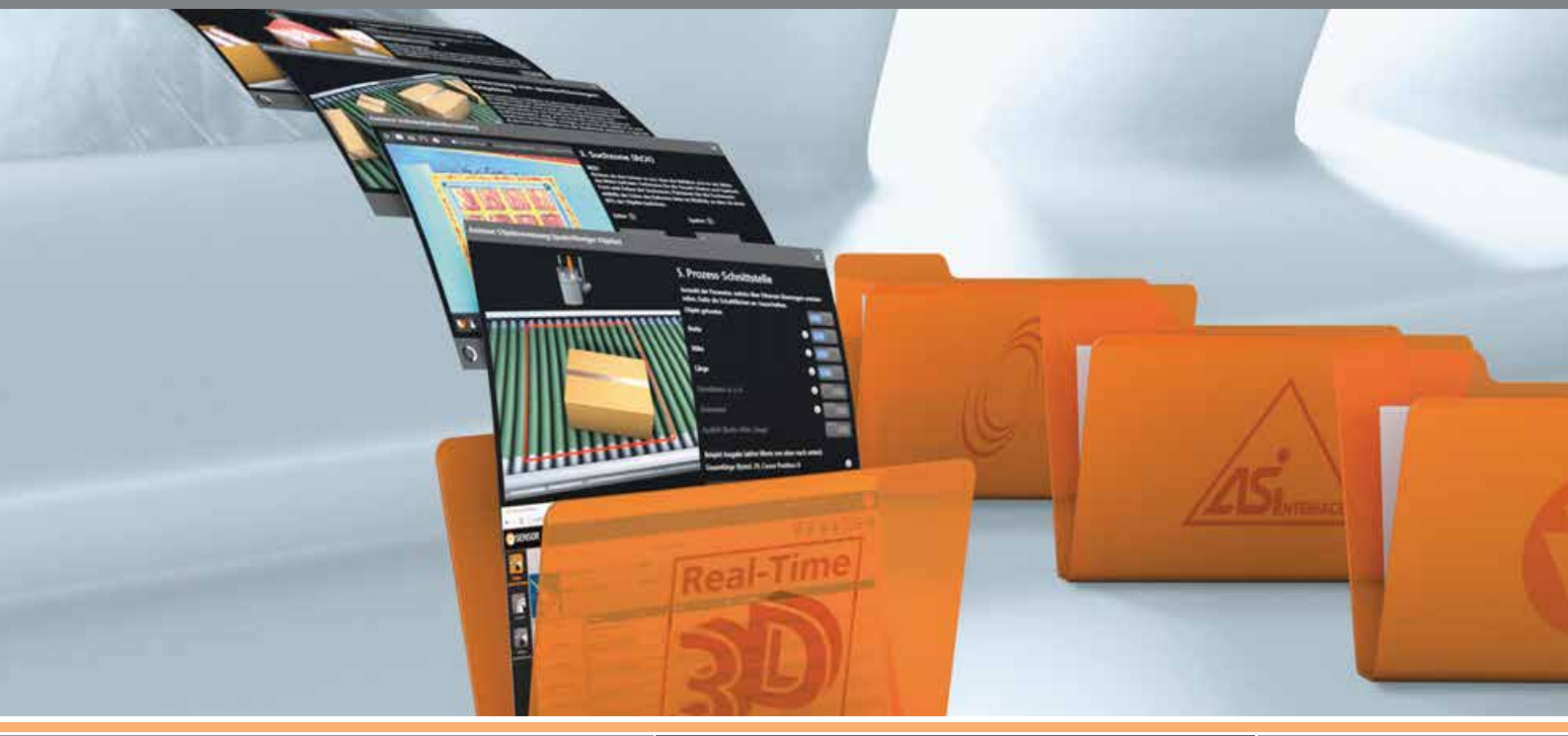
REAL-TIME MAINTENANCE:

THE BRIDGE TO PREDICTIVE MAINTENANCE



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The changing approach to maintenance

The healthy functioning of machinery is at the core of all industries. While maintenance is essential, the approach to maintenance is evolving to become more efficient. It's not just about downtime, but the costs involved if parts are replaced at the wrong time, which can happen with scheduled maintenance. With the intelligent sensor technology and network connectivity we have today, businesses are already adopting a real-time monitoring and condition-based approach to maintenance. This is an essential bridge to the future of predictive maintenance and the next global industrial revolution: industrie 4.0.

