

**Increasing the  
Competitiveness of Missouri's  
Hardwood Producers:  
An Introduction To Lean  
Enterprise Principles for the  
Timber Industry**

**Business and technical assistance to help you  
reduce costs and increase profits.**



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# INTRODUCTION

The timber industry contributes significantly to Missouri's economy. Missouri has more than 13 million acres of timberland, covering some 30 percent of the state. The forest products industry is one of Missouri's 10 largest manufacturing sectors, employing some 30,000 people, or six percent of the manufacturing workforce, with an annual payroll of \$681 million.

But, the contribution to the state's economic well being should be much higher. Many timber producers are not operating at the highest level of efficiency and some are producing only lower grade forest products, from high grade raw materials.

Recognizing this, and committed to helping Missouri businesses succeed, Missouri Enterprise Business Assistance Center partnered with the Missouri Department of Agriculture to submit an application for a U. S. Department of Agriculture Federal State Market Improvement Grant. The grant application proposed a study of the industry and development of ways for Missouri's timber producers to their enhance competitiveness in the global marketplace.

That grant was approved in February 2004. The study of the industry was undertaken, the results were evaluated and this Technical Report is the first of three reports addressing the application of modern industrial methods to the hardwood timber industry.

We are confident that this first report will introduce the timber products industry to proven principles and practical means to help all segments of the timber industry enhance productivity and increase profits. This first general introduction report will be followed by reports focusing on logging and milling.

# ACKNOWLEDGEMENTS

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## EXECUTIVE SUMMARY

Missouri Enterprise Business Assistance Center has recently conducted a survey of Missouri hardwood producers to determine if "Lean Manufacturing Principles" are applicable, as a value-added mechanism, to the timber industry. We were frequently told "Lean will not work in the timber industry because logging and sawmill operations are nothing like factory work." Our study has revealed that there are enough similarities between classical manufacturing and primary hardwood processing to make the application of Lean Principles effective. Therefore, based on our experience in the application of Value-Added Lean Principles, we are confident that Lean Manufacturing Principles, if properly applied, can increase productivity and profits in all segments of the hardwood timber industry.

In applying Lean Principles to any business, the first objective should always be to determine the material flow path on which the Lean value-added mechanism is to be mapped. In classical manufacturing business models the process flow starts with a clearly defined source of raw material and ends with finished goods shipped to specific customers. In the hardwood timber industry primary processing does not have a clearly defined beginning and it has an even harder to define customer. You could almost say that, "in primary processing of hardwood timber, material flow is frequently a loosely connected series of independent parties working through a rather disconnected set of processes." It is necessary, therefore, to look at all the hardwood processing fragments and collectively treat them as a single manufacturing process beginning with harvesting and ending with drying. Of course we must recognize that very few companies operate over this complete set of processes, but, strictly from an industrial engineering perspective, it is this complete set of activities that makes up the primary manufacturing flow of hardwood timber.

With a beginning and ending point defined for the primary processing of hardwoods the next step is to identify key differences between the hardwood primary process and standard manufacturing methods. By taking all the unique differences and grouping them into families of differences it is possible to reduce the number of variables to three principle differences between the classical manufacturing process and the primary processing of hardwood timber. The first difference between standard manufacturing and primary processing of hardwood timber is that in most classical industrial applications the distance which material flows between processes is measured in inches or tens of feet. In timber processing product flow is measured in tens of miles. These long distances between processes will have a major impact on the application of some Lean Principles such as "visual controls".

Second, in classical manufacturing material flow often takes place at a single location or under a single roof ... figuratively speaking. In the primary processing of hardwood timber, product flow takes place within and between at least two separate and isolated locations. The fact that primary processing almost always takes place in two or three fragments will make it very difficult to apply Lean Flow Principles across the fragments.

Third, in most factories the material flow process is under a single control mechanism. In the timber process, however, flow control frequently falls under totally separate company structures. For Lean to work, it is essential that a method exists for controlling the process across all primary processing fragments.

