



THE FIRST STEP TO INDUSTRY 4.0

ERIKS Condition Monitoring

know-how makes the difference

ERIKS

INDUSTRY 4.0: FROM VISION TO REALITY

The well-known vision for Industry 4.0 is clear: To integrate cyber-physical systems and processes to create the “Smart Factory”. As the next industrial revolution comes ever closer, we are now presented with a new challenge: how do we make this a reality?

With all the buzz, it is easy to forget smart factories will not happen over night. In the rush to take advantage of Industry 4.0 many will adopt a big bang approach - while the rest might take a back seat to see what happens.

Although both of these approaches are valid, each pose significant risks; one is the possibility for a failed implementation where the costs are too high and the second leaves companies behind struggling to catch up and compete.

A **BEST PRACTICE** APPROACH

Considering these approaches what becomes self-evident is there is no one way, or right way, to implement smart factories.

In order to find a balance, the best practice approach is to implement smart solutions one step at a time. By starting with small changes and building upwards the result will be a unique solution on a strong foundation. In this way you utilise the biggest advantage of Industry 4.0: flexibility.



OLD DOG NEW TRICKS

A first logical step towards the smart factory vision is Condition Monitoring. If this sounds familiar, it is because it is not really a new solution, in fact ERIKS has been pioneering in this field for a number of years.

Condition Monitoring is the process of monitoring machinery during operation to identify changes which indicate the development of a fault. The result is the prevention of failure and optimised machine maintenance.

Condition Monitoring Systems have been significantly improved with Industry 4.0. Sensors can now communicate with the cloud while simultaneously alerting technicians via email or SMS of significant changes which require attention. The more data is stored and analysed, the more predictive Condition Monitoring becomes. Finally, Condition Monitoring doesn't just tell you there is a problem, with the right information it can suggest the solution; linking you to the part or repair you need to stay running.

FIRST STEP YOU CAN TRUST

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



CERTIFIED COMPETENCE

With the ISO standard, you can be confident in the expertise of the technician, and the solution recommended is right for you.

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.

WHAT DOES IT MEAN?

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.



**PREVENTION
IS BETTER THAN
A CURE...**



THE **RIGHT** INFORMATION

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.

Talk to a manufacturer instead, and you may get more expertise, a more considered solution, and less emphasis on simply selling you product. But when the time does come to purchase, you can guarantee whose products you'll be offered.

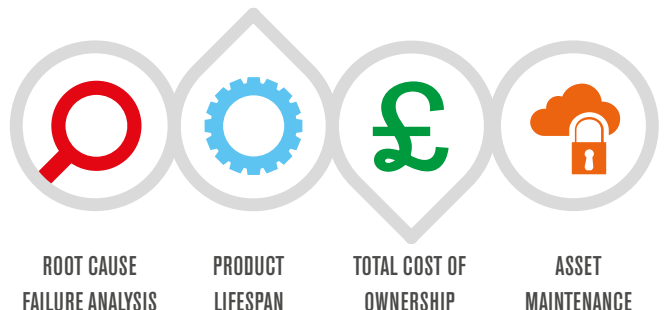
No manufacturer will ever suggest a competitor's product might be more suitable.

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 of 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. A full range of value-added services
- **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.



VIRTUOUS CIRCLE

FROM START TO FINISH

It's important to understand what you need to have in place before embarking on Condition Monitoring. As with any implementation there are minimum requirements, you'll know what is most critical and ERIKS can work with you to identify the rest...

The condition based maintenance process is a circular one, driving continual improvement, as the diagram opposite 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.

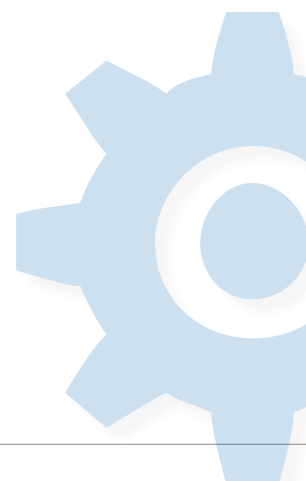
ACHIEVING MAXIMUM BENEFIT

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 competencies (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 production requirements.



Proper implementation, data gathering and identification of failure modes will lead to asset repair or replacement. What's important is a choosing a Condition Monitoring provider with solution-neutral advice.