A brief background of maintenance

Humans have been performing maintenance since they invented tools. The first industrial revolution occurred in the late 18th century and mass industrial production was in full force by 1900. In the early 1900s maintenance was basically only performed when there was a machine breakdown, otherwise known as as 'Breakdown Maintenance' or 'Reactive Maintenance'. In the late 1940s, the concept of 'Condition-Based Maintenance' was introduced in the US[1]. In actuality it was 'Preventative Maintenance' that was being practised. This is characterised by the development of scheduled techniques employed to improve the longevity of manufacturing production equipment. The early Preventative Maintenance approach involved routine maintenance activity such as inspection, adjustment, and parts replacements performed on a planned basis in order to prevent equipment failure. While this was more effective than Breakdown Maintenance, it also became problematic in other ways – scheduled parts changes for example could be costly for operators, especially if they weren't necessary.

The emergence of 'Reliability-Centred Maintenance'

The inefficacy of certain Preventative Maintenance techniques led to the development of what is known as 'Reliability-Centred Maintenance' methodology. The term Reliability-Centred Maintenance (RCM) was coined by engineers of United Airlines in the US. It was used to describe a process that determines optimal maintenance requirements for aircraft in the 1970s, namely with the emergence of the Boeing 747. After investigations into heightened numbers of jet aircraft crashes, studies performed by airline senior management and the US Federal Aviation Administration found that the fundamental principles of engineering maintenance were wrong. There was a shift in the paradigm of physical machinery asset management – one inspired by RCM[2].

The RCM methodology maintained that the vast majority of failures were not necessarily linked to the age of the asset and that managing the process of failure was more efficient that predicting an asset's life expectancy. It was determined that assets needed to be assessed in terms of their condition, rather than their age and that there were basic maintenance routine tasks that could be used to keep the assets working well. The standard SAE JA1011 was created to define the exact evaluation criteria for RCM[3]. Companies still use this standard to ensure their processes, services and software all conform to what is defined as RCM in order to establish safe minimal levels of maintenance.

In a more recent manual describing the principles of the SAE JA1011, authors say that for a process to be identified as RCM, the following steps must be taken:

- Delineate the operational context and the functions and associated desired standards of performance of the asset.
- Determine how an asset can fail to fulfil its functions.
- Define the causes of each functional failure.
- Describe what happens when each failure occurs.
- Classify the consequences of failure.
- Determine what should be performed to predict or prevent each failure.
- Decide if other failure management strategies may be more effective.[4]

When the above process is undertaken by businesses and coupled with modern technology, better efficiency can be achieved.

Modernising the maintenance approach

With increased pressure on businesses to optimise their productivity and delivery times to meet modern demands, effective policy and processes for machine maintenance is essential. If machines break down, that downtime translates to lost sales, machine repair and part costs in addition to the salary costs of idle employees. This kind of event also has other consequences. It reflects badly on the business's reputation, which may deter potential customers.

For this reason, many industries are adopting maintenance processes that combine the RCM methodology with intelligent sensor technology and software that provides real-time monitoring. This enables businesses to better anticipate when their machines need maintenance and avoid break downs completely. The improved accuracy of sensor measurements and software-generated data has been instrumental in achieving effective condition-based maintenance. One of the more trusted brands in Australia for providing this type of technology – as well as the service expertise – is ifm. This German company was founded in 1969 with the mission to develop high quality, reliable and innovative sensor technology.

