Modicon® Momentum™ PLC significantly reduces bindery process time

Heckman Bindery, located in North Manchester, IN, employs approximately 250 people. They are a service organization whose primary business is that of providing hard cover bindings to protect books and periodicals in high use environments. According to Tim Baker, Maintenance Manager, their customer base typically consists of university, law, and medical libraries, as well as the Library of Congress. They will put new cases or covers on books with worn covers, put hard covers on paperback books, and bind 6 to 12 issues of periodicals into one hardbound volume. The company has maintained a single location for its 73-year history and is the respected leader of a small industry. Heckman produces 8,000 pieces per day from their single location.

Application

The process of putting a new cover on a book begins by removing the old cover and reattaching the leaves of the book together. A barcode is then applied that identifies all the pertinent information. This cover-less book is called a "text block." This text block is then measured and the binders board used for the cover is cut to size, the spine reinforcing inlay is cut, and the proper size cloth cover is imprinted and cut. All these case parts then pass through the "case making" process where all parts of the case are glued together. The text block is then inserted into the case and the two glued together. Historically, each of these processes was performed at individual stations in batches of 100 pieces at a time. When the operation was completed on 80% of the batch, the portion finished was released to the next operation. With 60,000 to 70,000 pieces in process at one time, this batching required a significant amount of space and time. It would typically take 7-8 days to complete the processing of the product.

Objective

- Further implementation of Lean Manufacturing
- Reduce time in process for products
- Maintain or better the quality of product
- Ability to run a "batch of one"

INDUSTRY
Bindery

OBJECTIVE
- Reduce process time
- Maintain or better product quality
- Ability to run a "batch of one"

SOLUTION
- Modicon® Momentum™ PLC
- Altivar® variable frequency drives

BENEFIT
- A significant reduction in "time in process" for each piece
- A "batch of one" where each and every book can be different
- Consistent high quality maintained
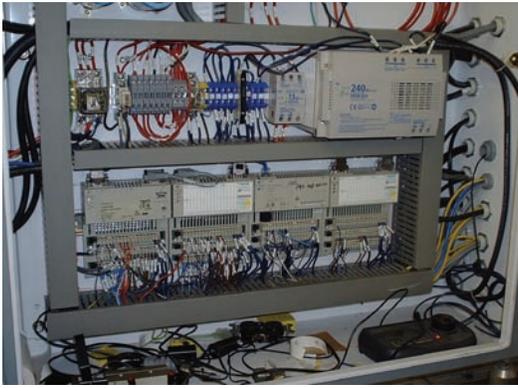- The ability to serve more customers over a broader geographic region

COMPANY
Heckman Bindery
North Manchester, IN

Merlin Gerin
Square D
Telemecanique

**Schneider Electric**
Building a New Electric World

Solution

Heckman personnel approached Bob Tenney of ERS Automation in Columbia City, IN, to automate the individual operations into one process. The end result is the Case Component Line (CCL) which automates the operations of sizing and cutting each piece of the case. In choosing the controls, Bob's PLC of choice for this application is the Modicon® Momentum™ PLC because of its communication and distributed I/O capability.

The Momentum PLC's Ethernet network was used to communicate to a computer for operator interface and data collection. Ethernet tophats were also placed on Momentum modules provided by Integrated Industrial Technologies, Inc. (I²T) and Niobrara Research & Development (NR&D), both members of Schneider Electric's Collaborative Automation Partner Program. I²T's module is used to control stepper motors. NR&D supplies a Momentum Universal Communications Module (MUCM) that is used to interface the PLC with a bar code reader, a vision system, a laser binders board cutter, and other serial devices. By using the I/O Bus system on the Momentum processor, the I/O was distributed into five different electrical enclosures mounted in various locations. Altivar® variable frequency drives power the conveyors that take the text blocks and their associated case parts to the final assembly location. Various other Square D parts, such as transformers and pushbuttons, were also used.

Once the barcode on the text block is scanned, the operator places the text block on the conveyor, which carries it to a measuring station. At this station, the text block is precisely measured by a vision system and this dimensional data is then communicated downstream as the text block moves past each operation. As the text block moves down the conveyor, it stops at each station where the individual pieces for the case are automatically cut to dimension, printed, and stacked by the text block. At the end of the conveyor system, the pieces are assembled together into a completely bound book.
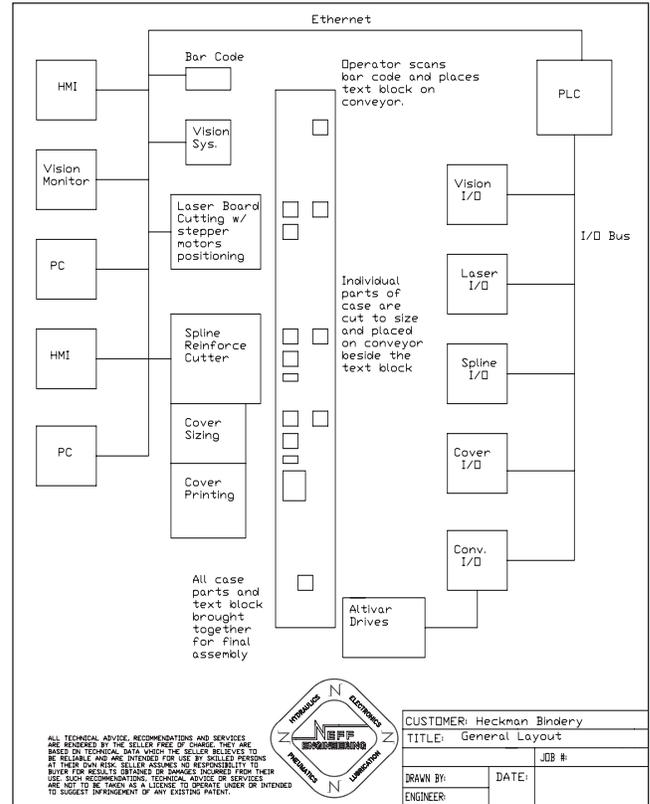
Benefit

Heckman achieved a number of benefits from this solution:

- A significant reduction in "time in process" for each piece. Under the old methods, order turn around was 7-8 days. Now with lean principles and the CCL in place order turn around is 3 days. The operations performed by the CCL used to take 12 hours, and now take two minutes.
- A "batch of one," using the CCL each and every book can be of a different type and dimension with different covering color and printing. Each one will be cased properly, accurately, and with the same consistent high quality.
- Heckman Bindery has the ability to service more customers over a broader geographic region. In an age of Internet communications and digital books, Heckman has to service more customers to remain profitable. With the normal customer delivery request of about two weeks, the shorter time in process allows Heckman to service customers all over the United States and not be limited to only those in a smaller radius.
- Fewer operators as direct labor for these operations was reduced by nine people.
- The high level of quality that Heckman is noted for was maintained.
- Heckman is the only company in the industry that has this technology.

Schneider Electric - North American Operating Division

1415 S. Roselle Road
Palatine, IL 60067
Tel: 847-397-2600
Fax: 847-925-7500