



Site Search:

[networks](#) [product review](#) [archives](#) [toolbox](#) [about us](#) [adhesive selector](#)

## INSIDE ASSEMBLY

[Home](#)  
[Subscribe](#)  
[Editorial Archives](#)  
[Articles](#)  
[News](#)  
[Showrooms](#)  
[Technology Networks](#)  
[Advertising](#)  
[Events](#)  
[Buyers Guide](#)  
[Ask Assembly](#)  
[Classifieds](#)  
[Industry Links](#)  
[FAQs](#)  
[Glossary](#)  
[Staff Directory](#)  
[About Us](#)  
[Product Review](#)  
[Toolbox](#)

[Torque Calculator](#)

[Torque Calculator](#)

[Online Poll](#)



Want to use this article? Click here for options!



[Print This Article](#)

Issue Date: August 2001, Posted on: 8/1/2001

## Forward Thinking: Want to Grow? Think Lean, First

John Sprovieri  
[sprovierij@bnp.com](mailto:sprovierij@bnp.com)



"Lean manufacturing" means different things to different people. To the ruthless, it means "lay off workers and get more from who's left." To the cynical, it's an empty buzzword spouted by ineffectual managers eager to apply the latest craze. But to others, at companies such as Boeing, Dell Computer and Cutler Hammer, lean manufacturing is a strategy for delivering high-quality products quickly and cost-effectively.

To get the real story, we spoke with Tom Greenwood, Ph.D., director of the University of Tennessee Lean Enterprise Forum and an assistant professor of manufacturing science. Dr. Greenwood is also president of Lean Works Inc., a consulting firm specializing in helping companies "get lean."

**Q:** Give us a step-by-step guide to lean manufacturing.

**Greenwood:** The first step is to start with the customer. What do your customers want? How soon do they want it? Not what they're used to getting, but what they really want.

Once you know that, you can find ways to create competitive advantage. The only way to grow a business is to do something that the competition cannot or will not do. Dell realized its customers wanted to order their computers over the Internet, configure them how they want, and get them quickly. Compaq is now selling computers online, but it's too late.

How many employees do you have?

1-50

50-100

150-1,000

1,000-5,000

5,000+

The next step is rate-based planning. The goal is to establish the minimum amount of people, equipment and materials needed to build orders as they come in. Instead of waiting until all the orders come in, and then scheduling them in the future, you make sure you have the resources to build those orders right away. You want to leave some "white space" in the schedule, too. "First in, first out" seems fair, but different customers have different expectations. You want to reserve capacity for customers you haven't even thought of yet.

The next step is to move to a one-piece flow operation. Once you pick up a part, you don't set it down until you hand it to the customer. You don't route orders back and forth between fabrication, welding, final assembly and a warehouse. Instead, you put all those individual machines or people together in a cell. Each cell is responsible for a particular product or product family. You fab it, weld it, assemble it, test it and ship it, all within one cell. You might have multiple cells throughout the plant, but not individual departments.

Once you have flow, then you establish a pull, or kanban, system. The goal is to make the orders as soon as they come in. As you consume parts, those parts are pulled from your suppliers or from internal fabrication.

Finally, the lean manufacturing process never ends. You must continuously improve your flow and your products.

**Q:** Which of those do manufacturers have the most difficulty achieving?

**Greenwood:** Many companies use lean manufacturing as a cost-reduction strategy rather than a growth strategy. Those manufacturers usually have difficulty with the first step--starting with the customer. Many times, companies begin the lean manufacturing process by looking at their internal manufacturing costs, but that's starting at the back end.

Companies also have difficulty establishing rate-based planning and configuring their products to meet customer demand.

**Q:** How so?

**Greenwood:** For lean manufacturing to work, you must be able to satisfy the customer without every job being a special order. Even if each order is different, they can often be based on common modules. You can then set up production cells to make those modules very quickly.

**Q:** Although most companies use the Internet to attract new

customers, less than 10 percent use it to communicate with their suppliers. How does this affect efforts to be lean?

**Greenwood:** Dell uses Internet-direct sales to reduce variation on the front end, to make sure that what it builds is actually sold. But, whether you take orders over the phone or from distributors and OEMs, you can still move from receiving large orders with long lead times to a consumption, or replenishment, model. Ordering more frequently in smaller quantities reduces variation. Any manufacturer can use that frequency to set up consistent replenishment cycles with their suppliers.

In the traditional push system, a company takes orders, puts them into a schedule, and uses [materials resource planning software] to spread the requirements out over time. Then, the company sends orders to its suppliers, who deliver the materials just in time. Essentially, the company is telling the customer, "We'll tell you what you want, how much it's going to cost and how long it will take to produce it."

In a lean enterprise, you ask the customers what they want, and you configure the product to meet those objectives. Then, you make sure you have the materials at hand to build those configurations in a short cycle time by setting up consistent replenishment cycles with your suppliers. Once a week, for example. Now the suppliers don't have to worry about *if* they are going to get an order. They know they're going to get an order every week. It's just a matter of how big the order will be.

The whole system is pulled by customer orders, and you try to design configurations to fit those orders. If the customer doesn't want those configurations, then you can treat it as a special order and plan it using the traditional system.

**Q:** What is the manufacturing engineer's role in lean manufacturing?

**Greenwood:** Lean manufacturing is not a project, it's an evolutionary process. Everyone in the company must understand the culture, from the senior leadership to the operators on the shop floor.

The manufacturing engineer works with every department in the company to make lean manufacturing go. For example, he has to get demand data from customer service and sales. And, he has to work with the design team to ensure that products are configured to meet customer demand.

On the shop floor, the manufacturing engineer makes flow manufacturing work. He establishes point-of-use materials and fabrication, so that when a part is taken, a replacement gets

made. He breaks down departmental layouts and brings them together into cells, where the focus is on product flow, not labor specialization. The manufacturing engineer has to increase overall equipment effectiveness and reduce setup time. He also ensures quality by providing good work instructions, mistake-proofing processes, and cross-training operators

### Related Articles

---

None Available



Copyright © 2002 [Business News Publishing Company](#)