

LCI Adopting Lean for Your Project: Using the LCI Lean Deployment Planning Guide

John Messner, Penn State Rob Leicht, Penn State Emily Lowe, Alexander Building Construction

A-#2-0#-0 2025022

Lean Construction Institute

© LEAN CONSTRUCTION INSTITUTE

Health precautions to keep everyone as safe as possible at Congress:

- Wear masks at all times in indoor events.
- Complete your daily health screening on your phone and bring it with you when you enter the center each day.
- Practice social distancing to the extent possible. Seating at plenary sessions is being structured to help with this.
- If you feel ill at any time, please leave the conference and return to your room/consult a physician as necessary.
- Ultimately, our collective health and safety at Congress is up to all of us. Thanks for your support!





Workshop Team Members





Robert Leicht, PhD

Assoc. Professor (Arch. Engr) Penn State University



Emily Lowe

Enterprise Lean Champion Alexander Building Construction







LCI Course: LCI Adopting Lean for Your Project: Using the LCI Lean Deployment Planning Guide 5 CEU

Sign the sign-in sheet for credit





Approved Continuing Education

Course Description

The hand-on workshop will integrate learning with practical application working sessions for identifying and planning lean methods. Learning will commence with an explanation of the Lean Development Planning Guide and resources that support the steps of the planning process for a project including: initiate, select, plan and integrate. Participants will gain an understanding of each resource included in the guide and how it may be implemented during the planning process. A case study where the Lean Deployment Guide was used by the project team to develop method-specific A3s for implementation will be shared. During the facilitated working sessions, participants will experience developing a Lean deployment plan for a simulation project, using the guide resources to select project methods, create a method-specific A3 plan and begin to integrate methods into the project dashboard for tracking and management.



Learning Objectives





Participants will be able to define essential steps for developing a projectspecific Lean deployment planning process.



Participants will be able to identify and use the resources in the guide that support each of the steps of the process.



Participants will gain insights from a case study project team with successful outputs.



Participants will use the guide resources to create a method-specific A3 plan for a simulated project.



Rules of Engagement



This is a safe zone

- Everyone has equal status
 - Speak up and share your ideas
 - Actively listen to others
 - One conversation at a time







Lean Deployment Planning

Lean Journey to Mastery





© LEAN CONSTRUCTION INSTITUTE



Visit LCI website for more learning: www.leanconstruction.org

Six Tenets of Lean









Lean Deployment Planning Guide





Why develop a Deployment Plan?

- Project teams need a 'place to start'
- Provides a basis for project's lean operating system
- Helps owners know what / how to ask for lean implementation on their projects
- Provides structured process for identifying & planning lean implementation - define 'why', then 'how'
- Allows for standardizing a project baseline
- Training and coaching can be better targeted to support a project's specific lean deployment plan



LEAN PROJECT DELIVERY METHODS & MANAGEMENT (Operating System)

TOELLERY STRATEGY

INTEGRATED PROJECT

LEAN CONSTRUCTION INSTITUTE

TRANSFORM

Lean Deployment Planning Guide Overview

DUDUDUUT



© LEAN CONSTRUCTION INSTITUTE

Lean Construction Institute

ransforming the Built Environment



Lean Deployment Planning Steps





Step 1: Initiate the Lean Deployment Planning Process

Identify lean coach and champions

Conduct lean training

Schedule a lean deployment kick-off session

Develop meeting agenda and presentation

Conduct kick-off session

© LEAN CONSTRUCTION INSTITUTE





Lean Deployment Planning

Step 2: Select Lean Methods



Review lean methods () 01 INITIATE **Evaluate methods Select methods** © LEAN CONSTRUCTION INSTITUTE





Defining the Lean Methods



Organization Methods - Definitions

Team Organization Problem-solving Decision-making Continuous Improvement A3 thinking (PDCA) Onboarding Quality Circles Choosing by Advantages A multi-criteria decision-making method A participatory management technique that Activities conducted strategically to quickly Documentation approach for problemengages workers directly in identifying and developed by for determining the best get everyone on the same page regardless of solving and reporting on project-related solving problems that span different steps in when they join the project team. Example: critical decisions using the Plan - Do - Check decision by quantifying the advantages of the design or production process. orientations, trainings, team building - Adjust. (PDCA) method for continuous each option. Construction is a project-base exercises, etc. improvement. adoption of lean can be chall each project brings together with a vast array of experience knowledge, each with a dif Work Clusters Benefits: Ň Helps create high-per Multifunctional work groups created within Reduces potential pri the project team to pursue complex breakdowns Helps develop leader decision-making and problem-solving by putting in use the different experience and Suggested Resource Additional Techniques used in Lean Implementation: skills of every member. Lean Simulations Project Lean Deploy Training space Book: Don't Confor 5 WHY Analysis PICK Chart Spaghetti Diagramming chapter on Onboard A map that shows current layout of An ease/impact chart that segregates ideas Problem solving technique to determine root operations and path taken by people, cause by diving deeper into the "why" five into possible, implement, challenge, and kill product, or the service as it moves through Task Breakdown Planning times. categories. · Which specific methods do you war the process. project team members? Which lean simulations should be use Which project leaders will be condu Ohno Circles Gemba Walk session? How frequently, or at which events, sessions be offered? How will onboarding sessions be eva Figuratively refers to a portion of the Means "Going to the work" or walking the job. What documents and training material workplace identified to be observed and site where the actual work is done to identify who will assemble them? What lean principles should be taug analyzed for an uninterrupted period of time waste elimination opportunities. to look for inefficiencies.

