

LEAN LEADERSHIP IN CONSTRUCTION

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ABSTRACT

Lean leadership is the missing link between theoretical solutions and application in practice. This is the difference between superficial attempts at implementing Lean, where the tools and techniques are evident, but the behaviors haven't changed, and the results are disappointing or not sustained beyond a few brief weeks of enthusiasm.

The key to understanding how to implement Lean successfully is to realize that Lean leadership is an integral part of the Toyota Production System (TPS), not an afterthought. The principles of Lean leadership are summarized in construction, which bring the 'Lean toolbox' to life and realize the benefits predicted by the academic models. The principles are then developed into practical behaviors that can be demonstrated, understood and replicated using rapid learning techniques, with particular focus on team leadership.

The critical success factor for accelerating the take up of Lean construction is contractor leadership. The reason why the contractor's role is key in leading the other stakeholders in the value stream is examined, and comparisons are made to leadership in the TPS.

Contractors have many opportunities to embark on the Lean journey, yet the claimed benefits often lack credibility. This often leads to the danger that a "Lean" façade is bolted onto their existing operations to attempt to convince their demanding clients that they are forward thinking organizations, and that their apparent skills in Lean will earn them another "tick in the box". This paper outlines the practical benefits of embracing Lean to fundamentally change the construction value stream, the contractor's business, to astonish their clients, and to deliver lasting tangible benefits.

KEY WORDS

Lean leadership behavior, Vision, Change management, Human centered focus, Process confirmation.

INTRODUCTION

There is a plethora of research and case studies on why Lean is applicable to construction. There is a good level of understanding in the industry of Lean tools, techniques and terminology. There are some high profile success stories. Yet has Lean really made the impact on construction that was promised? Has it changed the culture and behavior of the industry? Would the claimed benefits have been realized without Lean? Are partnerships, integrated development teams and excellence in project planning really Lean or just good modern practice?

In the housing industry, Lean often seems to mean big scale repetitive projects or is confused

with offsite-manufacture (on-site=bad, factory=good seems to be the mantra of a surprising number of construction professionals). This may be because there is no commonly agreed benchmark as there is in manufacturing (Toyota), and thus there is no clarity as to what Lean construction really means.

This paper suggests that those implementing Lean in construction should not be overwhelmed with the toolbox of Lean tools and techniques, but should focus on the leadership behaviors which are crucial for Lean to progress beyond limited pilot studies, to make a real impact on construction organizations and the wider construction industry.

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WHERE TO START?

One approach to start to answer this question would be to consider the definitions of “Lean” and “leadership”. Considering the audience for this paper, this is not dwelled on, but for completeness, some key thoughts on characterizing these terms are outlined below.

LEAN

The origin of the term is considered to be from the seminal textbook *The Machine that Changed the World*. Researcher John Krafcik, working on the International Motor Vehicle Program, studying the differences between the Japanese and US motor industries, commented that Toyota were Lean because:

“half the human effort in the factory, half the manufacturing space, half the investment in tools, half the engineering hours to develop a new product in half the time. Also, it requires keeping far less than half the needed inventory on site, results in many fewer defects, and produces a greater and ever growing variety of products.” (Womack, Jones and Roos, 1990)

A more general interpretation of Lean is:

“The relentless elimination of waste in every area of operations with the aim of reducing inventory, cycle times and costs—so that higher quality goods and services can be provided in the most efficient, effective and responsive manner possible”.

LEADERSHIP

Trying to define “leadership” is an industry in itself, with a seemingly never-ending quantity of papers and books offering insights, sometimes new and often summaries of existing work. Just one definition is included below which has been used successfully in developing Lean leadership skills:

“Leadership is the capacity to influence others through a dynamic, reciprocal covenant aimed toward identifying and accomplishing collective purposes”
(Parisi-Carew, 2000)

LEAN LEADERSHIP

There is a growing realization of the importance of leadership in Lean, but studies tend to either be too theoretical or simply “truisms” or reiterating common sense. This paper attempts to offer some original consideration to what Lean leadership is and why it is important for construction.

