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## Lean Manufacturing's Next Life

**Wondering what Toyota's recent woes mean about the viability of the manufacturing movement it inspired? These three success stories suggest lean still delivers - when it's done right**

BY DAVID DRICKHAMER

Toyota's quality and public relations troubles - still unfolding at press time - have prompted some to question the company's widely touted production system. But despite the company's failure to live up to its own lofty aspirations (See "[Lean Gone Wrong?](#)" below), there's no denying that the lean manufacturing model Toyota created - and which countless companies have since sought to emulate - now defines world-class manufacturing practices around the world.

In fact, a new generation of lean standard bearers continues to apply the well-known process improvement tools and managerial practices to deliver double-digit productivity and customer service improvements year after year after year. They've found that the push to never stop getting better, perhaps Toyota's biggest legacy, comes down to culture and people. As evidenced by the three case studies that follow, the end results are not only a lower cost structure, but operational advantages that customers notice, care about and, most importantly, are willing to pay for.

### Making the Numbers

"Compared to our direct competitors, we are the only company that really grew over the last seven or eight years," reports Alexander Wiegand, CEO of WIKA Alexander Wiegand SE. He attributes that growth to the Klingenberg, Germany-based company's ability to leverage ongoing process improvements into tangible benefits that its customers value. Selling more than 40 million gauges, thermometers and other measurement instruments annually, the 60-year-old, family-owned company has slashed manufacturing lead times and delivery times. It now ships some high-quality, customized products in just three to five days.

Perhaps most key, WIKA has made the financial connection that some lean adopters have found elusive. "Since 2002 we have improved our EBIT margin every year by about 1 percent," says Wiegand. Given the company's high percentage of sales in the U.S., that margin improvement is even more impressive when you consider the devaluation of the U.S. dollar that occurred over that time period. "That's the bottom line," says Wiegand. "It's not all coming from lean, of course, but more than half of that improvement is the result of our lean activity."

In 2008 WIKA posted record sales of €515million. Even though orders declined when the recession hit, WIKA was able to increase productivity by 5 percent this past year. Before the company implemented lean manufacturing, whenever sales would slow, productivity would follow suit. Assembling product in work cells, where detailed performance is tracked and reported for each shift, has increased transparency and increased management control.

"I know a lot of companies who say they're doing lean, but the basic way they produce is still the same," says Wiegand. "They just did a little bit of 5S, a little bit of kanban [a signaling system related to just-in-time production]. They have some results, but not real results." To Wiegand, the ideal lean operation holds zero inventory with minimal work-in-process and parts flowing one piece at a time through final assembly and shipment.

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### Toyota: Lean Gone Wrong?

Does a series of highly publicized quality failures and the recall of 8 million vehicles discredit more than 50

years of manufacturing excellence that propelled Toyota from a regional maker of budget-minded vehicles into the largest and most profitable automotive company in the world? Some critics have equated the widespread practice of using common components across platforms and models, which is partly to blame for the huge numbers of cars Toyota has had to recall, with its mythical production system. However, such standardization - provided there aren't any engineering flaws - actually improves quality by minimizing variation.

Most agree that the real issue is that Toyota sacrificed its famed discipline, customer focus and values in a relentless pursuit of growth over the last decade. That push culminated with its managers committing the fatal sin of passing on defects to customers. The Prius itself has been recalled in Japan to fix its high-tech brake system. At some point, Toyota stopped being Toyota.

"A culture of excellence that puts the customer first is not self-sustaining, not even at Toyota" says Anand Sharma of TBM Consulting Group. "The moment leadership relaxes, when they put it on autopilot and lose track of the basics, things always start to go south."

In short, there's a big difference between knowing about lean manufacturing - or even having invented it - and actually doing it on an ongoing basis.

How the drive for ever-lower inventory levels reduces order lead times is one of the counterintuitive characteristics of the lean methodology. Ware housing lower quantities of product exposes weaknesses in a production process, and thereby requires operations to be more agile and responsive, which subsequently increases the factory's ability to fulfill orders quickly. WIKA fully embraced lean after initial efforts at its factory in Georgia dramatically increased on-time delivery rates, solving a persistent weakness. Order lead times had been running anywhere from four to six weeks. Today they range from five to 10 days. Quality has also improved, from a customer reject rate of around 10,000 defects per million opportunities (about 1 percent), to below 2,000 today with a long-term target of 500 by 2012.