© LEAN CONSTRUCTION INSTITUTE



Organization Method

Onboard	ding
Onboardi common added tr member understa project, f specific f cultural, t disrupte	ng provides a way for team members to reach levels of learning as new team members are o a project. Onboarding allows for the new team rs to be immersed in the project organization, and the unique processes and expectations of this to be trained, and to gain access to project resources. Onboarding ensures that the team's behavioral, and procedural environments are not ad.
d industry where lenging because team members ce, abilities, and fferent level of	awareness or experience with lean principles. Onboarding presents an opportunity to align these experiences and knowledge at the beginning of each person's experience with this project.
rforming teams rocess rship skills	Success / Progress Metrics: All project leaders have led a session · % of team members that attended · Plus/Deltas from onboarding sessions · Post-session 'quiz' results
ces: ment Plan m. Transform - ling	 Potential Education needs: Who will lead onboarding sessions? What project's onboarding do they need further training to teach? Who needs training to facilitate lean simulations?
Questions: It to share with all new red?	Communication Planning: • How will team members be informed of onboarding timelines? • How will project culture and training from onboarding be reinforced visually throughout the project?
ting the onboarding will onboarding aluated and by who? ials will be used and ht at onboarding?	Continuous Improvement: • How will the onboarding process be updated throughout the project? • How will the effectiveness of sessions be evaluated? • Who will review the content or audit the sessions for quality and effectiveness?



Step 3: Plan Each Lean Method







Method Planning A3 Template

		ridect					_
ioals:	But the project goal(c) this method supports	Metrics:		Respo	sible Party:	Freque	ncy:
Participants:	List the calconv(), both internal to the team and external that are targeted as beneficiaries of this method			Intentify the measures that will be used to track and attentify challing and auceasus, in the implementation of this method. • Be use to contract the spirit regressible for tracking each • Canada: the specific three, or frequency, the methods are aptured and shared			i stentify challenges, d. sciling each metrics are
		Education Level	Who?		When?		How?
ask Breakdown	Responsible Party Milestone	Intraduction					
		Deep Dive					
	Drive the tasks to be performed, the person(i) exponsible for ensuring its completion, and the target date	Tuiter					
		Communication	Format	Audien	e Responsit	le Party	Frequency
				Result identify the how the method and its implementation is communicated to project task holders, i.e. • We there will be used (presentation, poster, posted leggle) • Now often down it need to be shared? With which address • We be inresponsible for maintaining and updating 87			entation is m, posted logs[7 Vich audiences7 ng 87
		Continuous Improvement	nt Process	Reviewer	Frequency	Future S	Steps
Related Methods:	Please identify other methods the team is pursuing, or should correlate, that support to can be enabled as a result of the methods use the methods.			Reaso define the use of this real Who will review	to timing and process had to a assess the current	that will be use	ed to improve the

Method: Onboarding	Champion(s): Andy	Project/Org	anization: Project
Goal(s): Create quality onboa	arding so everyone understands.	Metric(s): Observed a Reward syn	actions stem
Participants(s): All personne	I, Owner included.	Quiz (2 min	nute drills)
Task Breakdown:		Level	Plan: Who?
 Integrate the organization proc Leadership team defines inform but interdependence of parties Define Lean/IPD briefing for sa 	esses with the management processes nation for all members. Example: Not IFOA fety orientation	 Who will tra How freque What are the 	ain/give onboarding? ently will onboarding s he milestones for upda
 Define communication or visua Train the trainers Design assessment/health che Run/track metrics and audits Conduct Monthly "Reconnect" (I management strategies cks or "Lean Learning"	Communica Define slide Develop po Rewards a Rewards a	ation Plan: es for orientation osters for big room t luncheon ystem board
Related Methods and Strate	gies:	Continuous	Improvement
Weekly Work Planning		When do w	ve conduct audits

- Big Room Planning
- Visual Management
- Meeting Agendas

- How we frequently do we conduct
- Who will conduct these audits/ch
- How will we rotate responsibilitie

ample - (Onbo	ardin	g
A			
When?	Hour		
when?	How?		
sessions be offered? ating the training?s			
ct audits/check-ins			
heck-ins?			
187			



Step 4: Integrate Methods to Project Plan

Record project conditions of satisfaction and associated methods

> Consolidate project measures for tracking alignment to implementation plan

> > Consolidate all training to be completed on the project

> > > Consolidate all communication strategy(ies), and continuous improvement opportunities

INITIATE





Download at cic.psu.edu/lean

20

Project Summary Dashboard



Project: ABC Recreational Complex Renovation

Project Conditions of Satisfaction

Rapid issue-detection and resolution

Continuous and reliable workflow

High performing project team

Effective , efficient, and timely team communications

High performing building design

Organization Methods	Operating System Methods
Onboarding	Last Planner System
Work Clusters	Target Value Design
Gemba Walk	Big Room Planning
A3 Thinking/Reports	Visual Management

Lean Champion(s): Jane Doe

Lean Implementation Metrics:	Sta
All lean methods champions identified within 30 days of lean implementation planning kick-off	
Lean plan completed within 90 days of kick-off	
Education and Training Metrics	Sta
New person onboarding completed within 30 days of hire	
All lean champions trained within 30 days of kick-off	
All lean trainings completed within 90 days of kick-off	
Communication Metrics	Sta
Communication Metrics Project issues identified did not cause project delay	Sta
Communication Metrics Project issues identified did not cause project delay Identified project issues resolved within 15 days	Sta
Communication Metrics Project issues identified did not cause project delay Identified project issues resolved within 15 days Zero change orders post issue of detailed design docs.	Sta
Communication Metrics Project issues identified did not cause project delay Identified project issues resolved within 15 days Zero change orders post issue of detailed design docs. Continuous Improvement Metrics	Sta
Communication Metrics Project issues identified did not cause project delay Identified project issues resolved within 15 days Zero change orders post issue of detailed design docs. Continuous Improvement Metrics Plus-deltas recorded from all collaborative sessions	Sta
Communication Metrics Project issues identified did not cause project delay Identified project issues resolved within 15 days Zero change orders post issue of detailed design docs. Continuous Improvement Metrics Plus-deltas recorded from all collaborative sessions Deltas addressed in future sessions	Sta
Communication Metrics Project issues identified did not cause project delay Identified project issues resolved within 15 days Zero change orders post issue of detailed design docs. Continuous Improvement Metrics Plus-deltas recorded from all collaborative sessions Deltas addressed in future sessions Pluses repeated in future sessions	Sta





Workshop Conditions of Satisfaction (CoS)



manner

© LEAN CONSTRUCTION INSTITUTE

Lean Construction Institute

ansforming the Built Environment

Workshop CoS



- Breakout group directions:
 - Introductions
 - Introduce yourself
 - Ice-breaker questions: What was something fun you did this past weekend?
 - Identify group spokesperson / person to submit group response
 - As a group, brainstorm what you would like to get out of this workshop
 - Create stickies to capture your group's CoS & post
 - We will come together and share highlights with the whole group

