

May/June.07

MANAGING **TIMES**

Sharing Solutions for Your Lean Journey

Siemens Transmission and Distribution: Leveraging Lean to Respond to Customer Demand



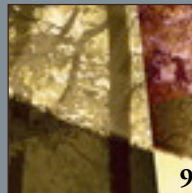
6

Designing and developing a training program.



8

LeanSigma® culture: leadership's role.



9

So you want to be green? Go lean.





Global warming: it's a topic worthy of books, movies, Academy Awards, Congressional hearings, and international treaties. Federal regulations have mandated some environmentally conscious practices, but many companies could go much further. The environmental movement aside, though, if you think about it, lean manufacturers should strive for "greenness" simply because it makes sense to do so.

Regardless of your individual beliefs about global warming, the reality today is that society is taking notice of environmental issues. Consumers are increasingly concerned with making socially and environmentally conscious choices in their investments and purchase habits. Obviously a company at the forefront of the green movement will have some advantages in the marketplace.

But there's more incentive to going green than just public perception. Actively pursuing resource conservation melds beautifully with a lean culture. Why? Because operational excellence always starts with 5S, and a big part of 5S is waste reduction.

Don't get caught up in the rut of believing that 5S means only cleanliness, orderliness, and removal of trash and things that you don't need. It also means addressing wasteful practices of any sort—like plugging leaks and addressing overuse of natural resources. Although it's not been a typical area of focus in the search for "low-hanging fruit," resource use and conservation should be. This is a case where re-using and recycling makes sense from both an economic and environmental standpoint.

Economically, resources cost money. Electricity, water, wastewater, waste removal, and raw materials are a large part of a business' operating expenses. Wasting any of these—using more than you need, for whatever reason—adds significantly to the cost of doing business. If you can find ways to save any of those resources, you can directly affect your company's profits.

When you look at your business through a lean lens and as you plan policy deployment and go-forward plans, keep "reduce, reuse and recycle" in mind. Make it a part of your organizational culture. The creativity your lean approach fosters among your employees can be put to good use in addressing these issues. Doing so will provide a dual benefit—you will save money and you will be doing your part to help the environment.

For further discussion on the value of going green, see "So You Want To Be Lean?" on page 9.

On the subject of energy, also in this issue Siemens Transmission and Distribution, makers of high-voltage electrical equipment, describes why the company embraced lean and how it has improved not just the processes the company uses, but also the company itself (p. 2).

You will also find valuable information on designing training programs (p. 6), the steps lean leaders should take to transform their businesses (p. 8), and assessing kaizen event participants' grasp of day-one training topics (p. 10).

Remember that going lean isn't just about operational excellence—it's about being excellent in all aspects of your business, from addressing wasteful practices and taking responsibility for the world around you to learning how to lead as well as teach. Lean brings about positive personal changes in all of us, while at the same time bringing positive change to our businesses, and hopefully to the world around us too. ■

A stylized, handwritten signature in black ink that reads "Anand Sharma". The signature is fluid and cursive, with a horizontal line underneath.

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A publication of
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Art Direction and Design

IONA design
www.ionainteractive.com

Printing

Carter Printing & Graphics, Inc.
www.carterprintingnc.com

Published bi-monthly in Durham, NC

4400 Ben Franklin Boulevard
Durham, NC 27704

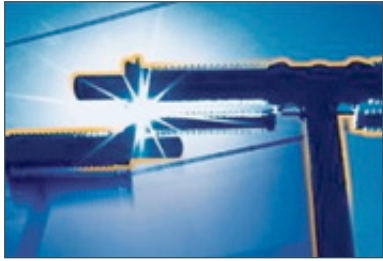
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On the cover: Siemens Transmission and
Distribution, a major figure in the high-
voltage sector, is using LeanSigma® to fine
tune its production practices in order to meet
increased customer demand for ever shorter
lead times and ever lower prices.

Saurabh Singh is the new vice president of operations for Circor Energy Products Group. He will report to **Paul Coppinger**. Paul Gomez is the new continuous improvement manager at Circor. He will report to Saurabh. Both Saurabh and Paul come to CEP from Dana Automotive, a supplier to Toyota Motor Corporation. ... **Gary Wilson** is now senior vice president of Lean and Technical Services at Nibco. ... **Fernanda Poda** has been assigned as continuous improvement supervisor at Paranoá Rubber auto parts in Brazil. ... **Jean-Sebastien Roy**, formerly MCE manger at the McCain Foods french fry plant, Grand Falls, New Brunswick, is moving to Montréal, Quebec, to head the MCE Initiative at Wing Wong and Tour Eiffel, both part of McCain Foods. **Paul Dickenson** of North Star Aerospace Canada is leaving the company to pursue another opportunity. ... Because of his role in the excellent lean results achieved by Mattel PTMI, Jakarta, Indonesia, in terms of lean and after more than 20 years of excellent work at PTMI, **Mike Burrows**, has been promoted to a position equivalent to general manager and moved to Mattel MAPS in Hong Kong. His new responsibilities include LeanSigma® implementation at MAPS, providing support to the new Mattel acquisition in China (Radica) for lean implementation, providing direct support to the China sites (MDC and MHK), and taking the role of lean coordinator for all of Mattel's Asian sites. ... **John Trang**, previously general manager at Mattel MHK responsible for two sites producing Barbie dolls is now also general manager for Mattel MDC. ... **William Poon**, former production manager for Mattel MHK is now the new lean supply chain officer for the company's three Chinese sites. ... TBM welcomes our newest consultant, **Tim Nickerson**. Tim comes to us with 20 years of diverse industry experience using lean methods, Six Sigma tools, and metric-based performance standards. He is based in Utah and will be joining Tom Morin's team. ... In corporate news, TBM congratulates **WIKA USA**, in Lawrenceville, GA, for winning the 2007 Perfect Engine Corporate Award, presented at this year's Executive Exchange. WIKA President Michael Gerster received the award on behalf of the company. To be eligible for the award, a company must be actively involved in a LeanSigma transformation throughout its value chain, under the direction of TBM Consulting Group, and should have

