CASE STUDY

GE LM2500 POWER TURBINE BEARING FAILURE

Chip detectors and vibration sensors failed to detect an expanding bearing failure resulting in severe turbine damage and loss of service.

User Application

GE LM2500 Aeroderivative Gas Turbine - equipped with MetalSCAN real-time condition indication sensors which monitor the A, B, C and AGB-Sumps. The gas turbine provides power and heat at a major chemical processing facility.

Timeline

Day 1: Initial Debris Detected

The engine was operating continuously with a normal healthy indication of bearing condition when the MetalSCAN sensor on B-Sump detected the presence of ferrous debris.

Day 10: Warning Triggered

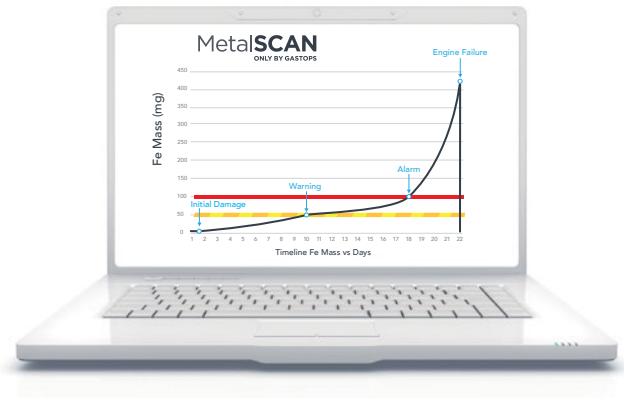
MetalSCAN data was sent to the Gastops Monitoring Team. Ferrous debris continued to accumulate and reached the warning limit. On review of the MetalSCAN data, Gastops advised the operator to plan for upcoming maintenance.

Day 18: Alarm Triggered

As the engine continued running, the counts progressively increased and exceeded the MetalSCAN alarm limit. On review of the MetalSCAN data, Gastops advised the operator to respect the MetalSCAN alarm limit and pending failures. The operator acknowledged this recommendation but continued turbine operation choosing to wait for secondary alerts from either the electric chip detector device, sump oil temperature or vibration readings before taking action.

Day 22: Turbine Failure

MetalSCAN counts rapidly increased above the MetalSCAN alarm limit, leading to a predicted bearing failure. This failure led to severe damage causing an engine trip that shut down the entire chemical plant production.



Benefits

- MetalSCAN helps gas turbine operators maximize equipment availability by providing the industry's earliest advance warning of potential damage events.
- With over 700 million operational hours over 25 years, MetalSCAN has been approved and validated by engine manufacturers, advanced research organizations, bearing companies and internationally recognized certification authorities.
- Chip detectors, vibration and temperature sensors have proven to be ineffective health indicators of equipment often leading to false, late, or missed bearing damage detection and unplanned shutdowns.
- MetalSCAN provides a clear indication once debris starts trending upwards allowing for planned maintenance – predictively and proactively.
- MetalSCAN and Gastops Remote Monitoring can advise operators on the real-time condition of their equipment, proactive actions for the condition and predict remaining useful life.

Metal Debris from B-Sump Screen

Conclusion

MetalSCAN real-time condition indication delivered advance warning of increased debris counts and an impending bearing event while all other indicators were silent until failure occurred.

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