ADI OtoSense™
SMART MOTOR SENSOR

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Case Study

Pharmaceutical Industry

Pharmaceutical manufacturer extends the life of a critical Environmental Conditioning Turbine while avoiding unscheduled outages

Background

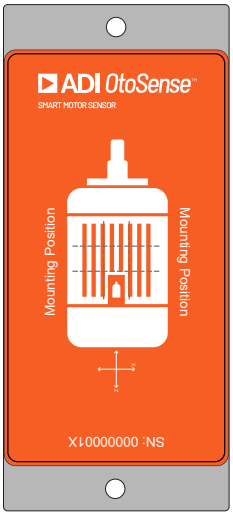
The pharmaceutical industry is subject to strict FDA regulations to ensure product quality and reliability. Process control is critical to regulatory compliance, as are the environmental conditions (e.g., temperature, etc.) in which the products are manufactured.

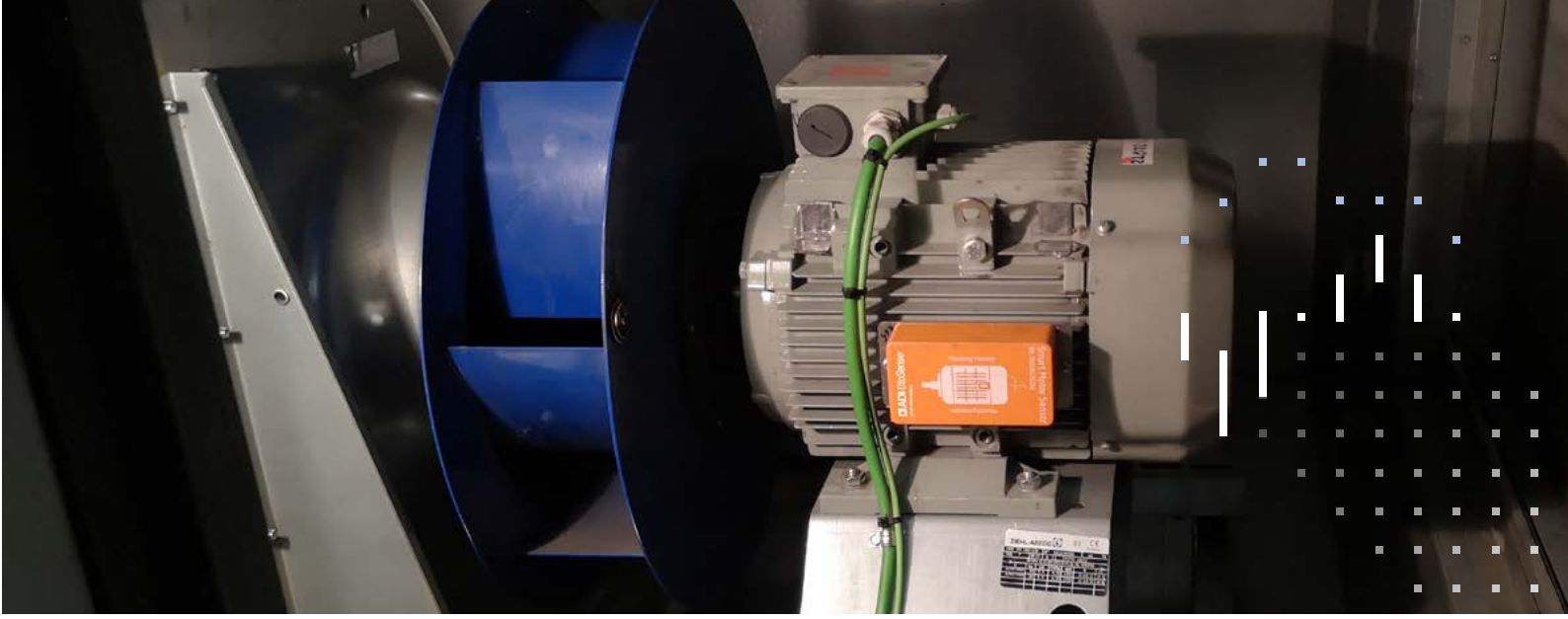
Traditional maintenance methods do not continuously monitor the health of regulatory-critical machines. Examples of these include air treatment units (ATU), compressors, pumps, and conditioning turbines. Yet, these machines continuously run 24/7 and can only be stopped once (or twice) a year for planned overhaul, whether they need it or not. Unexpected downtime of these machines is costly, resulting in out-of-compliance conditions, product spoilage, loss of product, and possibly even public health hazards.

The client (and subject of this report) exercised traditional preventative maintenance methods, with routine manual spot-checks and their inherent inability to detect machine health and anomalies in real time. Consequently, they sought a solution that would better anticipate equipment downtime, facilitating maintenance and repair planning that minimally impacts production.