completed at least three years of successful transformation at the beginning of the year in which the award is received. Companies that receive the award must be focused on customers; demonstrate a commitment to their entire workforce; exhibit innovation in listening to customer needs, developing products that meet or exceed those needs, and designing flexible processes; leverage lean for growth; and be able to do more with fewer resources and be focused on tangible near- and long-term financial achievements. ... WIKA's Lawrenceville, GA, plant will also be holding a senior-management-level **Managing for Daily Improvement (MDI)** course, conducted by the TBM LeanSigma Institute. The course will specifically focus on developing a response system protocol for standard work and abnormality management. This is an example of how WIKA continues to innovate and push the envelope for continuous improvement and employee development. ... As a result of the success at the **Enpro** sites in Thorofare, NJ, and Annecy, France, where the LeanSigma Institute has provided a customized training program for developing TCV Blackbelt candidates, Enpro has decided to roll out a third site, in Bay Minette, AL. All training has been self-funded based on the results of the lean work completed to date. These Enpro sites will also be offering customized training of green belts and in business processes. All site projects will include specific MDI events as well as two-day operator awareness training that emphasizes TBM's "teach and do" approach. A TCV Master Black Belt program is in works as well and will be launched in the second half of the year.



Power Transmission & Distribution
High Voltage



Power Transmission & Distribution
Medium Voltage



Power Transmission & Distribution
Energy Automation



Power Transmission & Distribution
Transformer



Power Transmission & Distribution
Services

Siemens is a name recognized around the world, but what lies behind this major group? The company has 475,000 employees working in 11 divisions, some of which are widely known: Automation and Drives (A&D), Medical Solutions (Med), Siemens VDO Automotive (SV), Industrial Solutions and Services (I&S), Siemens Building Technologies (SBT), Transportation Systems (TS), and Siemens Business Services (SBS), but also **Power Transmission and Distribution (PTD)**, which is subdivided into five activities. These are Medium Voltage, Energy and Control of Electrical Systems, Transformers, Services, and **High Voltage**. The French subsidiary Siemens Transmission & Distribution has been part of PTD since its July 2005 acquisition by Siemens.

Siemens is a world leader in high voltage, following closely on the heels of ABB. Other competitors to Siemens in this activity are: Areva, Alstom, Mitsubishi, Toshiba, and firms active in emerging countries such as PDS and Shenyang (Chinese companies).

A manufacturer and installer of high voltage electrical equipment, Siemens Transmission and Distribution employed 749 people on June 1, 2007. This represents an increase of around 10 percent compared to the end of 2004 and the start of a new dynamic for our company, featuring an improvement program for the Production Division carried out with the support of TBM.

Today, with 400 people on its payroll, the Production Division covers a wide range of skills in various fields: R&D, preparation of tenders, project management, engineering, supply chain, tests and dispatching, and assembly.

Manufacturing occupies 200 people working on the production of a comprehensive range of Gas Insulated Switchgear (GIS) products:

- TH7m and 8DN8 (72 kV and 145 kV)
- 8DN9 (245 kV)
- 8DQ1 (420 kV)



Each product is adapted to the specific needs of our worldwide clients.

Our main clients are energy producers such as EDF, energy distributors such as Réseau Transport Electricité (RTE), GECOL Libya, ENDESA Spain, STEG Tunisia and EVN Vietnam, as well as heavy process manufacturers and large energy consumers (metallurgy, aluminium works, petrochemicals, and so on) to whom we supply high voltage switchgear and equipment.

These projects (which can run from one to two years) generate large inflows of cash ranging from 10 to 100 million Euros per contract but remain highly dependent on strategic and political decisions taken at the highest levels—by governments, global financial organizations, and the clients themselves, who provide the financing for many of the projects. Currently this activity is booming, particularly in China, India, and the United States.

Based in Grenoble, France, Siemens Transmission & Distribution has a long history and is by no means a newcomer to the high voltage sector. The company started as Merlin Gerin at the beginning of last century. However, the current situation no longer bears any resemblance to the one that persisted until the turn of the 21st century. Indeed with clients demanding ever shorter lead times and ever lower prices, we—like other industries—are required to adopt lean manufacturing processes in order to fine-tune our production.

As a result, and independent of the takeover by the Siemens Group, at the end of 2004 the company's management decided to launch a program of continuous improvement to satisfy the growing demands of our clients. Within the Production Division, the project goes under the name of **RITMO** (Repenser l'Industrialisation dans le Temps et Maitriser l'Organisation), or loosely translated in English, Rethinking Industrialisation in Time and Mastering the Organization. It was at this time that the first exchanges took place with TBM.

The reorganization of production lines to accommodate lean manufacturing and so improve productivity became for managers a clear necessity that would entail profound changes on many levels.

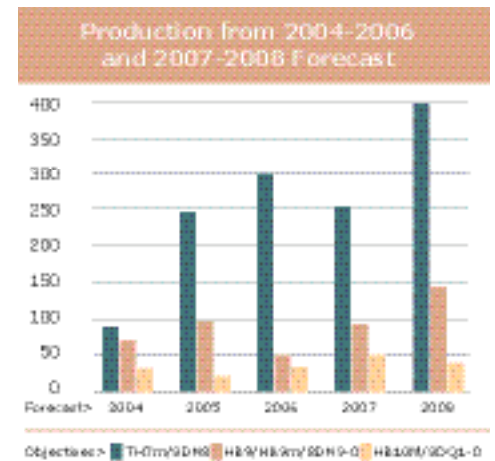
The first stage of the work conducted with TBM was an analysis of the current situation. This made it possible to identify difficulties encountered throughout the process, such as:

- Upstream: design and launch of products without a defined production batch; launch of projects without centralized planning, incomplete bill of materials and product structure, management of supplies and stocks not in line with actual requirements, logistics and procurement lacking in adequate structure
- Within the plant: production areas in need of reorganization to achieve streamlined production through the elimination of excess work in process, better balancing of work, parts shortages in assembly, and training and shop-floor management style
- Downstream: excessive lead times for the release and forwarding of equipment, storage and packing problems, delays in the commissioning of equipment

The list is not exhaustive but does give an idea of the difficulties present at all stages and at all levels. It is moreover what many firms find when they seek to understand the underlying causes of their under-performance. They also know that they are going to have to embark on a dedicated campaign to drive change.

