Looking for problems before they happen

OMDEC's Exakt failure prediction tool has lived up to its name, with recent news that it was used in a joint venture with Australian partner FIRM Solutions Pty Ltd to accurately identify a critical impending failure in a big front end loader for a large scale miner.

Starting with an incomplete data set, the team managed to refine the information to a point where the failure modelling produced a very accurate prediction (that there was a 90% probability of failure in the main engine bearing during the next 500 operating hours) regarding a machine that had no previous history of mechanical failure.

This was achieved through the thorough analysis of multiple equipment conditions, with the Exakt technology developing a measurable formula to accurately predict whether breakdown was indeed a possibility.

The mining company in question operated a fleet of loaders as a key part of its continuous production operation, with the primary objective of the latest exercise being to determine if smart data analysis could produce meaningful results relating to the probability of equipment breakdown.

A secondary objective was to apply the fleet model to individual units to predict costly and expensive impending failures.

So what methodology lies behind such testing?

Multi-year condition data was available for the fleet and subsequently used as the basis for the analysis work. In total, 31 failures were analysed covering 10 possible modes for the fleet of 64 engines. Main engine bearing failure was the dominant problem mode, accounting for about one third of critical failures.

It came as no surprise that this then became the focus of the detailed analysis, in which a variety of condition measurements was used to determine which combinations had the best predictive capability.

Among the possible conditions – such as vibration, engine operating temperature and fuel burn – two specific measurements met the standard 95% test for confidence levels.

These were derivatives of both the lead and antimony measurements obtained from oil sample analysis.

This was integrated with event data such as oil changes, operating starts, out-of-service intervals and actual failure dates extracted from work history.

One of the aims of the game was to keep the shovel fleet operating at full capacity.