Initiating a Culture of Lean Construction within the Firm

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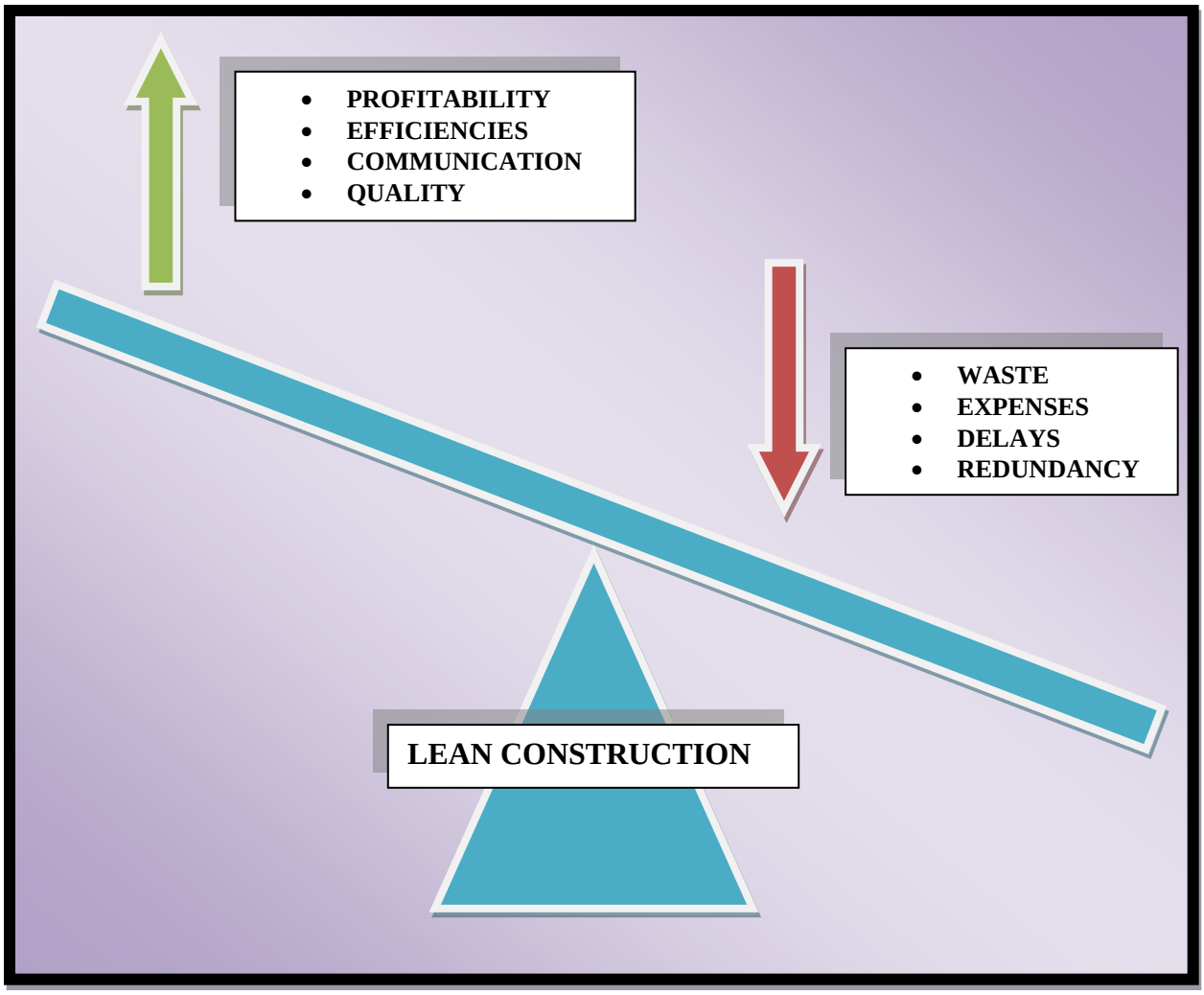


