A Leading Chemical Company Boosts Revenue and Equipment Reliability with Scalable Prescriptive Maintenance

> "AspenTech helped us successfully implement an AI-powered solution to maintain safe and consistent operations, improve equipment reliability and availability, and provide time to plan maintenance."
>
> -Digital Transformation Professional

$6M USD
Boosted Revenue in 3 Weeks

2%
Increased EVA Plant Uptime

CHALLENGES

- The chemical company was having difficulty finding a reliable, cost-effective method for predicting equipment failure.

- It was also looking to avoid environmental, health and safety incidents, and minimize production losses.

SOLUTION

After being disappointed with other asset maintenance solutions, the company selected the Aspen Mtell® prescriptive maintenance solution for its quick deployment, scalability and ease of use.

VALUE CREATED

- Increased EVA plant uptime by 2%

- Boosted revenue by $6M USD in just three weeks

- Provided early warning—up to 4 weeks in advance—of potential asset failure

- Fast deployment, enabling scalability to protect additional assets
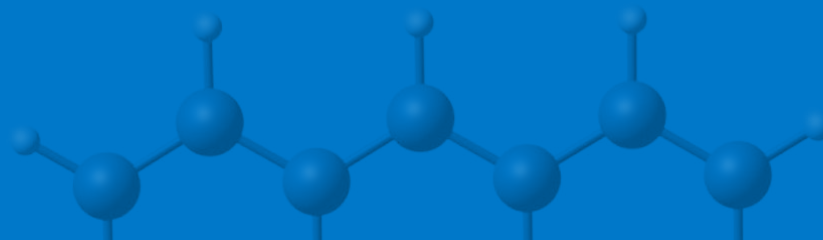
Overview

A leading chemical company offers a balanced and globally competitive business portfolio that includes petrochemicals, advanced materials, life sciences and a subsidiary specializing in batteries. The company's petrochemical business contributes to industrial development with various world-class products.

For chemical producers, equipment breakdowns can lead to more than just production slowdowns or outages—they can cause environmental, health and safety incidents, especially if small issues go unnoticed by maintenance staff and become bigger operational disruptions. When operators are able to strategically plan maintenance to optimize cost savings and plant efficiency, they can potentially avoid these larger disturbances from occurring.

A Long, Challenging Search...

The chemical producer had looked long and hard to find a reliable and cost-effective method for predicting asset failures, implementing a number of different solutions, one after another, without success. Initially, it relied on real-time, condition-based monitoring, control limit management and calendar-based maintenance. These traditional methods proved insufficient, partly because of their heavy dependence on operator training and expertise. It then tried a model-based solution, but this, too, fell short due to inadequate model tuning/implementation time, high maintenance costs and difficulty in scaling across the plant and the company's different assets. A machine learning solution looked promising, but was plagued by accuracy issues, generating false alerts and resulting in a steep decline in alert reliability. After operators lost trust in that technology, it was abandoned like all the others.

...Until Aspen Mtell Met Its Objectives

Ultimately, the chemical producer chose Aspen Mtell because it needed a solution that was quick to deploy, scalable across plants and assets, and easy to learn and maintain. An AI and machine learning-based solution that analyzes historical data to identify key asset failure events, it monitored the company's assets 24/7 and alerted them earlier of potential failures or anomalies. Unlike the company's previous model-based solution, which required months or years to tune and was maintenance and operation-intensive, it was able to deploy Mtell quickly and apply it rapidly to other assets, adapting it to new operating modes and processes. The company's engineers and operators welcomed Mtell's alert recognition and analysis tools, which leveraged industry knowledge and kept them involved throughout the process.

Rapid Development, Increased Uptime

The company began the Mtell implementation at its second largest site. To validate Mtell's capabilities on various equipment types and confirm its scalability, it used a mix of rotating and static assets like compressors, pumps, refrigerators and reactors. Team members selected assets based on several criteria, including how crital they were to operations and whether they had encountered degradation in the past. Its team then worked with Aspen-Tech engineers to configure the required systems and connectivity, such as interfacing with the real-time data historian to monitor equipment health. Based on the company's work order history, engineers initially created agents for six assets across three plants, and 77 agents using data from over 700 sensors in just three weeks.

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Proactively Protecting Critical Equipment

Aspen Mtell created a compressor knocking agent that was able to read hypercompressor sensor data to monitor for knocking noises indicating an impending failure. Because hypercompressors are critical to the company's operations—their failure could halt unit operations, resulting in high production losses and considerable maintenance expense—detecting potential failures early on is extremely valuable.

Mtell cleaned and displayed the data to users, triggering an alert if it detected issues and providing information in an actionable, easy-to-understand way. In one instance, Mtell identified a knocking issue, predicting a hypercompressor failure 15 days in advance, enabling the company's operations team to mitigate the issue within two hours of the initial alert and avoid hypercompressor failure.

Its purge and primary compressor is another crucial operational asset. Before implementing Mtell, a high vibration event led to a six-day shutdown. At the time, the company's conventional condition monitoring systems were unable to provide any warning or actionable insights. Since Mtell's deployment, its superior machine-learning approach has trained and learned from the data which the plant historian recorded during that event. Mtell created a vibration agent for the asset, analyzed the historical data and identified a degradation pattern 15 days before the failure. If Mtell had been in place before the shutdown event, the vibration agent's advance notice would have enabled the company to reduce repair time or avoid the failure altogether.

