

CHAPTER 8

How to Implement Lean— The Prescription for the Lean Project

In this chapter, we will describe how the various evaluations will create a comprehensive list of action items that can then be turned into a project for completion. This is the implementation plan.

“Failing to plan ... is just planning to fail.”

Unknown

An Overview on How to Implement Lean

The implementation of our Lean initiative is outlined here for ease of understanding. It will be managed and executed like any large project. The action items for this project will be compiled from two sources. The first set of data is gathered from the “systemwide evaluations,” while the second portion will be from the “specific value stream evaluation.” Both sets of evaluations will be compiled, prioritized, and lead to action items: *kaizen* activities. Together, in an eight-step process, all the evaluations and action items will be included in our plan and documented on some type of project documentation, whatever you are most comfortable with. We normally use a standard Gantt chart. *This is THE PRESCRIPTION on how to implement the Lean project.*

Steps 1–3: Systemwide Evaluations and Action Items

1. Assess the three fundamental issues to cultural change.
2. Complete a systemwide evaluation of the present manufacturing system outlined in Chap. 19.
 - a. The Five Tests of Management Commitment to Lean Manufacturing.
 - b. The Ten Most Common Reasons Lean Initiatives Fail.
 - c. The Five Precursors to Implementing a Lean Initiative.
 - d. Process Maturity.
3. Perform an educational evaluation of the workforce.

Steps 4–8: Specific Value Stream Evaluations and Action Items:

4. Document the current condition of the value stream.
 - a. Prepare a present state value stream map.
5. Redesign to reduce waste. (This is simply a summary of Chapter 7.)
 - a. Prepare a future state value stream map that will:
 - i. Synchronize supply to customer, externally.
 - ii. Synchronize production, internally.
 - iii. Create flow.
 - iv. Establish pull-demand systems.
 - b. Create a spaghetti diagram.
 - c. Show all *kaizen* activities on the Gantt chart.
6. Evaluate and determine the goals for this line:
 - a. Determine critical process indicators.
 - b. Set specific goals for this line/product. (Goal #1 is to protect the customer.)
 - c. Document all *kaizen* activities found in this analysis on the Gantt chart.
7. Implement the *kaizen* activities.
 - a. First implement finished goods inventory controls to protect the supply to the customer.
 - b. Implement your *jidoka* concept.
 - c. Implement all other *kaizen* activities on the Gantt chart.
8. Following the changes, evaluate the new present state, stress the system, and then return to step 4.

The Implementation Plan Will Be Documented on a Gantt Chart

We have spent little time in this book on project management. Since this book is written to those in manufacturing, like engineers, performing projects is something we assume you are already skilled in. If you are not, a number of excellent references are available. I recommend *Project Management DeMYSTIFIED* (McGraw-Hill, 2004) by Sid Kemp. At a minimum, your Gantt chart—or project management tool, whatever it is—should have certain data. For example:

- Show all *kaizen* activities.
- Show key milestones.
- Show completion dates and responsibilities.

A Key Question to the Implementation**Value Stream by Value Stream or Facility-wide?**

To install a Lean manufacturing system for all value streams in a large complex plant simultaneously is very difficult. Although this “clean sweep” approach is surprisingly

popular, it usually is an inferior technique to one-value-stream-at-a-time implementation. The “clean sweep” has a couple of merits that I will discuss in a minute. However, there are at least four very large reasons to implement one value stream at a time.

- The initial learning curve is very steep, and no matter how well prepared you are, there are many unforeseen results. Sometimes they are positive results, other times negative, but it is best to experience these issues on a smaller scale and learn from them. This learning from the first line is invaluable in executing the conversion on the subsequent lines.
- There is the matter of resources ... Specifically trained eyes and ears to evaluate implementation, evaluate progress, and assess problems on the value streams being converted. No one has a plethora of such people and they are invaluable. These few people can move from line to line with the implementation and provide expert advice and training so the gains may be sustained.
- Each change has an effect on subsequent and past changes. It is not uncommon to Lean out Line A and then move on to Line B for its implementation and then find some aspect of Line B implementation that has an unexpected effect on Line A. Sometimes the effect is a positive one, other times it is detrimental, but either way this approach allows you to better understand these effects so they may be exploited more fully on all lines .
- I have seen a number of line-by-line efforts progress quite nicely, but all the global implementation efforts I have seen have struggled to meet their objectives. A common postmortem comment on a global implementation effort is “In hindsight, we should have done this one value stream at a time.”

There may be a few cases where plantwide implementation is the best choice. I can think of two.