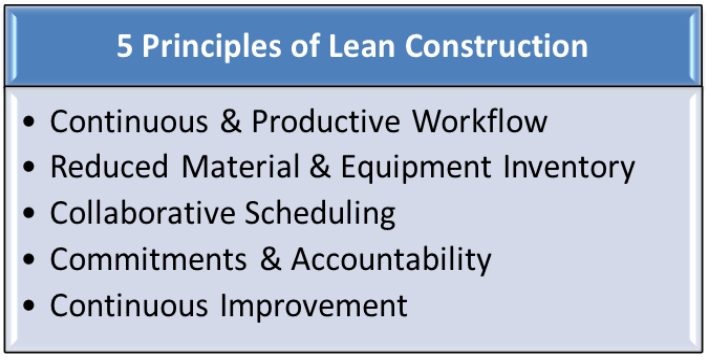
Abstract

Lean Construction is defined by adding value, reducing cost, and eliminating waste and redundancy for the client and construction partners. Five principles of Lean Construction have been chosen as part of a program to be initiated within a company: Continuous and Productive Workflow, Reduced Material and Equipment Inventory, Collaborative Scheduling, Commitments and Accountability, and Continuous Improvement. This program will be executed on a continuous cycle to become embedded in company culture through five major phases with definable objectives: Plan for Success, Communicate and Market the Plan, Education and Training, Execution, and Evaluate.

Introduction

The derivative of Lean Construction is Lean Production. Lean production methods have been used and perfected in the world's manufacturing facilities for years. Most see Toyota's "Just-In-Time" production (providing the necessary parts for the car when it is needed rather than storing them) as the monumental achievement of Lean Production (Malloy, 2002). Since the success of Toyota in the manufacturing world, many industries are trying to translate those methods into their own, including construction. So, what is the main goal of Lean? For a process to be Lean it must shorten the timeline between a customer order and when the customer finally gets that order while still maximizing value (Abdelhamid, 2004). Five Lean Construction principles have been chosen to lay the foundation for a cyclical plan to initiate a culture of Lean Construction within the company.

Principles



Today, "Lean" is being applied to every industry and practice where the methods seem practical, creating a seemingly infinite web of knowledge. Just like there are many ways to apply "Lean," there are many different principles and methods that can be created along the way. For our purposes, the best way is to create rules for the construction industry that translate to a heightened level of planning, time reductions, and maximized value to the customer. The five principles

discussed in this paper give a foundation for creating a plan for implementation into company culture.

1. Continuous & Productive Workflow

There is something to be said for how much time can be wasted by trying to figure out what to do next on a jobsite. These stoppages in work can add up very quickly and cost the company money. Having a well thought out plan for each day can help crews work continuously without question on what to do next. Also, a backlog of work not on the critical path to perform when sudden critical path delays occur can keep a working crew from coming to a grinding halt (Strickland, 2010). When these efficiencies prove to increase productivity, the company will be able to claim a competitive advantage that can ultimately be passed on to the owner.

2. Reduced Material & Equipment Inventory

Materials and equipment that are not in use get in the way of employees trying to work and drive down the efficiency of crews. Having a lot of material and equipment on site can be a liability to your productivity and profit margins. Damage can occur, double handling of materials, and higher equipment rental expenses are some of the drawbacks that can affect the company's bottom line. A well thought out material logistics plan can allow material to show up when it is needed and placed where it will not need to be constantly moved to get to other materials or equipment. Combating this problem in the planning stage can be solved by adding material and equipment approvals to the schedule

so that the time allotted for those materials and equipment to be on site is carefully monitored.

3. Collaborative Scheduling

Scheduling is one of the most important principles in Lean Construction. The other principles involve some type of extensive and creative planning to make them take effect properly. There are a few guidelines that can make scheduling more effective and thus impact the other principles in Lean Construction as a whole. Collaborative scheduling is getting everybody, no matter what level of employment they are in, involved in the planning and scheduling of the project. The people who know most about the material going into a project are the people who work with it every day; so get the field involved in pre-construction scheduling. Create scheduling teams to work on different aspects of the schedule with knowledgeable representatives from the field. Also, include key milestones in your schedule, such as “topped out”, “shelled in”, and “roughed in” that trades can easily identify with, so they all know what the project should start to look like.

