10x RoI in 3 months for 500HP motor

Executive Summary

A mega poultry company loses about 10%-12% of revenue due to unplanned downtime. This study is one example of the significant savings that their plant derived from the MyVIE solution. MyVIE sensors were installed on a 500HP AC motor and the 800 ton screw compressor it was driving. Within 2 months of installation, the MyVIE system discovered rotor rub and bearing wear in the motor. The customer switched the load to backup compressors and sent the motor for rebuild that confirmed the MyVIE findings. MyVIE prevented catastrophic failure with large direct and indirect savings to the customer –

(1) MyVIE's early detection saved $40,000 in direct costs, a greater than 10x RoI for the motor-compressor combination
(2) MyVIE additionally prevented 3 hours of line downtime with undisclosed dollar savings

About MyVIE

VIE's patented MyVIE solution provides a cost effective means to reliably assess machine condition and to predict upcoming maintenance and inspection needs. MyVIE's process-in-a-box provides everything needed to modernize and optimize a maintenance operation – hardware, connectivity, cloud analytics and an intuitive, condition and incident management app. Beyond improving operational effectiveness, MyVIE provides the governance solution that facilities need to remain in compliance with safety, regulatory and industry requirements.

FRICK AMONIA SCREW COMPRESSOR

Problem Statement

Our customer is a U.S. based $85B industrial conglomerate. MyVIE sensors were installed on multiple refrigeration chillers, each one comprising of a 500HP Teco-Westinghouse AC motor driving an 800 ton Frick ammonia twin screw compressor.

The compressor and motor are part of a monthly regular maintenance schedule that includes mechanical and electrical inspections as well as greasing of the bearings. Level 3 vibration analysts in the product safety management team also run full vibration analysis every six months on all the company's compressors. These reports are stored for EPA audits.

Despite rigorous preventative maintenance processes, the customer has noticed a year-over-year increase in the number of failures. Enhancing the inspection regime has not had the intended effect. The situation has been further complicated by delays in procuring components to rebuild. **The customer wanted to know whether problems can be identified sufficiently ahead of time to facilitate proper supply chain and repair planning.**

MyVIE Installation

A total of 6 intelligent MyVIE sensors were installed on the chiller with 2 on the motor bearings plus 2 on the driver rotor and 2 on driven rotor bearings of the compressor. Sensors were installed on 7 such chillers and a single MyVIE wireless gateway was installed in the room to provide 4G/5G backhaul to the cloud. The MyVIE system collected both high and low resolution baseline readings over the first few days. The cloud based Artificial Intelligence (AI) engine mapped out the operating conditions based on the received data based on the inputs from the intelligent sensors.