- In a few cases I have seen where the customer has decreed that they will only work with facilities that are Lean, top to bottom.
- The second case is rare but there are some operations where the manufacturing is trivial compared to the overall operation. Packaging is one such case I have encountered. In this instance, 19 different products were packaged and shipped to different countries. Hence, the packages were labeled in many different languages. The net effect was that there were over 400 individual part numbers. The manufacturing was not complicated. Rather the complications, and hence the variation, and hence the waste, was in the interaction with the storehouses. First, there were the issues of pickup, delivery, and movement of raw materials from the raw materials storehouse to the production lines. Second was the handling of the over 400 part numbers on the floor and in the finished goods warehouse. In this case, the handling of the storehouses was the key issue and the implementation had to be done globally.

In the absence of these two items, I can find no reasons more compelling than the four mentioned earlier: learning curves, resources, lessons learned, and historical success. Consequently, we have found it usually the best choice to implement one value stream at a time.

Step 1: Assess the Three Fundamental Issues to Cultural Change

Do We Have the Leadership to Make This a Success?

The first step is to select the leader for our initiative. If that person is probably you, that step is done. If it is not done, carefully select a leader, taking into account all the information on leadership detailed in Chap. 6.

Next, you will need to find a *sensei*. The leader and the *sensei* are far and away the two most important people in the effort. All too often, some high-level manager appoints someone to lead the effort and expects him to act as *sensei* also. In our experience, they do this because good *sensei* do not come cheaply. Quite frankly, a good *sensei* is the best bargain you will ever have in this Lean effort. His experience is invaluable. He will guide you away from failure and toward success. Many of the paths you would like to take in a Lean initiative are counterintuitive and most managers reject some important ideas because they simply do not know this. For example, the order in which you attack the transformation is of the utmost importance. Many managers want to dive in head-first and begin to reduce inventories. Almost always that is not only a bad idea, it is counterproductive. Your *sensei* will make sure the path you take is not only logical but is the best path for your particular situation. I have yet to see any Lean initiative that was a carbon copy of a previous one. They each have their uniqueness, which may be unnoticed by the novice.

In addition, the *sensei* is a set of eyes with some “distance” from the inner workings of the plant. This distance will give him objectivity that is invaluable when any evaluations are made. Just as there is no substitute for good leadership, on this journey there is no substitute for a good *sensei*. Choose carefully and don’t worry about the costs for these two people. If you have chosen well, this will be your smartest investment, without question.

Do We Have the Motivation to Make This a Success?

Motivation is a complex cultural issue, so we will not delve into it deeply at this point. However, most managers can determine, at least at the gut level, if the organization is properly motivated for this initiative. Two things must be done, at a minimum.

First, one of the great motivators is “to be in the know”—that is why rumor mills are so popular. So, to “get them in the know,” the Lean effort will need to be publicized and all that Lean is should be open and discussed. That puts a stress on a lot of cultures, which are very closed. Characteristics of closed cultures include lots of secrecy, even about the most mundane of topics, and managers who do not appear to be forthright. For example, in these closed cultures, many questions get avoided and there is an unstated but understood air of secrecy that forbids some questions being asked. Those elements will destroy a Lean initiative, so they must be avoided. So tell them what is going to happen, when it is going to happen, and what you expect the results to be. Be sure to get them “in the know,” and above all else be open and honest.

Second, for the group to be motivated, the leaders must be motivated. This motivation must be obvious by their actions. If the leaders are not motivated—not just motivated, but literally exuberant about the future of this Lean initiative—either you have picked the wrong people or they simply do not know the power of a Lean initiative. Quite frankly, in the world of manufacturing, there is no cultural change initiative that can create so much hope as the proper implementation of Lean!

Do We Have the Necessary Problem Solvers in Place to Make This a Success?

Do we have enough and do we have the needed level of training? Make sure you have earmarked the problem solvers and they know their roles. It is common to have a small cadre dedicated to problem solving under some sort of Lean support staff. Also, generally assigned to each value stream are what most organizations refer to as process engineers. Train and use these two groups fully. If they are not fully trained, have a plan to get there. It is very common to have a lot of the training done by the *sensei* as you progress. I call this JIT training. Some offsite training is also common. Whatever the current status, this is a critical aspect because the initiative will only proceed as fast as you can solve the problems—and the problems will come rapidly as soon as you start making the big changes when the four strategies to become Lean are installed on the first value stream.

Step 2: Complete a Systemwide Evaluation of the Present State

The Role of the *Sensei*

Now it is time for the leader and the *sensei* to make an evaluation of the present state of the entire manufacturing system. They will make four evaluations of the manufacturing system. They are:

- The Five Tests of management commitment to a Lean Manufacturing
- The Five Precursors to Implementing a Lean Initiative
- The Ten Most Common Reasons Lean Initiatives Fail in part or totally
- Process maturity

In this step, the *sensei* is absolutely critical. This step cannot be done by a good manager who understands Lean techniques. This must be done by a seasoned veteran in Lean applications. If you, for some odd reason, have decided not to employ a *sensei* and are doing this with a seasoned manager with solid engineering skills, but who is not seasoned in Lean, go hire someone with experience to assist you. I have never seen a good plan come out of anything but a person seasoned in Lean.

