# DEVELOPING LEAN SUPPLY CHAIN PROBLEM SOLVERS

**Robert Martichenko**
Lean Supply Chain Professional Series

This white paper is based on a webinar presented by Robert Martichenko for Georgia Tech. The webinar introduced the concept of lean problem solving through eliminating waste at the root cause, understanding process thinking and seeing problems as opportunities for continuous improvement. The key elements are problem solving and process thinking. The webinar also provided a brief summary of the topics and concepts that are covered within the nine-day Lean Supply Chain Professional Certificate Series taught through Georgia Tech Professional Education.

## Lean: What Does It Mean?

This term has become popular and is used in many ways. It is important to focus on similar core principles and speak the same language when discussing lean. For this purpose, lean organizations solve problems every day, get it right the first time, and avoid waste. They do not pursue what does not add value.

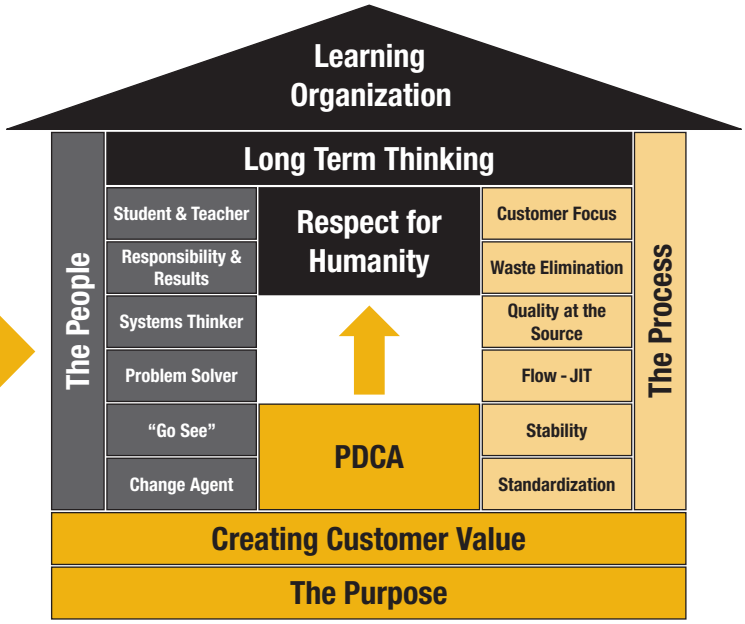
Many people think about "visual management" and "standard work," but those are simply tools that do not get to the heart of the culture businesses are trying to build with lean thinking. Keep these key principles in mind. As a lean thinker, you:

- **Articulate your purpose and customer value proposition.**
- **Build the learning organization.**
- **Show respect for people.**
- **Show respect for processes, focusing on stability, standardization and quality at the source.**
- **Make problems visible and solve problems in real time.**
- **Eliminate all waste and do only those things that add value to the customer.**
- **Think long-term as well as short-term.**
- **Continuously improve and get better every day.**
- **Teach the power of process review and use a simple and standard problem-solving model.**

## About the Presenter

**Robert Martichenko** is CEO of LeanCor, LLC. He has 15 years of experience in supply chain, logistics and lean implementation. This experience includes multiple lean supply chain implementations supporting successful organizations, including Toyota Motor Manufacturing. Martichenko authored the Shingo Research Award-winning book **"PEOPLE: A leader's day-to-day guide to building, managing, and sustaining lean organizations"** and **"Everything I Know About Lean I Learned in First Grade."** Martichenko also co-authored the logistics management book **"Lean Six Sigma Logistics,"** published by J. Ross Publishing and co-authored the Shingo Research Award-winning workbook **"Building the Lean Fulfillment Stream,"** published by the Lean Enterprise Institute. Martichenko is an award recipient of the CSCMP 2015 Distinguished Service Award. He holds a bachelor's degree in mathematics from the University of Windsor, an MBA in finance from Baker College, and is a trained Six Sigma Black Belt. For more information about Martichenko, visit LeanCor.com.

The Lean Enterprise System




## The Lean Problem Solver

Lean thinkers must recognize that most problems are associated with processes. This means the lean problem solver needs to be a process thinker. But when we talk about problem solvers, what do we even mean? Consider these questions: What is a problem? How would you define a problem? What are different types of problems? What is a solver?

