



## **Lean Manufacturing Practices: Emerging Issues**

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***Abstract:***

*Lean Manufacturing uses less of everything and attains its set objectives by excellent teamwork, communication, and competent use of available resources & continuous Improvement. The present paper is an attempt to study employee's perception towards lean manufacturing systems in gear industry. Many companies who implement Lean do not adequately take advantage of the improvements. Highly successful companies will learn how to market these new benefits and turn them into increased market share. Lean techniques are applicable not only in manufacturing, but also in service-oriented industry and service environment. The present paper aims to study emerging issues in relation to the lean manufacturing practices in organizations.*

***Key words:*** Lean, Manufacturing, Techniques, Organizations, Principles.

### **1.Introduction**

Womack coined the phrase "Lean Manufacturing" so as to encourage its adoption of TPS methods everywhere (for competitors to admit they were borrowing from Toyota was not feasible, nor politically possible; the old "Not Invented Here" syndrome). Unfortunately, most didn't realize that Toyota had borrowed heavily from Henry Ford's principles of the 1930's. Henry Ford's book was a best seller in Japan well past when the existence of Ford's book was already forgotten in North America.

Today Lean Thinking (re-coined again so as to signal that the same techniques can be used in banks, service organizations, hospitals, and all manner of business systems) is being used world-wide in a growing number of organizations. It is applied at the point of contact with customers, as well as back room work. It applies to Engineering & Design offices, as well as traffic flow in urban centres. Toyota suggests that it takes a smart person at least 20 years to complete full training, attitude, knowledge and comprehension of TPS in their work venue. However, the most significant savings can be achieved in the first 9 months. The amount of "low hanging fruit" that is available in most organizations is staggering.

### **2.Review Of Literature**

Womack and Jones (1993) state lean manufacturing requires that not only should technical questions be fully understood, but existing relationships between manufacturing and the other areas of the firm should also be examined in depth, as should other factors external to the firm. Liker and Wu (2000) define lean as a philosophy of manufacturing that focuses on delivering the highest quality product on time and at the lowest cost. Motwani (2003) views that LM implementation requires time, money, energy and fulfill company commitment. Hines, Holweg & Rich (2004) highlight that lean has undergone a significant evolution and development and has attracted more attention to be applied in the service sector. Dennis (2007) says that the foundation of the lean system is stability and standardization. Kosuge, Holm, Modig, & Ahlstrom (2009) explain that lean has its own uniqueness as an initiative for improvement. Wilson (2010) reveals that lean system strives to make one piece at a time; this is true one piece flow.

### **3.Objectives & Research Methodology**

The present paper aims to understand the basic concept of lean manufacturing practices and to study the emerging issues pertaining to lean manufacturing. This paper is based upon review of literature and secondary data collected from various websites, journals, magazines, newspapers and reference books. Literature review has shown prior research work done in this area.

### **4.Advantages Of Lean**

Lean manufacturing not only reduces operational costs but also targets to boost, restore and significantly raise the competitiveness of a company. Several advantages of adopting lean manufacturing principles. The first advantage identified by experts from implementing lean manufacturing techniques and strategies is the reduction of manufacturing time. Thus, lean manufacturing helps companies retain, maintain and significantly increase their earnings, widen their margins and help them generate savings from lower costs. Space is another area where lean manufacturing advantages are clearly and effectively exhibited.

Companies implementing and adhering to lean manufacturing practices significantly boost and increase their manufacturing productivity. The advantages in terms of waste to profit relationships It follows that elimination and reduction of wastes will gradually and efficiently help boost and raise up earnings and profits in companies.

The advantage of that, above all is that, when customer satisfaction is achieved, sales will surely rise. The best way to establish a good relationship with customers is to improve the products and services offered to them. Lean manufacturing would be of great help to achieve a good customer or client relations.

Another advantage brought about by lean manufacturing techniques among various companies and firms adopting it worldwide is streamlined, rationalized or lean structuring of the organization. In lean manufacturing, the cultures are standardized, thus, unfavorable practices and behaviors of both the employees and the management are reduced, if not eliminated.

### **5.Effectiveness In Cost Reduction And Elimination Of Waste**

One of the goals of Lean Manufacturing is to locate waste pragmatically in each process and then eliminate it. It is possible to uncover a very large amount of waste by observing employees, equipment, materials and organization in the actual production line from the

perspectives of the process itself and the actual work involved. Some types of waste are obvious, but others are hidden. Waste never improves value; it only increases cost. The thorough elimination of waste leads to greater employee self-respect and to major cost reductions by preventing unneeded losses.

### **6.Variables affecting Lean Manufacturing Practices**

Lean production is a technique to make the production process more efficient. It has been successfully implemented by many large manufacturers. There are some critical variables that make for success in implementing lean manufacturing practices. A global implementation of lean techniques beyond the manufacturing process facilitates better lean implementation. It is important to have well organized work stations in a manufacturing plant. Work stations cluttered with scrap and workers who are constantly hunting down parts and tools do not promote a lean environment.

