Success story

Paper manufacturing company saves €300 000 per year using SIMCA® and SIMCA®-online

A paper specialty company has implemented a data-driven solution that predicts paper quality using SIMCA and SIMCA-online for real-time assessment of product quality. With the solution, the company has been able to reduce start up time by up to 50 percent with the corresponding reduction of spoil. The company is now deploying the solution to other paper machines and to other areas of the business.

Using data as a driver of change

The company has a history of about 200 years of making paper. Today, the company produces a very specific mix of products, with complex designs and specifications. The production runs are very short, typically days or sometimes even hours. The production therefore generates a lot of spoil from machine start up and from out-of-control processes.

Some years ago, data was mostly used retrospectively at the management level. With time, however, the company became continuously more confident with using data for process improvement and for solving issues through data analysis. However, the increased use of data did not bring about any substantial change in operations or in process quality.

Having also successively gained access to more and more data, the company decided to explore how data could be used as a driver of change and how it could be used to grow value for the business.

Reducing spoil the biggest opportunity for the business

Starting out, the company identified spoil to be the most significant cost to the business. Traditionally, operators will set up a machine, often using old settings with some tweaks, and then send samples to the QC-lab to assess the quality. After feedback from the lab, operators will tweak the set points again, get a new quality assessment from the lab, and 2-4 hours later, up to the operators will be ensured that the machine is making a good product. This means that the paper machine will produce spoil for several hours before a quality paper can be produced.

Solution design – from hundreds of inputs to actionable information

A project was started with the aim of designing a data-driven solution that would aggregate the data into simple and actionable information for the machine crew – with everything on one screen. The core of the solution was to provide the crew with optimal set points for machine start up. Product quality should be predicted and the amount of spoil should be reduced.

Using the OSIsoft PI System, the company had access to extensive historical data from the production process. Around 200 process inputs and 20 quality parameters would have to be monitored, where the impact of the process parameters on the quality was not fully understood. To further complicate the picture, there was a huge number of very complex products in the company portfolio.

Predicting quality with SIMCA and SIMCA-online

The company developed a system that provides real-time estimations of product quality against specifications. Using SIMCA and SIMCA-online from the Umetrics Suite of Data Analytics Solutions the system can predict all 20 paper quality parameters based on the process input variables. The implementation of SIMCA and SIMCA-online was facilitated by the fact that the company already had deployed the PI System and therefore had a good data structure.

"The company wanted product quality to be predicted and a system that would automatically detect abnormal processes."

"The system can predict paper quality in real-time based on process input variables."

A model of the production at optimal performance is first built in SIMCA, and then SIMCA-online runs the model in real-time to detect when a machine is making spoil.

"A prerequisite for using SIMCA is that you have historical data, which the company already had accumulated over the years," says Erik Johansson, Data Scientist at Sartorious Data Analytics, who have worked with the implementation of SIMCA and SIMCA-online in the project.

The predictions from SIMCA-online is returned to the PI System, which has showed to be an added benefit as it has helped to change the optimal set points for the machines.

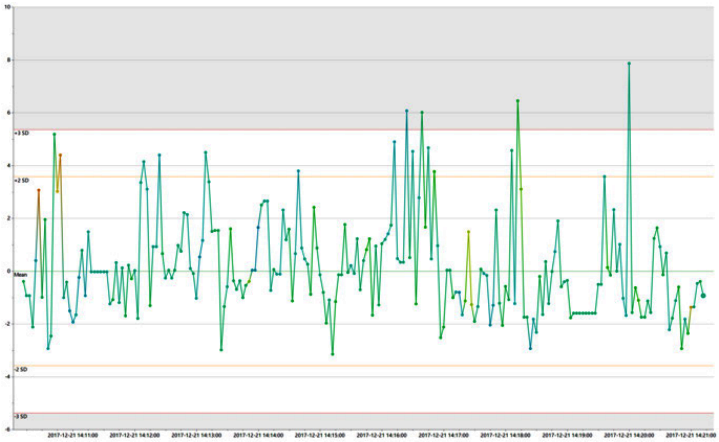
As the quality is now assessed in real-time, with fewer samples being sent to the QC-lab, the company has reduced start up time by half. This has implied a reduction in spoil, saving the company close to €300 000 on one machine.

Next steps

The next step for the company is to deploy the solution to more paper machines and to other areas of the mill. Another step is to improve the SIMCA predictive models and to be able to handle additional complexity for new products.

"An unexpected challenge for us was to develop easy-to-use visuals for the operators," says Erik Johansson.

Having solved that issue, the company will now move on to create actionable visuals for the management team, showing the savings that can be made with real-time quality assessment.



The customer:

A paper manufacturer specializing in products with very complex designs and specifications.

The challenge:

To reduce start up time on the paper machines to reduce spoil.

The solution:

Predicting paper quality with real-time analysis of process parameters using SIMCA and SIMCA-online.

The result:

Improved throughput with a reduction of start up time by half. A 50 percent reduction in spoil, saving the company close to €300 000 per year on one machine.

SIMCA® Multivariate Data Analysis Solution and SIMCA®-online Solution are part of the Umetrics® Suite of Data Analytics Solutions for real-time process monitoring and multivariate analytics.

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