CASE STUDY – SL AMERICA

Automotive OEM Supplier Automates Lines to Eliminate Mis-Shipped Products

Process automation and automated labeling reduce human errors and improve accuracy

SL America is a manufacturer and Tier One automotive supplier to General Motors, Hyundai, Kia, Chrysler, Honda and Acura, producing headlamps, rear lamps, fog lamps and CHMSLs (Center High Mounted Stop Lamps). SL America also produces AVM (Around View Monitoring) systems to provide a 360-degree view around a vehicle to eliminate blind spots and prevent accidents. Additionally, they produce auto/manual shifters, pedals and park brake levers for a variety of car models all around the world, e-shifters using shifter-by-wire technology, turn signal/power folding mirror systems, and Front End Modules (FEMs), which reduce the production and processing time of automobile assembly lines.

At its lighting plants in Alabama and Tennessee, SL America was mislabeling finished goods and shipping incorrect or defective products to automotive manufacturers. After receiving large, daily fines from a major automotive OEM, SL America had to take quick action to implement automation controls to eliminate its manual processes and improve accuracy, otherwise face additional fines and the potential loss of its large client.

The Problem:
SL America's automotive light assemblies had to pass a series of quality control checks during production. Quality control workers would place assemblies into test jigs, which identified the components and tested them for leaks and omissions. Parts that passed QC were forwarded for packaging and finished goods put-away, while parts that failed were to be set aside for repair, rework or recycling. Because there was no accurate or visible parts identification in place, the light assemblies for different OEMs would frequently get mixed and incorrect parts would be shipped to the manufacturers. Additionally, parts that failed QC were not obviously marked and would occasionally get shipped with good parts.

Because they were receiving incorrect products with frequency, General Motors levied heavy, daily fines against SL America. SL needed immediate automation controls that would accurately verify the correct parts for each OEM and only allow labeling and packing of items that passed QC testing, while flagging and labeling parts that failed inspection with "fail" labels. The solution was needed initially on five production lines, with expansion to 20 lines if it performed as required.

Why Inovity?
Inovity, formerly BarCode ID Systems, was introduced to SL America by leading industry partner and barcode printer manufacturer, Zebra Technologies. SL initially approached Zebra knowing they needed to implement a barcode system as part of their solution. Zebra knew that Inovity, one of its only 16 Premier Partners in North America, had developed innovative process automation

software that would work for SL America. Time was of the essence due to the daily fines SL was receiving, and they awarded the project to Inovity to start and implement the solution immediately.

The Solution:

Using their internally-developed process automation software, Automation IQ™ (AIQ™), Inovity proposed a control system to eliminate human decision-making from the pass/fail labeling process, as well as integrate with SL America's Oracle database to automatically identify assemblies and print correct item, tote and pallet labels. The software would connect each individual item to its tote and pallet by its serial number, so SL would know what products were on each pallet when time to ship. Supervisory controls would be granted to trigger end-of-run printing, label reprints or exceptions such as partial totes or pallets.

On each of five production lines, Inovity installed one set of equipment consisting of two Zebra barcode label printers and one Digital Input/Output (DIO) controller. A supervisor's computer was located in the general area of the initial lines, and all lines would connect to SL America's SQL server running Oracle. AIQ was also installed on the server, along with event-based, centralized label-printing software from NiceLabel, which would enable communication and synchronization of the label printing process based on pre-defined triggers. Additionally, all label formats would be housed on the server and operators would not be able to change label formats or data, thus ensuring the correct and properly-formatted labels would be printed for each item.

QC workers on each line would first place an assembly into a testing jig for "leak" and "omissions" testing. An existing PLC would send a combination of control signals to the DIO that both identified the item and indicated communicated the pass/fail test results. If the part passed, the DIO would send the message to the application server to interpret the signals, perform a database lookup, log the pass/fail message and send instructions to the print server to print the correct item label for that assembly. If the assembly failed, a different signal would be sent and a "fail" label would print instead. All control signals would be processed via the AIQ software, which was integrated with the PLCs, DIOs and the Oracle database to send, receive and interpret signals.

The AIQ server would keep track of how many assemblies passed both tests and when the correct quantity was reached to fill a container (tote or case), it would signal the label server to print a container label. Then, upon creating enough containers to build a full pallet, AIQ would signal the label server to print four pallet master/license plate labels for the completed pallet. Once a master label was executed, each individual assembly's serial number would be associated with that pallet to ensure full traceability.

For additional shipment accuracy, SL America later engaged Inovity to develop a shipping validation application to run on mobile devices at the shipping dock. As workers prepared shipments of finished goods, they would launch the application on a mobile computer from Motorola Solutions (now Zebra Technologies), and scan their unique ID badge to identify them as the worker processing the shipment. The worker would scan the work order number and the shipping container number, prompting a database lookup to validate the shipment and confirm that the contents of the pallet matched the work order. Visual color indicators were included to signal the workers if the shipment did (green) or did not (red) match. Additionally, if the shipment did not match, the operator would be presented with a message box to be cleared by a supervisor's password. The validation process ensured that workers were picking and shipping the correct products to the correct location and tied the shipment back to the worker for increased accountability.

The Results:

With the process automation solution from Inovity in place, SL America could verify that all parts in all shipments had passed QC testing and that the correct shipment was going to the correct manufacturer, bringing them into compliance with General Motors and ending the heavy, daily fines immediately. The additional mobile shipping validation solution added another layer to guarantee there were no mis-shipped products. The successful solution, which was ultimately installed on 20 production lines at SL Alabama, was duplicated at SL Tennessee where they manufacture both lighting assemblies and chassis.

Inovity's unique process automation software, Automation IQ, was able to connect previously disparate pieces of data from PLCs and a centralized database, and execute automated actions to reduce human decision-making and human errors. By connecting QC test results to product labeling and finished goods put-away, Inovity improved the accuracy and adherence to OEM compliance regulations at both SL America's manufacturing facilities.