Management attention, which starts with CEO participation at project meetings where improvement teams report process changes and subsequent performance gains, has been key to WIKA's progress. "I still participate one or two times a year in a *kaizen* [Japanese for 'continuous improvement'] workshop," says Wiegand. "Everybody in the company knows that I am always very interested in the results and seeing what has changed."

These workshops extend beyond WIKA's factories. Employees work on distribution processes, quality management and product development. A *kaizen* event in the corporate office cut the time it takes to build the annual budget, starting in each subsidiary, from eight weeks down to four weeks. Order processing used to require two to three days; now it's measured in hours. Such gains come from using lean tools to identify the best methods for doing something and then standardizing those methods across the company.

In 2010 one of WIKA's top priorities is to improve sales effectiveness worldwide, including the number of sales calls per engineer and the quality of those calls. WIKA will be using *kaizen* workshops to improve the work of the inside sales organization and increase the time that sales reps can spend with customers.

"Sales and new product development are two areas that often have broken and ineffective processes, which leads to lost sales and missed revenue opportunities," notes Anand Sharma, CEO of the lean and Six Sigma consulting firm TBM Consulting Group, based in Durham, N.C. "Symptoms include poor anticipation of customer needs, last-minute design changes, manufacturing difficulties and delayed product launches." The recent recession, he adds, has pushed more managers - forced by economic circumstances to improve their effectiveness - to call in help from their internal lean experts.

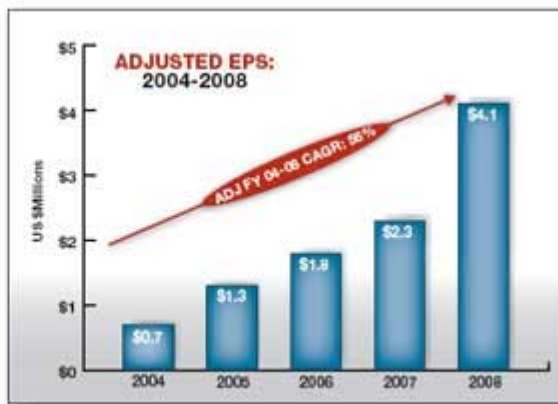
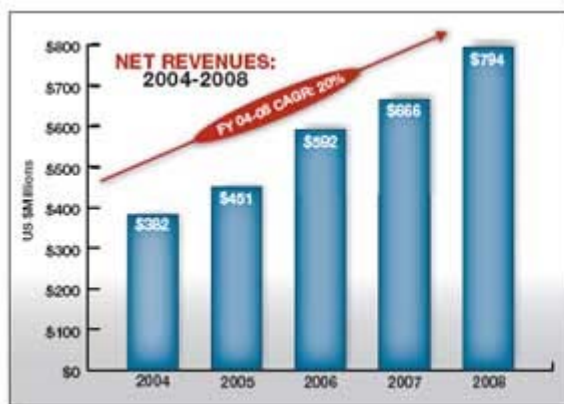
### **Building Bench Depth**

CIRCOR International is another company where lean manufacturing is about much more than the shotgun application of a few, popular business improvement tools. Based in Burlington, Mass., CIRCOR manufactures valves, regulators and systems that control the flow of fluids in energy, industrial and aerospace applications. Growing through a series of 37 acquisitions, it will record estimated year-end sales of around \$690 million in 2009, down from a pre-recession peak of \$794 million in 2008.

Chairman and CEO Bill Higgins joined the company as EVP of operations and COO in 2005 with a mandate from the board of directors to implement lean and improve operational performance. A year into the effort, he recognized the

need to recruit lean and Six Sigma experts from outside the company. “There are a lot of people who can say the words,” says Higgins, who sought out leaders able to mentor, coach, teach and get people engaged. “But individuals who can really change a factory, or change a business process, are worth their weight in gold. They can move an organization to a level no one ever thought it would get to.”

CIRCOR also continues to train and develop the larger work force. They’ve found that while employees become very enthusiastic about the change process, a middle manager’s world can be turned upside down. So the company devotes a lot of time to working with first-line supervisors and functional leaders, including people in engineering, finance and sales. The objective is for everyone to understand how they affect the overall value stream using lean tools, from the front office to supplier management and sales.



