

Customer Case Study

Detection Of A Bearing Outer Race Failure On A Critical Pump Saved Downtime Cost Of \$145k

BACKGROUND

India Farmers Fertiliser Cooperative (IFFCO) is among India's largest manufacturers of complex fertilizers (29% of national production). The Phulpur plant alone produces ammonia and urea with a throughput of approximately 1.7 million metric tons per year.

THE CHALLENGE

The process condensate pump, one of the critical pumps in the manufacturing process, has a history of failures every 6 to 12 months. This centrifugal pump operates at 3000 rpm with a discharge pressure of 28 MPa (400 psi). Each day this pump is offline, it costs the plant as much as \$145,000 in lost production and each failure costs tens of hundreds of dollars to execute an unplanned repair.

Nanoprecise Sci Corp was asked to implement a predictive maintenance solution to detect faults at an early stage and provide a reliable prediction of Remaining Useful Life (RUL).

THE SOLUTION

We proposed our RotationLF system under which we installed wireless sensors on 7 equipment as a part of a year long contract project.

The specific placement of the RotationLF sensors are selected to monitor:

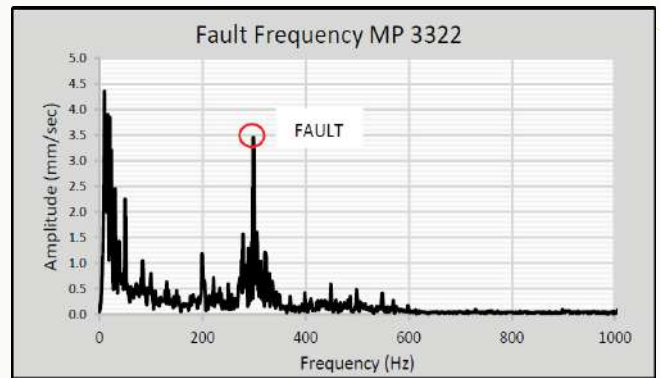
1. Non-drive side bearing, pump
2. Drive side Bearing, pump
3. Drive side bearing, electric motor



Indian Farmers Fertiliser Cooperative Limited, also known as IFFCO is a Multi-state cooperative society engaged in the business of manufacturing and marketing of fertilizers headquartered in New Delhi, India.

Once installed, strong battery-powered wireless sensors started monitoring pumps, motors and sent data to our SaaS-based platform through an encrypted & secured network using Edge and Cloud computing. As system received the data, our RotationLF platform performed data analysis using highly sophisticated algorithms.

Approximately one month after the sensors were installed, the system alerted IFFCO that a bearing outer race failure had been detected on the pump. The fault frequency depicted in the below plot is indicative of an early stage failure.



THE RESULT

The RotationLF analytics sensed & detected the anomaly in the pattern and alerted the plant staff about this unusual trend automatically through mobile text and email alert. The IFFCO maintenance team used a handheld vibration meter to verify the fault detected by RotationLF, Then they partially disassembled the pump to visually confirm that the bearing was damaged. The RUL prediction of 37 days to failure provided sufficient time to schedule the pump repair during an already planned maintenance outage.

The fault frequency depicted in the plot is indicative of an early stage failure. As the damage to the bearing progresses, the amplitude increases and the RUL decreases. The decrease which is a function of the load conditions is not linear and requires constant monitoring.

ABOUT NANOPRECISE

Nanoprecise specializes in the implementation of Artificial Intelligence and IoT technology for predictive asset maintenance and condition monitoring. Our timely and accurate diagnosis of machine faults provides our clients insights that allow them to make decisions that will save them considerable time and resources. Nanoprecise is headquartered in Edmonton, Canada with branches in Bangalore, India; San Diego, USA, and Newcastle, UK. We have managed to establish ourselves as a trusted solution provider in the asset management industry.

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