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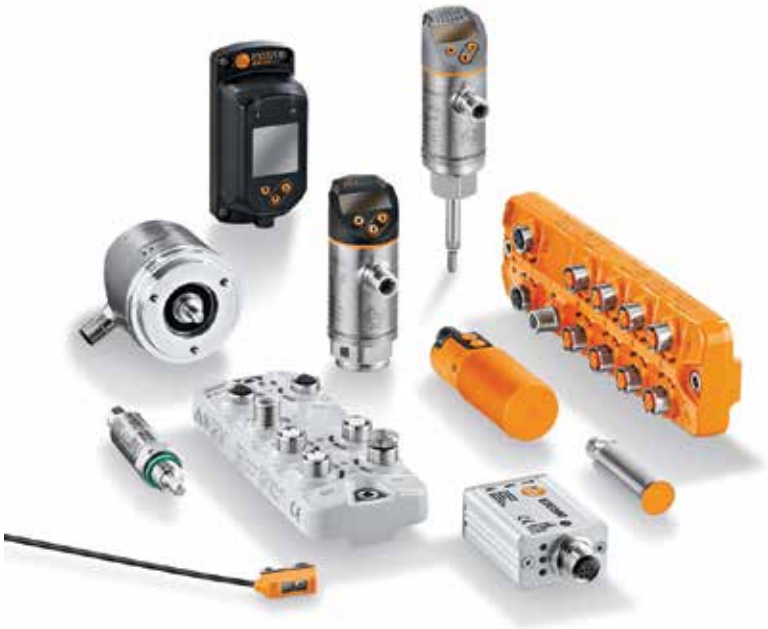
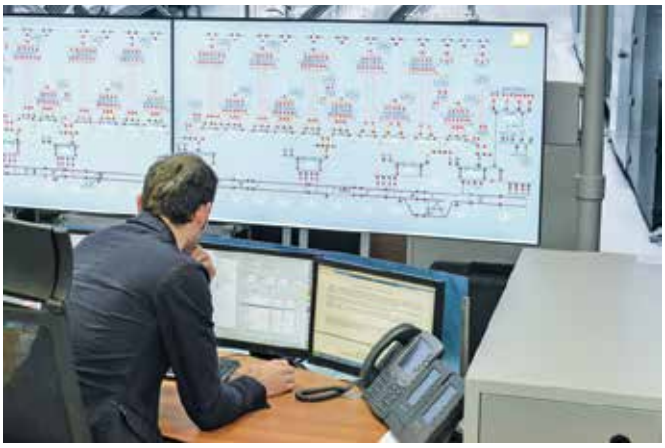


German products, local solutions

The worldwide brand of ifm is well-respected. This is partly due to the company's commitment and reputation for being close to their customers at all times. It is also owing to the exceptional quality of their products – a statement that is reinforced by the fact that the company offers a blanket 5-year warranty on all products. The ifm product range is extensive and includes condition-monitoring systems such as: systems for vibration monitoring and diagnostics; flow meters for compressed air; flow meters for water; systems for oil quality monitoring; pulse evaluation systems; systems for evaluation of standard signals; signalling and display systems; and systems for signal conversion. Importantly, their level of customer service ensures that local businesses have the right solutions in place for their specific needs.

Preparing for industrie 4.0

There has been a lot of buzz about the next industrial revolution and Internet of Things (IoT) technology. In reality, we're in the beginnings of a revolutionary phase with industries already adopting automated machinery. Predictive maintenance is the next step in ensuring the vitality and longevity of these machines – and removes the chance of human error. In the interim, employing intelligent technology such as sensors and software that provide real-time condition monitoring as well as adopting an RCM process, will ensure businesses are industrie 4.0-ready. Businesses that are interested in an assessment of their processes and to improve their current capabilities can rely on ifm to provide products and holistic solutions.



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