

Deliciously Lean – A Mouth-Watering Introduction to Lean Manufacturing for Printing Professionals and Sandwich Makers Alike



■ Drum roll, please...Introducing Lean Manufacturing — now appearing at the local sandwich shop and specialty graphics enterprise near you!

Actually, you've already seen countless examples of Lean in your everyday life, but may not have noticed. It's literally everywhere you go: The drive-thru window at your favorite burger joint, the self-checkout lines in the supermarket, automated or online bill payment and the list goes on and on.

Okay, so maybe you don't think of these as examples of Lean Manufacturing. But allow me to show you how your local sandwich shop uses Lean principles, and how they can teach you much of what you need to know about applying Lean techniques in your company. And it really doesn't matter if you are making cars or pizzas, or printing on t-shirts, posters or billboards. Lean principles work wherever you apply them.

Before we get in line at the local Subway for a sandwich, let's consider a couple of the most basic tenants of Lean Manufacturing. They are:

- A. Companies exist to make money.
- B. Lean Manufacturing is all about the elimination of waste and improvement of processes so that (A) can happen.

Applying Lean tools and **ingenuity** is ultimately **paramount** to ensuring a **successful** transition to the new **demands** for businesses and **maintaining** profitability.

There it is; as straight-up as I know how to say it. Just as you and I trade our time and efforts for an honest day's pay, companies must also make money or they cease to exist. Of course, most companies also have nobler reasons for being in business like providing jobs and opportunities, improving society, helping the less fortunate, etc. One could easily argue these motives ultimately inspire and energize people far more than profit goals. Lean's main goal is to make sure companies continue to make money no matter if markets change or products revolutionize (VCR replaced by DVD or 35 mm film replaced by digital imaging). Applying Lean tools and ingenuity is ultimately paramount to ensuring a successful transition to the new demands for businesses and maintaining profitability.

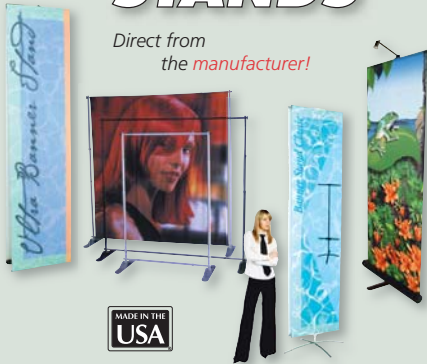
The other side of Lean we should note — before sinking our teeth into our Subway sandwich example — is the need



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and inevitability for considerable culture change in most industries. For example in a flexographic shop that started with Lean, the operators, though skilled, were taking hours to switch from a run of one label to another. One of the tools of Lean is Single Minute Exchange of Die (SMED), which enables operators to switch machines over in less than 10 minutes.

Though committed to quality and taking great pride in their work, changeovers were slow, cumbersome and un-choreographed to say the least. There also was a culturally accepted practice of “not bothering pressmen with anything else while their presses were running.” The concern was that somehow they would miss some minute detail and the entire run would be ruined, so people just kept their distance and held their breath, hoping for a “good run.” Violators were flogged for bothering them. Okay, not really, but I think you get the point.

It was no small change to get the operators to prepare for a changeover before the current run was over and perhaps even more ludicrous, allowing others from outside the process to help facilitate the changeover. Yet, this was exactly what was required to make these critical changeovers happen in less than 10 minutes repeatedly day in and day out.

Quite literally, the culture had to change from one of elite specialists, with very narrow and limiting expectations, to that of teams working together to better accomplish the main goal...making money. I'm happy to report both the culture and the profitability of the company changed. And a company that was considering the purchase of a larger building and buying more presses found they could do much more with what they already had which resulted in record profits without making any further capital investments.

Your appetite should be whetted by that example of Lean improvements, so consider your local Subway sandwich shop for just a minute. Is it a good example of Lean Manufacturing in action? Well, sort of. In truth, not all of its practices are Lean in nature, but it does employ some of the basic and most fundamental principles found in Lean organizations.