Case Study Project Introduction: Hampden Medical Center

DDDDD



© LEAN CONSTRUCTION INSTITUTE

Lean Construction Institute

ansforming the Built Environment



Strategic Goals: Penn State Health

- First greenfield hospital expansion for the system
- Bring world class care closer to patients in more effective setting – hospital within 30min (10-20-30)
- Speed to market





Selecting the Team



- CannonDesign Architects & Engineers hired June 2018 ullet
- Barton Malow / Alexander JV hired July 2018 ullet
- IPD Spectrum: Bringing the Right Tools for the Job How do you define "Lean" or "Integrated" delivery? ۲





26





© LEAN CONSTRUCTION INSTITUTE



Not an IPD project, but we did have a contractual methodology and issued a contract for our DA partner preconstruction services

Design Summary









300,000 BGSF **108 Patient Beds** • 12 ICU • 4 Labor / Delivery 18 Post Partum **6** Ante Partum 6 OR's 2 Cath Labs **30 ED Exam Bays**

\$197.7M Target

Design Summary







© LEAN CONSTRUCTION INSTITUTE



300,000 BGSF 108 Patient Beds • 12 ICU • 4 Labor / Delivery • 18 Post Partum • 6 Ante Partum 5 OR's 2 Cath Labs

30 ED Exam Bays \$197.7M Target

29

Penn State Health – Hampden Medical Center

- Over 500 Workers
 OnSite + Prefabrication
 Efforts
- Almost 1M Labor Hours
- 26 mo. Construction
 Phase; did not change
 thru pandemic





Penn State Health – Hampden Medical Center





Lean Deployment Planning Guide Step 1: Initiate Lean Deployment Planning



© LEAN CONSTRUCTION INSTITUTE



ean Construction Institute

sforming the Built Environment



Lean Deployment Planning Steps





Sample Content



Executive Summary

The core principles of Lean construction are respect for people and continuous improvement by focusing on process and flow, thus eliminating waste and creating value in facility delivery. Encompassing all principles, the overarching goal for implementing Lean construction is to focus on continuous improvement as we deliver construction projects. This can be done by implementing Lean holistically on a project by focusing on the commercial structure (i.e. the business), the organizational structure (i.e. the culture), and ultimately, the operating system (i.e. the project). (LCI, 2010).



Figure 1: LCI Triangle: A Framework for Change (LCI, 2010)

A Lean Deployment Plan for a project can help with Lean implementation by allowing project teams to plan the Lean principles and practices throughout the stages of a project by embedding them into the project management processes, ultimately delivering better value for clients while simultaneously improving overall safety, cost, schedule, and quality. The Lean Deployment Plan is to be developed following the formation of the project team and, the development and validation of the project business plan. Therefore, the plan is ideally meant to be developed by the project team collaboratively with commitment to the resources and competencies needed for lean implementation

This guide is designed to walk the project team through the steps of the planning procedure systematically as you create your project specific Lean Deployment Plan, while encouraging discussion of lean principles on the project. Each step in the procedure is defined and described in detail in the following sections of this guide. Along with this description, there are also template resources provided to help the project team work through the planning procedure, and document their project specific Lean Deployment Plan



Figure 2: Lean Deployment Planning Procedure Steps

As shown in Figure 2, the planning procedure is composed of four steps. Adoption of Lean principles into a capital project is challenging because each project brings together team members with a vast array of experience, abilities, and knowledge, and different levels of awareness and experience with Lean principles and methods. This variability of awareness and knowledge leads to inconsistency in Lean implementation on projects thus resulting in waste in the form of duplication of efforts and lack of standard processes and procedures. The purpose of this planning procedure is to support consistent and systematic implementation of Lean principles and methods within the project's management processes. To do so, the project team needs to develop a common understanding of which Lean methods will be used, how the Lean methods will be deployed and communicated, and how they can be measured and improved to support the project's specific goals. The development of this common understanding can be supported by collaboratively identifying the strategies and methods that serve the project specific value proposition and then customize them using this structured planning procedure

As the project team works through the planning procedure, the templates provided within the guide are designed to help facilitate and document a complete plan for lean implementation. Therefore, it is beneficial for the team to collaboratively work on this plan, recording all the critical decisions that led to the project specific Lean goals, the methods that will be used to support these goals, the plan for implementing each method, the metrics that will be used to track implementation, the education and training strategy, the communication plan, and finally the continuous improvement plan.

Planning Procedure Overview

The Lean deployment planning procedure is designed to help project teams interested. or required by the project client or owner organizations, to implement lean strategies and methods on their projects. Implementation of Lean is supported in this Guide by embedding Lean methods into the project's planning process to deliver better value for clients, simultaneously improving the overall performance of safety, cost, schedule, and quality on the chosen project.

This procedure can also be used by the project planning group, a Lean coach or consultant, or an owner's representative to promote and manage consistent implementation of Lean at a project level. By working through the planning procedure using the resource templates provided, the project team will be able to develop a complete project specific Lean Deployment Plan.

The planning procedure comprises four steps and each of these steps have been defined based on research conducted in conjunction with the Lean Construction Institute to address consistent implementation of Lean at a project level. By identifying current practices in Lean method planning and implementation of Lean across projects, these steps were developed to capture the best practices and to minimize the existing challenges to support Lean adoption while improving the consistency of Lean implementation.

Step 1 - Define Project Goals

Defining clear goals collaboratively for implementing Lean on a project is the first, most important step before being able to execute the subsequent steps of this procedure. The specific goal(s) is critical to the selection of methods and planning for the process that needs to be implemented to support project goals. The goal(s) represent the value proposition of the project with respect to the client, and as such the process that follows should also be derived to deliver and support that value with minimal waste.

Step 2 - Select Methods and Define the Process

The goal-setting and implementation planning are ultimately targeted at delivering the client's conditions for satisfaction with maximum value and minimal waste. To support this effort methods are required that enable the project team to deliver the project using Lean processes. The method selection step leads the project team to review methods that can help identify value and eliminate waste throughout the delivery process. Due to each project being unique, different strategies and approaches may be required during the project lifecycle. Following the selection, the team works together to develop the specific

delivery.

successful.

