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Immersive Education Program

Introduction to Lean in the Design Phase

Virtual Course

Michael Williams

INSERT PRESENTATION DATE

Lean Construction Institute

Provider Number H561

Introduction to Lean in Design

LCIV.LDPh

Presenter

date

2 HSW Credit(s) earned on completion of this course will be reported to AIA CES for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

Course Description

During the Design Phase, teams seek ways to improve client outcomes while maximizing design excellence. Lean In The Design Phase participants gain insight to Lean approaches and tools relative to the design phase to optimize team communication, collaboration and results. Learners will understand how a Lean strategy can drive innovative solutions by connecting people, principles and practices. This course is foundationally important for anyone involved in preconstruction to improve the impact you are having on the project outcomes.

Learning Objectives




01.

Participants will learn key definitions of Lean, review foundational goals and benefits, recognize key components and discover the Eight Wastes.

02.

Participants will earn how to connect people through collaborative communication by understanding the Lean mindset, and identifying keys to developing a high-performing team.

03.

Participants will ;earn how to connect principles and practices by discovering the benefits of key Lean approaches: Big Room, Target Value Delivery and Collaborative Planning.

04.

Participants will discover set-based design practices, understand the impact of sound decision-making, and the relationship to optimizing outcomes.

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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
- Use E.L.M.O.
- Silence phones
- Be focused and engaged
- Stay on time
- Have fun!

Lean Journey to Mastery

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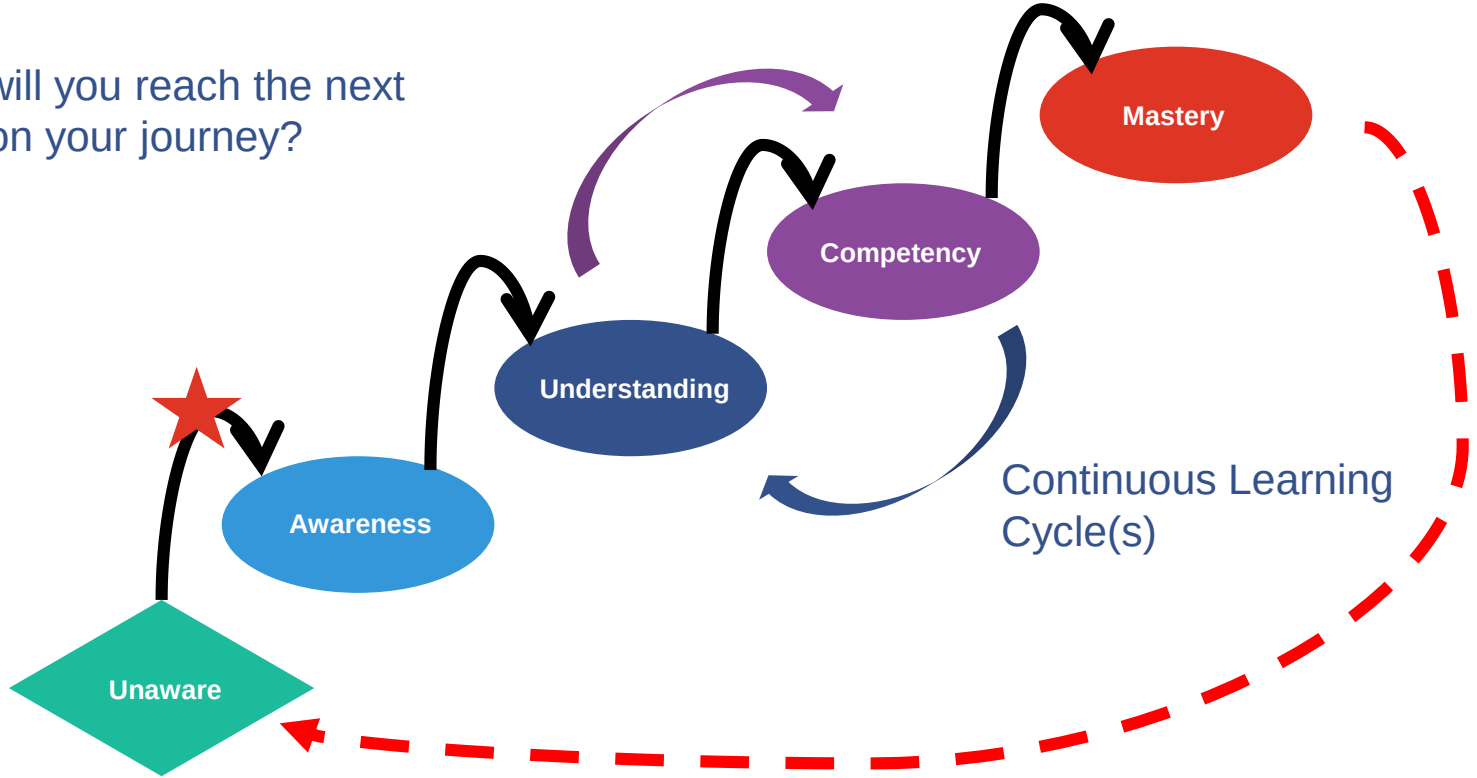
How will you reach the next level on your journey?



Discussion Question

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What are some challenges in managing design projects?

Chat Box
3 minutes

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Challenges in Design

By nature – Design is **complex**

It often involves **thousands of decisions**

Sometimes over a period of **many years**

With **numerous interdependencies**

Under **highly uncertain environments**

Reference: Freire, J., & Alarcon, L. F. (2002). Achieving Lean Design Process: Improvement Methodology. Journal of Construction Engineering and Management

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Challenges in Design

Design can involve a large number of participants

Include many decision makers

Require trade-offs between competing criteria

Be based on inadequate (or incomplete) information

with intense budget and schedule constraints

Reference: Freire, J., & Alarcon, L. F. (2002). Achieving Lean Design Process: Improvement Methodology. Journal of Construction Engineering and Management

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Traditional Delivery Outcomes…

- Risk is high.
- 70% of projects are delivered late.
- 73% of projects are over budget.
- Rework and waste is high.
- Teamwork is unreliable.
- Customers are not satisfied.
- Profit margins are shrinking.

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Traditional Delivery Outcomes…

Lean Project Delivery Enables

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- Risk to be collaboratively managed.
- Projects to be delivered on time.
- Projects to be delivered within the budget.
- Minimizing waste and rework.
- Team-wide reliability.
- Higher customer satisfaction.
- Fair profits for providers.

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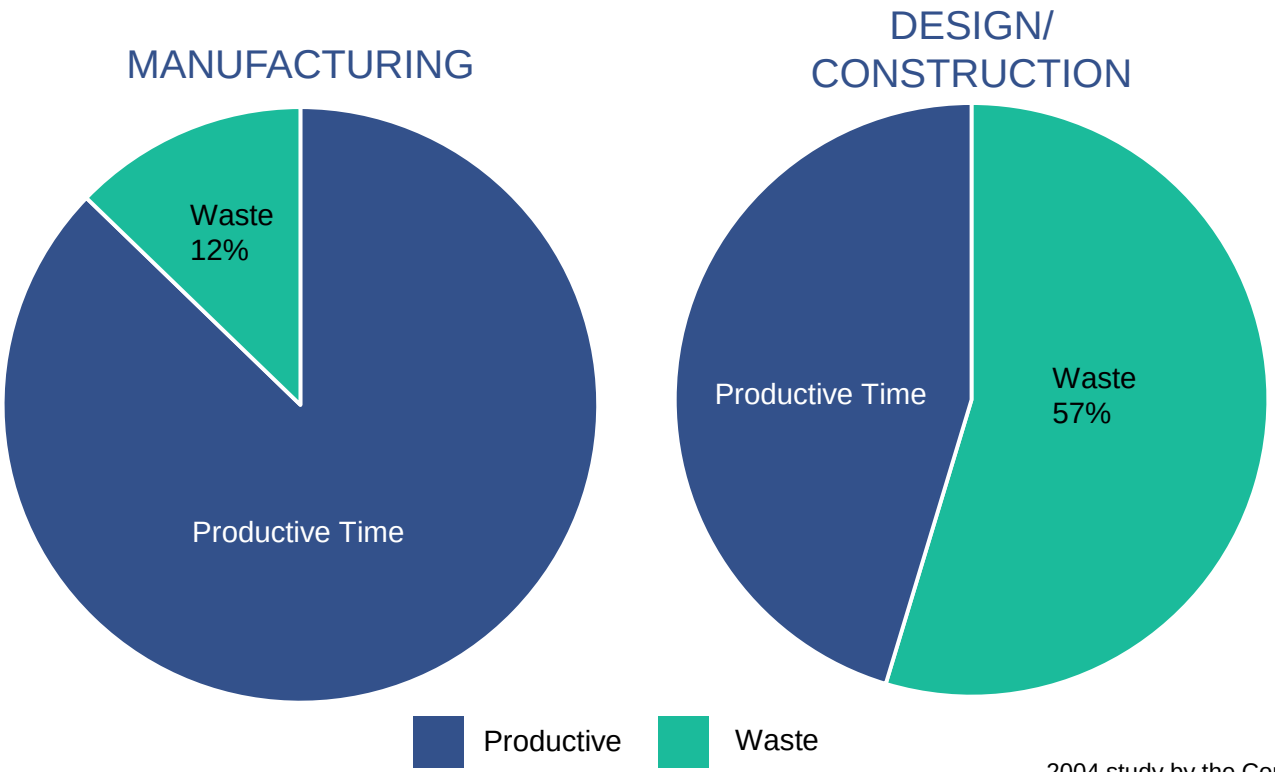
The Opportunity…