It Is Driven by Customer Demand.

The shop makes the exact sandwich you want as you order it. Although they prepare various breads, meats, and cheeses, etc. beforehand, they make your sandwich fresh as you order it and not a minute before (unless you call it in of course).

Often you will hear about “Pull Systems”

in Lean Manufacturing. The pull is always based on a customer who wants or takes something. You make what the customer needs, wants and orders, and nothing more. In Lean, we speak of this as “Takt Time,” which is matching the production pace with the pace of sales. Clearly, Subway has mastered this concept.

If the franchise changed its practices to pre-make sandwiches and put them in a holding bin (inventory), it would likely wind up re-opening the packages and modifying the products to meet changing customer demands. There's also a good chance they would not sell some or many of the pre-made sandwiches resulting in additional waste. Building inventory in hopes that customers will buy it is not Lean, and always results in waste in multiple forms.

The Inventory Is at the “Point of Use” and Highly Organized (5S).

It's no accident that Subway has all those bins holding peppers, tomatoes, cheese and other toppings. The bins layout is such that as your sandwich progresses through the “manufacturing process,” the right components are sequentially placed right in front of the “operators” making it.

If you'll notice, some of the less popular condiments, such as cyan pepper flakes, are kept in smaller quantities furthest from the “operators” while very popular items like Swiss and provolone cheeses are very close at hand. The shops even use the 5S “Visual Workplace” techniques to illustrate how their standard and “special” sandwiches are constructed, so far fewer errors are made.

They Use “Standardized Work Processes and Measurements,” Including “Error and Mistake-Proofing.”

At the most basic level, sandwiches start with bread. Hence, we get the question, “what kind of bread would you like?” Then, all of the other appropriate questions are asked per the sandwich type they are making for you.

I like the “Steak & Cheese” sandwich. The truth is I wish Subway restaurants weren't quite so standardized when it comes to making it though. In the “old days,” they would scoop up the steak from a large pot, and heap it onto my sandwich. If I winked just right or told the sandwich maker how hungry I was, there was a good chance I would get two or three times the amount of meat I was supposed to get. Ah the good old days! Now, when you order a “Steak & Cheese” sandwich, you will get either one pre-measured tray of meat for the 6-inch sandwich or two pre-measured

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trays of meat for the foot-longer. This is a form of “Standardization” and “Error & Mistake-Proofing.”

This repeatable process that consumes the correct amount of inventory each and every time helps Subway remain profitable and maintain accurate inventories. From a customer standpoint, I’ll have to pay a bit more if I want the extra helping of meat.

They Work as Teams and Practice “1 Piece Flow.”

Your sandwich progresses through a series of processes until it is everything you ordered. In a busy Subway, you may see as many as six or eight people assembling your sandwich. If you look carefully, you’ll even notice they divide the tasks fairly evenly among the operators, so sandwiches don’t get stuck or begin piling up at any one operation.

Most likely the products made in your company will pass through many hands as well. So how is this different? First off, consider the proximity in the sandwich shop. One operation leads naturally to the next one. In many printing operations, long or bulky equipment is placed in one area of a plant while the other operations a product must pass through (cutting, sheeting, etc.) are located elsewhere. This seemed to make sense when the plant was originally laid out, but how many hours have been spent loading and unloading materials, and then transporting them to the next operations?

Imagine if our Subway workers had to take your sandwich to the back room to put mayo on it. Or if you wanted your bread toasted, they had to schedule a time with a “toasting specialist” and put in a request to a “material handling” (bread mover) before it could be taken to the toasting operation. Sure, it sounds silly. But companies do this sort of thing all of the time.

The truth is, I could go on and on about examples of Lean at Subway. But let’s just say if a sandwich shop can do it, so can you. We have helped companies implement Lean in aerospace, sporting goods, elevators, antennas, health care, foundries, automotive parts, high-tech sensors, coaxial cable, circuit boards, and many other industries. And it always works, even in printing and imaging shops. The details change, but

the tools of Lean do not. They are applied across-the-board in the ways that fit your unique and specific needs.

