Industry Perceptions of Lean Construction

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Manager, Industry Insights and Alliances
McGraw Hill Construction
Lean Construction Builds on Industry Best Practices & Latest Trends

All these industry trends are important aspects of a Lean Construction approach.
Study Launched to Understand Benefits and Drivers in Lean from the Insight of Practitioners

► Participating contractors drawn from two samples:
  • MHC Industry-Representative Contractor Panel (120 respondents)
  • Members of the Lean Construction Institute (73 respondents)

► Lean Practitioners defined as firms using at least one of the following practices:
  • Lean Construction
  • Pull Planning
  • Last Planner System
  • Just-In-Time
  • Toyota Way
  • Six Sigma
Agenda

- Understanding Lean: A Gap
- Benefits and Drivers of Lean Construction
- Collaboration and the Tools that Support Lean
- Key Recommendations for Future Actions
Understanding Lean: A Gap
Familiarity with Lean Construction and Specific Practices

- Lean Construction: 48% Not Familiar, 29% Familiar, 23% Implemented
- Pull Planning: 70% Not Familiar, 15% Familiar, 15% Implemented
- Last Planner System: 73% Not Familiar, 18% Familiar, 9% Implemented
- Just-In-Time: 54% Not Familiar, 31% Familiar, 15% Implemented
- Toyota Way: 66% Not Familiar, 24% Familiar, 10% Implemented
- Six Sigma: 58% Not Familiar, 38% Familiar, 4% Implemented

Over one third are not familiar with any of these specific practices.
Construction Industry Needs Greater Awareness of Need to Improve Efficiency of Construction Processes

Not Familiar with Lean Practices

- 55% Efficient/Very Efficient
- 26% Neutral
- 14% Inefficient/Very Inefficient

Implemented Lean Practices

- 62% Efficient/Very Efficient
- 19% Neutral
- 19% Inefficient/Very Inefficient
Newest McGraw Hill Construction Study Demonstrates That Benefits of Lean Are Not Understood

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Top Challenges to Lean Adoption or Implementation

Non-Practitioners
- Lack of Industry Support/Understanding of Lean: 39%
- Belief That Lean Takes Too Much Time: 33%
- Lack of Knowledge: 32%

Lean Practitioners
- Lack of Knowledge: 49%
- Lack of Sufficient Support Across the Project Team: 43%
- Employee Resistance/Belief Lean is Too Complex: 40%
Lean Experts Find Culture Change Within Their Organization One of Their Greatest Challenges

Employee sign-off is essential.

“Our superintendents need to be the ones driving it. If not, you can forget it.”

Engagement is important.

“People get more engaged in their work. They get excited about coming in and doing things everyday. That turns into higher quality, better safety and the things that are tough to quantify.”
Prefabrication: Engaging Workers in Coordination and Planning to Improve Efficiencies

Project: St. Elizabeth Hospital
Contractor: Boldt Construction

- Worked with the field to evaluate use of prefabrication based on supply chain, schedule, safety, cost and quality
- Engaged workers in creating more efficient processes for installation, including specially designed cart
- Early planning and employee buy-in allowed them to calculate savings

Benefits:
- Headwalls: Total man hours reduced from 24 to 7 per headwall
- Bathrooms: Onsite man hours reduced from 9.5 to 3

“We have these foremen in the room, and we need their buy-in because if we don’t have it, they are not going to do it anyway.”
Benefits and Drivers of Lean Construction
Top Benefits of Using Lean Practices According to Lean Practitioners

- Higher Quality Construction: 84%
- Greater Customer Satisfaction: 80%
- Improved Safety: 77%
- Greater Productivity: 77%
- Reduced Project Schedule: 74%
- Better Risk Management: 71%
Quantifiable Benefits from Lean Reported by Lean Experts

Consistent Margins:

4 to 5%

“Our margins have improved to expectation, we’re taking the job at four or five percent, and we’re making four or five percent.”

Reliability of Outcome:

“Reliability of outcome has changed from about 20% to about 80%-85%”

Reduced Project Schedule:

“The first project I worked on…We did it in 4.5 months [instead of 6 months] without any overtime.”

