



WL Gore

Challenge

Excellence depends on a culture of continuous improvement. WL Gore seeks to make its already high-quality products even better – in less time. And make production more efficient.

Statisticians help secure a competitive edge in manufacturing

Statisticians at WL Gore partner with engineers and scientists across the organization to ensure quality and reliability in all aspects of the business

The name WL Gore has long been synonymous with technological innovation. Since the discovery and subsequent expansion of the versatile synthetic polymer ePTFE – now Gore's core technology – by Bob Gore in 1969, the company has continued to push the boundaries of entrepreneurial, outside-the-box thinking. But Gore's ability to stay ahead of the curve isn't just luck and magical thinking; rather, it's the organization's continued reliance on science not only in product design but in every aspect of its manufacturing processes worldwide. "We look at the data and make data-based decisions," says Maria Lanzerath, statistician and statistical consultant at Gore in Germany. "Analytics is really deeply embedded in our organization."

Lanzerath works with internal cross-functional teams of process engineers and scientists within Gore's global operations to address specific needs or challenges. Her mission? To use statistics to monitor and improve quality in both Gore's products and the processes used to make them. "When I compare Gore to other companies who work in Germany," Lanzerath says, "one of the things that makes Gore stand out is that we hire statisticians and most other companies don't. For example, we have two full-time statisticians in Germany alone – and that allows us to dig much deeper into analytics than [our competitors].... I can't imagine our technical organization without designed experiments and all of these data analysis tools [that enable us] to ask good questions and arrive at a data-driven decision."

says, "is a challenge for production which requires good methods and process understanding."

To that point, Lanzerath now supports – among other things – Gore's venting business, producing vents for the automotive industry. "Auto manufacturers have highly variable requirements [for vent technology]," Lanzerath says. And prioritizing necessary and sometimes conflicting characteristics can be difficult. In venting, Lanzerath notes, "we weld PTFE laminate onto a mold using ultrasonic welding technology. The difficulty is to do the welding strongly enough to provide vent waterproofness and impermeability without burning pieces of the product with excess energy." That's why Lanzerath was called upon to help identify a process window that would constrain the amount of energy used. "We had to balance out these two targets, and there were some real limitations – some combinations that were not possible. They needed a design with constraints."

Collaboration at the plant level helps identify new process windows

Whether in venting or fabrics, electronic components or filtration systems, Lanzerath says there is one commonality she sees on the plant floor: "Very few engineers know how to code and are willing to dive into the programming." So the statistics team supports a wide range of Gore's operations, ensuring data-driven decision making while also

Overcoming data challenges created by product variability

Lanzerath says that in Gore's textile processing operations, the team faces considerable variability in the products they manufacture thanks in part to the volatility of the raw materials involved. And variability, she

JMP helps us to ask the right questions, gather the right data and arrive at the right decision. I would even say that there is a JMP success story each day in one of our plants somewhere in the world.

Maria Lanzerath, Statistician



freeing up some of the industry's most forward-thinking engineers to focus on product and process design.

Part of that support involved finding the right tool to facilitate work-flows and make sure statisticians and engineers were speaking the same language. "We started to look around for software, and what we really liked about JMP was the depth you get in statistics [coupled with] very good user-friendliness and an emphasis on design of experiments (DOE)," Lanzerath says. "JMP combines a user-friendly interface with deep technology.

"People love to set up graphs in Excel. But once they've touched JMP and see how easy it is - like with Graph Builder or the variability gauge chart, for example - they see how easily you're able to get a graph in just a second. JMP is so quick and self-explanatory, users don't want to go back to Excel." In fact, it's that ease of use that helps build a dialogue among all the stakeholders on the factory floor.

DOE and custom scripts provide clarity amid many variables

Lanzerath says the software allows her to solve even the most complex manufacturing challenges that Gore's engineers bring to the table.

"JMP enables us to set up DOE analyses that are specifically tailored to the needs of our engineers," she says. "With DOE, I can put together trials under certain conditions to determine an operating window for a specific production process. What I find especially innovative about JMP is the custom design platform with optimal designs - it lets us set up the experiments just as we need them. Then we can analyze the data with a fit model platform to learn which combinations best meet our specifications."

Even with the advanced quality validation and monitoring systems in place at Gore, Lanzerath says it's not uncommon for her and her colleagues to encounter production challenges that can't be solved

with a standard designed experiment. "We validate our measurement systems using a methodology called EMP," she says. "Operators in the lab work to test different products on different days in order to capture the variability within that measurement process. The design itself is in essence a simple full factorial, but we don't want all of the factors to be fully randomized. Since most of our internal users don't use DOE much, it's a bit harder for them to do it themselves. And that's why I decided to write a script in JMP that provides them with a finished data table that will do the manipulation for them. They just need to enter the number of days, the number of operators and the number of products to test. They press 'OK' and they're done."

The beauty of JMP is that it enables advanced users like Lanzerath to create their own custom scripted applications. "The big advantage of JSL [JMP scripting language] applications is that users don't need any additional software to solve even the most complex problems," says Lanzerath. "And that saves us a lot of money and time by enabling us to invest in new developments while staying within one software package. It's a huge advantage."

A dynamic software package that evolves along with its users

One of the most exciting things about JMP, Lanzerath says, is that the product keeps step with the evolving market. As statisticians develop new applications and with it, new uses for JMP within their organizations, the product has kept up. For example, Lanzerath says she was very pleased to see the new compare design feature in JMP 13. "That was an idea that came from a colleague of mine at Gore. He presented the concept to JMP and said, 'can you do something about it?' And now it's available. JMP's developers are always working to improve the software by listening to what customers require and incorporating that into the next version. My colleagues and I could see how we could influence the software and make it even better able to meet our needs."

Solution

Run DOE in JMP to optimize products and processes while rolling out more advanced capabilities via script-based applications.

Results

With data-driven decision making, WL Gore saves time and money - thus proving once again why they are a global industry leader.

To contact your local JMP office, please visit: jmp.com/offices



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