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## Lean Strategies for the Process Manufacturer – A Primer

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Lean Manufacturing techniques can produce “breakthrough” results. Much of the talk about lean focuses on discrete manufacturing operations. However, lean techniques apply equally well to process manufacturing in Food, Chemical and Life Sciences.

This primer will serve to provide an understanding of the key concepts of lean as they apply to The Process Sectors, including the steps for implementation and the benefits that may be realized.

### IT’S A JOURNEY, NOT A DESTINATION.

Lean is more than a specific tool, management technique or software package. Above all, lean is a strategy, a commitment to organizing and managing the manufacturing process in ways that **REDUCE WASTE** and assess **VALUE** from the customer’s eyes. This is why lean initiatives integrate well with other customer-focused initiatives.

**WHY LEAN** – Let’s begin by understanding how a transformation into a lean manufacturing enterprise can benefit an organization. A recent study of companies that have implemented lean has identified the following (see table A below) expected benefits:

Indicator	Companies Reporting Improvements
Distance work travels	90%
On-time delivery	90%
Number of handlings	87%
Flexibility	82%
Productivity	80%
Morale	76%
Quality	76%
Set-Up Time	76%
Accuracy of information	68 %
Timeliness of information	65 %
Documentation	52 %
Sales	38 %

**Table A**



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**ELIMINATION OF WASTE.** One of the main concepts of lean is simply the “Elimination of Waste”. Waste may be defined as any activity (shop floor or office) that does not add value to the product from the customer’s point of view. *If an activity does not add value then the mission is to minimize or eliminate this activity.*

Table B below highlights the most common types of waste.

- **Time** – Used to produce products that are not immediately needed.
- **Energy** – Consumed by equipment producing intermediates, by-products or finished goods that are not immediately needed.
- **Material** – Utilized to make product before it is needed or idle inventory
- **Labor** – Expended to perform work for products that are not immediately needed
- **Space** – Areas occupied by intermediates or finished goods that are not needed right away.
- **People** – Talent, or problem solving ability.
- **Movement** – Unnecessary travel or movement.

Table B

**LEAN PRINCIPALS** - There are five (5) Lean Principals that you need to familiarize yourself with:

1. Specify value from the point of view of the customer.
2. Identify the value stream from raw material to the final customer or from product concept to product launch.
3. Flow – make value flow, strive for one-piece flow and continually reduce batch sizes.
4. Pull system - Manufacture only what is needed or Pulled by the customer. The entire supply chain needs to be synchronized into a “pull system”.
5. Perfection - Produce perfect products in exactly the correct quantities, exactly when the customer wants them at a fair price and with minimum or no waste. The goal is zero waste.



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**LEAN PROCESS** - The lean process consists of the following five (5) steps. Each of these steps is defined with a Japanese word starting with the letter “S.” Hence these are known as the five 5S’s. These words and their English translations are listed below.

1. Seiri – Clearing Up
2. Seiton – Organizing
3. Seiso – Cleaning
4. Seiketsu – Standardizing
5. Shitsuke – Training and Discipline.

We will briefly review each of these lean process steps:

**Clearing Up** – Over time we tend to clutter up our facilities with unneeded materials, tooling and even unfinished rework. Having all these materials and tooling lying around serves no useful purpose and tends to create a layer of confusion for the operators working in the area. By removing clutter, we can greatly improve the focus on the job at hand.

**Organizing** – Next, we need to organize all these tools and materials. The old adage “A place for everything and everything in its place” is a good rule for organizing each station. All unneeded tools and raw materials should be returned to stock or the Tool Crib as appropriate. For items that must remain at the work center (such as unique tools or inspection devices), creating storage location using tool templates can go a long way to reorganizing an area. It should always be apparent that a tool is available, in use or missing for some other reason.

**Cleaning** – The entire facility should undergo a through cleaning to assure that only raw materials and tooling which are presently needed are on the floor. Everything else should be removed and stored in an appropriate location. Clean facilities, and clean work centers help to raise morale, inspire pride of workmanship and go a long way to raise quality consciousness.

**Standardizing** - The fewer the number of variables we deal with each day, the more we can remain focused on the project at hand. By standardizing such things as manufacturing lot sizes, WIP and storage containers, floor storage locations we can become a great deal more organized.

**Training and Discipline** – A lean implementation must begin with education and training for all individuals who will be involved in the implementation -- from top management to the production line worker. Don’t ignore “quality tools” which are used for problem solving and continuous improvement, such as: Brainstorming, Cause & Effect / Fishbone diagrams, Pareto Analysis, and Process Mapping.

**IMPLEMENTATION** - Implementing Lean Manufacturing strategies is a project similar to any other major initiative, requiring support and championing from Top Management, and a comprehensive team of



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Management and Functional Champions. Like any “change initiative” it requires both the acceptance and use of new concepts and techniques as well as changes to the organizations culture. *In smaller companies the road to lean can be considerably shorter particularly if all operations are under one roof.*

**Beginning the process.** Once management is firmly on board we can begin our journey to “Lean” by following the ten-step (10) processes listed below. Note all steps are equally critical or need to be tackled for each kind of environment for you to get the benefits of lean.

- I. **Assess Opportunities for Improvement.**
- II. **Sales and Product family analysis line.**
- III. **Process Mapping**
- IV. **Reduce lot size around customer needs.**
- V. **Cellular Manufacturing.**
- VI. **Reduce equipment set-up times. (Needed to support reduced lot sizes.)**
- VII. **Visual Manufacturing. Lean is simplicity. Use warning lights, colored bins, etc. This translates into speed and quality.**
- VIII. **Quality. Since lean focuses on the process, it is invariably linked with higher quality products. However, training your team in TQM and other quality philosophies will provide added ROI.**
- IX. **Sales and Operations Planning (SOP). In lean environments, market data can be integrated and reflected in production capabilities much faster.**
- X. **Metrics & Feedback Systems. Define and benchmark your metrics before you implement lean, and then monitor these going forward.**

#### **SUMMARY.**

In this primer, we’ve only touched upon the key elements and benefits of Lean. Once your team has a solid grounding in the concepts and the strategy for lean implementation, it’s time to get started! You’ll be amazed by the transformation that takes place.

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