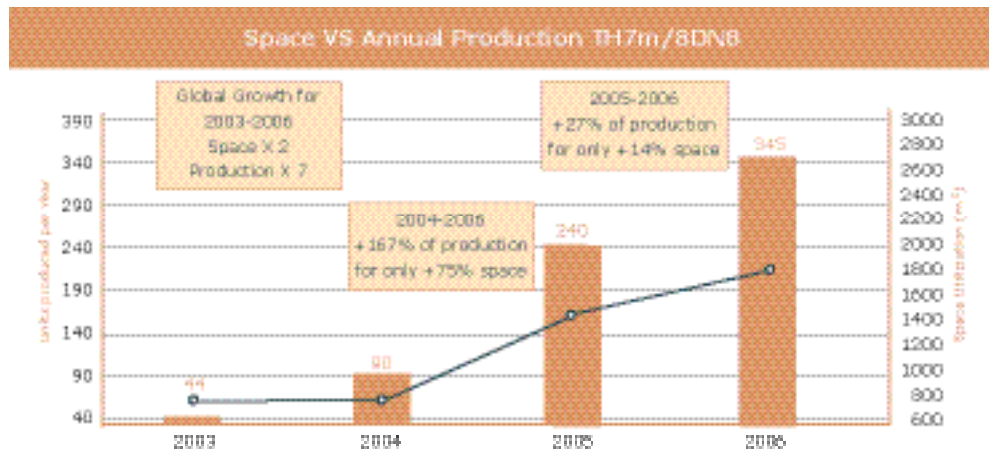
At that time, customer requirements were very much focused on one product range in particular: the TH7m (switchgear with a voltage of up to 145 kV). It was on this production line that the first kaizen projects were introduced, the aim being to progress from 90 to 260 units between the end of 2004 and the end of 2005.

SIEMENS



Although early efforts met with some opposition—resistance to change can be considerable—after six months improvements became noticeable and other production lines quickly became eager to join in the initiative!

In concrete terms, in less than a year the TH7m line acquired a more industrial appearance with among other changes the creation of the job of kit man who supplies each work station. This avoids useless motion and assures the coordination of parts and supplies for the line. The best change was that the TH7m line succeeded in attaining the defined production targets.



On this line, labor productivity increase was in the order of 5 percent in 2005 and 10 percent in 2006, with the aim for 2007 being to reach 20 percent for all production lines combined.

On top of this, when we have a reliable supply of components (through working with the critical suppliers and introducing second sources) we are able to produce one unit in one week. Previously the assembly lead time was three weeks—proof that, by using takt time (based on the customer requirements) we have been able to make a significant reduction in lead time. But the improvements don't stop there.

The ratio of floor space used/number of units produced is another example. Better use of floor space and optimized layout of the TH7m production line have made it possible to improve the floor space/quantities produced ratio very markedly.

And this better use of floor space also improves workplace ergonomics and job satisfaction among operators.

The introduction of line side supermarkets, a kanban system between stores and production, the creation of work standards for each job, and the introduction of FIFO (using color codes for each day of the week) for the material flow from the wash and paint process to the production lines are also tangible proof of improvements made.

Visual Management of the 'Monument Processes' such as Cleaning & Painting

Day	Picking	Cleaning	Painting
Monday	Yellow	Blue	Orange
Tuesday	Green	Yellow	Blue
Wednesday	Magenta	Green	Yellow
Thursday	Orange	Magenta	Green
Friday	Blue	Orange	Magenta



Kitting system / poka yoke to ensure quality & remove mistakes



Meanwhile we are continuing our collaboration with TBM, being convinced of their expertise and the benefits accruing to us from the accumulated experience of our consultants, who are always encouraging us to ask more questions and are ready to steer the debate in new directions when necessary.

Organized in the traditional way as recommended by TBM, these projects occupy groups over virtually a full week, starting Monday at noon with training and continuing through Friday noon with a kaizen presentation to the management team. The managers of the Steering Committee and employees from the sector concerned by the project attend the presentation. This is the first part of call for information about the project and any actions to be completed within the next 30 days.

Around 26 projects have been completed in the Production Division and four have been carried out in other divisions. More than 170 people have taken an active part in these work groups, with some repeating the exercise several times. Since March 2006, one person directly attached to the Production Division has supervised the continuous improvement initiative to ensure rigorous follow-up of the 30-day actions, as well as promotion and organization of the process, an important part of which is also devoted to behavior and quality of work on a day-to-day basis.

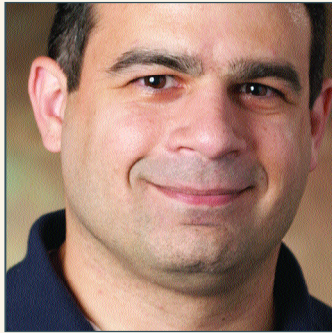
Several audits conducted either internally by the Siemens Group or externally by some of our clients (EDF, LAPEM (Mexico), and GOST (Russia)) have recognized this approach in their reports. It has been identified as a very positive factor for the company.

