46th Annual ECC Conference
ALIGNING THE STARS
Connecting People, Projects & Performance
ENGINEERING & CONSTRUCTION CONTRACTING ASSOCIATION
A New Approach to Construction

“...the devastating impacts of the long recession have made it clear that, even as the economy slowly recovers, business as usual can no longer be an acceptable approach in the construction industry. Lean Construction offers an alternative that allows companies to thrive in any economic conditions.”

McGraw Hill Construction
SmartMarket Report 2013
Lean Construction – Leveraging Collaboration and Advanced Practices to Increase Project Efficiency
Survey Results From The Use Of Lean Practices In Construction

- Higher Quality Construction (84%)
- Greater Customer Satisfaction (80%)
- Greater Productivity (77%)
- Improved Safety (77%)
Agenda

• Lean – the What, the Where & the Why
• Lean in the Engineering & Construction Industry
• An Enterprise-Wide View
• One Company’s “Journey”
• How do we improve?
Lean – What is it?

“Lean is a customer-centric methodology used to continuously improve any process through the elimination of waste in everything you do; it is based on the ideas of “Continuous Incremental Improvement” and “Respect for People.”

Lean For Dummies Cheat Sheet
Definition of Value Added

- **Value Added** – those activities that are **required** to provide the products and services to our customers **for which we get paid**

- **Non-Value Added** – Those activities that do not add value to the paying customer, **only add cost**
  
  - But Necessary – **reduce** to the extent possible
  
  - Unnecessary - **eliminate** to the extent possible
Lean – Where did it come from?

- Created out of necessity by a company with limited resources (Toyota Production System)
- People
- Space
- Working Capital
Toyota’s 7 (+1) Wastes

1. Over Production
2. Excess Inventory
3. Defects
4. Extra Processing
5. Waiting
6. Transportation
7. Excess Motion
8. Underutilized Employees
Lean – Why is it important?

The Challenge Facing All Businesses…

Do **three** things well, all **at the same time!**

- **Reduce Cost**
  - “Cheaper”
  - Production Costs
  - Customer Price
  - Net Margin

- **Reduce Lead Time**
  - “Faster”

- **Improve Quality**
  - “Better”
Lean – Why is it important?

- Lean = Easier-Better-Faster-Cheaper

  Easier - simplify everything

  Better -
  
  Improved employee Quality of Life
  Higher Quality of services
  Safer work environment

  Faster – reduced cycle times for all tasks

  Cheaper – lowered costs
Benefits To The Enterprise

1. Unleashed restrained capacity
2. Increased cost competitiveness
3. Increased speed to market of new products & services
4. Ability to change strategic direction quickly
5. Improved customer satisfaction and relationships
Benefits To The Enterprise

6. Improved supplier relationships
7. Improved employee quality of life
8. Increased shareholder equity
9. Improved credit ratings
1. **Lean Construction**: Elimination of waste from design and construction processes.

2. **Pull Planning**: A targeted, specific tool involving the definition and sequencing of events on a project, working backward from a target completion date.

3. **Last Planner**: A comprehensive trademark approach developed by the Lean Construction Institute that includes several layers of planning and full commitments to schedules from the entire project team.
4. **Just-In-Time**: Delivering just the amount of materials needed when it is needed.

5. **Toyota Production System**: A system for providing the best quality, lowest cost and shortest lead time by eliminating waste in processes and procedures.

6. **Six Sigma**: A set of strategies, techniques and tools to reduce variability and improve quality.
Engineering & Construction Firms Implementation of Lean Practices

Lean Construction
- Trade Firm: 6%
- General Contractor: 38%

Pull Planning
- Trade Firm: 3%
- General Contractor: 31%

Last Planner
- Trade Firm: 28%
- General Contractor: 22%

Just-In-Time
- Trade Firm: 33%
- General Contractor: 28%

TPS Or Other Manufacturing Lean Approach
- Trade Firm: 44%
- General Contractor: 30%

Six Sigma
- Trade Firm: 0%
- General Contractor: 6%

Source: McGraw Hill Construction Research & Analytics
Benefits Achieved By Firms That Have Implemented At Least One Lean Practice

Higher Quality Construction: 81% (Trade Firm) 84% (General Contractor)
Improved Safety: 75% (Trade Firm) 74% (General Contractor)
Greater Productivity: 51% (Trade Firm) 84% (General Contractor)
More Focus By Supervisory Staff On Managing Workers: 58% (Trade Firm) 76% (General Contractor)
Greater Profitability/Reduced Costs: 45% (Trade Firm) 80% (General Contractor)
Improved Lifecycle Cost/Cost Of Ownership: 57% (Trade Firm) 92% (General Contractor)

Source: McGraw Hill Construction Research & Analytics
The Last Planner® System (LPS) Responsibility-based Project Delivery (RbPD)