In the absence of a *sensei* or a consultant, *quit this effort and move onto something else*. I cannot state this more clearly. The likelihood of partial failure is 100 percent, and the likelihood of total failure is significant. The bottom line is, management is not committed (they will fail questions 2, 4, and 5 in the commitment test).

Well, now that you have either a *sensei* or at least experienced help, let's proceed to the assessment. In Chap. 19, I have included four assessment tools. I will explain each. The four assessment tools are:

The First Management Commitment Test

This management commitment test is the first and most important of the commitment evaluations. The key questions are, "Do we have the level of commitment necessary to make this a success?" And, "If we do or do not, what are we going to do about that?"

Before we discuss the evaluation, let's explore exactly what commitment is. (In Chap. 14, we have the story of the Alpha Line, which is a good example of management commitment.) A lot has been written about commitment and many confuse it

with involvement. Those walking around, making casual comments, and even helping out are involved. Commitment goes much deeper. The best description I have ever heard uses the metaphor of eating ham and eggs for breakfast. In this case, we can say the chicken was *involved*; the pig, however, was *committed*.

Now, back to the evaluation. This can be done two ways: quick and dirty or thoroughly. I suggest you do both, for different reasons and at different times. First, you and your *sensei* should do a quick-and-dirty evaluation:

- List the key players who are necessary to make this initiative work.
- Make the best evaluation you can using The Five Tests of Management Commitment to Lean Manufacturing.

Make sure you do your evaluations *based on the behavior you see* from the key players. Don't just go by what they say. At this point, this evaluation may be very rough but it will point out any obvious issues and will get you thinking about this issue. At some point, or at several points, individual or group commitments, or a lack thereof, will be significant issues, and it is best to flush them out early. So an early awareness of problems is a good first step.

From this evaluation, develop potential action items. At this point, this is just an opinion, so treat it very carefully. As you proceed in the early steps of the initiative, take careful note of any commitment issues. Be complete and document the who, what, when, where, why, how often, and how much, for each example. However, unless there are obvious and very serious problems, take no action on this list of items at this time. Save it for later.

The Second Management Commitment Test and Group Dynamics

Next, do a thorough evaluation of the management commitment—this can not be done initially. For this second evaluation to have significant meaning, there must have been some context developed so the key players can more fully understand what types and levels of commitment the Lean initiative will require. It is best to do this evaluation after the key players have been trained in your Lean initiative. Also, there must have been several major changes made in the basic operation so the key players can understand, firsthand and by experience, the type of changes required. Generally, this can be done as early as three months after kickoff, or as late as 18 months afterward.

This is a crucial time in the program. For the first few weeks of program implementation, particularly if the initiative was sold well by the Lean leadership, there will be a lot of positive energy and the majority of those involved will be very enthused about the initiative and its future prospects. This is how nearly all groups form and develop—lots of positive energy and seeming agreement early on. Life seems pretty great during this phase, which we will call the “cocktail party phase.”

Unfortunately, some time after starting the program, some tensions develop due to the necessary and resultant changes. This tension is unavoidable. What happens is that people begin to jockey for position, reassess their positions, and question things like, “How can I do this and still meet my goals?” In short, individual goals conflict with group goals and differences surface. Even if they do not, the worry exists that they might. This creates some conflict that was not present on day one. What started as a conflict-free group with seemingly common goals and a large amount of agreement is now breaking down.

It always happens. It is not only inevitable, it is necessary. This is the second phase of group development: let's call it chaos (a term coined by M. Scott Peck). This chaos has developed because the realities of life have been imposed on the group, and differences that they initially did not envision are popping up all over the place. These differences are now creating problems. Furthermore, having just left the cocktail party, so to speak, they don't really know how to handle the problems.

This is the earliest time we would want to do the second evaluation. Without this chaos and some understanding of the chaos, there is no real context to have a deep and meaningful evaluation. That chaos is often felt as early as three months after kickoff, but more typically in the 6- to 18-month period afterward. It is at this time that it is appropriate to do the second evaluation of management commitment. This will be a very sensitive evaluation and it will require good planning by both the Lean leader and the *sensei*. All too often, because it is sensitive and brings up problems most groups work hard to avoid, it is frequently avoided. Doing this evaluation will be a test of the courage, character, and resolve of the Lean leadership and the facility's management.

