

# Lean Six Sigma

## —Declare All-Out War on Waste

*This program of continuous improvement for operators represents a journey, not a destination*

**By Ed Kwasnick**

**O**ur company recently went through a four-month training process to become Lean Six Sigma certified. When I tell people about the process, I always begin with the question, “Do you know what Lean Six Sigma is?” Here are some recent answers.

“You know, I’ve heard of that before. What is it?”

“Hey, I just attended a class on 5S. Isn’t that part of Lean?”

“I use a lot of Lean concepts in my plant. In my previous career I was trained as a Lean Six Sigma Champion. So I am very familiar with Lean Six Sigma.”

“It’s one of those improvement fads, just like quality circles and TQM.”

“That’s what Toyota does to improve their operations. Sounds cool, but I don’t build cars for a living. I do laundry.”

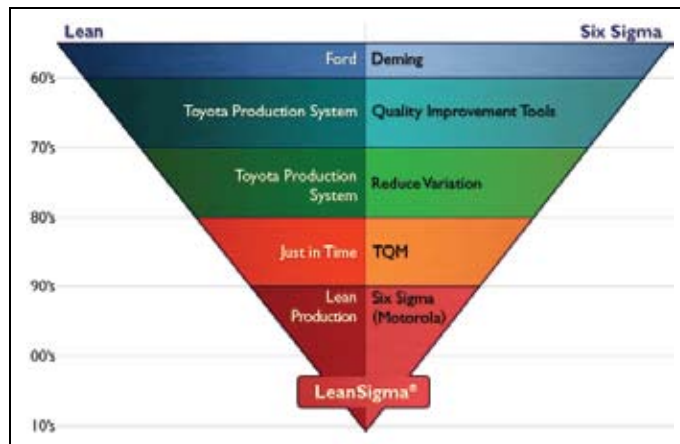
The fact is most people in the laundry industry are familiar with Lean Six Sigma (LSS). They’ve heard about it in one place or another. Some people have attended training sessions or read books such as Daniel Jones and James Womack’s *Lean Thinking* or Eli Goldratt’s *The Goal* (both of which I highly recommend.) And there are a few companies that have adopted some of the tools. However, the majority of our industry is still in the dark and has only a rudimentary understanding of what it is and how it works. So I’d like to use this article to bring you up to speed on LSS and its application in the laundry industry.

### What is Lean Six Sigma?

LSS combines two improvement processes, Lean Manufacturing and Six Sigma, into one methodology. Lean Manufacturing was first developed by Toyota and is best known for reducing waste and increasing speed. Motorola developed Six Sigma, which focuses on reducing rework and improving quality. Each process provides a significant impact by itself. However, when Lean and Six Sigma are combined, process speed increases, costs decrease, quality improves and customer satisfaction increases—all simultaneously. Improvements are greater and more sustainable. That’s why LSS has proven successful for so many businesses in so many different sectors, including organizations such as:

- Lockheed Martin (defense)

- Bank One (finance)
- Stanford Hospital and Clinics (healthcare)
- Porsche (manufacturing)
- The City of Fort Wayne (government)



*Lean Manufacturing is designed to reduce waste and speed up production. Six Sigma focuses on improving quality and reducing rework. Together they improve speed, lower costs, enhance quality and boost customer satisfaction—all at once.*

The next couple of sections are devoted to laying out the basic background on LSS, including fundamentals, methodology and other key information.

### The Fundamentals

The LSS fundamentals are based on Lean concepts and include the following:

**Value** – This is the most important part of the process, and you must understand it fully before moving forward. Value is defined by the customer. Let me repeat that. Value is defined by the customer—and only the customer. Any other definition of value is irrelevant and potentially detrimental. So, when you view your processes, you must see them through the eyes of the customer. To meet the customer’s needs, you must use processes that provide value from their perspective. These services are known as value added (VA). You also must eliminate processes that don’t provide value from the customer’s perspective. These services are known as nonvalue added (NVA).

**Map** – The value stream, i.e., the flow of materials and information

from you to your customer, must be shown in a visual manner using detailed flow charts, so you can see the entire process from start to finish. Once the value stream is mapped, improvement opportunities are more easily identified.

**Flow** – Your business is a stream of value that flows from you to the customer. You must eliminate all bottlenecks, inefficiencies, delays and other wastes from your business so the stream can flow quickly and smoothly. You have to get faster if you want to get better.

