

## Never Too Lean

Lean manufacturing is a process whose time has come--with help from software vendors

By Beth Bacheldor, InformationWeek

April 19, 2004

URL: <http://www.informationweek.com/story/showArticle.jhtml?articleID=18901848>

Lean isn't a word that's generally associated with smoke-belching factories and mammoth manufacturing plants. But in some circles it is--more and more, these days.

"Henry Ford used the word 'lean' when referring to manufacturing," says Mike Mitsch, VP of operations at Keihin Aircon North America Inc., a company that has used lean-manufacturing techniques for nearly a decade to make heating, ventilating, and air-conditioning components for the automotive industry. "Lean has been around for years in different capacities, and now it's making a comeback."

Mitsch is referring to the practice of lean manufacturing, a methodology that seeks to eliminate all waste from the manufacturing process. With a sluggish economy and increasing competition from abroad, U.S. companies are taking a hard look at their manufacturing strategies, and lean is increasingly appealing. Fortunately, it's happening at a time when software tools are being customized to help companies synchronize enterprise systems with lean-manufacturing processes, such as real-time communication, and extend those processes beyond their factories' four walls.

"In the last half of the 1990s, operations weren't a relevant issue, and everyone was driven by a need to change their business models," says James Womack, who introduced the term "lean manufacturing" to the American public in 1990 with his book, *The Machine That Changed The World*, an in-depth look at Japanese automakers' manufacturing systems. "Now what [companies] need to do is pay attention to the operations side of the business, get costs out, and improve performance."

The practice of lean manufacturing originated in Japan some 50 years ago at Toyota Motor Co. The goal is to create a production environment driven by demand that holds only a small amount of inventory and products at any given time. In a lean-manufacturing environment, whenever finished goods are sold, the sale triggers a signal to the process one level back calling for a replenishment. The replenishment generates yet another signal one level back asking for components that go into the finished product; the components process then sends a signal back asking for parts that make up components, and so on. "It's a reverse cascade, and each step consults with the previous step in the chain," says Womack, founder and president of the Lean Enterprise Institute, a nonprofit training, publishing, and research organization.

Lean manufacturing encompasses a number of modern practices, including just-in-time inventory and

delivery, kaizen, and kanban. Just-in-time processes ensure that goods arrive when needed for production, rather than ending up as inventory. Kaizen is a Japanese term that refers to continuous improvement; a kaizen strategy calls on everyone in an organization to look for ways to improve quality, cycle times, safety, and other aspects of an operation. Kanban, the Japanese term for signal, establishes a "pull" instead of "push" system of moving goods through the factory. It typically relies on printed cards that contain specific information on parts for production or final assembly and are used to signal the start of steps, such as raw-material replenishment, that flow in reverse order (from shipping of goods to receiving supplies) in a production line.

Lockheed Martin Commercial Space Systems, which manufactures both commercial and government satellites, needs to wring every advantage out of its operations. "The competition right now--our classic word to describe it--is brutal," says Fred Musco, CIO of the Lockheed Martin Corp. division. A companywide strategy to embrace lean-manufacturing principles, called the LM 21 Program, has helped Lockheed reduce manufacturing cycle times by at least a third, and the division can now deliver a satellite, which can cost anywhere from \$100 million to \$150 million, in two years. Lockheed Martin Commercial Space is expanding its lean-manufacturing initiative to other sites, and critical to that are integrated enterprise applications that operate in real time. Most manufacturing-resource-planning software runs in traditional modes of operation: batch and queue. And Lockheed Martin, like many other manufacturers, has relied on MRP systems that operate in silos: a system for purchasing, a system for planning, a system for assembly.

The manufacturer is working with SAP to optimize its enterprise-resource-planning software for operation in real time. "So, if you place an order and want to do assembly on a real-time basis, SAP will let us run MRP in real time," Musco says (see story, "[Lockheed: Lean Cuts Costs](#)").

All of the major ERP vendors--Oracle, PeopleSoft, and SAP--offer applications that are designed to support lean-manufacturing practices, as do vendors heavily focused on manufacturing, such as QAD Inc. and Fujitsu Ltd. subsidiary Glovia International. There also are newcomers such as Factory Logic Inc., which built its entire suite of manufacturing software around lean concepts.

PeopleSoft most recently made its case for lean manufacturing with upgrades to its EnterpriseOne software, adding tools to help companies build products to actual demand rather than to forecasts. There are self-service portals that support real-time inventory alerts and production-schedule sharing among suppliers and customers. The upgrade also includes a kanban lean-manufacturing procurement module to enable pull-based replenishment at each stage of assembly and a demand-scheduling-execution app to match manufacturers' and customers' forecasts and schedules.

