Vol. No. 14 Issue No. 21 *Fortnightly, Free soft copy* **1st November 2023**

How to use Lean to improve and drive safety performance

INTRODUCTION

These days nearly every organization is striving to do more with less, especially given the challenging economy of recent years and uncertain economic climate for future years. Most business executives and operation managers are constantly looking for ways to reduce operating costs while improving efficiency without damaging customer satisfaction and quality. One of the most common ways in which organizations are trying to achieve operational excellence has been through the use of lean methodology and management system that is focused on reducing waste and costs while simultaneously improving speed, quality and customer satisfaction.

Depending on the organization, lean may or may not directly involve safety. If lean does not involve safety, safety tends to both stay by itself and come in after the 'leaning' has been done or becomes part of lean projects during their later phases. If lean does involve safety, it is often in the context of 5S, sometimes referred to as '6S' or '5S+S'. In the first case, those organizations are technically going against lean as they are not practicing and implementing value streams. There should be no question that safety has a part in every aspect of the organization and as such should be included and integrated into lean. In the latter case, although better than not being included in the lean, safety can be perceived as an add-on to the single lean tool. When used this way, the effectiveness and sustainability of safety is limited.

OHS professionals must understand the foundational concepts of lean and common lean tools so that they can apply them to their safety practices and departments. Then, they can utilize lean to embed safety into all areas and value streams of the organization.

WHAT IS LEAN

It is important for the safety professional to have a solid understanding of the lean-what it is, why it is used and it's common tools to bring safety into lean and then use lean to drive and improve safety performance.

The term 'lean' was coined by Toyota's business during the late1980s by a research team headed by Jim Womak at the MIT's International Motor Vehicle Program. The core premise is to maximize customer value while minimizing waste. The lean simply means creating more value for customers with fewer resources. Two pillars of lean are 1) organization's management team's commitment to continuously invest in and respect its people; and 2) promote a culture of relentless continuous improvement. The essence of lean is that each individual employee is given the opportunity to find problems in his/her own way of working, to solve them and make improvements.

FIVE LEAN PRINCIPLES

There are five primary principles or thought processes behind lean:

1) Value: what service or work is being provided, specifically looking from the standpoint of end-customer;

2) Value Stream: All the steps needed to accomplish this work, eliminating whenever possible that step that does not create value;

3) Flow: how we put these steps one after other in a tight sequence so that the product will smoothly flow to the customer;

4) Pull: How we react to real customer demand;

5) Perfection: how we improve this forever (continuous improvement);perfection is reached when perfect value is created with no waste.

WHY LEAN ?

Organizations have turned to lean to help them improve many processes and achieve certain outcomes. Here is a list of some of the expected benefits of lean:

1) improved customer satisfaction;
2) less waste;
3) increased efficiency and reduced cycle times;
4) greater profitability;
5) smoother operations;
6) Just in Time (JIT);
7) Make things simpler and easier;
8) Reduced operations cost;
9) Profit center and increased company health.

COMMON LEAN TOOLS

Many tools are used within lean. The most common one is 5S and as stated in the introduction, safety is typically tied into lean as part of this tool. Other common lean tools include visual management, standard work, value stream (and value stream mapping), plan-do-check-act cycle and pull systems. We will take a brief look at each tool individually as it is used in lean and how it can and should be used to drive and embed safety into the organizational processes and culture. Readers interested in learning more about these tools are invited and encouraged to do so by reading literature about lean, along with reaching out to colleagues who are experienced in lean.

5S

The term 5S is derived from five Japanese words that describe a process to organize a workplace. It is typically summarized to mean “a place for everything and everything in its place.” 5S stands for:

- Sort (eliminate what is not needed);In Japanese, it is called Seiri meaning sort or cleaning or classifying;

- Set (a place for everything and everything in its place);In Japanese, it is called Seiton meaning straighten or simplify or set in order or configure;

- Shine (cleaning and looking for ways to keep it clean); In Japanese, it is called Seiso meaning sweep or shine or scrub or clean and check;

- Standardize (systemize the maintenance of the first three S's);In Japanese, it is called seiketsu meaning standardize or stabilize or conform;

- Sustain (stick to the rules; maintain over time); In Japanese, it is called shitsuke meaning sustain or self-discipline or custom and practice.

When we ask managers and employees their purpose for doing 5S the usual responses are to keep things clean, be able to find what I need, reduce wasted motion, improve safety and be prepared for company tours or inspections. The real purpose of 5S is to identify problems quickly. If something is missing or out of place it is easy to spot in an area that has been treated with 5S.

