PLAN, PLAN, PLAN

Sorting out the details of a control system implementation early in the game helps ensure a successful start-up.

By Theresa Houck, Executive Editor, The Journal

A major manufacturer implemented a new product-management system that would not only handle new palletizers, but eventually would handle the entire distribution facility, which includes more palletizers in the future. Here is one of the palletizer's discharge areas.

Any surgery requires detailed preplanning to ensure its success. CT scans, MRIs and myriad other tests pinpoint the problem. The surgery's procedures and goals are established. The insurance company's approval is obtained. The operation is scheduled. Doctors, surgical nurses, anesthesiologists and other staff review the case. The appropriate surgical equipment and supplies are laid out and ready for the medical staff. And an after-care plan for the patient must be in place.

A factory technology implementation project requires the same type of detailed preplanning. Without it, equipment, controls, people, time and money are wasted when start-up fails.

The key to a successful project is to focus on up-front engineering, working through the details in preparation for a smooth start-up, says Brent Stromwall, vice president of Polytron, a Rockwell Automation® Solution Provider.

"You can spend half of the project money for services during start-up," Stromwall says. "If we focus on a smoother start-up, then not only do we stay on schedule, but we can reduce our costs on-site and help the customer get to market faster." This critical focus on preplanning is one of the reasons a

major consumer products manufacturer selected Polytron to manage a technology implementation at one of its plants.

The manufacturer recently launched a major capital development project that included new production lines, expand associated packaging lines in its production facility, and a new warehouse building with associated finished goods handling and palletizing equipment.

Time to Upgrade

As part of this overall development, the manufacturer needed a product-management system for the new distribution system. The company decided to replace the Wonderware®-based legacy product-management system with the FactoryTalk® View Supervisory Edition (SE) system from Rockwell Automation® to enter product specifications such as case size, pallet requirements, pallet pattern, and whether a label was on a unit load or pallet load. The system distributed the data to programmable logic controllers (PLCs) that need the information when they receive the product.

> "Success is measured on how well you deliver your scope, the timing of when you deliver it and the cost for which you deliver it."
>
> — Brent Stromwall, Polytron, Inc.

The legacy system was outdated, making it difficult to update and maintain. "The requirements and specifications are constantly changing, so if the plant needed to add an additional field or PLC to the recipe or product-management system, it was very difficult to do," explains Michael Shell, Polytron project lead.

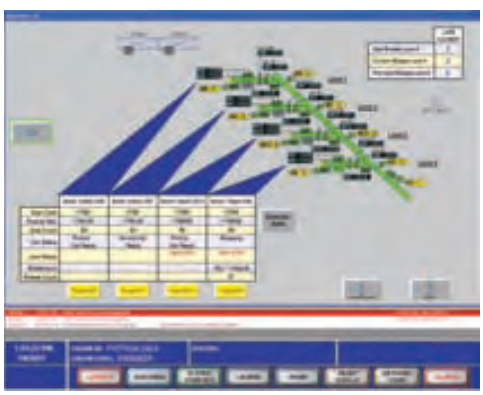
The new finished goods handling system would convey products from the new production lines to the new warehouse, where product is scanned, sorted, palletized and stretch-wrapped in preparation for loading onto trucks or storing in the warehouse. The new product-management system dissemi-

nates the necessary information to the conveying and palletizing equipment for proper handling and processing of the product. It would not only handle the new palletizers, but eventually would handle the entire distribution facility, which includes more palletizers in the future.

"Working with our strategic partner, E²M, our involvement included project management, vendor management, schedule oversight, capital costs, system design, conveyor control system automation and supervisory HMI/product-management system development," Shell says.

Polytron/E²M coordinated with the project team, which included Scott Richards, Polytron project manager; Michael Shell, Polytron project lead; and the manufacturer's engineering leader, project manager, engineering manager, mechanical lead and operations staff. Polytron also coordinated with all the OEMs — machine manufacturers for the sorter, conveyors, palletizers and stretch wrappers.