2004 study by the Construction Industry Institute

Correlation of Lean

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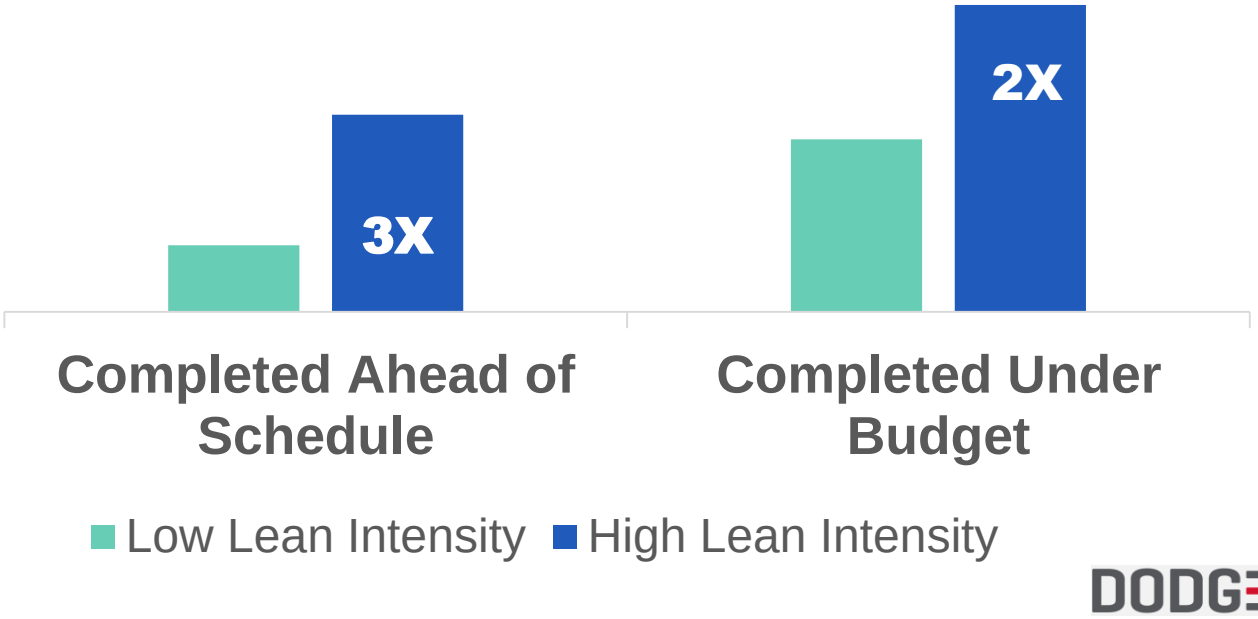
Correlation of lean intensity to outcomes (% likelihood on best projects)



DODGE DATA & ANALYTICS

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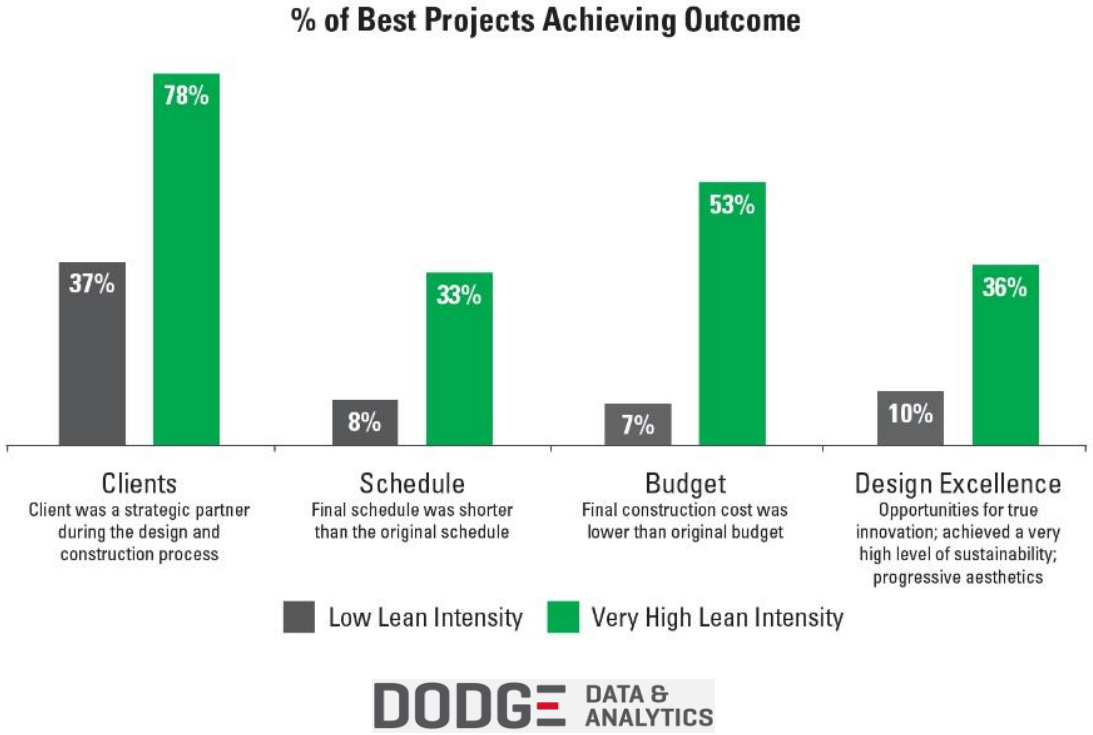
Correlation of Lean in Design

In an industry study, Dodge benchmarked “best” and “typical” projects from 310 designers. Each project was completed in 2012 or later with construction costs of at least $10M.



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Definition

Lean:

Culture of respect and continuous improvement aimed at creating more value for the customer while identifying and eliminating waste.

Lean Operating System:

An organized implementation of Lean Principles and Practices combined to allow People to operate in unison to create flow.

Goals of Lean Design & Construction

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1. Achieve reliable workflow
2. Maximize value to the customer
3. Minimize waste
4. Optimize the whole, not the parts
5. Develop a discipline of learning and continuous improvement.

Lean in Design

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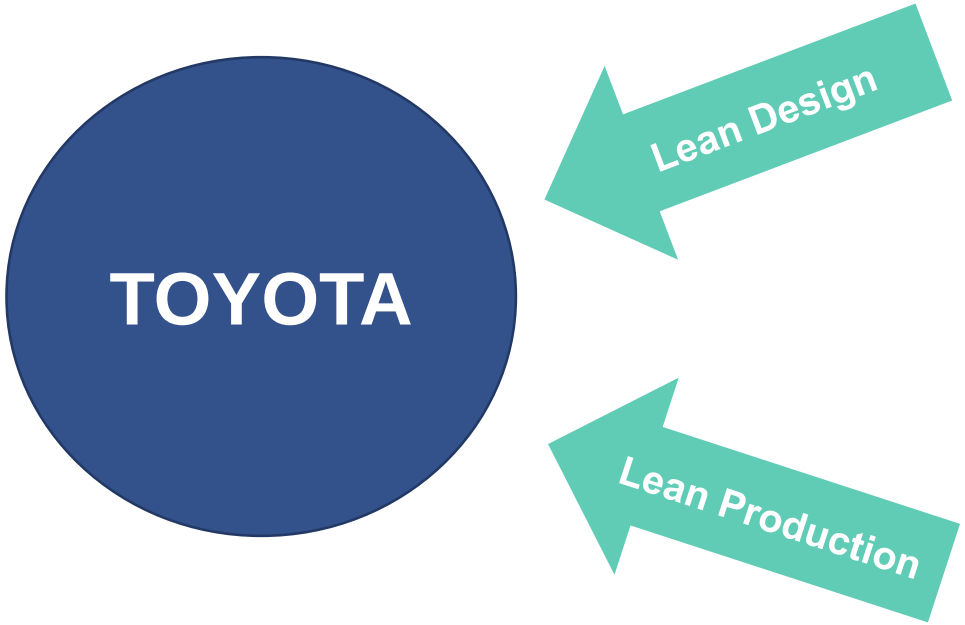

Maximize innovation!

A process to maximize innovation
…not standardize design

Minimize waste!

Compliments of Stan Chiu, HGA

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Project Elements

Lean teams organize in a structure that leads to improved outcomes.

Lean can be implemented regardless of commercial terms:

A Lean Operating System is a organized implementation of Lean Principles and Practices combined to allow People to operate in unison to create flow.

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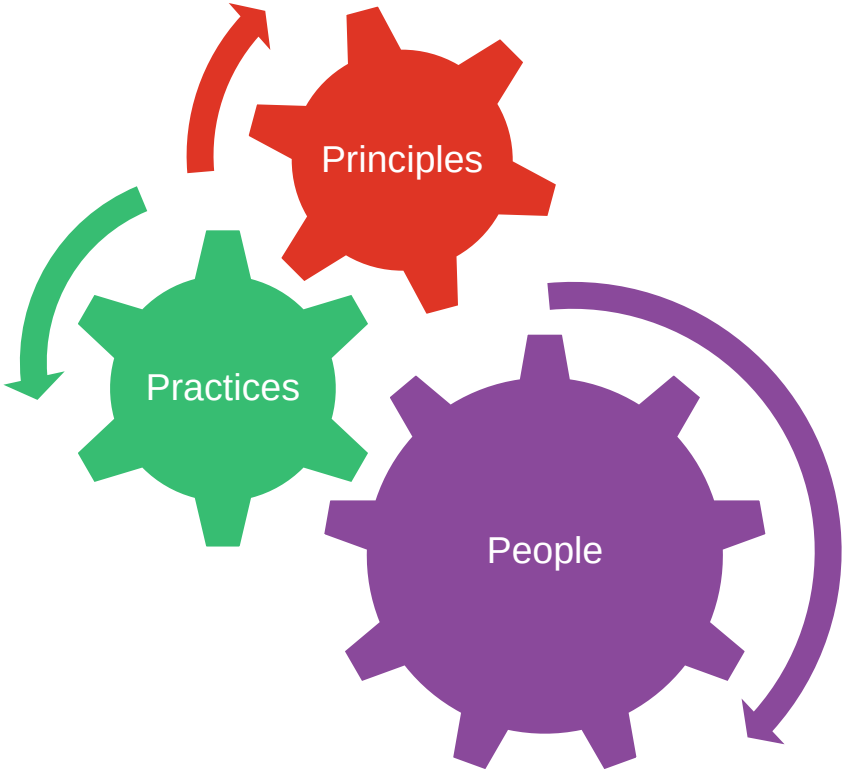
Lean Operating System

Components Include:

- Principles
- People
- Practices



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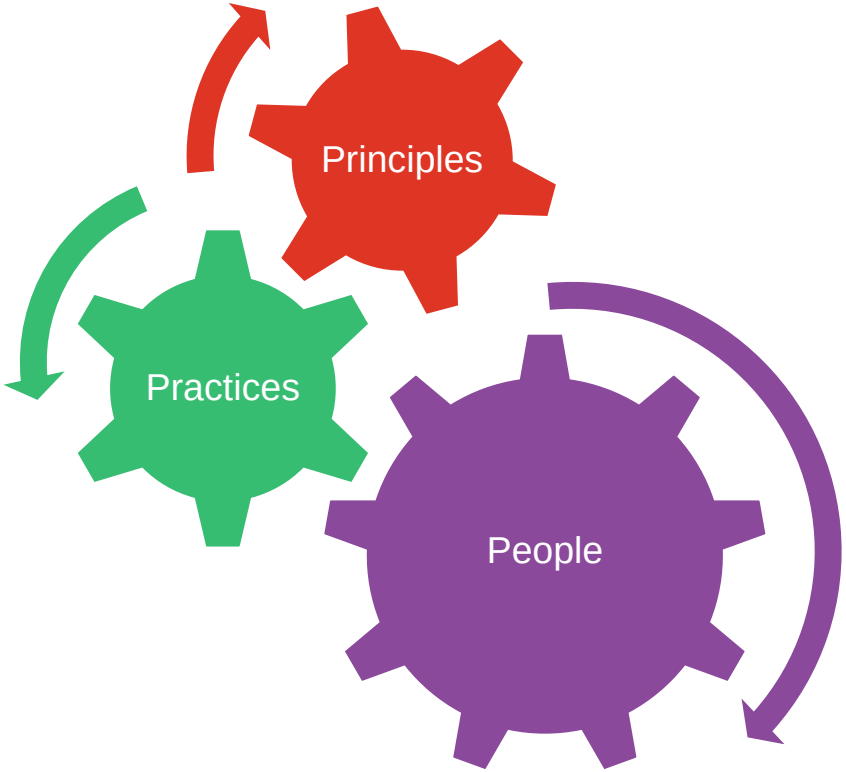
Principles

- LCI Six Tenets
- Eight Wastes



Six Tenets of Lean

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1. Respect for people
2. Optimize the Whole
3. Generate Value
4. Eliminate Waste
5. Focus on Flow
6. Continuous Improvement

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Generating Value

If it is not something the client is willing to pay for - it is non-value added.

