

BUILDING A LEAN CULTURE

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Abstract: To accelerate understanding and implementation of Lean throughout a large general contracting company, the Lean leadership group, with the support of management at all levels, shifted from training employees on tools and solutions, to educating them about Lean principles as an overarching way to run their projects. This industry paper describes the work that the company has and is currently doing to train professionals in all its business units. It explains why and how the effort started, the feedback received from participants who have attended a new course in Lean leadership, and the plans to expand this program to increase and sustain Lean implementation. The paper provides a contribution to the literature on Lean implementation and change management and underscores the importance of creating a culture based on solid understanding of the Lean vocabulary, principles, and goals to create a critical mass across projects.

Keywords: Lean leadership, Lean education, Lean culture.

1 INTRODUCTION

This industry paper describes a General Contractor's effort to establish a Lean culture, which enables their project teams to deliver greater value to customers. The goal is to share what was learned from this experience and benefit from the feedback that will result from discussing what is being presented within the IGLC community and beyond.

2 LEAN IMPLEMENTATION IN CONSTRUCTION COMPANIES

In their roadmap for Lean implementation Ballard et al. (2007, p. xi-xii) suggest several actions for organizations to implement Lean in capital projects: select partners who can adopt lean project delivery, structure project organization to engage downstream partners in upstream processes and vice-versa; encourage thoughtful experimentation and celebrate breakdowns; build quality and safety through the work of those designing and making; amongst others. Along these lines, another example found in the literature includes Izquierdo et al. (2011)'s work, which proposed the development and implementation of a 'Basic Management Functions Workshop' with the goal of training a company's employees and aligning them towards a way of doing business using Lean principles.

A common thread in the literature about Lean implementation is the idea of aligning those working for a company, and its extended network of partners, toward common goals and purposes that matter for their clients (value), as well as creating a critical mass of stakeholders who understand Lean principles. Alves et al. (2012) suggested that

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developing professional curriculums that teach Lean and its related vocabulary is an important step to creating a platform that to consistently communicate overarching Lean goals and principles. Similarly, the use of examples grounded in practice, metaphors (e.g., lower the river to reveal the rocks), and simulations are also important ways to help practitioners understand how they can think and apply Lean practices in their daily work. The case presented here reflects many of these recommendations and builds on previous experiences and lessons learned about implementing Lean. More importantly, it recognizes the need to explain Lean within the context of company's business environment and culture so that people can plan and act to make value flow on their projects.

3 CHANGING DIRECTION

This company's project teams have used Lean principles well on specific large and complex projects over the years. One such example was the case described in Britt et al. (2014) when the company's project leaders led the creation of a high-performance team based on collaboration and alignment, shifted focus from tools to outcomes, and enabled rapid problem solving.

The company's philosophy embraces the inverted pyramid for leadership to manage complexity and the risk that it spawns by enabling people executing projects closest to problems to solve them. Attention is focused on developing people above processes and procedures, which has made many leaders suspicious of the heavy emphasis Lean Construction places on processes and tools, and the discipline required to apply them consistently. The company culture is one of openness and accessibility versus authority and hierarchy. The company works without a CEO, and relies on a Management Committee, which helps business leaders in different offices to make decisions (Feintzeig, 2016), exemplifying shared governance and collaboration. It was in this environment that the informal Lean leadership group started a new training program aiming at shifting the focus of previous efforts from tools to Lean thinking, leadership and problem-solving.

3.1 Phase 1 – Testing a Different Approach

Initially, the Lean champions recognized that their focus on processes and tools was not sufficient. They decided to shift attention to teaching the fundamental ideas of Lean, i.e., focusing on respect for people and continuous improvement, value stream thinking, flow, problem-solving, and Lean leadership and management. Two of the Lean leaders, enrolled in 8-week facilitated online course on Lean Leadership offered by a Lean logistics company (<https://leancor.com>) and reported that they found it quite rewarding. They saw that being able to study each week's material online over the 8-week course gave participants the opportunity to think about the concepts, put them into practice, and share stories during the weekly conference call.

The course did and continues to blend weekly online training sessions with mentoring/coaching sessions, and requires participants to read the book, *People: A leader's day-to-day guide to building, managing, and sustaining lean organizations* ("People book") by Gran et al. (2012). Learning comes through coaching by the class facilitator in applying Lean concepts during the weekly conference call.

