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ENGINEER**

Engineering & management solutions at work

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November 2006

VOLUME 38 : NUMBER 11 : \$9.00

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Faster results come from a lean culture

BY MARK NASH, SHEILA R. POLING, AND SOPHRONIA WARD

THE LEAN MOVEMENT IN THE UNITED STATES HAS NOT ONLY CAPTURED the essence of Henry Ford's statement, it has also used his words as a cornerstone for creating a lean culture: "The longer an article is in the process of manufacture and the more it is moved about, the greater is its ultimate cost."

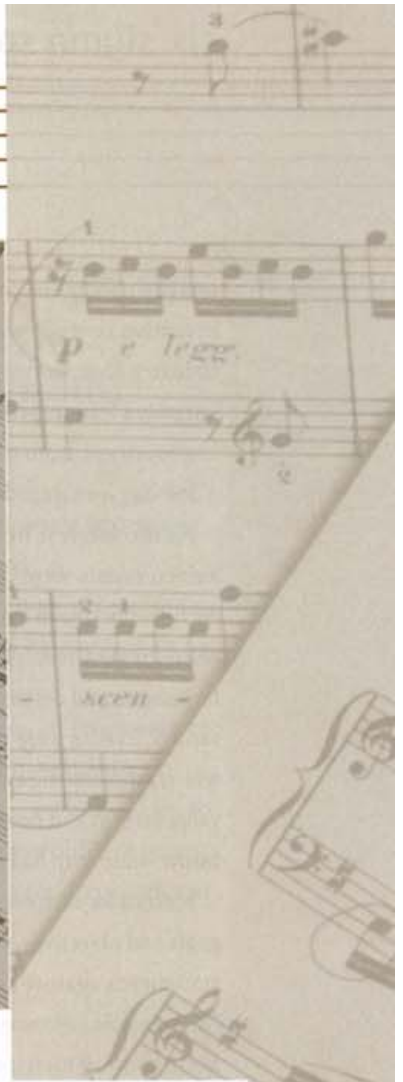
Striving to reduce the production cycle by decreasing task time or eliminating rework and non-value-added steps has become an easily understood method for convincing the work force to embrace lean. From this lean culture, many positive outcomes occur. Of these outcomes, faster Six Sigma results may be one of the most powerful.

In recent years, many continuous improvement practitioners have jumped on the lean and Six Sigma bandwagon, drawn there by the promise that this blended approach produces fast results by doing Six Sigma projects at the speed of lean. The structure of such approaches may direct the organization to operate a Six Sigma initiative using the basic Six Sigma management structure: use the define-measure-analyze-improve-control model known commonly as DMAIC, add in lean's focus on waste elimination, and conduct projects from start to finish at breakneck, kaizen-type speed.

This approach may work in some cases, but the number of resources required to make it happen can be staggering. To conduct Six Sigma measurement and analysis at this speed, focusing on each item identified in the project charter will require either additional black belts or limiting the scope and depth of the project. Additionally, as focus is placed on making sure the data are accurate, it is possible to begin ignoring lean concepts and opportunities. After all, if there is a financial threshold criteria on the amount of savings being generated by a Six Sigma project, many lean opportunities may be overlooked or ignored.

The best approach is not to blend these techniques into one effort, but to use the techniques in an integrated manner to derive the most benefits possible from each





type of project. Companies that enter Six Sigma after working with lean have come to understand this concept. There are many companies that have tried both approaches, but the data shows that Six Sigma projects are conducted more efficiently and effectively if a successful lean implementation has already taken place in an organization.

Using a synchronized approach in an integrated manner makes it possible to blend both disciplines to address all issues and opportunities in an area quickly, keep the momentum of change going, and produce significant results using the correct skill sets at the correct time. It is possible to use lean to remove the waste and create standardized, simplified processes and then use Six Sigma to address tougher issues related to defects and variation.