Everything that is not value is waste, and therefore should be eliminated, simplified or reduced.

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Waste Defined

Waste is any activity that requires time or resources but does not create value as defined by the customer.

Eight Types of Waste

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- Over/Under Production
- Waiting
- Unnecessary Transportation
- Over Processing
- Excess Inventory
- Unnecessary Motion
- Defects
- Unused Creativity of Team Members
  (Not listening/Not speaking up)

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1. Discussion Question – Breakout Room

List examples of waste you see in design and construction process.

Breakout Discussion
(5 minutes)
3 Groups share a key takeaway
(1 min each)

Continuous Improvement (PDCA)

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Lean thinking demands a mindset of continuous improvement.

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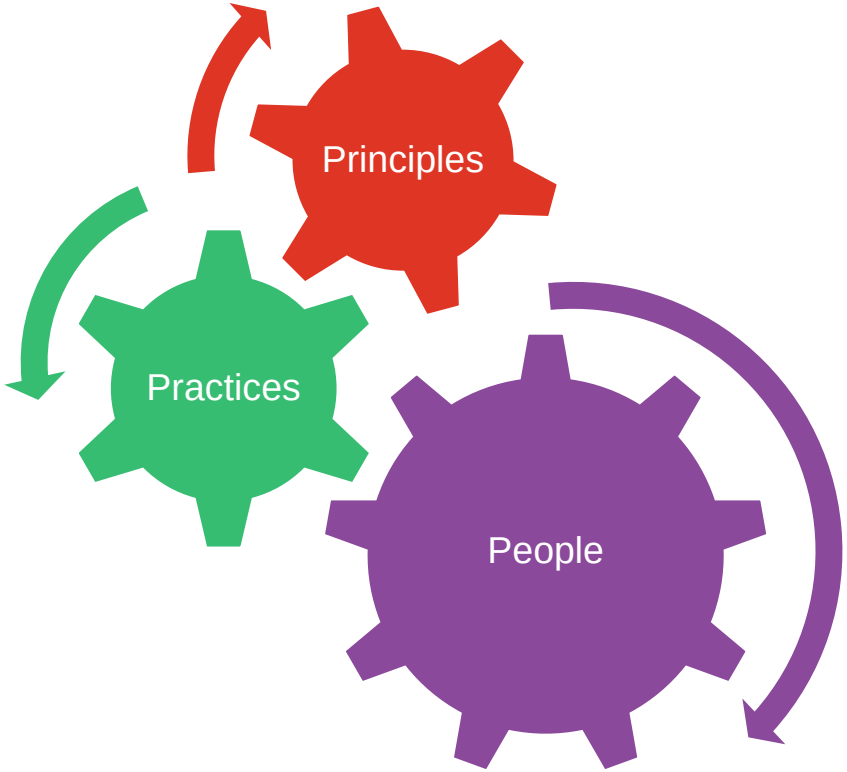
People

- Project as a Promise
- Conditions of Satisfaction
- High Performing Team



Project As A Promise

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- All groups can be viewed as operating as a *network of promises* or commitments, whether done well or poorly.
- The goal is to understand how to *improve the quality* of commitments
- And to *actively take responsibility* for managing them.
- The Last Planner System is a planning system based on developing a *network of commitments*, then delivering on the commitments.

Resource

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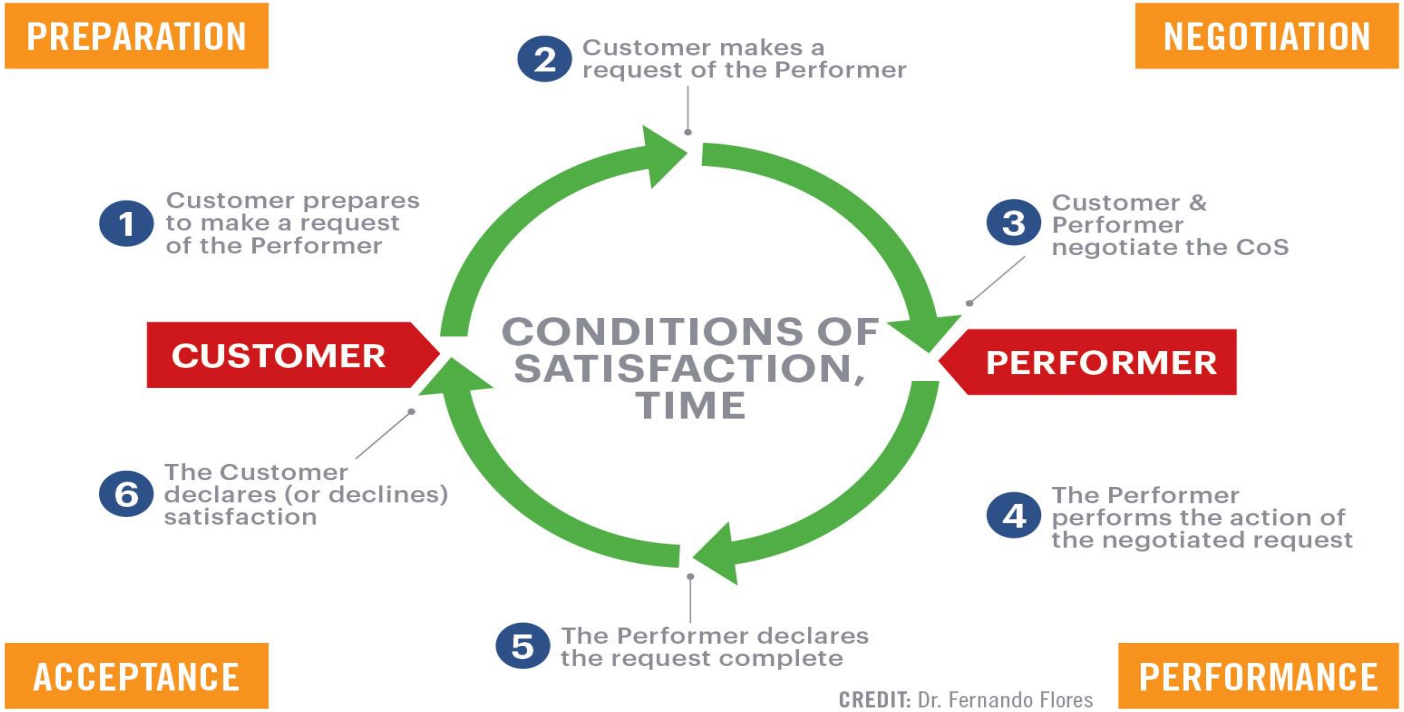
Basic Action Workflow Of A Promise



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Conditions of Satisfaction (CoS):

- Are developed by the team informed by the *Value Definition Statements*.
- Measurable statements that inform a project team about which *tests a project must pass* to be accepted as a success.
- Inform the *decision-making process* of the team.
- Are *developed by the team* including the owner.

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2. Discussion Question – Breakout Room

How might creating a commitment-oriented environment improve your team's outcomes?

Breakout Discussion
(5 minutes)
3 Groups share a key takeaway
(1 min each)

Characteristics of High Performing Teams

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1. A high performing team is built on a strong foundation of trust among all members.
2. There is a culture of respect that enables members to effectively delivery against CoS.
3. High performing teams break down barriers through innovation and continuous improvement
4. They break down traditional silos to maximize skills and optimize performance.

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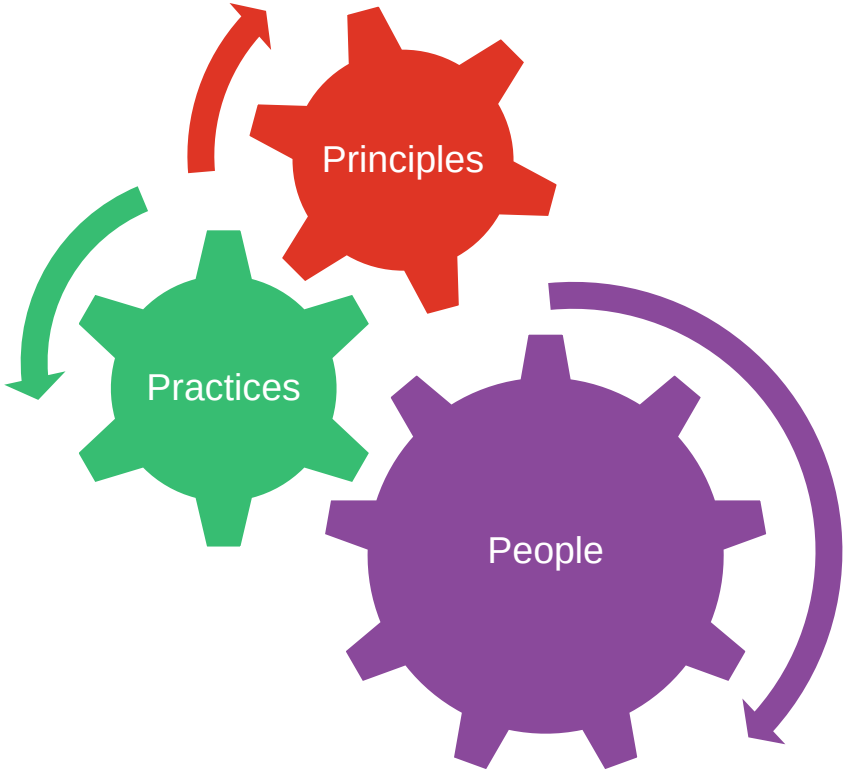
Practices

