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Case Study

Major Bank Data Centre, Slough

Overview

Cooling System Upgrade - In 2016 AVK were instructed to assist with engine issues encountered by the client. Their 6no MTU 20v 4000 engines were all experiencing serious cooling system leaks.

AVK engineers carried out intrusive investigation work and found numerous engine components were seriously damaged by what appeared to be cavitation, including the cylinder liners.

Metallurgy analysis of the affected components showed extensive water side pitting had been caused by the quality of the cooling system water.

Further investigations showed that the coolant pipework that directly coupled the engine to the radiators some 60m away was severely corroded. This led to corrosion within the engine which subsequently resulted in severe damage and imminent failure of the engines.

Cooling System redesign

A review of the engine issues and the cooling system design led to a comprehensive redesign of the cooling system.

It was impractical to replace the cooling system pipework, and extensive flushing could never guarantee that the pipework would be suitable for connection directly to an engine, so a heat-exchanger system was designed and installed to provide mechanical protection to the engine.

Fortunately, the existing dry-air coolers were deemed sufficient to work with the engines and heat exchangers following a review by our engineering department.

Installation changes

New pumped primary and secondary plate heat exchangers were installed for each of the generators, and the carbon steel pipework disconnected from the engines.

Stainless steel pipework was installed on the primary (engine) side of the heat exchangers, with the secondary side reconnected to the existing flushed and treated secondary pipework.

Modifications were made to the ancillary system control panels so that the heat exchanger pumps were called to run at the same time as the ventilation fans.

Engine Remediation

The cooling system modifications were carried out on 2no generators at a time to maintain N resilience for the facility.

During the cooling system works, each of the engines was fully overhauled which included replacing the piston liners and all major cooling system components with new OE MTU parts.

Commissioning

Following completion of each pair of generators, a comprehensive testing process was carried out with loadbank load to prove the performance of the newly rebuilt engines and the new cooling system design.

A full IST was carried out to conclude the project.

Conclusion

Poor cooling water condition caused by corroded pipework led to the failure. Retrofitting heat-exchangers into the system allowed the engine condition to be safeguarded.

A sound migration and integration strategy allowed the works to be sequenced and sectionally commissioned whilst retaining generator backup to the data centre at all times.

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For more information on AVK's Cooling System solutions, please visit: www.avk-seg.co.uk

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