The ultimate solution to these three main differences is to build a business model where the “factory” receiving dock is at the edge of the forest and all remaining processes, from bucking to kiln drying, are mobile modules, which can be moved from forest to forest. Will this happen? In the softwood industry, this capability already partially exists. It is very difficult to see this taking place in the hardwood industry. Until this happens, if it ever should, it is our opinion that adopting Lean Manufacturing techniques is one of the best ways to help small independent companies remain competitive. For example, the distance material flows will influence operational cost but it will not eliminate the usefulness of implementation of Lean Principles. Control over the material flow is absolutely essential to Lean operation, but control does not have to come from a single company ... it can come through a cooperative effort. Processing at multiple locations, like material flow distance, impacts operational costs but does not reduce the effectiveness of Lean Principles if they are employed at each location. Generally speaking, there is no doubt that Lean Principles will make significant contributions in reducing operational costs all along the hardwood material flow path in primary processing. What we foresee as truly revolutionary in the hardwood timber industry will be synergistic implementation of Lean Principles in a cooperative effort along the entire primary processing chain. For this to happen, however, it will require a high level of cooperative effort to put a strong and effective control and communication mechanism in place.



## UNDERSTANDING THE PHILOSOPHY OF LEAN OPERATIONS

### *A Brief History Of Lean Manufacturing*

Manufacturing in our nation started out as small isolated "cottage factories," where low-volume high-craftsmanship single piece production methods dominated. Under these methods the factory worker made many process decisions and often was responsible for such activities as design, engineering, quality and delivery times. By the late 19th and early 20th century "cottage factories" had given way to process-oriented mass-production manufacturing methods such as the one developed by Ford.

The unique attributes of a craftsmanship workforce culture were soon replaced by repetitive work, which was more conducive to the demands of mass production. Under these conditions, workers no longer had any significant influence over the manufacturing process and in many cases they were relegated to the role of a "human-machine." It wasn't until after World War II that manufacturing methods underwent a new transformation. At this time, the mass production culture began to adopt a more results-oriented and output-focused production system but without any significant change in corporate attitudes toward the worker. It was not until Japanese manufacturers began to seriously challenge America's manufacturing position with their customer focused and worker oriented Lean operations that we saw the benefits of integrating cottage industry and mass production cultures.

Japanese manufacturing came to center stage after the Second World War, because Japanese manufacturers followed a different course of



action in the process of rebuilding their manufacturing capability. After losing the war, Japanese manufacturers were faced with a reduced workforce, the lack of resources and materials and serious financial shortages. Under these conditions, they were forced to look for alternative manufacturing practices. As Japan struggled to transition from manufacturing novelty items to serious consumer products, they had to find methods for competing against Western industrial powers. Eventually these efforts produced Japanese leaders such as the Toyota Motor Company's Eiji Toyoda, Taiichi Ohno, and Shigeo Shingo who took visionary American teachings and developed a highly structured and disciplined production system now known as the "Toyota Production System." This workforce empowered, process-focused manufacturing system eventually became known as "Lean



Production." The ultimate goal of this system was to minimize process activities and resources that added no value to a product. By the late 20th century, the Japanese had taken what American manufacturers had ignored and perfected it as a premier manufacturing business model.

## LEAN PHILOSOPHY

If you participate in management conversations today you will find them filled with Japanese terms such as "kaizen," "kanban," "heijunka," and "muda", as though speaking these words will make you an expert in Lean or conjure up some kind of success-spell. Even more dangerous is the common belief that taking a Lean seminar and learning how to speak the new Lean lingo

will give you the capability to transform your business into a more efficient employee-empowered and customer-focused company. The sad truth however, is that taking a few classes, speaking the lingo, developing work standards, putting up andon boards, building manufacturing cells and using kanbans will not transform a company into a Lean

Enterprise. Lean is not about words and flavor-of-the-month activities ... *Lean is a totally new way of doing business.*

If a company is serious about becoming Lean they must be totally committed to implementing the Lean philosophy in all aspects of their operation and they must be just as devoted to the belief that Lean implementation is a never ending process. Far more than manufacturing, Lean is a business philosophy that evolves from its own application and it is not just a set of rules or a cook book of instructions. Lean can only be made to truly work when it becomes a way of doing business that is applied across all operations, from the operator level to the executive decision making process.

