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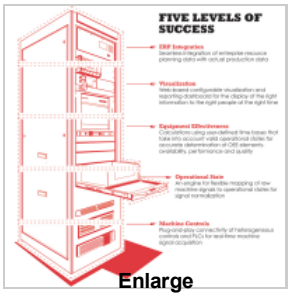
Creating Value in Manufacturing

FILED IN: Operations, Automotive

"Lean," properly speaking, is not a program, a platform, a methodology or a one-time event. Lean is a way of life that seeks to add value and eliminate waste whether, in manufacturing or the office.



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By Gary Mintchell, Co-Founder and Editor in Chief

Lean is a word marketing people and executives love. "We're Lean," they often proclaim. But far too often, the words are superficial fluff masking the grim reality of an organization tolerant of waste and forgetful of adding value. Even the company that was home to the "Bible" of Lean—Toyota and the Toyota Production System—slipped recently because new leadership decided to seek shortcuts.

To most people in the field, Lean encompasses such useful tools and methods as one-piece-flow, **kaizen (continuous improvement)** events, five whys, 5S and assuring that every operation adds value. Many original practitioners thought that these only applied to manual processes and that automation was expensive and only used to cover up inefficiencies. However, many companies integrate automation into Lean—especially automated information flow—and find that Lean and automation need not be polar opposites, but rather colleagues on the path to profitability.

Lean remains one of those concepts much discussed but not adopted as widely as one would think after all the years. Many companies are well along the Lean journey and several stories will help you start your own journey—or serve as examples for management that, far from being a fad, Lean is the way to profits and excellence.

Create capacity, improve efficiency

Vehicles produced by Audi are among the most sought after cars in the worldwide market today. Audi locations include Ingolstadt, Neckarsulm, Györ (Hungary), Changchun (China) and Brussels (Belgium). Car body panels for a number of car models are manufactured by Audi in Ingolstadt and Neckarsulm, where more than

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1,500 employees are working on state-of-the-art metal press machinery. This independent subdivision is responsible for the distinctive Audi design in aluminum and steel, hence it is one of the most efficient plants in the whole company.

The automobile industry has changed considerably over the past few years. To remain competitive, instant reaction to specific customer requests is paramount. This, in turn, has implications for the manufacturing of car body panels, as it requires the production of more and more sophisticated pressed parts, involving the use of a wide range of tooling. For Audi, this necessitates creating capacities and improving the efficiency and performance of the press plants.

In this respect, Lean production has emerged as a resourceful strategy, with constant performance monitoring being an important principle in order to continuously improve procedures. This ensures constant progress and a sustained high level of productivity. For this, **Forcam,** a German-based technology vendor of Factory Framework Manufacturing Execution Systems (MES), is a partner.

"Thanks to the application software Factory Framework, we are able to completely monitor the production process as well as the necessary infrastructure," says Axel Bienhaus, head of Central Management/ Section, Press Plants, at Audi AG. During production, all production-related data is available in real-time, allowing for detailed analysis, and it facilitates Total Productivity Management (TPM), thus enhancing Lean manufacturing efforts at Audi Press Plants.

During the pilot phase in 2005, Forcam implemented the new system in select press lines at Ingolstadt and Neckarsulm. The modular composition of the solution simplified the gradual implementation of individual modules and also allowed for smooth, continuous production. The same year, Forcam went on to implement the software in a total of 33 press lines at Ingolstadt and an additional 15 at Neckarsulm.

The application automatically monitors all machinery and their procedures. A specially developed category portal enables each staff member to access important information, which facilitates a selective analysis of weak points. The data is accessible from everywhere in and outside the press plant. And because of the standardized data model, comparing performance of all plants in all locations is possible.

Select press lines can be segmented into so-called Harbour Categories. The Harbour Report is the automobile industry's universally most recognized benchmark for productivity. Based on the acquired data, press plant supervisors are able to immediately see how they compare on an international level. Via a large LCD screen, each press plant supervisor is able to monitor all machines. Graphical cockpits with charts of key performance indicators (KPIs) make it possible to immediately detect the current status and take proactive action.

Once Audi had implemented the new software, the following year there already was a clear increase in productivity. "Due to Factory Framework, the press plants increased their productivity by 20 percent; investing in a new software architecture was well worth it," declared the press manager.

Are you designing waste?