5S by itself does address safety even when it is not officially added to it. For instance, a work area prior to5S has a number of tools, electrical cords and supplies place here and there, often on the floor. After it has been treated with 5S, everything has its place, and by doing so the fall and trip hazards have been eliminated. As stated earlier, 5S becomes 5S+S or 6S when safety is added to it. Organizations that do so believe that by purposely adding safety as the sixth S that all potential hazards will be considered and addressed every time. Some organizations even add another S (i.e., 7S for security). It is the author's opinion that it is not necessarily wrong to add safety to 5S; however, it is not exactly advantageous to do so. There may be other lean tools that would be more effective at driving and sustaining safety within the organization.

Visual Management

A simple definition of visual management is when anyone can walk into a workplace and visually understand the current situation. Visualization is a good thing, as we all know that seeing things is much easier and quicker to understand compared to reading or hearing. Most lean organizations practice visual management to some degree. Visual management can consist of display boards, Gemba walks (Go See) and 5S (yes, 5S as it typically involves some sort of visual method to delineate where various items are to be placed). Visual management can be used for goal setting and performance tracking, scheduling and production control, idea sharing and team communications. A common example in manufacturing is the display of customer order amount, expected production and actual production. It allows the workers on the line to see how they are doing in relation to what is needed and expected.

Standard Work :

Standardized work is by far one of most powerful tools in lean. However, it is also one of the least used and difficult to achieve buy-in tools. Standard work is essentially the best method as we know today to complete a task or process. It is important to note that standard work is not a large, complex document of work instruction, nor is it a binder hidden in a cabinet covered with dust and perhaps most frustrating to those who have implemented standard; it is not once and done. Improving standard work is a never-ending process. Two well-known examples of

standard work include any visit to McDonald's (everything in regard to food order, preparation and delivery is standardized) and the preflight checklist performed by pilots.

The benefits of standard work include documentation of the current processes; reductions in variability; easier on-boarding of new hires; easier cross training of existing employees; reductions in injuries and errors; and it serves as the baseline for improvement. If no standard for performing a process or a task exists, there can be no way of improving it. The importance of standard work cannot be over emphasized.

Standard work results in:

- consistent customer experience;
- repeatable outcomes;
- ensures quality;
- standard company expectations;
- *Ensures the safety, health and wellness of workers (*if these areas are included in standard work)

Value Stream & Value Stream Mapping:

A value stream is all of the steps needed to accomplish the work. Another way to look at it is tracking the flow of information and materials needed bring products and services to the customer. Value stream provides a method of seeing the whole and the parts at the same time. Value stream is where the focus on waste, identification and elimination is found within lean. The eight wastes of lean are defects, overproduction, waiting, not engaging all, transportation, inventory, motion and extra processing.

Examples of each waste include rework, scrap material, producing too much, time delays, not utilizing employee skills, multiple handling, having too much raw material, excessive reaching and unnecessary processing steps. The eight wastes are used to classify three types of activities within the value stream. These are:

1) value-add activities (VA)—those that help satisfy a customers' need by transforming inputs to outputs the first time;
2) non-value-add activities (NVA)—consumes time and money and doesn't help satisfy customers' need;
3) necessary but non-value-add activities (NNVA)— an activity that consumes time and money and does not help satisfy customers' need but needs to be done (e.g., order entry).

One should note that NVA and NNVA are both considered waste.

The premise is that performance will improve if waste is eliminated. Visually mapping out all of the steps involved in a process makes it easy to see the wasteful steps in the current state and

to determine the desired future state. It is important to point out that a process cannot be mapped until there is an agreement on the process (e.g., standard work).

Plan-Do-Check-Act Cycle:

Lean has its own continuous improvement methodology called the plan-do-check-act (PDCA) cycle. Since relentless continuous improvement is a pillar of lean, it obviously is vital to the success of any lean program. The PDCA cycle can be used in many instances when starting a new improvement project, when developing a new or improved design of a process, product or service, and when implementing any change. The PDCA procedure is pretty straightforward:

- Plan: Recognize an opportunity and plan a change;
- Do: Test the change. Carry it out on a small scale;
- Check: Review the test, analyze the results and identify what you have learned;
- Act: Take action based on what you learned.

If the change did not work, go through the cycle again with a different plan. If it was successful, incorporate what you learned from the test into wider changes, and then the cycle begins again.

The PDCA process can be quick and simple or it can be more involved. “Just do it” is the quick and simple improvement process. It is best used when the solution is known, when there is no reason to wait and when it can be completed within hours with minimal resources. A more thorough improvement process is known as A3 thinking which utilizes an A3 report form (A3 is a piece of paper similar in size to 11-in. x 17-in.). The A3 report is a tool that provides the structure for PDCA management. The A3 report consists of nine boxes (topics) that must be filled out which in the process of doing creates and supports A3 thinking. The nine boxes are: purpose/background (what are we talking about and why?); problem situation (where do things stand now?); goal (what specific outcome is required?); analysis (why does the problem or need exist?); recommendations (what do you propose to do?); plan (how will you implement?); and follow-up (how will you ensure ongoing PDCA?).