It is critical that the project team continue to reflect, learn, reassess, and update the plan to the most current information. Routine events need to be embedded into the project processes with time and resource commitments to enable the team to learn and improve This step reinforces the need to learn in a collaborative environment and to encourage peer motivation and team progress as a whole.

WHY LEAN? (PROJECT GOALS)

METHODS SELECTION WORKSHEET IMPLEMENTATION PROCESS PLANNING



implementation plan for each of the selected methods. The templates in the guide are intended to help project teams identify and develop the targeted methods. The planning needed helps to translate their project goals into an actionable plan that can be measured and continuously improved throughout the project. The implementation plan can be integrated into the project's management processes to support overall project

Step 3 - Measure Progress

Once the implementation plan has been laid out for the project, the project team can work to integrate and further develop the metrics, educational plan and communication needed, to tell the story of Lean implementation at the project level. The goal of the step is to the information and plans into resources and a stream of information to identify challenges or potential breakdowns early and ensure that the implementation, overall, is

Step 4 - Learn and Continuously Improve



Step 1: Initiate the Lean Deployment Planning Process

Identify lean coach and champions

Conduct lean training

Schedule a lean deployment kick-off session

Develop meeting agenda and presentation

Conduct kick-off session

© LEAN CONSTRUCTION INSTITUTE







Step 1: Initiate – Coaches & Training

- Identify a Lean Champion on your Team
- Bring in a Lean Coach (internal or consultant)
- Connect your Lean Champion to continue to consult with your Coach
- Identify the Team's (owner, design & builders) knowledge / experience with Lean – Where are you starting from?
- Need an Owner that's willing to let you try
- Start the Project with setting your Conditions of Satisfaction and use those to guide which Lean Methods you select.





Step 1: Initiate – Kickoff Session Planning

- Start the Project with setting your Conditions of Satisfaction
- Best to facilitate a meeting with the entire team (owner, designers & builders) to identify the methods you want to try
- Let CoS guide which Lean Methods you select
- Develop a core group to work with Project Champion to build momentum






Conditions of Satisfaction



The project priorities that guide decisionmaking throughout the development and implementation of the project.

An alignment of interests

 Everyone is in agreement that this goal is a priority (co-developed)

A goal that is obtainable by all

• <u>Everyone</u> can assist in achieving the goal

A goal that creates focus and drive for a positive end result

 Everyone feels invested and motivated towards achieving the goal









EXERCISE: Developing Example CoS

- Breakout group directions:
 - Draft 2-3 conditions of satisfaction for the Hampden Medical Center project







Lean Deployment Planning Guide Step 2: Select Lean Methods

nnnnn



© LEAN CONSTRUCTION INSTITUTE

Lean Construction Institute

ransforming the Built Environment

Lean Deployment Planning

Step 2: Select Lean Methods



Review lean methods () 01 INITIATE **Evaluate methods Select methods** © LEAN CONSTRUCTION INSTITUTE





Download at cic.psu.edu/lean

Defining the Lean Methods



Operating System Methods - Definitions

Production

Design development

Last Planner System

Collaborative and commitment-based system of planning and control that helps develop a reliable workflow through pull planning make-ready look-ahead planning, and weekly work planning.

SIPS/Takt Planning

Short Interval Production Scheduling (SIPS) focuses on detailed planning of worker and crew level tasks at short (15 or 20 minute) intervals for highly repetitive work.

Modularization

Strategies employed in production to develop assemblies off-site to streamline work flow and add efficiencies to work onsite

Set-based Design A method to explore and optimize design alternatives in small sets, based on a set of design criteria, for the project, to find the best solution

Agile Planning

An approach to planning the development of design by prioritizing a portion of the work scope and making realistic commitments to finish them based on analysis of previous performance

Value Stream Mapping

Mapping the process by including value and non-value add work activities to identify areas of improvement in the delivery process.

Additional Techniques used in Lean Implementation:

First Run Studies

Trial execution of a process ahead in time in order to determine the best means, methods, sequencing, etc. to perform it.

Poke-Yoke

A Japanese term for mistake-proofing method or device used to prevent an error or defect from happening or being passed on to the next operation.

5-5

exactly what was wanted

and/or elements.

An approach for workplace organization and maintaining visual control. The "S" stands for: Sort, Set, Shine, Standardize, Sustain.

Scope & Cost

A design approach that meets target cost

and client's needs by focusing on creation of

value, innovation, and elimination of waste in

A method to determine project related

interdependencies and accordingly develop

the design sequence for the project systems

Conditions of Satisfaction

An explicit description by a Customer of all

the actual requirements that must be

satisfied by the Performer in order for the

Customer to feel that he or she received

Target Value Design

all forms of resource consumption.

Design Structure Matrix

Information Management

Big Room Planning

A practice that focus on planning and organizing a space to facilitate collaborative and interactive engagement of project teams.

Visual Management

A way to manage information visually such that it enables collaboration, open communication, helps track progress and notice disruptions auickly.

BIM Execution Plan

Planning for implementation of building information modeling (BIM) using a structured process to define uses, information hand-offs, and deliverables

3P stands for Production Preparation Process, which is laid out to physically organize the area where new work is about to begin.

3P

Operating System Method



Construction projects tend to be complex and require multiple experts to provide input along the design process. It helps to break down the overall project scope into smaller components.

Benefits:



Design experts

Task Breakdown Planning Questions:

- How will you define the design set criteria? When will you assemble the design team?
- How will you make decisions when reaching design milestones?
- How will you incorporate the required design expertise?
- When will key charrettes/workshops occur?
- How will you track design development?
- How will you engage the client in the process
- of design review and selection? How will you evaluate options and make final
- selections? (For example: Visualization, CBA)



Set-based Design



Set-based Design (SBD) is a method to explore design alternatives for the project in small sets, to find the best solution. Each set of design alternatives is distinguished by a set design criteria. As the design evolves, the best features from each set are consolidated to generate the option that delivers maximum value to the project. Eventually design options are evaluated based on client preference, target value, feasibility, advantages, and constraints.