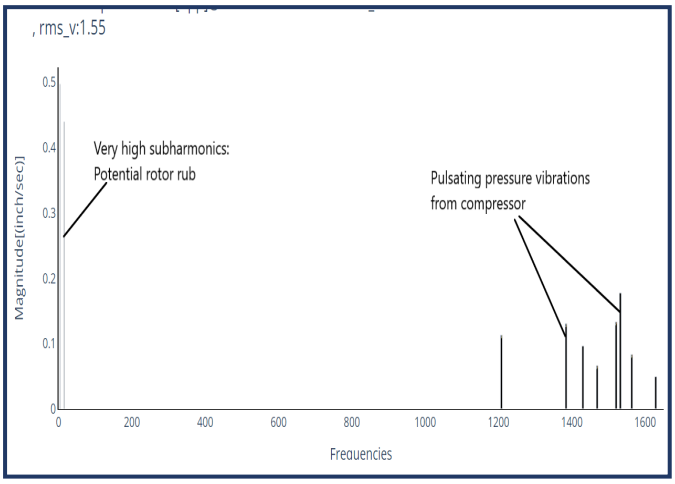
MyVIE VIBRATION & TEMPERATURE INTELLIGENT SENSOR

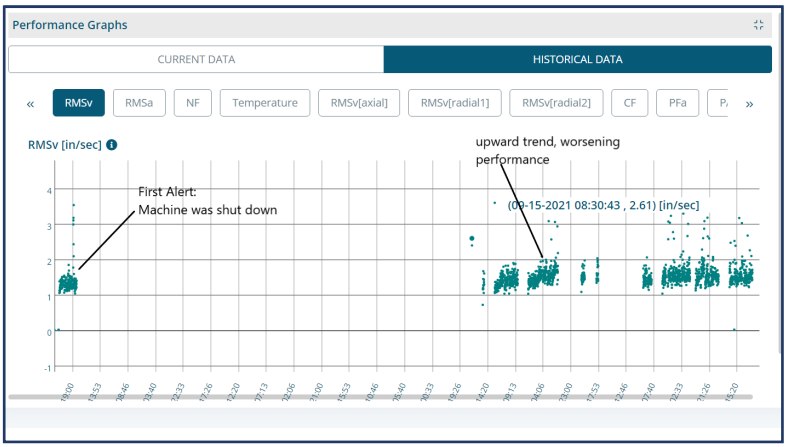
Key Results

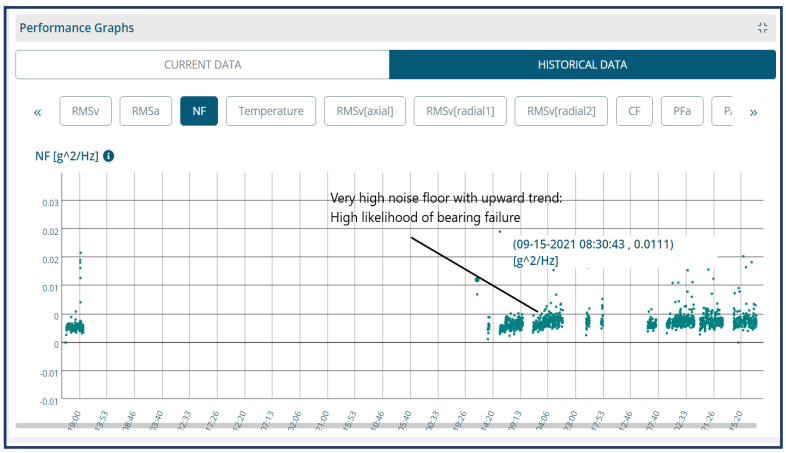
Deep Analysis, Straightforward Advice

Following the baseline period, MyVIE revealed a number of key operating characteristics of each chiller. By correlating data collected from different location on each equipment, MyVIE cloud analytics was able to account for pulsating pressure vibrations typical of this equipment and distinguish between different sources of vibration. The motor of LBC-4 chiller showed clear signs of problems. While it had signs of pulsating pressures from the compressor, it also had very high sub harmonic vibrations, very large overall vibration levels and increased noise floor. Many other monitoring locations also showed signs of misalignment.

From combination of this information, the AI engine concluded that the motor is showing signs of either heavy bearing wear or rotor rub. In either case, implications were grave and an urgent alert was issued for customer to schedule an immediate checkup.







The MyVIE Performance

Within weeks of installation, the MyVIE system detected increasing overall vibration levels together with an increasing noise floor. It alerted the customer both via the app and email.

Ability of MyVIE to establish the specific equipment's profile and continuously discern specific actionable issues in noisy conditions gives it the edge. Pulsating pressure typically confounds data interpretation due to high associated vibration levels. MyVIE was able to segregate this impact on the data and establish the cause of degradation.

Such ability is unique even when compared to the vibration specialists who collect data every 6 months. For an analyst to arrive to a conclusion, equipment should be functional and operating at same operating condition (same ammonia compression pressure) as the last time, so that trends could be established. Otherwise, since the compressors are cycled and operate at changing load requirements, a vibration specialist is very likely to miss an issue. MyVIE sensors are monitoring the equipment several times in an hour without in all operating conditions. The cloud AI engine removes outliers, determines operating conditions, discerns issues, and tracks trends separately within each operating domain. Further, all diagnostic information, as shown here, is available for an expert to verify using MyVIE app and MyVIE web based dashboard.

Reduced Maintenance Costs

Plant management informed us that the replacement cost of the LBC-4 compressor motor would have been $45,000 plus rigging and labor. The total cost of rebuilding the motor was $5,000 plus rigging and labor, saving the company $40,000 in direct costs. Due to part shortages, it took 9 weeks for the rebuild to be completed and the motor to be reinstalled.

The power of MyVIE was demonstrated in the speed of detection and the ability to communicate the information to all parties needing to be informed. Accordingly to the plant management, prior to MyVIE, had this unplanned downtime occurred switching to backup compressors would have taken 3 hours or more as there was no remote detection capability in service. The customer was unwilling to share the cost impact of those 3 hours of downtime. A few months later, MyVIE detected and alerted the plant staff of a similar problem on LBC-2.