

Case study

Blue Bell Creameries finds Siemens has the right ingredients

Upgrade with Siemens SIMATIC PLCs and Scalance WLAN gives new, more productive life to aging automated storage and retrieval system for venerable Texas ice cream maker.

Blue Bell Creameries opened its doors in Brenham, Texas in 1907. While its automated storage and retrieval system (ASRS) doesn't date back quite that far, it was beginning to show its age, with 20-year-old components starting to fail and causing significant delays.

Seeing the potential for disaster, Keith Jenkins, project systems designer for Blue Bell, raised a red flag with management and made the case for an upgrade. He wound up replacing five PLCs on each of its three ASRS units with a single Siemens S7 PLC and Siemens HMI along with a new

Siemens Scalance W wireless LAN. The new setup is so much easier for operators to use that Jenkins estimates the company has gained more than an hour and a half per crane per day in increased ASRS productivity.

What's more, the Siemens equipment has proven to be both reliable, even in the harsh Blue Bell warehouse environment where the temperature is a constant -20 degrees F, and easy to work with. "I've got 25 years of experience in programming various PLCs," Jenkins says. "Over the years, Siemens has been the easiest to program, easiest to negotiate and the most stable."

Showing its age

Given his history with Siemens equipment, and with the local Siemens distributor AWC, Inc., Jenkins was quick to check out what Siemens had to offer when it came time to replace his aging PLCs and communications system.

The PLCs were used to drive the ASRS units, which are large, manned cranes that run on a train track to move pallets of ice cream around the Blue Bell warehouse. Each of the three cranes was outfitted with five PLCs. A pair of Prolog "breadboard" PLCs were used to communicate with a back-end warehouse management system – a database containing information on what ice cream is stored in each warehouse location – and to communicate to the other PLCs on the crane. The other three PLCs controlled vertical and horizontal crane movements as well as the deposit and pickup of pallets.

All of the PLCs were about 18 to 20 years old, with some running DOS-based programs. The infrared communications system used to communicate from the cranes to the warehouse management system server was similarly out of date, making it difficult to get replacement parts for all of the systems. "If more than one device failed, we could be down days without one of our ASRS units, which would take out one-third of our capacity," Jenkins says.

Each crane was also outfitted with an interface unit that "looked like a point of sale terminal from 1982," says Adam Bailey, a senior engineer with Premier Automation, the systems integrator on the project (Premier has since been acquired by Tegron). The 6- to 8-inch green CRT screen was difficult to read and operators also had to learn a complex series of keyboard commands to move the ASRS units – F1 to move one way, control/F1 to move another shift/F1 for yet another and so on. Yet precise instructions were mandatory, given the size and scope of the warehouse environment, with cranes running on a track more than 500 feet long with pallets running 7 high and 4 deep – more than 7,000 spaces in all.

"It would take two to three weeks of training to get a new operator going," Jenkins says.

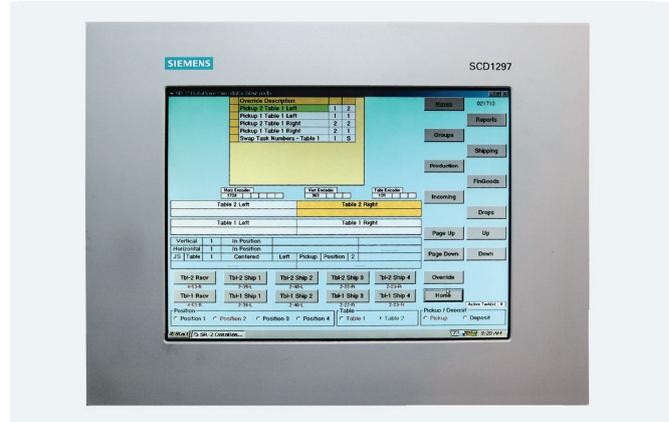
All in all, Blue Bell suffered a major ASRS breakdown every three to four months. "We'd blow a fuse on a power supply or have one of the PLCs or other pieces of equipment go out," Jenkins says. "It'd take 30 to 45 minutes, sometimes an hour to fix depending on what went wrong."

Birth of a solution

When he got the OK to begin the process of upgrading the ASRS control and communications system, Jenkins immediately went to AWC for a quote on some Siemens equipment as well as to a competing firm selling another brand. AWC brought in Premier Automation and Bailey to help with the design of the solution.

"Blue Bell wanted to have an integrated solution, with all the components from one manufacturer," Bailey notes. "With the immense range of products Siemens offers, we had a lot of different options to choose from."

