



Case Study: Fulghum Industries

Opto 22 SNAP PAC System integrates with Allen-Bradley® RSLogix™ platform for wood handling processes

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43044 Business Park Drive • Temecula • CA 92590-3614

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CASE STUDY: FULGHUM INDUSTRIES

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BACKGROUND

Fulghum Industries, Inc. (www.fulghum.com) provides heavy-duty industrial machinery to the forest products industry. The company's product line includes saws, chippers, loaders, conveyors, log handling cranes, drum debarkers, turnkey woodyards and chipmills, all designed to effectively transport and process wood into woodchips and usable wood fiber for manufacturing pulp and paper products, animal bedding, and other goods. To provide additional value to customers, Fulghum also offers a variety of services, including consulting, engineering, construction, and start-up.

Fulghum was also one of the first companies to implement remote wood processing facilities (woodyards) adjacent to paper mills and other customers' facilities, and has established operations of this type for major pulp and paper companies.

Increasingly, in operating these woodyards, Fulghum has been called upon to integrate its equipment into environments that include sophisticated wood handling machinery that very often has its own embedded control systems. At some woodyards, this machinery includes stacker-reclaimers manufactured by Bruks® Rockwood LLC (www.rockwoodinternational.com), which serve the

purpose of recovering and stacking woodchips into stockpiles of up to 6 million cubic feet.

"Stacking and reclaiming of stockpiles is one of the basics of materials handling," says Fulghum's John Lewis. "Besides simply keeping facilities neater, safer, and more organized, it also speeds up processing and provisioning of material to the customer, while reducing manpower requirements for facility operation and maintenance."

Packaging Corporation of America (PCA) is a world-class manufacturer of container board and corrugated packaging that produces about 2.4 million tons of container board and ships 31.2 billion square feet of corrugated products annually.

The Rockwood stacker-reclaimer located at the PCA facility in Valdosta, GA includes an Allen-Bradley control system, which communicates via EtherNet/IP™, an industrial application-layer protocol developed by Rockwell Automation® (Allen-Bradley's parent company). This stacker-reclaimer is basically a belt conveyor on a crane boom that builds a kidney-shaped pile.

"The reclaimer's design is similar to that of a giant chainsaw, with a massive boom that rotates and then rakes woodchips back from the stockpile to load onto conveyors," says Lewis. "This machinery is outfitted with variable frequency drives (VFDs) regulated by Allen-Bradley controllers that, among other functions, speed up or slow down recovery of the wood chips."

TWO CONTROL SYSTEMS

Birmingham, Alabama-based systems integrator Electric Machine Control (www.emcinc.biz) was subcontracted by Bruks Rockwood to program the reclaimer's Allen-Bradley control system. Apart from this, Fulghum has responsibility for the myriad of other equipment at the woodyard—such as the log handling cranes, debarkers, and conveying systems it provides—for which Fulghum uses different control systems, including Opto 22's SNAP PAC System™.



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"We use the SNAP PAC System for controlling the conveying systems that handle materials from our woodyard chipper and debarker, as well as from two truck dumps," explains Lewis.

Fulghum also uses the SNAP PAC System for monitoring chipper motors' amperage, temperature, oil pressure, and other conditions.

INTEGRATING DISPARATE CONTROL SYSTEMS

Improving operations at a woodyard where critical control processes are handled by hardware from multiple vendors proved challenging for Fulghum and its integrator partner, Advanced Control Solutions (www.advancedcontrolinc.com). The two companies had worked together on multiple large projects and were very happy with the performance of the SNAP PAC System, which they valued for its distributed control architecture, easy programmability, and reliability.

The stacker-reclaimer, meanwhile, remained inextricably dependent on its embedded A-B control system. As time passed, however, the scope of operations at the woodyard



Rockwood stacker-reclaimer (center) at Packaging Corporation of America's Valdosta, Georgia, facility.

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began to expand. Fulghum, ACS, and Electric Machine Control found themselves having to respond to new control system performance requirements.

As new processes were added and others were modified, newly added equipment and instrumentation needed to be switched, and operating conditions and equipment states needed to be closely monitored. In some cases, alarms needed to be established to warn when conditions (or machine performance) deviated out of specifications.

Systems Engineer Sean O'Rourke from ACS implemented and configured new SNAP analog and digital I/O and controllers to add the needed functionality. Electric Machine Control customized and fine tuned changes to the Allen-Bradley ControlLogix® PLC and control programs.