The Lean group decided to sponsor a private course for themselves and other like-minded company managers as an experiment. They launched it with an in-person workshop with people from two other business units attending remotely. Business unit

leaders were also invited to participate. It became clear during workshop, led by an experienced facilitator from the company that had developed the material, that if the 8-week course was to succeed, people who understood how to apply Lean concepts to managing construction projects would need to facilitate the 1-hour weekly conference calls. This also meant that they needed to teach people using ideas and examples that individuals could relate to and build on.

3.2 Phase 2 – Deploying the Lean Training Course

The 8-week course was and is offered to employees, from offices across the company. The course covers a range of topics covered in the People book such as: "Characteristics of a Lean Leader", "Leading with Purpose and Principles", "Focus and Alignment", "Value Stream Thinking", "Effective Measurement Systems", "Reflection", and "Building Teams". Every week, participants work through assigned reading and questions at their own pace whenever they find time, Every Friday they join a 1-hour conference call with their facilitator to discuss what they learned and how they might apply it on their current or a future project.

The People book is continuously referenced within the course content, which allows participants to review the material before and after meetings. For example, one project team has been passing the People book around to help disseminate these concepts. An observation of this team's planning meetings revealed that concepts discussed in the People book are being applied to their project. The team has defined a baseline to keep improving upon, as they work to employ better management systems. They have continued to educate all team members in the topics covered by the course content and the book.

From the outset, the two facilitators used the Plan-Do-Study-Act (PDSA) method to improve the way they taught the course. A key early improvement was to have students send in their "apply your learning" homework, for others to see. The facilitators also worked on a teachers' guide and decided to use their own questions to provoke discussion of how students could use each chapter's concepts to improve delivery of their projects. Each student answered five to ten questions on the chapter, then the instructors posted everyone's answers in a shared location. Later, participants and teachers would have a designated call once a week to discuss the answers. Each student was given five to seven minutes during the weekly call to discuss one answer that they felt passionate about, and to go deeper into the way it impacted them or how they are now doing something different based on the coursework. This shifted responsibility for learning to the students, and allowed the facilitators to help each student become a teacher. Highlights from each chapter were also taken and improved and posted as examples for other classmates and future students to see.

The facilitators created the illustration in Figure 1 to help students understand how they can use the information during and after they completed the course. It shows a constant PDSA cycle of learning through the entire lifecycle of their project. The graphic also communicates that the company leaders want them to continue learning and mastering Lean thinking and leadership.

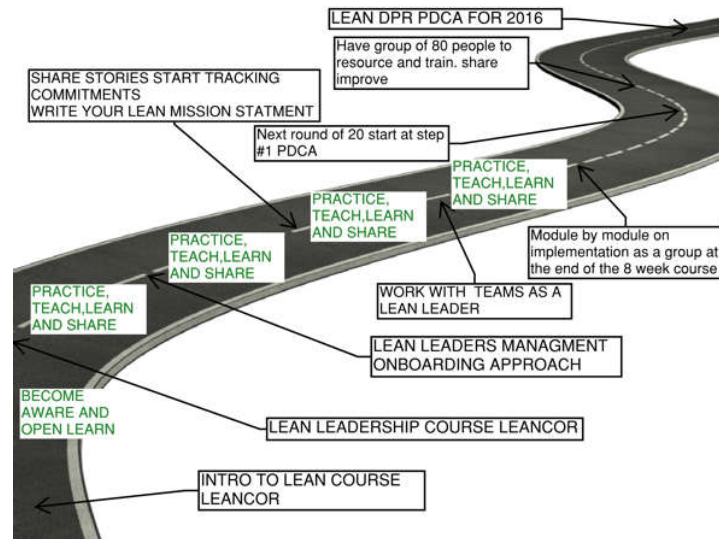


Figure 1: Road map of the Lean Leadership training

3.3 Phase 3 – Learning and Creating New Opportunities

A major challenge of this course was to educate people across the country and in different roles. The course material and its related examples had to be relevant to a wide audience, yet be consistent. As the course unfolded, and participants engaged with the instructors and coaches on learning and applying the material, the facilitators started collecting feedback and compiling a list of lessons learned to improve future offerings. They started working on examples of the principles in practice and how Lean leaders could approach problems.