Lean Philosophy starts with the understanding that the greatest device in the world is of little value if its production will not result in a reasonable return for the manufacturer. The manufacturer will not realize a reasonable return unless the customer's perceived value of the device is greater than its manufacturing cost. From a timber perspective, this first means that you fully understand the markets perceived value of your product in terms of quality, price, and delivery; and second, that you develop a manufacturing process capable of generating that perceived value at a board-foot cost, which is less than the board-foot cost the market is willing to pay.

To transform your company with Lean Philosophies means that you have taken the time to become well versed with timber product value based on your local market and on your under-

standing of the local market in relationship to the global market. Developing a Lean Philosophy also means learning to identify business activities that waste money and using modern business tools (in some cases the buzz words) to eliminate waste from every process or function including sales, purchasing, product development, design, maintenance, accounting, and human resources.

Transforming your company with Lean Philosophies means that Lean has become a vital part of your business strategy and it is now pervasive in the company culture.



## Lean Operations Should Be Centered On Four Lean Sub-Philosophies

**1. Customer satisfaction.** This sub-philosophy is based on your already having developed a complete understanding of market and customer expectations. You will have used this knowledge to enhance the production process with the capability of providing quality that exceeds customer expectations. Now that you know the customer and you are capable of profitably meeting his quality expectation, you will also develop a relationship with the customer where he knows that your product will be where he expects it when he expects it.

The Lean Philosophy calls for us to go beyond simply meeting expectations. We should always strive to exceed the customers expectations

**2. Elimination of waste.** This sub-philosophy of Lean demands that each step in the production process is critically examined to ensure that it adds the customer's perspective of value to the product. Any non-value-added operation is considered waste and is eliminated. Of even greater importance is a careful analysis of every value-added process to ensure that it is being performed in the most efficient form.

**3. *Know your tools.*** It is impossible to successfully implement a waste elimination program without being trained in using the tools developed for waste elimination. A chainsaw is a far more economical method for falling trees that a double bitted ax, but if you have never seen a chainsaw before and if you have no idea how to even start the chainsaw, then using it to fall trees will be more costly than an ax. In the same way, trying to implement a waste reduction program without the proper tools and the necessary training will probably result in failure.

**4. *Respect of human dignity and contribution to the production process.*** Lean will never become a reality unless the sub-philosophy of employee value and empowerment is put in place. A Lean manufacturer knows that their employees are their most valuable asset. Lean never seeks to exploit the workforce. Instead, Lean continually seeks to provide a working environment where people know their contribution is valued from both a labor and decision making perspective. More importantly, Lean values a persons mind more than their hands. The desire is for employees to obtain a personal fulfillment as part of the Lean manufacturing process and never to feel as if they are working only to the benefit of their employer. This will never happen unless the employee comes to know that they are expected to make intellectual contributions on the execution of the process and function as an equal in designing improvements. In a Lean workforce it will be very difficult for an observer to distinguish between levels of management.

## KNOW YOUR CUSTOMER

In classical manufacturing the customer has always been clearly identified and some attempt has always been made to develop a working relationship with the customer. With the advent of Lean manufacturing the customer was given special attention. The old attitude of "I made it, you buy it," was replaced with the desire to fully understand the customer's expectations. Today, modern manufacturers model their businesses to produce quality, on-time delivery, customer designed delivery modes and extended services. The modern business man fully understands his product market, he selects customers that are a match for his business and then he takes the time to develop a partnership relation with his individual customers.

The hardwood timber industry needs to adopt the Lean philosophy for marketing and building customer relationships. It is not terribly uncommon to find loggers indentured to sawmills through equipment loans, pre-buying of logs, or in some rare cases the intimidation of: "if you sell to anyone else I will stop buying from you." This less than helpful attitude can also exist between the sawmill owner and the lumber buyer. Too many small hardwood sawmills neither completely understand their products market nor do they have adequate training to undertake a modern market survey. As a result, it is not uncommon to find sawmills where the lumber buyer determines product quality and sets prices as they see fit. In some cases, it is almost as if the lumber purchasers have the attitude of "if you don't sell to



me who are you going to sell to." In any event, there is ample evidence to indicate that the hardwood industry would benefit from the application of modern marketing and sales techniques in developing better and stronger customer-partner relationships.

