

LEAN MANUFACTURING



SSD Global
Solutions

Leaner Six Sigma© (LrSS)
www.ssdglobal.net

A LETTER FROM SSD GLOBAL SOLUTIONS

I am often asked what makes SSD Global Solutions' Leaner Six Sigma© (LrSS) different from the many Lean Six Sigma programs available today. This has been an easy question to answer! We honored the Voice of the Customer. Then, we implemented the suggestions they made. As a result, we simplified the statistics, made the concepts less difficult to understand and cut out all the unnecessary jargon.

In addition, as part of the program, we started providing forms and templates that allow students to effortlessly duplicate what they learned in class. This method facilitates immediate application of knowledge to real projects or process improvements.

We ultimately trust in the student's subject matter expertise and respect their knowledge base. We believe you know your environment much better than we do! Our goal is to align your irreplaceable abilities and past experiences with our LrSS toolkit. This allows each individual to become better, faster and more cost-effective in their current situation and future endeavors.

But, the most valuable offering we support is that the tools and methodology promoted in our packages are framed in a way that can be applied to business as well as personal life. In our fast-paced and busy world, we can all use a little help increasing our critical thinking skills and problem-solving capabilities.

SSD Global Solutions also recognizes the new science of mindfulness and believes that sometimes we must restore and stabilize before making an improvement. We appreciate the current state and explore root causes and solutions. Our students adopt and start using these concepts instantaneously.

Leaner Six Sigma© is not just a workshop to become certified in Lean Six Sigma. LrSS It is a learning experience that can provide a road map to accomplish unspoken dreams and achieve buy-in from even the most unlikely supporter.

Terra Vanzant Stern, PhD. PMP, SPHR/GPHR
Lean Six Sigma Master Black Belt
Principal, SSD Global Solutions, Inc.

SSD GLOBAL SOLUTIONS LEAN MANUFACTURING TRAINING OUTLINE



DAY 1 ACTIVITIES

Pre-Test

On the first day of class students are given a multiple choice test. This test will be compared against a test taken at the end of the class to measure progress. In the Lean only classes this is not a graded test but rather for the student to measure their progress and provide information on areas of self-study.

Introduction to Lean

Lean production is the value of a product based solely on the customer's point of view. Products must meet customer needs, both at a specified time and price. The thousands of mundane things that are needed to deliver a product are generally of little interest to the customer. To see the value from the eyes of the customer, most companies need to undergo a comprehensive analysis of all their business processes. Identifying the value in Lean Production means to understand all the activities required to produce a particular product followed by optimizing the entire process. This section discusses the basics of Lean Manufacturing.

Lean Terminology

Lean has a language of its own. We have separated lean terms into six subdivisions: General Terms, Workflow, Workplace Organization, Workplace Simplification, Process Improvement, and Measures.

Lean Components

This section gives an overview of several topics explained in-depth later in the course. The components include: Value Stream Mapping, 5s, Quality, Mistake Proofing, Set-up Reduction, Total Productive Maintenance, Visual Workplace, and continuous improvement via PDCA (Plan-Do-Check-Act) Model.

Waste Management

Lean methods typically target eight types of waste. Each of these wastes has a potential environmental impact, shown below. It is interesting to note that the "wastes" typically targeted by environmental management agencies, such as non-product output and raw material wastes, are not explicitly included in the list of manufacturing wastes that lean practitioners routinely target.

PRACTICE, GROUP EXERCISES, QUIZ

This section focuses on identifying various lean tools, models and terminology needed to be successful in a Lean Manufacturing environment. Practice on PDCA, 8 Areas of Waste, and basic 5s





DAY 2 ACTIVITIES

Value Stream Mapping

Value Stream Mapping is a technique used to analyze the flow of and information currently required for a product or service to a consumer. Value Stream Mapping is often used in environments to identify opportunities for improvement in delivery time. Value Stream Mapping is often associated with production, it is also in logistics, supply chain, services, software, software and product development.

Lean Projects

Lean Project Planning is the first step toward the timely completion of any project. The Lean Project Planning process traces the flow of information. Lean project management leads to more successful projects. This includes satisfied customers and project team, full-scope, on-time, and under-budget projects. This section of the training also covers how to reduce pressure on project team members and how to reduce unnecessary project paperwork.

Lean Tools

This section gives an overview of a number of tools discussed in-depth later in the program such as Conflict Resolution Diagrams, Future Reality Diagrams, Inventory Turnover Rate, JIT, Kaizen, Kanban, and Voice of the Customer, and Critical to Quality.

Application

In this section Lean Tools are applied to Lean Projects. This section is designed to enhance the previous two learning modules: Lean Projects and Lean Tools.

