

Reprint

Automation of Plant Floor Processes

As featured in the
March/April 2011 issue



Automation of Plant Floor Processes

As featured in the March/April 2011 issue of
Wiring Harness News



By Michael Reeve
OES, Inc.

Think for a minute about the old checkout counters that used to exist in retail settings. Cashiers had to identify the product based on their knowledge of the inventory, remember the specific code for the product, key the code in correctly, and hopefully not miss anything. The small difference in a product's size or appearance could easily lead to a wrongful identification and consequentially the incorrect product code.

Now think about the manufacturing sector, where operators are required to manage several aspects of several jobs. This includes machine setup, validation of material, setup of the in-process monitoring systems (crimp force monitors, wire end inspection devices, first piece inspection, visual inspection), and reporting on the production run - all done manually.

Further contributing to their challenge is the transition to smaller production runs, which translates into more frequent machine setups and changeovers. On top of production and quality, operators manage maintenance activities in real time while meeting production targets and objectives, which are continuously updated and changed.

The evolution from a manual to an automated process in manufacturing is not revolutionary, but has only been implemented in certain industries. If the technology exists to automate processes, why is it that so many manufacturing plants still operate manually and under such chaotic and demand-

ing procedures? If these steps can be bundled into a single quality process management approach, why not implement it?

The answers are tough, but it's very likely that the industry will see a majority shift in the near future as there is increasingly marginal room for error in this traditionally operator dependent environment... and more and more Tier One manufacturers are pushing the use of process automation to ensure quality.

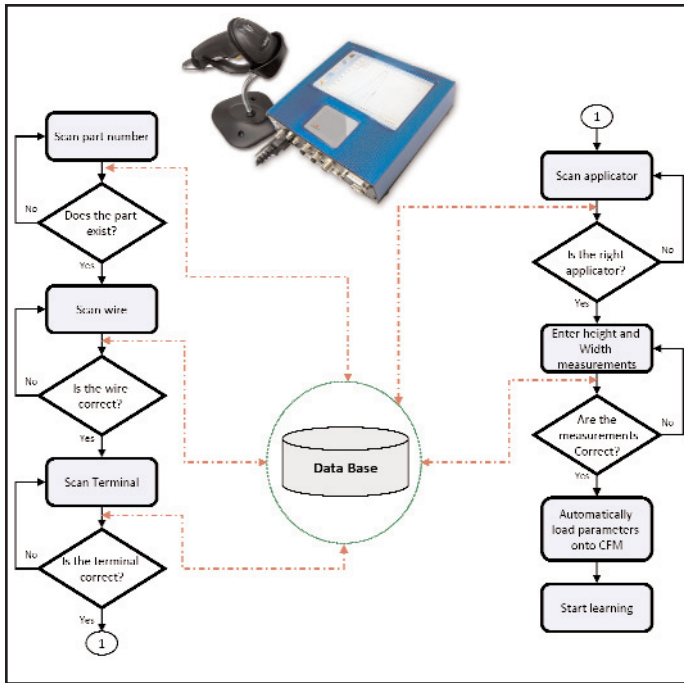
Already we're seeing new wire processing machines equipped with process management systems that automate and streamline the setup and optimize the in-process quality monitoring systems. This eliminates potential error and unnecessary scrap associated with incorrect material and/or machine setup.

But what about existing equipment? Many companies do not have the budget for brand new machines. Legacy machines cover a large portion of the landscape of existing automatic and bench press machines. These can be retrofitted with the recently designed technology and continue in use for years.

Quality Process Management (QPM) for Wire Processing: Simple. Accurate. Efficient.

The automation process starts off with a bar code scan of the work order, which then prompts the operator through a series of steps (supported by visual aids) to confirm that the correct items such as terminals, wire, weather seals, and tooling are installed on the machine. The setup validation may also include first part inspection and a pull test of sample parts prior to the start of production, which further error proofs the machine setup.

Let's address the near impossible challenge that operators' face following each new setup, to manually reconfigure and optimize in-process quality monitoring systems. These systems, such as crimp force monitors and wire end inspection devices are logically integrated into this quality process management system and can be automatically configured during the setup, ensuring a high level of integrity, performance, and quality control.



even photo images or illustrations of the product which serve as visual aid for the operations personnel.