## ELIMINATING WASTE

Lean transformation, although made complicated by some Lean vendors, is really a simple process of knowing your customer's product expectations and then using Lean tools to eliminate waste in producing that product. Basically, successfully executing Lean transformation requires the capability to recognize waste in your production process and the skills to effectively



use Lean tools to eliminate that waste. The elimination of waste must take place in every area of business including customer relations, product design, supplier networks, production processes, and company management. The goal of waste reduction is to use less human effort, less inventory, less time, less management, less

control and less space to exceed customer expectation in a process where the workforce and the company are rewarded and function as a team.

In the business model we have chosen for the hardwood industry our value-added process starts with the falling of a tree and ends with a dried board. The goal of our Lean transformation process is to identify every action that takes place along this process and identify those things that do not directly contribute (add value) to what the customer expects to find in our finished product ... the dried board. Along this process we will find that there are basically eight non-value added

activities or wastes common within the process itself and even within each employee's routines or job functions. Remember that "waste" is essentially anything that does not contribute to what the customer is willing to pay for. Typically the types of waste considered in a Lean manufacturing system include:

1. Overproduction is to produce more than demanded or before it is needed: Visible evidence of this would include storage of material. It is the result of producing to speculative demand. Overproduction means making more than is required by the next process, making earlier than is required by the next process, or making faster than is required by the next process. Causes for overproduction waste include:

- Just-in-case logic
- Misuse of automation
- Long process setup
- Unlevel scheduling
- Unbalanced work load
- Over engineered
- Redundant inspections

*Application:* Most manufacturing operations do a fair job of minimizing this waste through cross training of employees and shifting workers between jobs to keep them producing as part of a balanced system. In some situations where the old culture of measuring a persons worth by how much they produce as an individual exists, over production will often be rampant. For example, in poorly managed sawmills it is common to see a sawyer who constantly pushes the edger by sawing faster than edging can take place. This over production almost always results in the edger trying to work at a rate faster than quality edging will allow ... thus money is lost at the edger ... and it is the fault of the sawyer.

2. Waiting for the next processing step: This waste takes place when a task is delayed due to the fact that the prior step in the process has not been completed. This applies not only to a product delay, but also to the lack of the necessary



information. During this waiting period an employee, and possibly the equipment related to their job, is not being used to its full capacity, resulting in a loss of time and money. Another form of this waste is waiting for a piece of equipment to be fixed, set up, or for it to arrive at the needed location. Causes of this waste include:

- Unbalanced work load
- Unplanned maintenance
- Long process set-up times
- Misuses of automation
- Upstream quality problems
- Unleveled scheduling



*Application:* Primary processing of hardwoods is very labor intensive and most companies do a good job of balancing workloads. It would be very unusual to find a skidder operator waiting for a tree to be cut or an off-bearer to be waiting for boards from the edger.

**3. Inventory or Work in Process (WIP):** This is material piled up between operations due to large lot production or processes with long cycle times. Causes of excess inventory include:

- Protecting the company from inefficiencies and unexpected problems
- Product complexity
- Unleveled scheduling
- Poor market forecast
- Unbalanced workload
- Unreliable shipments by suppliers
- Misunderstood communications
- Reward systems

*Application:* It is common to see logs and lumber piled up between various processing steps. In industrial engineering terms this is known as Work In Progress (WIP). The philosophy of Lean

Manufacturing calls for eliminating, or at least reducing, the amount of material piled up ... get rid of the WIP.

The odds of reducing cost by reducing WIP are high. But, in the timber industry, this must be done very carefully so as not to actually increase costs. For example, reducing WIP at your log landing will cost you money if trucks have to wait for each log to be skidded, bucked and loaded.

**4. Unnecessary processing:** This type of waste is performing a process that is not required. This includes any process that adds no value from the customer's perspective. Causes for this waste include:

- Product changes without process changes
- Just-in-case logic
- True customer requirements undefined
- Over processing to accommodate down time
- Lack of communications
- Redundant approvals
- Extra copies/excessive information

*Application:* If you have never been trained to avoid doing the unnecessary, then doing the unnecessary can happen without ever noticing it. For example, why fall a tree that will not be skidded (assuming it is not in the way)? Why skid a tree that will be rejected at the log landing? Why debark a log that will end up being rejected? Why dry a board that is not grade?