Quite often, the Six Sigma team will then once again depend on lean facilitators to implement changes recommended by the Six Sigma project team and use lean techniques to accomplish these changes. In organizations that have gone down the lean

path and then introduced Six Sigma, this synchronized transition back and forth between the two methods is seamless. Employees not only understand how both initiatives work together, they also expect the two initiatives to be used in a seamless environment. The workers don't have to know all the details and understand all tools to appreciate how lean and Six Sigma complement each other to generate significant results.

Since many organizations have already implemented or are just beginning to implement lean, they can see what happens when Six Sigma efforts are launched after lean efforts have succeeded. The resulting one-two punch of lean followed by Six Sigma helps speed up Six Sigma project times and results.

Six Sigma after lean

A profitable electronics manufacturer adopted lean manufacturing as its continuous improvement method after sending management team members to several lean workshops and seminars. Facing the reality that foreign competition was

increasingly taking market share, management knew that a proactive strategy was required to retain its position in the industry. Determined to make the cultural change necessary to support a lean transformation, company executives drove lean improvement from the top, requiring all employees to attend a one-day lean introduction class.

As the interest in lean spread through the organization, kaizen events were conducted one product family at a time. As five-day kaizen events were completed, the executive team would review results with the lean project team and outside facilitators and determine whether additional events were warranted. Events were conducted in each area until agreement was reached by the executive team and the facilitators that the value stream had been improved — at least 80 percent of the future-state map had been implemented.

Metrics for each event were tied to work cell and value stream goals and objectives, which in turn were translated into impact statements against key performance indicators of the entire company. Success was determined by each team's performance against these metrics and by demonstrating improvement regardless of total bottom-line impact. After all product family work cells had been improved using lean techniques, the executive team reprioritized areas for future events based on the input of employees and lean teams.

After 18 months of intense lean improvement throughout the company's manufacturing facility, one product family stood out from all other lines and work cells. Through each reprioritization cycle, the executive team consistently ranked this product line at the top of the list for additional kaizen. Even though

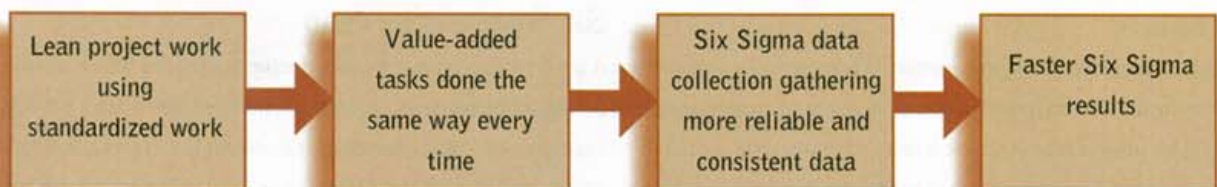
the product family had reported annual savings in excess of \$225,000 through four weeks of kaizen events, it was apparent to the executive team, the lean facilitators, and the majority of employees working in this cell that there were still several large opportunities that had not been addressed successfully.

Several members of the executive team were interested in adding Six Sigma to the lean initiative. Initial reaction to this idea ranged from excited approval to cautious support to outright objection. The members of the executive team who objected were concerned that after 18 months of including all employees in lean projects, the employees' enthusiasm would be extinguished if the preferred method was suddenly back in the hands of a select few. They feared that using Six Sigma and running projects with black and green belts instead of using all employees to identify opportunity and implement change would send the wrong message.

After extensive discussion of the pros and cons of this approach, the executive team determined that adding Six Sigma would not be detrimental to the culture change that had taken place across the company. They authorized two employees for black belt training and certification. As a part of the extensive five-week black belt training, each candidate was required to complete successfully one Six Sigma project approved by course instructors. One of the black belt candidates was directed by the executive team that the project he would focus on during training would be the work cell that continually appeared at the top of the lean prioritization list.

By selecting this as a Six Sigma project, the executive team hoped to achieve success and demonstrate a purpose for adding

INTRODUCING SIX SIGMA INTO A LEAN ORGANIZATION ACCELERATES RESULTS



Six Sigma to the company's lean initiative. The results of this first project were powerful and surprising.

The black belt candidate assigned to this project was able to assemble a project team, create a project charter, and get his Six Sigma champion, project team, and executive team approval all within three days. Quickly moving from define to measure and analyze, the project team focused on line balancing and production rate issues. A control chart was created for 15 months' worth of historical production rate data.