Just so you are aware, two more phases of group development exist. These are called forming and performing. In forming, the group must confront the differences, and then by using honest open communication and problem solving, they can resolve the differences. This is easier said than done, however. After accomplishing this stage, the group can then move into performing. In the performing phase, the group will be able to effectively and efficiently execute its mission. (There is some very good information available on group dynamics. I recommend *The Different Drum* (Simon and Schuster, 1987) by M. Scott Peck and *The Team Handbook* by Peter R. Scholtes (Joiner Associates, 1988). Both are excellent.)

Since the second commitment evaluation may be more than a year off, I have attached it as Appendix A at the end of this chapter.

The Five Precursors to Lean

Background

The Five Precursors to Implementing a Lean Initiative have an interesting history. In the late '80s and early '90s, when the first U.S. firms were implementing JIT (Just In Time) systems, a large number were encountering problems. Many firms were able to reduce inventory volumes significantly but often other problems developed. Frequently, the production rate would drop—this was the worst and also the most common of the problems. Other less serious issues cropped up as well. Once these unexpected problems surfaced, we would then be asked to assist these firms as they tried to work out of the JIT mess they had so carefully managed themselves into. After a few experiences, we found that the reasons these groups had failed could be classified into a few categories. In addition, about this time Ohno's book and several others became available, which more fully explained the TPS (Toyota Production System) and the JIT portion that so many firms were trying to copy.

Upon reading Ohno's book, and with further study of the TPS, it became obvious that the TPS was vastly superior to the production system in most North American firms, even if these North American firms had already implemented the JIT system. We quickly realized that the majority of the problems were related to this fact—that is, the TPS is a superior manufacturing system, with or without JIT. We also concluded that when Ohno began his quantity (note: that is QUANTITY) control and seriously undertook his JIT

effort (in about 1961), his production system was superior, at that time, to the manufacturing systems we are working with now, nearly 30 years later. This was not only sobering to most, it was also depressing.

We understood the problem and began preaching that the failing of a JIT effort was not due to the JIT effort itself, but the fact that the facility did not have the needed foundational elements in place to start a JIT effort. These needed foundational elements we named “The Five Precursors to Implementing a Lean Initiative.”

Today we find, without exception that all companies must work on one or more, or often all five, of these precursors to have a fighting chance of implementing quantity control measures. However, these issues need not be totally corrected before quantity control can be initiated—often they can be done simultaneously. Let’s say, for example, we have a process that has very high variation in hourly production. Although the stability needs to be addressed and it needs to be one of the first things done, we have seen instances where the solution to the rate variability problem was solved by a *kanban* system. So voilà! We get better stability and quantity control at the same time. This is something that is frequently not seen by the novice, but your *sensei* can give guidance as to:

- Which precursors need to be addressed
- What order these precursors must be addressed
- What amount must be addressed

Each of the five precursors should be evaluated and the results of this evaluation will often become a significant part of the implementation plan. A description of the five precursors follows. Refer to the Matrix in Chap. 19 for clarifications.

Stability and Quality

High levels of stability and quality in both the product and the processes are the most basic of standards. Ohno says that flow is the basic condition. It is the foundation of the Toyota Production System (TPS). He says this only because he takes it for granted that process stability is a given. (Return to Chap. 3, and reread the section “It Is Not a Complete Manufacturing System.”) Absolutely nothing is more basic to quantity control than process stability. So it is necessary to review all aspects of the product and process stability and make a list of items to include in the goals of your Lean initiative. First, evaluate and make sure the quality and the production rate of your product and processes are statistically stable. This can easily be done on a simple control chart—most often an Xbar-R or an XmR chart. Check the stability of the production rate: day by day, shift by shift, and hour by hour. If there are instabilities, put them on the list of items to address. For both the product and the process, check each quality characteristic for both stability and levels; evaluate both. Each can be checked using control charts. List all product and process quality characteristics that are not statistically stable. If they are variables data, list all those that have Cpk below your threshold value, usually most organizations start with a minimum of 1.33. If they are attribute data, work to improve the process to eliminate the need to do the evaluation. If this is not practical in the short term, work to correlate the attribute characteristic to variables data, and then strive to reach the threshold Cpk for this as well. If there are processes that do not meet Level 2 criteria, this constitutes a crisis and should be addressed immediately. The minimum goal for nine months is to have all product and process quality levels to Level 3 on the matrix; Level 4 can be a goal for 18 months.

