

Machine Vision System Increases Productivity and Quality in Automotive Lighting Manufacturing Lines

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With increasing labor costs in Mexico, Tier One automotive suppliers are turning to more economical and accurate methods of inspecting critical automotive components. NewPlus Technologies, of Monterrey Mexico, excels in real-time, online quality control solutions that use machine vision and related automation technologies to achieve *zero-defect*

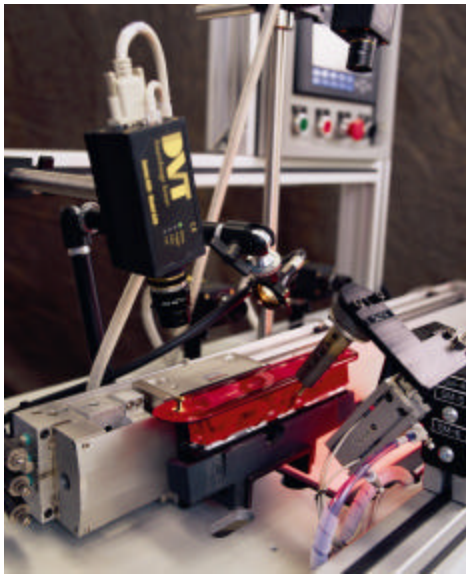
manufacturing. At the heart of these solutions are DVT Corporation's SmartImage Sensors. With DVT's patented machine vision technology and expert support, NewPlus has the ability to explore all facets of a problem to arrive at the best solution.

SmartImage Sensors provide complete compatibility and seamless Ethernet TCP/IP integration into existing automotive manufacturing processes. When connected to system controllers, the NewPlus inspection system becomes a highly accurate source of rapid real-time data and an integral part of the quality control process.

A recent NewPlus Technologies design involved a vision inspection system for dimensional defects and incorrect part assembly at a world-class manufacturer of automobile headlamps, signal lamps, rear lamp systems, instrument panels, consoles and fuel tanks. This Tier-One supplier has a production line that manufactures eight different models of rear lamp assemblies with a volume of up to 4,000 units per day operating. NewPlus Technologies was challenged with the design and build of a system that could inspect up to 12 different features for each of these units in less than eight seconds. The alignment and penetration of two screws had to be confirmed within 0.1mm accuracy and the presence or absence of a gasket, waterjet and washers had to be confirmed. Simultaneously, the unit model was to be identified through characters embossed in the plastic.

The NewPlus Technologies solution is a fully automatic inspection system that drives each unit through three inspection stations with four DVT Series 600 SmartImage Sensors, NER backlighting and Fiber-Optic Specular Lighting. This station consists of a loading and unloading module, an Allen-Bradley PLC and PanelView 500 display, start buttons, linear actuator, two fixtures accommodating the 8 different lighting assemblies, four DVT Series 600 SmartImage Sensors, three NER Backlights, One Fostec Fiber-Optic Power Source and Fiber-Optic Cable.

The operator inserts the rear lamp assembly onto one of the two fixtures and presses the start buttons to initiate the inspection. The actuator moves the part through two inspection stations. The four DVT Series 600 SmartImage Sensors image and inspect the assembly while in motion relaying the results to the Allen- Bradley PLC, which in turn displays the results on the PanelView Display. At the core of this inspection system are the four DVT SmartImage Sensors. Two of the SmartImage Sensors view screws and calculate their precise penetration and orientation, verifying they meet the OEM's specifications. One of the SmartImage Sensors identifies the presence (or absence) of gaskets, washers and the waterjet. The SmartImage Sensors detect any flaws and an output signal for accept/reject is sent to the reject mechanism of the assembly machine. The final DVT SmartImage Sensor identifies the part model through alpha-numeric characters embossed in the lens cover. Conventional vision systems could not recognize the markings on the high-gloss plastic. However, DVT's SmartImage Sensor technology filters out character voids and blemishes, poor lighting and background inconsistencies.



Prior to installing the NewPlus solution, the inspection was performed by two operators that would inspect more than 1,000 lamps per shift, requiring more than 30 seconds per part. The new system, incorporating DVT SmartImage Sensors, now performs the complete inspection in 5.5 seconds. Initially, when first installed, the manufacturer detected an injection molding error rate of up to 25%. “They detected a problem with the holes where the screws are inserted. With the precise inspection data obtained from the DVT SmartImage Sensors, they were able to pinpoint a problem with the mold and it was modified. After fixing the mold, the error rate dropped to near zero,” said Sergio Sedas, President of NewPlus Technologies.

“NewPlus provides 24-hour service to our customers, but we do our best to transfer the technology to the plant floor. With DVT's free software and emulators, the operators can learn more about the system—resulting in less down time,” Sedas said. The ease of use, seamless integration and low costs of DVT's SmartImage Sensors are motivating NewPlus Technologies to integrate these machine vision systems in other production lines at this automotive supplier.