- Team Organization
- Big Room Mindset
- Collaborative Planning
- Target Value Delivery



Early Team Involvement

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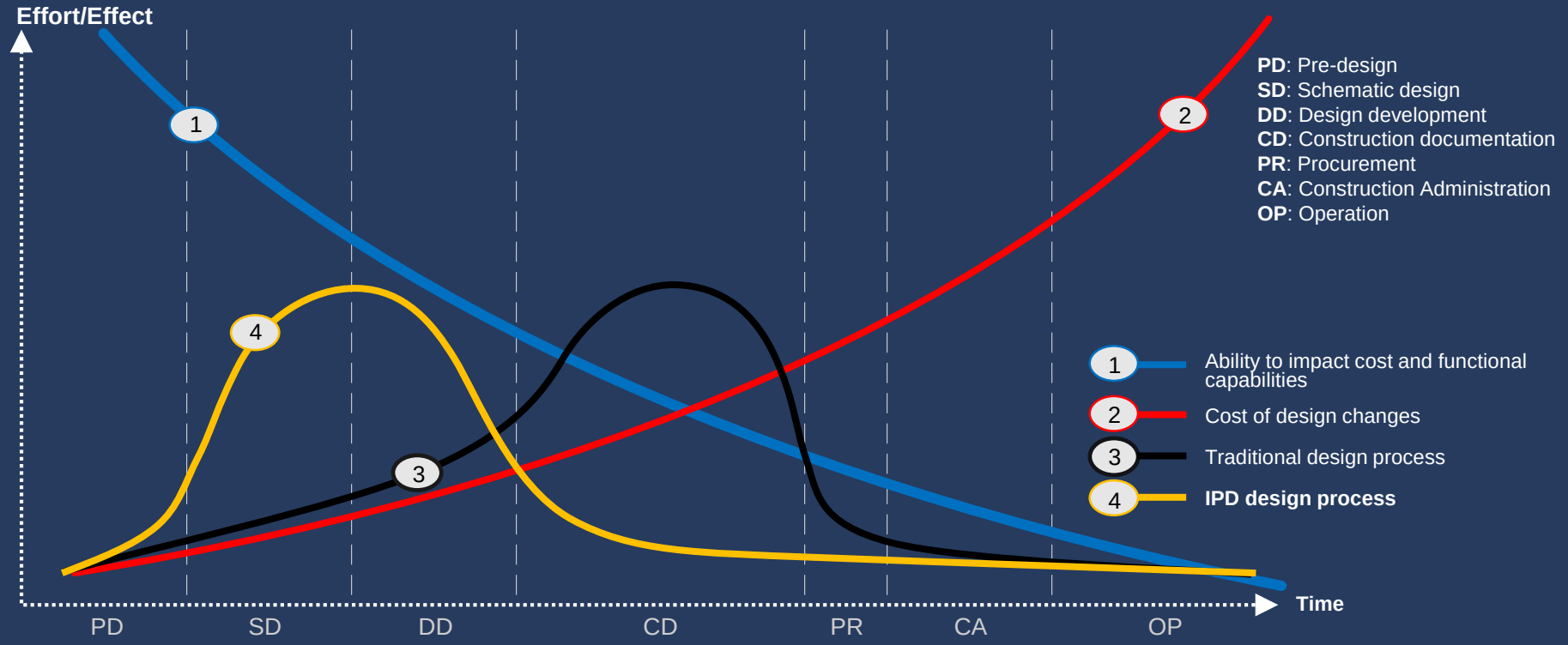

Graphic courtesy of Patrick MacLeamy AIA / HOK

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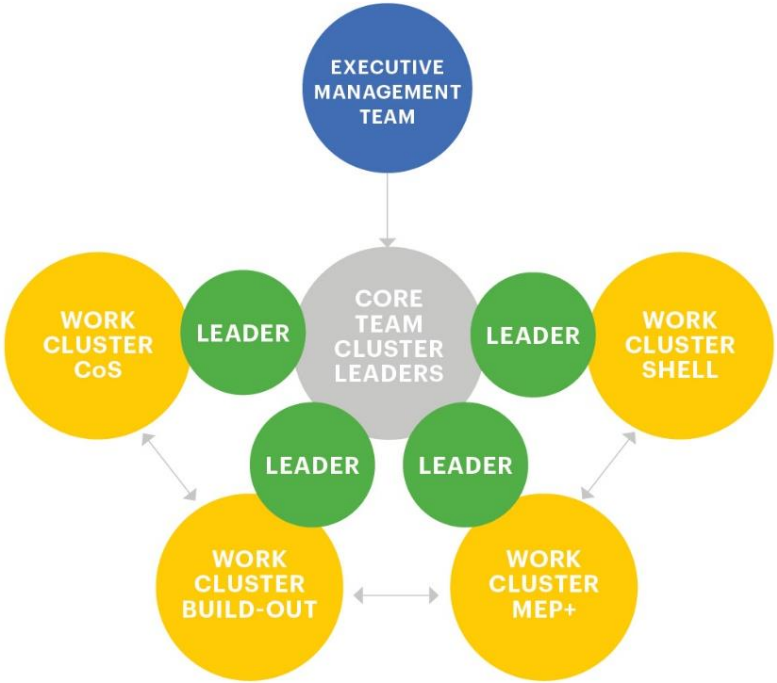
Work Cluster Organization

Executive/Senior Management:
- Not involved in day-to-day of team
- Resolve conflicts

Core Team:
- Day-to-day leaders of the team

Work Clusters:
- Leader
- System oriented
- Cross discipline
- Stakeholder representation
- Form as need

Work Cluster Leader:
- Coordination between work cluster & core team



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Big Room

Is a project approach of bringing key individuals together to:

- Speed communication
- Improve decision-making
- Reduce siloed thinking or approaches.

Big Room is a commitment to a project, the team, and to working together!

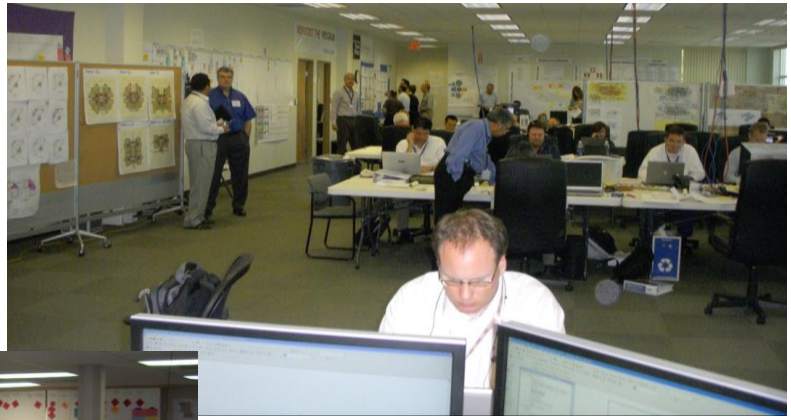
Big Room

- Fosters behavior leading to high performing team
- Adds significant value
- Drives down overall project costs
- Supports a the rapid advancement of work in short time frame
- Produces less rework & waste
- Promotes collaborative brain power output

Big Room Examples

Small Project
1X Weekly
Big Room

Medium Project
2X Weekly
Big Room



Large Project
100% Co-location
Big Room

Last Planner System®

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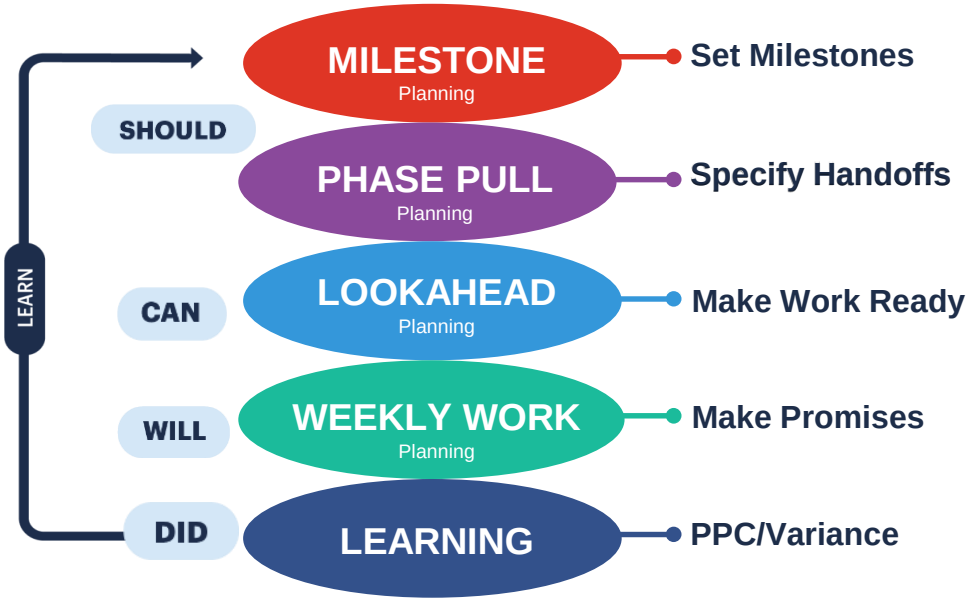
The LPS is a commitment-based system integrating 5 connected planning conversations:

1. Milestone Planning (Should)
2. Phase Pull Planning (Should)
3. Lookahead Planning (Can)
4. Weekly Work Planning (Will)
5. Learning (Did/Learn)