Machine and Line Availability

Excellent machine and line availability is frequently a very large problem that has gone unattended for years. For those companies without a formal TPM (Total Productive Maintenance) program, it is common for this factor to reduce OEE by 25 percent. In practical terms, this means we must run the line 25 percent more than cycle time would predict, with all the attendant costs of running the line. This problem alone will frequently make a product unprofitable. Usually low levels of line availability are due to two major factors: materials issues (usually stock outs or late deliveries) and machine downtime. Frequently, materials issues can be alleviated by a Lean initiative and the quantity control aspects of the TPS. However, machine downtime is different and usually must be addressed by a concerted TPM effort. If a TPM initiative is not already in place, almost all firms need to develop a new database to keep track of machine uptime and train the personnel in the use and manipulation of this database. There is some commercially available software for TPM and machinery uptime, although I find most can develop a good Excel spreadsheet and make it quite serviceable. Again, if you find in the evaluation that Level 2 criteria cannot be met, this is a crisis requiring immediate action. Regardless, there is usually a large list of materials and machinery issues that are created by this evaluation. The goal to reach Level 3 should be set for six months, with Level 4 scheduled to be attained in one year.

Problem Solving Talent

In several sections we have discussed problem solving and the need for problem solvers. The need for these skills cannot be underestimated; it literally is the vitality of the Initiative. Furthermore, to complete this five-part evaluation, the skills of MSA (Measurement System Analysis) and SPC (Statistical Process Control) are required. Hence, anything less than Level 2 is an absolute crisis and must be corrected. If these skills are not available onsite, hire trainers right now. A six-month goal is to reach Level 3, while Level 4 should be met by 18 months.

Continuous Improvement Philosophy

Mature continuous improvement philosophy is something that is often talked about but infrequently reduced to a process that can be taught to and understood by all. A copy of one we created is shown in Fig. 4.1. If the evaluation is less than Level 2, we again have a crisis and it needs to be taken care of immediately. Reaching Level 3 is a reasonable six-month goal.

Standardizing

Strong proven techniques to standardize is the foundational of all foundational issues. This skill is so important it received its own chapter in this book: "Sustaining the Gains." Anything less than Level 2 is an immediate crisis and must be addressed. Reaching Level 3 is a reasonable goal for 18 months.

As part of this evaluation of the Five Precursors to a Lean Initiative, a list of issues must be compiled. This wish list will usually make up the majority of the effort for the first pass of the Lean Initiative. After the first six months, more and more quantity control efforts can be implemented, but in our experience most firms have a number of foundational issues, which must first be addressed.

The Ten Reasons Lean Initiatives Fail

These ten reasons listed in the evaluation in Chap. 19 were developed from actual data I have accumulated over the years, and I include them here for your reference and use. I suggest you go through this list with your *sensei* and address each for your situation. Take notes and develop action items.

Process Maturity

The Process Maturity document is included so you might analyze the issues with your processes with more specificity. It is a refinement of the first of the five precursors: high levels of stability and quality in both the product and the processes (it contains more specific auditing criteria). The vitality of your initiative will be highly dependent upon your ability to improve your processes. This document is designed for just that purpose.

Document the System Evaluation in the Plan

These four evaluations have given you a rather large group of action items that will generally fall into one of three categories.

- System action items
- Educational and training action items
- Line-specific action items

What Is Next?

In about two minutes we will do a more thorough educational evaluation and a series of value stream evaluations. This will add considerably to your list of action items. These action items now form the nucleus of your implementation plan. As you recall, it is simply a project—something we engineers are good at accomplishing. To execute this project, the first and most important tool is, guess what? The plan—the first of the requisite tools of a leader. Your Lean implementation plan will normally be expressed in the form of a Gantt chart. I normally use MS Project. It works nicely, but I am sure others out there are equally good.

You can now start your Gantt chart. Fill in the System, Educational, and Line by Line Action items you have from the System evaluation.

Step 3: Perform an Educational Evaluation

Formally Introducing the Issue

A formal introduction is often a key to getting started well. Remember, the second requisite skill of leadership—the ability to articulate the plan so all can understand it. It is worthwhile to tell the entire facility, “We are going to make a change and that change is to implement the concept of Lean manufacturing.”

Many facilities make this a monster effort, with special invitations, a formalized meeting attended by all the top management, coupled with meals and motivational speakers galore. I find this degree of effort is not needed. In the end, the most important aspect of selling the issue of changing to Lean is dependent upon the continued actions of the Lean leaders and top management. If they talk Lean and do not walk the talk, no amount of up-front selling will work. On the other hand, if the Lean leaders and top

management do really walk the talk, then no large selling effort is required. Either way, a mega-effort at selling is generally a waste, hence I do not recommend it.

Rather, I recommend you have two types of Lean introductory training sessions, as described in the following paragraphs.

