifecycle of the asset.

We are a team of multi-sector experts, specialising in Asset Lifecycle Management, Enterprise Asset Performance Management (EAPM) and Reliability Engineering. Our worldwide engineering consultancy offers a holistic, pioneering, and technology driven approach to EAPM through a business led suite of solutions; expertly tailored to maximise productivity, profitability and ultimately, the ROI of physical assets.

### Turning Data Into Actionable Insights Using Predictive Analytics

#### Multi Machine Data at your Fingertips



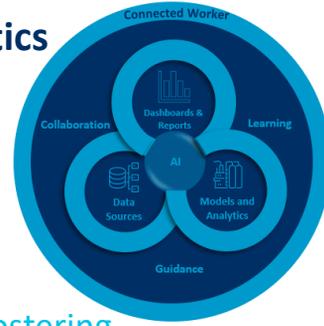
As part of value added outcomes of this project, Optimal has provided client with access to AVEVA Insight Predictive Analytics Dashboard for displaying and manipulating compressor operational performance data gathered through online monitoring. AVEVA Insight is a cloud based application that allows for fast consolidation of data collected by sensors that is then processed and displayed in a form of tailored reports and dashboards. Integration of online monitoring data and Insight helps to empower operators to drive performance improvements with visibility of equipment efficiency KPIs in real time.

By using the capabilities of the AVEVA Insight software we have been able to display the collected online monitoring data and present it in dashboards, where operators can view the machine status on their mobile devices and take away key information required for taking preventive action when the plant deviates from the set parameters.

Further, AVEVA Insight has a built in Guided Analytics capability allowing the system to learn the normal operating parameters of equipment, which leads to automated defect notifications to the end user. Alarms set on Insight have enabled us to advise the client to early developing situations, such as increased bearing temperature and rising vibration, the early intervention preventing faults escalating.

We can use this data to identify where particular plant is repeatedly causing issues and plan modifications to design out the problem at source, or introduce mitigations. Additionally this data provides an invaluable source of data for RCA investigations.

The dashboards have been created to display not only machine data, but also the accumulated history of plant and geographical data, allowing engineers to find the plant on site or global maps. Senior management can have a set of data on the map showing green or red locations of plant running normally or with developing faults so they can focus their teams.



#### Fostering Collaboration

Enabling Collaborative working wherever you are



#### Value Add Outcomes:

- The project was integrated to demonstrate how different tools when used in a collaborative way enhance everyone’s understanding of plant performance allowing to focus on prevention rather than reactive maintenance after a breakdown has occurred.
- Consequently, this project provided the client with a strong basis for continued maintenance reviews and implementation of online monitoring and predictive analytics in other plant areas.

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