CASE STUDY

Instron Technologies

Traceability Journey in Goods Manufacturing Processes

Industry

Global leader in automotive components.

Client Summary

Our Client is a leading manufacturer of advanced automotive components. With a strong focus on innovation and quality, the company supplies engine and filtration systems to major OEMs, adhering to the highest standards of good manufacturing practices.

Highlights

▷▷ Enabled real-time QR label generation using Zebra printers over ZPL (Zebra Programming Language) formatting, triggered by PlantON events

▷▷ Generated QR codes based on shift, project ID, genealogy (parent-child), and pallet split, supporting both backward and forward traceability.

▷▷ Developed a user-logged QR reprint mechanism and maintained OK/Not OK status for product levels and OK, Rejection Qty for pallet levels

▷▷ Comprehensive Reporting: Delivered detailed reports including process-wise QR movement, rejection analysis, and genealogy (lot-wise & QR-wise).

Challenges

▷ **Seamless Zebra Printer Integration:**
Faced issues with ZPL-based network printing. Solved by creating a middleware with ZPL templates and preview features—reducing label errors and wastage.

▷ **Dynamic QR Code Generation:**
Needed unique, context-aware QR codes at each stage. Built a flexible QR generator with genealogy links, real-time metadata, and optimized scan reliability.

▷ **Configurable Process Interlocks:**
Managed complex workflows with mandatory and optional stages by designing a skippable process interlock engine mapped to product types and rework routes.

▷ **Pallet Splitting & Sub-Level Traceability:**
Addressed traceability gaps caused by pallet splits using a hierarchical parent-child pallet system with retained history and reportable splits.

▷ **Hybrid Traceability Through Harsh Processes:**
Handled QR code damage during heat treatment by implementing pallet-level tracking and switching to product-level post-process with continuity maintained via checkpoints.

Project Success Factors

✓ Batch traceability of raw materials helps quickly pinpoint the batch involved during client quality-related escalations.

✓ Enables to gain deep visibility into each process stage—like quenching, hardening, tempering, and forging—by identifying whether the material stayed within or exceeded critical threshold levels, thus ensuring quality control and process transparency.

✓ The project's success was driven by its intelligent traceability architecture that ensured end-to-end product genealogy even through destructive processes. A dynamic, context-aware QR ecosystem enabled real-time, error-free labeling with adaptive interlocks. Enhanced accuracy through OK/Not OK status logging and detailed rejection tracking improved accountability. Comprehensive reporting empowered informed, data-driven decisions.

💬 Customer Feedback

"Instron Technologies has transformed our manufacturing visibility with their robust traceability solution. From raw material intake to finished goods dispatch, every step is now trackable in real time. The hybrid traceability model they implemented—pallet-level before heat treatment and product-level afterward—was perfectly aligned with our operational needs."

ℹ️ About Instron Technologies

Instron Technologies, with operations in India and Canada, is a leader in Digital Factory Solutions, Industrial Automation, and Process Skid Systems with committed to sustainability. Our dynamic team develops innovative solutions that address critical customer challenges while emphasizing eco-friendly practices. We proudly serve the Manufacturing, Automotive, Chemical, Oil & Gas, Food & Beverage industries, and Research Labs, delivering cutting-edge solutions that enhance operational efficiency and drive sustainable growth. With a strong presence in over 10 countries and a trusted partnership with more than 200 clients, we remain dedicated to innovation, efficiency, and environmental responsibility.

✉️ Contact Us for More Details

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