

# Implementing On-the-Fly Motor Phasing

Siemens Industry, Drive Technologies & Motion Control

Located in Glen Carbon, Ill., near St. Louis, FASTechnology Group (FASTech) is an industrial controls system integration and manufacturing company that specializes in turnkey automation systems.



*Siemens Simotion package combines motion control, drive control, and logic control.*

With its core expertise in the commercial printing industry, FASTech is often called upon to affect changes in the control architecture and drive mechanics on the very largest printing and bindery equipment in the industry. Over recent years, the company has developed its proprietary FASTpro bindery line control systems, along with application-specific software tools, to streamline the operation and data transmission to and from the bindery floor.

One recent job involved the rebuilding of three machines that constituted a major binding operation at Arandell, a leading magazine and catalog printer in Menomonee Falls, Wisconsin.

A 30-year-old binding system, while still in solid mechanical and framework condition, had worn and obsolete controls onboard. This condition made it virtually impossible for the company to add needed functionality to the system while maintaining an integrated control and communication architecture. Arandell turned to FASTech for assistance on the gatherer, binding, conveyor, and trimming process stages of their system.

The goals for the project were several and some were quickly implemented by the

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rebuilder. An automatic lubrication system for the main drive chain was needed, with a user-settable interval of application. Likewise, a marquee for alarm annunciation was sought and two 20-character overhead displays were installed, enabling a clear view of the machine status from anywhere near the machine. These displays were controlled by the Siemens Simotion D-series processor, using the corresponding serial interface module.

The key goal, however, was the implementation of on-the-fly phasing between the motors on the machine.

Each motor controlled a section of the multi-staged conveyor system in the binding operation. The customer wanted to have the product hand-off points between each conveyor section be adjustable while the machine was in operation. Likewise, full motion control integration of up to 10 conveyor sections was needed, as was the elimination of a clutch assembly between two sections of the machine.

Prior to the retrofit, these two sections were driven with one motor, equipped with a single planetary gear between the sections. This single motor was replaced with two motors and the planetary gear was replaced with an electronic lineshaft, also provided from Siemens. This particular modification provided greater control of the product transfer between the two sections, which facilitated a smoother transition over a greater range of machine speeds.

By updating to this new platform of control and with the training provided onsite by FASTech, Arandell realized a significant 20 percent improvement in throughput of the overall binding machine operation. Moreover, the system could be more easily modified by plant personnel, who likewise had the cross-training skills to operate multiple sections of the overall machine.

Three separate machines at the facility were updated by FASTech, all utilizing the Siemens Sinamics S120 drive and Simotion D drive platform, which combined the motion control, logic control and drive control into a single system that essentially became the machine controllers.

In tandem with the complementary hardware and HMI provided by the control supplier, this drive system functions as a common platform/interface for the entire Arandell bindery operation which significantly simplified operator cross-training to allow the printer considerable flexibility in machine crewing. Furthermore, this FASTech customer could now keep fewer spare parts in stock. And finally, the plant communications were enhanced, as the entire system now runs on a single Profibus network.

Detailing the project, Dave Carlos, FASTech's vice-president of sales and marketing, noted, "We evaluated the project and determined our architecture needed to be very flexible, expandable, easy to install, set up and operate for the customer's plant personnel. Because so many on-the-fly handling and transition modifications are present in the various magazines and catalogs produced here, we also had the challenge of making the system work at a very cost-effective level."

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He further noted the architecture and hardware chosen needed to be reliable and easily serviced, making his choice of Siemens the best match for the performance and support criteria on this project.

Jeff Mills, vice-president of engineering at this integrator, added, "The Simotion architecture with its integrated motion controller and PLC controller, allowed us to perform advanced motion control along with normal PLC level logic. The modularity of the line we chose further allowed us to take the functionality we had developed for our customer and apply it elsewhere on similar machine retrofits. Recently, we've accomplished rebuilds on four perfect binders, seven saddle stitchers, four stackers, a stand-alone trimmer and mail table, plus numerous machines outside the commercial printing industry, as the result of this platform."

In addition to the printing industry, FASTech also serves a number of automated manufacturing concerns in the automotive, aircraft, packaged goods, food/beverage, military and pharmaceutical markets.

For more information visit [www.fastechgroup.com](http://www.fastechgroup.com) [1] or [www.usa.siemens.com/motioncontrol](http://www.usa.siemens.com/motioncontrol) [2].

*Mr. Padraic Hagen-Stapleton, project engineer at FASTech, supplied additional information for this story.*

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