Product lifecycle management (PLM) software, mostly known for computer-aided design of

products, wasn't even on my radar for research into Lean until a post on the **Siemens PLM** blog posed this essential question, "Are you designing waste?" Tim Egloff, a marketing manager for the Tecnomatix brand of Siemens PLM software, posed that question and others.

"Now, we all know that Lean is a journey requiring cultural shifts, management commitment and in all cases, a dogged determination to institutionalize Lean behaviors; it's the bedrock of a Lean institution," Egloff says. "Yet, with the complexity of global economies, shifting demographics and broadening competition, today's world requires that we look at how technology can assist our Lean initiatives."

Egloff emphasizes, "There is no doubt that traditional Lean initiatives provide value, but when you ask the questions I'm asking, it becomes clear that the traditional strategy will never return what a digital manufacturing enabled strategy can. He quotes a recent paper written by CIMdata entitled Enabling Lean for More Flexible Manufacturing: "…digital manufacturing allows engineers to tune the line in a virtual environment—increasing early efficiencies to levels unachievable by deploying and continuously improving."

So technology, "specifically digital manufacturing technology, allows for efficiencies unachievable through traditional Lean initiatives," asserts Egloff.

Often, the first step is the creation of a value stream map in order to understand inputs and outputs, validate product and process flow and apply standard work practices in order to more clearly see waste in the system. This is where digital manufacturing technology can provide benefits, according to Egloff. "One simple example: imagine the ability to create a value stream map in a digital environment. Not just a single work cell, but also the entire system. The technology not only streamlines the creation of a value stream map, but we can now analyze the system with a discrete-event engine."

Not just cost reduction

Paul Golden is founder and managing partner of Schilling Ventures, a privately held firm in Naperville, Ill. building a family of market-leading industrial companies that have been positively transformed by Lean. Golden has successfully deployed a Lean culture at numerous organizations and provides strategic counsel on Lean operations to both private equity firms and their portfolio companies.

Golden says he's really looking at building Lean enterprise. He works with his company executives to begin a Lean journey and then works with them to improve their business. "Lean was associated with cost and cost reduction, so management teams are often leery. We have cut costs, but we don't focus on cost—we focus on strategy. We sit with the CEO and top leadership and ask, What is value your business creates for customers? What is your value proposition? What is your strategy for creating that value? What techniques do you have for driving competitive advantage through that strategy?"

Then, the discussion centers on how to get there, According to Golden, the first tool is alignment to objectives. From that begins the value stream analysis. They typically first take a look from a high level, the overall business, then the product line and facility, then to factory.

From the values stream analysis, the next step is to identify kaizen (improvement) opportunities and determine where to focus resources. "The typical process is to identify three to four areas with the biggest challenge, the least value added, and then do kaizen events," adds Golden. "The team will include some people who do the work and some who do not. We provide some training on defining kaizen, what are wastes and what to look for."

Golden recognizes two business benefits that come to mind right away. First, in a legitimate Lean effort, you become the customer's first choice, so that price becomes the second or third story with the customer. Second, by becoming first choice, you're viewed as a winning

organization. People want to be part of that, so recruiting improves, and profitability improves. You become known as a place where people want to work. That feeds innovation, because you get the best and brightest.

8,450 improvements

GR Spring & Stamping, a manufacturing company in Grand Rapids, Mich., has inculcated a culture of continuous improvement. Employees there have generated a total of 8,450 implemented continuous improvement ideas. The program cost the company $70,000 to manage and resulted in annual savings and cost avoidance of $1.2 million.

Dan Armock, vice president, Advanced Engineering & Development, says, Continuous improvement is a way of life here. It is well understood that customers expect improvements every year. World Class Idea (WCI) is at heart of it. We do many Lean and continuous improvement activities. Training is a big part. Every associate is provided Lean simulation training, learns how it impacts the balance sheet, and that it makes jobs easier and more efficient."

WCI is more than just an employee suggestion program: It's also an implementation program. Armock emphasizes focus on employee involvement. "We know that every day we've got to get better," he says. "We can't rest. Everyone is involved about—97 percent have turned in one implemented WCI each year. We average 26-27 ideas per associate. We have a company-wide meeting every six weeks to cover WCI, and highlight goals and successes."