Some “Tools of Lean” are:

5S Visual Workplace — 5S creates a workplace that is clean, well organized, and efficient. The 5 S’s are taken from five Japanese terms. Roughly translated, they are:

- **Sort:** Remove all unnecessary items from the workplace.
- **Set in Order:** Make a place for everything and put everything in its place.
- **Shine:** Thoroughly clean and inspect everything in the work area (preventive cleaning also applies).
- **Standardize:** Maintain improvements through discipline and structure.
- **Sustain:** Continue to support 5S efforts through auditing, job descriptions, which include maintenance of the system, management support and expectations.

Standardized Work Instructions (SWIs) — SWIs are specific instructions that allow processes to be completed in a consistent, timely and repeatable manner. By implementing SWIs, employees will increase production, improve quality, reduce waste and enjoy a safer working environment.

Total Productive Maintenance (TPM) — TPM is a powerful program for planning and achieving minimal machine downtime.

Kaizen Blitz Events — Kaizen Blitz Events are highly focused improvement events designed to address and resolve important business issues and constraints. Common results you can expect from a five-day event include:

- (By the end of the week)
- 20 % Productivity Improvement
- 40 % Floor Space Reduction
- 25 % Quality Improvement
- 80 % W.I.P. Reduction
- 45 % Setup Time Reduction
- (Over the long-term)
- Lead-time is cut from months and weeks to days and hours.
- On-time delivery reaches 100 percent.
- There are near-zero quality defects.

- There is a better and more satisfying work environment.
- And there is greater customer satisfaction.

Error and Mistake Proofing — One of the more powerful Lean tools used to ensure products and processes are completed correctly the first time.

5 Whys — Asking why until you reach root causes for the problems you encounter, and then asking how to solve it once and for all now that the problem’s root cause is known.

Self-Directed Work Teams — Throughout the natural evolution of the Lean work environment, people begin to work more as interdependent teams to accomplish area and company goals. Teams work more like independent business units with increasing self-management responsibilities.

Mixed/Level Loaded Production — A system for advanced scheduling of production activities. This tool allows you to reduce inventory, decrease lead-times and produce the variety of products your customers want as they want them.

Setup Reduction — Also known as Single Minute Exchange of Die (SMED), this Lean tool is used to create fast changeovers and setups that greatly reduce machine downtime and increase throughput. It is common to reduce machine changeover times from hours to less than 10 minutes. That sounds too good to be true, but it happens time and time again.

Constraint Management — This tool addresses and helps resolve the biggest deterrent to throughput and productivity in your operation.

Two-Bin, Auto-Replenishment System — The system, and other forms of Lean parts/supplies replenishment, eliminates downtime because of part shortages and makes replenishment simple while creating a “self-evident” inventory.

Inventory and Lead-Time Reduction — Through inventory reduction, you will reduce lead-time. Inventory carries a great deal of waste including quality issues, storage requirements, investments, limiting cash flow and obsolescence.

KanBan Implementation — KanBans are “signals” that indicate what work is to be done and when. KanBans help reduce inventory and clutter.



This is by no means an all inclusive list, but it should give you a sense of some of the tools available in Lean Manufacturing.

The Seven Wastes

Earlier, I mentioned Lean Manufacturing is largely about eliminating waste. As it turns out, there are seven (really eight) primary wastes that Lean seeks to eliminate.

The seven (eight) wastes identified in Lean Manufacturing are activities identified and categorized as “non-value adding” events, or processes that limit profitability in a company. First identified by Taiichi Ohno of Toyota, the “Seven Wastes” are as follows:

- 1 Overproduction: Making more parts than you can sell.
- 2 Delay: Waiting for processing or parts sitting in storage.
- 3 Transporting: Taking parts and materials to various storage locations and from process to process.
- 4 Over-Processing: Doing more “work” to a part than is required.
- 5 Inventory: Committing money and storage space to parts not sold.
- 6 Motion: Moving parts or people more than the minimum needed to complete and ship them.
- 7 Making Defective Parts: Creating parts that cannot be sold “as is,” or that must be reworked etc.
- (8) Untapped Human Potential: Failing to tap into the creativity, abilities and talents of your workforce. We contend that this waste often has a far greater impact on companies than all other wastes combined.