Set-based design helps with the development of such smaller components to streamline the overall design development process.

· Concurrent development of multiple Maintains design options longer, then advances quickly as decisions are

Design visualization and review space

Project Lean Deployment Plan Book: Transforming Design and Construction: Set-based Design



0

Success / Progress Metrics:

- · Effectiveness of design criteria sets
- Support of Conditions of Satisfaction
- Innovativeness of ideas
- · Design development deadlines

Potential Education needs:

- · Who will facilitate the SBD process?
- Who is experienced in SBD?
- · How will you plan the design handoffs and collaborative development?

Communication Planning:

- · How will you communicate the design schedule and progress with project team, including the client? · How will you communicate design
- alternatives for final selection?

Continuous Improvement:

- · How will you improve the efficiency of the design development process?
- How will you improve the efficiency of design development tools?
- What routines can you use to continue maximizing value for client through design development?

Defining the Lean Methods







Onboar	ding				
Onboarding provides a way for team members to reach common levels of learning as new team members are added to a project. Onboarding allows for the new team members to be immersed in the project organization, understand the unique processes and expectations of this project, to be trained, and to gain access to project specific resources. Onboarding ensures that the team's cultural, behavioral, and procedural environments are not disrupted.					
d industry where	awareness or experience with lean principles.				
lenging because	Onboarding presents an opportunity to align				
team members	beginning of each person's experience with				
fferent level of	this project.				
	Success / Progress Metrics:				
rforming teams	 All project leaders have led a session 				
ocess	• % of team members that attended • Plus/Deltas from onboarding sessions • Plus/Deltas from				
rship skills	Post-session 'quiz' results				
ces:	Potential Education needs:				
ment Plan	Who will lead onboarding sessions? What project's onboarding do they				
8	need further training to teach?				
m, Transform -	 Who needs training to facilitate lean 				
ling	simulations?				
	Communication Planning:				
//	· How will team members be informed				
Questions	of onboarding timelines?				
t to share with all new	from onboarding be reinforced				
	visually throughout the project?				
sting the onboarding					
ull asherefor	Continuous Improvement:				
an andarang	How will the onboarding process be				
aluated and by who?	How will the effectiveness of				
ara wit be used and	sessions be evaluated?				
ht at onboarding?	 Who will review the content or audit the sessions for quality and 				
	effectiveness?				

Lean Deployment Planning



Methods by Function and Project Phase





44

Evaluating Lean Methods

- The purpose of the evaluation step is to prioritize methods that add value to the project
- Consider Value to the project
- Review and share awareness and experience using methods

			_
	Low	Medium	
- 4	(In-depth training needed)	(High-level training needed)	- (
	[
35			
8			
88			
68			
분용 📕			-
8 18			H
Σũ			
50			
žš			
19 (B			
28			
80			
2			
2			
	Projec	at Team's Experience with Me	ati
	Le. Av	vareness and Understanding	i L







Lean Deployment Planning

Step 2: Select Lean Methods



Review lean methods () 01 INITIATE **Evaluate methods Select methods** © LEAN CONSTRUCTION INSTITUTE





Download at cic.psu.edu/lean

46



Method Selection Worksheet

		Customer(s)	Value to Customer(s)	Responsible Party	ty Resources or training needed to Notes		Proceed with Method
			High / Med / Low		mperient		YES / NO / MAYBE
Production System Design	Last Planner System	[Project Team]	High	Construction Team	Lean Coach needs to conduct pull planning workshop for hands-on	Contact organizational lean	YES
		[Client]	Medium		training	coucinnie consultant	
Scope & Cost Management	Target Value Design	[Project Team]	High	Design Team	Experienced design team, no additional		YES
		[Client]	High		training needed		
Design Development	Set-based Design	[Project Team]	Medium	Design Team	Experienced design team, no additional		MAYBE
		[Client]	High		training needed		
Information Managemennt	Big Room Planning	[Project Team]	High	Project Management	Lean coach needs to conduct training	Contact organizational lean coach/hire consultant	YES
		[Client]	High		workshop for hands-on training		
Information Management	Visual Management	[Project Team]	High	Project Management	Need data analytics and visualization training for individuals responsible for	Contact trainers for webinars/in-person	YES
		[Client]	High		performance reports	workshops	
Team Organization	Work Clusters	[Project Team]	High	Project Management	Experienced team, no additional		YES
		[Client]	Low				
Team Organization	Onboarding	[Project Team]	High	Project Management	Experienced team, no additional		YES
		[Client]	Medium				



Select your methods

Method Selection Worksheet



Client

Team 1 Review each of the lean methods in the two charts below. Decide, as a team, which methods you would like to perform on the project, and place either a green (yes) checkmark or a red (no) x on the method. You can use the matrix at the bottom to evaluate each method if you would like **Operating System Methods - Definitions** Production Design development Scope & Cost Target Value Design Last Planner System Set-based Design A method to explore and optimize design A design approach that meets target cost A practice that focus on planning and Collaborative and commitment-based system of planning and control that helps alternatives in small sets, based on a set of and client's needs by focusing on creation of organizing a space to facilitat develop a reliable workflow through pull design criteria, for the project, to find the value, innovation, and elimination of waste in planning make-ready look-ahead planning, and weekly work planning. Design Structure Matrix SIPS/Takt Planning Agile Planning Short Interval Production Scheduling (SIPS) An approach to planning the development of A method to determine project related A way to manage information visually cuses on detailed planning of worker and design by prioritizing a portion of the work scope and making realistic commitments to the design sequence for the project systems crew level tasks at short (15 or 20 minute) finish them based on analysis of previous and/or elements. intervals for highly repetitive work. performance. Modularization Value Stream Mapping Strategies employed in production to Mapping the process by including value and An explicit description by a Customer of all Planning for implementation of building velop assemblies off-site to streamline non-value add work activities to identify work flow and add efficiencies to work onareas of improvement in the delivery process. Customer to feel that he or she received interview service whet was wanted Additional Techniques used in Lean Implementation 5-S First Run Studies Poke-Yoke Trial execution of a process ahead in time in A Japanese term for mistake-proofing An approach for workplace organization and order to determine the best means. method or device used to prevent an error or maintaining visual control. The "S" stands for: methods, sequencing, etc. to perform it. defect from happening or being passed on to Sort, Set, Shine, Standardize, Sustain. the next operation Organization Methods - Definitions







48

Break



© LEAN CONSTRUCTION INSTITUTE





Methods Discussion



- What methods did you agree to implement?
- Which methods were harder to agree? Why?
- How were you able to address the goals / risks you defined earlier?
- How does your current understanding of the methods influence your decisions?