There are several ways to define a problem, including:

- **An undesired condition without a solution.**
- **The gap between the current state and a desired future state.**
- **A situation in which you are unsure of the optimal solution.**
- **Something that requires a resolution.**
- **Something that is not doing what is expected.**
- **An undesired situation that impedes customer objectives.**
- **Anything that impacts the business's process.**
- **Wherever there is waste, there is a problem.**

In some traditional companies, workers are not allowed to say the word "problem." Everything is an "opportunity." If someone is run over in a warehouse, it is an "opportunity" to create a safe warehouse. The fact of the matter is businesses do have problems, and in lean organizations, people say "problem" all the time. It is not a bad word in lean culture. It is defined as the gap between plan versus actual. If you planned to ship 1,000 orders and only sent out 900, the missing 100 orders is a problem. Lean requires the ability to problem solve and close that gap.

In lean companies, business is associated with process. In traditional companies, everybody points fingers and asks who is to blame, but it is about the process and not the people. Lean thinkers are hard on process and easy on people, which shift paradigms from looking at how people failed to what happened and how the process failed. To solve problems by looking at process, the lean problem solver needs to be a process thinker.

## The Lean Process Thinker

If it is all about process, we should know what a process is. So what is a process? It could be:

- **A sequence of activities.**
- A **series of steps to reach a desired outcome.**
- **The means of getting something done.**
- **The method for getting from point A to point B.**
- **A series of defined steps to arrive at a desired outcome.**

A process is a systematic series of actions directed to some end. It is a series of steps. Business is about taking inputs and transforming them into outputs that the customer will see value in. How well we do this determines how well our organization performs.

For a traditional example, that means putting the hamburger in, and a patty comes out. It is as simple as going back to algebra:

$$y = f(x)$$

The input is "x" and the output is "y." The "x" elements that drive the process are suppliers, input, procedures, timing, output, measures, and customers. The supplier provides input, there is a set of procedures that have timing around them to produce an output, and there are measures and customer receipt of that output.

As lean thinkers, we must recognize what we are doing every day in terms of this process. Stand back and think about the job. Manage these elements of the process. What we know from the lean point of view is that those areas need to be problem solved, and areas that create instability will have failed output for the customer.

## Second Law of Thermodynamics

One important key to remember is that problems will always exist. One of the most enlightening parts of working in an organization that embraces lean is that when you have a business problem, it should not come as a surprise.

Go back to the basic laws of the universe, specifically the second law of thermodynamics, which states that in a system, a process that occurs will tend to increase the total entropy of the universe. Entropy is a measure of the disorder or randomness in a closed system, and a system is a group of interacting, interrelated or interdependent elements forming a complex whole. So what does this have to do with problem solving?

Basically, entropy means that when processes get up in the morning, they want to fall apart. Processes left unchecked will do everything they can to fall apart. This is a valuable notion for the lean thinker to understand.

What we need to recognize is that the tools—visual management, quality at the source, standard work—are simply tools that allow us to put equal or more pressure on a process to keep it together than the process puts on itself to come apart. This is another important paradigm shift for people to keep in

## What is Entropy?

- **Entropy** is a measure of the disorder or randomness in a closed system.
- **A system** is a group of interacting, interrelated or interdependent elements forming a complex whole.
- **Processes left unchecked** will do everything they can to fall apart.
- **Lean thinkers** should consider this a valuable notion to understand.

mind. In many cultures, people are not allowed to talk about problems, they ignore it and want it to go away, and bosses don't want bad news. In lean culture, we recognize that every part of the universe is trying to make that process fall apart, and we shouldn't be surprised when it does. It highlights where the work needs to be.

## Formal Problem Solving Models

To address this entropy and solve problems, everyone in a lean-thinking organization must follow the same model. But why is it critical to have formal problem solving models in your organizations? Formal problem solving models can help businesses gain alignment between parties, continue the efforts of continuous improvement methodologies, and set benchmarks and improve the model through experience.

Simply put, if a business is going to have a problem solving culture, it needs to have a common language. This creates alignment and allows the organization to move the bar. When professionals are talking to bosses and people on all levels of the organization, expectations are set about how to solve problems. It does not matter what model is used, as long as it is embraced in the culture. Any model should ask three basic questions:

1. **What is the problem?**
2. **Why do you think this problem exists?**
3. **Do you have any ideas about what could solve it?**

## The ORLOE Model

As long as a business and/or lean thinker has a formal problem solving model or language, it will have these core elements:

