

Brick Kiln Control



Distributed Control System uses Windows NT for enterprise-wide information transfer

The Cherokee Brick plant in Macon, Georgia has two kilns. While the kilns were relatively new, Kiln 02 was built in 1990 and Kiln 01 in 1993, the control systems were old. Old enough that repair parts were becoming impossible to get and the systems were no longer fully supported.

Choosing a new control system that would serve the plant well into the next century was the challenge for the system integrator, the late Frank Gatti of Energy Accounting Systems in Macon, Georgia.

Management at Cherokee Brick realized that an efficient flow of information would be necessary for future success. With an eye on the future, EAS had installed a fiber-optic backbone for a networked information system several years ago.

Design Goals & Constraints

- The system had to be reliable (i.e. have a long service life (MTBF).
- The system had to be easily maintained (short MTTR) with isolation between and among all functions and devices.
- The programming system had to be contemporary and use state (not ladder) logic. It must use engineering units at all levels in interaction with the operators. The Operating system of choice was NT, and the system would be asynchronously redundant.
- The conversion from the old to the new would be done LIVE (i.e. no shutdown was acceptable) and all electronic and programming efforts would have to occur while both systems were in full production mode. "I cannot emphasize too strongly that it was paramount that the new system have extreme isolation in *all modes, both physical and logical*" said system designer Frank Gatti.
- Cost containment was of great importance.

"Few control systems meet these requirements, and only FactoryFloor met all of them. The Project was started early in October 1996 and was functionally completed and in production by mid-March of 1997" said Gatti.

The Opto 22 Solution

The Opto 22 FactoryFloor software suite is a true 32-bit application designed for Windows NT which takes advantage of the distributed processing power of Opto 22's mistic controllers and intelligent I/O bricks. FactoryFloor consists of a control language, OptoControl, a man-machine interface called OptoDisplay, and a Sequel Server Database utility called OptoConnect. One of FactoryFloor's most powerful attributes is the use of a common database for control and mmi, resulting in fewer errors and dramatically-reduced development time.

The Sales Pitch

"Let's see if I have this right. I can be out on my boat with a notebook computer and a cell phone. I can call up my plant, look at my kiln operating temperatures and status, and even see real-time production information?"

The kiln operation is highly automated, with all kiln operation and product movement under computer control. The control system consists of two Opto 22 G4LC32 controllers, 56 analog I/O points and 310 digital

I/O points connected to 7 analog and 10 digital bricks. The controllers communicate with the 200 megahertz dual-Pentium processor via coax ARCNET, while the triple-redundant server communicates with the rest of the plant via a dual 100 megahertz Ethernet network. All controllers, bricks, and processors are supported by multiple, autonomic, redundant UPSs and power supplies.

The graphic power of NT 4.0 is utilized in the OptoDisplay man-machine interface screens. A single graphic overview of the entire kiln makes it easy for an operator to identify and correct problems.

Analysis of data recorded during normal operations has frequently allowed staff to identify and correct production-related problems which could never have been pinpointed without an automated data collection system. Increases in production and product quality and consistency have been dramatic.

NT Version 4.0 was chosen as the PC operating system because of its robust operating history as well as the ease with which enterprise-wide networking could be accomplished. As it is with most businesses, the PC based distributed network will be implemented in phases. The Opto 22 and Microsoft NT solution provides a strong cornerstone upon which to grow.

Work has already started on Kiln 01, the significantly-larger counterpart of Kiln 02.