5 Connected Conversations



Last Planner System® in Design

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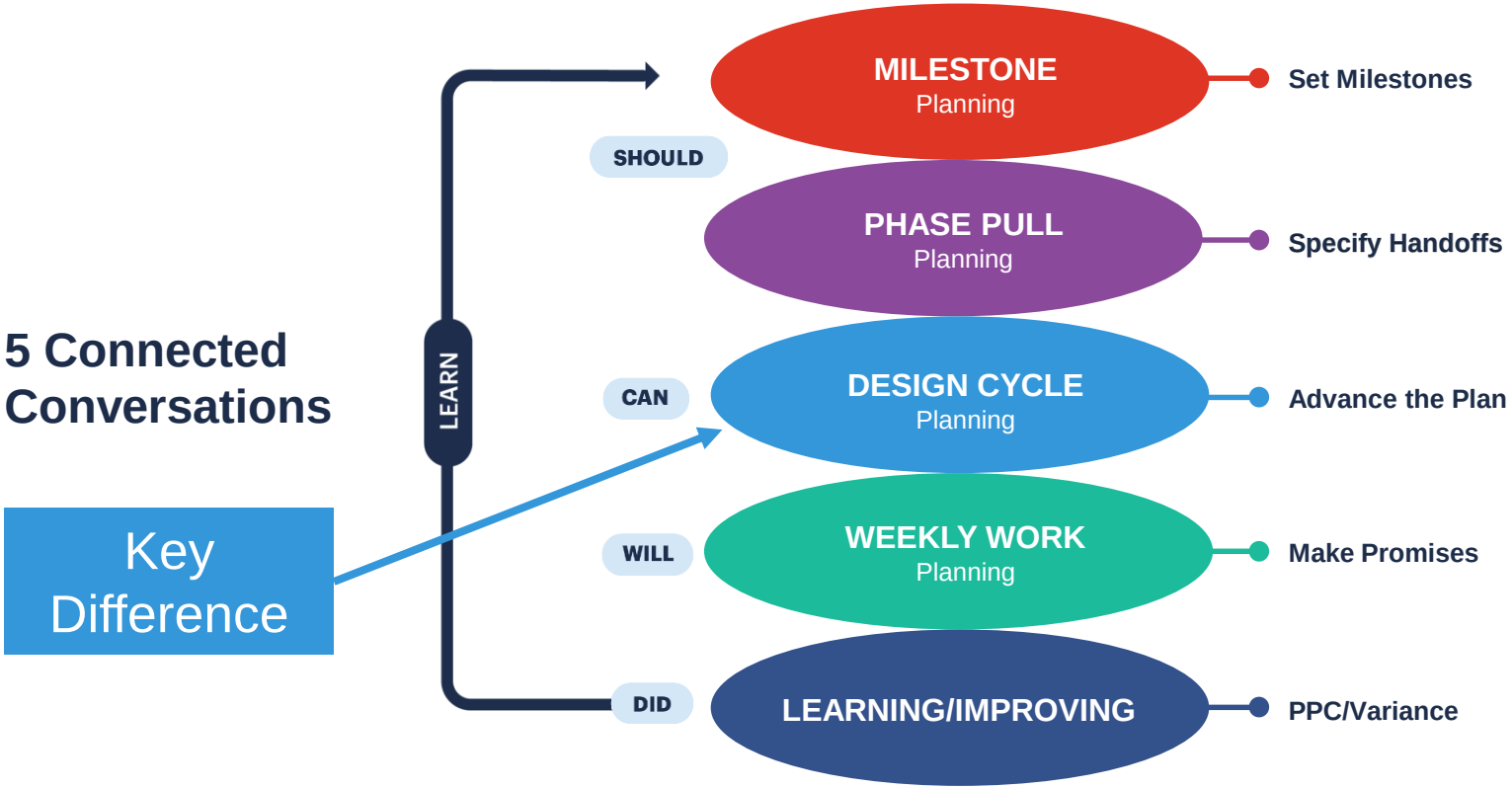

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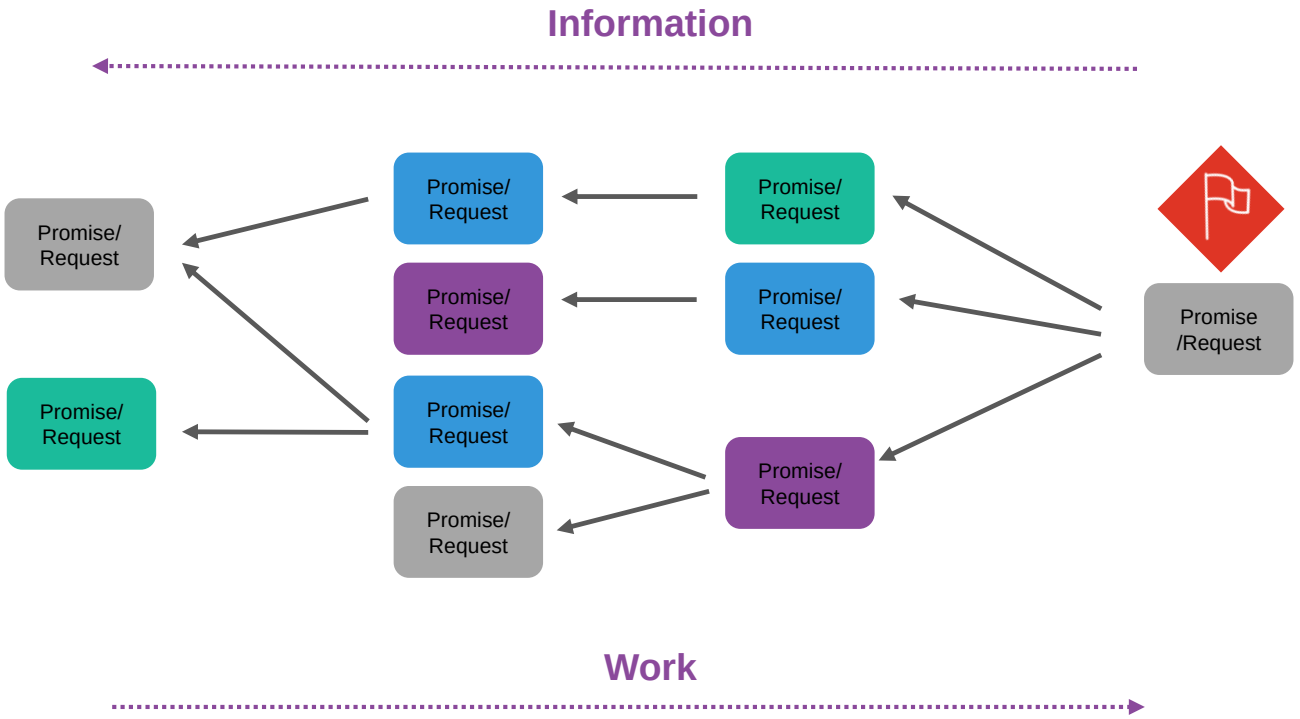
Pull-Creating Flow



Milestone Planning Example

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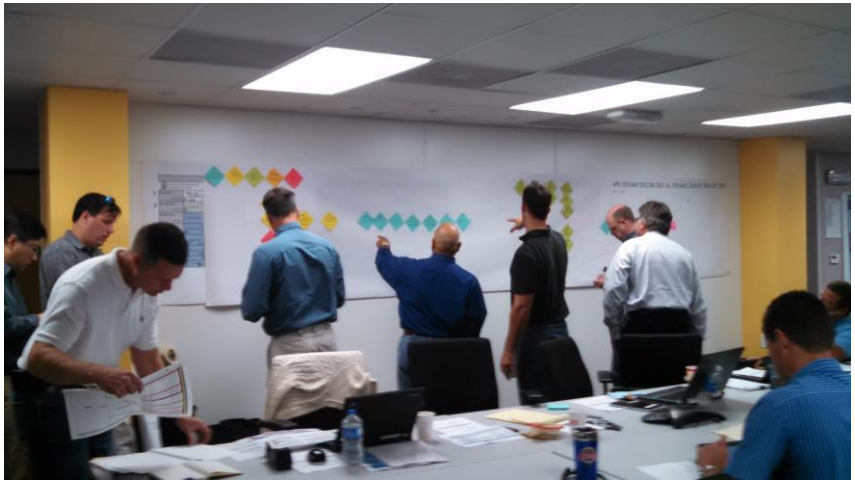
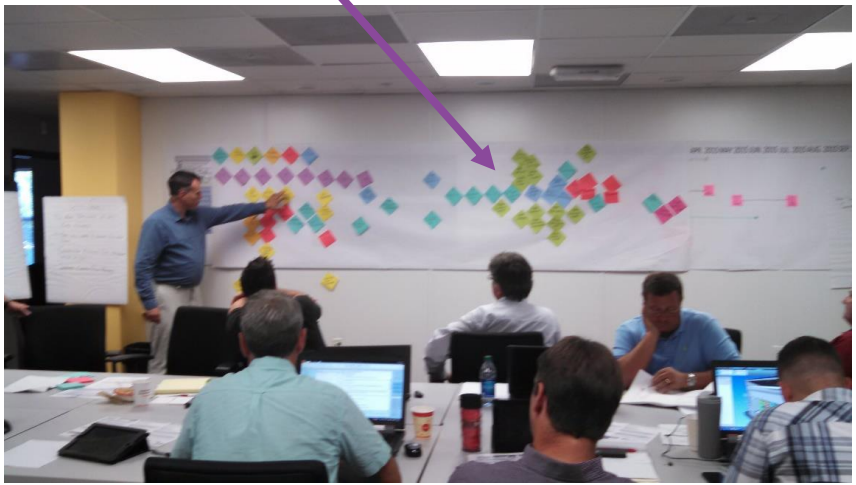
Colors for different aspects of the plan





Phase Pull Planning

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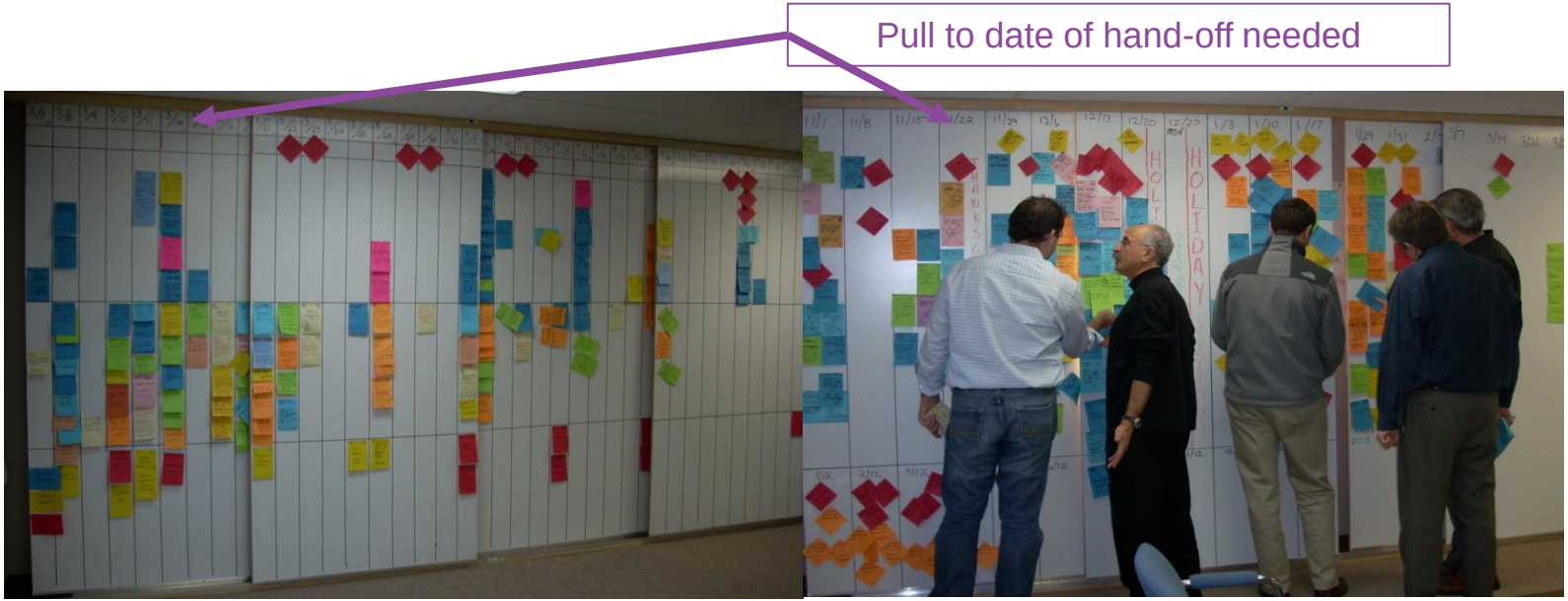