- **Operate: Do the work and identify the problem. Plan and perform the work as scheduled. Identify gaps between plan versus actual. Make the problems visible.**
- **Review: Define the problem. Document and validate the current state. Develop a clearly defined problem statement. Can we clearly say we know what the problem is?**
- **Learn: Determine the root cause. Identify all possible causes to the problem. Isolate critical few root causes to the problem. Recognize that there will be more than one reason because of the second law of thermodynamics.**
- **Optimize: Identify solutions. Develop solutions that address the root causes to the problem. Ensure the solutions support the entire value-stream. Don't probe in a silo and optimize only one area. Businesses are a supply chain and a system. If you make change in one area, it will have consequences somewhere else.**
- **Execute: Implement and sustain the solution. Communicate, train and implement the solution. Measure and monitor the impact of the solution.**

## ORLOE Problem Solving Model

- **OPERATE: Do the work and identify the problem.** Plan and perform the work. Identify gap between plan vs. actual condition.
- **REVIEW: Define the problem.** Document and validate current state. Develop a clearly defined problem statement.
- **LEARN: Determine root cause.** Identify all possible causes of the problem. Isolate critical few root causes of the problem.
- **OPTIMIZE: Identify solutions.** Develop solutions that address the root causes to the problem. Ensure the solutions support the entire value stream.
- **EXECUTE: Implement and sustain the solution.** Communicate, train, and implement the solution. Measure and monitor the impact of the solution.

## Why Problem Solve?

In any business, there are three types of work: value-added work, incidental work, and waste. Value-added work transforms products and moves them closer to the customer. Value-added work means working toward getting a product to our customer at the right time, right cost, and right quality. Incidental work doesn't add value to the product or service, but it is part of business and must be done. Incidental work includes legislative reasons, regulations, and human resources. If you don't do the incidental work, it cripples your business. With waste, the customer doesn't care and the business doesn't care either. This includes a waste of knowledge, inventory, motion, overproduction, transportation, over-processing, and time. There's absolutely no reason to be doing these things, and it only adds cost and confusion to a business.

Most businesses are an aggregate of the three-piece pie, and they need to problem solve as they grow. The problem with growth is that if businesses don't manage growth, the pie grows. As an organization increases revenue by 10 percent, it increases not only value-added work but also incidental work and waste. If revenue goes up, for example, this means more warehouse space, more computers and lift trucks, and more people. This doesn't need to be the case. If an organization can grow by taking a chunk of the waste and applying the continuous improvement process, more valuable work can be added to support that growth. Let us stop doing wasteful work and replace it with value-added work.

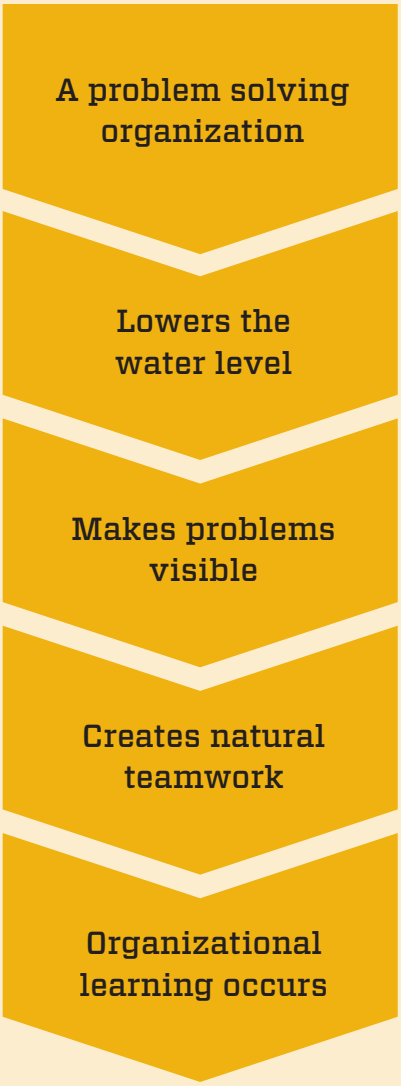
To do this, the organization must be a problem solving culture. To be a problem solving organization, it must be a learning organization. The fundamental difference between a lean organization and a traditional organization is being a learning organization every day.

## Creating a Learning Organization

Studies show that people learn most clearly and most permanently when problem solving. A learning organization is a problem-solving organization. Workers expose problems and fix them at the root cause by lowering the water level and getting to the river of waste. The water level in business is the inventory, space, software and people, and we throw these resources at problems. It appears the problem has gone away, but it has not. It is merely hidden. By reducing how much space is used or how many people are part of the process, we expose the problem. What's really powerful is that a natural teamwork is created, and a learning organization will occur.