**5. Transportation:** Transportation waste occurs when a product is moved unnecessarily. Moving material from one process to the next should be minimized or eliminated. Causes of transportation waste include:

- Poor plant layout
- Poor understanding of the process flow for production
- Large batch sizes, long lead times, and large storage areas

*Application:* Transportation is the timber industries Achilles heel as far as Lean Principles are concerned. From a Lean perspective, moving material does not add value to the product. Every time you move any timber product you are losing money.



Common sense must prevail in all applications of Lean. Timber is going to have to be moved. In most cases, haulers will do a good job of picking the best path to the mill. This sometimes is not the case with operations such as skidding. Therefore, before any harvesting operation is undertaken the company should carefully plot out all skidder paths to reduce distance traveled and minimize impact to the environment.

**6. Unnecessary movement:** Unnecessary movement involves any motion of a worker or a machine that does not add value to the product.

Causes of motion waste include:

- Poor machine/people effectiveness
- Inconsistent work methods
- Unfavorable facility or cell layout
- Poor workplace organization and house keeping
- Extra "busy" movements while waiting

**Application:** The application of standardized working practices goes a long way toward eliminating wasted motion. Remember that wasted motion is any motion that is not directly supporting the adding of value to the timber. This waste is also one of the easiest costs to hide because motion has historically been viewed as a measure of work effort. For example, driving a forklift around the wood lot restacking logs is wasted motion when the logs could have been placed properly to begin with.

**7. Making defective products:** This waste applies to any product that will not be able to bring in a profit or that will require labor to reverse a defect

in order to make a profit. Lean Principles calls for preventing the occurrence of defects instead of finding and repairing defects. Causes of this waste include:

- Weak process control
- Poor quality
- Unbalanced inventory level
- Deficient planned maintenance
- Inadequate education/training/work instructions
- Product design
- Customer needs not understood

**Application:** If there is one place where implementing a Lean philosophy will demonstrate cost reductions in the timber industry it will be in reducing production of a bad product. In the Missouri hardwood industry there is an industrial culture that views low grade lumber as its primary product and grade lumber as only an opportunity product. From the logger to the edger, grade material is not planned for ... it is only captured when the opportunity presents itself. Therefore, a grade log can be poorly bucked generating a below grade log because time is considered more important than quality. In the same way, a grade board coming from the head-saw can be edged into pallet lumber because volume through the edger has a higher priority than quality. In the same way, below grade boards can be sent to the kiln because the grading process was rushed or unskilled labor was utilized. Unlike classical manufacturing where a bad part is a definite loss, producing a bad part in the timber industry often

goes completely unnoticed. This results in a significant loss of value.

**8. Underutilizing people:** This waste is defined as not taking advantage of people's abilities.

Causes of manpower waste include:

- Old guard thinking, politics, the business culture
- Poor hiring practices
- Low or no investment in training
- Low pay, high turnover strategy

**Application:** When we fail to train and cross train our work force we are underutilizing them. We can also see this form of waste if we fail to equip our work force with the proper tools and techniques, or if we fail to give them responsibility and authority. Most important of all is our underutilizing our manpower because we fail to listen to them.

The Lean Transformation process is the elimination or reduction of waste in our company's activities. Nearly every waste in the production and management process can fit into at least one of these categories. Those individuals who understand the concept of Lean will come to view waste as the biggest enemy to business performance. Lean Transformation is an approach that focuses on the elimination of waste in every aspect of a business.

## **TOOLS FOR LEAN TRANSFORMATION**

There is only one approach to Lean implementation that will work. This approach is for you to get the appropriate training, with a long term commitment of assistance, from an expert. It is no different than giving a young man a set of mechanics tools and then telling him to go fix the log-yard fork lift. The biggest toolbox, filled with the best tools, has never fixed anything without a skilled mechanic there to use the tools. It is no different when it comes to implementing Lean Principles. This technical report will show the types of wastes that rob your company of revenue. It will explain to you some of the basic tools that are used to repair your business process and thus eliminate waste. But, it takes training and time to

become skilled in finding waste generating activities and fixing the situation.