Operating System Methods - Definitions

Production

Last Planner System

Collaborative and commitment-based system of planning and control that helps develop a reliable workflow through pull planning make-ready look-ahead planning and weekly work planning.

SIPS/Takt Planning

Short Interval Production Scheduling (SIPS) focuses on detailed planning of worker and crew level tasks at short (15 or 20 minute) intervals for highly repetitive work.

Modularization

Strategies employed in production to develop assemblies off-site to streamline, work flow and add efficiencies to work of

Design development

Set-based Design

A method to explore and optimize design alternatives in small sets, based on a set design criteria, for the project, to find the best solution.

Aaile Plannina

An approach to planning the development of design by prioritizing a portion of the work scope and making realistic commitments to finish them based on analysis of previous performance.

Value Stream Mapping

Mapping the process by including value and non-value add work activities to identify areas of improvement in the delivery process.

Scope & Cost

A design approach that meets target cost

and client's needs by focusing on creation of

value, innovation, and elimination of waste i

Target Value Design

all forms of resource consumption.

Design Structure Matrix

A method to determine project related

interdependencies and accordingly develop

the design sequence for the project system

A practice that focus on planning and organizing a space to facilitate collaborative and interactive engagement of project teams.

A way to manage information visually such that it enables collaboration, open communication, helps track progress and notice disruptions

An explicit description by a Customer of a

and/or elements.

the actual requirements that must be satisfied by the Performer in order for 🕅 Customer to feel that he or she received exactly what was wanted.

Conditions of Satisfaction

3P

Additional Techniques used in Lean Implementation:

First Run Studies

Trial execution of a process ahead in time in order to determine the best means, methods, sequencing, etc. to perform it.

Poke-Yoke

A Japanese term for mistake-proofing method or device used to prevent an error or defect from happening or being passed on to the next operation.

5-8

An approach for workplace organization and maintaining visual control. The "S" stands for: Sort, Set, Shine, Standardize, Sustain,

Information Management

Big Room Planning

Visual Management

BIM Execution Plan

Planning for implementation of building information modeling (BIM) using a structured process to define uses, information hand-offs, and derverables.

3P stands for Production Preparation Process, which is laid out to physically organize the area where new work is about to begin.

Organization Methods - Definitions

Team Organization

Problem-solving

Decision-making

Onboarding

Activities conducted strategically to quickly/ get everyone on the same page regardless of when they join the project team. Example, orientations, trainings, team building vercises, etc.

A3 thinking (PDCA)

Documentation approach for problemsolving and reporting on project-related critical decisions using the Plan - Do - Check - Adjust. (PDCA) method for continuous, reprovement.

Choosing by Advantages

A multi-criteria decision-making method developed by for determining the best decision by quantifying the advantages of each option.

Quality Circles

Work Clusters

Multifunctional work groups created within the project team to pursue complex decision-making and problem-solving by gutting in use the different experience and skills of every member.

Additional Techniques used in Lean Implementation:

5 WHY Analysis

Problem solving technique to determine root cause by diving deeper into the "why" five times.

Ohno Circles

Figuratively refers to a portion of the workplace identified to be observed and

PICK Chart

An ease/impact chart that segregates ideas into possible, implement, challenge, and kill categories.





Continuous Improvement

A participatory management technique that engages workers directly in identifying and solving problems that span different steps in the design or production process.

Spaghetti Diagramming

A map that shows current layout of operations and path taken by people, product, or the service as it moves through the process.

Gemba Walk

Means "Going to the work" or walking the job site where the actual work is done to identify

Step 2: Selecting Lean Methods

- Begin to identify champions of each initiative
- Start on Day 1
- Don't jump into the deep end (don't try to do it all at once)
- Start with some easy wins
- Continue regular Lean Initiatives session to engage the larger team







DRK
ers / Dan Munn
ie S. / Chase V.
F. / Tom H. D. / James H.
Emily L.
Greg M.
odney W.
. / Tom H.
/
/
/

Lean Deployment Planning Guide Step 3: Plan Each Lean Method

DININI



© LEAN CONSTRUCTION INSTITUTE

Lean Construction Institute

ransforming the Built Environment



Step 3: Plan Each Lean Method





55

Method Planning A3 Template



Method:

Champion(s):

Goal:

(please list the project goal this method supports)

Customer(s):

(please list the customers, but internal to the team or external that are targeted as beneficiaries of this method)

Task Breakdown	Responsible Party	Milestone

Related Methods:

(please identify other methods the team is pursuing, or should consider, that support or can be enabled as a result of, this methods use on the project)

Project:

Metrics:

(please identify the measures that will be used to track and identify challenges, and successes, in the implementation of this method.

- Be sure to capture the party responsible for tracking each
- Consider the specific times, or frequency, the metrics are captured and shared

Education Plan:		
Level	Who?	When?
Introduction		
Deep Dive		
Trainer		

Communication Plan:

(please identify the how the method and its implementation is communicated to project stakeholders)

- What forms will be used (presentations, posters, posted logs)
- How often does it need to be shared? With which audiences?
- Who is responsible for maintaining and updating it?

Continuous Improvement:

(please define the timing and process that will be used to improve the use of this method

- Who will review or assess the current implementation?
- When and how often will the process be assessed?
- How will targeted improvements be incorporated into future steps?