UHS Temecula Valley Hospital Team

Target Value Delivery

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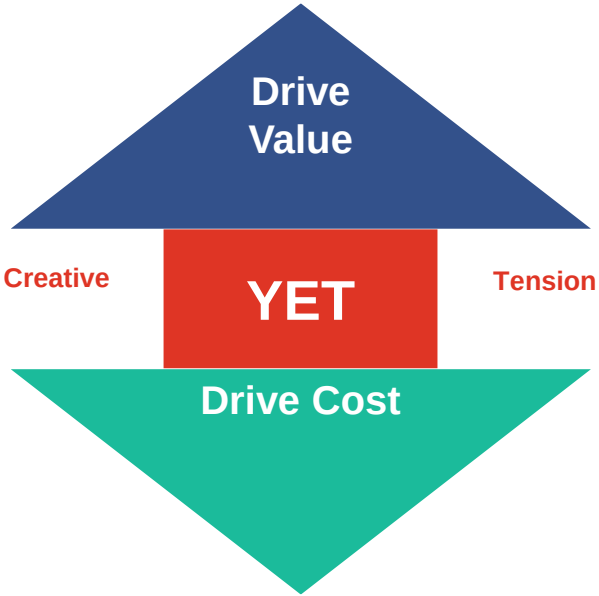
- Target Value Delivery is a culture of Lean thinking and approaches.
- It is to be applied holistically to obtain maximum value.
- It generates a creative tension between driving value up YET driving cost down.



Target Value Delivery

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Traditionally:

- Cost is an output of design
- Finish your work before I start mine mentality
- Early commitment to design solutions in silos
- Design then determine cost, then rework

Target Value Delivery:

- Cost is an input to design
- Information is shared early and often
- Sets of solutions are carried and optimized holistically
- Continuous estimating and cost modeling based on concepts

Traditional vs. Target Value Delivery

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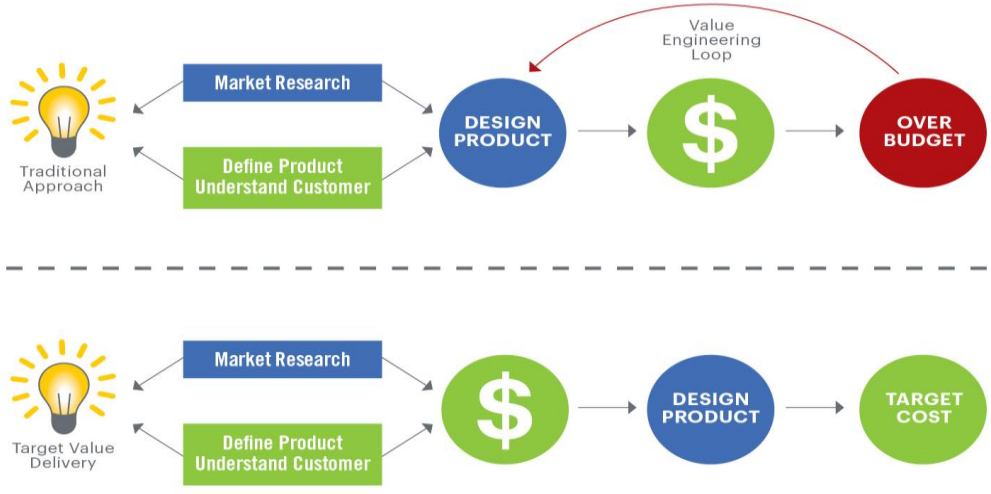
The goal of TVD is to minimize the waste produced by the design-estimate-redesign cycle(s) of the traditional value engineering approach.

Cost is an *output* of design



Cost is an *input* of design

Courtesy of HKS Architects

TVD & Cost Modeling

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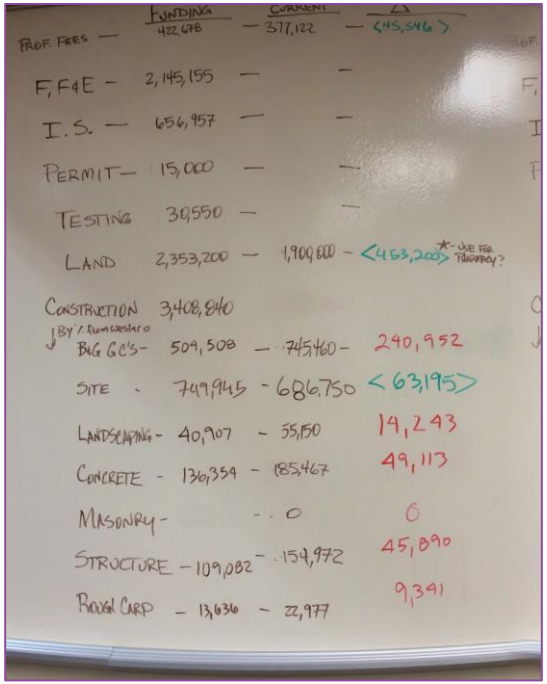
- Model of the cost components & systems of a project.
- Structured to allow the costs to be continually updated.
- Provides the team with a constantly up to date cost model.
- Should allow for projecting ‘what-if’ scenarios based on value decisions that have yet to be made.

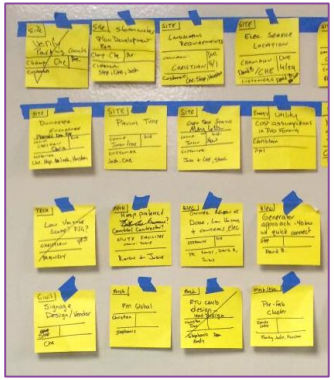
Cost Model (Simple Approach)



CWE/ Cost Model Tracking

Risk

Path Back



Hot Topics

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3. Discussion Question – Breakout Room

How might implementing Target Value Delivery methods change how your team works and the outcomes?

Breakout Discussion
(5 minutes)
3 Groups share a key takeaway
(1 min each)

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Set-based Design

Set-based Design is a method that:

- Keeps requirements and options flexible for as long as possible
- Narrows decisions by means of set intersection
- Results in the best combination that solves the problem as a whole.
- Supports teams driving innovation
- Reduces development costs.
- Agile and Lean intersect at set-based design.

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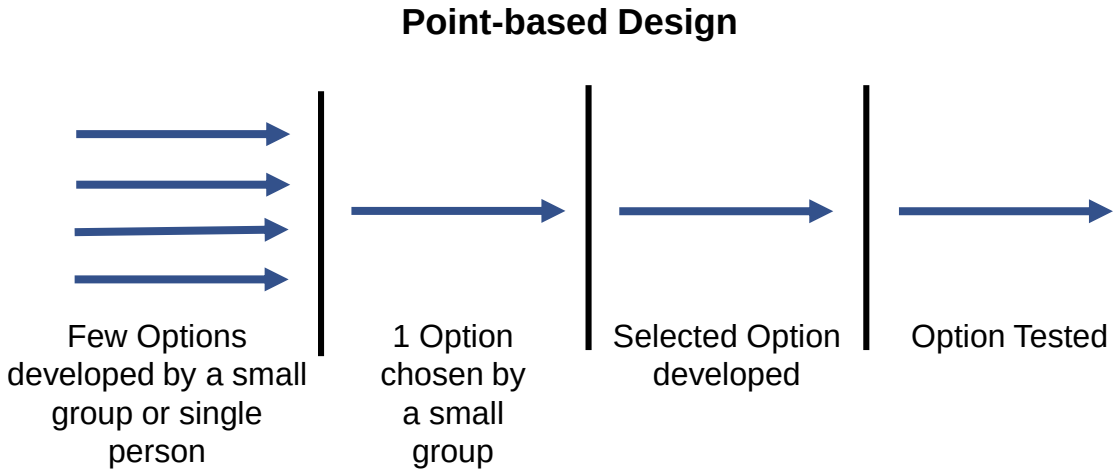
Point-based Design



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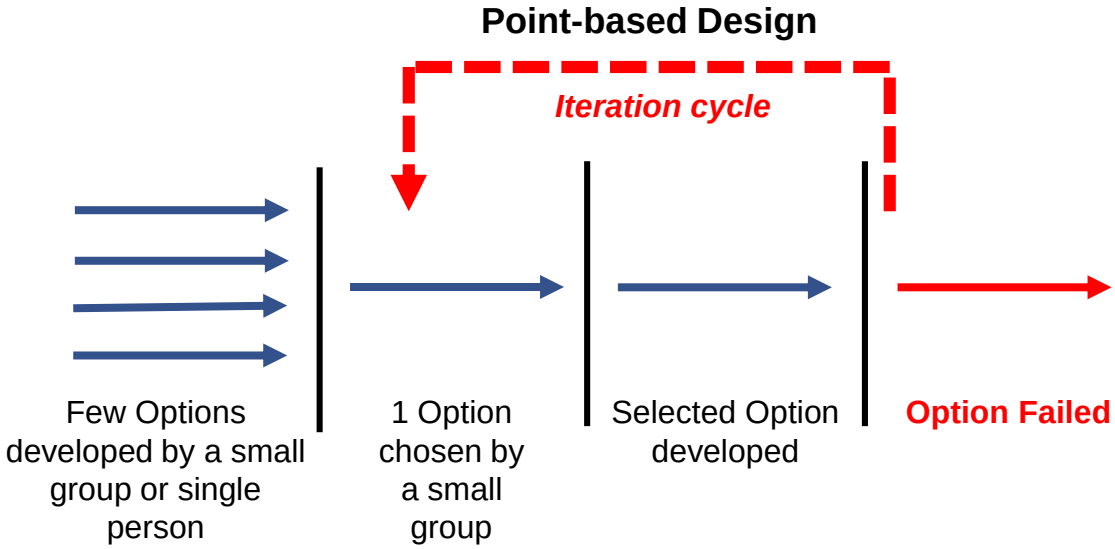
Point-based Design



