Unlock New Revenue Streams with Predictive Maintenance for the Connected Plant

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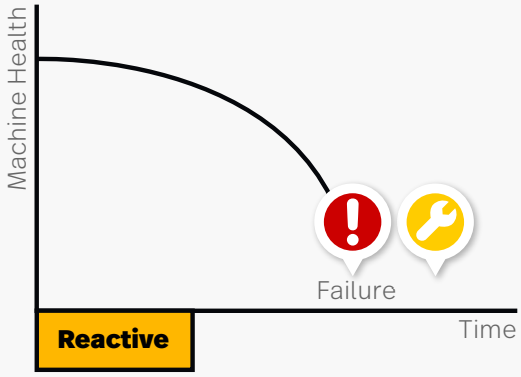
Very

Plant maintenance is like flossing. Everyone knows they should do it, but it's easy to deprioritize when there aren't any visible problems. Just like neglecting oral health can be costly in the long run, failing to do preventative plant maintenance can increase operating costs and the risk of unplanned shutdowns–translating to millions of dollars in lost revenue. Downtime costs the average plant between 5 and 20 percent of its overall productive capacity.[1] Unplanned downtime caused by equipment failure costs industrial manufacturers $21 billion every year.[2]

For years maintenance professionals have combined quantitative and qualitative approaches to try to predict failures and mitigate downtime in their manufacturing facilities with limited success. New industrial internet of things (IIoT) tools improve on these methods using machine learning to take a more data-driven approach.

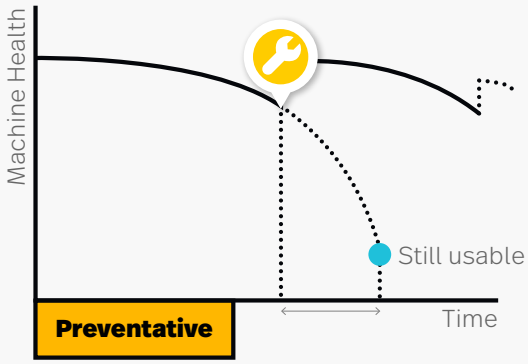
Converting to a predictive maintenance posture opens the door to optimize maintenance tasks in real-time and maximize the useful life of equipment while avoiding disruption to operations.

Types of Maintenance



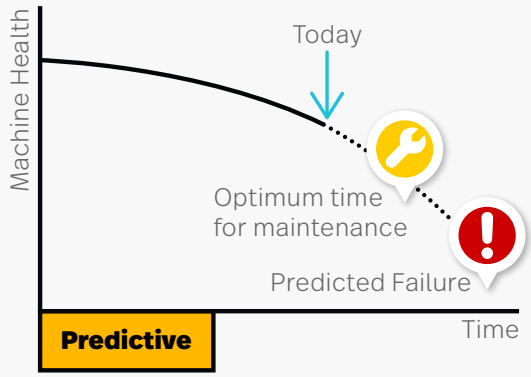
Reactive - >55% of systems

The reactive, break-fix approach only replaces components when they fail. This method can lead to crippling and expensive consequences. The unexpected downtime caused by failed equipment can lead to millions of dollars in lost revenue.



Preventative - 31% of systems

Regularly scheduled preventative maintenance is a more cost-effective and time-efficient approach. This method addresses potential issues on a consistent schedule. However, if the equipment doesn't require maintenance, scheduled downtime can waste valuable resources. A conservative approach should be taken to prevent an unexpected failure because you don't know when that failure is likely to occur. However, servicing a machine too early wastes useful machine life, applies maintenance resources inefficiently, and increases the cost of doing business.



Predictive - 12% of systems

Knowing when a machine will fail maximizes the useful life of industrial parts while preventing unexpected downtime. Unfortunately, it is difficult to forecast with pinpoint accuracy through traditional methods. In an ideal case scenario, it's known exactly when a machine is due to fail and exactly which parts will fail, eliminating the time spent diagnosing the issue and reducing waste and risk in the process. Of course, perfection doesn't exist, but prediction comes close when enhanced with reliable data and the right ML algorithms. When an enhanced predictive system signals an impending machine failure, the maintenance team can schedule downtime as close to the event as possible to extract the remaining useful life from the machine.