THE PROBLEM

It is difficult to agree what Lean and leadership are. It is often easier to agree what they are not. The above definitions serve some purpose, but there are still wildly differing interpretations of what application of Lean leadership means in practice. For example some proponents of Lean state that it’s common sense or best practice, others state that it is inherently counter-intuitive and this is why Toyota and other leading proponents of Lean remain so confident that the traditional West will never understand:

“We are going to win and the industrial West is going to lose out: there’s nothing much you can do about it, because the reasons for your failure are within yourselves.

Your firms are built on the Taylor model; even worse, so are your heads. With your bosses doing the thinking while the workers wield the screwdrivers, you’re convinced deep down that this is the right way to run a business.

For you, the essence of management is getting the ideas out of the heads of bosses and into the hands of labor.

We are beyond the Taylor model. Business, we know, is now so complex and difficult, the survival of firms so hazardous in an environment increasingly unpredictable, competitive, and fraught with danger that their continued existence depends on the day-to-day mobilization of every ounce of intelligence.
(Konosuke Matsushita, 1979)

More than a quarter of a century later, there still seems to be confusion in the West. Some interpreted Matsushita’s message (and other similar ones) and invested in small group activity such as QC circles, veering away from the Taylor model to “empowerment”. This had limited success in manufacturing, indeed Liker states that empowerment programmes “did a great deal of harm to organizations in the 1980s and 1990s (Liker 2004). Since the early 1990s, since the advent of the term “Lean”, manufacturing seems to have forgotten the debate on human motivation, and has focused on techniques, where the emphasis has been on deploying new methods, rather than understanding how work is organized and led. In both manufacturing and construction, some see 5S, floor painting and Visual Displays as being Lean, and others see it as meaning reduce inventory through developing supply chain partnerships. Others claim that Lean is a toolbox, and demonstrate proficiency in an exhaustive range of tools and techniques from Quick Changeover to Value Stream Mapping, or from Policy Deployment to standardization. And then there is Six

Sigma that apparently doubles the size of the toolbox, and of course makes consultants and experts even more awe-inspiring as practitioners can't hope to understand these tools and techniques without demanding training courses, which of course these experts can provide...

Few understand what Matsushita is meaning. It is so much more than technical tools and techniques, Lean is a profoundly different way to think and to behave, and is counter-intuitive to the western-mindset. Liker explains the Toyota's approach using the "4 P" model:

Table 1: "4 P Model" (Derived from Liker 2004).

"P"	Theme
Problem Solving	Continuous Improvement and Learning
People and Partners	Respect, Challenge and Grow Them
Process	Eliminate Waste
Philosophy	Long—Term Thinking

Clearly the tools and techniques, and the focus on waste elimination are only one of the "Four P's": Process.

This focus on the process aspects of Lean is what I call toolbox Lean. It is evident all around us. Processes in offices and sites have been mapped to death, partnership contracting is the norm, 5S events are run to demonstrate how much clutter can be removed from the workplace, case studies are published, best practice is shared etc, yet seldom do we see a change in behavior, and thus often we find that the results of these well intentioned activities are little more than fads or at best initiatives, and the results are disappointing and non sustainable.

Toolbox Lean is obvious to see once you know what to look for. The signs are a handful of advocates, often full of enthusiasm, and often some impressive and pragmatic implementation at the workplace, usually demonstrating improvements in space, lead-time, defects, and safety. The participants who have been involved in the implementation are also usually positive, yet the acid test is to return a few months later and confirm if this had been sustained and the scope of implementation has widened. The cases of successful sustainment are unfortunately limited. What is being observed is in effect a 21st century Hawthorne Experiment.

Real Lean is not obvious. Indeed it can be disappointing at first sight. This used to often occur when western companies traveled to Japan (and it probably still happens today)—the worksites could be disappointing—the equipment would be

old, the workers would be working slowly, not all of the toolbox techniques were evident...

What is difficult to see at first glance is the missing link between toolbox Lean and real Lean—leadership.

LEADERSHIP AND THE TOYOTA PRODUCTION SYSTEM

The origins of Lean are the Toyota Production System (TPS). Leadership is different in TPS, in terms of what leaders think, say and do. Starting with thinking, consider the quote below:

"The Toyota Production System should actually be called The Thinking Production System. In essence to truly implement Lean the company has to learn to think differently. To be successful everyone must engage in thinking for the company all the time."