- Produce predictable workflow
- Produce rapid learning
- Focused on making work ready and using commitment based planning
- Requires new thinking and new behavior from top managers and participants
The Last Planner® System
Should-Can-Will-Did Planning

As Needed

Should

- Milestones
- Master Schedule
- Establishes promise of project

Can

- Pull planning to complete a milestone
- Collaboratively built plan
- Focus on handoffs

Will

- Look-ahead Plan
- Make work ready
  - Identify constraints
  - Commitments to remove constraints
  - Constraint Log

- Weekly work plan
- Reliable promising

Did

- Daily coordination
- PPC
- Rapid learning

Weekly As Needed
The Last Planner® System

Rule for Reliable Work Flow
- All Constraints removed
- Work is Ready

Weekly Work Plan
- What
- Where
- When
- Who
- Coordinated across Trades

Daily Huddle
- Did we do what we said?
- If not, why?
- What can we learn?
- Do we need recovery plan?

New Week
- What new activities are starting?
- ID Constraints
- Obtain commitments to remove

Review Weeks
- Any new constraints/commitments?
- Review constraint removal
- Any management actions needed?

Milestone Plan
- July 11

Phase Plan
- April 4

6-week Lookahead Plan
- Oct 11
- Oct 18
- Oct 25
- Nov 1
- Nov 8
- Nov 15

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The Last Planner® System (LPS)
Responsibility-based Project Delivery (RbPD)
Although Lean has its roots in Operations, it can and should be applied across the entire Enterprise of any business in any industry

- Lean Design
- Lean Manufacturing
- Lean Services
- Lean Construction
- Lean Supply Chain
- Lean Office and Business Processes

An Enterprise-Wide View

“... used to continuously improve any process...”
Becoming LEAN should not be a goal or objective on your business plan.

It is the method by which you achieve your goals and objectives.
One Company’s Lean Journey
A Case Study

- 1985: Lean Manufacturing Consulting Practice Established
- 1997: Lean Construction Institute Founded
- 2014:
Lean Construction Projects
Lean Integrated Project Delivery Concepts

• Contractor input into Scope and Design
• Continuous contractor involvement in Design
• Focus on workflow – LPS & RbPD
• Focus on collaborative project culture
• Full collaborative Design Sessions
• Target cost set up front
Lean Construction Projects

- 10 Construction Projects
- $7M to $150M (EPC & EPCM)
- Projects utilized most of IPD concepts
- Cost – 8 projects excellent scope control, met or underran budget
- Schedule – 8 projects excellent adherence to schedule, met or beat milestones
- Safety – 7 projects listed zero injuries, excellent record or “World-Class”
• 8 projects resulted in very high to extremely high customer satisfaction & team satisfaction

• 7 customer PMs’ replied “Best project of my career”
Lean Manufacturing Consulting Practice Established

1985

Lean Construction Institute Founded

1997

Business Process Re-Engineering Started With AP Improvement $2M Savings/Year

2006

PMT Assessment

Inter-Company Trade Settlement

Anchorage Invoicing

Performance Enhancement Program

Qatar 2022

Established Spartanburg Design Center Lean Program

2014

Established Denver Delivery Center Lean Program

One Company’s Lean Journey

A Case Study
So….how do we improve?

• **Capacity (100%) = VA Activities + NVA Activities**
  
  Revenue Generating
  Cost Generating

• **Goal** - Increase the overall % of our capacity that is directly focused on providing the **VALUE** to our clients for which we get paid

• **How** - By making it **EASIER** for all employees to provide this **VALUE**
Elements of a Sustainable Lean Transformation Program

• Must be led from the top of the Organization

• Must be endorsed and supported by all levels of management

• Requires full support and participation of all functional areas

• All employees are involved

• Improvements must come from and be implemented by employees to be sustainable
Lean Program Action Plan

• Start with awareness and education
  - Include all employees
  - Reading material and formal training

• Create a culture of continuous improvement
  - Management must show that it is important (think Safety Programs)
  - Make Lean a subject at every communications meeting
  - Have “Lean Moments”
  - Dedicated Lean Message Board(s)
  - Lean posters and other signage
  - Be rigorous
Lean Program Action Plan (continued)

- Plan for success and sustainment
  - Organization
    - Lean Council provides program leadership
    - Lean Leaders work with employees to identify and implement improvements
  - Develop and execute an implementation plan
    - Identify Value Streams
    - Start close to the customer and work your way back
  - Develop and post relevant metrics that drive the right behaviors

- Publicly recognize individual and team wins
Lean is a journey that does not end…..
In Summary….

Where can Lean be applied in your business?

To everything you do, for every customer you serve
“There is nothing so useless as doing efficiently that which should not be done at all”

Peter Drucker

“Any intelligent fool can invent further complications, but it takes a genius to retain, or recapture, simplicity.”

E.F. Schumacher