GR uses software from **Plex Online,** a maker of cloud-based ERP software in Auburn Hills, Mich., to document and coordinate the system. Says Armock, "We started with them in 2003. At the time, we were expanding facilities and had an outdated IBM AS400 [minicomputer] that needed to scale. We were now handling multiple plants."

Armock says the Web-based, software-as-a-service (SaaS) model from Plex "was new but solid. We were adding sites in Kentucky and trying to plug in from new sites in Grand Rapids. Problem was how to get everyone connected. The software is written from a manufacturing standpoint, not from an accounting standpoint. They were willing to adapt and improve themselves. We had an offline database for WCI. So, we said to Plex you don't have employee suggestion module. They said, OK. We'll develop one. We worked together to develop one where we can track a lot of issues and get good reporting."

Rev-A-Shelf's visible inventory

Meanwhile, in Jeffersontown, Ky., custom-storage organization products manufacturer Rev-A-Shelf implemented a comprehensive Lean manufacturing initiative throughout the corporation, which required the company to integrate in order to achieve real-time visibility of inventory and finished goods.

"With the implementation of Lean manufacturing, we needed to ensure real-time visibility," said Michael Rodgers, information systems manager at Rev-A-Shelf. "Now all information we get on inventory is in real-time. That makes a huge difference. If something is moved, it's shown and accounted for," added Rodgers.

Operating with Lean manufacturing means you have to make changes to production and material flow frequently. Rev-A-Shelf uses manufacturing software rom Epicor Software Corp. in Irvine, Calif. to get the information they need to make those changes.

For Rev-A-Shelf to become Lean they had to make some changes in operations. After implementation, the company moved from a build-to-stock to a build-to-order philosophy. With build-to-order in place, they set a company goal of shipping OEM/retail customer orders in three business days, and distributor orders in four business days.

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With the move to Lean Manufacturing, integration has become critical for inventory accuracy and productivity. Since implementing Epicor, productivity is up 25 percent because picking is more efficient and less time is wasted searching for material. Adds Rodgers, “Rev-A-Shelf surpassed its shipping goals and now ships orders in two days.” Accordingly, daily shipments have increased from 75 skids per day to more than 250 skids per day.

Eliminate waste

Schneider Electric is not only a leading automation supplier, it also has a major manufacturing presence. Ted Klee, senior vice president of Schneider Electric’s supply chain for North America, describes how the company achieves Lean manufacturing and eliminates waste.

“We have the Schneider Production System, kind of like TPS is to Toyota,” says Klee. “Maybe 10 years ago, as the company started to globalize and come together, we looked at various Lean initiatives around the world. We found we had great practices, but people were doing different things that may have worked, but couldn’t leverage across the enterprise. We boiled it down to 40 principles in three buckets. We have a commitment to people. Every employee is a problem solver. Improvements will come from people. Second is an understanding that how we design products and processes will determine 80 percent of the cost of product going out of the door. This includes activities such as safety, ergonomics, environment, product flows and maintenance. Third is the management of industrial and logistic processes—planning how to link customer demand to production.

Schneider practices short interval manufacturing getting the information to flow as soon as possible. Information rolls up from the production floor to the plant manager. “When you don’t get your numbers,” adds Klee, “you must identify the barrier. The plant manager walks the floor, not to get on people but to get them to recognize barriers to production flow.”

The company has seen many benefits and results from the program. Klee says, “Our proudest point is impact on safety. We’ve experienced an 80 percent reduction in workplace accidents. This is clearly from heavy employee involvement, but also from design of process. We’ve also cut energy by 30 percent. We’re running the highest service levels and quality levels are high, while inventory levels hit all time record lows. This may not be obvious, but as you become Leaner you do those both.”

Not all people look at Lean manufacturing as a way of life. Some, like Graham Harris, president of controls supplier **Beckhoff Automation U.S.** in Burnsville, Minn., says just implementing modern control technology can be considered Lean. “It allows you to eliminate waste, which is a Lean concept,” Harris says. “If you can save 10 percent of plastic material in a machine, then you are eliminating waste. The end product is lighter. Machines break down because of lack of a modern control system. Today, with electronics and software and the ability to add vibration monitoring and other sensing and feedback, we know more about the machine and how to keep it running. Not only that, we have better energy and carbon monitoring—which may become a requirement in Europe.”

No matter your point of view, there is no doubt that manufacturing professionals of all stripes are looking for ways to eliminate waste and create value.

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