



MITSUBISHI
CHEMICAL
GROUP

Mitsubishi Chemical Uses Aspen Hybrid Models™ to Detect and Avoid Product Quality Issues

“AI-Driven Hybrid Models provide a very good solution, because you do not need so much data science knowledge to create a very good model.”

– Yuping Liu, Production Engineer,
Mitsubishi Chemical Group Corporation

Time to run optimization
**Decreased from
10 minutes to
<1 minute**

CHALLENGE

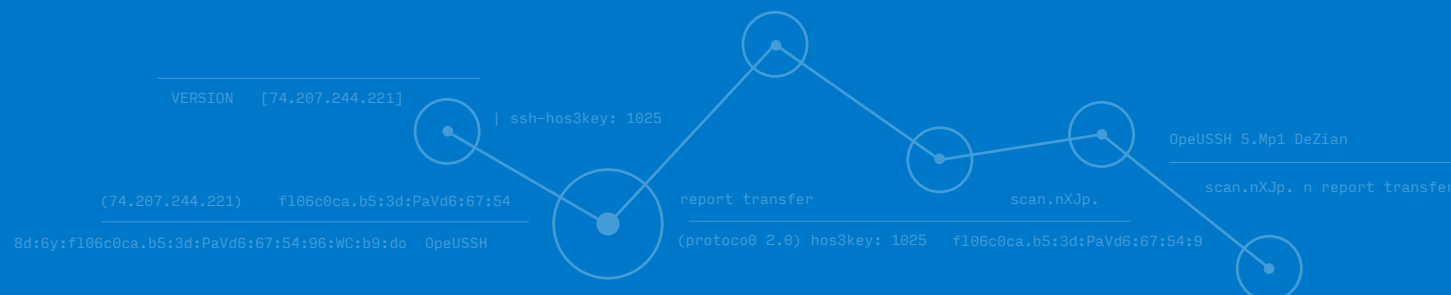
Quality problems in the company’s polymer manufacturing processes could not be detected on time, impacting production.

SOLUTION

Aspen Hybrid Models with Aspen Plus®

VALUE CREATED

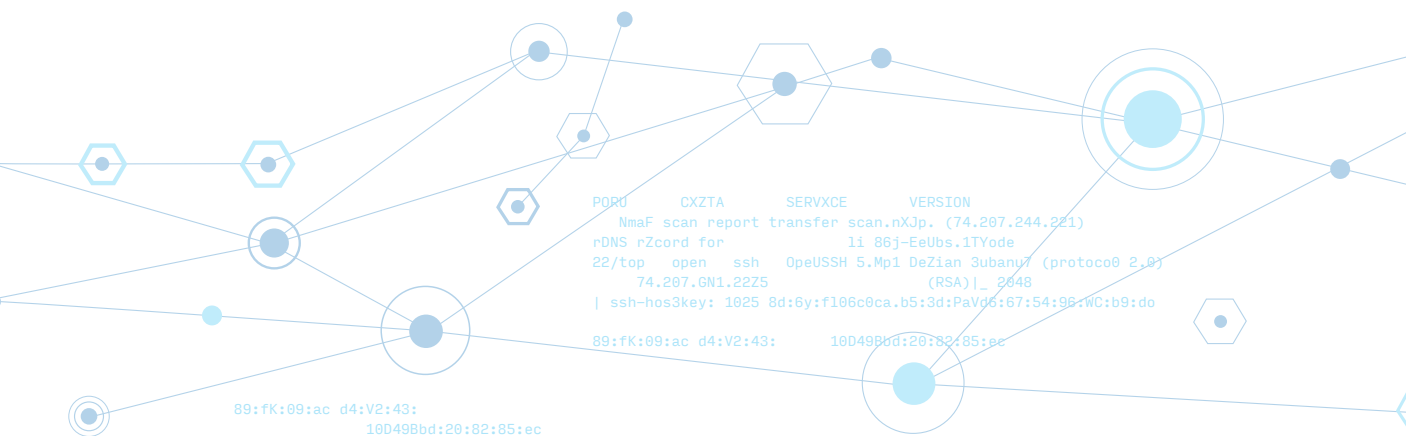
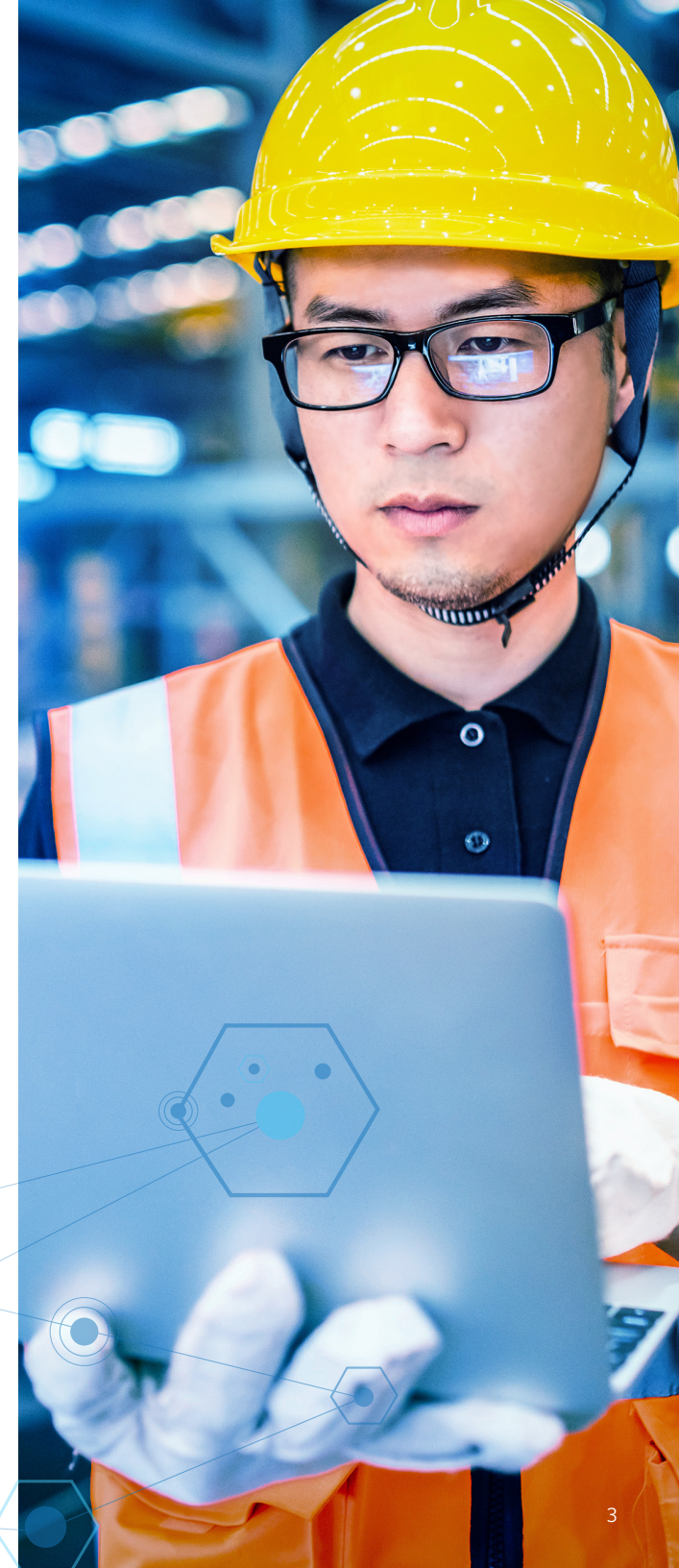
- Detected and avoided potential quality issues
- Significantly reduced on-site sampling work
- Accelerated time to value for operators