This year we have decided not only to tackle administrative processes within the Production Division itself—particularly by inviting our suppliers to become more involved in the process—but also to conduct mini-projects internally to promote the lean manufacturing philosophy based on tools used in kaizen.

In this way we are seeking to continue our progress by eliminating nonvalue-added work wherever possible and continuing steadily to improve our processes and our organization. ■

Note: TBM had this article translated into English from the original French text written by Nadine Calmin.

By Joe Panebianco, TBM Senior Trainer and Design Specialist



Joe Panebianco



In the last two articles, we looked at how adults learn, what conditioned behavior is, and how this shapes our current behaviors. Now it is time to use these concepts in the context of developing a training program. Let's learn about instructional design and integrate adult learning theory where appropriate.

More than 100 different Instructional System Design models exist, but almost all are based on the generic "ADDIE" model. In 1975, Florida State University developed the ADDIE model of analysis, design, development, implementation, and evaluation, which was selected by the Armed Services as the primary means for developing training. At the time, the term "ADDIE" was not used, but rather SAT (Systems Approach to Training) or ISD (Instructional Systems Development). Each of the five steps in the model has an outcome that feeds the subsequent step.

Analysis Phase

In the analysis phase, instructional goals, objectives, and behaviors are defined. The learning environment and learner's existing knowledge and skills are identified. Below are some of the questions that are addressed during the analysis phase:

- Assess the audience and identify their characteristics.
- Determine what information will be covered in the training—that is, learning objectives, exercises, content, and subject matter analysis.
- Specify the types of learning constraints.
- Identify delivery options and media selection: online, classroom, self study, on-the-job
- Develop ways to measure the effectiveness of the training.
- Identify the timeline and cost for project completion.

Design Phase

In the design phase, we take the audience assessment, learning objectives, exercises, content, subject matter analysis, and media selection from the analysis phase and design the training program. The design phase should be systematic and specific. Systematic means a logical, orderly method of identifying, developing, and evaluating the training program. Specific means each element of the instructional design plan needs to be described in explicit, unambiguous terms.

These are steps used for the design phase:

- Identify and list the learning steps required to perform the task.
- Develop performance tests for the training.
- List desired behaviors that each learner should ideally demonstrate prior to training.
- Sequence and structure the learning objectives (e.g. easy tasks first).
- Develop the project's instructional, visual, and technical design strategy.
- Create storyboards for the class or classes that are being designed.
- Create a prototype of the training.
- Design graphics and materials that will enhance the training experience.

Development Phase

The development phase is where the developers create and assemble the content that was created in the design phase. Programmers work to develop and integrate various materials, graphics, and visual aids with the media selected for the training. The project is reviewed and revised according to any feedback given.

- Develop activities that will reinforce the learning.
- Select the delivery method, such as overheads, handouts, or podcasts.
- Review existing material so that you do not reinvent the wheel. You might find you are able to incorporate some existing materials into the new program.
- Develop the instructional material.
- Review the materials to ensure they accomplish all goals and objectives.

Implementation Phase

During the implementation phase, procedures for training the facilitators and the learners are developed. The facilitators' training should cover the course curriculum, learning outcomes, method of delivery, and testing procedures. Preparations of the learners' materials include training participants on new technologies (i.e., podcasts, webcasts, etc.) as well as student registration.

This is also the phase where the project manager ensures that the books, CDs/DVDs, and any software needed are in place and that the learning application or website is functional.

- Create a management plan for conducting the training.
- Conduct the training.

Evaluation Phase

The evaluation phase consists of tests designed to assess the effectiveness of the training process—that is, assess the training material, instruction, delivery method, and the learners' retention.

- Review and evaluate each phase (analyze, design, develop, implement) to ensure it has accomplished its intended goals.
- Perform external evaluations—observe that the tasks that were trained can actually be performed by the learner on the job.
- Revise the training to make it better.

Performance tests are a key evaluation measure that can be used to assess how much of the training has been retained. During a performance test, the learner is required to demonstrate a skill that has been learned by using the skill in a simulation environment or role-playing experience. For example, a classic performance test that virtually all of us have gone through is a driver's test. Before the student is awarded a driver's license, he has to demonstrate that

**“What I hear, I forget.
What I see, I remember.
What I do, I understand.”
– Kung Fu Tzu (Confucius)**

he has mastered the basic skills required to operate an automobile. This is done with the student using an actual vehicle, operated under the close supervision of an evaluator who uses a checklist of performance steps that the student must perform in order to pass the exam. This performance test, like all well-designed performance tests, exhibits three key characteristics:

- The student must demonstrate key skills in a specific order if he or she is to pass the test.
- The test involves any necessary equipment in the appropriate setting—that is, it comes as close as possible to simulating an actual experience.
- The evaluator knows what behaviors the student must demonstrate and the parameters for the successful completion of each step within the test.



While performance tests are often viewed as a critical evaluation measure, they are also essential learning components for the adult learner, who learns by doing.

Laying the groundwork

One potential shortfall of the ADDIE system is that it doesn't lay the basic groundwork for adult learning. As mentioned in previous articles, adult learning theory tells us that adult learners are needs-driven. This means that adults will be most interested in training when they are aware of the need for change and that the training itself will help them with that change. So think of this as the pre-work or part of the marketing that needs to be done before the learner even starts the training. If we just tell someone, “Hey show up on Monday at 1 p.m. for some training,” we've done nothing to tell them what the training is about, why we're having the training, or how it will help them (what need it will satisfy). We need to take the time before, or at the very beginning, of the training to explain not only what the participants are going to learn, but why they are in the training. This is especially true with LeanSigma® training. If you just get up in front of a group and start to teach takt, flow, and pull, people are going to be sitting there saying, “Why am I here, how does this help me in my job, and what do they expect me to do with this information?” They walk away from the training not knowing the value of the materials they just covered or how it will help them. So a vital part of developing any training program—laying the groundwork—is communicating the reasons and benefits of the training before the student even enters the classroom. ■