First and foremost, an introductory session to management will need to be prepared. This group should be the key decisionmakers, usually what is referred to as “top management.” This first training is the classic “Who, What, Where, When, Why” training with special emphasis on the: “What,” which is the House of Lean that was created with the help of your *sensei*; and the “Why,” which is the motivating force behind the effort. This training is often more than a one-day event. It could be the basis for a two- or three-day retreat for the management team. This group needs to especially understand the House of Lean. The training should include exercises on variation reduction (the dice game in Chap. 19 works nicely), *takt* calculations, OEE calculations and line balancing (for these, my Lean Kit is a great tool and is available at my web site: www.qc-ep.com). This training session should be hands-on and instructional, and it must take into account both the present state of the facility and the desired state of the facility. Change, including the types and amounts of changes needed, should be openly and honestly discussed. At this point, it is unlikely that all four of the systemwide evaluations of the present state have been done, but still your Lean implementation manager and your *sensei* will be able to quantify this concept for the purposes of this training.

The second type of training is informational in nature and should be given to all employees on all shifts. It should first be given to those reporting to top management, next supervisors, and then to the general plant population. This is typically a Power-Point presentation describing the House of Lean and the implementation schedule. Including ample time for a Q&A session, this usually takes about four hours, and groups can be as large as 40 and still be effective.

Specific Skills Training

The systemwide evaluations almost always create a very large list of needed training to teach the strategies, tactics, and Lean skills. The composite list will largely follow directly from the Five Precursors to a Lean Initiative, which have already been added to your Gantt chart. In addition, as you do the assessment of each value stream, training topics will almost surely be found. Once combined, these trainings will almost always include problem-solving training, training on statistical tools, and facilitation training for all in leadership positions. In addition, Lean-specific trainings are available in skills such as line balancing, SMED methodology, *takt*, and *kanban* calculations, to name just a few. It will be necessary to inventory the needed skills and teach them as they are needed to those using the tools.

Just another word on education and training: It should be focused and JIT. For example, during the implementation, if you choose to change the plant one value stream at a time, train just those people involved. Often, it is not that simple and some people may need to be trained prior to the implementation of their product; it is never perfect. The point here is to avoid the global mass training of individuals that makes good use of the training resources, yet provides the training either too early or too late. Efficiency of the training organization is not of paramount importance when compared to training effectiveness. If there is long time between the training and the implementation of that training, a large fraction of the learned material is forgotten. Consequently, it will not be effective and it is then waste, the very item we are trying to eliminate, not create.

At this point, you can also add these introductory training items to your Gantt chart.

Step 4: Document the Current Condition

Preparing a Present State Value Stream Map (PSVSM)

This document will be used to gather current information of the present state conditions for the entire value stream. This will be a door-to-door PSVSM—that is, we will start at the shipping dock and document the value stream up to the raw materials supply.

Step 5: Redesign to Reduce Wastes

Prepare a Future State Value Steam Map (FSVSM) That Will:

- Synchronize supply to customer, externally.
- Synchronize production, internally.
- Create flow (including the *jidoka* concept).
- Establish pull-demand systems.

This will analyze current conditions and redesign the process flow to eliminate waste. Refer to Chap. 7 for the specific technical details of this step.

Creating a Spaghetti Diagram

This diagram will show the movement of the assembly as it is constructed, and show the movement of both the people and the product. Work to reduce the movement and transportation wastes and free up floor space. Do this on a plot plan, made to scale.

Document all *kaizen* activities determined in Step 5 on your Gantt chart.

Step 6: Evaluate and Determine the Goals for This Line

- Determine critical process indicators (for more details on goals, see Chap. 9).
- Set specific goals for this line/product (goal #1 is to protect the customer).
- Document all *kaizen* activities found in this analysis on the Gantt chart.

Step 7: Implement the *Kaizen* Activities

- Implement finished goods inventory controls to protect the supply to the customer.
- Implement your *jidoka* concept as defined in Step 5.
- Prioritize and implement all other *kaizen* activities on the Gantt chart.

Step 8: Evaluate the Newly Formed Present State, Stress the System, Then Return to Step 1

Some Clarification on Step 8

As part of the project prescription, you will:

- Evaluate the newly formed present state.
- Stress the system.
- Return to Step 1.

To make a system Lean is a never-ending process. Each change brings about a new present state that then gets evaluated for improvement activities, which creates more changes and the cycle starts all over again. On many occasions, the system will stress itself through the unexpected appearance of quality or availability problems, for example. Sometimes demand changes will put a stress on the system. All of these are opportunities to improve the robustness of the system. Although it sounds a bit crazy at first, it is wise to stress the system yourself to see what other process opportunities may be present. A typical “stressor” for the system would be to remove a few *kanban* cards and see what the system response will be. The primary tool you will use to protect you from system failure will be system transparency. Remember when we said we need to create a culture that embraces change? This may be the clearest manifestation that we have changed the culture, when we start stressing the system to make it better. Recall the metaphor of the athlete in Chap. 6. How did he get better? Isn't this the same concept?