A sign-up list for future offerings was opened after Phase 1 and employees from across the United States signed up for three additional course offerings. In the meantime, as the word spread and the waiting list grew, the facilitators were busy compiling feedback from participants and adjusting the technology platform hosting it to improve course delivery. This encompassed new ways to teach and support the needs of the field supervisors, project managers and project office staff taking the course. Participants willingly provided feedback. Some excerpts of the feedback received (verbatim) are transcribed below:

- *“Many of the tools we have been learning are straightforward concepts. I think the biggest challenge is taking the time and putting forth the effort to apply these tools to our daily work habits. But we also need to promote them to our other team members. One person cannot make a project lean. But one person can promote lean philosophies to a project team and foster a collaborative environment where these principles take root and are applied.”*
- *“I feel that this was a great course to encouraging and fostering being a lean leader. I think that the instructors did a great job of coaching and teaching. I do not know if this is a game changer - business system. Time will tell on this.”*
- *“Five things learned in the lean core academy: 1. Expect difficulties when implementing change. It is just part of the process; 2. Using inquiry to gain perspective; 3. Exposing rocks by not throwing resources at problems when they arise; 4. Plan, Do, Check, Act – just creating a lean workflow doesn’t mean your job is done. Implementing is the difficult part. It requires follow-up and re-*

follow-up; 5. Measure performance of the process, not performance of the people. In the end, it is always a PROCESS that caused the failure by allowing someone who was able to fail to be in that position.”

- *“Five things learned in the lean core academy: 1. Lean Concepts that work in a manufacturing setting can apply to construction; 2. Focus on being lean to better meet the client expectations rather than DPR’s; 3. Exceeding goals and expectation is not lean. (overproduction); 4. It is important to understand “purpose” (i.e. what the customers wants, not what we perceived they want); 5. Do not do things for the sake of being what you think is “lean” if it does provide value at the end.”*
- *“I’m looking forward to learning how to be a more efficient and effective leader”, I really feel like this class and the information and tools I’ve gained form the course have and will continue to help me improve upon my leadership skills. I also feel like the course has helped me see things from a very different perspective, to ask more questions and involve more of the team before developing an opinion.”*

In addition to providing feedback about the course, participants conducted a self-evaluation of their performance. Participants evaluated their own capabilities compared to the understanding they gained of the qualities of a Lean leader, and the facilitators produced a radar chart, shown in Figure 2, for each student and combined for all students in each course, and overall for the year. This evaluation helped participants identify the areas in which they needed to improve.

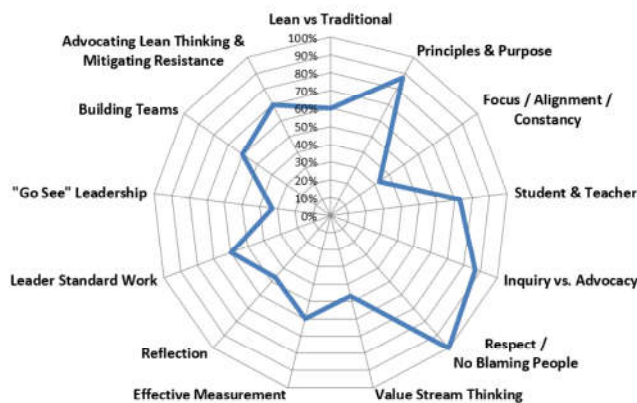


Figure 2: Lean Leadership categories average scores for Round 1 – Radar chart

During the weekly calls, especially in the second and third courses, participants began relating how they had applied one or more concepts. For example, a project engineer explained how he gathered his team together and convinced them that they had to rethink how they had been working and develop a different process for distributing RFI's to the field. The solution included needing paper copies in the field and a discussion of what changes were made to the drawings, so the field and the office were aligned prior to completion of the work. The team made the necessary changes and continued to use the PDSA cycle on their job for the remaining work.

The course content resulted in “a-ha” moments and students started seeing the value of the coursework. For example, one student realized that they were more of a traditional

leader after completing the Chapter 2 module on Traditional Leadership versus Lean Leadership; the student then realized that they should work on new Lean habits. Additionally, the self-paced online content made it easy for students to attend, while the weekly check-ins keep it personal and hold people accountable for delivering their assignments and attending the meetings.

