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# Smart maintenance for hazardous area industries

**U**nplanned downtime is a major challenge for businesses operating in hazardous industries. In fact, 82 per cent of the oil and gas businesses surveyed have identified predictive maintenance as a strategic priority to combat this. However, hazardous industries including oil and gas, chemical production or mining and quarrying are among the slowest industries to adopt digital technologies.

Here, Marek Lukaszczuk, European and Middle East marketing manager at **industrial digital solutions** provider WEG, investigates how the latest digital technologies can help companies operating in hazardous industries better monitor and maintain their assets.

Hazardous area facilities represent some of the most demanding industrial environments, with many machines expected to run continuously under the stresses of extreme temperatures, dust, dirt, and vibration. Not only that, but ageing infrastructure is rife.

Unplanned downtime is a serious and costly challenge facing the industry, but it's also one that's tricky to circumvent. The sheer number of motors, drives, gearboxes and other assets in just one facility makes managing maintenance a mammoth task, and this increases the likelihood of machine failure. Moreover, the remote location of many sites makes transporting maintenance teams a costly exercise, and with many demands on their time, the teams' work schedule must be carefully considered for maximum efficiency.

## Better, connected

One solution? The implementation of digital technologies. In particular, condition monitoring. Manufacturers that are ahead of the digital adoption curve have focused heavily on investing in plant connectivity and successful maintenance regimes to safeguard critical assets. In fact, it's often argued that, to minimise downtime effectively, maintenance technologies should be the most important aspect of digitalisation.

*Maintenance 4.0* is the phrase used to describe the digitalisation of maintenance and includes a **holistic view of sources of data**, analysis and recommended actions to ensure asset function and management are digitally assisted. Crucially, these technologies must be able to diagnose problems **faster than a human engineer**, **often using artificial intelligence and machine learning techniques to do so**.

Many of the issues that result in unplanned downtime in hazardous area facilities aren't able to be picked up in a visual inspection. For example, common causes of motor failure include bearing wear, shaft misalignment and winding insulation, which can all only be identified by vibration and temperature analysis.

**Condition monitoring sees smart sensors connected to industrial equipment like motors, where the sensors capture data regarding vibration, heat, and other outputs of industrial assets.** By feeding this data into an industrial software platform, it can be analysed and transmitted anywhere in the world. What this means is that facility managers can spot issues long before they cause disruption, and then perform appropriate maintenance measures to prevent unplanned downtime.

Many industries have already successfully adopted condition monitoring technologies – particularly manufacturing. But the adoption rate in sectors such as oil and gas, chemical production and mining has been much slower. This can be ascribed to a lack of cost-effective and easy to install solutions, as well as the difficulties surrounding the connectivity of remote sites.

Now, the development of low-cost telecommunication options as well as much wider availability of smart sensors and monitoring technologies mean that operators can take advantage of much more frequent data collection and the ability to monitor the condition of their assets from anywhere in the world.

In hazardous areas, having insight into asset performance is crucial. It increases safety by limiting worker exposure to dangerous environments, as well as reducing the potential for human error during maintenance – as all the necessary performance data is at the team's fingertips, it is highly unlikely for signs of machine faults or above average wear and tear to be missed.

Repair operations in hazardous areas can also be very time consuming, often requiring specialist equipment, procedures or permits. With a comprehensive plan of maintenance procedures in advance of a site visit, maintenance teams can ensure they have all the right procedures in place, preventing unnecessary delays and making remote monitoring even more advantageous.

Ultimately, condition monitoring enables a predictive, rather than reactive approach to maintenance. It equips facility managers with a comprehensive understanding of the performance of their assets, enabling them to take better informed decisions about the need for maintenance and ultimately preventing costly disruption and downtime.

### The barriers?

The reasons why companies operating in such environments are slow to embrace digitalised technologies are numerous. Businesses may be sceptical about how Industry 4.0 can fit into their existing ways of doing things. Process change of course invites risk, one of which being whether managers can win the buy-in of workers on the shop floor. Many manufacturers also wrongly perceive it as being expensive.

Historically, many businesses have perceived the cost of digitalisation as an initial barrier. Thankfully, Industry 4.0 solutions like sensors are becoming



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more accessible to businesses thanks to falling costs and, along with software and firmware, technological advancements that make their use more flexible.

Due to the highly regulated nature of these sectors, any new technologies must be considered, vetted and must meet stringent safety and operational standards. This can make digitalisation seem like a daunting task; however technology offers many advantages that can support hazardous industries to meet the regulatory conditions of the sector.

Another of the biggest reasons why businesses find it difficult to make a smooth transition to digitalisation is the lack of data. Not having sufficient data means you do not understand the problem and consequently do not have the means to tackle the situation. On the other hand, having access to high volumes of quality data allows hazardous industries to have more accurate records of their operations. Not only is this useful from an operational optimisation perspective, but can sometimes be essential to meet regulatory requirements. Data analytics has the potential to provide actionable insights on operational risk status by discovering patterns and correlations within existing data sets.

Downtime can be incredibly costly for businesses operating in hazardous areas, but a comprehensive maintenance plan is not without its challenges, due to remote facilities, harsh conditions and a multitude of assets to manage. Digital technologies

like remote monitoring help businesses of all industries implement a predictive maintenance strategy and prevent disruption due to machine failure.

Overcoming the challenges of predictive maintenance begins with a clear understanding of a manufacturer's asset base and its reliability goals. Moving towards high levels of predictive maintenance maturity requires careful planning and the right advanced digital tools. ■

### About the author



**Marek Lukaszczuk** is the European marketing manager for Europe & Middle East at the motor, drives and gearbox manufacturer WEG. Marek offers a wealth of knowledge in the electrical and electronic manufacturing industry and is crucial in several areas of WEG, including business planning, sales, market research and international marketing.