4. Commitments & Accountability

Commitments and accountability deals with making sure the plan the company created is being carried out in the correct manner and that employees and subcontractors are adhering to the plan. In order to get the plan to function properly, people need to feel responsible for upholding the different guidelines the company has laid out. When people feel like they are part of a group they do not want to be the “weak link” that lets the group down. Measuring team member success is crucial to know who is contributing positively

to the team. A publicly issued commitment report can show who is sticking to the rules and who may need a little help with the plan.

5. Continuous Improvement

Continuous improvement is a principle that really creates a culture of Lean Construction within a company. It is the point where a company goes from doing what every other company is doing to turning it into their own unique plan. When problems arise or inefficiencies occur they need to be evaluated, improved upon, and, if necessary, a part of modifying the overall plan. Some problems may be immediately noticeable through every day operations that warrant an immediate change to the policies. However, a bulk of unknown information and historical data can come from evaluation of completed projects. It is beneficial to review projects for "lessons learned". Conduct closeout interviews with subcontractors, review production numbers, and solicit ideas from all levels of employees.

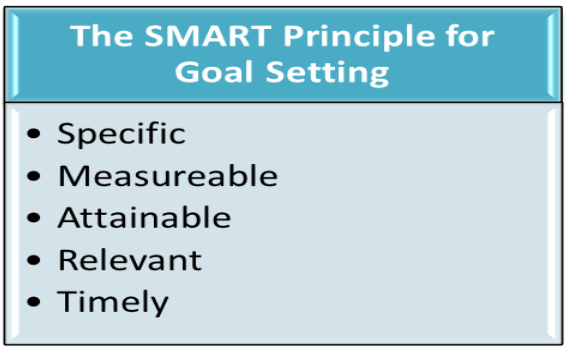
As one can see, a lot of these principles 'feed' off of one another. The result of a good plan can lead to other Lean principles coming into effect and saving time and ultimately money for the contractor and the client. However, you can also see the negative effect of a bad plan that will subsequently affect the possibilities of applying Lean principles to the rest of the project.

Steps to Implement Lean Construction within the Company

Implementing a culture of Lean Construction, using the principles discussed above, can be a beneficial addition to policies for the company and the client. A plan to establish Lean Construction can be created to maximize these benefits and provide a competitive advantage. Part of creating a culture is to embed the plan into the company's every day procedures and make a continuing effort for improvement. See **Figure 1** below. In order to create this culture, the steps discussed below are to be utilized as a cycle. Once the cycle has been completed, an allotted amount of time needs to be established to start the cycle over again such as quarterly or yearly. Use this plan as a guideline to start permanently seeing the benefits of Lean Construction.

Figure 1

Plan for Success



It cannot be said enough, planning is the root of all the principles of Lean Construction and it should be the root of implementing the program as well. The best plan comes from the people best suited to create it. A strategic committee from front line managers to executive leadership should be formed to lay the roadmap for the company's Lean Construction initiative. Having a team that is diversified by different levels of employment allows everybody in the company to have a say in the new plan. Once the team is formed, a list of short term (1 year) and long term (5 year) goals needs to be created. "Experts recommend using the SMART principle when setting goals, which specifies that goals be Specific, Measureable, Attainable, Relevant, and Timely" (Dray, 2010). In order to achieve the goals, the team must create procedures for employees to follow. Procedures make it easy for employees to understand the direction the company wants to go with the new initiative and how the tasks need to be performed. However, employees should be aware they are not locked into a specific procedure; they should be encouraged to voice their good ideas to the company for altering methods. A river of ideas flowing from all employees to the company utilizes the diversity of the organization as a whole in a unique way.