With the vibration agent and a clear detection signature in place, the company's team was confident they could detect similar future events weeks in advance, saving an estimated $2.7M USD by reducing unplanned downtime.

With Aspen Mtell in place, the company will save an estimated $2.7M USD by reducing unplanned downtime.

Conclusion

The company was able to implement Aspen Mtell in just three weeks' time. It quickly realized that Mtell was a reliable solution that could protect key assets across multiple plants. During the initial phase of implementation at its EVA plant, the chemical producer increased uptime by 2% and revenue by more than $6M USD. Internal teams received extensive training and support, giving them confidence to fine tune and build new custom agents to assist with other operational scenarios.

Mtell was deployed at one of the company's sites, then scaled to a second complex. As of early 2021, Mtell was being used to monitor 34 assets with 300 agents, resulting in savings of $2.6M USD at one facility and $0.99M USD at a second.

Mtell has helped accelerate its company-wide digital transformation while proving to senior leaders the value of AI- and machine learning-powered prescriptive maintenance. Results have been so impressive that Mtell has been introduced as a best practice across its affiliates. The company plans to expand Mtell's use beyond equipment maintenance to process optimization and equipment degradation.

ARTIFICIAL INTELLIGENCE

PRESCRIPTIVE MAINTENANCE

MACHINE LEARNING
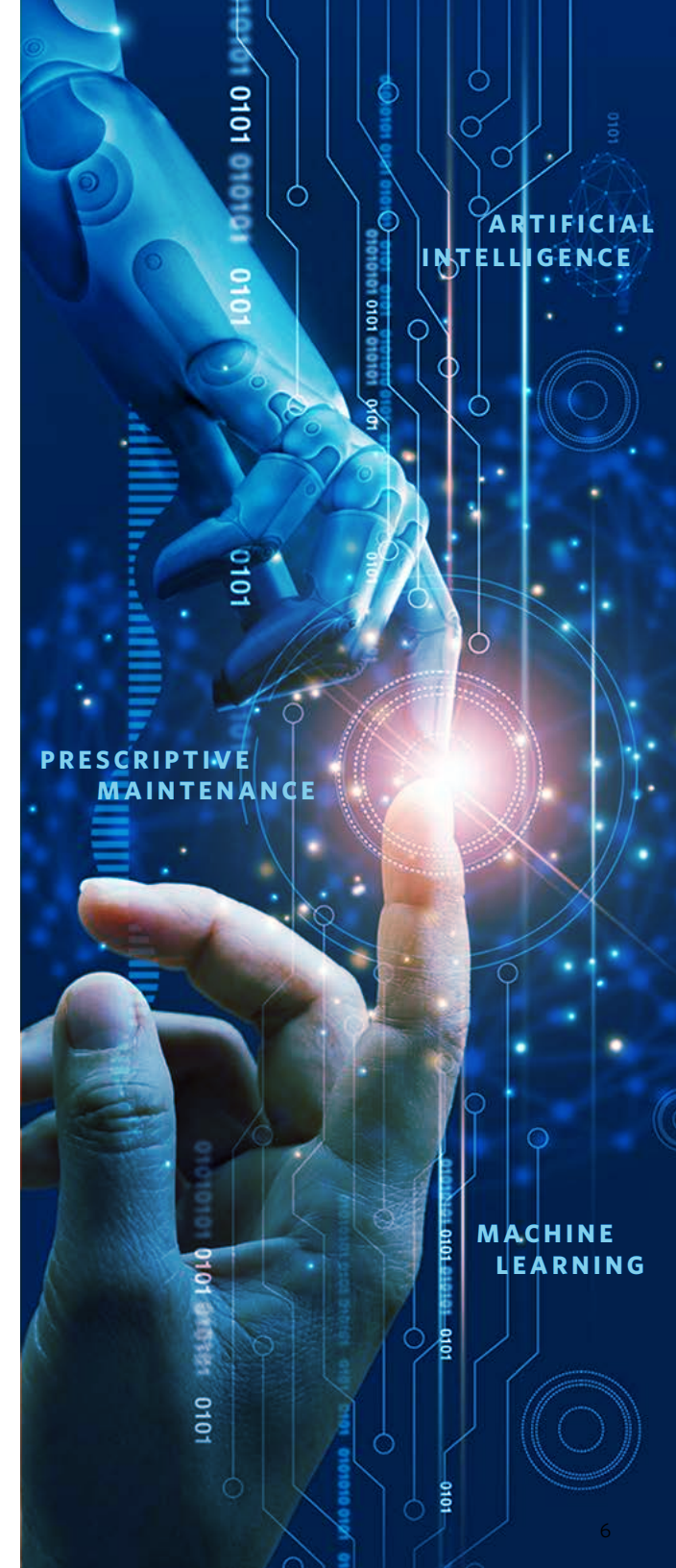
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About Aspen Technology

Aspen Technology, Inc. (NASDAQ: AZPN) is a global software leader helping industries at the forefront of the world's dual challenge meet the increasing demand for resources from a rapidly growing population in a profitable and sustainable manner. AspenTech solutions address complex environments where it is critical to optimize the asset design, operation and maintenance lifecycle. Through our unique combination of deep domain expertise and innovation, customers in capital-intensive industries can run their assets safer, greener, longer and faster to improve their operational excellence.

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