By Gary Hourselt, Vice President, TBM International and Strategy Practice



Gary Hourselt

A cultural transformation is not a revolution brought about by a discontented mass of employees, but a revolution stirred by the company's leaders. While the most important job you have as a leader in your organization is to develop people, creating and sustaining a compelling value proposition for your customers and having high-performing people around you are the ingredients for success. In transforming your business into a LeanSigma® enterprise, you should be taking twelve actions to create a real and lasting cultural transformation. These actions are described in the following list:

- 1. Create a sense of urgency.** With a growing global marketplace and increasingly aggressive competition, no company needs to create the urgency for change. It is already there. Most leaders understand this. Your job is to make sure your employees understand it too.
- 2. Change the focus.** Shift attention away from the past and toward the future, beginning with turning from an analysis of past customer interactions to personal insights into the solutions your customers need now and will need going forward.
- 3. Develop leaders.** Find, groom, and motivate the leaders you need to transform your organization, and then put them in the right positions to drive the change.
- 4. Communicate openly and often.** You exhibit your commitment to the transformation through such actions as visiting customers, participating in kaizen events, and communicating key elements of the transformation relentlessly, in existing and new forums, with all employees, over and over and over again.
- 5. Focus on your customers.** All senior leaders should spend at least one week a month with key customers. You need to be among the collectors of customer information that can be used to develop innovative solutions.
- 6. Encourage and sustain innovation.** Kaizen events help participants experience rapid innovation. Develop programs that encourage innovative thinking by all employees. You must teach the organization to recognize unconventional opportunities that can help you lock up your customers.



7. Align through policy deployment. No organization can afford to waste energy and resources on efforts that do not support its objectives. You can use policy deployment to build consensus on a few, critical things that will generate growth and long-term success.

8. Allocate resources to ensure success. You are likely to spend less on equipment, facilities, and technology, and more on people, processes, and projects that support your business objectives.

9. Measure progress. You need to identify metrics that capture the implications of your strategy on multiple levels, collect and analyze the data, and develop countermeasures when goals are not reached.

10. Extend the transformation across your value chain. Once you've achieved a level of operational excellence, the second phase of the transformation involves suppliers, distributors, and customers in effective planning and the seamless delivery of value.

11. Promote continuous improvement. The notion that every task and every process can be improved—no matter how often they have already been improved—is one characteristic of the transformational management system. Leaders must applaud the improvements of today while demanding further improvements tomorrow.

12. Maintain discipline and focus. As the initial buzz wears off, people naturally slip back into old habits. Sustaining the transformation is a challenge for every organization. You will need to conduct regular reviews—daily, weekly, and monthly—of organizational performance and hold people accountable to keep the transformation on track.

Be committed to a long-term vision of adding value to customers and society in general. Be committed to developing and involving your employees. Make sure there is continuity and alignment among all of the top leaders in your organization. Doing these things and following the twelve steps outlined here will insure a successful and lasting cultural transformation for your LeanSigma enterprise. ■



Being a good corporate citizen or doing the right thing is part of Toyota's mission. It's also good business. I believe that doing the right thing also means doing what's responsible to the environment and the people in it.

Twenty or so years ago when I worked for Toyota, during one of the many "Gemba" training sessions (learning to see waste), I was walking an assembly line with a seasoned group leader. As we walked he asked me to describe what I saw. At this time we were 18 months into the start-up of a new plant in the U.K. so I quickly began to point out opportunities for improvement. After only a few seconds he stopped and turned toward me and said, "No! What do you see?" After several more long seconds with his eyes fixed on my confused expression he said, "Do you see the people?" By then I was even more confused, but I dutifully turned and scanned the operators, team leaders, and material handlers and started to describe waste in manual operations. "No!" my trainer shouted, "Do you see the people?" At this stage I'd had enough and obviously I wasn't going to get it, so I opened my arms and told him "Yes." "Good," he said, "Now you have to see through the people." (I was even more confused.) "You have to see their children and their children's children; this is your responsibility as manager," he added. End of lesson. Remember, this was a group leader, not a vice president or CEO giving a political message, and he meant every word: the elimination of waste was a major contribution to the future of his community.



Some politicians believe that the rising support for greater environmental care will be detrimental to the cost of living and jobs. Certainly today Earth-friendly energy is more costly than traditional fossil-fuel sources, but while scientists and engineers develop and scale alternative-energy technologies, we in the lean community can do our part by reducing the consumption of natural resources.

The foundation of a LeanSigma® strategy is the pursuit of waste elimination—doing more with less. During every kaizen event we strive to use less material and we look for ways to save energy through smaller, more efficient equipment and decreasing floor space. I'm proud to say that TBM's client partners are steadily increasing their participation in energy kaizen events.

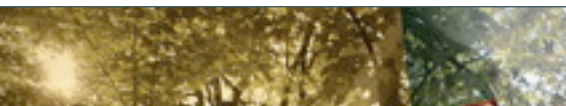
To be successful in commerce, our products and services must reflect the voice of the customer. Environmental stewardship is no longer the cause for just a few or even an emerging trend, it's being demanded. People are questioning product origins, materials, and manufacturing methods before they buy; legislation and the Internet are leading to a more informed customer. Demand for hybrid vehicles, compact fluorescent lighting (CFL), and organic produce is increasing every day. Green sells, and by conducting voice of the customer workshops and activities we can capture and incorporate the "need for green" in products and services and create a strong market message.

Back to the big picture—I'm sure everyone has an opinion on the causes and effects of global warming, and this is truly one of the most important questions facing us today. What we do know is that more carbon dioxide is going into our air than the environment can absorb, and this is contrary to the "more with less" philosophy. Whatever your thoughts are on this matter, I hope you agree that lean principles can provide a positive contribution to a less wasteful and a more responsible future.