Summary

The illustration (bottom) highlights the common elements of a Quality Process Management (QPM) system for an existing and/or new wire processing machine and/or bench press application.

The MATERIAL VALIDATION is performed during the machine setup with a bar code reader. The scan of the work order references the data base to confirm all of the correct material.

The SETUP VALIDATION process automates the first part inspection to confirm the crimp dimension and optional dynamic pull test are within the product specification before production can resume.

The QUALITY SYSTEM OPTIMIZATION automatically configures the parameters of the crimp force monitor and/or wire end inspection device (tolerances, analysis regions, etc.) and enables these systems following the material and setup validation.

Production Reporting

Production data is captured in real time and compiled into production reports for traceability, quality, productivity, equipment utilization, and material usage.

Automating the production equipment with the work order not only supports a plant-wide process management system, but also supports cutter task sequence optimization, inventory management, and management of equipment and tool maintenance. A natural evolution of the QPM system is to automatically download the production work orders to the machine work cell based on availability. Tracking inventory would ensure sufficient material is available before a production task could commence... again a natural evolution of the system.

Maintenance

There is a high desire within the industry to manage applicator tool maintenance based on usage/cycles. The applicator tools have perishable components and wearing elements, requiring maintenance and component replacement before they reach a stage of wear that may lead to defective products, unnecessary scrap, and losses in productivity. The automated quality process management system naturally integrates with the process of managing tool maintenance on a predetermined cycle count.

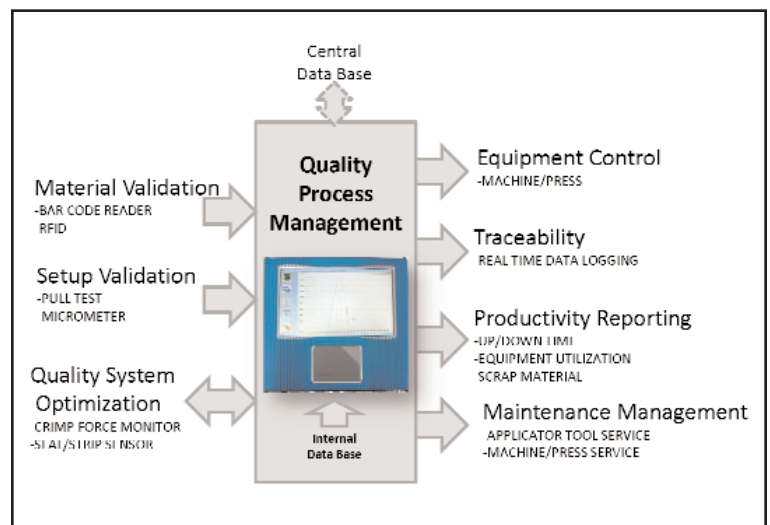
Deploying a plant wide Quality Process Management system means integrating or “bundling” technologies onto a common platform with a customer configurable DATA BASE. This data base contains all product data - material, specifications, and

The EQUIPMENT CONTROL ensures that the wire processing machine or bench press is controlled through the setup and production process so as to only produce product that matches the work order.

TRACEABILITY occurs automatically during the production run capturing all of the production and quality data referenced by time, work order, operator, machine, shift, etc.

PRODUCTIVITY REPORTING provides summary reports of the machine efficiency and productivity.

MAINTENANCE MANAGEMENT of applicator tools monitors and manages the accumulated cycle counts and flags



tools and/or presses that have reached their preset cycle count to scheduled maintenance ensuring an effective maintenance program

The potential benefits to the wire processing industry are abundantly clear - automation streamlines and simplifies plant floor processes for operations personnel; improves the production efficiency with reduced scrap and quality issues; and provides traceability and reporting in support of contin-

uous improvement... translating into significant costs savings. Like the retail business, manufacturers will soon begin to see the results of automation in wire processing and never look back.

Michael Reeve is VP of Product Development, OES Inc. He can be contacted at OES Inc., 4056 Blakie Road, London, ON, N6L 1P7. Phone (519) 652-5833 or email mreeve@oes-inc.com