

Emerson's PeakVue™ Technology Detects Faulty Bearing at OMIFCO, Preventing Costly Breakdown

RESULTS

- Prevented catastrophic pump-turbine breakdown.
- Solved persistent turbine thrust bearing failures.
- Initiated route analysis to avoid failures in the future.
- Saved probable extensive production losses.
- Improved plant uptime and overall reliability.



APPLICATION

Four KP KPW heavy-duty boiler feedwater pumps operate in the utility plant which produces steam used in processing ammonia and urea fertilizers. One of the two turbine-driven pumps must be in service at all times to assure full production of steam. There are also two motordriven backup pumps.

CUSTOMER

Oman India Fertiliser Company S.A.O.G (OMIFCO) is a joint-venture business established to operate a state-of-the-art two-train ammoniaurea fertilizer manufacturing facility in the Sur Industrial Estate in the Sultanate of Oman. Plant capacity is 1,750 tons per day of anhydrous ammonia and 2,530 tpd of granular urea. All production is shipped to India to support that country's growing agriculture industry.

CHALLENGE

The two turbine-driven pumps, which are critically important in providing steam at the rate necessary to maintain fertilizer production, had a history of thrust bearing problems. Even though casing vibration checks were done fortnightly, and proximity and RTD monitoring were done continuously online, OMIFCO maintenance personnel were never able to detect emerging problems in time to prevent sudden thrust bearing failures. This happened every year or two, causing damage in the journal bearing area. During the last failure, a turbine rotor was damaged as well. The boiler had to be taken out of service, resulting in substantial production losses.

The vibration data collection system in use ignored high frequency data and did not recognize the warning signs of imminent bearing failure.

“Using the PeakVue technology, we saved a critical machine and avoided production downtime.”

Ali Al Siyabi
Inspection Manager

SOLUTION

OMIFCO began using the CSI 2130 Machinery Health Analyzer in October 2012 to gather vibration data from these machines every two weeks. This portable analyzer quickly and accurately identified developing faults in rotating machinery – and helped get to the root cause of the problem. Data collected by the CSI 2130 can be uploaded to AMS Suite where detailed analysis takes place. This includes advanced detection of bearing and gear faults using Emerson’s unique PeakVue technology.

Rolling element bearings have specific failure modes that can be observed in the spectral and waveform data. PeakVue technology uses a unique method of separating very high frequency, short duration stress waves from regular vibration data. These stress waves are generated from faults that cause impacting, friction, and fatigue, particularly in gearbox and rolling element bearings. If the rolling element in a bearing passes over a defect, which may still be below the surface of the inner or outer race, the metal of the race will deflect and spring back. The energy created is detected using PeakVue.

With this vibration technology, OMIFCO technicians quickly identified a potential problem in a turbine thrust bearing. The impacting faults were readily visible in PeakVue waveform long before any significant increase in overall vibration was noticed. As a result, OMIFCO engineers began to carefully monitor that machine. In February 2013, a sudden 50 percent increase in PeakVue spectrum and waveform was observed, followed a few days later by another large increase. At this time, a slight increase in turbine horizontal vibration velocity was evident for the first time.

At this point, the machine was taken out of service to check the thrust bearing, which was found to be severely damaged with large pitting in the inner race and additional small pitting in the balls. After the thrust bearing was replaced and the machine put back into service, all of the vibration readings returned to normal levels.

OMIFCO officials praised the PeakVue technology, saying that it saved a critical machine from severe damage and prevented substantial production losses.



“PeakVue trend data enables us to stop critical turbine-driven pumps before catastrophic failure and rotor damage occurs.”

Ankitniranjan
Inspection Engineer

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