



Sandvik Coromant combines human and digital intelligence into a predictive analytics solution

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Nevzat Ertan, Chief Enterprise Architect and Manager, Sandvik Coromant

The logo consists of the word "SANDVIK" in a bold, red, sans-serif font, with "Coromant" in a smaller, red, sans-serif font directly below it. The text is contained within a red rectangular border.

Whether it flies at 35,000 feet, drills into layers of hard rock, rolls down the highway, or excavates tons of earth, every machine is a fine-tuned composition of precision-manufactured parts. Achieving that precision requires tight control of the tools and processes that produce those parts to ensure consistent quality and reliability, and minimize waste. Sandvik Coromant is in the forefront of developing manufacturing tools, machining solutions, and knowledge transfer processes that help customers produce the parts they need in the most efficient, reliable, and cost-effective way possible.

To maximize the benefit of its deep knowledge of the machining process, Sandvik Coromant has developed a solution that integrates all elements of the production flow—people, machines, tools, and data—to empower customers to make the best possible business decisions. The solution combines the company's human brainpower and long experience with the Microsoft Azure IoT Suite, Microsoft Cortana Intelligence Suite, and Microsoft Dynamics 365 for Field Service to optimize processes, planning, and predictive maintenance scheduling, so that Sandvik Coromant customer service reps can more effectively help customers avoid downtime.

Sandvik was founded in 1862 in Sandviken, Sweden, and from the beginning was committed to making significant investments in R&D and working closely with customers to develop the precise products to meet their individual requirements. That strategy still drives the company and has helped build its machining solutions division—Sandvik Coromant—into a global leader in machining tools and tooling systems for advanced industrial metal cutting.

Sandvik Coromant has maintained that reputation over the decades by providing much more than tools and systems. Its employees have built up years of in-depth knowledge of machining and tooling processes in multiple industries. If customers have a problem with a machine, they call Sandvik Coromant and one of its technical experts will arrive onsite to help. The salesperson talks to

the operator, listens to the machine, and adjusts feeds and speeds to restore proper operation or recommends further service.

This personalized approach helps customers optimize machines, tools, processes, and ultimately their end products. However, the technical experts can't be everywhere all the time so Sandvik Coromant decided to digitize their knowledge. By doing this, it can make the information available to all parts of the production loop and can apply analysis tools to provide intelligent feedback to the machines and the humans running those machines.

Combining human intelligence with machine intelligence

"Today the customer is depending on the skills of the operator and the skills of the technical expert," says Nevzat Ertan, Chief Enterprise Architect and Senior Manager at Sandvik Coromant. "We are looking to convert the knowledge our people have in their heads into a digital format and apply machine learning tools that can look at the data, optimize it, and adjust configurations to optimize production. It will not replace the operator, but will give the operator another tool to improve production."

Sandvik Coromant developed the solution with Microsoft, using Azure IoT Suite, Cortana Intelligence Suite, and Dynamics 365 for Field Service.

"With the solution we have developed with Microsoft, we use the Azure IoT Suite to bring real-time, high-frequency machine data into the cloud and analyze it using Machine Learning algorithms from Cortana Intelligence to optimize the process. The power of these cloud-based services enable us to set up predictive maintenance schedules and set alarms so that we can take a machine offline before it fails."

Nevzat Ertan, Chief Enterprise Architect and Manager, Sandvik Coromant

Customer Name: Sandvik Coromant
Industry: Process Mfg & Resources
Country or Region: Sweden
Customer Website: www.sandvik.coromant.com
Employee Size: 8,500

Customer Profile

Sandvik Coromant is part of the Sandvik Group, a global industrial engineering organization based in Sweden. It is at the forefront of manufacturing tools, machining solutions, and knowledge that drives manufacturing industry standards and innovations. Its educational support, extensive R&D investment, and strong customer partnerships ensure the development of machining technologies that drive the future of manufacturing. The company owns over 3,100 patents worldwide, employees over 8,100 staff, and is represented in 150 countries.

“Through our close partnership with Microsoft, we have developed this new predictive analytics manufacturing solution that includes an in-house shop floor control tool that collects machining and tool data and sends it to Azure for real-time analysis using Machine Learning algorithms from Cortana Intelligence to optimize the process in real time,” says Ertan. “It will help our customers make quicker and better informed decisions to become more profitable.”

Machining data is also collected from sensorized cutting tools through Azure IoT. Adding embedded intelligence to these tools with the help of Azure Machine Learning and Streaming Analytics enables the tools to capture more data from the machining operation that can be used to automatically adjust equipment, notify technicians when maintenance is needed, and alert plant managers of a potential failure.

Ultimately the solution will integrate customer master data from Dynamics 365 for Field Service with meta data from the shop floor system and the machining system.

Gaining tool-level intelligence

What is unique about this solution is that it adds intelligence at a tool level—not just at a machine level—to optimize tool adjustments for a continuous workflow. By alerting customers of when something needs to be changed, they can plan

the optimum time for that action to maintain a continuous production flow.

“Right now we have boxes that we put on machines that can detect electrical surges and abnormal patterns and can stop the machine in real time if those exceed certain thresholds,” says Ertan. “With the solution we have developed with Microsoft, we use the Azure IoT Suite to bring real-time, high-frequency machine data into the cloud and analyze it using Machine Learning algorithms from Cortana Intelligence to optimize the process. The power of these cloud-based services enable us to set up predictive maintenance schedules and set alarms so that we can take a machine offline before it fails.”

This system will also help optimize aspects of the manufacturing loop beyond machining operations. For example, if a milling machine is working at 100 percent capacity, but the storage handling or tool management systems cannot cope with that capacity, the machine has to wait for a tool or a part. At that point, the machine’s performance is secondary to the fact that the logistics system isn’t able to keep up with the machine.

Driving more productive, profitable decisions

The overall goal for this tool is to help humans make better decisions based on objective integrated production data. Integrated systems and processes can help machines provide information that supports resource planning and

can justify a machine tool purchase based on return on investment, rather than just anecdotal data.

“It takes deep knowledge about machining processes to be able to interpret all this data, and that’s where we excel,” says Mats Lindeblad, Global Product Manager at Sandvik Coromant. “What sets our company apart is our deep knowledge of the machining process and our ability to translate that knowledge into the algorithms used to analyze the data.”

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Mats Lindeblad, Global Product Manager, Sandvik Coromant

Software

- Microsoft Azure IoT Suite
- Microsoft Azure Machine Learning
- Microsoft Azure Streaming Analytics
- Microsoft Cortana Intelligence Suite
- Microsoft Dynamics 365