The ROI of Predictive Maintenance

When compared with preventative maintenance programs, the US Department of Energy estimates that predictive maintenance could save at least an additional 8–12%—but, depending on the facility, these savings could exceed 30–40%. Independent surveys show that switching to a predictive maintenance program results in a 10x return on investment on average for industrial applications.[3]

If equipment fails unexpectedly, a company must undergo discovery, containment, and recovery before that piece of equipment can be brought back online. Troubleshooting and remediation incur significant operating costs over and above the associated capital equipment costs. Additionally, the company may accrue expenses due to reduced employee productivity and even supply chain disruption. Given this extensive list of expenses, it's unsurprising to find that the average cost of downtime is more than $260,000 *per hour*.[4]

Addressing Problems with Predictive Maintenance

Leveraging data collected from IIoT devices, Very can begin to address a wide range of maintenance issues by using machine learning to assume a preemptive posture. This, in turn, will help us achieve the ultimate goal: a highly efficient, productive plant.

At Very, we focus on IoT. Each client has different goals, but we've found that most projects for industrial applications coalesce around a few key problems.

Common Issues Very Addresses:

- **Determine the Point of Failure.** We'll predict when a component has failed to minimize troubleshooting time and speed up repairs. Detecting failures also helps to forecast when in its lifecycle a part or machine is likely to fail.
- **Detect Incipient Failure.** We can use recorded sensor data to detect failures before they result in downtime by training an ML model to detect anomalies that likely indicate impending failure.
- **Maximizing Remaining Useful Life.** With the ability to predict the interval before a component fails, we can apply maintenance or replace components at precisely the correct times.

The more accurately we can predict when a part or a machine will fail, the easier it is to achieve maximum productivity and efficiency in the plant.

Typical Improvements:

Optimized Workforce:

- Eliminate non-essential maintenance tasks
- Monitor machine function with fewer resources
- Coach operators on optimal cost-performance behaviors

Improved Machine Productivity:

- Predict productivity levels
- Maximize machine and part life
- Maintain peak overall equipment effectiveness

Reduced Risk:

- Improve workplace safety
- Identify previously unknown variables
- Create predictable capacity

Succeeding with Predictive Maintenance

For predictive maintenance to succeed, three main aspects must be present: quality data, focused data filtering, and a well-defined context.

Obtain High-Quality Data

First, you need quality data. Ideally, you want historical data that takes into account events that have, in the past, failed. Failure data needs to be compared against static features of the machine itself, including average use, general properties, and operating conditions. This is a particularly valuable opportunity for machine manufacturers who can utilize aggregate data from hundreds or thousands of machines to inform predictions.

Find the Right Focus

While you will undoubtedly gather a lot of data, it is critical to focus on the right data. Getting hung up on extraneous information does little more than muddy the waters, deflecting attention away from what's most important. Instead, you should ask yourself: What failures are likely to occur? Which ones should be predicted? What happens when a process fails? Does it fail fast, or is it a slow breakdown over time?

Establish Context

Finally, take a close look at any other related systems and parts. Are there other components that are related to the failure? Can their performance be measured? How often do these measurements need to happen?

For best results, data collection needs to take place over an extended period of time. Shorter periods will narrow the field of possibilities and reduce the reliability of your insights. The time investment is worth it–quality data results in a more accurate predictive model.

Analyze the data and ask yourself or a trusted partner if it is possible to build a predictive model based on currently available information. It is crucial to have the proper context when looking at a problem, as only then do we have the ability to evaluate the predictions with some accuracy.