I have been fortunate to be involved with continuous improvement for most of my working life. My appreciation of the world we live on has been with me far longer and is something I will value until my time is done. I sincerely hope that my generation can have a positive impact on our planet. Doing more with less sometimes means spending more for what we might normally see as lower value. My bicycle cost more than my first car, which in turn reminds me to maintain it and use it at every opportunity. Being a good corporate—and global—citizen starts with you. ■



Carl Deeley



Melissa Sawin, Director of Continuous Improvement, Reviva

“Do I really need to sit through Day 1 training again?” How often have you heard this question or some variation of it? Associates, supervisors, and even KPO managers have probably wondered if it makes sense to skip the training, especially for repeat participants. In fact, repeat participants seem to pay less attention each time they attend such a training session. As a result, we started letting people out of the training if it seemed logical to do so. So just how important is Day 1 training?

After reflecting on it, we decided to recommit to Day 1 training, but we also decided to figure out a way to give people back that time if they’ve truly mastered the subject matter. We started a year ago by offering to allow people to teach the various modules if they thought they had a good grasp of them. We have a reward system in place where associates can earn lean points tied to a pay-based system, and we offered a lean point to anyone who taught a module. It turns out that the module on 5S was the most sought after for teaching. But we wanted to take it a step further and develop a more objective and structured means to determine people’s understanding of the various Day 1 concepts.



We thought that taking a true measure of everyone’s knowledge base would give us a better understanding of which concepts people understood and which they did not and allow us to make informed decisions about allowing people to skip training, or at least parts of it.

Because we knew that no one had mastered the entire set of modules, we started out by assessing knowledge in only the three core areas. Depending on the event being held, testing would be allowed on only certain of those core modules. For example, if seven modules are being presented in training, participants may be able to opt out of three of those modules if they can show they are proficient in those areas. Our plan is that as we grow and people become more experienced, we will expand the number of modules on which they can be assessed.

We envision that participants will take an assessment each time they attend a kaizen event. We will change the tests over time so that no one can just memorize answers from previous tests—in this way we can make sure that people truly do understand the concepts in a particular module.

We introduced the whole concept of assessments by noting that we have done a lot of events in the three years we’ve been on our lean journey and that we were trying to eliminate waste (wasted time) by making people repeat training unnecessarily.

The assessments themselves are not multiple choice, but rather fill-in-the-blank or require individuals to provide definitions in their own words. This isn’t Vegas—you can’t play the odds! We’re not looking for rote memorization but rather true understanding. Interestingly, people have discovered by taking the assessments that they didn’t know as much as they thought they did. In fact, after three years on the journey, the number of people who couldn’t name the seven wastes was quite surprising.

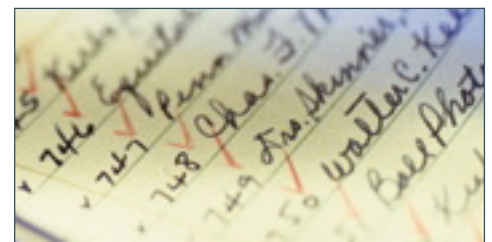
The assessments have become a valuable and objective way to determine if an event participant needs to sit through training. The reward to the employee for mastering a topic is gaining the time back that would have been taken up by being in the classroom.

The approach we have taken is to have everyone take the assessment at the start of training. We then take a break so the assessments can be scored, and people are given their scores individually. Anyone who achieves a score of 80 percent on any one module is considered to have a sufficient grasp of the subject matter and can be excused from that module. Everyone else is encouraged to keep the assessment sheet in front of them during training and use it as a learning tool.

We then reassess at the end of the the training day to see where everyone stands. Some of the modules contain difficult-to-grasp concepts, so these after-training assessments help us to understand not only where people are struggling but also how we can improve our training methods to help them better understand the topics. Recognizing that we may need to adjust our training techniques is just one more benefit of the assessments.

The assessments also help us to determine whether we are using people’s time wisely with our training modules. And they serve as a motivator to individuals to pay attention in class by putting individuals in control of their time. And that’s a win-win situation. ■

I have included a sample assessment with this article. I would appreciate any reader feedback on how we can make the assessments even more useful, from both training and learning standpoints. If you have any comments or suggestions, please send them to me at the following e-mail address: msawin@reviva.com



Day 1 Training Assessment

Developed by Melissa Sawin, Director of Continuous Improvement, Reviva

Directions: Fill in the blanks

LeanSigma Overview

1. LeanSigma is a business strategy that improves _____, _____ and _____ at the same time.
2. Lead time is _____.
3. List 4 value added and 4 non-value added activities in our business.

Value Added Activities

Non Value Added Activities

4. What are the 7 wastes in manufacturing?
 1. _____
 2. _____
 3. _____
 4. _____
 5. _____
 6. _____
 7. _____

Lean Production System

1. _____ is a manufacturing system that produces what the customer wants, in the right quantity, when the customer wants it using the minimum raw material, equipment, labor and space.
2. Takt is a German word that means _____.
3. _____ flow is better than fake or _____ flow.
4. WIP (work in process) hides _____. Define a pull system: _____.
5. Autonomation is separating _____ from _____.

6. Mistake proofing (or Poke Yoke) is important because it _____.
7. Production smoothing is a way to manage variation in both _____ and _____ of customer demand.

5S

1. 5S is not just _____.
2. Name and describe/define the 5 levels of 5S in their English (not Japanese) terms. To describe, you may explain what is done at that step of 5S.
Level 1: _____
Definition: _____
Level 2: _____
Definition: _____
Level 3: _____
Definition: _____
Level 4: _____
Definition: _____
Level 5: _____
Definition: _____

Standard Operations

1. Takt Time = _____ customer demand
2. _____ Operating time is the total time available minus any _____, meetings or cleanup.
3. A work sequence is balanced to _____.

