

MANAGING automation™

FOR BUSINESS & TECHNOLOGY MANAGERS IN MANUFACTURING

MARCH 2002



**BUSINESS
CASE
STUDY**

3-02



dkodama@tpmgn.net.com

David Kodama

A Plant-Floor Handshake

Emerson's DeltaV digital automation system helps Solutia's plant-floor systems communicate to **improve production, scheduling, and planning.**

To efficiently run a plant floor with multiple manufacturing processes operating at any given time, a lot of handshaking between applications, controllers, and other devices is a must. When different areas of a chemical plant have to share production and inventory, that handshaking is critical to coordinating production and eliminating bottlenecks and inventory shortages. Solutia Inc.'s

(Decatur, AL) Acrilan Acrylic Fiber facility had a problem communicating production requirements and data from one area of its plant to the other, which was critical since both areas draw material from the same inventory.

Solutia's nylon division manufactures synthetic fibers sold under brand



David Montgomery
Solutia

names like Acrilan, Wear-Dated, and Ultron VIP. It also produces nylon chemical intermediates, cyanide intermediate, and acrylic fibers, and makes up about one-half of the company's overall sales volume. To manufacture acrylic fibers, the company first produces an acrylic polymer, dissolves it in a solvent, and

then spins it into a fiber. The solvent is then removed using water, the water-and-solvent mixture is reclaimed, and the solvent is separated from the water to be used again. In this process, it's important to know how much solvent is available and how much solvent-and-water mixture is in each of the plant's recovery areas. It's also important to know how much solvent and water is in each of the plant's two recovery areas.

The problem was that the two recovery areas didn't exchange data easily. The operators in each area had to communicate by phone to balance the load and check available solvent inventory—not a very efficient system. Solutia also faced the challenge of integrating two different systems. With the goal to get the two

IMPACT STATEMENT

Technology:



- Implemented Emerson Process Management's DeltaV system to automate plant operations.
- Integrated plant operations using Aspen Technology's InfoPlus.21 data historian and made the data available to operators on the plant floor.
- Deployed an Oracle database that replicates data from the historian for other plant applications to access.

Organization:



- Improved the efficiency of plant operations by providing operators with visibility into multiple areas of the plant.
- Put data and production decisions in the hands of operators to balance production levels and inventory.

Management:



- Reduced the time required of mid-level supervisors needed in the plant.
- Established company standards and cross-divisional teams to reduce staff.

DeltaV Upgraded to Version 6

Emerson Process Management's DeltaV version 6 is due to be released this month. Key new features include support for DeviceNet, redundant FOUNDATION Fieldbus and redundant I/O, FOUNDATION Fieldbus device alerts (to provide proactive maintenance messages to DeltaV from PlantWeb fieldbus devices), and neural-network logic added to the control suite of applications including model predictive control, continuous variability inspection, and simulation.

Emerson has sold and installed more than 3,500 systems worldwide since DeltaV was introduced in 1996. Target continuous process markets include oil and gas, refining, petrochemicals, chemicals, pulp and paper, and metals, mining, and minerals. Key batch process industries include pharmaceuticals, biotech, food and beverage, and specialty chemicals.

recovery areas to share data and better manage its inventory and production capabilities, Solutia had to get its DeltaV and PROVOX automation systems, both from Emerson Process Management (Austin, TX), to shake hands. "We needed better communication at the control level between operators," says David Montgomery, a Fellow in Solutia's Advanced Process Control Group. "We have two main recovery areas of the same size and we split the process between the two. These were pneumatically and electronically controlled." The systems are 1,100 feet apart and are connected by fiber-optic cable.

The north recovery area runs an Emerson PROVOX system connected to an Aspen Technology Inc. (Cambridge, MA) InfoPlus.21 data historian. The historian provides the south area with visibility into operations in the north area but it was only one-way communication. Plant operators, plant managers, and engineers were able to access data, but could only access information in the south by calling that area's operator on the phone.

The south recovery area runs an Emerson DeltaV system. That system didn't offer visibility into its data to other plant operators or managers. Why the different systems? "In the north, we had a PROVOX-based system already in place. We only had to add a controller. The south was a standalone control room with only the recovery unit and there was no infrastructure. When we decided to integrate our plant floor, we went with DeltaV in the south because it's a newer product and it's the future of the industry," says Montgomery.

At this level, operator consoles typically provide data about what the controller

is doing and the operator can influence production by changing the outputs, modes, or set points. DeltaV goes beyond that to let operators run console-based calculations. This way, developers can write rules that can recommend courses of action that the operator should take to improve performance.

To get the two systems to shake hands, Solutia looked to its software vendors to provide the answers. Emerson answered that challenge and created a product called OPC Mirror based on the OPC (OLE for Process Control) integration standard to help applications share data. OPC Mirror also provides a set of standards to which other vendors can write drivers. AspenTech took advantage of that and wrote an OPC driver that looks at the DeltaV database and automates the OPC Mirror process. "Emerson now offers a PROVOX/DeltaV integrator that is specific to those products and we plan to install that in a couple of months. It will let us run both controllers from either console transparently, which will merge our two systems. They'll still push information to the InfoPlus.21 data historian through the OPC drivers," says Montgomery. In Solutia's control system, operators can have various devices and modules displayed in different areas of their console. The operators can operate either system from a common location to adjust production levels. The data from both systems is automatically moved into a common historian and stored for a year.



For more information...

Aspen Technology Inc. www.aspentech.com Emerson Process Management

www.emersonprocess.com Oracle Corp. www.oracle.com

...or go to www.managingautomation.com/infolink

The Oracle plant database, another component of the system, is updated on demand and is accessible to other business applications. It merges the production data with data from the lab. "The Oracle database helps us schedule shipments of raw materials to the two intermediate processing areas. The availability of these raw materials at times has been a bottleneck. Now the generation of intermediate raw materials has been passed to the operators. The operators now make production decisions and the plant managers check the inventory levels," says Montgomery.

So far, this has worked well. Montgomery says there seem to be fewer interruptions in production, and plant managers have stepped back from the production process. It has also put more data in the hands of decision makers at all levels. "We are a textile operation and that takes people. Our strategy is to provide those people with as much data as possible. Our intent is to provide all process data to every operator within the Acrilan manufacturing organization."

By moving the responsibility to the operators, the company was able to operate without a number of low- and mid-level supervisory positions. Improving systems and eliminating positions at the same time made some users nervous at first. But once operators and other managers got over the perception that the system was going to replace them and they saw what they could do with the new system, "they embraced it and now accept greater responsibility for plant operations," says Montgomery.

Solutia's decision to standardize on Emerson technology allowed it to reduce its staff by sharing experience and development expertise between divisions. To upgrade the nylon division's control systems, Solutia formed a migration task force with people from other areas of the company. The group is developing a standards book using their combined knowledge to support future projects. MA