(Terayuki Minoura, 2000)

Leadership is of course fundamental for engaging this different approach in thinking. In this context, leaders are not necessarily top and senior management. Leaders are employees with influence on the work, at whatever level of seniority and responsibility. Of course many leaders are both senior and have high levels of responsibility, but leaders in the work process may be workers' representatives, or simply employees who are trusted and respected, and are leaders because they inspire others to follow. Now as osmosis is not a common skill, the leaders can only influence their followers by words or actions. These are summarized as Lean leadership behaviors.

These behaviors have been distilled by an expert in the Toyota Production System, Mike Denison who held a number of senior positions including Group Leader of the Deeside Plant Machine Shop and TPS / Member Development Training Coordinator. However they are relevant for Lean leadership in any environment, from

Table 2: Nine Lean Leadership Behaviors (Denison 1999)

Ref	Behavior
1	Teaches and engages workgroups
2	Respect for people
3	Process Focused
4	Support and Recognition
5	Lead by example
6	Deploy policy and objectives
7	Commitment to standards
8	Long term vision and principles
9	Support the change process

building site to office, or from warehouse to factory. To see this, they are broken down into more detail considering the role of the contractor in Lean construction.

WHY FOCUS ON THE CONTRACTOR?

There is a multitude of stakeholders in a typical construction project including client, funding provider, contractor, sub-contractors, consultants, architects, surveyors, engineers, suppliers, users/residents etc. In such a complex environment, effective Lean always focuses on the value stream and the “Gemba” (where the work is done)². In the development process, once the design is agreed, the majority of the value adding occurs on the site, and is completed by the contractor, and their sub-contractors. Traditionally the stakeholder organization may be drawn as a pyramid, similar to an organization chart, with the director at the top, and the manual workers at the base. These manual workers can be highly skilled, and are sometimes very specialized. The principle is that directions given from the top, in a command and control manner. In a Lean construction philosophy, the pyramid is inverted so that the manual workers are at the top and are supported by the rest of the stakeholders. Note that the role of team leader has been introduced, as this is the role that will be the focus of Lean leadership behaviors. They have the challenging role of being between the reality at the cold, wet and windy site, convincing their team members that Lean is not just another management fad that the director has read about in an aircraft magazine. Being an effective leader at this level is the critical success factor of effective Lean construction.

CONTRACTOR LEAN LEADERSHIP BEHAVIORS

The nine Lean leadership behaviors are considered in more detail below, with focus on leadership on the construction site. These have been drawn from the author’s and his colleagues many years experience in Lean manufacturing, and recent study and application in construction which commenced in 2003.

1. TEACHES AND ENGAGES WORKGROUPS

The leaders engage with the site workgroups through systematic habitual site visits, and audits of the process. They coach and encourage the

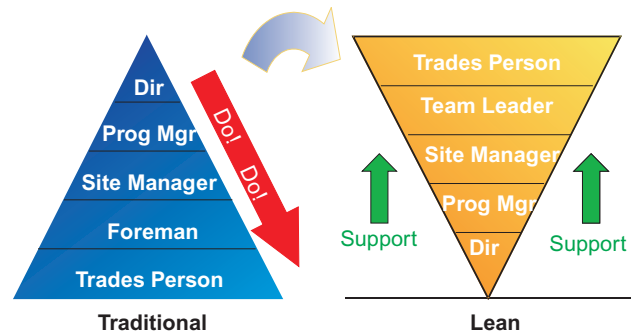


Figure 1: Human Centered Behavior
(Based on Choppin, 1997)

members of the workgroups to challenge and be creative in their efforts to improve the process. This encourages the workgroups to learn through experience, and motivates through the visible commitment and support of the leaders in focusing on the workgroups and their site processes. Additionally the leaders communicate project and site information, tailoring it to be specific to members’ needs.

2. RESPECT FOR PEOPLE

The ethos that others are treated, as you yourself would expect to be treated is practiced and evident. For example, the leaders recognize and demonstrate that communication is a two way process, giving people issues a priority over process and commercial issues. This fosters an atmosphere of mutual trust and respect. The leaders should be prepared to encourage and manage a diversity of opinions. A simple method to consider is for leaders put a “10” on people’s heads (visualize that they are the “best”, treat them accordingly and you will be surprised how they react...).

3. PROCESS FOCUS

When problems are investigated, tackle the process first not the people. Do not blame. Foster a deep understanding of the problem, by leading effective root cause analysis. Improvements should be on the process and system. Live to the principle that it’s OK to make mistakes as long as we learn from them.