**Pull** – Your business must enable the customer to pull value from your enterprise. You can't decide what is valuable for your customer, and then push it on them. They have to tell you what is valuable and pull it from you. This is the key to maximizing value and minimizing costs.

**Perfection** – Continuously seek perfection, because every process can be improved. There will always be impediments that can be removed from your value stream. There will always be nonvalue-added processes that can be eliminated. Remember, continuous improvement is a journey, not a destination.

I am a visual person. To make LSS easier to understand, I like to use the following mental image. Imagine that your business is a mountain stream that flows from your suppliers at the top of the mountains to your customers in the valley below. It's a beautiful bubbling stream of clear icy water that flows straight down the side of the mountain. Now pretend that over time your stream starts to collect debris such as rocks, branches, fallen trees, and perhaps a beaver dam or two. So, the stream develops new branches that meander around the debris. Sections of the stream get blocked by fallen trees and beaver dams, and water gathers in large pools. The water travels a much more circuitous route, eventually taking much longer to flow from the top of the mountain to the valley.

LSS helps you identify and remove the rocks, branches, fallen trees and beaver dams. When those barriers are removed, value flows smoothly and at a much faster rate. And once you've cleaned up the stream, you continue to improve it by removing additional rocks and other debris.

### The Methodology

The principal methodology for LSS is based on the Six Sigma approach to problem solving and includes the following steps:

**Define** the current process and high-level project goals.

**Measure** key aspects of the current process and collect relevant data.

**Analyze** the data to determine root causes and improvement opportunities.

**Improve** the process based on data analysis.

**Control** the improvements to prevent erosion of results.

The process outlined above is called the DMAIC problem-solving methodology. It sounds complicated, but it's really not. You actually use this problem-solving method every time you make travel arrangements. Let's pretend you are going on vacation. You start by *defining* where you want to go. Then you go online and look at

your flight options. At this point you are *measuring* key information and collecting relevant data. Then you compare the costs, departure and arrival times, layover, departing and arriving airports, and airline choices and *analyze* the data. You find a flight that works, but then decide to look at another airline or a different departure airport. That's when you find the perfect flight—the correct times, the right airport, and the lowest cost. You just *improved* your situation. You click on the flight, enter your credit card information, and buy the ticket. The day of your flight, you get to the airport an hour early, check in and sit down in the terminal area to await your flight. You are *controlling* the process to make sure you receive the expected outcome. See that? ... You were using the DMAIC process and didn't even know it.

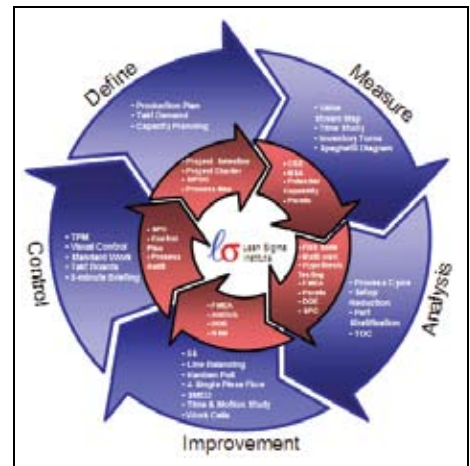
### Faster is better and better is faster

You have to be faster if you want to be better. But you have to be better if you want to get faster. The concepts of speed and quality are inextricably linked. Increasing speed leads to improvements in quality and vice versa. For some people, this may sound counterintuitive, or even incorrect. We all know that if or when we try to do an activity faster than our capabilities allow, for example typing, we make mistakes and can't sustain the increase in productivity for very long. But, I am not talking about pushing people or machines to work faster. I am talking about removing barriers that slow down the process—things such as rework, wait time, work-in-process, extra motion—so the process can flow continuously without delay. When you don't have rework, when everything you need is at your fingertips, when you don't have delays or interruptions, individual processes can work at a steady, sustainable pace while, almost magically, the entire value stream moves faster—*much faster*.

### War on Waste

That brings us to the crux of the matter, the very core of LSS. When you boil it down, LSS is an all-out war on waste. Waste is the enemy of any process. It is the root cause of slow speed, low productivity, poor quality, high costs, decreased customer satisfaction, poor employee performance—you name it. LSS attacks and eliminates waste. But, before you can attack waste, you have to know what it is and where to find it. LSS very clearly defines waste as the following:

**Transportation** – Moving products from point A to point B is waste. Whether it's delivering products on a truck, or pushing carts



The DMAIC model shown in the chart above isn't as abstruse as it looks. You set goals, measure results, review data, improve processes and provide follow up.

in your plant, there is no value created from transportation. You must identify methods to decrease transportation if you want to reduce waste.