Error Proofing

Product Quality is the key to successful business. Manufacturing process, machine, human error and many other factors contribute to product failure. It can be frustrating, as customers demand and expect zero defects. Quality is not free. Poka-Yoke (error proofing) is a technique to prevent product defects caused by human error. Defects in two states: It is about to happen (destruction) or it's already happened (detection).

PRACTICE, GROUP EXERCISES, QUIZ

This section focuses on using various lean tools and working with lean projects and cases studies. Error proofing and how to identify the right lean projects is also part of these exercises.

DAY 3 ACTIVITIES

5s Model

The first step in Lean requires a clean, streamlined factory floor so that everyone involved can better focus on production processes and the flow of material. 5S is a housekeeping methodology for the shop floor. There are five rules of housekeeping for a lean environment and they help to expose waste.

FMEA

Failure Mode and Effects Analysis (FMEA) is a procedure for analysis of potential failure modes within a system for the classification by severity or determination of the failure's effect upon the system. It is widely used in the manufacturing industries in various phases of the product life cycle. Failure causes are any errors or defects in process, design, or item especially ones that affect the customer, and can be potential or actual. Effects analysis refers to studying the consequences of those failures.

SIPOC

A SIPOC diagram is a tool used by a team to identify all relevant elements of a process improvement project before work begins. The SIPOC tool is particularly useful when it is not clear: 1) who supplies Inputs to the process, and/or 2) what specifications are placed on the Inputs and/or 3) who are the true Customers of the process and/or 4) What the customer requires.

TPM – Total Productive Maintenance

TPM is an equipment operating philosophy that aims at extreme productivity by relying on team-based activities to completely eliminate equipment breakdowns, defects, and other manufacturing losses.

PULL SYSTEM

Pull is a method of controlling the flow of production through the factory based on a customer's demand. Pull Systems control the flow of resources in a production process by replacing only what has been consumed. They are customer order-driven production schedules based on actual demand and consumption rather than forecasting. Implementing Pull Systems can help you eliminate waste in handling, storing, and getting your product to the customer.

PRACTICE, GROUP EXERCISES, QUIZ

This section focuses on designing and examining 5s, SIPOC, TPM and Pull System Models.



DAY 4 ACTIVITIES

SPC – Statistical Process Control

Statistical process control (SPC) involves using statistical methods to measure and analyze the variation in processes. It is most commonly used for manufacturing processes. The aim of SPC is to monitor product quality and maintain processes to fixed targets. SPC is used to monitor the consistency of the processes used to manufacture a product as intended. The aim is to get and keep processes under control. No matter how good or bad design is, SPC can ensure that the product being manufactured is designed as intended. A primary tool used for SPC is the control chart. A Control Chart is a graphical representation of certain descriptive statistics for specific quantitative measurements of the manufacturing process. The types of charts are often classified by the type of quality characteristic that they are supposed to follow. There are quality control charts for variables and control charts for attributes.

DMAIC

The DMAIC model typically used in Six Sigma is rapidly becoming popular in Lean Manufacturing. This section provides an overview of this powerful methodology. The DMAIC model has a series of five steps that are designed to provide a proper framework for successful projects. Experts, including Six Sigma Black Belts, swear by this model for overall business success through quality control, problem management, and common sense. This section is a brief overview of how the model is applied in a Lean Manufacturing environment.

WIP- Work in Progress

A core Lean Manufacturing philosophy is to reduce the amount of things in WIP. This leads to efficiency and better quality. This section discusses tools and activities that can reduce WIP. Work that has not been completed but has already incurred a capital investment from the company.

Value Stream Mapping

This section takes a more in-depth view of value stream mapping, a concept learned earlier in the program. Value stream mapping is a paper and pencil tool that helps you to see and understand the flow of material and information as a product or service makes its way through the value stream. This tool may also now be computerized. An introduction to VSM symbols is included.

The first stage of any Lean improvement activity is to identify the product or service value, with respect to what the customer/end-user is willing to pay for. Following this, the creation of value needs to be identified and arranged in such a way as to minimize the amount of waste created. Value Stream Mapping (VSM) and Analysis is a tool that is used to analyze the processes or activities in a manufacturing operation. These activities can then be divided into ones which do and do not add value. Mapping involves producing a diagram that describes the process. Value Stream Mapping can be carried out using pen and paper for a quick representation or software can be purchased to aid the construction of the maps and analysis of the value streams.

Standardization

A key concept in Lean Manufacturing is standardization. This section discusses how to recognize which processes should be standardized and how to calculate the time and resources saved by this process.

PRACTICE, GROUP EXERCISES, QUIZ

This section focuses on building value stream maps and working with Control Charts.

