

CONDITION MONITORING: What, why and how

IF THERE'S ONE THING WORSE THAN A PLANT FAILURE, IT'S AN UNEXPECTED PLANT FAILURE – BRINGING PRODUCTION TO A GRINDING HALT AND TAKING TOO LONG TO RESOLVE. CONDITION MONITORING IS THE ART OF IDENTIFYING LIKELY PROBLEMS, AND EITHER PREVENTING OR BEING PREPARED FOR THEM. WHICH MEANS A PROBLEM DOESN'T GET THE CHANCE TO BE A CATASTROPHE.

Having been a recognised technique and discipline for several decades now, Condition Monitoring (CM) – and the associated Condition Based Maintenance – has its own ISO set of standards and its own defined process. This means that customers looking for CM services can be sure of finding a reputable provider, and can also follow a process which delivers the required results and continuing improvements.

Certified competence

In the words of the ISO, standard 18436 part 2:2003, 'specifies the general requirements for vibration analysis personnel who perform machinery condition monitoring and diagnostics of machines. Certification to this standard will provide recognition of the qualifications and competence of individuals to perform machinery vibration measurements and analysis using portable and permanently installed sensors and equipment'. Similar statements precede the other parts of this standard that cover certification in the rest of the condition monitoring technologies.

This standard means customers cannot only be sure they have hired a competent technician, but can also be confident that the solutions they recommend are right for the job. Over- or under-selling should be eliminated, because the Standard is administered by the British Institute of Non-destructive Testing (BINDT), whose code of ethics is incorporated in the standard.

ERIKS' Condition Monitoring service, for example, employs only technicians who adhere to the BINDT Code of Practice for CM, and who are either Level 2 competence or working towards that certification.

Monitoring methods

There are a number of methods for conducting effective CM, depending on the machinery being monitored.

Thermography – monitoring for unusual temperatures which may suggest bearing wear or lubrication failure, for example.

Acoustic emissions – monitoring for unusual noise or noise levels which may suggest failing or failed components either by airborne or contact means.

Vibration monitoring – monitoring for unusual vibrations or vibration frequencies, which may suggest failing or failed components.

Lubrication analysis – regular monitoring of a lubricant's properties, looking for change in viscosity, contaminants or particles of wear.

Electrical analysis – the supply current or insulation electrolytic strength can be monitored for changes or patterns that give an indication of condition change.

However, to be a truly useful tool, CM should not be carried out in isolation from maintenance, or without information to hand on the plant construction and production requirements.

CM can only inform effective Condition Based Maintenance (CBM) if comprehensive information is available to ensure the appropriate maintenance techniques are used, and if information on the results of corrective actions is fed back to the CM technician.

Factors such as fault and failure modes, criticality and cost-effectiveness all need to be considered, to avoid using the wrong CM techniques which may waste time, money and resources – and often with no discernible effect on improving or maintaining plant availability.

The virtuous circle

The condition based maintenance process is a circular one, driving continual improvement, as the diagram below demonstrates:



The steps in the red highlighted sections need to be in place before a CM provider considers making changes to an organisation's maintenance regime. Without this data – and measurable uptime, availability, energy and throughput data – there is no benchmarking and therefore it will not be possible to measure improvements or return on investment.

Most organisations will know their critical plant and be aware of the cost of any loss of production. An experienced CM provider – such as ERIKS – will be able to help in identifying component parts and advising on criticality, but the customer will need to provide a failure/repair history, asset lists and downtime costs, as a minimum requirement.

Achieving maximum benefit

With the key plant and equipment identified and components logged, it's time to review the maintenance tasks – ensuring they address the known failure modes. This means the engineering budget can then be applied in the best places and used in the best way to achieve maximum benefit for the customer.

Again, an experienced provider such as ERIKS will be able to deliver added value.

ERIKS Electromechanical Services, for example, have six key engineering core competences (Condition Monitoring, Electronics Services, Gearbox Services, HV Motors and Coils, Electrical Power Distribution and Pumps Services).

This means they have a history of known failure modes across all these areas, and will be able to apply the correct maintenance task – either eliminating the failure mode entirely, or increasing the mean time between repair or failure.



Where CM begins and ends

The specific Condition Monitoring aspect of the condition-based maintenance process takes place within the three steps in the tinted box.

It may require test equipment, online or portable data acquisition systems or embedded solutions. The data thus gathered and failure modes identified could then lead to asset repair or replacement, or engineering-out of recurrent issues.

A CM provider with all these capabilities – such as ERIKS – will be able to provide solution-neutral advice aimed solely at the continuous improvement of a plant's efficiency and productivity.

The final step before the condition-based maintenance process begins again is a joint review of the process to measure its effectiveness so far, and to identify the next level of improvements for the short- and long-term.

Adding value

Without KPIs and SLAs as benchmarks, it is impossible to measure the effectiveness of any CM and CBM measures put in place. That's why ERIKS offers an initial two-day CBM review before any site signs-up to an annual CM service. This enables accurate benchmarking and the provision of a road map with the best improvement routes highlighted.

To find out more, please visit www.eriks.co.uk/condition-monitoring