“We’re driving lean and continuous improvement in all of the functional areas, not just the factory,” Higgins explains. This enterprise wide approach includes the finance department. In 2008, CIRCOR hired Fred Burditt, the former CFO of Danaher Corp.’s Tool Group, as VP, CFO and treasurer. Growing through the acquisition of over 600 companies and the rigorous application of the Danaher Business System, the publicity-shy conglomerate is widely regarded as one of the preeminent U.S.-based practitioners of Toyota’s manufacturing methods. Higgins reports that Burditt has brought standardization, predictability and better quality to the company’s financial practices, including cash management and how it closes the books every quarter.

Across the board, whether they’re serving internal or external customers, lean manufacturing has made the company more dependable, according to Higgins. He points to their Oklahoma City operations, which serve the oil and gas industry, as an example. From 2007 to 2008 the division’s sales grew by 29 percent. During this period of dramatic growth, lean manufacturing efforts freed up space and other resources, allowing CIRCOR to not only meet the increased demand, but consolidate facilities.

Higgins also credits customer recognition of lean-driven performance improvements for helping the company to win new contracts. From 2004 through 2008, CIRCOR’s average on-time delivery climbed from 77 percent to 87 percent. During this same period, revenues increased at a compound annual growth rate of 20 percent, and earnings per share grew by 56 percent per year. High-profile contracts include the landing gear for Boeing’s CH-47F Chinook helicopter, and speed-sensing, speed-control and landing gear systems for the Airbus 350.

Weak global demand has hit the company’s aerospace and energy market segments hard. Total sales fell by more than 30 percent through the third quarter of 2009. In response CIRCOR reduced its workforce by 17 percent and consolidated more facilities.

“The way I’ve described it to our investors and the Wall Street community is, we were changing so much of the business from the inside with the lean work we were doing, that when the downturn came, we had a running start,” says Higgins. “We knew what to do and how to do it... and we were able to manage through the downturn much more successfully than we would have historically.”

### Goal Driven

Headquartered in Paris, Alstom Transport manufactures trains, develops and maintains rail infrastructure, and supplies maintenance, refurbishment and parts management services. With 27,000 people working in 60 countries, it recorded sales of €5.7 billion for its 2008–2009 fiscal year. In the U.K., Alstom Transport employs some 2,000 people, many providing maintenance services to a variety of private customers. On the country’s West Coast Main

Line, a long-time unionized work force mostly services the Pendolino high-speed tilting trains manufactured by Alstom and operated by Virgin Trains.

At 9:00 a.m. every morning the members of each department in each of Alstom's five depots and the fleet control center come together for a 15-minute meeting to discuss the previous day's performance and other pressing issues. They stand in front of display boards showing detailed performance metrics, focusing primarily on safety, quality, delivery and cost. These departmental results then get rolled up to the division office.



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"We have an office in Manchester, which we call the war room, where we hold all senior management meetings and meetings with the union," reports Roy Sullivan, Alstom's mainline operations director. "Posted in that room are the top level key performance indicators as well as the CEO's challenge letter, which lists our breakthrough goals for the next three to five years."

These goals set the priorities for the company's continuous improvement program, dubbed the Alstom production system or APSYS. Adapted to suit the rail sector, its characteristics include the elimination of waste, the standardization of operations, problem resolution in the field, involvement of operators and continual improvement. The system revolves around people and the organization of work areas in manufacturing and maintenance facilities.

Following a lean approach called policy deployment, also known as *hoshin kanri*, Sullivan's management team created and agreed to this short list of breakthrough objectives. They then translated that plan into practical implementation steps, specific projects and progress measures. One of the goals that Alstom's managers set was to grow the business by 20 percent over a three-year period while keeping the number of employees constant.

"We've just had our internal review and we're certainly on target, so we're pretty chuffed," reports Sullivan. "With the old way of working we'd probably have been looking at 1,200 people, instead of where we are, which is at around 900. So we're going in the right direction."

Progress has varied by depot, but each location now has dedicated process improvement managers who facilitate six to eight week-long *kaizen* events every year. These pull people together from various departments and give them the time, data and analytical tools to focus on a particular issue. Typical results include double-digit productivity gains, similar quality improvements and dramatic reductions in turnaround time.

"I always find people who haven't done well on their lean experience have probably not had the buy-in of senior management, and they've tried to rush it," says Sullivan. "If you buy into the lean philosophy, you just never stand still."

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