10/11/18





Method Planning





© LEAN CONSTRUCTION INSTITUTE





Goal, champion, and participants

Method:

Champion(s):

Goal:

(please list the project goal this method supports)

Customer(s):

(please list the customers, but internal to the team or external that are targeted as beneficiaries of this method)

Task Breakdown	Responsible Party	Milestone

Related Methods:

(please identify other methods the team is pursuing, or should consider, that support or can be enabled as a result of, this methods use on the project)

- Goal which project CoS and team member goal(s) does this method support and enable?
- Champion which team member will be leading the implementation of this method?
 - Should be engaged in the project on a daily basis
 - Role should align with method use, support their responsibility for implementation
- Customer & Participants: who should be involved in planning the methods?
 - Participants should be involved in planning and implementing
 - Customers should be recipients / benefit from the use of the method

10/11/18



Tasks and Related Methods



Method:

Champion(s):

Goal:

(please list the project goal this method supports)

Customer(s):

(please list the customers, but internal to the team or external that are targeted as beneficiaries of this method)

Task Breakdown	Responsible Party	Milestone

Related Methods:

(please identify other methods the team is pursuing, or should consider, that support or can be enabled as a result of, this methods use on the project)

- **Tasks** what are the one time and repetitive tasks that need to be planned to manage the use of the method?
 - Appendix C method specific questions to support planning
 - Assign timeline and responsible party for implementing each task / step
- **Related Methods** identify methods that are • inter-related with the use of this method
 - Methods Summaries (App C) help identify this
 - Supports consideration of shared metrics, training, and implementation tasks

10/11/18



Education and Communication Plans

- Education Plan define who needs to be trained for using this method and how deep the training needs to delve
 - Introduction general awareness or understanding of method
 - Deep Dive active participants in using method
 - Trainer those that lead, facilitate, or train others
- **Communication Plan** define the critical aspects that need to be communicated throughout the project team
 - Where can information be displayed?
 - What can be embedding in onboarding?
 - How can we create routines and processes that enable regular updates and sharing?



Metrics:

(please identify the measures that will be used to track and identify challenges, and successes, in the implementation of this method.

- Be sure to capture the party responsible for tracking each •
- Consider the specific times, or frequency, the metrics are captured and shared

Education Plan:			
Level	Who?	When?	How?
Introduction			
Deep Dive			
Trainer			

Communication Plan:

(please identify the how the method and its implementation is communicated to project stakeholders)

- What forms will be used (presentations, posters, posted logs)
- How often does it need to be shared? With which audiences? •
- Who is responsible for maintaining and updating it?

Continuous Improvement:

(please define the timing and process that will be used to improve the use of this method

- Who will review or assess the current implementation?
- When and how often will the process be assessed?
- How will targeted improvements be incorporated into future steps?



Metrics and Continuous Improvement

- **Metrics** the metrics and measures should • support tracking and monitoring
 - Should align with project processes
 - Identify best information/metrics first, then refine
- **Continuous Improvement** define the plan for • monitoring, evaluating, and improving the use of the method
 - Should align with metrics being captured
 - Define meetings/timelines for review and evaluation
 - Capture actions and improve!

Project:

Metrics:

(please identify the measures that will be used to track and identify challenges, and successes, in the implementation of this method.

- Be sure to capture the party responsible for tracking each
- Consider the specific times, or frequency, the metrics are captured and shared

Education Plan:			
Level	Who?	When?	How?
Introduction			
Deep Dive			
Trainer			

Communication Plan:

(please identify the how the method and its implementation is communicated to project stakeholders)

- What forms will be used (presentations, posters, posted logs)
- How often does it need to be shared? With which audiences? •
- Who is responsible for maintaining and updating it?

Continuous Improvement:

(please define the timing and process that will be used to improve the use of this method

- Who will review or assess the current implementation?
- When and how often will the process be assessed?
- How will targeted improvements be incorporated into future steps?



EXERCISE: Define your Daily Huddle Plan

Customer(s):

Task E

- What tasks need to be performed
 - What metrics can you use to measure?
 - How will this be communicated?
 - How will we identify and phase in improvements?

Related Methods:

(please identify other methods the team is pursuing, or should consider, that support

communication Plan:

(please identify the how the method and its implementation is communicated to project stakeholders)

- What forms will be used (presentations, posters, posted logs)
- How often does it need to be shared? With which audiences?
- Who is responsible for maintaining and updating it?

Continuous Improvement:

(please define the timing and process that will be used to improve the use of this method

- Who will review or assess the current implementation?
- When and how often will the process be assessed?
- How will targeted improvements be incorporated into future steps?

(please identify the measures that will be used to track and identify challenges, and successes, in the implementation of this method.

- Be sure to capture the party responsible for tracking each
- Consider the specific times, or frequency, the metrics are captured and shared

ean Construction Institute **Immersive Education Program**

hen?	How?

Barton ALEXANDER	ANNONDESIGN	LIBERTY ELEBERTY ELEBERTY Stechnology Stechnology Stechnology Stechnology	Micompany AN Nat Glass		Stantec	Pe Ha
Method Name:	MAHAN RYK	CIEL SINTE Champion(s) Name:	Date:	6/4/2019		
		Larry D./ Greg M./ Em				
Goal(s):			Metric(s):			
Speed to Market RollUp Informat	tion from Huddle into the Last Pl	lanner System	Effective Comm	inication (not sure	how to track?) Tea	am Health 5 Why
Strong Team Communication	Trackable Metrics		Have past const	raints been resolv	ed, or are they still ou	itstanding? Log/tra
Accountability, Creates Culture of Team Collabo	ration		Attendance Trac	king early Issues and	resolution thru huddles	Tracking issues that
To Resolve Issues Quickly, Bring to attention	Standard Agenda		Short goals, not b	ogging team down wi	th out of reach goal time!	rramesr Unboarding s
Celebrate win, Good Catches			Education Dia			
Customorfoli			Education Pla			
customer(s):				evel	Who?	When?
Superintendents/ Project Management (BMA) a	and Subcontractor Management	:	Facilitator			asap
			Tracker (Monitor	of Daily Huddle Iss	ues) Participants of Hud	dle
TASK BREAKDOWN	Responsible Party	Milestone	Communicatio	on Plan:		
Create the standard agenda	Superintendents (PM's)		White board, hu	ddle board		
Define the metrics on the huddle board	Any project team member		Report/notes de	eveloped at the en	d of each huddle and s	saved on Box
Create the Huddle Board	Larry D/ Em		Picture of huddl	e board saved on E	Box	
Identify the location for the Huddle Board	Larry D/ Em					
resolved	Any project team member					
Establish a cadence for how often the huddle	hity project teammember					
meets	Larry D/ Em/ Greg M					
Related Methods and Strategies:			Continuous In	nprovement:		
Last Planner System			Plus/Deltas (Go	ood Catches)		
Work Cluster Groups			Evaluation of the	processes that ha	ve been developed for	r the Huddle Board
Visual Management			revised?	processos (nacina	in seen serenoped to	
Onboarding			Team feedback			
Gemba Walks/ 6S Observations			5 Why Analysis			

n	nState Health	-
np	den Medical Center	Institute
		ım
	Responsible Party	
5	Jeff Work Sessions	
ickir	Jeff Work Sessions	
creat	Jeff Work Sessions	
Succe	Jeff Work Sessions	L
	How?	
	LCI webinars, LCI Books, BM LC	
	Facilitator/Trainer (Jeff Creighton)	
		-
		l.
- are	• they working? Do they need	