Author and consultant Art Smalley, who witnessed lean-manufacturing practices while working for Toyota in Japan, says there's huge potential for lean manufacturing in the United States. "One measure of productivity is speed through the factory, and inventory turns are a rough measure of that," Smalley says. "Inventory turns in the U.S. aren't all that impressive." Automotive is the one industry that has significantly improved inventories with lean-manufacturing processes, Smalley says. In addition to his time at Toyota, Smalley has led lean-manufacturing efforts at automotive supplier Donnelly Corp., worked at management consulting firm McKinsey & Co., and recently co-authored a workbook, *Creating Level Pull*, published this month by the Lean Enterprise Institute.

Today, lean manufacturing is vital to automakers--and their suppliers. Auto-component maker Keihin Aircon North America, a 5-year-old division of Keihin Indiana Precision Technology, is renewing its lean-manufacturing initiatives this month, upgrading to Glovia's latest software release. "We adopted lean manufacturing in 1995 with a goal to balance manufacturing cycles and eliminate waste, so if you double the number of contracts, in theory, you wouldn't have to increase your resources," says VP of

operations Mitsch. Since implementing Glovia five years ago, Keihin Aircon has reduced inventory levels to half a day, down from four days. With the new version, it expects to be able to meet more stringent customer demands by delivering products at specific dates and times.

ArvinMeritor Inc.'s customers said to win long-term contracts, the auto supplier would have to cut prices by 3% to 5% across the board. "Our margins aren't that great to begin with, so we have to drive costs down and make sure income isn't shrinking," says Brian Cavagnini, director of continuous improvement for ArvinMeritor's commercial-vehicle systems group. "The method to do this is lean manufacturing."

ArvinMeritor is betting that using a more-homogenized software platform will make real-time data sharing among applications easier. The auto supplier is installing Oracle 11i across its plants to replace more manual and disconnected systems, such as Excel spreadsheets. "Information is disjointed throughout the chain, so it isn't in real time, and there are inaccuracies," Cavagnini says. ArvinMeritor plans to use tools in the Oracle suite, such as the flow-manufacturing module, that mirror lean-manufacturing processes such as build-to- sequence. Once its Tilbury, Ontario, and Manning, S.C., sites are using Oracle's flow-manufacturing software, employees there will be able to build products in specific sequences that best suit customer orders. "Customers want trucks to be loaded in such a manner that when the truck arrives at their plant, the products come off the truck in the correct sequence," Cavagnini says. "We haven't had the systems to do that, and we were building in batch."

Dura Automotive Systems Inc. is installing QAD's manufacturing software at nine production sites and upgrading 11 others in North America to the latest version. The project, which will include an integrated ERP platform, common financial software, and QAD's lean-manufacturing, inventory-management, and EDI modules, is expected to take about 20 months and cost several million dollars. "It's our IT budget," says John Knappenberger, VP of sales, marketing, quality, IT, and materials.

Lean manufacturing is a priority at Delphi Corp., an automotive supplier that has used its Delphi Manufacturing System to cut product-cycle times and improve on-time delivery, productivity, and quality. "It's part of a bigger picture to drive cost out of the supply chain through efficiencies," says David Nelson, VP of global purchasing. "There are ways in which companies that use lean techniques can considerably improve manufacturing processes and cut costs" (see story, "[Delphi: Parts Maker Helps Suppliers Shape Up](#)").

Just over a year ago, Nelson instituted a program to share procurement and manufacturing secrets with suppliers. Delphi sends employees to supplier sites as consultants to help revamp suppliers' manufacturing and procurement processes. Supplier quality has improved by 34% and "reduction from unforeseen disruptions to the production line has improved by 28%," Nelson says.



Companies can use lean techniques to cut costs, says Delphi's Nelson, VP of global purchasing.

Photo of David Nelson by Jeff Sciortino

The factory isn't the only place that's getting lean. ArvinMeritor has an initiative to infuse its support divisions with tools and techniques rooted in lean's continuous improvement processes. Employees set goals and regularly measure themselves against those goals (see story, "[ArvinMeritor: A Lean Culture](#)").

F.W. Murphy Manufacturing Co., a \$50 million-a-year maker of process-control systems, is stepping up its lean-manufacturing effort because it won't be able to compete on cost alone against overseas competitors (see story, "[F.W. Murphy: Success Brings Broader Initiative](#)"). "We've got to be



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able to offer things that offshore folks can't, and that's flexibility and variety," says Mitch Myers, VP of operations. "We've got to deliver custom products quickly, within two to three days, and standard products the same day orders come in. And we need to be able to customize products to all our customers' needs."

Author Smalley agrees. "If you have quality products, very short lead times, and are delivering what a customer wants the way the customer wants it, you can get away with charging more," he says. "Higher value is the only way we will be able to compete."

An increasing number of U.S. companies see lean manufacturing as a way to approach and ensure that higher value.

-- with *Laurie Sullivan*

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