Most importantly, if we know we are solving a problem and will fail our customer if we don't solve it, there is no question natural teamwork will happen. Because if that does not happen, a business will not get the job done. In cultures where the executive committee is dysfunctional and the vice presidents do not get along, there typically is so much inventory in the system that the management team can be dysfunctional and still service the customer. If the organization would reduce inventory and the water level, the natural teamwork would be created and a real learning organization would develop. Problem solving becomes the skeleton of the organization.

## Learning Organization Flowchart



## Lean Organizations Think Differently

Creating a lean culture is a big job and can feel like a daunting task however it is valuable for any organization. Consider these traditional principles versus lean principles. As your organization moves from the left side to the right side of each principle, a formal problem solving culture and model is created.

| Traditional Thinking | Lean Thinking |
|---|---|
| Push–economies of scale–make the numbers-unit cost | Pull–Make (move) only what the customer has ordered |
| Batch and queue-make (order) and move big batches | One-piece flow–Move small batches and keep them moving |
| No standards or complicated standards hidden in a binder | Simple, visible standards for all critical processes for all to see |
| Move the product, let defects flow down the supply chain | Stop the process immediately. Deal with defects at root cause |
| Engineers solve problems and create the best way to do work | The people doing the work design it and solve the problems |
| Hire brilliant people to try to fix broken processes | Empower regular people to improve upon brilliant processes |
| Hide problems by throwing inventory and resources at them | Expose problems by reducing inventory and resource levels |
| Managers work in offices and manage with data and reports | Managers “go and see” and manage with data and facts |
| Execute fast and go on the the next “new” thing | Plan, Do, Check, Act...Getting the *Right Things Done Right* |
| A problem is an unclear opportunity... it is optional to fix it | A problem is a deviation from the standard...it must be fixed |
| The cause of a problem is people... we ask who? | The cause of a problem is the process...we ask why (5 times) |
| We become defensive if others suggest problems in our area | We are thankful others see what we do not see ourselves |
| The business is a collection of independent departments | The business is a system of inter-dependent processes |
| Focus on outputs and cost reduction | Focus on inputs and lead time reduction |
| If it’s not broken, don’t fix it | It can always be improved |

## Lean Questions & Answers

**Q: Are more companies using lean practices and policies?**

A: There is no question that lean is becoming an operation model for tons of organizations. It has been 25 years since the first lean thinking book, so it is not an overnight trend. It is also not just a program. Do not compare lean to Six Sigma and others. It is broader that problem solving. It is a method to run your business. It can become an operating system for many organizations, though it may not be called "lean."

**Q: What's the best way to get senior executives engaged?**

A: At the end of the day, some folks struggle to get on board and may never get on board. Others need to be shown. A boss may not be a lean thinker, but you need to understand what your boss is trying to accomplish. At some level, it is about cost and quality. Connect problem solving to your boss' objectives. If you can solve your boss' problems, you can go a long way to becoming aligned with your boss. If you're not doing what your boss perceives as fixing those problems, you will struggle to get aligned.

**Q: What if you work in a company that applies the tools without the philosophy?**

A: That's right—it is not about the tools. It is about the "why" and building culture. If you are in a culture that is trying to implement certain tools, start asking people "why" and have a dialogue. Why are we implementing the "pull" system? What is the purpose? Will it make our business better? Informal and formal conversations around the "why" help to build momentum in understanding the culture you're trying to create.

**Q: How can I become a problem solver?**

A: Go solve a problem. Everybody has problems in day-to-day work. Right now, without going outside of your own sphere, find a gap between plan versus actual. Grab a simple problem solving model, and start working through it. See if you can close that gap between plan versus actual. Don't overcomplicate this. Pick an easy problem and try to solve it at the root cause.

## Georgia Tech Professional Education Lean Supply Chain Courses

The Lean Supply Chain Professional Series of the Georgia Tech campus in Atlanta is a nine-day, three-module program that helps professionals become lean thinkers and problem solvers. Learn more about lean problem solving in the upcoming Lean Essentials for the Supply Chain Professional course or take all three modules for a Lean Supply Chain Certificate from Georgia Tech Professional Education. Earn a certificate and you will acquire in-depth expertise and increase your impact within the workforce and the world.

**Lean Essentials for the Supply Chain Professional**
Three days about problem solving.

**Lean Implementation for the Supply Chain Professional**
Three days about the lean supply chain.

**Lean Leadership for the Supply Chain Professional**
Three days about becoming a lean leader.

For more information or to register for this certificate, visit:
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