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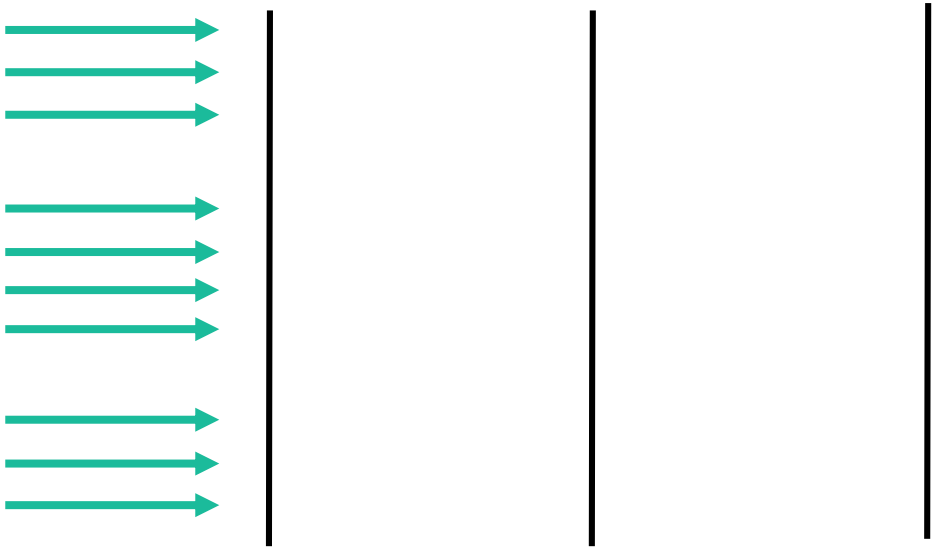
Set-based Design

Many options developed by a diverse group for subsystems.



Courtesy of HMC Architects

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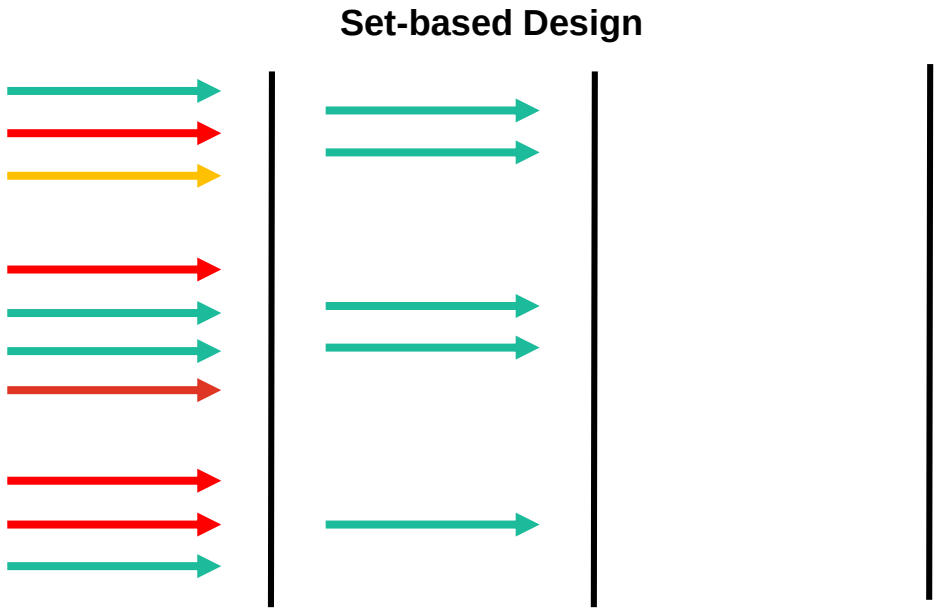
Set-based Design

Many options developed by a diverse group for subsystems.

Evaluate against risks and in consideration of the project as a whole.

Weaker options are eliminated.



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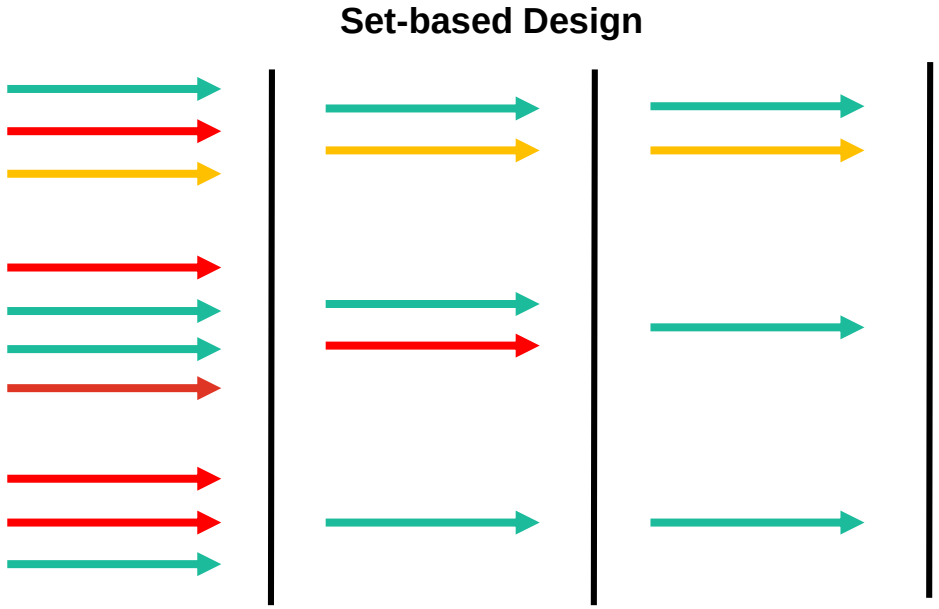
Set-based Design

Many options developed by a diverse group for subsystems.

Evaluate against risks and in consideration of the project as a whole.

Weaker options are eliminated.

Options are continually evaluated and narrowed.



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Set-based Design

Many options developed by a diverse group for subsystems.

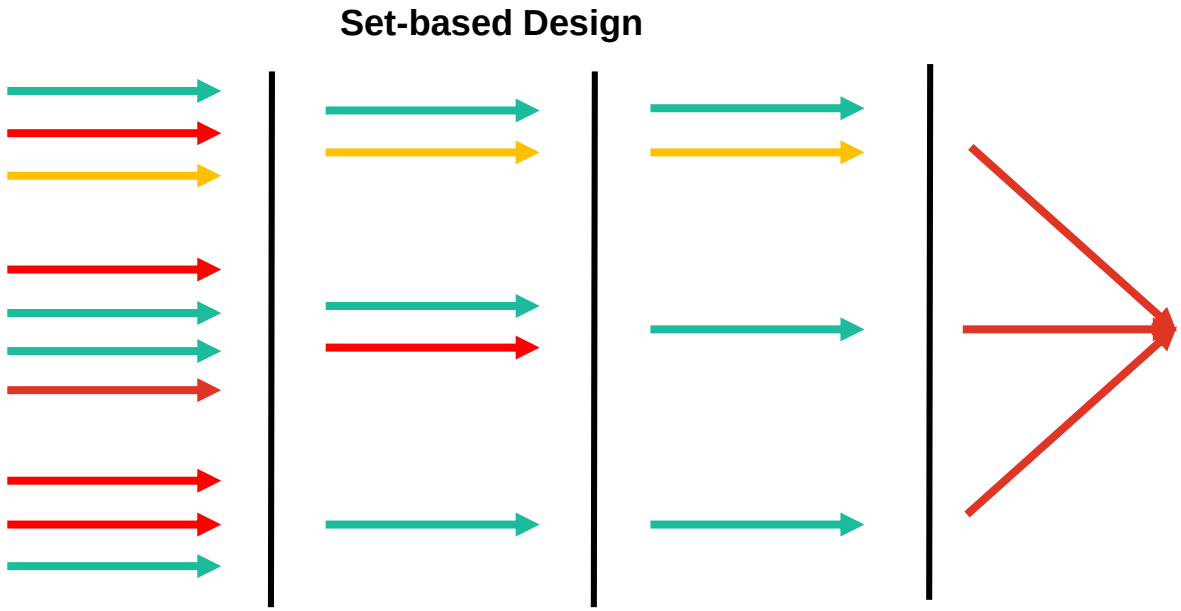
Evaluate against risks and in consideration of the project as a whole.

Weaker options are eliminated.

Options are continually evaluated and narrowed.

Final options selected.

No iterative cycles!



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A3 Thinking Structure

Title: Describes the problem

Background:

Provides the context

Current Condition

Describes what is currently known

Goal/Target Condition:

Identifies the desired outcome

Analysis:

Analyze the situation for root cause creating the gap between current condition and target condition

Collaborators: List

Proposal/Recommendation

Propose countermeasure(s)

Implementation Plan:

Indicates the actions/outcomes, time table and responsibilities

Follow-up

Creates a follow-up / review process

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A3 Example

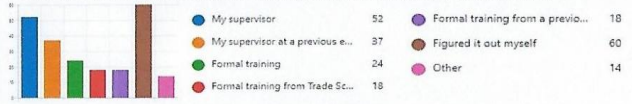
A3 No.	Title	Revision	Champion	Date Started	Collaborators	Approved by:	Status
	Planning Standards	3	Rebecca	4/4/18	Chris, Rebecca, Will, Vern, Eric, Pat, Dan, Jason, Erik		❑ Development ✓ Collaborative review ❑ Implementation

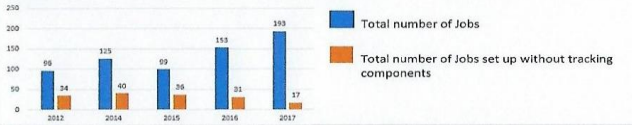
Problem Statement

With significant growth projected and limited availability in workforce, we need to find ways to remove the noise for our foremen and skilled trade workers, so they can be as efficient and effective as possible with their time.

Current State

129 Foremen and Superintendents told us "Where/How did you learn to plan and execute work?"





Future State

We have a baseline process for planning work along with a process for tracking productivity to measure and improve our performance.