There are 15 basic tools that can be used in the transformation process in accordance with the philosophies of Lean. Many of the industrial engineering tools, found in the Lean toolbox have been around for many years. Some of these tools are so complex that entire books have been written about them and their use. Most of these tools, if put to use on an individual basis, will do little to assist your company in its Lean transformation. The real power of these tools is only achieved when they are all used in conjunction with one another under the influence of the Lean philosophy. You might go so far as to say that "These 15 tools are power tools and they will only work when they are plugged into the Lean Philosophy generator!"

**1. Standardized Work** - There can be no continuous improvement where there is no standardization of work between people, material, methods, or equipment. It is a necessary foundation for Lean Manufacturing. The Toyota Production System graphically demonstrated that standardized work is one of the very first activities of small groups working to improve manufacturing processes by implementing Lean. It is a major component of any quality system.



**2. Workplace Organization** - Are work areas neatly organized or do people spend a lot of time searching for things? If you have to look for anything, then there is waste. It takes discipline and procedures to keep it organized and functioning efficiently and effectively.

**3. Visual Controls** - These are simple signals that provide an immediate understanding of a situation or condition. They are efficient, self-regulating, and worker managed to help eliminate waste. They should be designed to relay only the information required, i.e. out of stock, safety requirements and acceptable quality. "Keep it simple". This may be applied affectively with color coded tools, shelves, and parts or lines on the floors/walls to delineate storage, parking, walk ways, work areas, etc.

**4. Layout** - This would mostly support the assignment of work and priorities from technical planning. Most companies make an attempt at engineering production layouts but few do so in conjunction with other improvement tools.

**5. Workforce Development** - How does the business system support teams, cross training, continuous improvement, quality process, participatory decision making, suggestion systems, etc.? How a company manages change can have dramatic impact on the work culture and the motivation levels of its employees.

**6. Batch Size Reduction** - Are there areas where resources (people, equipment, material) are batched and queued that inhibit process lead-time? Can they flow continuously?

**7. Quick Changeover** - What can be done externally to the process (i.e. preparation, obtain/return items, after-process adjustments, moving materials/equipment, maintenance, etc.)?

**8. Point-of-Use Storage** - This can be a great opportunity to improve handling and transporting time. All materials and equipment should be stored where they are used. Kanbans/Supermarkets can be applied to distribution philosophies to support flow and control amounts.

**9. Quality at the Source** - Do things right the first time!! Each person is responsible for making

sure the material they pass to the next function is acceptable. Workers must be given the means and a total quality management system needs to be in place to ensure customer satisfaction.

**10. Pull/Kanban Systems** - Flow of material through the process must be controlled by flow of material from the shipping dock. To do this, control of the movement of raw materials, work in progress, and Maintenance Repair and Operating (MRO) items must take place on the floor.

**11. Cellular Manufacturing** - Cellular manufacturing is a method for arranging process in a sequence that allows single or near single piece flow. Machines and operators are matched and physically located so that each process or sequence of process, requires about the same processing time. While the physical aspects of most sawmill operations may not fall under this concept, the activities could be linked to generate these effects.

**12. Takt Time** - What is the customer's demand rate? How do they measure throughout the work-day? Do they balance work to achieve this rate? How do they react to issues? Takt time is the ration between how much you have to produce and how much time you have to produce it in. For example: the mill wants 6250 board feet of logs per day. This 6250 bft divided by 8 hours is a takt time of about 781 bft per hour.



**13. Total Productive Maintenance** - TPM philosophy is more proactive to ensure all equipment is operating in peak conditions. Carefully planned and controlled expenses need to be measured. Maintenance is everyone's job and is required to support 100% quality and continuous improvement. It should also be scheduled regularly so that it does not interfere with the flow of the process.

**14. Value Stream Mapping** - This tool can critically help a company evaluate their business process and develop a Lean system that will meet/exceed their customer demand rate. The mapping steps start with understanding the current system and issues while working toward addressing these issues often through simple changes. These changes are incorporated into a kaizen event (or continuous improvement plan) to help a company transition from their traditional practices and 'learn to see' the future opportunities.

**15. Teams** - It is impossible to imagine implementation of Lean Principles without teams. The entire Lean process is oriented to business operations being planned and conducted by individuals with a vested stake in the process. A team set-up allows a company to realize the synergistic benefit of multiple capabilities all working toward a common goal.