Momentum built as participants from multiple business units and backgrounds signed up to attend the course. Currently, the facilitators and students believe that silos are breaking down as people from different functional groups go through the course together and share their knowledge with others. As the courses are not offered to any single group or managerial level, participants are part of a diverse group of backgrounds and ideas, which serves to spread knowledge throughout the company.

3.4 Phase 4 – Expanding the Offerings

Corporate leaders committed to the team's idea to license and deploy the online Lean Leadership course (Lean Leadership Certificate, <http://academy.leancor.com>) company-wide after seeing metrics collected throughout the first two offerings of the course. The marketing efforts for the course were improved to consistently reach out to employees interested in attending the course. This helped make it easier for the students to sign up because the message was clear, and a sign-up link was embedded in the email notices. Students could read a "what's in it for me" message, recognize the value of the offerings, and sign up for the courses all in one document. Currently, the students sign up directly through the company's internal learning center, which is a system they are already know how to use.

At the close of 2016, over seventy people had been through the course, and another 230 were signed up for the next three offerings. The number of individuals interested in taking the course increased rapidly due to very positive reviews from the graduates. The survey feedback from students, along with the radar charts, was shared across the company's business units, whose leaders also promoted the course. As demand grew, so did the need to train more instructors, which has produced a bottleneck because of the scarcity of experienced Lean practitioners with both the time and facilitation skills.

Early in 2017, the two facilitators arranged for another course called "Lean Fundamentals" to be uploaded to the learning management system to serve as a starter for those who are either waiting, undecided, or unable to commit to the 8-week long course.

Focusing on Lean thinking and leadership has increased interest in learning and applying Lean practices and tools. In the past six months, the Lean Leadership facilitators and other members of a formal group focused on planning and scheduling, have trained 80+ operations people to apply Lean principles and practices, particularly pull planning to plan and manage production. 150 people signed up for the three 30-minute Lean Fundamentals modules within the first week after it was announced in January 2017 and 30 completed the course in the following 2-months.

3.5 Looking Forward

Currently, the goals for 2017 are: to leverage the on-line content now available. This will allow 150 people to go through Lean Leadership and another 100 to complete the Lean Fundamentals by the end of the year. The facilitators anticipate 200 will complete Lean Leadership and 200 will work through Lean Fundamentals in 2018.

Other goals the team expects to achieve include: creating a scorecard to reach out to graduates and measure their improvements; helping the graduates define Lean goals and check-in monthly to review their progress towards meeting these goals; improving communication and promoting the use of an internal Wiki to disseminate what teams are doing and what they have learned; identifying Lean champions in each region who lead by example, educate, coach and mentor others; requiring the Lean Fundamentals course for all new hires as they join the company; and educating the group on Lean tools. The team is also looking for new and innovative ways to share stories.

4 CONCLUSIONS

As demand for construction grows across the country, and the company's offices continue experiencing high growth rates in the number of projects, the company is working to build a Lean culture to promote consistency across its offices. More importantly, the team is focused on how the company's employees interact, learn, and teach each other Lean across the country. The course facilitators together with the Lean group have drawn several lessons from their experience so far, as follows.

- Employees from all functional groups and levels are interested in learning about Lean.
- Training on Lean tools is necessary but training on overarching Lean concepts, principles, and goals is essential.
- Make training interactive and allowing people to be heard reflects respect for people, and are great ways to accelerate learning.
- Consistency and support are required to expose many people to Lean ideas.
- People need a common vocabulary to share knowledge and gain enough confidence to put them into action.
- Offering courses at different levels to engage participants improves understanding. Not every person has the time to engage in multi-week training sessions. Creating short courses with practical examples breaks the inertia and potentially the fear of changing or having to learn something new. Opening the class to employees at all levels and responsibilities increases understanding of the problems others face, and relatedness between people.
- The PDSA cycle can and should be used to continuously improve Lean education and training.
- Educating employees about Lean principles and leadership may be the most effective means, acting as a bridge, for incorporating Lean thinking into the company's culture of collaboration, individual initiative and accountability.

This is an ongoing change process that will be evaluated along the way, and new findings will be reported in the future.

5 ACKNOWLEDGMENTS

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