Pull Systems:

The last tool is more a principle and outcome of lean processes. In manufacturing, the purpose of a pull system (sometimes called kanban system) is to have a measured amount of materials ready to be pulled by the next step in the process. After the materials are pulled, a signal is sent to the preceding process step to replace what was taken. Pull systems are wanted because that allows the organization to make or provide what is needed when it is needed unlike a push system where resources are provided to the consumer based on forecasts or schedules. Question to consider: Is safety a push or a pull system?

Definition of Lean Success :

The next element to understand is how do organizations define and/or recognize lean success. Lean done successfully can be summarized as follows:

- shortest “end to end” value stream;

- providing customers (internal and external) with exactly what they want when they want it.

The organization has produced the best quality product or service, with the fastest delivery at the appropriate price every time (with little to no waste) while utilizing the least resources, all while generating highest long-term economic vadelighted customers, 100% of engaged employees and value to the company. One company the author worked with stated that it would know its lean journey was successful if it had 100% of delighted customers and 100% of engaged employees and100% confident shareholders. the Visually mapping out all of the steps involved in a process makes it easy to see the wasteful steps in the current state and to determine the desired future state.

What About Safety?

By now you may be asking yourself, "Where is safety in all of this?" This is supposed to be an article about using lean to drive and improve safety, but safety has hardly been mentioned. You would be correct. I purposely have left out safety until now because as a safety professional you must read, see and hear about lean from an executive and operations point of view. In their eyes, lean is not about safety. Lean to them is a revenue generating, cost reducing and customer satisfying means to an end. Yes, they want safe and healthy employees but in their minds' there's a big chasm between safety and lean. It is the OSH professional's job to break down those stereotypes, remove the chasm and integrate the two.

A New Business Improvement System/Strategy

Safety professionals know all too well that the organization is not built around the safety department. Other priorities exist; the number one priority is making a profit so that the company can stay in business and employ people who they need to keep safe. Lean is one business methodology organizations use to better themselves. Another common improvement methodology is Six Sigma. Both focus on continuous improvement but from different angles; however, both also have strengths and weaknesses. This is why it is necessary to bring QDCS into all conversations.

Now let's look at safety—are there safety methodologies? Safety in and of itself is a type of methodology and so, too, is ergonomics, as by definition, ergonomics focuses on optimizing human well-being and system performance. We propose a new combined, holistic business strategy called "Do More With L.E.S.S." which stands for lean, ergonomics, Six Sigma, safety (and systems thinking). It takes four to five potentially separate siloes and unites them in one unified approach and way of thinking. A single united approach optimizes the strengths, effectiveness and sustainability of the approach. Take for instance a rope. A rope made up of a single strand is rather weak and has obvious limitations, but when multiple strands are braided together into a single, united rope the strength multiplies and the weakness nearly disappears.

How to Start :

Chances are the executive and management team will not perceive the direct linkage of lean and safety (or L.E.S.S.), nor will they initially appreciate the power, effectiveness and sustainability this approach will have on operations. So where and how do you start? Begin to use lean in your safety initiatives and projects to drive and improve safety success. This requires a change in mind-set and a little out-of-the box thinking and go beyond the traditional role of safety in lean (e.g., 5S + safety). Overtime the goal should be to transform those safety

only projects and initiatives into project and initiatives to improve the organization—no labels required.

Step 1—Change the Conversation:

The first and easiest thing to do is to change your conversation to match the lean conversation. Four words play an integral part of lean that have not yet been mentioned— quality, delivery, cost and safety(QDCS). Oftentimes, lean projects and conversations focus heavily on the QDC and little on the S. Safety professionals can begin to make inroads and start changing the mind-set of others by including QDCS in safety initiatives. Of course, conversations already include safety and the related costs to make whatever safety improvement is discussed. However, how many times have you made it a point to mention how and why this safety project will affect quality (reduce errors/defects) and delivery (delivery of products or services, customer satisfaction)? Now your safety conversations will be taking on the sound and content of what is typical for operational conversations. I would also recommend that you include QDCS in your reports and e-mails. Even if safety is valued and a priority in your company, safety compared to operational issues is probably still a push rather than a pull. This is due in most part because safety is, for the most part, regulation and compliance. Standards are needed; however, they produce the perception of safety as compliance issue, which is generally negative. It also equates safety as cost with time attached to it. This is not to say that it is a losing battle. Think about all of the quality regulations such as ISO standards. There are a bunch of time and money involved in meeting those standards as well—it is just that the executive teams and managers see quality as an investment since it leads to revenue and profit whereas they tend to see safety regulations as a cost. It is up to OSH professionals to open their eyes that it is really the same thing. This is why it is necessary to bring QDCS into all conversations.