This should not be considered as a comprehensive set of requirements to apply Lean Principles to timber product operations. These observations were developed in order to synthesize and evaluate the potential application. Further work would be required to develop an actual Lean implementation plan containing preparation, training, and implementation elements.

## **WORKFORCE .... THE KEY TO LEAN SUCCESS**

Transforming to a Lean Business model is transforming to a performance-based process that provides your company with significant competitive advantages.

Your company's new business model will employ a continuous-improvement culture with the goal to seek out and eliminate waste or non-value added activities within the organization. To generate a performance-based continuous-improvement culture requires that considerable emphasis be placed on developing a workforce



dedicated to creating and sustaining a long-term commitment to your companies vision.

You could fill the average living room with books written about workforce development and its impact on your business. Implementation of Lean Principles in no way negates the work that has gone into building methods and techniques for developing your workforce. Implementation of Lean relies on utilization of proven workforce development techniques within a framework, which promotes employee empowerment. To accomplish this, Lean conducts workforce development under a 10 segmented implementation program. The 10 steps are as follows:

### **1. Top Management Commitment to Workforce Development**

- Company ownership must be the driving force
- Company ownership must develop the vision
- The company must dedicate time and resources to workforce development
- A commitment document signed by management is essential

## 2. Share the Wealth

- A timber processing owner adopts "Lean" to make more profits
- Workers are what makes "Lean" work, thus they deserve to make more money as well as the owner
- Takt time is the ration between how much you have to produce and how much time you have to produce it in. For example: the mill wants 6250 board feet of logs per day. This 6250 bft divided by 8 hours is a takt time of about 781 bft per hour.

## 3. Communications

- Develop an internal communications plan to inform the workforce
- Keep the communications plan active
- Communication goes two ways - not just one

## 4. Prepare and motivate people

- Take the time and effort to prepare to market and sell the philosophy of Lean to your workforce
- Spend the time and money to properly train your workforce
- Let the workforce create a common understanding of why Lean is important

## 5. Employee involvement

- Lean only works when your workforce shares in decision making and system development
- Everyone must be trained in Lean
- Everyone must be empowered with Lean principles
- The workforce must eventually develop a vision that the company will follow

## 6. Share information and manage expectations

- Knowledge is only power when it is shared
- Everyone needs information that enables them to generate realistic expectations

## 7. Identify and empower champions, particularly operations managers

- Remove roadblocks (i.e. people, layout, systems)
- Make it both directive yet empowering

## 8. Atmosphere of experimentation

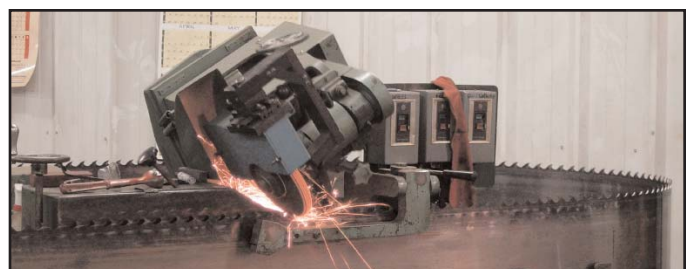
- Tolerating mistakes, patience, etc.
- Willingness to take risks
- There are no stupid ideas
- Remember that: "from wild crazy ideas come some of the most effective and revolutionary cost savings programs!"
- Remember that: "finding one workable idea in 100 unworkable ideas is worth the effort!"

## 9. Install realistic performance measures, evaluation, and reward systems

- Do away with rigid performance goals during implementation
- Measure results and not number activities/events
- Tie improvements, long term, to key macro level performance targets (i.e. inventory turns, quality, delivery, overall cost reductions)