Lean Goals

Lean goals (Step 6, item 2) are always an interesting topic. The name Lean came about because, in the end, the process can run using less manpower, take less time, consume less space, and use less equipment and material investment. So often when evaluating the success of a Lean initiative, these terms are used and calculations of space utilization, and even distance traveled, are used. In the long run, these are not very meaningful measures since they typically are not a good subset of the plant goals, nor do they readily translate into key business parameters such as profits or return on investment (ROI).

Most plants already have good measures of manpower utilization. For the other Lean measures, the ones that typically get woven into the general plant goals are inventory management measured as inventory turns, and the lead time, measured as manufacturing lead time. If OEE (Overall Equipment Effectiveness) is not already a line goal, this is clearly to be added. In total, there should be five to seven goals that are the metrics to measure how the line will supply the product, with better quality, with shorter lead times, and do so less expensively.

What about Goals for the Lean Initiative Itself?

We do not favor any specific goals here beyond the goals of the project that are included in the schedule. This is for two very sound reasons:

- At some point these goals will clash with the plant goals. It is best to simply weave them into the plant goals. If the plant goals do not reflect the need to be Lean, *change the plant goals*.
- We want to make as much effort as we can to weave the Lean initiative into the normal workings of the plant and not make it a “New Thing We Do.” Rather, it should not be a new thing, but a *new way of doing the things we need to do*. We want to begin immediately weaving Lean activities into the culture, which will start the needed cultural change to sustain the gains. There is no better point to start than right here.

What to Do with the Plan?

Management Review

The plan needs management review, discussion, and acceptance. This should be done in a formal meeting. This formal review is done for four reasons.

- It will show, in one document, what is going to happen and when.
- It will give top management, the movers and shakers, an opportunity to see the entire effort. They can see and comment on those things in their areas of responsibility and also those changes outside their areas, but these changes still might affect them. In short, they will have an opportunity to bring up questions.
- Any plan includes the topics of objectives, timing, and resources. This meeting will allow a check on not only those three topics, but their interrelationships as well.
- How they respond to the plan will be a reality check on the commitment of the top management. This is most important.

It is necessary to make sure, at this meeting, that everyone understands that the next step is implementation. You want to leave the meeting with the understanding that the top management understands and will support the plan, because in five minutes you will implement it.

Publish and Follow-up

Immediately following the meeting, publish the plan and put it into action.

Let the Fun Begin!

Chapter Summary

The book *How to Implement Lean Manufacturing* is summarized in this chapter. First, we make evaluations using the following tools:

- The three fundamental issues to cultural change, outlined in Chap. 6.
- The fourfold evaluation of the present manufacturing system, including the commitment evaluations, five precursors to Lean, ten reasons Lean initiatives fail, and process maturity (found in Chap. 19).

- The educational evaluation of the workforce.
- Specific value stream evaluations, as detailed in Chap. 7.

These evaluations, and the countermeasures, then create a huge list of *kaizen* activities that can be included in a Gantt chart or an appropriate project planning and tracking tool. We can then evaluate and determine completion dates for *kaizen* activities in the project, set specific goals for the value stream, prioritize the activities, and implement the *kaizen* activities. Almost always, our first two goals will be to implement finished goods inventory to protect the supply to the customer and to implement our *jidoka* concept. Finally, we will present this to management for review, and once reviewed and accepted, we will begin to immediately eliminate the waste.

Appendix A—The Second Commitment Evaluation of Management Commitment

The Process of the Second Commitment Evaluation

The second commitment evaluation should be done in a facilitated session, which your *sensei* should be capable of facilitating. It is not unusual to take a full day for this evaluation and problem-solving session.

As preparation for this session, make sure each manager has a copy of The Five Tests of Management Commitment to a Lean Initiative. In addition, ask them to do a personal evaluation, and also an evaluation of the management group as a whole. When you ask them to do these evaluations, tell them the results from the tests are personal and will not be shared.

What you want to do is uncover the issues, frame the issues into problems, and begin the problem solving to eliminate the issues. Actually, most of the issues will be known, but most will be difficult for people to discuss and bring out in the open. We find that once the problems are on the table, 70 percent of them solve themselves. However, you will also find that some problems are more difficult to solve.