Step 2—Use the Tools:

We have already explained each of the tools and how they are used in lean. Now we will explore how to use the same tools in safety.

Standard work.

The first standard work recommendation was mentioned previously—including QDCS in every conversation, project and strategic initiative. From there, use standard work to embed safety into all jobs and tasks. For example, a CNC machine operator follows standard work for operating the machine as well as for part changeovers. The standard work lists step of the process that should be followed. Adding safety processes and/or considerations into the standard work will keep safety first in workers' minds and ensure that it is not overlooked. The intent of embedding safety into standard work is to avoid the common pitfalls that occur when workers are asked to be safe and do their job, or when asked to use lean and do their job. We want to avoid the worker saying "I wish I could just do my job," and instead have them say, "I do my job—period." One caution must be considered with standard work. Through human factors studies we know that the likelihood of mind wandering, errors and/or incidents increases when activities become routine. Although standard work is a great tool for making sure the same thing is done each time, by default it is also a great tool for creating routines where the brain can shut down and not think. With this in mind, introduce some type of variation into the standard work every so often to minimize the potential hazards produced by routine.

Visual management.

"Out of sight, out of mind" is true for some aspects of an organization, safety being one of those. The safety department should utilize visual management boards as a method of tracking improvement projects, safety incident investigations and safety metrics. Show what is being done, improvements, safety project status, and if a project is held up (e.g., waiting for approvals) visually communicate this by showing red on the board, which means it is stopped. Likewise, if your safety metrics are meeting goals, then show green.

Value stream and value stream mapping.

Map out current safety processes and see how they intersect and interact not only with other departments but specifically across entire value stream(s). Like safety, most transcend many departments and sites. Then, evaluate for your current safety processes for waste. Look for what is value added and what is not, and base improvements on reducing waste. Also, do your mapped safety processes (reality) match your policies? Sometimes safety policies are just that—words on paper that are not practiced. If this is the case, which one is correct (policy or reality), what should be done so they match? At this point, the future state of safety can be mapped out (i.e. how safety should operate). You may even want to map out two future states. The first future state assumes your company is not aligned in value streams so you are improving the safety processes as much as you can in the current structure. The second future state would map safety using a value stream approach. In this map you could present how much better (QDCS) it would be if there was a systems and integrated approach to safety than departmentalized. Another way value stream mapping can be used is to map out the risks (i.e.. visual the risk management system). Mapping is very useful for risk analysis. It can also be used to show how risk and occurrence in one area can/will affect another area within value streams and/or within departments. It also shows how much risk (i.e., waste) is in it. Then everyone can see what should change to reduce the risk and agree on what the future (reduced risk) state looks like. The key here is to look at risk across the entire value stream, not just within one site or department.

PDCA.

The PDCA cycle is used to instill the mindset of continuous improvement. Safety professionals should always be striving to make improvements. Continuous improvement should be practiced within your safety department and outside of it (i.e., value streams).

Step 3—Act

The last step is get everyone on board. Getting those buy-ins from the top-down is key for safety and lean (or all 4 L.E.S.S. methodologies) to become one. What is required to achieve buy-in? It comes down to the what's-in-it-for-me (WIIFM) principle. Below is a list of buy-ins needed and the WIIFM that must be supplied.

- Executive team buy-in = QDCS ?
- Quality team buy-in = prove safety impacts quality
- Process excellence team buy-in = prove process excellence will be limited without including safety

- Lean team buy-in = prove safety improves lean •Safety team buy-in = prove lean improves safety

- Frontline supervisors' buy-in = prove it is not just one more thing to do on top of my job, just another fad

- Frontline employees' buy-in = ditto

Conclusion:

Safety professionals must fully understand lean to successfully use lean to improve and drive safety success. There are many benefits to safety by using lean tools and incorporating lean language into all safety conversations, projects and initiatives. A unified, singular approach and mind-set to improve business performance by combining lean and safety, along with ergonomics and Six Sigma is recommended as the next level of business improvement systems. The end goal of all this is for safety to be pulled instead of pushed.

Published by : D. L. Shah Trust, **Room No. 16, 1st Floor, Gool Mansion,** **Homji Street, Mumbai 400 001** **email: dlshahtrust@yahoo.co.in** **Ph: 022-22672041** **Subscription: Free on request** **(soft copy only)**	**Edited by : Hari K Taneja, Trustee,** **D. L. Shah Trust** **email: dlshahtrust@gmail.com** **Phone: 022-2309 6529** **Subscription: Free on request** **(soft copy only)**