

As seen in

Minnesota Technology[®]
FALL/WINTER 2003

Lean Dreams

Lean practices help manufacturers shape up and compete.

BY MARY LAHR SCHIER | PHOTOGRAPHS BY JASON WACHTER

Keith Nilson talks about lean manufacturing with all the zeal of a convert. In the mid-1990s, he worked for Kohler Co., the 100-year-old maker of bathroom fixtures. Kohler “saw itself as a marketing company, not a manufacturer, even though it did make its products,” he says. When a fellow Kohler executive—who had spent a couple of years working for a company that practiced lean manufacturing—tried to convince Kohler of the benefits of this program to reduce waste and improve efficiency, Nilson was as skeptical as anyone.

“He really went unheard until he did a couple of test cases to prove his point,” recalls Nilson, noting that the plants at which the tests were done suddenly showed huge improvements in productivity. “I went into the experience believing it was not worthwhile and soon became a very strong believer.”

Now director of operations for Detroit Lakes-based BTD Manufacturing Inc., Nilson preaches lean manufacturing himself. The results experienced at BTD, a metal tooling and stamping company with customers in the agriculture, recreational vehicle, and lawn and garden industries, would convince even the most committed skeptic. Since training its employees in lean practices in November 2001, BTD has reduced its average project setup time by 50 percent. The amount of scrap it produces has declined by 80 percent. The work-in-progress sitting in the plant at any time has dropped by two-thirds. Most importantly, the company’s year-to-date sales in 2003 are 10 percent higher than a year ago.

“We’re in an extremely cost-competitive environment,” says Nilson. “Our customers look at us as providing a com-

modity, and if we cannot meet their requirements in terms of cost, they are perfectly willing to go to another firm here or offshore. When I look at all we have accomplished with lean manufacturing, I think it is getting through to our customers.”

Many Minnesota manufacturers, like BTD, have turned to lean manufacturing as a way to reduce waste, manage inventory, and improve efficiency on the factory floor. Started by Toyota more than 30 years ago, lean is both a philosophy and a set of tools. Although auto manufacturers pioneered its use in the United States in the 1980s, lean has been employed in a variety of industries under many names, according to Dave Ahlquist, a member of Minnesota Technology, Inc.’s (MTI) lean manufacturing team. Just-in-time manufacturing, total quality management, quick response manufacturing, demand flow manufacturing, and synchronous manufacturing represent the evolution of American ideas on manufacturing efficiency.

“All of these are tool sets,” says Ahlquist. “Lean is defined as a systematic approach to identifying waste and other non-valued activities to improve quality. Essentially, you are trying to find activities customers aren’t willing to pay for.” The lean approach requires a detailed and systematic analysis of processes, such as cycle times, lead times, work-in-progress, setup times, and work flow, among others. It relies on specific measurements to track improvements. For instance, lean manufacturers talk about how many miles (or feet) parts travel in their factories, or how much time it takes from a customer’s order to product shipment. The underlying philosophy insists



Keith Nilson, BTD Manufacturing

on involving employees at all levels and an acceptance of the idea that improvement is a continuous process—not a destination at which the company miraculously arrives.

Rachna Shah, a professor of operations management at the University of Minnesota's Carlson School of Management has studied lean manufacturing, in part because of her own questions over the claims of the practice's most zealous advocates. "Doing lean right takes a long time," Shah says, adding that it will not work in every environment. "But it has the capability to work in most plants. The conditions have to be right. Management support is critical. Without that, it's just another flavor of the month."

A common vocabulary

BTD had that commitment from the top when Nilson joined the company in September 2001. The market for metal parts had become increasingly competitive as customers demanded lower prices and better service. BTD began working with MTI business consultant Bill Martinson. All of the firm's 350 employees received training in lean principles and practices. The program, called Lean 101, "creates a common vocabulary," says Nilson. "Our primary goal in this program is that every employee learn to recognize waste and to learn to recognize that they can do something about it."

The training reviews the primary causes of waste in manufacturing and uses a simulated manufacturing environment to help employees step away from what they have always done and think about how to turn raw materials into products in the most efficient way. It also covers concepts such as how to set up work stations most efficiently, when to use visual signals to reinforce good work practices, and the benefits of standardized approaches and small batch sizes. It also encourages the

use of concrete measurements. For instance, at BTD, the company's overall goals are to increase plant capacity per square foot, increase inventory turns, and reduce all labor, both in-house and contracted, as a percent of sales.

Having specific goals and a common understanding of lean principles helps companies continue to practice lean manufacturing beyond the initial spurt of enthusiasm. "We have 200 employees working five shifts and operating 24/7," says Dave Lamb, director of manufacturing at Donnelly Custom Manufacturing Inc., an Alexandria-based injection molding and assembly company. "It's a challenge to get everyone on board, but we've trained everyone because we think it's important."