Solution

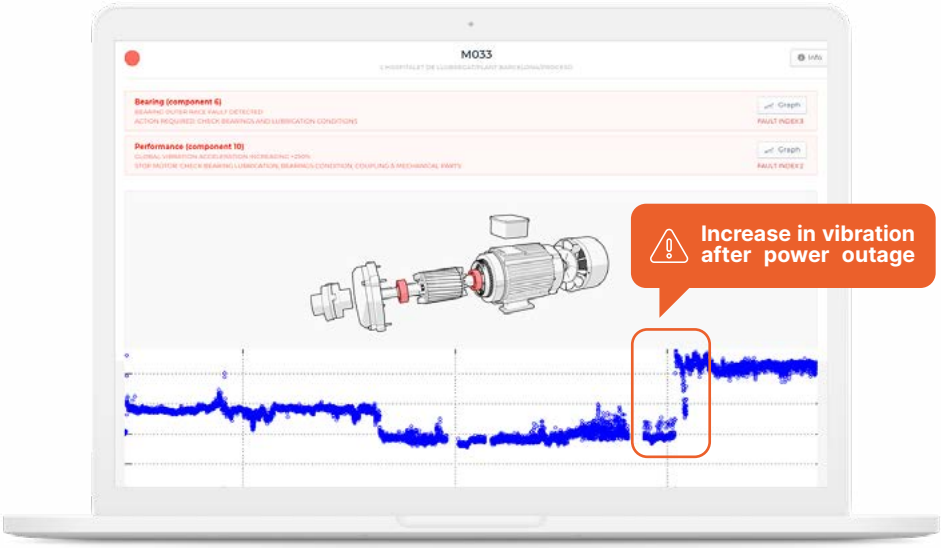
- Detect potential assets breakdowns at an early stage, well before they happen, to allow for planning of repairs, and avoid unscheduled downtime
- Enable maintenance team to better estimate maintenance and repair urgency.
- Implement a Predictive Maintenance Program for critical equipment to facilitate real-time, readily accessible health monitoring.





Solution implementation and results

ADI OtoSense Smart Motor Sensor (SMS) devices were placed on key air conditioning units. This case study focuses on the SMS device located on a three-phase asynchronous motor driving an air conditioning turbine.

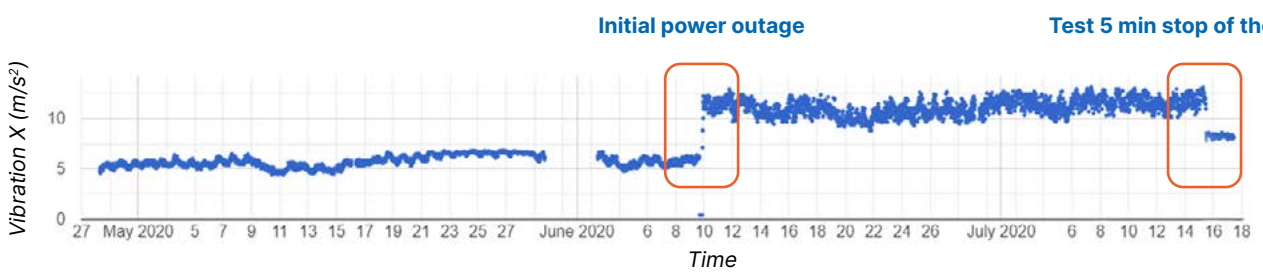


A few months after installation, the room where the air conditioner was located experienced a power outage, which caused the motor to stop for a few hours. After the motor was restarted, the vibration levels increased. This increase in vibration was likely due to a failure in the motor bearing cage, as indicated by the Smart Motor Sensor.

An alert was generated and sent via the mobile application and email, along with the recommendation to check the bearings and lubrication conditions.

Fault signs

The customer decided to let the motor run for five days in this state: the vibrations remained high, but stable, without any major peaks. The following week, the customer decided to do a test, stopping the motor and restarting it after 5 minutes. The vibration level dropped.



Corrective action

After the test, the vibration level, though still high, remained within acceptable limits. The severity level of the fault indicated that failure was not imminent, allowing the manufacturer to wait until the next maintenance period to replace the bearings.

At the next inspection, the maintenance team confirmed the worn condition of the bearings and decided to change the motor.

Conclusion

The Smart Motor Sensor anticipated a failure and allowed the maintenance team to intervene at the right time, to avoid impact on production.

The customer can now optimize maintenance decisions, as they have continuous insight into what equipment needs attention and when to prioritize maintenance activities.

Visual confirmation of the fault

Advanced wear of bearing races.

Inner track

Outer track

Bearing balls

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