Overview

Mitsubishi Chemical Group Corporation is Japan's largest chemical company, with a portfolio covering a variety of chemical products, including basic chemicals, resins and specialty polymers. The company also has a presence in North America, Europe and the Middle East. It supplies various sectors, from automotive and electronics to medical and sports.

Mitsubishi Chemical was having difficulty detecting and resolving product quality issues on time in a specific polymer process. It identified an opportunity to work with AspenTech to address these issues. Using Aspen Hybrid Models enabled the company's process engineers to create a robust and performant model that accurately predicted quality issues and supported preventive actions. Other benefits of using Aspen Hybrid Models included a significant decrease in the amount of on-site sampling work needed, greater visibility into operations across the entire plant and reduction of optimization run time by over 90% (from ten minutes to under one minute).



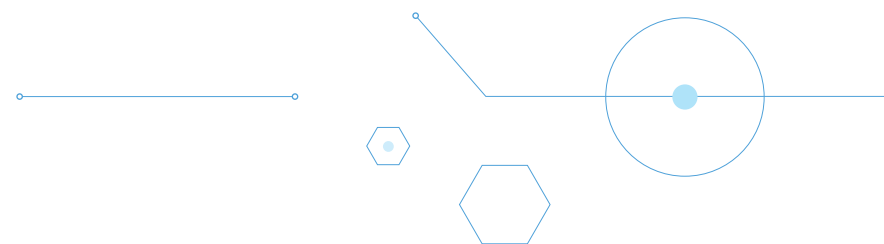
Identifying the Opportunity to Push the Boundaries of What Is Possible

During routine quality testing of its polymers manufacturing process, Mitsubishi Chemical's process engineers noticed that some products were not performing according to specification. Manual sampling was unable to detect product quality issues early enough for corrective actions taken to address the problem. While conventional process simulations provided good insights to guide operations, the models were not able to reflect how small changes in the process affected product quality.

The process engineers were already using Aspen Plus to model some of the company's processes to troubleshoot and provide guidance to improve operations. They decided to use Aspen Hybrid Models and Aspen Plus to obtain greater visibility into the product quality issues. They chose AspenTech's hybrid models because the technology combined first

principles with AI and machine learning to address complex problems and accurately reflect operating conditions. Using Aspen Hybrid Models enabled the team to leverage the extensive amount of available historic operational data within Aspen AI Model Builder™ to produce a model best suited to address the issues facing them.

The AI-driven model was deployed within an existing process model in Aspen Plus, allowing for the intermediate reaction rates and key properties in the model to be updated to align with reality as process conditions change. Using the Optimizer in Aspen Plus enabled the model to obtain reaction rate constants and overall material balances, providing accurate insights into process performance.





Developing an Accurate, Robust, Performance Model to Quickly Scale Up for Other Uses

To further improve decision-making, Mitsubishi Chemical used AI to create a high-fidelity model of the base Aspen Plus simulation. Aspen Multi-Case™ was used to generate simulation data under multiple conditions, while Aspen AI Model Builder transformed this simulation data into an AI-Driven model that was deployed as a reduced order model within Aspen Plus. The resulting hybrid model maintained the high accuracy of the original model but instead of taking 10 minutes to run the optimization of the reaction rate constant, it is more robust and solved it in less than a minute.

In the end, Aspen Hybrid Models enabled Mitsubishi Chemical to create a robust model that accurately predicted quality issues and supported preventive actions, without the need of extensive on-site sampling. Based on the successful implementation, the company has plans to continue rolling it out to use with other processes.

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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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