Supervisory Staff Can Focus on Managing Workers:

60%

“We have probably found a 60% increase in their ability to directly manage the labor force”
Lean Practitioners Report That Savings from Lean Make Projects More Profitable

64% of Lean practitioners see reduced costs/increased profits due to Lean

Savings from Lean Contribute Directly to Bottom Line/Project Profitability (According to Firms With Reduced Costs/Increased Profits)

- Agree: 72%
- Neutral: 24%
- Disagree: 4%
Lean Experts Report that the Ability to Compete in a Challenging Market Is a Key Lean Benefit

I can point to projects we’ve won because of our experience with Lean. We’ve gotten work with repeat clients...where they were absolutely thrilled with the results and they just handed us work.
Benefits of Conducting Value Stream Mapping

Project: Installation of Light Fixtures at UCSF Cardiovascular Research Building
Contractor: Rosendin Electric

- Engaged field workers in study, gathering their feedback throughout the process
- Recorded every activity (value-added and non-value added)
- Created a process map to identify potential time savings

Benefits:
- Process cost approximately $2,000 in man hours to conduct
- Saved 15 minutes per fixture on 2,000 fixtures, roughly $50,000

"[Value stream mapping] deepens the knowledge of the installation process and really improves communication between the field and management because you are collaborating together on this solution."
Factors Most Influential for Non-Practitioners to Consider Adopting Lean Practices

- Greater Profitability/Reduced Costs: 83%
- Greater Productivity: 81%
- Greater Customer Satisfaction: 70%
- Higher Quality Construction: 70%

Consistent with Benefits Achieved by Lean Practitioners
Owners Are Increasingly Important Drivers for Lean

74% of Lean practitioners see reduced project schedules due to Lean

Firms Use Lean Practices to Stay Competitive Because Owners Increasingly Expect Shorter Schedules

Lean Experts:
- Owners are showing more familiarity and expectation of Lean today than 5 years ago
- Owners need to mandate Lean to encourage wider industry adoption
Collaboration and the Tools That Support Lean
Improving the Flow of Data Supports a Firm’s Ability to Collaborate

Top Benefits Reported by Contractors of Improvements to Information Mobility in the Last Two Years

- Better Collaboration Among Team Members: 81% (General Contractors), 70% (Trade Contractors)
- Better Productivity: 62% (General Contractors), 77% (Trade Contractors)
- Less Reliance on Blueprints/Specifications: 42% (General Contractors), 31% (Trade Contractors)
- Reduced Risk: 35% (General Contractors), 33% (Trade Contractors)

Communication is Selected as Top Factor for Mitigating Causes of Uncertainty

Communication has high/very high mitigation impact on problems caused by:

- **96%** Accelerated Schedule
- **94%** Design Errors
- **88%** Owner Driven Changes
- **79%** Unforeseen Conditions
Key Recommendations for Future Action

► Spread the word about the benefits of Lean
  - Top Benefit According to Nearly All Lean Practitioners: Greater Competitiveness
  - Top Drivers for Lean Also Widely Reported as Achieved Benefits: Improved Productivity (77%) and Lowered Costs (64%)

► Engage employees in Lean efforts

► Create better tools that support collaboration

Download your free digital copy of the full report at analyticsstore.construction.com
Changing the Uncertainty Conversation

Bevan Mace
@bevanmace
Balfour Beatty Construction
October 9, 2014
Key Takeaways

1. Current state of perceptions in our industry

that creates an

2. Opportunity to change the conversation
Managing Uncertainty and Expectations Research

Goals:

- Identify the most impactful aspects of uncertainty
- Evaluate alignment between Owner, Architect and Contractor perceptions and expectations re: performance
- Identify effective mitigations and opportunities for performance improvement

Process:

- Association Survey
- Owner Advisory Group
- In-depth Interviews
- Analysis
- SmartMarket Report (Oct.)
- Dissemination
- Next Steps
Causes of Uncertainty: Approach

The impact of each of these 7 factors:

- Accelerated Schedule
- Owner-driven Program or Design Changes
- Design Errors
- Design Omissions
- Construction Coordination Issues
- Contractor-caused Delays
- Unforeseen Site or Construction Conditions

On each of these 3 metrics:

- QUALITY
- COST
- SCHEDULE

Perspective of these 3 players:

- Architects
- Contractors
- Owners
## INDEX: Frequency and Cost Impact of Factors

### Top Factors Causing Uncertainty

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**Impact Index re: COST**

Each cause was scored based on (1) its reported frequency of occurrence, and (2) its reported impact on Cost when it does occur. The scores were then indexed on a 1-100 scale to indicate relative importance.

- **How frequently does it occur?**
- **What is the typical % impact on COST?**

Impact Index (1-100)
Perception of Owner Satisfaction: Three Metrics

Q: How often do projects meet [your/owners’] expectations re: Quality/Cost/Schedule?