Analysis

Proposal

Step 1 Have 1-on-1 Conversations with Proposed Participants	Step 2 Have conversation with Participant and Identified foreman	Step 3 Collect info from Skilled Trades	Step 4 Live Sessions: Day 1 Attendees: Selected Participants and 3-4 GS
• Explain why this is important • Explain what we need • Help them outline the process steps they use, capture in a shareable format • Help them identify a Foreman who is good at scope level planning	• Explain why this is important • Explain what we need • Help them outline the process steps they use, capture in a shareable format	• Have Participants and Foreman ask skilled trades for the top 3 things that get in their way from being as productive as possible. • Create survey?	• Each participant share what they do for Job Level Planning • Discuss as a group, collect advantages of each • Each participant share what they do for Scope Level Planning • Discuss as a group, collect advantages of each
Step 5 Live Session: Day 2 Attendees: Same from Day 1	**Step 6** Live Session: Day 3 Attendees: Same from Day 1 + select Foremen	**Step 7** Implement Draft Process on Participants' Jobs	**Step 8** Follow up Skype Calls Attendees: All from Day 3
• Align on baseling process for Job Level planning • Align on baseling process for Scope Level planning • Prepare team to present the next day	• Present draft baselines of processes • Discuss and improve	• Put processes in system • Have all participants from Day 3 implement the new planning process, noting how they are improving it	• Biweekly or Monthly • What have they improved? • What do we need to improve further?

Follow Up

Action	Who	By when	Notes
1. Create One Note	Rebecca	4/4/18	Complete 4/4/18
2. Get data for charts on current state	Chris	4/13/18	Complete 4/11/18
3. Create Draft A3	Rebecca	4/13/18	Complete 4/12/18
4. Get buy in from DCOs	Chris	4/20/18	Complete 4/20/18
5. Create Prep/Eval sheet for 1-on1	Rebecca	4/20/18	Complete 4/20/18
6. Identify Appropriate Participants	Chris/Rebecca	5/31/18	Complete
7. Get buy in from GS	Chris	6/6/18	Complete 6/6/18
8. Confirm August/September Dates	Rebecca	6/15/18	Complete
9. Create Training Plan for new processes	Chris/Rebecca		After 3-day session
10. Set dates for follow up skype to finalize process	Rebecca		After 3-day session

JEDUNN

DUNN lean

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Choosing by Advantages (CBA)

A decision-making system developed by Jim Suhr for determining the best decision by looking at the advantages of each option.

It is highly recommended that it be taught by a knowledgeable CBA facilitator to ensure proper implementation.

P3 Prototyping

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Learn From Mock-ups

Create real size mock-ups or prototypes of the spaces.

Courtesy of HMC Architects

Group Discussion Question – Chat Box

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New Actions?

What new actions or ideas that you learned today can you take back to your project?

Chat Box
3 minutes

Lean Journey to Mastery

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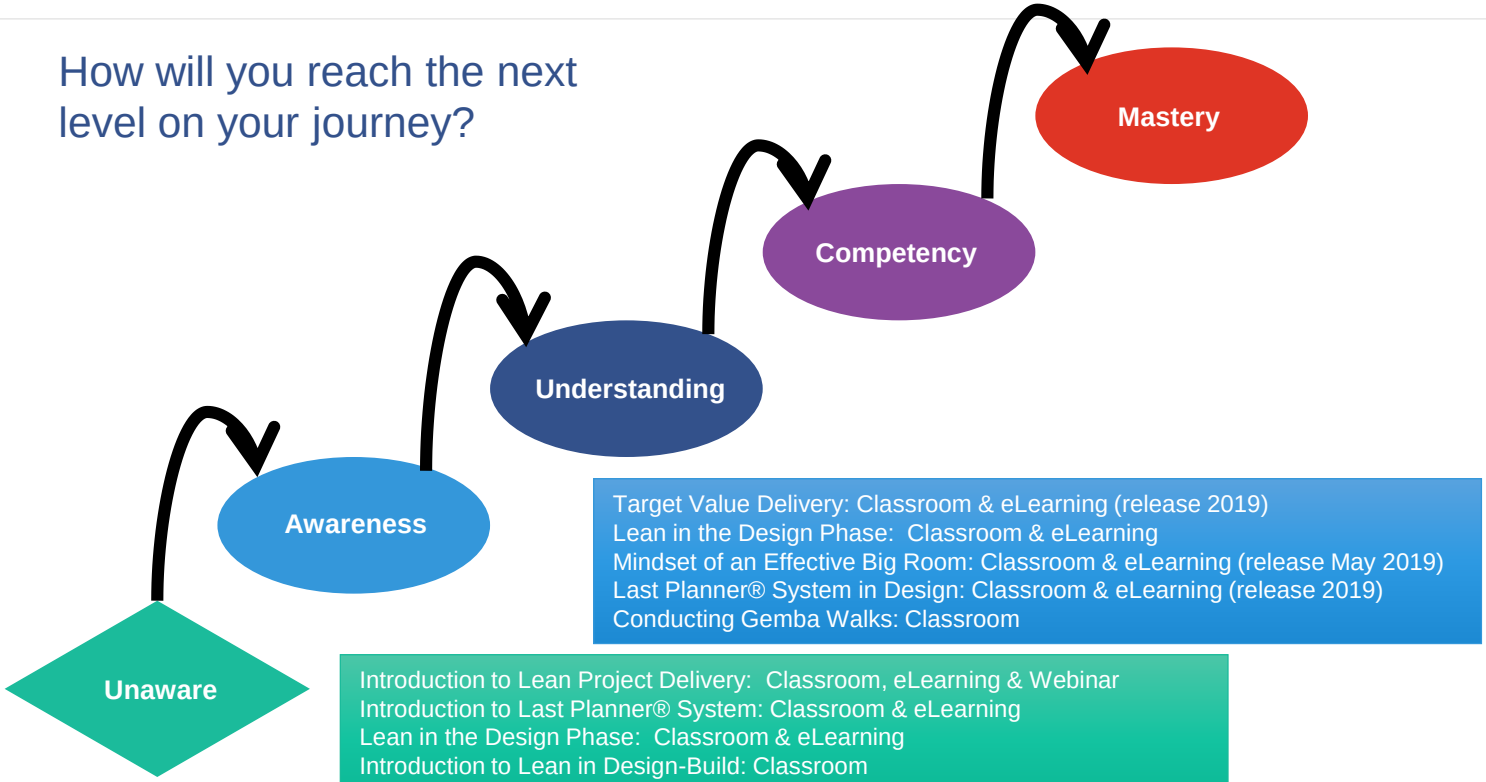
How will you reach the next level on your journey?



More on Learning

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Books:

Events:

- Local Community of Practice
- Congress (October)
- Design Forum (May)

eLearning:

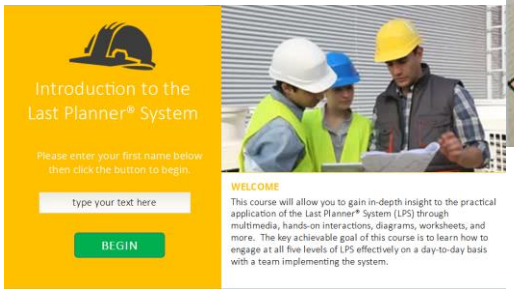
Learn on your own time without taking time off project work.

Start learning now:

www.LeanConstruction.org

eLearning Courses

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



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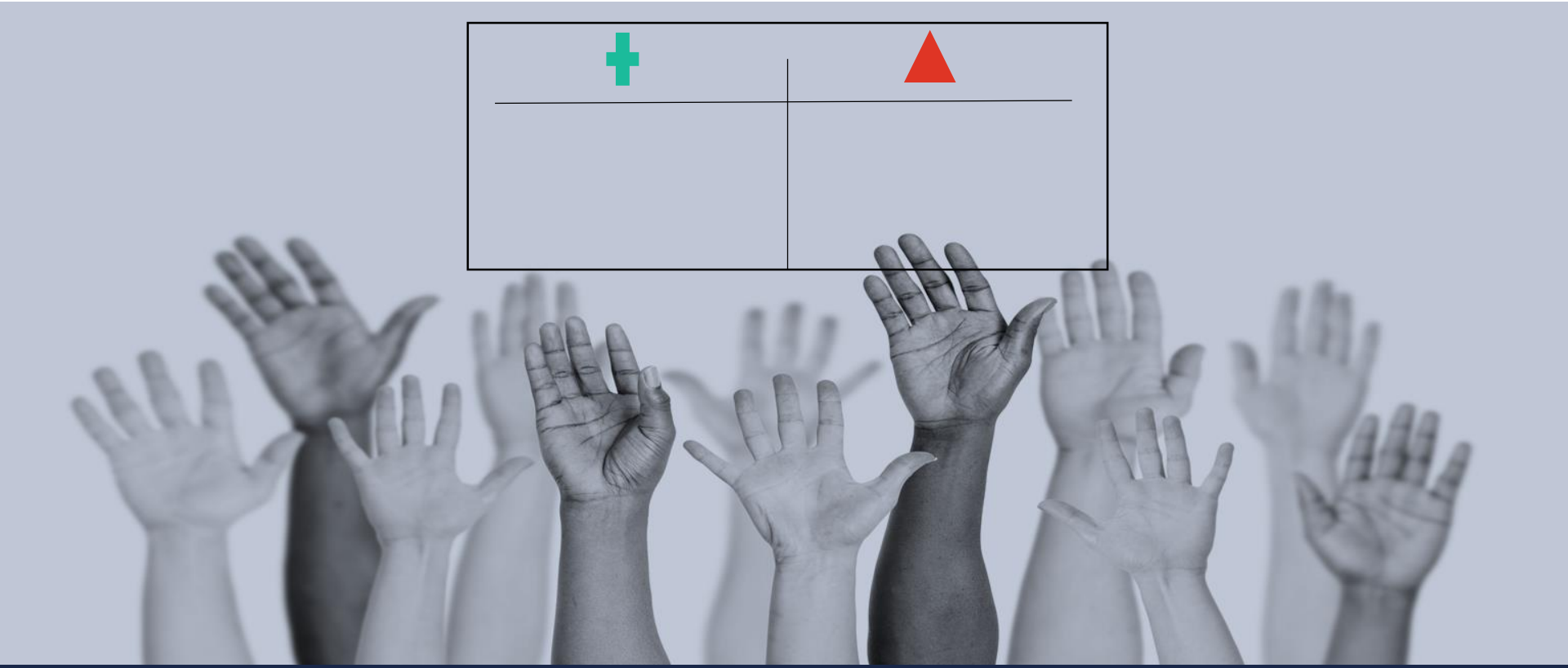
Questions & Plus/Delta



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LCI Contact Information

Membership:	Ilene Goldberg	iGoldberg@leanconstruction.org
eLearning:		eLearningdiscounts@leanconstruction.org
LCI Website:		www.leanconstruction.org

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This concludes The American Institute of Architects Continuing Education Systems Course

Lean Construction Institute info@leanconstruction.org