industry: various
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Can Industry 4.0 Solve Downtime Issues?

Manufacturing downtime is costly. Industry 4.0 solutions can prevent downtime, but only if concrete steps are taken.

Summary:

If yours is like most businesses today, you run a tight ship. When you see problems on your production line, you do not wait to solve them, and the result is a lean operation that does not let issues linger or snowball into larger problems.

But it is impossible to fix what you cannot see or track. While Industry 4.0 is often a buzzword, Watlow® is already providing solutions that are helping manufacturers proactively forecast future issues and reduce costs. Given that the average cost of an hour of downtime in manufacturing was $532,000 in 2021, there is so much opportunity for businesses to save money with Industry 4.0.

Availability losses are a result of both unplanned and planned losses. Unplanned losses include equipment failures and material shortages, while planned stops include changeover time, test runs and related time losses.

Performance losses result from both downtime and slow operating speed. A performance loss has occurred if a line must be stopped so an operator can clear a jam. Likewise, a performance loss occurs if aging equipment or a staffing shortage necessitates running a process at reduced speed.

Quality losses result from defective goods that cannot be delivered to the client.

All losses are a mix of planned and unplanned events. But, given our technology, are unplanned events still unavoidable? With Industry 4.0, they may be.

What is Industry 4.0?

The definition of Industry 4.0 will vary wildly based on whom you ask for an answer. Here at Watlow, we think of the concept as having two layers. The bottom layer comprises physical components such as sensors and smart controllers, paired with digital assets, such as networks and virtualized controls that constitute the Internet of Things. On their own, each part of this system is fairly low impact. However, the combination of data with simulation capabilities allows companies to build out autonomous systems that are faster, safer and provide a better real-time view of status than current production lines. Altogether, we could call this system a "smart factory."

Industry 4.0, then, involves the ways that actual factories put these advances into practice. Consequently, what Industry 4.0 looks like will vary greatly from factory to factory and could even vary between production lines in a single facility.

However, the common thread that connects varying Industry 4.0 implementations is the way in which data is created and leveraged. With a greater sensor density, factories will be able to generate data sets orders of magnitude larger than present efforts. That data will enable operators to make better predictive maintenance decisions, as well as create new opportunities for optimization.

The data itself becomes a platform for future technological advancements. For one, it can potentially be leveraged to improve existing autonomous systems, or train new ones from scratch. But it also serves as a training set for artificial intelligence (AI) tools, which will, at first, create different predictions that optimize production and reduce downtime. Once enough data has been collected, in many cases, the quality of the AI's work will surpass what its human controllers can provide, at which point the factory could be labeled smarter than its creators.

How can Industry 4.0 Reduce Downtime?

As an approach, there are an unlimited number of ways that Industry 4.0 could help reduce downtime, but here are a few examples that many companies could benefit from.

More and Better Sensors

With the falling cost of sensors over time, it is less expensive than ever to get the sensors you need to have a full accounting of your factory. In the past, you might not have a temperature sensor for each heating element, but that is now a possibility. Or, you might take advantage of level sensors to create real-time information about inventory. This information will help you make better decisions on practical problems in your factory, including improving the efficiency of predictive maintenance, leading to reduced downtime.

Artificial Intelligence

With your expanded sensors, you will have more data than ever, which means you can start training artificial intelligence. The potential of AI is nearly unlimited, but in a manufacturing setting, one of its most relevant jobs will be driving better predictive maintenance. Because it does not share our human biases, its thinking will truly be "out of the box," replacing parts in ways that may not make sense to its human operators but will lead to lower costs and reduced downtime in the long run.

Virtualization

AI is a significant first step, but it bases its predictions on historical information. That means it will not always handle edge cases well, but Industry 4.0 has a solution. A virtualized factory is a digital representation of your real factory that can be used to run simulations that test future scenarios. For example, you could simulate millions of variations on predictive maintenance and test how those affect downtime. The results could be transformative.

Other potential applications include:

- Lengthening predictive maintenance cycles for equipment

- Smart scaling of facilities to handle sudden influxes of work

- Modeling and re-arrangement of process steps in a model to find optimal configurations

- Detailed upstream troubleshooting for quality assurance

- Business intelligence and decision support

How to Start with Industry 4.0

The key with Industry 4.0 is not asking what it can do; instead, you should look at your most significant problems and determine how you can leverage what Industry 4.0 offers to solve them. Luckily, that is not a process you have to go through alone, especially if heating and thermal sensing are involved. To learn more about what Industry 4.0 can do for you, please reach out to your Watlow representative today.

Further information is available at: www.watlow.com