**Inventory** – Products sitting on a shelf, in a cart, in a sling or on the truck are all examples of inventory. Inventory, by itself, does not create value and is therefore classified as waste. Like transportation, you must identify ways to reduce inventory, especially work-in-process, if you want to eliminate waste.

**Motion** – This waste is one of the easiest to see and understand. Extra motion takes more time. More time slows down the process. And a slower process is less efficient and more costly, which creates waste.

**Waiting** – This waste permeates every aspect of our life. The next time you visit your doctor, see how long the overall appointment takes and how much of that time was spent waiting. Most doctor visits take about an hour, of which about 30-40 minutes is wait time. In fact, most of our daily activities—standing in line to pay at the grocery store, getting a new drivers license at the DMV, getting a cup of joe at your favorite coffee house—involve wait time.

**Over Processing** – This waste is more common than you think. To ensure that processes are done correctly, we tend to develop multiple checks and balances. The purpose is to ensure that the job is done right. However, these checks and balances add additional steps, which lead to over processing.

**Over Production** – If you can't produce enough goods to meet your customer's needs, that is wasteful and you won't be in business very long. However, if you produce more goods than your customer needs, that is also wasteful. Over production causes work-in-process (WIP). WIP takes up space, requires more equipment and slows down the process. And guess what? All that costs money.

**Defects** – Defects lead to scrap, scrap leads to rework and rework is waste.

**Underutilized human resources** – We've all heard the expression "People are our greatest asset." This is absolutely true. People are the engine that drives the business. And if you are not fully using their potential, your value stream is probably full of rocks.

### Is Lean Six Sigma for me?

If I were reading this article, my next question would be, "All these theories sound great, but what kind of return can I expect from LSS?" Many of you have implemented improvements in the past with mixed results. Maybe you attacked a bottleneck in your plant. When you eliminated it, you discovered another bottleneck downstream and the final results were not as great as expected. Or, you made huge gains in the first 3-6 months, only to have those gains backslide because you couldn't sustain the improvements.

Based on 20 years of LSS implementation in other industries as well as initial results from projects in the laundry industry, here is what you can expect:

**Increase overall process output by 25%– 50%**

**Reduce operating costs by 10%–25%**

**Reduce inventory costs by 25%–50%**

**Reduce WIP by 70%–90%**

**Reduce production space by 10%–25%**

Because the process looks at the entire value stream from start to finish, you won't solve one problem and uncover another. Improvements are complete and sustainable.

With results like this, why isn't LSS common in the laundry industry? First of all, it has a manufacturing stigma. Most people associate LSS with the

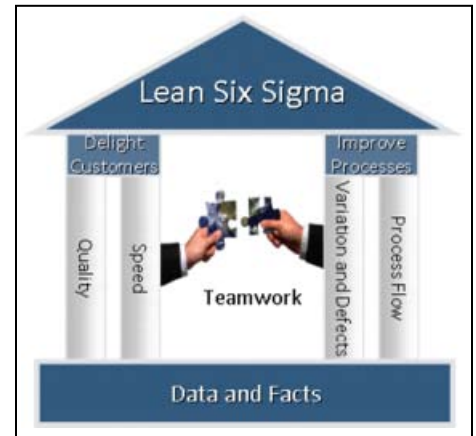
automotive industry and other manufacturers. Also, the language is a problem. It is chock-full of technical jargon, thus making it difficult to understand and interpret. Due to the manufacturing stigma and language issues, service industries (including the laundry business) have been slow to adopt LSS because they see it as highly technical and not relevant to their business.

Also, many in the laundry industry are skeptical. People want to know if LSS is for real, or just another "flavor of the week" quality-improvement program similar to Quality Circles, TQM, Quality Action Teams, Re-engineering and a myriad of other improvements processes from the '80s and '90s.

Lastly, the laundry industry doesn't like to follow the DMAIC (Define, Measure, Analyze, Improve, Control) method of problem solving. We do some parts like measuring data and making improvements. But we don't want to analyze and control our improvements. That takes too long. We know the business and we know our customers. So, why waste all this time analyzing and controlling? Let's just fix the problem and move on. I am not picking on the laundry industry because it is the same for most service industries. However, as the market becomes more competitive and profits get slimmer, we'll have to embrace LSS and the DMAIC approach, just as our manufacturing brethren did 20 years ago.