The specific Condition Monitoring aspect of the condition-based maintenance process takes place within the three dark blue steps in the visual below.

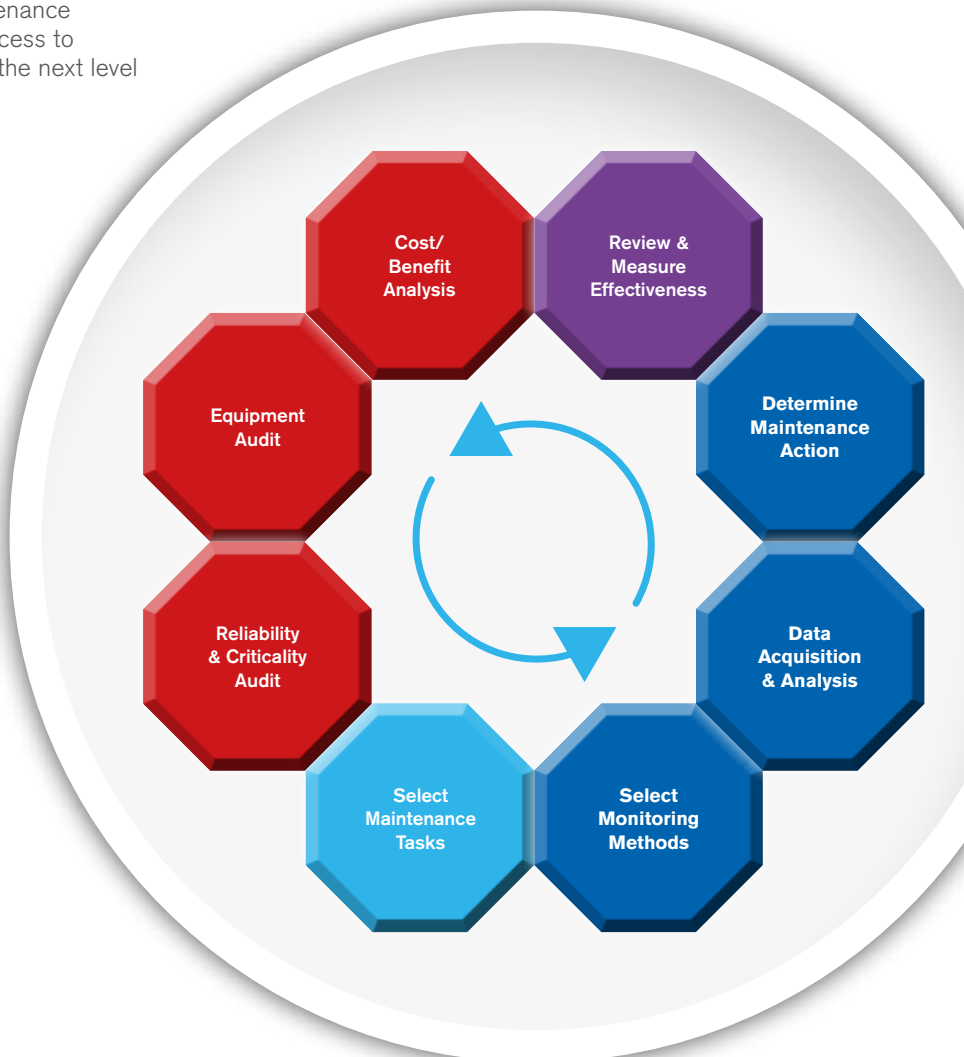
It may require test equipment, online or portable data acquisition systems or embedded solutions. The data thus gathered and failure modes identified could then lead to asset repair or replacement, or engineering-out of recurrent issues.

A Condition Monitoring 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.



