

DRIVING QUALITY WITH MANUFACTURING INTELLIGENCE

Automotive Component Manufacturer uses Manufacturing Intelligence to Drive Quality.



by Robert Jones
Project Lead, Polytron

An automotive component manufacturer was having challenges maintaining, troubleshooting and upgrading their legacy quality control and parts tracking system.

The system had been created with proprietary code to ensure quality control consistency and data tracking across eight manufacturing cells for the premier brake manufacturer. This case study demonstrates how manufacturers can effectively replace legacy control and information systems with solutions that are more reliable, better integrated, scalable, and easily maintained.

A disciplined approach for implementing Manufacturing Intelligence (MI) solutions is applied with a focus on providing timely actionable information to each user.

Hampered Operational Efficiency

Over the years, the automotive component manufacturer had developed an in-house proprietary quality control system with data capture at every step of the process. Over the years, accessing, maintaining, and upgrading the system for effective quality control and reporting had become costly and difficult. Overall production performance was hampered by the need to manually manage quality metrics and reporting as the system developed became increasingly cumbersome to manage.

Quality reporting became more critical as the automotive component manufacturer's customer required more real-time detailed reports. The customer required specification validation details on each part received from the component manufacturer, and in addition, also wanted to validate how the quality reports were being generated and recorded.

Upgrading to an industry standardized Manufacturing Intelligence System would give them the ability to meet their current quality and reporting objectives while offering a path for upgrades and enhancements well into the future.

Customer Driven

In the automotive industry, manufacturers rely on hundreds of component manufacturers to supply the parts needed to assemble the vehicle – from electronics to tires. Each part must meet stringent production specifications and be certified per the established quality criteria. Poor quality control can lead to failed components and costly recalls. To manage the standard of quality for well-built auto products, rigorous quality data points must be tracked and reported throughout the manufacturing process. Ensuring that the shipped components meet the established requirements through real-time quality reporting has become the standard in the industry.





The Challenges

The previous system was not networked and the setup used standalone computers for each of the eight manufacturing workcells. Within each workcell were stations where the components were assembled. Each station applied quality control checks based on specifications set by the manufacturer. At each step, established test values were checked with pass or fail tests before going on to the next station. Based on these quality thresholds at each step of production, the product might be prevented from moving forward at any point in the line. Pass/fail data was collected on every product at every station within each of the eight cells.

The manufacturer had a good process in place to ensure that quality was maintained, but due to the inefficiencies of the existing system, the records were compiled and reports had to be created manually after production was complete. The component manufacturer needed to automate the data capture and quality reporting process to meet the customer's needs, streamline the process, and increase overall production efficiency.

The Approach

Applying the Polytron Manufacturing Intelligence project approach, information was gathered to focus on what the manufacturer needed from the system: user requirements for each user and stakeholder; Key Performance Indicators (KPIs); various data sources; interfaces such as dashboards and HMIs; gaps in the infrastructure and technology to achieve project goals.

The manufacturer's current needs and plans for future growth required a solution that was scalable, reliable and robust.

The Solution

The new architecture design integrated well with existing hardware and leveraged the existing Ethernet architecture. The new system was designed around industrial hardware and Commercial Off-The-Shelf (COTS) software to allow for standardized software upgrades as needed, easy troubleshooting, and support by vendor-trained programmers.

A dedicated Data Concentrator / Supervisory Programmable Automation Controller (PAC) was implemented for both the quality control and collection of the OEE data and individual part statistics. Data within the new PAC is now recorded by a historian. The off-the-shelf software installed will create OEE and Part Statistics reports from the data recorded in the historian. This configuration will also allow for new reports to be created without additional programming.

A Quality Database System is being added outside of the historian to maintain part statistics by barcode. The historian transaction manager will transfer the part data from the new Data Concentrator to a separate quality database created in an existing SQL Server allowing changes in quality reporting requirements without making any changes to the architecture.



The Result

The new system now delivers:

- Automated quality system control by station across all eight manufacturing cells to ensure all specifications are met
- Comprehensive data capture for quality and KPIs across all eight manufacturing cells
- Historical quality and KPI data for the eight workcells is stored and accessible for reporting and analysis
- Report access drill downs to a single part complete with test values
- Accessibility to performance metrics for all eight cells for Overall Equipment Effectiveness (OEE) on an over-time or real-time basis providing:
 - Quick identification of product and/or quality issues
 - Real-time feedback of quality parameters and KPIs
 - Easy method of report distribution to users
 - Report creation without the need for outside assistance

Unstoppable Success

The new integrated quality control solution proved to be more successful than anticipated. Originally, the solution was developed for only one production facility to remedy specific quality control and reporting issues caused by the proprietary system.

The manufacturer quickly realized the benefits of improved overall production and increased quality control, and has expanded their vision for implementation into additional facilities.