David Ahlquist, Minnesota Technology, Inc.

Donnelly, which makes parts for ATM machines and other short-run industrial applications, implemented lean manufacturing about a year ago. Since the initial training, Lamb reports that the company's employees have done nine "continuous improvement events"—periodic pushes to improve efficiency in specific areas.

Hot on the trail of a single part

In continuous improvement events—the second hallmark of lean manufacturing—a diverse group of employees examines a particular problem in depth. The event may take several days and require a large commitment of employee time. However, the results usually lead to significant savings in time and money. At Donnelly, a continuous improvement team typically includes six or seven employees, some of whom work in the area that is being examined, some who work elsewhere, and some from management. The first step is to document current practices. For instance, a team recently looked at the processes a single part might follow as it moved through the plant, including all of the support processes needed to complete the part, says Lamb. After documenting what is happening, the team brainstorms possible improvements and looks for steps in the process where the part sits and waits. They find roadblocks or places where it takes several steps to do what might be done in one step or

in several steps at one workstation. The group then tries out possible improvements and incorporates the best of them in a new process, which is taught to workers.

In the case of one part Donnelly followed, the streamlining process cut by 50 percent the distance the part traveled in the plant. It reduced paperwork for producing the part by 25 percent and internal systems transactions by 40 percent. The overall cycle time dropped by one third. "We have since been applying this same approach to other similar parts we manufacture and are seeing the same types of results," says Jerry Benias, the company's vice-president of finance.

Another continuous improvement event at Donnelly looked at the company's approach to regrinding plastic. Rejected parts and material left over from the molding process can often—but not always—be reused. "We had migrated over time to not doing as much as we could," recalls Benias. Employees were not sure which parts should be reground, and so erred on the safe side and reground only those they were certain could be reused. The company created a rules-based decision-making process that helps employees confidently determine which parts can be reground. As a result, the amount of new material being used has declined, which Benias attributes to better usage of reground plastics.

BTD has had similar positive results from its continuous improvement events. Several events have focused on company scheduling processes, new ways to reduce machinery down time, and scheduling jobs that require fabrication and assembly near each other.

Lean manufacturing is a system "that has to be bought into on the factory floor," says Nilson. "BTD is a very open company. We have monthly employee meetings to talk about sales success and failures. We discuss company financials there."

BTD employees also are knowledgeable about a wide range of issues facing the company—from new tariffs affecting the industry to methods of recycling scrap metal. "Our opinion is that we are a world-class company," says Nilson. "We try to show our employees why that is our opinion and why it is the opinion of our customers."

Staying on the lean path

While companies often see striking and immediate benefits from lean manufacturing, the real gains come over time, says the Carlson School's Shah. "Lean is hard to implement because it is an entire culture," she says. "To get to the next level, the cul-



ture has to change. The tools will give us huge improvements and some companies will stay there. To get the culture entrenched you need to stay at it a long time.”

Micro Dynamics Corp., an Eden-Prairie-based electronic manufacturing services provider with a plant in Montevideo, has been practicing lean principles in one way or another for about 13 years, says Gary Boettcher, manager of the Montevideo plant. A few years ago, it recommitted to lean and began working with MTI business consultant Rick Kvasager on training employees. In addition to education, the company also focused on reducing waste in its processes and creating an environment in which employees strive to improve processes. For instance, Micro Dynamics has undertaken several projects to reduce cycle time. When it began working on lean practices, it took 13 days from the time a lot was ordered to its shipment. Today, the process takes 48 hours. The amount of work-in-progress at any one time is 1/20 of what it used to be, Boettcher says. The company also relied on lean principles during a recent remodeling of its factory.

As an experienced lean practitioner, Boettcher recommends those new to lean do two things. First, for your first project, pick

an area in which you are sure you can make substantial improvements. “It’s almost essential that you win on the first one,” he says. Second, companies should not try to implement lean without assistance. Outside help, such as that Micro Dynamics received from MTI, keeps the company on the right track. “It’s very easy to fall back into the rut you’ve been in,” says Boettcher. “You need someone to keep you at it.

“The key to this is a little patience,” he adds. “This does not happen overnight and you are never done with it.” ■

Mary Labr Schier is a Northfield-based freelance writer.

Based in Alexandria, Minnesota, Donnelly Custom Manufacturing is dedicated to setting the standards in the custom injection molding marketplace for *How Short Run Is Done.*

**For further information contact:
Jim McCarthy, V.P. Engineering Services
Donnelly Custom Manufacturing
(952) 447-6074**



Left to right: Dave Lamb, Director of Manufacturing; Ron Kirscht, President; Gerald L. Benias, V.P. Finance & Technical Operations; Donnelly Custom Manufacturing, Alexandria