“Proposed changes should always be structured as experiments” (Spear, 2004)

This can be difficult in a construction environment when relationships are often temporary, and contractual conditions can be demanding—this

² Some definitions of lean focus only on the elimination of waste. Not only is this a limited perspective (see definitions at the start of this paper), but waste cannot be eliminated unless value is clearly understood from a customer perspective.

must be understood by leaders at the most senior level when these relationships and contracts are established.

4. SUPPORT AND RECOGNITION

Encourage the use of a clear escalation process (Andon) to inspire confidence that the work is valued and that the leaders care that it is managed effectively. The escalation process is core to Jidoka (Built in Quality), one of the two pillars of TPS. The core principle is to stop the process when an abnormality is identified, and escalate to the workgroup leader that support is rapidly required to prevent it being passed down the process towards the customer. Problems are truly viewed as opportunities, and the work group members are recognized and supported to find and resolve them. In a non-continuous process such as construction, be available for the workgroup when problems and difficulties are likely to occur (e.g. the start of the day). Likewise ask for support when you as a leader need it, and be prepared to help other teams when necessary.

As a leader, direct all support by yourself and others, towards the point where value is added. Recognize individual and team efforts and achievements. Use training to support and develop your team.

5. LEADERSHIP COMMITMENT—LEAD BY EXAMPLE

Practice “Go, Look, See” philosophy—go to the point of cause of the problem as quickly as possible, whilst the evidence is fresh. Indeed if you commit to spend a significant amount of time at the work site, you may see the problem occur.

“There is no substitution for direct observation” (Spear, 2004)

Be prepared to do and practically demonstrate what you expect of others, yet admit own mistakes to inspire respect and encourage others to admit theirs. Use integrity, openness and honesty about abilities and knowledge. It may sound simple, but do what you say you’ll do.

6. DEPLOY POLICY AND OBJECTIVES

Use and follow master schedules. Keep them visible, and easy to interpret at the worksite, rather than remote in the site office, on a computer, or in your back pocket. A master schedule should be just that—only the percentage completion should be updated, not the start/finish times. To be useful it must be reviewed frequently and regularly probably at least every day.

Guide and lead your people to understand their worth and their ideas to meet the wider program objectives.

“Leadership is no longer a matter of motivating those who have subordinated their interest, rather it is working with them to reveal a new future” (Howell, Macomber, Koskela, Draper, 2004)

7. COMMITMENT TO STANDARDS

Understand and use standards to define normal and abnormal conditions. Develop clear, user friendly, visual controls at all levels to help monitor and improve standards.

Maintain personal discipline, direct and coach others to keep within standards, and procedures. Always react to off standard and off target situations with immediate investigation and counter-measure. Don’t allow short cuts, and tackle reasons why a standard is overlooked or neglected.

8. UNDERSTAND LEAN VISION AND PRINCIPLES

Promote Lean concepts and principles by actions and decisions. In particular, promote visualization of information and processes. Continually challenge the current way (lower the water level). Always relate and confirm activities to the achievement of a clearly defined program and organization vision. Guide others to understanding and working towards a clearly defined vision. Review the team’s work for its value and outcomes towards the Vision

9. SUPPORT THE CHANGE PROCESS

Understand and know what the changes are, and take an active part in the change, demonstrating positive change actions yourself. Indeed where possible, lead the change, identify and remove roadblocks, checking all the factors for change are in place. Stimulate others and inspire actions towards the future state vision. Identify own inhibitors, be honest and communicate to help evolve methods to overcome lack of knowledge and confidence

Work one-step at a time, check, confirm and then move on (Plan Do Check Act)

“Workers and Managers should experiment as frequently as possible” (Spear, 2004).

FROM PRINCIPLES TO REALITY

There is no recognized “magic recipe” to transform from traditional leadership / supervision / management to Lean management. Yet there are

apparently thousands of books and papers published on leadership every year, and more consultants than you could possibly imagine who will offer to assist. As Brandt (2005) suggests “The cultural perception of lean mutated from an actual improvement process into a fashion accessory for senior executives.”