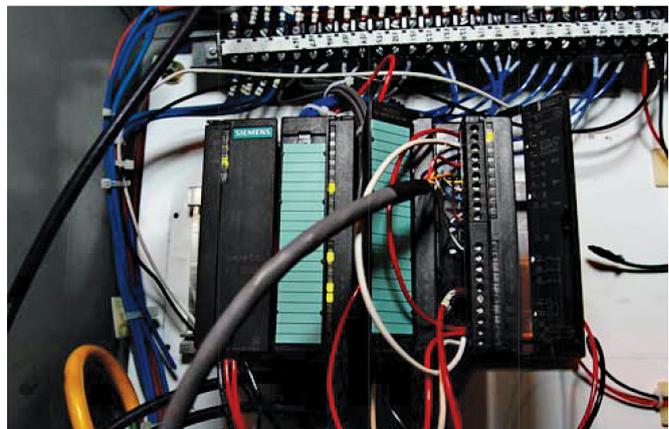
Ultimately, Premier's proposal included a single Siemens SIMATIC S7-300 PLC on each crane to replace all the existing PLCs along with a Siemens SCD1297 HMI, with a 12-inch color touch screen. The configuration also called for Siemens Scalance Industrial Ethernet Wireless LAN and SIMATIC ET 200M remote I/O, to replace the existing infrared communications system.



"The Siemens solution came in at about half the price of the competing proposal," Jenkins says. Perhaps more importantly, it worked as advertised in the tests conducted prior to installation.

Installation

For the installation, Jenkins, Bailey and his team had little margin for error, since the Blue Bell warehouse operates more than 18 hours per day, save for a break from Friday night till Sunday afternoon.



"We worked about 20 hours both the first day and the second," Adams says. After installing and testing the first unit in February 2007, Blue Bell and Premier spent about a month testing and tweaking it. The team used the same procedure to upgrade the second crane in March and the third in April.

One important consideration was that Premier was able to integrate the Siemens PLCs with the existing Blue Bell warehouse management system. The system was the result of years of painstaking work by Blue Bell to optimize routes around the warehouse in order to determine the most efficient position for each pallet.



“There was a tremendous amount of knowledge and learning in that database; it had to be kept,” Bailey says.

The Siemens solution made the integration straightforward, he says. The warehouse management system ran on a Windows-based server in the warehouse offices. With the Siemens WLAN equipment in place, it was a simple matter to establish a network connection with the server, given it was all Ethernet. And with lots of third-party drivers to choose from, Bailey had no problem finding one that would enable the PLC to talk to the Windows server. What’s more, he notes, the Siemens S7 programming language made it easy to translate a map of the warehouse, which was in a text file format, such that the Siemens PLCs could understand it.

AWC played a crucial role, too, Bailey notes. At one point, his team decided they needed to upgrade the encoders that keep track of crane positioning in the warehouse. “Even though that decision came in the middle of the night, we were able to get on the phone with AWC and they got us the part,” he says.

Results

Today, things are running more smoothly in the Blue Bell warehouse. From the first time they saw it, the ASRS operators loved the new HMI and found its touch screen simple to use. “You just touch one button and the crane goes where it’s supposed to,” Jenkins says, noting operators can also easily flip from one page to another to see what’s next on the agenda.

Such ease of operation saves valuable time in every crane movement, reducing the time to input each command from 15 seconds to 5 seconds or less. For each of the three cranes, that adds up to 90 min. in increased efficiency over the course

of an 18.5-hour day, Jenkins says – a total of 4.5 hours. What’s more, the system is so easy to use that operator training time went from about a week down to 2 to 3 days, he says.

Other benefits include increased uptime and reliability, Jenkins says. “It’s also cut down on our inventory of spare parts because we no longer have to go out and find used pieces of equipment that we can use for parts,” he says.

Servicing the new equipment is also a simple matter. In August 2009, Jenkins had to make some changes to the vertical and horizontal coordinates that the ASRSs use. “It took me about an hour and away we went. It’s that easy to deal with,” he says. And that was the first change he’d had to make in more than a year, a testament to the reliability of the Siemens equipment.

“In my eyes, serviceability was the biggest benefit,” Bailey says, bringing a service provider perspective. “And I know the reliability has been good – because I haven’t gotten any phone calls.”





Blue Bell at a Glance

Founded in 1907 as Brenham Creamery Company, in 1930 the company changed its name to Blue Bell Creameries, after the native Texas bluebell wildflower.

Produces some 250 different products

Available in 19 states across the South and Southeast

Ranks as one of the top three best selling ice cream brands in the country

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