A company should guide its workers to organize their work stations. Also, the work load should be balanced so the manufacturing process flows smoothly.

Optimal layout of a manufacturing plant is important. In one vehicle manufacturing factory, researchers added a few sub-assemblies stations to make the flow more efficient. It is found that one work station was slowing the system and realized that dashboard assembly and wiring could be set up in a separate sub-assembly to speed up that workstation and the manufacturing flow. Sometimes, after straightening out one station and moving on to the next, the manufacturer finds that changes to a second work station also have an impact on the first one. Manufacturers implementing lean techniques need to be aware of this interconnection.

Even after manufacturing processes have been straightened out, lean techniques could be used to improve the overall implementation. In one factory, the management found that the more important issues that impeded their flow related to the logistics of their packaging. However, simply having experts on the implementation team does not guarantee success, as every business process is unique in nature. Further, there are several variable factors affecting every such process; these can be, at times, hard to define. Thus it is vital to carry out design risk assessment before actually implementing the lean process.

### **7.Awareness towards Lean**

Lean manufacturing is not about making cuts and squeezing more out of what's left. The lean approach minimizes those activities that do not add to customer value, leaving more time for those that do. Lean allows an organization to cut costs and improve performance. Awareness towards is vital to the organizations that wish to fully understand the advantages available from lean techniques. Much has been written about lean construction and there is a great deal of confusion about the principles.

Awareness towards lean will certainly provide a good understanding of Lean Principles and how waste reduction will improve business performance combined with an understanding of Kaizen and how it can be utilized to ensure successful results. The level of information that is handled with respect to the progress of the improvement project (attainments, difficulties) has a significant influence on the behavior and attitude of the persons that belong to the organization.

### **8.Methodology Of Implementing Lean**

Lean methodology aims to streamline workflow and processes to improve business performance, while adding value for the customer and reducing waste. Lean methods are mostly used to streamline manufacturing processes. These methodologies can help:

- Analyze working processes, flow between processes and methods and timing of delivery of customers.
- Increase efficiency of processes.
- Reduce waste of materials, resources, staff time and downtime.

When approaching this topic from a training perspective, a number of concerns have been identified related to implementing lean techniques. Blanchard & Thacker (2004) stated language is an important element of training. Unfamiliar terminology must be defined prior to beginning any intensive training program. This becomes an interesting problem. According to Liker (1998) the concepts and terms associated with lean enterprise are primarily in the Japanese language. Liker then explains how translation for U.S. firms is highly complicated because many of the terms cannot be precisely translated to the English language.

The implementation of the “Lean” improvement methodologies inside the organization, calls for levels of commitment and involvement (Coffey 2000). Despite this, at the time when companies implement improvement programs, one of the main issues is to obtain

commitment from people in the organization and the necessary involvement with the new challenge. It has been imperative, then, to investigate and go deeper in the reasons and factors that make the implementation of improvements difficult, so as to establish the mechanisms and instances that enhance and permit increasing the scope and effectiveness of the implementation (Hessen 2000). Based on this, another great issue consists in how to achieve that the people in the organization consider the improvement process important and be and feel a vital part of it.

Eight core lean methods are described below:

- Kaizen
- 5S
- Just in time Production
- Total Productive Maintenance (TPM)
- Cellular Manufacturing / One piece Flow Production Systems
- Kanban
- Six Sigma
- Pre Production Planning (3P)

### **8.Principles of the Lean Manufacturing**

Following are the main principles of the lean manufacturing:

- Identify Value
- Map the Value Stream
- Create the Flow
- Establish Pull
- Seek the Perfection

### **9.Lean Training Programme**

Training is an undisputed agent of change for implementing improvements inside an organization and the training workshops generate a greater participation and commitment towards such processes. Lean Manufacturing requires significant training for everyone in the organization. People will normally need training in three areas:

- Team Processes
- Process Design & Process Management

- Task Skills

Since a primary goal of a Lean Culture is to build an empowered workforce, empowering leadership behaviors are crucial. One of the key factors for successful Lean implementation is a complete educational programme. Typically this would consist of Lean Leadership training for Management, Lean Awareness training for all staff and Techniques training for the core Lean team members.

### **10.IT-enabled Lean Technologies**

Selecting the most appropriate lean techniques or tools and the accompanying packaged enterprise software for an individual enterprise has never been that simple. In fact, it is a major exercise for an enterprise to initially identify the most appropriate tools for eliminating different types of waste. For instance, overproduction could be mitigated by improved changeover times and balanced lines, whereas defects and rework could be curbed by improving visual controls, initiating more complete standard operation procedures (SOP) or operation method sheets (OMS), and implementing mistake proofing techniques at the source of error. Furthermore, waste of excessive inventory could be reduced by implementing kanbans and other similar pull systems. With Lean IT, technology can lead the way in providing value across the enterprise, but it is the alignment with business strategy and the proper governance model that will ensure success and achieve measurable results. Forward-thinking organizations are already well along this path.