DAY 5 ACTIVITIES

DOE-Design of Experiments

A Design of Experiment (DOE) is a structured, organized method for determining the relationship between factors (Xs) affecting a process and the output of that process (Y). Taguchi methods, developed by Dr. Genichi Taguchi, refer to techniques of quality engineering that embody both statistical process control (SPC) and new quality related management techniques. Most of the attention and discussion on Taguchi methods has been focused on the statistical aspects of the procedure; it is the conceptual framework of a methodology for quality improvement and process robustness that needs to be emphasized. The entire concept can be described in two basic ideas: 1) Quality should be measured by the deviation from a specified target value, rather than by conformance to preset tolerance limits and 2) Quality cannot be ensured through inspection and rework, but must be built in through the appropriate design of the process and product.

SMED-Single Minute Exchange of Die

Single Minute Exchange of Die (SMED) is one of the many lean production methods for reducing waste in a manufacturing process. It provides a rapid and efficient way of converting a manufacturing process from running the current product to running the next product. This rapid changeover is the key to reducing production lot sizes and thereby improving flow (Mura) which is a 'Lean' aim. It is also often referred to as Quick Changeover (QCO). Performing faster change-overs is important in manufacturing, or any process, because they make low cost flexible operations possible.

TOC-Theory of Constraints

Theory of Constraints (TOC) is a comprehensive management philosophy aimed at eventually achieving more of the goal of a system. If this system is a for-profit business, the goal is to earn more money, both now and in the future. TOC is comprised of two primary collections of work: 1) The five focusing steps and their application to operations, 2) The thought processes and their application to project management and human behavior. According to TOC, every organization has a key restriction that limits system performance relative to its target. This section discusses how to recognize and control these limitations.

Additional Tools

This section introduces additional tools that may not have been covered during the course and also provides a recap of the tools formerly discussed.

PRACTICE, GROUP EXERCISES, QUIZ

This section focuses on exercises and material related DOE and TOC.

REVIEW

An extensive review of the course is done with student study groups.

FINAL ASSESSMENT

This a final quiz, graded in class by the students to help each student identify areas they may want to study later. Students have an opportunity to look at the Pre-Test taken on the first day of class to see their progress.

ABOUT SSD GLOBAL



TERRA VANZANT STERN, PHD
PRINCIPAL, SSD GLOBAL SOLUTIONS

Terra Vanzant Stern, PhD., PMP, SPHR/GPHR. is a Six Sigma Master Black Belt and the principal of SSD Global Solutions, Inc. She has held a number of board positions to include: Chair, ASQ Lean Enterprise Division, Chair, Strategy and Development for Colorado Human Resource Association, Chair, ASQ Denver, Chair, Rocky Mountain Quality Conference and Curriculum Chair for Projects with Industry (who worked placing developmentally disabled adults in the workforce community). Dr. Stern is a USAF veteran who has written several books and articles on problem solving, process improvement and leadership. Her most recent books, *Lean and Agile Project Management* and *Lean Six Sigma: International Standards and Global Guidelines* are available in bookstores and Amazon.com. She has worked with George Washington University, Baker University and CSU developing programs in the areas of practical statistics, leadership and critical thinking. Her newest work focuses on the area of Lean Negotiations with an anticipated release date of early 2018. All of her programs are fun and entertaining to the student and draw from several different adult learning theories. Other publications by Dr. Stern include: *Lean Six Sigma: Practical Bodies of Knowledge*, *HR Concepts for Project Managers*, *Leaders Asleep at the Wheel* and her dissertation: "The Paradox of Corporate Darwinism - Why the Fittest Don't Always Succeed in Corporate America." Current Clients/Partners of SSD Global Solutions include TVA, SCE, AHOLD, Jefferson County, Colorado, NG, and Fidelity. Recent partnerships include Cross Knowledge, Francis & Taylor Publishing, New Horizons Learning Centers and IT Pro TV. Dr. Stern also offers personal business coaching as well as training for middle managers interested in making the next step to the "C" Suite. Although this is a confidential service, she can provide one-on-one references from successful clients.



We believe strongly in the art of elegant problem-solving!

SSD Global Solutions specializes in Smart, Simple Decision-Making Tools by using our “Leaner” Six Sigma (LrSS©) training methodology. LrSS© allows students who are interested in certification as a Lean Six Sigma practitioner a faster and easier path to becoming a Lean Six Sigma Yellow, Green, Black or Master Black Belt. Another advantage of our “Leaner” program is that the concepts and constructs can be immediately applied to make any process or activity better, faster or more cost-effective even before the student has left the classroom!

Our classes can be delivered at your company or on-line LIVE in real time. We also offer public classes and train-the-trainer opportunities. We teach you to be the consultant and fix your own problems.

