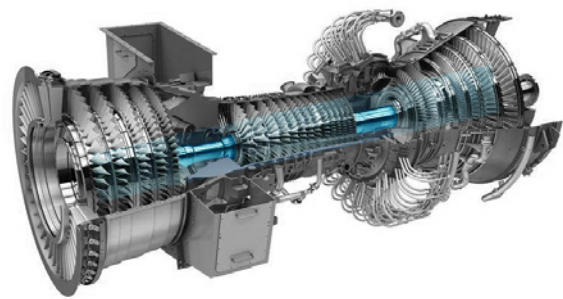


CASE STUDY

GE LM5000 POWER TURBINE BEARING FAILURE

There was no other indication of a problem from vibration, temperature or the chip detector in the seven days of early warning from the MetalSCAN sensor.



User Application

GE LM5000 Aeroderivative Gas Turbine with MetalSCAN real-time condition indication sensors monitoring A, B, C, D and AGB-Sumps operating on an offshore platform.

Timeline

Day 1: Initial Debris Detected

The engine had been operating continuously for 28,200 hours with normal healthy indication of bearing condition when the MetalSCAN sensor on D-Sump detected the presence of ferrous debris indicating damage initiation on the power turbine. A trace amount of debris was found attached to the magnet which led to the decision to keep the engine running, while closely monitoring the MetalSCAN trend, and begin planning for an upcoming maintenance activity.

Day 6: Warning Triggered

As the engine continued running, there was a steep rise in counts which triggered the warning after six days.

Day 7: Alarm Triggered

Seven days after the initial debris detection the alarm limit was reached at which time the engine was shut down.

Day 8: Scheduled Maintenance

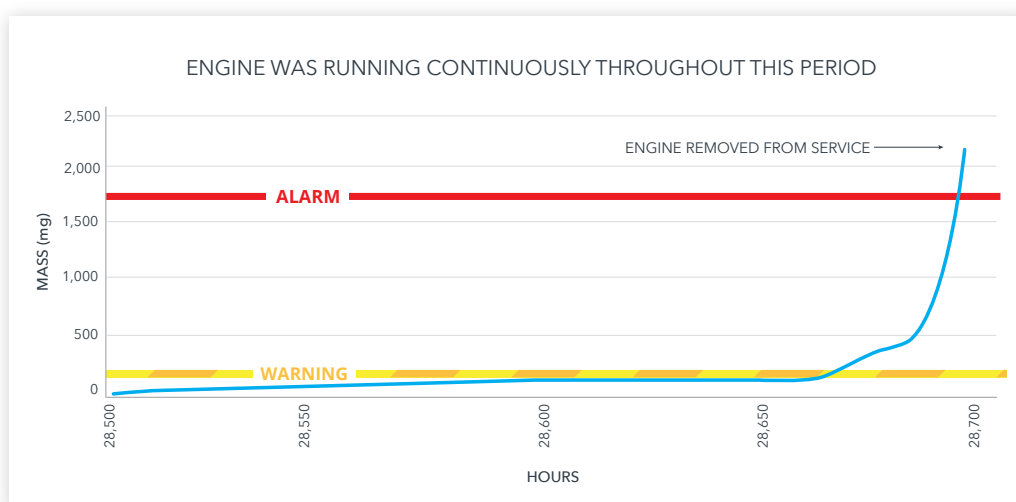
The teardown inspection revealed damage limited to power turbine bearings and no secondary damage. The bearing repairs were completed within the scheduled maintenance period.

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 40 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 data once debris counts start trending upwards allowing for planned maintenance – predictively and proactively.

Conclusion

The engine was running continuously up to the day of the maintenance period. The power turbine was replaced with minimal engine down time.



Head Office

1011 Polytek Street
Ottawa, ON K1J 9J3
Canada

Nova Scotia

10-109 Williams Avenue
Dartmouth, NS B3B 2E3
Canada

Newfoundland

146A Glencoe Drive
Mount Pearl, NL A1N 4S9
Canada

Europe

Info.eu@gastops.com

Asia

Info.ch@gastops.com

sales@gastops.com | +1 613 744 3530

gastops.com

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