Recognizing that of course both academia and consultants tend to try to demonstrate “thought leadership” through developing new insights and approaches, it is not surprising that much advice on lean and leadership is either at best confusing or at worst contradictory. The author thus suggests that a pragmatic approach is taken in developing lean leadership behavior:

- Harness an early adoption of some of the Lean tools, gain some early and visible success and then rescue it from tending to become yet another case of toolbox Lean, by developing practice in the nine Lean leadership behaviors.
- Work with the leaders and managers who have influence in the workplace, and develop a vision for their Lean transformation.
- Translate this vision into some tangible measures that measure the effectiveness of the work.
- Develop and **use** a Master Schedule³ to plan and manage the activity required to deliver the change.
- Develop work standards and visualize the work through Visual Management
- Develop a “Day in the Life” typical day of a Team Leader and Site Manager—use this to develop a consistent structure into these key roles.
- Develop work confirmation system—a means to teach and engage, focus on the process, and demonstrate commitment to standards.
- Develop a self-assessment framework for each of the nine Lean leadership behaviors, and then use it to develop personal activity plans for each leader and manager. Re-assess on a regular basis.

This suggested approach, makes no excuses for using some of the “tools”, in particular visual management and standardization, but the emphasis should be on using them to both develop the processes **and** the leadership behavior.

Finally, whilst this Lean leadership transformation is in effect a “change program”, it is worth

concluding with the thought that there is “no such thing as organizational change, only personal change” (source un-attributed). Lean Leadership in construction as in any other industry is dependent on the transformation and behavior of individuals. Training courses, culture change initiatives, rapid improvement teams etc will have only limited impact unless Lean leadership is developed on a one-to-one basis. However the good news is that behavior can change very rapidly, and given the right support, the rest of the stakeholders will begin to mimic the Lean leadership behavior surprisingly quickly.

CONCLUSIONS

Lean has the potential to radically improve the construction industry, yet its impact has often been limited. This paper stresses the importance of Lean leadership in making larger and broader impact in construction.

Recognizing the difficulties of defining Lean and leadership, never mind Lean leadership, the author returns to the origins of Lean, the Toyota Production System, and explains why “real” Lean is so much more than a toolbox of techniques. The emphasis in the Toyota Production System on human centered work is explained in the context of the critical role of the contractor in leading Lean construction.

The contractor role is used to illustrate how to progress beyond “toolbox Lean”, using a framework for developing Lean leadership called the Nine Lean Leadership Behaviors.

Finally, a pragmatic approach is summarized on how to turn these principles into meaningful action. The author’s experience in that this can be surprisingly rapid, and that the personal changes in leaders’ behaviors can both be infectious and astonishing. True Lean leadership.

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REFERENCES

Brandt, John R., Hooked on Lean, *Industry Week*, 2005

3 The use of the term Master Schedule should not be confused with a Gantt Chart. Just as Lean leadership is more than the tools and techniques, Master Scheduling in a lean environment is more than the timing plan. It must consider how the team is engaged in developing it, how it is communicated, how it is reviewed in a regular and consistent manner, how problems are “escalated”, and how recognition is given for success. In other words just as Lean tools are of limited benefit without Lean leadership, a Change Program mapped on a Gantt Chart is not a guarantee of success without effective management and leadership, ideally Lean leadership.

- Choppin, J., *Quality Through People*, Rushmere Wynne, Bedford (UK), 1997
- Howell, Gregory A., Macomber, Hal, Koskela, Lauri, Draper, John, Leadership and Project Management: Time for a shift from Fayol to Flores, *Proceedings of the 12th Annual Meeting of the International group for Lean Construction*, Helsingør Denmark, pp. 22–29, August 2004
- Konosuke Matsushita, Matsushita Electric Industrial Company, Ltd., Japan, 1979 (translated)
- Liker, Jeffrey K., (2004) *The Toyota Way*, McGraw-Hill, p13 and p146
- Parisi-Carew, (2000) Carew, Finch, Stoner *Office of the Future* Dec 2000
- Spear, Steven J., Learning to Lead at Toyota 1 sspear@hbs.edu, *Harvard Business Review*; May2004, **82**(5), 78
- Terayuki Minoura, President, Toyota Motor Manufacturing, Detroit Auto Show, 2000
- Womack, James P, Jones, Daniel T. & Roos, Daniel. (1990) *The Machine That Changed The World*. New York. Harper Perennial; p 13.