The manufacturer specified Rockwell Automation controls for the new conveyor system. Six control panels with Allen-Bradley® ControlLogix® Programmable Automation Controllers (PACs), Allen-Bradley® Bulletin 190 Compact Combination Starters (www.ab.com/go/tj190) and PowerFlex® 40 drives (www.ab.com/go/tjpf40) were designed to accommodate the conveyor controls. Communications between PLCs, remote racks and the supervisory human-machine inter-



This FactoryTalk SE HMI screen displays the viewing status of a conveyor 4:1 merge. A distributed FactoryTalk View SE HMI system shows the status of all conveyors and machines in the system.

face (HMI) system are performed using a multi-level Ethernet network.

A distributed FactoryTalk View SE HMI system shows the status of all conveyors and machines. Users can enter and distribute product information to the machines and conveyors. These conveyor controls connect with each machine's PLCs for system interface and control.

Polytron was responsible for programming the PLCs, the HMI stations and all the interfaces with OEM equipment. That included ensuring that the case flow and pallet flow was managed correctly for picking up the palletized product and getting it to the warehouse to load it on the truck.

Because the manufacturer had never applied FactoryTalk View SE to this type of application before, Polytron was challenged to make sure it performed all the functions the customer wanted. "We worked closely with the manufacturer's engineering and its IT groups in defining specifications for the HMI."

"Another challenge was to communicate with a computer-based sorter, which essentially is a black box that doesn't have access to the floor code," Shell says. "We had to interface our PLC controls with that computer-based sorter."

Preplanning is the Difference

"If you plan for start-up, it will go well," Stromwall says. "This requires a solid plan and supporting methodologies and tools to create a 'landing zone' for the project implementation."

This sorter is diverting product into accumulation lanes.

The first step in the preplanning process was to define the capital required for the manufacturer's Board of Directors' approval. This pre-capital

appropriation process included defining the project objectives, acceptance criteria, success criteria and other details early in the project life cycle. The project team also performed preliminary design and recosting.

Next, the team developed a functional specification. "We got a lot of involvement from the customer on this front-end document to define how the system will function, and we reviewed it several times to make sure the customer was happy," Shell says.

Polytron then used the details in this document to create the logic narrative

The team then performed the factory acceptance test (FAT) using Polytron's PolySim℠ modeling service. It's a service that provides static modeling in the design stages through full 3-D dynamic emulation in the execution phase to confirm that the objectives will be achieved. Stromwall says this methodology identifies issues in the field earlier — during design, rather than in the field — which reduces field changes to programming and builds confidence in the control system before entering the start-up phase.

"That enabled us to debug the controls and perform the FAT in our office," Stromwall explains. "We make sure the logic is operating as expected before getting into start-up."

> The manufacturer now can more easily change specifications and maintain the product-management system thanks to FactoryTalk View SE.

Shell says one of its biggest challenges was converting from a legacy system to the distributed FactoryTalk View SE system, which meant adopting this technology in a new way for the manufacturer. "We worked closely with the customer to make sure the system did everything they needed."

After the FAT process, the start-up phase began. The FAT occurred at the end of January, 2007. The new distribution system accepted new production beginning early March 2007.

Devil's in the Details

The new product-management system went online in March as well when the initial new production lines went live.

Shell says the manufacturer now can more easily change specifications and maintain the product-management system thanks to FactoryTalk View SE. "For example, the new sys-

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tem makes it easy to add additional specifications on a product recipe or to add PLCs for new palletizers," Shell says.

Polytron's EPTraining program for plant employees was critical to getting everyone ready for start-up and operation. "We have a training group with curriculum designers, technical writers, trainers, etc. Because we managed all the OEMs, we developed not only our training, but we managed the systems training for the OEMs," Stromwall explains.

Polytron's preplanning and attention to detail are what made this project's start-up go well and get the system up to performance acceptance levels quickly. "Success is measured on how well you deliver your scope, the timing of when you deliver it and the cost for which you deliver it," Stromwall explains. "In all three areas, we met the customer's expectations and, in some cases, exceeded it." □

Rockwell Automation Solution Provider Polytron, Inc., a systems integrator based in Norcross, Ga., provides electrical engineering, project management, and training services for manufacturing systems in the food, beverage, pharmaceutical, consumer products and water wastewater industries.

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