Using this control chart to identify signals of possible exceptional variation, the black belt candidate pointed out numerous dates where the production rate fell outside the lower control limit and asked line leads and the line supervisor what problems occurred on the given date. Since the supervisor had been maintaining a production log complete with notes for several years, it was easy to determine what was occurring.

Product engineers and the production supervisor began addressing vendor delivery problems and parts quality issues with several vendors. All occurrences of late deliveries were immediately reported to the purchasing department, and corrective action was initiated. Visual aids were used to assist employees in identifying convoluted cords and defective cases.

The leads and supervisor then looked for more recent dates where problems were occurring but could find no other signals to review until lean work had begun. From the time that the second lean kaizen event had been conducted, there were numerous signals, but nothing was noted in the logs suggesting possible problems.

It was decided that in place of the logs, a control chart would be used to measure the cycle time at three distinct points on the production line and proactively address these signals as they occurred. A second chart was used to show the gap between cycle time and takt time. During the next three weeks, these control charts were used to monitor performance on the production line.

At the conclusion of this time, the team met to discuss the results. With the exception of one late box delivery and one bad case of cords, there were no obvious answers noted on the control charts for more than a dozen signals — each occurring when employees on the production line were moved to balance

Synchronized lean and Six Sigma

- Synchronization creates an environment where overall project timelines are shortened.
- Bottom-line results are increased at a more rapid pace than using either initiative as a stand-alone effort.
- The synchronized approach allows all employees to participate, creating faster employee buy-in.
- This approach allows black belts and champions to focus Six Sigma efforts on the more difficult issues, and lean teams can lead the way attacking waste and low-hanging fruit.

the work.

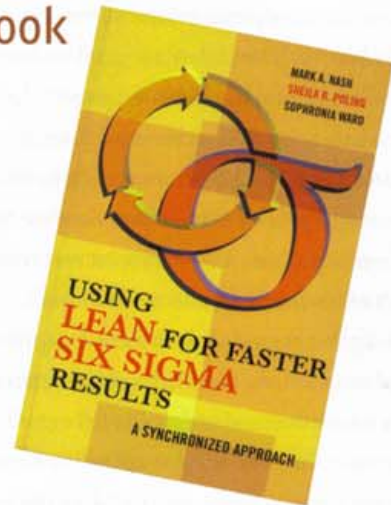
Anecdotal evidence presented by one of the leads suggested that one employee, who had been identified as a roadblock by several lean project teams, disrupted the flow of work intentionally whenever adjustments to task content were made. Additionally, several leads noted that this employee intentionally slowed down when the takt decreased and sped up when the takt time increased. Additional results are highlighted below in "Results at a Glance."

By eliminating many of the simple distractions and low-hanging fruit from the equation, it is possible to address the scope and focus of the Six Sigma project much faster, identify issues and causes without delays and interruptions, report findings, and implement solutions in a timely manner. While first-time Six Sigma projects in this lean world are conducted in significantly shorter time spans than in Six Sigma organizations that don't have lean, the real power comes from the integrated and synchronized approach using both disciplines at the correct time. ❖

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Results by the book



Using Lean for Faster Six Sigma Results by Mark Nash, Sheila R. Poling, and Sophronia Ward details a no-nonsense approach for maintaining the best of both initiatives without diluting either. The book explains the differences and complementary functions of these methods through the eyes of a lean practitioner and master trainer who is also a Six Sigma black belt, partnered with died-in-the-wool Six Sigma and statistical process control experts. Surely, it's a combination for an industrial engineer to love.

Using Lean for Faster Six Sigma Results is published by Productivity Press.

Results at a glance

Lean labor cost reductions	\$238,060
WIP reduction (lean and Six Sigma)	\$87,290
Six Sigma labor cost reduction (increased throughput)	\$299,096
Line defects reduction	\$12,017
Total	\$636,463
Floor space reduction	63%
Process locations	From three to one
Travel distance reduction	87%
Sigma level	from 2.9 to 4.8