So, is Lean Manufacturing just a set of tools you throw at your problems? The best answer I have is “sort of.” It’s similar to thinking of the alphabet as a set of tools. All by themselves, most letters really don’t mean much of anything. But when you put a few together in the right order and inside of a context, then you have a message that conveys meaning. The “rules” of how letters, sentence structure and grammar are used hold it all together. Likewise, Lean is made up of tools held together by governing rules or principles, which create tremendous improvements when applied correctly.

The real trick to Lean is applying the right tools in the right order to the right process. And it really starts with finding the right process.

So what is the “right process?” It’s the process that is hurting your customers the most, costing your company the most money, wasting the most time and resources and generally bogging everything else down.

Identifying where to start for the greatest impact in your Lean efforts comes from understanding the “concept of Value-Adding vs. Non-Value Adding activities”.

Value-Adding Versus Non-Value Adding

In Lean Manufacturing, we constantly look at every part of every process to determine the activities that add value to a product or service, and activities that constitute waste or are non-value adding. Adding value means you are making your product or service more like what your customer is willing to pay for.

Back to our Subway example: As soon as the person making your sandwich puts tomatoes on it, they have added value because you ordered a sandwich with tomatoes. On the other hand, if the sandwich maker ran out of tomatoes, had to go slice some more in the back room and return to the counter, then that is a non-value adding activity, because you just want tomatoes on your sandwich. If the employee said you would now have to pay extra for the walk to the back room and the slicing activity, would you pay it? Not likely. If anything, you have been inconvenienced.

Sure, tomatoes still need slicing and inks still need mixing, but customers just want the finished product. They do not want to pay for things such as walking, talking to your co-workers, getting a department head’s signature, correcting mistakes, moving parts and supplies around the warehouse and sweeping the floor. In most companies, we find about 95 percent of all activities are technically non-value adding. Think about that for a minute! At a recent client company, we found about two and half hours of value-adding time was put into a product that required 16 weeks to produce! Remember, the customer just wants the product, not all of the other non-value adding stuff you do to make it. How much of what your company does is value-adding?

Customers expect the following:

- Perfect Quality (Not a selling point but an expectation)
- Short Lead-Time (I want it yesterday)
- On-Time Delivery (Delivered as promised)
- Made to Order (Exactly how I want it)
- Inexpensive (Give me a great price or justify a higher one)
- Innovation (I want the latest and greatest)

Lean focuses on the customer first, and is a comprehensive system you can use to achieve all of these customer expectations.

Back to the question of “where to start?” The best advice I could offer any business

considering the Lean Manufacturing journey is to have a Lean Assessment performed by a reputable consulting firm. Working with senior management, the Lean assessment findings are used to create a prioritized step-by-step plan that will address your specific needs in the order of greatest positive impact on your company. Most consulting firms offer this service at reduced rates and guarantee their work. Oftentimes, consultants will even help you solve several problems during the assessment process.

In complete honesty, all is for naught if you don't have support from senior management. It is almost impossible to create a Lean company without the support and direction of senior management. Senior managers truly set the tone for how successful the transformation to Lean will be by communicating their vision and expectations to management and the general staff.

Managers must likewise be open to the practice of empowerment. Lean Manufacturing works best when employees at every level are involved in the implementation. This requires some

patience during the learning process and a fair measure of trust.

In the end, "Going Lean" is justified because your business needs to make greater profits. Transitioning to Lean is a noble undertaking that has the power to secure your company's future and change lives. As you empower your employees to contribute in ways that encourage pride and ownership, you play a significant role in their personal development as well as the success of your company. Lean is truly for everyone.

Lean **focuses** on the customer **first**, and is a **comprehensive** system you can **use** to achieve all of these **customer** expectations.

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