BY KAREN M. KOENIG

STOR-X SCORES BIG *with lean manufacturing*

This Vancouver-area closet manufacturer nets profitable results through its transition to lean manufacturing.

These before and after views highlight the changes in the machining area. With the new machinery purchases and other equipment repositioned, material now moves quickly and efficiently from the Schelling and Holz-Her panel saws to the Biesse Rover machining center and on to the IMA single-sided edgebander or Biesse/Polymac radius edgebander, with no buildup of work in process.

There's no constraining this closet and home organization manufacturer when it comes to improving efficiency and productivity in the workplace.

It's been slightly less than two years since Richmond, BC-based STOR-X first embarked on a path toward lean manufacturing. Already, says STOR-X President Wolf Nickel, the company has seen significant reductions in inventory and material waste, as well as faster turnaround times.

Using 32mm construction, STOR-X organizers are custom built wood and laminate modular systems. The products are sold throughout North America by a large network of distributors.

Lean manufacturing is an ongoing process in which companies strive to eliminate waste in every area of production, including work-in-process inventory and reducing non-value-added activities. Before beginning the lean process, Nickel says, the company laid out five key objectives:

- Increase efficiency.
- Reduce overall costs.
- Improve product quality.
- Add value to the product.
- Expand STOR-X's brand awareness and market coverage.

"Even during the economic downturn we've been busy, but we began to get long, extended lead times and couldn't see a way to get past that," he says. Neither of the standard solutions — hire more employees or expand the shop size — were viable options.

Instead, Nickel adds, the company chose to get more efficient.

Going lean

STOR-X learned about lean manufacturing through organizations such as BC Wood Specialties Group and FPInnovations - Forintek, whom Nickel consulted with for the transition.

Nickel says he focused on finding ways in which STOR-X could add product lines and increase capacity, without expanding the current plant size.

Among the first items to be looked at was the manufacturing method — push vs. pull — used at STOR-X. Lean manufacturing works best when product is built on demand (pulled through the company). Employees at STOR-X participated in a Lego training exercise (*see sidebar below*) which helped to illustrate the pros and cons of each method. The pull method was shown to yield a larger number of finished goods, with less scrap and work in process, Nickel says.

STOR-X closet organizing systems feature 1/2-inch drawer boxes with full extension or partial-extension slides. The company also offers a variety of accessories, including: tie racks, belt racks, garment valets and roll-out baskets.

Lego lesson

Lego building typically is used as a training exercise to teach companies the benefits of pull manufacturing, particularly when used in conjunction with the Theory of Constraints.

In round one, "assembly workers," a timekeeper and a quality control individual build a product using a simulated production/push manufacturing environment. Results with this method typically yield high rates of scrap, work in process and costs, with a low rate of completed product.

Round two demonstrates a one-piece flow concept, where "workers" build the subassemblies into kanban "squares," stopping when they are full and thus decreasing the amount of work in process. This simulates pull manufacturing, i.e., building to customer demand. In addition, it allows for faster recognition of defects before the product is finished, thus significantly reducing scrap and time needed for rework.

Products are available in solid wood veneers of oak, maple and cherry. The company also offers systems in more than 18 different finishes, including environmentally friendly options. STOR-X also carries a "no-added formaldehyde" line of products.

As part of its lean initiative, STOR-X recently purchased this new Schelling panel saw which has network and label capabilities. The labels not only identify the necessary machining operations, but can be used to track the product in process.

The Biesse Rover 20 can be used to bore and route one large panel or multiple smaller ones. Also located at each station throughout the plant is a flat-screen monitor to allow operators to verify the production steps and flow.

The IMA single-sided edgebander features a quick-change glue pot and ease of setup. STOR-X's use of clear glues with color bandings and white glue for white edgebanding eliminates visible glue lines, thus saving time at the cleanup station.

STOR-X President Wolf Nickel stands by one of the company's "Huddle Boards," which was created from a Kaizen event. The board displays employee suggestions, which are then prioritized for action. Each department meets for five minutes every day to quickly go over any issues or submitted suggestions.

"The goal was to help us identify what we need [operationally]. From there, we were able to evaluate wasted space in the plant and wasted time [in non-value-added operations]," he says.

STOR-X has since switched to pull manufacturing, utilizing the Theory of Constraints philosophy, for maximizing throughput in the shop while minimizing inventory and costs — a process of continual improvement. This also has led to revamping of the plant's layout, as well as value-stream mapping of the shelf, partition, drawer and assembly operations.

For value mapping, Nickel says, "We broke into groups and every group underwent training. One of the first things was to time the process to see how long it took, was it adding value to the product and how much inventory it was adding to the pile."

From this exercise, STOR-X was able to identify and eliminate unnecessary machining operations, creating what it calls "Smart Finish." For example, Nickel says, since purchasing the Biesse Rover 20 machining center and eliminating line boring, STOR-X is no longer drilling "unnecessary extra" holes — an immediate time savings.

A Kaizen event led to the creation of department "Huddle Boards," on which employee suggestions are noted and prioritized for action. The depart-

About the company

STOR-X is the rebranded name of Pacific Closet Works Ltd., which was established in 1989 to manufacture custom storage organizers for the residential market. Twenty years later, the Richmond, BC-based company continues to net strong sales, using lean manufacturing techniques to produce the STOR-X organizing line. The company's facility has 7,500 square feet of manufacturing space, with an additional 1,700-plus square feet for offices. STOR-X currently has 24 employees.

According to company President Wolf Nickel, the versatility of STOR-X modular wood and laminate organizing systems enables the products to be used in a variety of applications. These include: walk-in closets, reach-in closets, pantries, garages, mudrooms and home offices.

Products are sold through a network of more than 100 dealers located across North America. For more information, visit **stor-x.com.**

ments then meet for five minutes daily to go over the suggestions and any other issues. "It's another way of constant improvement through implementation of our employees' ideas," Nickel says.

Also from a Kaizen event, STOR-X is developing step-by-step pictorials of the machining processes at each station. "This will be another training tool, plus it helps in double-checking all the [production] steps — another quality control," he adds.

Each workstation in the shelf area is optimized for efficiency. Parts are manufactured on demand, eliminating work-in-process inventory.

No price tag

As part of STOR-X's transition to lean manufacturing, the company invested in a number of new machines with improved network capabilities. Among the recent purchases were: a Schelling panel saw with descriptive label and bar code capabilities, the Biesse Rover 20 machining center and an IMA single-sided edgebander. The company also added TigerStops for the cutting of parts in the shelf area.

Other equipment used in the plant includes: a Holz-Her vertical saw, Biesse Polymac radius edgebander and Blum Minipress.

"One thing we learned from the lean process is there is no price tag for good equipment. Make sure you have what you need," Nickel advises.

Another investment has been in software. STOR-X uses a custom version of 3Dcadsoft, which offers screen-to-machine capabilities as well as integrated costing and 3-D design capabilities. Nickel says the STOR-X3D software also can be used by distributors as a sales tool, allowing customers to see a 3-D image of the closet before it is installed.

*For more information visit **stor-x.com**. Also see the video of STOR-X's sawing operation on **closetsmagazine.com.***