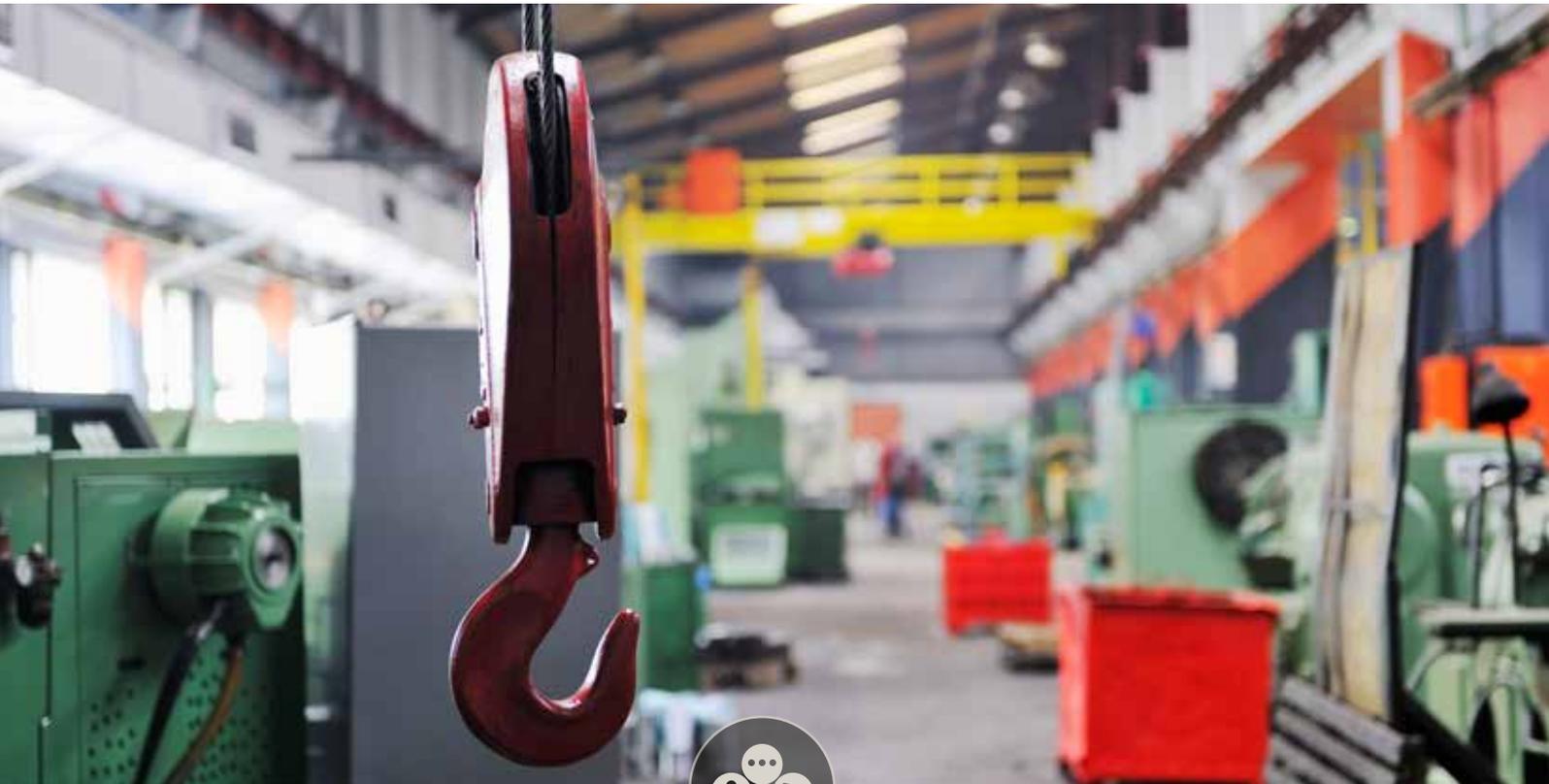
We provide executive-level Critical/Creative Problem Solving Workshops as well as Leadership and Organizational Development C-Suite workshops.

SSD Global employs only the best and most seasoned professionals who offer stellar reputations and references.

SSD Global Solutions has worked with some of the largest utility and nuclear companies in the U.S., such as Southern California Edison (SCE), South Texas Project (STP) and Tennessee Valley Authority (TVA) where our training programs have resulted in millions in documented ROI that we will happily share with potential clients or students.

Retail/Grocer experience includes Wal-Mart Bentonville Corporate Offices and Ahold, the holding company for Giant Grocery Stores and Stop N Shop. Other retail experience includes Safeway. Insurance companies include Blue Cross/Blue Shield and Fidelity.

INTERESTED IN LEARNING MORE?



**Contact our team today to see the training options
available for your company.**

DIRECT MANUFACTURING CONTACT

Andrew Anderson

202-486-1662

Andrew.Anderson@SSDGlobal.net

GENERAL CONTACT

SixSigma@SSDGlobal.net

SSD Global Solutions, Inc.
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Lean Six Sigma Consulting & Training
Leaner Six Sigma (LrSS©)

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