Daily Huddles

- Standard agenda
- Anyone can run
- Safety
- Metrics (each day)
- Why?
- WIN
- Ideas
- Kudos









Playvideo

© LEAN CONSTRUCTION INSTITUTE





Lean Deployment Planning Guide Step 4: Integrate Methods into Project Plan



© LEAN CONSTRUCTION INSTITUTE



ean Construction Institute

sforming the Built Environment



Step 4: Integrate Methods to Project Plan

Record project conditions of satisfaction and associated methods

Consolidate project measures for tracking alignment to implementation plan

Consolidate all training to be completed on the project

Consolidate all communication strategy(ies), and continuous improvement opportunities





Project Summary Dashboard



Project: ABC Recreational Complex Renovation

Project Conditions of Satisfaction

Rapid issue-detection and resolution

Continuous and reliable workflow

High performing project team

Effective , efficient, and timely team communications

High performing building design

Organization Methods	Operating System Methods
Onboarding	Last Planner System
Work Clusters	Target Value Design
Gemba Walk	Big Room Planning
A3 Thinking/Reports	Visual Management

Lean Champion(s): Jane Doe

Lean Implementation Metrics:	Sta
All lean methods champions identified within 30 days of lean implementation planning kick-off	
Lean plan completed within 90 days of kick-off	
Education and Training Metrics	Sta
New person onboarding completed within 30 days of hire	
All lean champions trained within 30 days of kick-off	
All lean trainings completed within 90 days of kick-off	
Communication Metrics	Sta
Communication Metrics Project issues identified did not cause project delay	Sta
Communication Metrics Project issues identified did not cause project delay Identified project issues resolved within 15 days	Sta
Communication Metrics Project issues identified did not cause project delay Identified project issues resolved within 15 days Zero change orders post issue of detailed design docs.	Sta
Communication Metrics Project issues identified did not cause project delay Identified project issues resolved within 15 days Zero change orders post issue of detailed design docs. Continuous Improvement Metrics	Sta
Communication Metrics Project issues identified did not cause project delay Identified project issues resolved within 15 days Zero change orders post issue of detailed design docs. Continuous Improvement Metrics Plus-deltas recorded from all collaborative sessions	Sta
Communication Metrics Project issues identified did not cause project delay Identified project issues resolved within 15 days Zero change orders post issue of detailed design docs. Continuous Improvement Metrics Plus-deltas recorded from all collaborative sessions Deltas addressed in future sessions	Sta
Communication Metrics Project issues identified did not cause project delay Identified project issues resolved within 15 days Zero change orders post issue of detailed design docs. Continuous Improvement Metrics Plus-deltas recorded from all collaborative sessions Deltas addressed in future sessions Pluses repeated in future sessions	Sta







Resources





© LEAN CONSTRUCTION INSTITUTE

atisfaction	Status	Implementation Measures	Status
		Education/Training Measures	Status
	Otatura	Promoving the file allowers Manager	Status
	Status		Status
		Continuous Improvement Measures	Status

Summary and Lessons from Hampden Medical Center Project

DURDERCE



© LEAN CONSTRUCTION INSTITUTE

Lean Construction Institute

ansforming the Built Environment

Current Progress: Hampden Project

Building handed over to Owner May 2021

First Patient – October 1, 2021





Happy Client! Lancaster Project

Project Started One Year After Hampden

> Set To Open Summer 2022

\$240M Greenfield Hospital



Lean Construction Institute Immersive Education Program


How can I apply this to my project?

Start with Lean Deployment Guide Day 1



Identify Lean Champion Early; Champions by Method



Support by Owner and Leadership



Be deliberate with onboarding process and have continuous training



Don't take on too much – do what's right for your project



Continually promote a Lean culture



Go slow to go fast and take time to plan





Insights



- Start with 'Why', followed by 'How', and then 'What'
- Be proactive versus reactive \bullet
- What matters should be measured and what is measured should matter \bullet
- Focus on continuous improvement
- Delivery method can significantly impact implementation ۲
- Training and coaching are core parts of the planning and implementation
- Challenging to institutionalize within an organization ullet



Questions?



Conduct Plus/Delta

Conduct a Plus/Delta Capture on a flip pad or white board:

Plus: What produced <u>value</u> during the session?

Delta: What could we <u>change to improve</u> the process or outcome?

	Ð	



Lean Construction Institute Immersive Education Program



eLearning Courses

Available now:

- Introduction to the Last Planner System®
- Introduction to Lean Project Delivery \bullet
- Lean in the Design Phase \bullet
- Effective Big Room
- Target Value Delivery





BEGIN

This course will allow you to gain in-depth insight to the practical application of the Last Planner® System (LPS) through multimedia, hands-on interactions, diagrams, worksheets, and more. The key achievable goal of this course is to learn how to engage at all five levels of LPS effectively on a day-to-day basis with a team implementing the system.

WELCOME





The key achievable goal of this course is to prepare and enable team members with a foundational understanding of Lean approaches for daily use within a project environment.



LPD **OVERVIEW**

LESSON 1: LESSON 2: Lean Project Delivery Syster LESSON 3:

© LEAN CONSTRUCTION INSTITUTE



INTRODUCTION TO LEAN PROJECT DELIVERY





This concludes The American Institute of Architects Continuing Education Systems Course



info@leanconstruction.org

Lean Construction Institute