ERIKS E-CONNECT

CLOUD BASED SYSTEM

WHERE **CONDITION MONITORING** MEETS **INDUSTRY 4.0**

ERIKS comprehensive engineering and process knowledge means we know how machines fail. So we also know how to design the most effective systems to protect customers' vital assets.

e-Connect offers a number of insights and benefits:

- **Predictive maintenance support** - Providing specialised knowledge and insight into the possibilities of equipment and its utilisation. ERIKS insight also helps identify and remove the root cause of failure
- **Preventive maintenance support** - Providing advanced warning of failure or under performance of equipment
- **Remote Process control support** - Assistance with commissioning and fault finding using e-Connect as a virtual gateway
- **Predictive stocking** - Linking warning of failure to parts and labour supply to pro-actively manage resources. Offers reduced delivery time and lower the working capital requirements
- **Real-time system information** - Live online status reporting for multiple assets across all locations via ERIKS e-Connect
- **Near miss analytics** - Analysis of near misses or provision of data to run risk management
- **Big data analytics** - For process optimisation, ERIKS know-how supporting process development to improve your systems

RIGHT DATA, RIGHT TIME, RIGHT DECISION

The design of your sensor system makes a significant difference to the effectiveness of asset monitoring eliminating background noise whilst providing early accurate identification of impending problems. Designed correctly by ERIKS experts, our e-Connect system can measure a wide range of attributes:

- Position
- Temperature
- Flow
- Vibration
- Level
- Pressure
- Torque
- Speed
- Current
- Voltage
- Cleanliness
- Viscosity
- Ferrous Content
- GPS Location





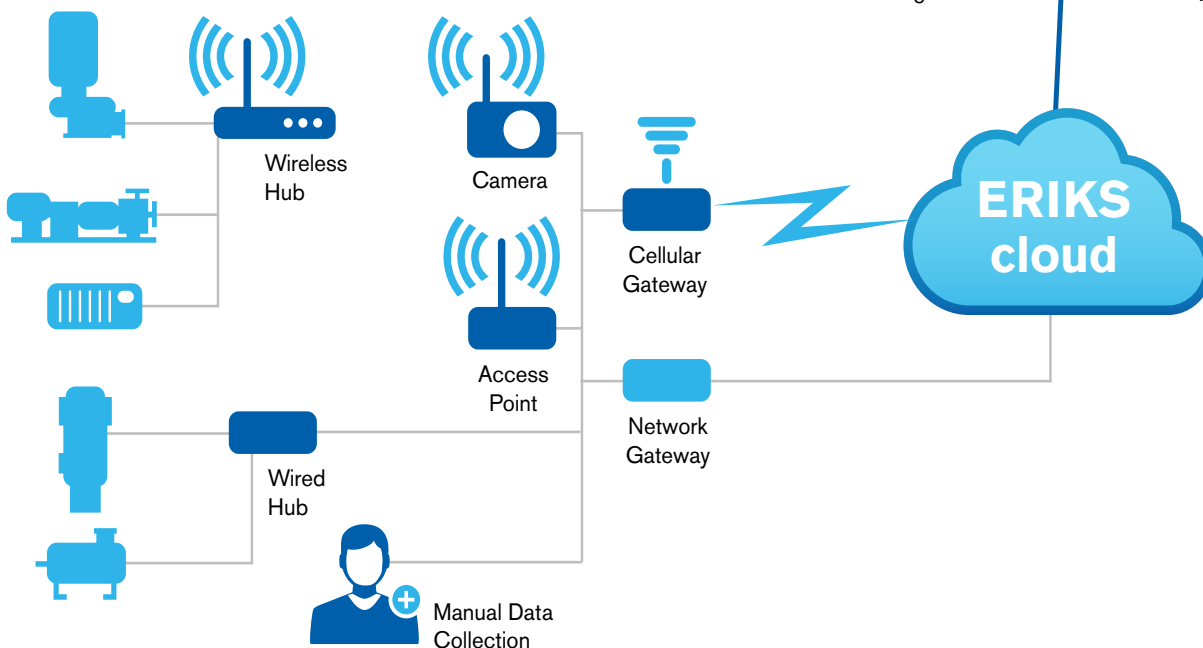
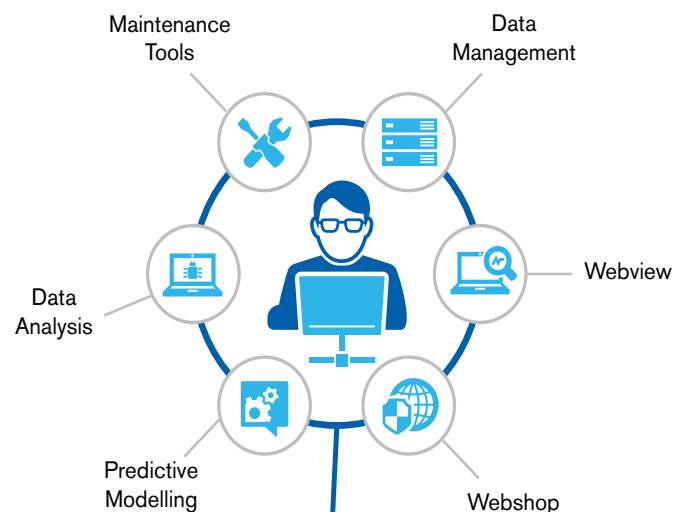
READING THE SIGNS