A primary goal from the start of the project was to interconnect the two control systems for data throughput and operational coordination. Lewis says it was imperative to find a way for these two seemingly mismatched systems to not only coexist, but also to communicate and share information. It was determined that the best way to accomplish this would be to maintain the local Opto 22 distributed system while utilizing the plant-wide Ethernet TCP/IP network.

MAKING IT ALL WORK

A solution was found with Opto 22. The company had recently added support for Allen-Bradley's EtherNet/IP protocol, which provided a method for the SNAP PAC System to communicate directly with the Allen-Bradley PLC.

"All of our new standalone and rack-mounted controllers, as well as our I/O, support EtherNet/IP," explains Opto 22 Senior Application Engineer James Davis. "Once enabled, our I/O can be added to Logix platforms and communicate with PLCs with no programming required. Also, Opto controllers can serve as 'slave' devices [or adapters] in the Logix architecture."

O'Rourke worked with Electric Machine Control to interface to the Allen-Bradley PLCs via fiber optic



Fulghum Industries provides conveying systems and other heavy duty equipment for the woodyard in Valdosta.

connections that provided a reliable, high bandwidth, long-distance physical medium with a high degree of noise immunity.

Reconciling two disparate control systems, each very powerful and having its own strengths, is becoming quite common for systems integrators like ACS and Electric Machine Control, because increasingly, end-users are looking for a broader variety of options as they build or modify their control systems.

Davis believes that instead of being locked into the platform or products of a single vendor, many customers want more latitude and the ability to use best-of-class technologies to homogenize their systems with no hiccups or sacrifices in performance. "Ultimately, it's just about giving customers more choices and the ability to use the right tools to accomplish their goals," he says.

AN EASY INTEGRATION

For Fulghum, implementation of the Allen-Bradley-Opto 22 system project was accomplished simply and easily. Integration that normally would have taken lengthy software development time was accomplished in no time.

"Configuration and setup was simple," O'Rourke says. "We only needed to define the assembly instances and assign

inputs or outputs, then specify the number of bits for how long each instance was going to be."

This configuration was then downloaded to the Opto 22 SNAP PAC, and all that remained was to configure the Allen-Bradley RSLogix software and define communication to the SNAP PAC as a "Generic Ethernet Module."

"It was very seamless and for the few issues we did have, Opto was always there to provide support," O'Rourke says.

WHAT'S NEXT

Fulghum is next considering working with customers—such as the owners of pulp and paper mills where Fulghum has established its woodyards—to extend the reach and capabilities of EtherNet/IP

communication. Lewis says many of these customers use the ControlLogix platform for process control within their facilities and would likely find great value in being able to aggregate and combine operational data relating to their manufacturing and processing equipment with information from the woodyard.

Fulghum customers could also choose to modify or expand their existing A-B system with SNAP I/O and in the process gain new distributed processing capabilities.

"Our I/O can perform sophisticated functions like PID loop control, ramping, scaling, and thermocouple linearization, independent of the PLC," explains Davis. "Customers will no doubt see the value in off-loading these tasks from their Logix controllers and realize the benefits of having intelligent remote I/O in the field."

ABOUT OPTO 22

Opto 22 was started in 1974 by a co-inventor of the solid-state relay (SSR), who discovered a way to make SSRs more reliable.

Opto 22 has consistently built products on open standards rather than on proprietary technologies. The company developed the red-white-yellow-black color-coding

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system for input/output (I/O) modules and the open Optomux® protocol, and pioneered Ethernet-based I/O.

In early 2013 Opto 22 introduced *groov* View, an easy-to-use IoT tool for developing and viewing mobile operator interfaces—mobile apps to securely monitor and control virtually any automation system or equipment.

Famous worldwide for its reliable industrial I/O, the company in 2018 introduced *groov* EPIC® (edge programmable industrial controller). EPIC has an open-source Linux® OS and provides connectivity to PLCs, software, and online services, plus data handling and visualization, in addition to real-time control.

All Opto 22 products are manufactured and supported in the U.S.A. Most solid-state SSRs and I/O modules are guaranteed for life.



The company is especially trusted for its continuing policy of providing free product support, free training, and free pre-sales engineering assistance.

For more information, visit opto22.com or contact

Opto 22 Pre-Sales Engineering:

Phone: **800-321-6786** (toll-free in the U.S. and Canada)
or **951-695-3000**

Email: systemseng@opto22.com