IT can be used to automate existing process, where the existing manual process put into a system to automate the process. The other area is where IT is a trendsetter, which is, where it comes with new methodology and dictates the process. Many organizations have placed customer relationship management (CRM) systems online as part of their web site. A customer can login and create a trouble ticket online for a support or service request instead of talking to a customer support representative on the telephone. Many organizations are using self-service frequently asked questions (FAQ) sections on their web sites where customers can see if their problem has been faced by other customers, and what the solution was, in those cases.

Business process management systems (BPMS) enable streamline and integrate different software systems that may be involved in a business process. By providing an overall framework for the business process, BPMS systems enable smooth flow of business processes across different departments, functions and backend software systems. The

service-oriented architectures (SOA) technology enables software systems in the same or disparate organizations talk to each other and exchange information automatically, without any human intervention.

### **11. Robotics In Lean**

Robots could be an acceptable automation solution that adds value to Lean Manufacturing System. While small manufacturing systems can be easy to design with limited need for software based validation, larger systems involving multiple robots, tooling fixtures, humans, etc. need to be validated and optimized prior to system build to ensure that the robotic system behaves as predicted.

One tool that is being used heavily in the robotic automation engineering business is robotic simulation software to validate robot reach, robot cycle times, robot motion paths and envelopes, robot positioning within the system, to name a few benefits. Most production lines are designed to be a cooperatively productive and efficient effort between humans, tooling, robots, etc. While it is difficult to ensure strict consistency in humans, robots and machinery can be programmed to be at their optimized best. An efficient automated robotic station ensures that stations ahead of the line are not tied down ensuring better lean performance. Thus, the use of robots in lean manufacturing can save time and materials by simplifying production.

### **12. Barriers To Implement Lean**

To implement lean manufacturing system is not an easy task. For any change in organization to take hold and success, the resistance forces or barriers need to be identified and understood. Failure to assess organizational and individual change readiness may result the management to spend significant time and energy. Dealing with resistance to change requires a lot of risk and hard work. The one major barrier to starting Lean Manufacturing is to do so without top management's total understanding and support. Without this total top management support the skeptics may want to cancel all activities and call it, "Just another program."

### **13. Departments Practicing Lean**

Today, the lean concepts have reached many other industries including healthcare, service providers and even military. The variety of organizations that are practicing lean concepts in them goes to show the universal applicability of lean concepts or lean

thinking. Lean technologies may be unique to the implementation but the lean thinking is universal. In any organization, Lean can be implemented in production, planning, engineering / maintenance, sales, marketing, R and D, store etc.

#### **14. Conclusion**

Successful implementation of any technique largely looms upon various factors. The application also requires coordination and combination of various tools and techniques without which success of LMS may be doubtful. It is the duty of the organizations to recognize and prevent obstacles that may create flaws in successful implementation of LMS. No tools & techniques are flawless. There are certain obstacles in the implementation of LMS. But they can be overcome by successful planning. However, Lean Manufacturing is not just a program, but instead is a continuous, never-ending journey. The three main barriers in non-lean firms are the lack of lean understanding, lack of senior management and middle management attitudes. On the other hand firms which are in-transition towards lean system, most of their barriers are in the lack of lean understanding and employees' attitude. Appropriate communication and training on the concept and basic principles of LM system would give greater level of understanding about the system and encourage motivation and innovation in the work culture and employees attitudes.

**15.Reference**

1. Dennis, P. (2007), *Lean Production Simplified: A plain language guide to the world's most powerful production system*. New York: Productivity Press.
2. Hines, P., Holweg, M. & Rich, N. (2004). Learning to evolve. A review of contemporary lean thinking. *International Journal of Operations & Production Management*.
3. Karlsson, C. and Åhlström, P., (1996), "Assessing changes towards lean production", *International Journal of Operations & Production Management* 16, pp 24-41.
4. Kosuge, R., Holm, M., Modig, N. & Ahlstrom, P. (2009), Adoption of the lean concept at a Toyota car dealer: Identifying the key factors. *Proceedings of 2009 European Operation Management Association (Euroma)*.
5. Liker, J.K. and Wu, Y.C., (2000), "Japanese automakers, US suppliers and supply-chain superiority", *Sloan Management Review*.
6. Motwani, J., (2003), "A business process change framework for examining lean manufacturing: a case study," *Industrial Management & Data System*, 103(5).
7. Wilson, L. (2010), *How To Implement Lean Manufacturing*. New York: McGraw-Hill
8. Womack, J. P., & Jones, D. T. (2003), *Lean Thinking: Banish waste and create wealth in your corporation*. New York: Simon and Schuster Inc. - Revised edition. (1993).