Communication & Marketing the Plan

Now that a plan has been agreed upon by the Lean Construction committee, it is time to communicate and market the plan to the rest of the company. Communicating the plan

makes everyone aware of what the company is about to propose and gives them time to adjust to what will become a new set of policies and principles. Roll out the new plan seeking input and feedback from all levels of employment. As was mentioned earlier, this creates a pool of ideas that can be used to put the polishing touches on the plan and help bring to light any problems that may have been initially missed. The marketing of the plan needs to have a "top-down" approach. Employees are more willing to accept new procedures if the President of the company states that he or she supports the new plan and understands the employee struggles that may accompany the implementation of new procedures (Marks).

Education & Training

Education and training is one of the most important steps in initiating any new procedure into a company. Employees need to know exactly how the company wants them to perform and what is expected of them. Begin by training key people at a variety of levels to become "Lean Experts". These will be the "go-to" people for anything and everything Lean Construction. For additional support, provide your employees with a "Lean Library" both on the company website (virtual) and in hard copies of books kept in the office. The "Lean Library" will provide employees with a place to learn more about Lean Construction, the company's procedures, how to become a "Lean Expert", and attempt to answer any questions employees have about Lean Construction. Also, a great addition to the "Lean Library" would be a link to the AGC Lean Construction Forum; a place where Lean Construction ideas are discussed and shared by industry professionals. Once the "Lean Library" has been established and the company has created "Lean Experts"; team

training can be used to show all members of the organization how the company, the client, and the employees themselves can benefit from the techniques of Lean Construction. Most companies already have teams established and employees should be trained in these teams or with whom they will be working with the majority of their workday.

Execution

Now that the plan is in place, it must be regulated and cultivated to ensure maximum execution. Follow up with teams to assess their performance and gain feedback on procedures. Regulate the plan by establishing commitments and accountability with the entire project team, including architects, engineers, contractors, suppliers, and subcontractors. Measure how well employees are sticking to their commitments and hold them accountable; nobody wants to be the person who let the whole team down. With their standard cost reports, have each team provide a monthly "Lean Summary". Evaluate the Lean Summaries and provide team leaders with feedback on how to improve their statistics next month. Companies may also see a need to provide incentives for a positive Lean Summary each month.

Evaluation

In order to create a culture in a company, the culture has to continually improve and reevaluate itself to become a unique technique within the company. This is where a company goes from 'doing what everybody else is doing' to creating a competitive advantage. Every plan needs to be evaluated to see if the goals set in the planning stage

were met, and if not, why they weren't met and if they were attainable in the first place. In each evaluation, new goals will then need to be set to build off the ideas from the previous period. Since this is a company culture we are creating, then the ideas need to come from the company as a whole. Welcome ideas from all levels of the company. There could even be a program in place for "The Lean Construction Idea of the Week". The employees would all submit their ideas and the CEO would choose the best idea to be "The Lean Construction Idea of the Week". A system like this, with incentives to submit ideas, such as gift cards or other perks, allows the company to brainstorm as a whole to create a unique culture. Also, completed projects need to be evaluated to search for "lessons learned" and how the company can improve in the future. To be effective, perform closeout interviews with subcontractors to get their point of view of the project.

Creating a company culture is a never ending process; in fact, every company has a culture within it already. Lean Construction would be a new idea to inject into that culture and without the right plan and process a new addition to the culture can die as quickly as it was proposed. The key to making sure Lean Construction becomes an integral part of the company is to turn the plan into a cycle where all steps are repeated at a certain period of time in a year or multiple times in a year. It may be necessary to increase the frequency of these cycles when the plan is first implemented, but as time goes on; the plan should become steadier and an embedded part of the company culture.

Conclusion

Lean Construction is a new concept to the construction industry derived from old concepts in the manufacturing industry. It is gaining steam in the industry due to the need for increased profits, long-term relationships with clients, and to provide more value for the clients. Principles can be created to analyze different aspects of the construction process in which to evaluate for better efficiencies and eliminate "waste" to save time (cut cost) without any loss of value to the client. These principles can be developed into a program to be implemented into the company. Careful planning, effective communication, proper education and training, a plan to execute the program, and a means of evaluation will allow a stable and smooth transition of new policies within a company. With successful implementation of a Lean Construction program, a company will be more effective and efficient in operations resulting in a higher Return On Investment (R.O.I.).

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