So, does LSS really apply to the laundry industry? Absolutely! As I noted above, LSS is an all-out war on waste. And, like most businesses, the laundry industry has plenty of waste to attack. Here are industry-specific examples related to the eight categories of waste discussed earlier.

**Transportation** – I recently visited a plant where the hand-fold department was supposed to be adjacent to a flat belt take-away conveyor. The concept was that employees would stack washcloths, place them on the conveyor, and they would move to packout. For some reason, the department was moved to a location about 15 feet from the conveyor. Therefore, each employee had to walk a round trip of 30 feet to transport their washcloths to the belt.



*By looking at the entire value stream driven by customer needs, Lean Six Sigma helps point out problems such as over processing and over production.*

**Inventory** – Inventory equals money. Pretend that instead of your clean carts being full of linen, they were filled with brand new \$1 bills. And when you picked up dirty linen at the customer, you actually picked up bags of \$10 bills. What if every sling had \$1,000 in it? You'd probably look at carts, slings and customer bags a little differently. Remember, that is your money in there. If it's not being used, go get it and put it to use somewhere else.

**Motion** – Have you ever watched a really good employee feed napkins? The numbers tell you she is doing 1,200 napkins per hour, but your eyes tell you she isn't going that fast. So, you pull out your watch and time her to verify the numbers. Yep, she's doing 1,200 pieces per hour, but she doesn't look frenzied like the employee next to her. You know why? Because there's no wasted motion. Feeding napkins for this employee is a continuous process void of extra motion or other wastes that slow down the process. She doesn't lift her arms above the feed deck of the ironer. She doesn't strip the edges of the napkins. And her motions are smooth and fluid. Did you also notice that she produces the best quality? Faster is better and better is faster.

**Waiting** – Earlier I stated that waiting is part of life. That's true inside a laundry as well. Waiting is a big "rock" in the middle of the value stream. And the No. 1 cause of employee wait time is equipment downtime. I recently watched two employees feeding sheets through an automated spreader feeder. Although the equipment was relatively new, it was being extremely temperamental. Production and maintenance were shutting it down a couple times per hour due to missfeeds, jams, adjustments, etc. In the first hour of production, the two employees averaged 850 pieces per hour, but the ironer had run only 20 minutes. By noon, total uptime was less than 50%. Overall sheet production dropped like a rock and the entire ironing process was slowing down. We decided to get rid of the "rock." Maintenance removed the automated spreader feeder and replaced it with a vintage Sager A spreader. Production per employee went down because a third person was added to the crew. However, overall output of the sheet ironer doubled that afternoon. Sometimes automation isn't the answer.

**Over Processing** – A shirt gets returned to the garment stockroom. It is inspected and graded by an employee who determines that it can be reused as a "B" grade garment. Another employee takes this shirt and puts it on the proper storage rail. Along the way, she stops and inspects the garment to make sure it really is a "B" garment. Later that day, the stockroom puller picks that shirt to fill an order. She stops to make sure the garment really, truly is a "B" garment, even though two other employees already did this. Finally, the QC person checks the final order and stops to look at the shirt to make sure it is a "B" garment. This is over processing at its best. All that checking and verifying takes time and slows down the stockroom process. If the grader does her job right the first time, the other employees can focus on value-added activities.

**Over Production** – Laundries are notorious for over production, especially when it comes to the washroom. Tunnel washer uptime is a metric that many operators track very closely. The mindset is "I spent a lot of money for this equipment. And I want to make sure it is running at maximum efficiency." Makes sense, right? Not neces-

sarily. If clean-side production is able to meet your customer needs, then you should slow the tunnel down to match the pace of the clean side. Now the plant is using continuous flow and pulling value from the enterprise. However, most operators want that tunnel at warp speed. Unfortunately, the desire to maximize tunnel uptime and speed causes inefficiencies and congestion on the clean side of the plant. Guess what? This requires more carts, floor space, slings, rail and maybe even finishing equipment to absorb this additional production. The customer needs are no longer the driving force. It's all about maximizing tunnel output, which causes over production. And that, in turn, leads to increased labor, inventory and utilities costs.