4. The minimum amount of work in process required to complete the work sequence on demand is called _____.
5. Standard WIP is needed in a cell:
 - Where there is _____ between operators.
 - In every _____ machine.
 - For any _____ process (where process is longer than _____).

Standard Operations Tools

6. Optimal Staffing = _____ Takt Time
7. The result of the time observation forms is the _____ cycle time.

8. Standard Operations sheet documents the best combination of _____ and _____.

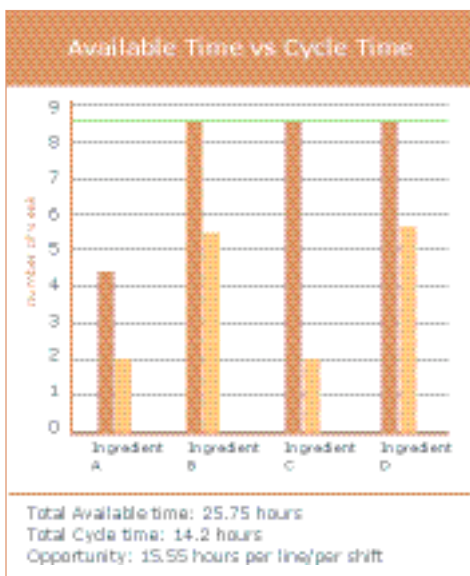
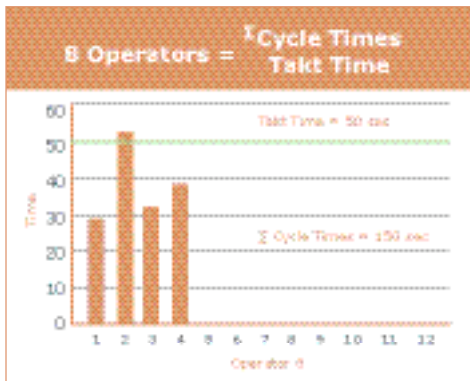
5S

9. 5S is not just _____.
10. Segregate & Discard: "When in _____, _____ it out."
11. Arrange & Identify: "A place for _____ and _____ in its place."
12. A clean work place enhances _____, safety and pride.
13. Revisit Frequently: "If it doesn't get _____, then it doesn't need to be _____."
14. _____ is the key to 5S sustainment.

Kaizen Breakthrough Methodology

15. Spaghetti diagram can show _____ flow or _____ movement.
16. During a kaizen event, we use a _____ to collect and organize ideas.
17. A _____ vs. _____ bar chart helps us determine how many operators are needed in the cell and balance the workload.
18. "Never leave in _____."
19. "Quick and _____ is better than slow and _____."

If you have any comments or suggestions, please send them to me at the following e-mail address: msawin@reviva.com



Not all of the lean tools used in discrete manufacturing translate easily to the process industry. This is especially true with regard to the takt time/cycle time (TT/CT) chart. Because the process industry is usually capital intensive, we often don't conduct labor productivity kaizen events. Instead we conduct events to maximize the utilization of capital equipment, such as TPM or set-up reduction, or we conduct events to maximize raw material utilization, such as Six Sigma or leak events. But there are some parts of process industry that require high labor intensity, such as in packaging or areas where operators have to add a lot of ingredients to create a food product. In the latter example, although all ingredients might be added to the product automatically, it requires a lot of labor to prepare those ingredients. We recently held an event to improve labor productivity of operators who prepare ingredients for addition to a food product.

In discrete manufacturing, we would first calculate takt time, then derive cycle time for each operator by using a time observation form. From these observations, we can then calculate the total numbers of operators required for a particular process. In the case described below, we would need three operators instead of four, an "instant" productivity improvement of 25 percent. Of course, if we can make physical improvements and reduce cycle times further, we can make additional improvements and eventually reduce operator counts to two or fewer. These are basic steps taken in discrete manufacturing to improve productivity.

In the process industry, however, takt time for each unit is not usually calculated, for there are no individual units. Production is continuous. Rather we calculate takt rate, because even when producing individual food products, the production rate is so fast (e.g., one item every 0.2 seconds) as to be essentially continuous. We try to understand how many of a particular food item customers want, then convert that into the number of that item that must be produced per time period. For this particular kaizen event it was 14,000 food items per nine-hour shift. As you can see, takt rate is a

reciprocal of takt time. In takt time, we have time in numerator and unit in denominator. But takt rate has unit in numerator and time in denominator. This gave me the idea to reverse the role of takt time and cycle time.

To improve labor productivity in the process industry, we should calculate what I would call "available time vs. cycle time" (AT/CT). First, just like in discrete manufacturing, we calculate takt rate to understand how much raw material is being consumed to satisfy customer demand.

In food production for example, if you need to produce 14,000 food items per shift, you might need six 600-kg tubs of ingredient B. Say the time required for an operator to get one tub of ingredient B to the production line is 30 minutes. The same operator could provide six tubs of ingredient D to the line in 10 minutes. So in a nine-hour shift, the total operator cycle time is 240 minutes. A nine-hour shift includes an hour for lunch and breaks, leaving a total available time (AT) of eight hours (480 minutes). In our example of an operator preparing ingredients B and D, available time is 480 minutes and the total cycle time is 240 minutes, providing a labor efficiency of only about 50 percent. The top chart shows actual calculations for four different operators.

During the kaizen event, we observed four operators on one line. Each operator, except one, has an AT of 8.5 hours per shift. AT includes a 30-minute break instead of the hour available because sometimes operators do not take breaks. The other operator has only 4.25 hours of AT because that operator actually works on two lines. The total AT for four operators on one line is 29.75 hours. The total cycle time is 14.2 hours, leaving 15.6 hours of idle time. From this calculation, you can see that this line really needs just two operators. If we can also make physical changes to reduce the total cycle time, then we can further reduce the number of operators needed, just as in the discrete model. ■

—Ku Ho (Jonathan) Chong
TBM Senior Management Consultant



TBM LeanSigma[®] Vision Tour

Tour Four World-Class Lean Businesses in Three Days

If you want to learn from the best, come join the TBM LeanSigma Vision Tour, October 16–18 in Des Moines, IA. Over three days, you will tour four world-class lean manufacturers—Amana Refrigeration, Pella, Vermeer Manufacturing Company, and EDS—and be able to benchmark your business against these best-in-class businesses, hold dialogs with senior management to get real-world answers to your questions, and clarify your vision as well as your understanding of the next steps you'll need to take to start or continue on your journey.

