

CONTROL ENGINEERING

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Advanced Technology Exceeds Expectations

Commissioning time reduced by three weeks, HMI greatly improved, and operators say new production line runs "best."

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Editor's note: This account is a first-person experience, written by the engineer who was personally involved in the plant improvements, hence the occasional personal references.

Using smart field instrumentation and bus-oriented plant architecture contributed to the timely startup of a new thermoplastic elastomer (TPE) production line for Advanced Elastomer Systems, L.P. (AES), in Cantonment, FL. AES, an ExxonMobil Chemical affiliated company, had set corporate objectives for the new line that included improved equipment reliability, reduced maintenance costs, and easier operation with maximum output.

Despite falling behind on the project schedule

due to two very active hurricane seasons, plus the resource and people drain in the aftermath of hurricane Katrina, we recovered some lost time through wiring efficiencies and fast startup. The original plan estimated a four-week instrumentation commissioning period, but that was reduced to just eight days.

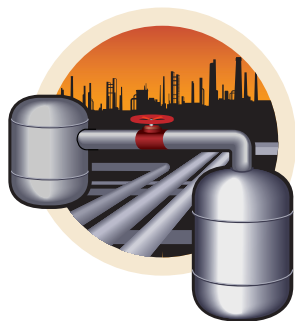
AES added the new production line as part of an expansion designed to maintain its position as a leading supplier of TPEs with approximately 30% of the worldwide market. Global demand for these elastomers is expected to grow at about 6.4% annually through 2007, according to a 2003 study by the Freedonia Group, Inc.

Advanced control technologies were specified to take advantage of the diagnostic capabilities of intelligent field instrumentation as well as installation efficiencies of bus architecture. For example, FOUNDATION Fieldbus networks, AS-interface for discrete I/O, and Ethernet/IP were implemented using Emerson's PlantWeb digital plant architecture. For the most part, the fieldbus network eliminated the jumble of wiring and large junction boxes of traditional distributed control systems. As a result, control system wiring costs on this project were reduced by approximately 15%.

We realized additional benefits during the commissioning, startup, and operational phases. As previously



The new production line at Advanced Elastomer Systems' plant in Cantonment, FL, is now a model of best practices for the company.



indicated, the time required to install and commission some 300 smart devices was shortened by approximately three weeks, partly because the instruments arrived from the vendor already configured and network-ready, so very little troubleshooting of individual devices was necessary as they were ready to plug in and test.

Advantages of asset management

Using an asset management application to communicate with field instruments for commissioning saved us a significant amount of time. Formerly, a multi-craft team would have to locate each device in the field, check wiring, and communicate by radio with the control room to verify each control loop. Using Emerson's AMS technology, however, a single technician was able to communicate directly with each instrument from the control room, confirm that device's functionality with an observer in the field, and move on to another device without anyone having to open instrument covers or an I/O cabinet. As a result, a smaller group of AES technicians was able to complete loop checkout in record time.

The fieldbus system worked well from the very beginning. There have been no calibration issues, a fact which in itself exceeded our expectations. Operators attribute this in large part to the versatility of the asset management application.

The same software now monitors these devices for maintenance purposes. If the condition of a device or associated equipment falls below certain predetermined limits, a status alert lets line operators know there may be a problem and a technician can investigate further online without ever going out to look at the device. Frequently, our personnel can determine directly from the interface whether a device is reporting correctly and, if not, what is causing the problem. The ability to view device status and diagnostics is what sets this technology apart from traditional, process-of-elimination troubleshooting procedures. It provides actionable information that simplifies device maintenance, equipment availability is greater, production is more reliable, and output is maximized. This has helped us to achieve some of the stated objectives for the new line.

Those objectives are further supported by the new digital plant automation system, which is designed to complement and work with the smart field devices on the bus networks to control the production process. It uses automated control design that is a generation beyond the legacy distributed control systems that operate the existing TPE production lines in this plant. Not wanting to copy existing operating procedures (and thus perpetuate known deficiencies of those systems), our people worked hard to understand the new technology and learn how best to apply it to the requirements. When it came down to specifics like the order of events, temperature and flow parameters, as well as

control monitor graphics, we relied on the experience of the operators who would run the system.

Operators love new HMI

The DeltaV automation system features functionality that is frequently described as "awesome." The operator interface is the most informative and the easiest to use of any in this plant. Since plant operators may be assigned to any of the production lines in the plant, they must be trained and capable of working with both systems. Some operators were resistant to the change because they felt the new system would be more complicated and more difficult to operate, but they found the opposite was true. After moving from one line to another, most of our operators agree that this new system is the best and have become true believers.

We began the commissioning process early in June 2006, and the line first produced test material in July. After completing an extensive internal certification process, material for shipment and sale was available in early October. Due to startup-related process equipment issues during this time, we needed more onsite support from the control system vendor than originally anticipated. Emerson exceeded our expectations, providing very capable assistance.

Things have operated smoothly since startup, with only three incidents requiring instrument troubleshooting. The diagnostics capability of AMS device manager shortened that process, because it enabled our maintenance staff to pinpoint each of the problems quickly. One field device failed very early, and in the other two cases, wire terminations had loosened. In each case, the problems were easily identified and corrected without affecting production. Our maintenance technicians are very impressed with this technology, although the reliable equipment on the new production line has not given them much cause to use it.

AES believes this unconventional architecture is the way of the future. The diagnostic capabilities and ease of working with the control system, coupled with excellent field instrumentation, have attracted many positive responses at this plant. If Advanced Elastomer Systems builds another new TPE production facility, these technologies represent the best practices that we will likely implement. **ce**

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