## 10. Allow your workforce to take ownership of what they do

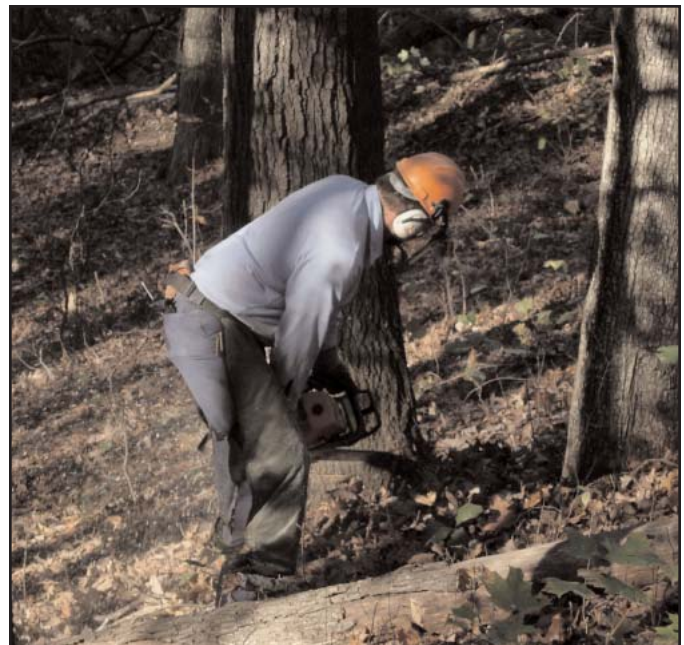
- Each employee needs to feel that they are working for themselves not just for the company
- Each employee must see that the decisions he makes effects his work satisfaction and his paycheck
- Empower ownership through training and personal development



## CONCLUSION

Our study and literature research have revealed that the potential exists for considerable timber value being lost in hardwood operations where antiquated business models and technologies dominate production. This situation is worsened when a company has the perception that success, or perhaps even survival, is totally dependent on increasing production levels. As significant portion of the hardwood timber industry remains locked into the old industrial model, which is driven by a mass-production mentality. There is reason to believe that if the hardwood timber industry can abandon the old methods of mass production and replace them with a process designed to provide the customer with what he wants when he wants it, a new level of Value-Added manufacturing will exist. While Missouri Enterprise is confident that Lean Transformation is the optimum solution to these problems, it is important to point out that care must be taken during the implementation process. Lean will reduce operational costs and improve a companies market position, but only if obstacles are carefully resolved.

One of the most obvious obstacles to implementing Lean in the hardwood industry is an existing culture which is deeply entrenched. The very fact that much of the industry is still working with a 19th century business model is a positive sign that value-added concepts can be made to work, but overcoming the existing cultural obstacle is a very difficult undertaking. When mass production has driven the mill floor for many generations, the idea of reevaluating the market and then developing a Lean production process to meet current and future customer demands can be a daunting challenge. Missouri Enterprise cautions any timber company desiring to capture the benefits of Lean production to first take the time to understand both the national and the world market for hardwood timber products ...from the log to the kiln.



...from the log to the kiln.

A major obstacle in transforming our timber industry along the lines of Lean production is the fact that much of primary processing is highly disconnected. In most cases, logging is an independent operation totally separate from milling and the sawmill is a totally independent operation separated from the kiln and planning operations. It will be very difficult to transform any one of these processing steps without transforming all of the steps. It will be extremely difficult to capture the full cost savings of Lean without bringing all of the primary processes under a single control mechanism. It is also easy to predict that because of the tremendous cost savings to be realized by integrating as much of logging and milling as possible, eventually, large companies could come to dominate the timber industry and much of the milling operation could take place in the forest itself. Under this scenario, as Lean transforms the industry, the kiln will replace the mill as the pivot point for timber operations.

The third challenge that we see in applying Lean Principles to primary processing of hardwoods is the fact that our material flow starts with nature. Most Lean consultants and industrial engineers are used to dealing with processes where the raw material comes from a vendor and its quality is well controlled. But in the timber industry we are dealing with a raw material that is highly variable in type and quality. This natural occurring issue will complicate the Lean Implementation process and, if not properly addressed, it will slow down the transformation process and negatively impact workforce motivation.

Missouri Enterprise is convinced that Lean will eventually be adopted widely in the timber industry. The cost savings are too great for Lean to be ignored. We also believe that this may be a difficult, and perhaps painful process for some, as the timber industry has some unique aspects and Lean transformation must be very carefully executed. For those companies that take the time to understand the national and global markets, clearly define process flow and empower their workforce, Lean Transformation will happen. And, eventually, Lean companies will dominate the industry.