e-Connect opens up access to ERIKS' many cloud based tools and technical support team who can help you run and maintain your assets:

- Understand the issues and take the relevant precautions to ensure optimum asset performance and protection
- Ongoing monitoring and maintenance advice
- Data interpretation for diagnosis and prognosis using sophisticated monitoring algorithms and the best technical know-how available

Our expertise means we:

- Know what and where to monitor for the most effective early-warning of failure.
- Use the correct predictive algorithms to provide exactly the right level of engineering and process.
- Can interpret the data gathered for the most complete insight into your assets including diagnosis and prognostics.



CASE STUDY

KEEPING A HOTEL CHAIN OPEN

Using ERIKS e-Connect one customer is aware when a fault has occurred, the system then automatically notifies the relevant engineer that the problem needs to be rectified.



“Due to the **early-warning** given by the **ERIKS e-Connect** system the engineer was able to **rectify the fault** in a **timely manner** with **no disruption to** business operations”

we **CAN**,
we **WILL** &
we **DO**



ISSUE

All hotels must provide hot and cold running water and a fully-functioning effluent removal system for guests. To continually support this hotels have both duty and standby hot/cold water pumps and effluent pumps. If the duty pump fails, the standby pump automatically comes into operation.

However, with no alert to indicate the duty pump has failed, it remains unusable until the next maintenance check. If the standby pump fails meanwhile, the system shuts down completely.

In the event of a complete system shut down it is an offence to let rooms. The hotel has to be closed and guests ejected

SOLUTION

The ERIKS e-Connect System was connected to equipment in the plant room and could send information via the internet to the cloud-based data centre. If a pump then had a fault the system sends a text and email to the designated maintenance engineer. Once alerted, logging-on to the system would provide a view of each pump's fault status, using a simple red and green traffic light graphic for each pump.

GETTING RESULTS

Within a week of installing the ERIKS e-Connect solution the monitoring system reported that one of the boilers was in fault mode.

The boilers were all new so it seemed unbelievable that one could be showing a fault. As the ERIKS e-Connect system was newly installed, it was first checked to confirm it was operating correctly. No fault could be found so a full inspection of the boiler began.

During the inspection it was discovered there was indeed a fault - one which could have been easily missed due to the young age of the boiler and could have continued for a prolonged period of time, but the ERIKS e-Connect system had correctly alerted the maintenance engineer so the fault could be found.

Due to the early-warning given by the ERIKS e-Connect system the engineer was able to rectify the fault in a timely manner with no disruption to business operations.

SAVING YOU **TIME** AND **MONEY**
EACH AND **EVERY DAY**

ERIKS UK & Ireland

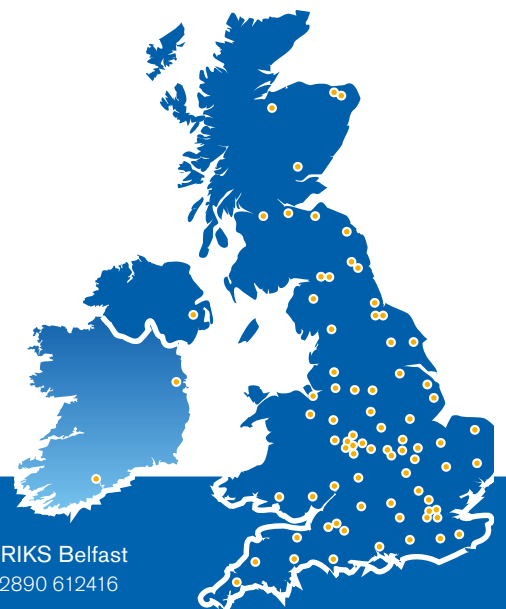
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