Improve manufacturing quality with advanced analytics across the entire product life cycle

Business Impact

"Our objective is to improve production, not spend time producing or collecting data."

– Senior manager of manufacturing innovation at a global electronics manufacturing leader

Challenges

- **Disconnected view of enterprise quality.** Disparate and isolated data sources limit a manufacturer's ability to see quality issues across the entire operation. With a limited understanding of these processes, companies are often unable to solve underlying quality problems or make improvements.
- **Failing to achieve yield and throughput goals.** The inability to know when quality control problems arise harms yield and throughput goals. Without the ability to know when a failure will happen and how to prevent it, manufacturers must rely on human intervention, which drives down yield and throughput.
- **Excessive scrap and rework.** Poor-quality goods that result in high rework and scrap costs can devastate a company's bottom line. Without a clear understanding of quality effects on manufacturing and service costs, organizations can be left with a broken business model, unexpected expenses and reduced yields.

The Issue

Today's manufacturers face countless issues surrounding product quality and production in general, for example:

- Integrating data from disparate systems and isolated sources.
- Obtaining visibility into and understanding of multiple operational processes.
- The cost of poor quality goods, rework and scrap.
- Improving overall manufacturing yields.

A lack of visibility across operational processes hampers a manufacturer's ability to react to changes in product quality and operational performance. Without this information, it's difficult to make fact-based business decisions, leaving manufacturers to rely on employee intuition and guesswork. This can be very expensive if the decisions made are wrong or based on incomplete information.

Downstream quality issues can also lead to significantly reduced customer satisfaction rates. This is especially true when problems appear after the organization manufactures and sells the product. If companies can't integrate both manufacturing and post-sales quality data, they don't know where problems are occurring or how to fix them.

Our Approach

Manufacturers need to integrate data relevant to quality, productivity and utilization. They must also monitor the health of processes and drive sustainable quality and yield improvements – all while containing costs. Having the right tools and processes in place is essential for improving manufacturing quality in key areas, including asset performance and field quality.

We approach the problem by providing software and services to help you:

- Take advantage of the large volumes of data generated by the industrial Internet of Things (IoT).
- Support multiple data domains (including material movement tracking, genealogy data, process data and asset condition data), using a rich set of interactive root-cause analysis and quality improvement tools that can identify quality issues and operational performance degradations before they become serious problems.
- Gain process understanding across the entire manufacturing operation, employing best practice workflows and case-management capabilities to document findings and problem-resolution measures while promoting collaboration and knowledge sharing.

The SAS® Difference

By capturing IoT data at the edge, SAS helps you make real-time, intelligent decisions. Use SAS to:

- **Make the right decisions at the right time.** With a data model specifically designed to handle "dirty" and missing sensor data throughout the enterprise, you can quickly identify patterns and deploy models while a process is still ongoing, allowing stakeholders to act promptly.
- **Gain a holistic view of the enterprise.** The SAS enterprise data model captures large volumes of data regardless of format or source, then transforms, standardizes and cleanses the data to prepare it for analysis. You can also extend it to incorporate any additional data types that you need. In addition, state-of-the-art analytics and reporting let manufacturers align strategies to reduce the gap between target and actual performance.
- **Understand changes quickly.** World-class quality control delivers up-to-the-minute insights into the performance and quality of manufacturing operations, enabling tighter process control at every level. Thanks to SAS early-warning analytics, users can proactively address potential quality and performance issues before they become a customer problem.
- **Lower the cost of quality.** SAS analytics and predictive data mining capabilities drive continuous quality improvements, increased reliability and higher yields. With tighter controls and more efficient processes, rework rates and scrap rates will decrease.
- **Increase profitability.** With optimal process setup from predictive modeling, manufacturers can improve asset utilization, optimize material consumption, and reduce rework rates and scrap expenses. And SAS analytics allows improvement of equipment performance and cycle times, improving overall profitability.

Case Study

Situation

A leading global electronics manufacturer needed to increase yield and improve processes without completely revamping longstanding manufacturing practices. But electronic component manufacturing is a multistep process with a different person responsible for each stage. The company quickly realized that it needed one repository from which data for all stages could be analyzed for quality, cost and delivery issues. It then needed to mine the data effectively, and with a sophisticated level of understanding.

Solution

To efficiently gather and mine this massive quantity of data, the company chose SAS' production quality analytics solution, which helped it:

- Create a single view of enterprise quality data. The company now has access to all of the data managed in all of the company's factories.
- Focus on improving production and quality rather than collecting and merging data that straddles different processes.

Results

Judging ROI on analytics isn't easy, but the company's senior manager of manufacturing acknowledges that even modest gains lead to substantial benefits. He estimates that just a 1% yield gain results in a savings of $50 million. "That's why we need to look for the detail in such a large amount of considerably varied big data," he says. By deepening its understanding of data mining, the manufacturer has seen impressive results. With the company's scientific approach to improvement, SAS will continue to be its best means for maintaining its world-leading position.

What If You Could...

- Increase the efficiency of data mining to improve yield?
- Create a single view of enterprise quality data?
- Capture all aspects of the manufacturing process, beginning with suppliers and carrying through manufacturing, including field performance and post-sales quality variables?
- Monitor the health of all processes to help ensure quality throughout your manufacturing and operations?
- Apply automated monitoring and alerting in real time, as the data is generated, or on landed data so you can refine and integrate business rules, enabling continual process improvements?
- Set up downstream processes to compensate for quality issues that may not have been identified earlier in the operation, or that were identified because of upstream analysis?
- Analyze quality issues and explore areas of improvement in a highly interactive and visual environment?
- Get reporting on current quality performance at all levels and across geographies?

With SAS, you can.

SAS Facts

- Over 2,000 manufacturing customers in more than 52 countries rely on SAS, including 82% of the Fortune 500 and 47 of the Fortune Top Global 50.
- SAS is a Leader in the 2020 Gartner Magic Quadrant for Data Science & Machine Learning Platforms.
- SAS helps customers at more than 83,000 sites improve performance and deliver value by making better decisions faster.

Learn more about SAS® Production Quality Analytics