Each of the participating companies has been engaged in its lean journey for at least two years, and some much longer. They have all leveraged lean to create operational excellence, improve profits, and drive growth, while putting the customer and the customer's needs first. Senior managers at each of these companies have displayed an unwavering commitment to a lean transformation, and they can teach you how they do it.

These manufacturers can offer you the best advice possible and give you a leg up in your lean transformation by sharing their own experiences, successes, and failures. You will observe lean practices in action throughout each plant. What you can gain from the tour is limited only by your imagination and the questions you ask.

Tour Iowa's Best Lean Leaders

- **Amana Refrigeration** is Maytag's second-largest manufacturing plant and is the engineering research and development headquarters for Maytag's Amana, Maytag, and Jenn-Aire refrigerator lines. This plant has realized nearly \$8 million in cost reductions as the result of more than 160 kaizen and point kaizen events. The plant also increased inventory turns by 11 percent between 2002 and 2006 and has decreased OSHA incidences by 69 percent over the same time period. In the face of numerous changes and rapid growth, the plant remains a world-class lean facility.
- **Pella Corporation** is one of the world's leading manufacturers of premium-quality windows and doors. Pella began its lean journey in 1993 and since then has made continuous improvement a way of life. Since the beginning of its journey, Pella has conducted more than 8,400 kaizen events and has involved more than 55,600 associates and suppliers in its lean initiatives. Pella has extended lean into its value chain as it continues to seek excellence in all areas of its business.
- **Vermeer Manufacturing Company**, which makes equipment ranging from farming machinery to wood chippers to cable- and sewer-line laying equipment, has been practicing lean manufacturing since 1997. As a result of its lean transformation, the company has realized significant safety, quality, cost, and delivery improvements. Vermeer is now expanding lean throughout its value chain, and most important, has made a strong and successful effort to really capture and be responsive to the voice of the customer.

- **EDS** is a global technology services company that offers information technology and business process outsourcing services to clients in manufacturing, financial services, healthcare, communications, energy, and transportation, among others. The company's Des Moines distribution and fulfillment center embarked on its lean journey in early 2005 and thus far has gained a 63 percent increase in units per labor hour, a 29 percent reduction in cycle time, and a 31 percent reduction in floor space. The facility has conducted 78 kaizen events to date, with 93 percent of full-time employees having participated in at least one event.

October 16-18, 2007

Des Moines, IA

visit www.tbmcg.com/lsvt

for agenda and registration details

May/June.07

MANAGING TIMES

TBM LeanSigma® Institute

2007 Event and Workshop Schedule

Business Process Kaizen Instructor Training

Oct 23-26 Durham, NC

Design for LeanSigma® New Products and Processes

June 25-29 Durham, NC Sept 17-21 Durham, NC
Aug 23-27 Monterrey, MX Dec 10-14 Durham, NC

Kaizen Breakthrough Experience

June 18-22 Alstom Transport, Manchester, UK
Aug 6-10 Foldcraft, Kenyon, MN
Nov 5-9 Vermeer Manufacturing, Pella, IA
Nov 19-23 WIKA Wiegand GmbH, Klingenberg, GR

Kaizen Promotion Office Workshop

July 2-5 Monterrey, MX Oct 2-5 TBD, BR
July 10-13 Durham, NC Nov 6-9 Durham, NC
July 17-20 Shanghai, CH Dec 11-14 Shanghai, CH
Oct 2-5 TBD, UK

Lean Certification

Track 2
Week 4: Sept 11-14 TBD
Track 3
Week 1: Aug 20-24 TBD Week 3: Oct 30-Nov 2 TBD
Week 2: Sep 25-28 TBD Week 4: Dec 3-7 TBD

Lean Management Accounting

June 24-25 Pasadena, CA Sept 18-19 Durham, NC
Aug 16-17 Monterrey, MX Nov 14-15 Durham, NC

Lean Sigma® Fundamentals

Sept 11-12 Mexico

Lean Sigma® for Process Industries

Oct 24-25 Sao Paulo, BR

LeanSigma® Vision Tour

June 26 Brazil Oct 16-18 DesMoines, IA

Management for Daily Improvement

Sept 17-21 TBD, Monterrey, MX
Nov 12-16 WIKA Instrument Corp., Lawrenceville, GA

Shop Floor Kaizen Breakthrough Instructor Training

June 26-29 Durham, NC Oct 30-Nov 2 Derby, UK
Aug 28-31 Durham, NC Dec 4-7 Durham, NC
Oct 9-12 Durham, NC

Sigma Kaizen Black Belt

Week 3: June 25-29 Durham, NC
Week 4: July 16-20 Durham, NC
Week 5: Circo

Sigma Kaizen Green Belt

Week 3: June 25-29 Durham, NC

Quest for the Perfect Engine™

July 9-10 Beijing, CH Oct 2-4 Pomona, CA (Hayward plant tour)
Aug 8-9 Cincinnati, OH Oct 18-19 Munich, GR
Aug 14-15 Sao Paulo, BR Nov 13-14 Hong Kong, CH
Sept 4-5 New Delhi, IN Nov 13-14 Buenos Aires, Argentina
Sept 17-18 Derby, UK Nov 14-15 Tijuana, MX
Sept 20-21 Paris, FR Nov 19-20 Madurai, IN

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