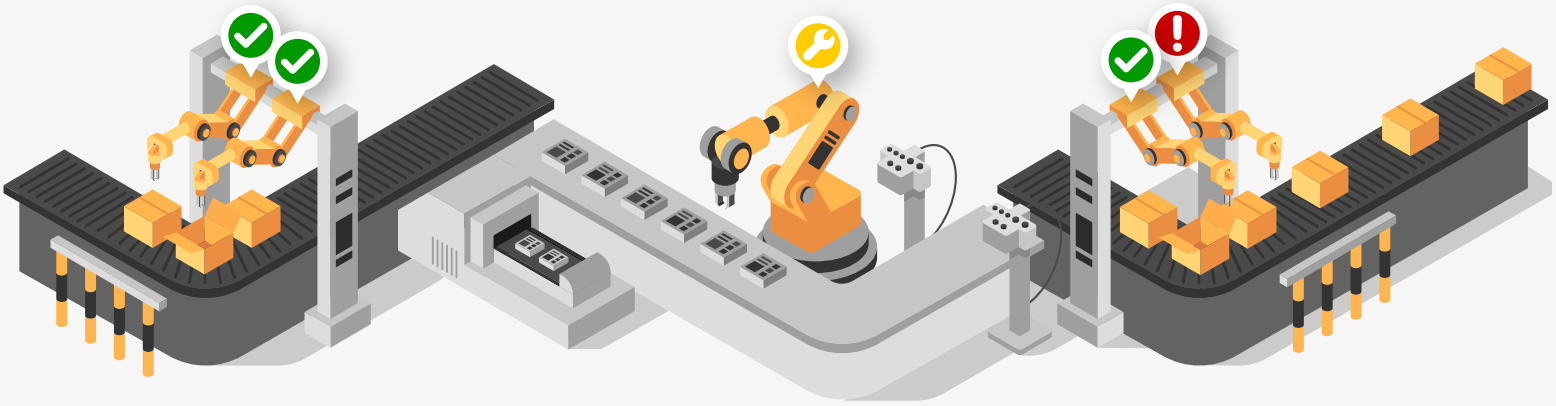
Creating New Streams of Revenue

Using a predictive model optimizes the costs associated with plant maintenance while also allowing you to more accurately predict the available capacity of a plant at any given time. Remember that downtime costs the average plant between 5 and 20 percent of its overall productive capacity, a potentially huge opportunity cost. With predictive maintenance, you can sell that additional capacity to new contracts. You can also adjust the timing of upcoming contracts based on scheduled maintenance windows to maintain your SLAs and optimize your downstream supply chain logistics.

Responding to the Needs of Connected Plants

Additionally, data from predictive failure models could inform maintenance plans for the plants' suppliers if the data was owned or shared with that vendor. This sort of data sharing could lead to the next level of just-in-time provisioning for key consumables, wear parts, or other important maintenance items.

By gathering detailed data from inside the plants of their customers, a vendor could identify common failure modes, estimate the timing and volume of replacement parts needed by their customers, and share information back to the plants to inform their predictive maintenance models.



Verify that everything is working

Proactively replace or repair parts to prevent downtime

Be notified when malfunctions occur

Vendors can also use this information to develop new products and solutions to mitigate or eliminate the most common failure modes–even monetizing them through one-off sales or bundling into subscription offerings. For example, a subscription that integrates monitoring using embedded IIoT devices with a just-in-time product or service delivery would provide a seamless experience for plant maintenance and ensure a more consistent source of business for the vendor. Spreading the expense out in smaller increments across the product's life also helps both the plant and vendor more easily navigate the procurement hurdles posed by large capital expenditures.

By connecting and sharing predictive maintenance information, plants and their vendors can eliminate many of the inefficiencies common in break-and-fix scenarios: tedious support tickets, long SLAs, slow troubleshooting, part supply logistics, and more. At the same time, plants and vendors will deepen their relationships and dramatically improve plant uptime.

Optimize your Connected Plant with Very.

LET US HELP YOU DEVELOP IOT SOLUTIONS FOR REAL-WORLD PROBLEMS.

REACH OUT TODAY →

Sources

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