Case Study

i-ALERT®

Application: Oil & Gas
New predictive maintenance program earns company quick returns.

An oil and gas company in Thailand has recently been upgrading their preventive maintenance program to a predictive maintenance program. At the core of this initiative is the i-ALERT2® equipment health monitor, a tiny sensor that mounts to any type of rotating equipment and continuously tracks tri-axial vibration, tri-axial kurtosis, temperature, and run-time hours. Data is collected via Bluetooth with a smart phone or tablet.

The i-ALERT app allows the maintenance team to create and edit their data collection routes. A technician walks around following the list that has been created. As each i-ALERT-enabled machine comes into range, it pops up on their tablet and the technician easily downloads the new data from a safe distance.

So far, the company has installed 150+ of the sensors at their site.

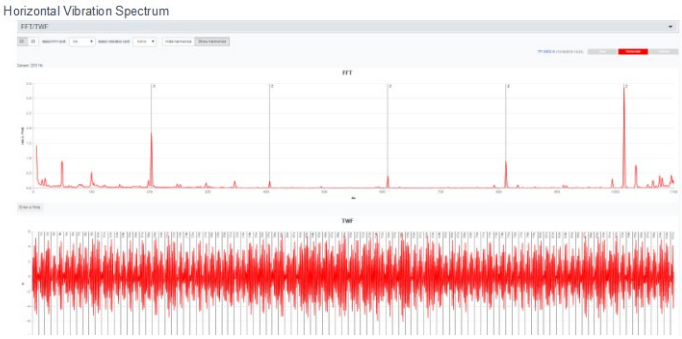

Fig 2 Review of the vibration spectrum (FFT) indicated an outer race bearing defect.

Problem

As one example of how the program has been working, consider a mag-drive hydrocarbon transfer pump that was fitted with an i-ALERT2 sensor on 30th September, 2019. Soon after, an alarm was captured as a notification during a routine walkaround. Downloaded data indicated that a vibrational issue was developing (see fig. 1).

Fig. 1 An i-ALERT2 sensor began recording vertical vibration spikes shortly after it was installed, triggering an alarm capture (the triangles below the timeline).

Review of the FFT vibration spectrum (see fig. 2) indicated that an outer race bearing defect had developed. It was determined that the pump could continue operating but with more frequent monitoring intervals and with alarm levels raised to reduce nuisance alarms.

Solution

About three months later, the amplitude of the vibrations crossed the higher threshold (see fig. 3), with the automatically captured vibration spectrum suggesting than an inner race bearing defect was also developing. Imminent failure was likely and further damage would occur at this increased level, so the pump was removed from service. Both bearings were easily replaced and the pump was quickly returned to service without any other parts damaged.

Fig 3. A sudden increase in the horizontal vibration trend indicated that pump failure was imminent.

As the key part of the company's predictive maintenance program, the i-ALERT2 provided a full three months of advance notification. Without it, the intermittent nature of pump operation and the fluctuation in vibration levels would not have permitted this development to be captured so early. Had the bearing failed without detection, pump damage could have been extensive and repair costs would likely have been the $8-10k USD range. Process disruption would have cost even more, particularly if the line had been contaminated with bits of metal during failure.

Fig. 4. As predicted by the vibrational data, an outer race bearing defect was found.

Overall, the company's new predictive monitoring program has been a solid success, with the i-ALERT2 sensors picking up multiple problems that are being addressed as they develop. Continuously monitored data has proven so valuable, in fact, collection routes that were once done every 3 months are now being conducted weekly. And the money being saved as a result of the program is continuing to accrue to the company.