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**Paul Rogers
Systems Engineer**

Elk Improves Product Quality and Lowers Plant Operating Costs

Elk, a leading manufacturer of roofing shingles, employs IndustrialSQL Server, ActiveFactory and InTouch software to improve product quality and lower operating costs

Shafter, Calif. — Food, water and shelter. At the most basic level, these are the three critical requirements for survival. Elk, a provider of premium-quality roofing materials, is in the business of making sure people don't have to look up when they come in from the cold.

Elk has developed an outstanding reputation for its high-quality laminated asphalt shingles. A key contributor to this success is the company's adoption of state-of-the-art technologies in its production facilities -- including the use of automation systems that streamline the manufacturing process.

In 1994, the company poured the foundation for a new manufacturing plant in Shafter, Calif., and selected Wonderware applications to manage a variety of functions, from product manufacturing and quality control, to systems safety and maintenance. With Wonderware's InTouch, SPC Pro, IndustrialSQL Server,

ActiveFactory and FactoryFocus applications, Elk Corp. today is running a highly automated facility which operates 24/7 to keep up with the housing construction boom which has fueled market demand for its highly regarded roofing materials.

Elk has been producing roofing shingles since 1955 and many consider it the top choice of architects, builders, professional roofing contractors and homeowners around the world. Elk offers premium laminated fiberglass asphalt shingles that are not only attractive, but boast an extended lifetime. The company operates four manufacturing facilities in the U.S., all of which use Wonderware technology to produce quality shingle products.



An Elk manufacturing plant in Shafter, California



Wonderware's plant intelligence products enable Elk to deploy customized applications for manufacturing premium-quality roofing materials.

Initially selected because it was one of the only HMI solutions based on the Microsoft® Windows® operating system, Elk rolled out Wonderware's InTouch software for visualization and industrial process control. The application's ease of use and simple-to-configure graphics enabled the company to quickly create and deploy customized applications that connect and deliver real-time information.

According to Paul Rogers, systems engineer at Elk Corporation of Texas, located in Shafter, the company has continued to upgrade its technologies since the plant opened more than nine years ago, including new Wonderware applications that he credits for having a tremendous positive impact on overall production efficiencies and product quality control - most notably the use of the IndustrialSQL Server real-time plant historian and its related plant intelligence applications.

"We installed the IndustrialSQL Server historian three years ago and it has been an invaluable tool to us throughout the organization," said Rogers, whose responsibilities include plant automation and system controls. "We use it to perform troubleshooting on the factory line, assist with preventive maintenance and identify opportunities for quality and production control improvements."

Plant Intelligence - A Window into the Manufacturing Process

Most people agree that the key to producing a quality product is to have a well-run factory. But how is this accomplished? Wonderware's answer is to implement an effective plant intelligence process that delivers plant performance information collected from real-time production data.

As a "green field" site, Elk's Shafter plant was built with an emphasis on establishing a technologically innovative manufacturing facility. Said Rogers, "We soon realized we needed to expand our data collection efforts to provide more detailed plant information that would assist in maintaining the overall health of the manufacturing process as well as provide vital information about product quality. To accomplish this, we chose to implement IndustrialSQL Server and ActiveFactory software."

As a real-time plant historian, IndustrialSQL Server software provides the backbone for Wonderware's plant intelligence solutions. The IndustrialSQL Server historian and associated data analysis tools provide plant decision-makers with immediate access to detailed, real-time plant information, which leads to actionable plant intelligence. The IndustrialSQL Server historian automatically acquires real-time production data at high speeds, at full resolution, and from multiple simultaneous data sources, and combines them to provide a complete, real-time picture of a plant's processes. With IndustrialSQL Server software, Elk can now collect data from 6,500 points every two seconds and keep more than 2 ½ years of data, which can be accessed at any given time to assess the plant's productivity levels. With this deep visibility into both current and historical information, subtle process inefficiencies and product quality problems can be identified and corrected immediately.

For example, Elk uses the IndustrialSQL Server historian to monitor the operation of its plant-floor Blue Max motors, which feature Siemens drives. The data collected by IndustrialSQL Server software enables plant management to monitor the motors' operations as well as when and if maintenance is necessary. The same monitoring is done on the manufacturing facility's pumps and pressure valves.

The IndustrialSQL Server historian also assists with the facility's material "call-overs" - a process of moving raw material products from storage bins to the production line. It monitors the timed process to supervise production efficiencies and machine operations. A slip in the average time of moving materials may indicate possible machine problems, such as a belt slipping, or a clog in the silo that houses the raw materials.