**Defects** – There are many examples of defects in a laundry—rewash, mends, poor finish quality and shortages are just a few. Each of these defects causes rework. However, do you know which one is costing you the most money? If the answer is "no," you have an opportunity to remove a fallen tree that's lying right smack in the middle of your value stream. Measure your defects and identify which one is the most costly. Once you know what it is, go attack it and eliminate it. The impact will be huge.

**Underutilized Human Resources** – By removing the barriers that prevent your people from reaching their potential, you not only improve the process, you also enhance their morale. LSS is all about making the job easier *and* more productive. When this happens, employees feel better about their job and the organization. Recently, a man was feeding blankets into an automated blanket folder. He was pulling the blankets out of a cart and would struggle trying to reach the blankets in the very bottom. So, he would dump the cart on the floor and pick up the blankets one at a time to feed them into the folder. There was a spare dump table in the hand-folding department, so we moved it next to the blanket folder. Now the blankets were right there at the employee's fingertips, which made it much easier to do the job. His productivity jumped 15%. I don't speak much Spanish, but I do know what "gracias" means.

As you can see, LSS definitely has an application in the laundry industry. And the opportunities aren't just in the plant. Service, sales, accounting and admin are all part of the value stream, and they all have wastes that can be eliminated.

### How do I get started with Lean Six Sigma?

There is an old Chinese proverb "The journey of 1,000 miles begins with the first step." So, what is the first step in your LSS journey? You should start by asking yourself the following questions.

**1. Do I believe that value is defined by the customer?** This is the foundation on which LSS is built. It helps you listen to the voice of the customer (VOC) and determine how to improve your business to match their needs.

**2. Am I ready to examine my business through the eyes of my customer?** You have to suspend your preconceived notions about your business and be prepared to see things in a new light.

**3. Am I willing to make the philosophical shift from traditional "batch and queue" to continuous flow?** Continuous flow is coun-

terintuitive. The fact that it increases speed, reduces costs and improves quality isn't obvious. In fact, it goes completely against the grain of common knowledge and common sense.

**4. Am I prepared to declare all-out war on waste?** This sounds like an easy question. Of course you're ready to declare war on waste. Who wouldn't be? But based on my experience, war on waste is tough. There is a lot of waste and it just keeps coming every hour of every day. It takes persistence and a high level of commitment to wage this war.

**5. Am I willing to go all out?** LSS is a total approach to improvement. It looks at the total value stream from start to finish and defines how to improve the entire enterprise. It is this complete approach that makes LSS so successful. However, the results are limited if you elect to only do one or two parts of LSS. It's just like when the doctor prescribes drugs, you have to take all the medicine if you want to get better.

If you answered "yes" to all these questions, you are ready to take the next step. Now it's time to use an LSS professional to facilitate your improvement process. LSS professionals fall into three groups: Green Belt, Black Belt and Master Black Belt. A Green Belt assists Black Belts with larger projects and facilitates small projects such as departmental-improvement efforts. A Black Belt

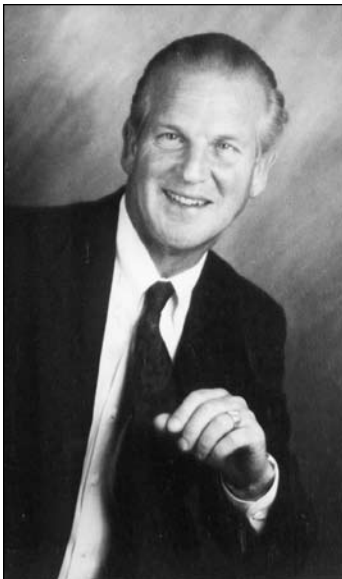
focuses on facilitating large projects, such as companywide improvement efforts. A Master Black Belt trains Green Belts and Black Belts.

If you have in-house engineers or quality professionals, you can use them to lead your process of improvement charge. If you don't have in-house resources, or it doesn't make sense to have a full-time LSS professional on staff, you can use the services of an outside consultant. Either way, make sure the person or company leading your project is American Society of Quality (ASQ) trained and certified. ASQ developed the LSS certification process to ensure that LSS facilitators had the proper training, experience and resources to generate results.

Now that all the pieces are in place, it's time to begin your journey of 1,000 miles. Like many of life's epic journeys, your LSS project will be demanding, challenging, frustrating and exhilarating. Just remember this Chinese proverb "The journey is the reward." **TR**



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