



No downtime or production losses thanks to new control software

TwinCAT controls canning line



→ McCall Farms produces a variety of canned fruits and vegetables that are distributed through all supermarkets in the southern U.S. under the “Margaret Holmes” brand. In line with strong product sales, there is a continuously high demand to meet store inventory levels. This requires efficient production with minimal allowances for equipment downtime and wasted product. Plus, according to a McCall Farms mandate, all products must be canned within ten hours of harvest.

High uptime is a crucial factor for the productivity of McCall Farms, located in Effingham, South Carolina. As part of a project to fully automate its 500,000 square foot plant, McCall Farms installed 4,000 feet of PROFIBUS-networked I/O wiring, numerous touchscreen HMIs and racks with 70 nodes consisting of Beckhoff I/O. “PROFIBUS (for all control) and Ethernet (for information and data gathering) were chosen for their speed and versatility,” Jason Durant, McCall Farms’ electrical engineer said. Three C3640 Industrial PCs from Beckhoff with TwinCAT automation software deal with process control tasks across the plant.

All equipment and departments are interlocked and kept in tight synch – from the prep room to the “porch” where the final product is unloaded for storage. Using the touchscreens, operators in each area are capable of stopping upstream production activity. The fill room can stop the inspection area if more product isn’t needed and similarly, the prep area can stop the porch. The control software used to be a weak link in the food chain. The assorted can and pouch types McCall Farms uses require up to four line changes a day. “An on-line change, as our previous software required, would sometimes cause computers to lock up, stopping the process and generally causing us to lose any food in production at that time,”

Jason Durant said. “Obviously, this was not a good situation and made us reluctant to make changes unless absolutely necessary.”

Flexible, easy-to-use programming speeds conversion

In 2002, the company began searching for a replacement controller software program. According to Durant, software had become a source of nagging problems. “When we contacted Beckhoff we were impressed by the comprehensive technical support,” Durant said, “In retrospect, the software changeover was an involved, but rewarding process. Another benefit was the cost advantage: TwinCAT licensing was about 25 percent less expensive than other offerings we looked at and, even better, there aren’t yearly upgrade fees.”

The User Defined Function Block (UDFB) capability of TwinCAT, which drew Durant’s attention from the start, turned out to be a major timesaver. “There was a lot of repetitiveness in our programming and the rungs were exactly the same with just different bits on them,” he explained.

He was able to convert his existing program files almost identically and then “streamline” the code. This saved considerable code space over the existing im-



The canning process

The McCall Farms canning process starts with fresh fruits and vegetables bought from farmers across the southeastern U.S. – peaches, corn, okra, squash, beans, leafy greens and peanuts. Once trucks reach the plant, each type of produce has its own unloading area where it goes through a series of wash tanks for thorough cleaning before being sent to a blancher.

Non-edible material and bad product is removed in the inspection area. The good product is sent to a filler, which puts the correct amount of food in each can. After the filler, the cans are seamed and sent to a continuous feed rotary cooker where they undergo cooking and cooling according to FDA standards. The cans are temporarily palletized and stored until ready for labeling. In the final stage, cans are brought to the label line where they're labeled, wrapped, palletized again and readied for direct shipment to purchasers.

TwinCAT eliminates downtimes and production losses in the McCall Farms canning line. The commissioning time was reduced by about 30-40 percent.



all involved without any major problems," Durant said. "We upgraded our existing HMI program, which directly links into TwinCAT via an OPC Server connection."

All feast, no famine

Recently, McCall Farms avoided considerable expense from potentially wasted product because TwinCAT runs in the Microsoft Windows kernel, and is independent of other operating system processes. A whitebox computer in their cook room locked up and Durant was unable to make an immediate corrective action. But because TwinCAT runs in the kernel mode, the process was able to complete without problem, resulting in zero loss of product.

"All five of our rotary cookers and all four of our pot cookers would have went down," Durant said. "This saved us several thousands of dollars that we definitely would have lost, had we still been using our previous software."

With what appears to be a winning automation fit, Durant and McCall Farms are confident in their future plans for the solution. "If we want to add a new piece of equipment or modify an existing process, it is very smooth and easy to implement," he said. "We're also able to easily simulate all of our changes off-line – without being physically connected to hardware. This allows us to optimize the code before running it on the plant floor. But overall, the biggest benefit has definitely been reliability and uptime on the line."

plementation but, more importantly, made the program much easier to modify and debug. "This amounted to about a 30 to 40 percent savings in programming time," Durant said. "We used three of the programming languages and tailored them to the area of the facility we were controlling. These are Sequential Function Chart, Structured Text and Ladder Logic programming."

The change-over has been so seamless that McCall Farms machine operators don't know that they've switched to TwinCAT. "It has been 'business as usual' for