"Before implementing IndustrialSQL Server software, we relied on the gut feelings of our plant-floor operators to determine if a problem was imminent, or we had no choice but to let something happen," Rogers said. "Now we can program preset event tags in the IndustrialSQL Server historian which will inform plant operators when a piece of equipment deviates from its preset operation parameters. This enables operators to quickly address

situations and bring in maintenance staff when necessary."

For example, Elk uses Wonderware's SPC Pro to monitor two critical elements: the manufacturing process and finished goods. SPC Pro is a statistical process control (SPC) package for InTouch software, which enables manufacturers to use real-time data to monitor, predict and make online adjustments for production quality and consistency. The Quality Assurance (QA) personnel at the finished goods end of the production line analyze the product as it comes off the line and report quality information to the SPC system. Engineers on the production end have access to this data and can make adjustments to the production process to address any problems QA finds in finished product without shutting down the line. Additionally, by tracking the weight of each bundle as it comes off the line, SPC Pro enables Elk to monitor the usage of expensive materials.

"We get a tremendous amount of value through quality control and assurance," Rogers said. "The ability to make constant adjustments based on each batch enables us to operate much more efficiently. Also, asphalt is a key ingredient in producing roofing shingles and it is very expensive. So by using less we save a lot of money. In fact, for an initial investment of only \$23,000, SPC Pro has generated savings of \$45,000 each year."

Moreover, by incorporating Microsoft's SQL Server technology, the IndustrialSQL Server historian seamlessly integrates data from other plant and business systems, providing a common point of access for production data and a single interface between production and business systems.

The Wireless Advantage

In addition to these tools, Elk has adopted a wireless strategy at the Shafter facility, which keeps managers and executives in touch with what's happening at the plant at all times, giving them the ability to respond instantly to problems regardless of their location.

Through the system, data is pulled out of the IndustrialSQL Server historian at preset events, such as shift change, and transmitted to managers and executives via the e-mail system. For example, each day a set of production reports is sent to managers' wireless Blackberry™ PDAs.

"This gives us the ability to respond a lot faster," Rogers said. "If there is a problem on the line, I can be notified immediately on my Blackberry PDA and quickly address it."

In addition, Elk has deployed FactoryFocus software, enabling managers to access a complete picture of what's happening on the line before they take corrective action. With this tool, managers can view data from their offices and homes via a broadband connection and the Elk virtual private network so they don't need to go to the floor every time an issue arises. FactoryFocus also is running at a few stations on the line where there is an information requirement, but control is not necessary.



Quality shingle products are produced with the help of Wonderware's plant intelligence products at four of Elk's U.S. manufacturing facilities.

"This flexibility has improved both the efficiency of the plant and the quality of life for our staff," Rogers said. "Our general manager runs the system at home, so he doesn't have to go to the site to solve a problem at 2 a.m."

Additionally, Elk uses wireless technology to improve safety on the plant floor. Cisco wireless devices are used to facilitate the implementation of new equipment. Now, this equipment can be started and monitored remotely via laptop using the wireless hub. Thus, if machinery fails, no factory personnel are in close proximity where they can potentially be hurt.

Going Forward

The next step in Elk's process of continuous improvement and evolution will see the InTouch software linked to the plant's maintenance system. By utilizing vibration monitoring equipment on key pieces of shop-floor machinery, the InTouch HMI can constantly measure performance against a set of preset optimal performance specifications. If the machine falls out of spec, InTouch software can instruct the system to issue a work order for maintenance.

"We've modeled it and it works," said Rogers, who added that it will give the preventive program a real boost. "We'll be able to repair problems before they become line-stopping catastrophes or have a significant impact on the quality of the product and cause the waste of raw materials due to scrapping sub-par shingles. This is just another way Wonderware software is going to save us money."

Dallas-based Elk has been manufacturing premium shingles and roofing products for nearly 50 years, and is a subsidiary of ElkCorp (NYSE: ELK). www.elkcorp.com.

Solution Overview

Industry: Construction - roofing shingles

Software

- InTouch HMI
- SPC Pro
- IndustrialSQL Server historian
- ActiveFactory reporting and analysis clients
- FactoryFocus software

Hardware

- 10 Allen-Bradley 540e PLCs
- Profibus for Siemens drives
- Cisco switches with Fiber optic gigabyte backbone
- AB data highway plus for PLC to PLC communications
- Dell Computers
 - 12 operator stations using InTouch software
 - 8 FactoryFocus nodes
 - IndustrialSQL Server software with 10-user license

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