<table>
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<th>Contractors</th>
<th>Owners</th>
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<tbody>
<tr>
<td>Low frequency</td>
<td>1%</td>
<td>3%</td>
<td>12%</td>
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<tr>
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<td>99%</td>
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ALIGNMENT: Owners significantly less satisfied with team performance re: cost and schedule than Architects and Contractors perceive.
Construction Industry Needs Greater Awareness of Need to Improve Efficiency of Construction Processes

Not Familiar with Lean Practices

- 55% not familiar
- 26% neutral
- 14% efficient/very efficient

Implemented Lean Practices

- 19% inefficient/very inefficient
- 19% neutral
- 62% efficient/very efficient
### Top Factors that Reduce Overall Uncertainty

(% of respondents selecting each as being High/Very High impact)

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**Mitigating Factors:**

Ranked by effectiveness against all sources of Uncertainty
How do we close the gap?

FROM
70% of all employees are disengaged in their work

TO
70% of all employees are innovating in their work
Adaptable Owners/ Designers/ Builders of the Future

IDENTIFY
VALUE

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Adaptable Owners/ Designers/ Builders of the Future

MAP THE VALUE STREAM

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Adaptable Owners/ Designers/ Builders of the Future
Adaptable Owners/ Designers/ Builders of the Future

ESTABLISH PULL

© Balfour Beatty Construction, illustrations by Michael Lagocki
How do we manage uncertainty?

Seek Perfection

Identify Value

Map the Value Stream

Create Flow

Establish Pull

Owner

Builder

Designer

Value Stream

People

Owner

Designer

Builder
## Causes of Uncertainty that Impact...

### QUALITY

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(Percentage of total that selected the factor as having the greatest impact)
INDEX: Frequency and Cost Impact of Factors

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Intentional discovery, alignment and role definition

ELEVATE OUR ROLES

MASTER OUR CRAFT

© Disney Enterprises, Inc.,

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The Pursuit of Perfection

Seek Perfection

Identify Value

Establish Pull

Map the Value Stream

Create Flow

Owner

Builder

Designer

Value

Value Stream

People

Owner

Designer

Builder
What do we mean by perfect?

Do you think it is possible to have perfect set of final construction documents?

- % Yes: 13%
- % No: 84%
- % DK: 2%

Do you think it is possible for the construction team to deliver perfect performance?

- % Yes: 20%
- % No: 65%
- % DK: 2%
### Metrics for Design Team Performance

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<td>90%</td>
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<td>78%</td>
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<td>Percentage of construction cost due to design errors and omissions</td>
<td>57%</td>
<td>64%</td>
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<td>52%</td>
<td>67%</td>
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<td>Number of change orders on a project</td>
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**ALIGNMENT:**
Relatively close alignment between players on priority order of metrics for design team performance

Q. Which of the following metrics do you think are appropriate to gauge the design team’s performance on a project?
Metrics for Construction Team Performance

(Percentage of total for each response)

- Architects
- Contractors
- Owners

Q. Which of the following metrics do you think are appropriate to gauge the build team's performance on a project?

**Ability to work with other team members to solve issues and not escalate to the owner**
- Architects: 85%
- Contractors: 77%
- Owners: 78%

**Percentage of construction cost due to construction errors**
- Architects: 62%
- Contractors: 58%
- Owners: 58%

**Percentage of contingency used due to construction errors**
- Architects: 45%
- Contractors: 45%
- Owners: 50%

**No errors due to negligence**
- Architects: 40%
- Contractors: 38%
- Owners: 43%

**Number of change orders on a project**
- Architects: 28%
- Contractors: 17%
- Owners: 52%

**Other**
- Architects: 2%
- Contractors: 3%
- Owners: 5%

ALIGNMENT:
Relatively close alignment between players on priority order of metrics for construction team performance.
Rethinking Perfection

What if we focused metrics on…

- Team health
- Percent rework
- Engineering out risk
- Planning for value
Summary

• Uncertainty:
  • The controlling party generally “under-perceives” impact of causes under their control.

• Expectations:
  • Owners less satisfied than A,C perceive (especially re: cost/schedule)

• Opportunities for Performance Improvement:
  • Lack of “science” behind establishing and allocating contingencies

• Organizational health is an enabler for learning and improvement

• Creating the science that repeatedly engineers out risk and plans for value

• Rethinking metrics to see reality and pursue perfection

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Thank you.

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