The agenda could be something like:

1. Group icebreaker on teamwork.
2. Break into small groups of five to seven and ask each group to answer the question, “What is commitment?” You and the *sensei* should move from group to group to make sure they are on track. Give them about 15 minutes for this exercise. This is for the small group’s purpose only.
3. Follow this by bringing everyone together in a group discussion facilitated by the *sensei* about “How do we measure commitment?” This must be done in a “spin-around” brainstorming session using strict brainstorming rules. Document this discussion and all subsequent steps on flipcharts that you will post on the walls of the meeting room. Beyond posting the flipcharts, nothing more needs to be done with this session. Very likely, you will want a break here.
4. Again facilitated by the *sensei*, do a brainstorm of, “What are our problems with commitment?”, or tackle a similar question. Document all the comments, concerns, and issues on flipcharts and post them. Make no effort at this point to discuss, validate, or reduce the list in any form. Just let it sit there. I cannot

emphasize those last two sentences enough. This step, to be effective, must be totally nonjudgmental.

5. A group exercise on values may be appropriate at this point. Many exist. I like the “Lifeboat Decision.” In this story, ten people have clambered onto a lifeboat, but it will only hold seven. Thus, three must be thrown overboard and they will die. If you do not throw three overboard, all ten will die. For instance, in the boat are a young child, a blind man, a priest, a prostitute, a mother and her baby, a grandmother, a convicted killer (who is strong and muscular) ... well, you get the picture. There are no right answers. It just forces the group to discuss values. It is a great exercise.
6. At this point, if there are many problems on the list you made in step 4, discuss each item in turn until the group is reacquainted with the list. The discussion must be “to a point of understanding”—we *still* do not want to pass judgment on the projects. We only want to understand the context of the problem.
7. If the list is large, we will need to select the most critical problems. It is likely that we have a number of very good projects, so almost any from the top of the list will be productive to solve. To find a few of the better projects, use nominal group technique or multivoting to select say the top four or five. Once this is done, we need to select just one of these projects to work on. Probably the *sensei* could say something like, “We will eventually solve all these problems, but for the first problem I would like to see the group solve the problem of...”
8. For the first problem, brainstorm. “What are the thoughts, concerns, issues, and so forth about this problem?” When the group has all the issues down on paper, do not reduce this list. Instead, proceed to the next step.
9. For this first problem, brainstorm again: “What are the possible solutions?” When the group has all the possible solutions down on paper, do nothing more with this list for the moment. Instead, proceed to the next step.
10. Conduct another brainstorming session on “What are the key criteria we will use in our decision-making process?” Discuss this and reach a consensus. This second step of reaching consensus on the criteria is often difficult. If you are not familiar with consensus, it is not disagreement, nor need it be 100 percent agreement. It is the concept whereby everyone involved can say, “I may agree with the group decision or I may not agree with it, but regardless, I recognize it is in the group’s best interest and I will give it my 100 percent support and commitment.” Like I said, it is not easy, but to reach consensus on this step is crucial.
11. Select the best of the possible solutions, and then develop action plans with responsibilities and due dates. Very often after the consensus on the criteria is reached, the process moves very rapidly.
12. Return to step 7, select the next problem, and move on.

It is important that the group completely resolve at least one problem. If they can and want to take on more than one problem, that is even better. However, here the major benefit comes not from the problem solution itself. Instead, it comes from the process of solving the problem. The Spin-Around technique requires:

- Good listening
- Understanding problems from different perspectives

- Nonjudgmental discussion
- Introspection
- Patience and respect shown by all, to all

Frequently, these are behavioral traits that are not found in abundance in the typical manufacturing plant environment. Consequently, and nearly always, the results of the process are more both important and more lasting than the actual problem that was solved. Following this, facilitated spin-around—the managers will be better equipped to work together to solve their problems. In addition, they now have a behavioral model they can take back to their individual groups to use in resolving their own internal issues.

It has been my experience that this evaluation is a very sensitive one—everyone thinks they are committed, but this is simply not the truth. I wish I could give you a prescription on how to do this comfortably, but I can't. The best advice I can give you is to do it—but do it carefully.

Simply because there is a possible downside is no reason to avoid it—yet avoid it is precisely what most people do. Unfortunately, when either fear or denial sets in and begins to rule the culture, the progress stops and the end is in sight. There is no substitute for simply fighting through these two problems of fear and denial, because they will appear again and again. Many of these issues test the courage and the character of the Lean initiative leadership. If they waver, the effort will suffer.

There is a wonderful quote from a movie where the protagonist, who is only 17, has thousands of dollars of video and sound equipment that he purchased with the profits from his marijuana sales. When he was asked by a friend if his father knows how he financed the purchases, he says, roughly, "My Dad thinks I can afford this on my minimum wage job," and then adds, "never underestimate the power of denial." This is true of denial, and the same maxim applies to fear as well.

Both fear and denial are two extremely powerful detractors that will rear their ugly heads time and again as you pursue this journey into Lean. The leadership has to be aware of these issues and must handle them in a professional and open fashion. This is necessary for the success of your Lean effort ... well, for any effort you might embark upon.

