Pump alignment/commissioning

Case study

Xylem's smart condition monitoring device helps US-based global metal processing company move one step ahead of pump failures

Challenge

When a multistage pump playing a critical role in a global metal processing company's cooling line failed, plant operators were anxious to get it fixed as soon as possible.

An inspection of the pump showed that the internals had been severely damaged by overheating. The plant operators arranged for the pump to be repaired off-site at Xylem's Morton Grove facility before being returned for recommissioning.

Solution

When the pump was reinstalled by the customer's team it was noted that a straight edge was used for the alignment. At Xylem's encouragement, a dial indicator was later used, and it revealed the alignment was slightly higher than the 0.004" (0.1mm) recommended in the product operating manual. The pump was realigned within limits and restarted. Initially, there didn't appear to be any operating issues. There was no discernible noise or vibration. However, the pump was running as part of a fully operational plant which made it difficult to hear or isolate vibration from other pieces of equipment.

To investigate further, Xylem recommended that its optimyze™ condition monitoring device be installed on the bearing housing.

Xylem's optimyze is a modular condition monitoring device that provides health guidance and predictive maintenance advice for rotating and fixed assets such as pumps and motors. Using predictive analysis, the technology identifies potential problems with pumps or motors before they occur, enhancing system reliability. It periodically monitors system vibration and temperature and allows everyday users to access simple-to-use monitoring tools from iOS or Android mobile devices. This enables operators to understand the current health and historical trends of assets, create maintenance reminders and generate detailed reports. As a result, preventative maintenance can be scheduled before potential issues cause downtime. optimyze is also a useful support when commissioning a pump and troubleshooting.

optimyze was attached to the installed pump – a Xylem e-MP Multistage Pump – to check the operating parameters and help determine how they were affecting pump performance. When the optimyze data was viewed through the app on a smart phone, the unit alarm was showing red for high vibration. The data readings confirmed the highest vibration at a rate of 1.18 inches per second (ips).

The optimyze condition monitoring device monitors system vibration and temperature on rotating and fixed assets such as pumps and motors.

Project Highlights:

- Data revealed by optimyze prevented future pump failures
- Data also supported pump alignment correction and proper installation
- As a result, vibration was minimized and bearing housing temperatures stabilized and plant operations resumed without disruption

Solution:

- Xylem's optimyze condition monitoring device

optimyze vibration limit settings were based upon ANSI/HI Condition Monitoring Guideline 9.6.5. For a pump in this application, readings higher than .15 ips are considered excessive. optimyze data also revealed that the bearing housing temperature was steadily increasing.

Armed with this information, it was decided to shut the pump down and further investigate the pump installation and alignment to see if operation could be improved. The analysis also revealed that the coupler the customer used on the pump was for a 1750 revolutions per minute (RPM) pump and not suitable for this 3600 RPM pump. More in-depth work was needed to align the pump properly and investigate if other issues such as soft foot (poor or no contact between the feet and the machine base) could be causing the high vibration.

Result

A local Xylem distributor with expertise in condition monitoring was brought on board to assist the customer on-site. The distributor leveraged an outside vibration monitoring system to validate the optimyze readings. The system confirmed what optimyze had already shown – excessive vibration and increased bearing housing temperatures. The distribution team successfully isolated and resolved the soft foot issue. The customer installed the properly sized coupling. The Xylem distributor team laser aligned the pump to the motor within recommended limits and the pump was recommissioned. Following this, work vibration levels were minimized and the bearing housing temperature stabilized during operation.

Attaching the optimyze onto the e-MP led the team to successfully isolate and resolve the performance issue, preventing future operational disruptions.

"optymize provides real data plant engineers need to make decisions. In this case, optimyze provided all the information needed to flag an issue and investigate further at a cost significantly lower than alternative vibration monitoring systems. It also prevented future pump failures due to misalignment and incorrect installation."

Stephen Clark, Director for Xylem's Intelligent Solutions