

THE CONSTRUCTION USERS ROUNDTABLE
"THE OWNERS VOICE TO THE CONSTRUCTION INDUSTRY"



International Group for Lean Construction

Construction Strategy: CURT's Path Toward LEAN Project Delivery

WP-1004A
November 2007

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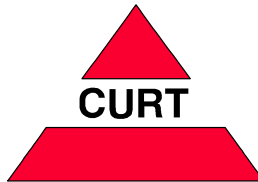
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Note: Membership listing current at time of publication

Notice:

The purpose of this publication is to make available to industry the results of research and common owner practices. The information is provided solely for the individual consideration and education of CURT members and the industry. The publication does not necessarily represent the views of every CURT member company on this topic. The booklet is offered as an informational publication only. CURT intends only to synthesize current thought and trends concerning the topic. Neither CURT nor its committees make any warranty as to the completeness regarding the materials. Readers are encouraged to further research the topic before relying exclusively on these materials. Each CURT member and other readers of these materials are free, acting in its own discretion and its own perception of business self-interest, to reject or adopt the recommendations in whole or in part. Adoption and/or reliance upon these recommendations is strictly voluntary. The Mission of The Construction Users Roundtable (CURT) is to promote cost effectiveness for owners doing business in the United States by providing aggressive leadership on issues that will significantly improve project engineering, maintenance and construction processes, thereby creating value for the owners.

Construction Strategy:
CURT’s Path Toward LEAN Project Delivery
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**Cynthia C.Y. Tsao, University of Cincinnati, Department of Civil and
Environmental Engineering**

**Joe P. Gionfriddo, Procter & Gamble, Corporate Engineering, Global
Construction & Welding Fabrication Technologies**

**George M. Lancos, Johnson and Johnson, World Wide Engineering
and Real Estate**

1. Abstract

The Construction Users Roundtable (CURT) represents over 50 major corporations that are among the largest U.S. consumers in the Architecture-Engineering-Construction (AEC) industry. CURT provides owner input on AEC industry issues and stands for changing and improving (1) overall cost effectiveness, (2) the way construction is planned, managed, accounted for, regulated and executed, (3) the way workers are motivated, supervised and work, and (4) what owners permit, require and accept responsibility for. This white paper examines CURT's emerging path towards LEAN project delivery and how Owners, Designers, Contractors, and Researchers can assist each other in the LEAN journey.

2. History

The paths of CURT and LEAN crossed in 2001 and 2002 when the LEAN Construction Institute (LCI) made presentations at CURT's National Conference. LCI's presentations described what LCI was doing to define a new way to deliver projects and how these successes connect to gains already seen in the manufacturing sector. In 2004, CURT hosted a workshop that reviewed in detail the use of pull scheduling and the Last Planner System™. In CURT's 2005 Value Generation Survey covering two years of CURT activities, the 2004 LEAN workshop ranked third amongst the top ten workshops and CURT members expressed an interest to have a continued emphasis on LEAN. In response, CURT's Education and Implementation Committee started a LEAN Construction Task Force to address how CURT should take advantage of the emerging capability of LEAN Construction.

In April 2005, the new task force identified the following focus areas to guide its efforts:

- ▲ LEAN Strategy – i.e., creating a vision for the use of LEAN Construction in the AEC industry, identifying a high-level roadmap for implementation, helping CURT members

develop realistic expectations of the types of benefits that can emerge, and outlining the roles needed within companies to move project organizations forward on the LEAN journey

- ▲ LEAN Education and Communication – i.e., raising awareness of LEAN Construction among CURT members, understanding the basic principles of LEAN Construction, and having early adopters of LEAN Construction share their experiences and lessons learned with CURT members
- ▲ LEAN Enabler and Identification – i.e., working with CURT’s Productivity Committee to define measurable benefits, identifying a model contract for LEAN Construction, and managing a close interface with LEAN-related research being managed by the Construction Industry Institute (CII)

In November 2005, the task force organized a plenary session for CURT’s National Conference that explored the relationship between LEAN Construction and Building Information Modeling (BIM). In 2006, CURT formally chartered the task force and in April 2006, the task force decided to organize a workshop in 2007 to increase the awareness of LEAN Construction among CURT members. Specifically, the workshop would:

- ▲ Demonstrate how the LEAN Construction journey parallels the safety journey
- ▲ Illustrate how LEAN Construction requires a change in both cultural and behavioral mindset
- ▲ Discuss techniques that projects can use to identify waste within existing systems.

To generate interest in the April 2007 workshop, *the Voice* (CURT’s magazine for members) developed a feature story on LEAN Construction in its Summer 2006 issue and a discussion on how LEAN Construction can help alleviate the workforce crisis in its Winter 2006 issue.

3. Why “LEAN” and “LEAN Project Delivery”?

The term “LEAN” is misleading because those unfamiliar with LEAN Construction may perceive that it focuses primarily on waste reduction and the use of Just-In-Time (JIT) on construction projects. As a result, with little or no buffers of resources and work-in-progress, projects risk becoming unable to respond to last-minute changes in project conditions. However, the task force kept the term “LEAN” to demonstrate how its efforts center on practices rooted in LEAN Manufacturing (as established by the Toyota Production System) and promoted and researched by LCI and the International Group for LEAN Construction (IGLC).

In promoting the use of LEAN Construction among its members, CURT started writing the word “lean” in all capital letters within internal correspondence and external publications to help LEAN-related efforts stand out at a glance. Then, while planning the 2007 workshop, the task force replaced the phrase “LEAN Construction” with “LEAN Project Delivery” to emphasize how this management approach was not limited to construction. Rather, it encompasses an alternative method of project delivery that uses LEAN concepts and principles to guide a combination of new and existing techniques for contracting, design and supply chain management, and off-site and job-site assembly coordination. Consequently, the “LEAN Construction Task Force” became the “LEAN Project Delivery Task Force” and the 2007 workshop became the “2007 CURT Member Workshop on LEAN Project Delivery.”

4. April 2007 Workshop

By 2006, the task force expanded to consist of Owner, Designer, Contractor, and Research members. The task force worked collectively over the later half of 2006 and beginning of 2007 to organize the 2007 CURT Member Workshop on LEAN Project Delivery and conduct an internal survey on LEAN implementation

by CURT members so the results could be presented during the workshop.

Held on April 11, 2007 in Phoenix, AZ, the comprehensive workshop focused on increasing LEAN Project Delivery awareness and identifying potential opportunities for CURT members. One group of workshop presenters used the title “This Changes Everything” for their presentation. Since the task force felt the title effectively conveyed the primary workshop message, CURT obtained permission from the presenters to use the same title for the workshop.

The task force invited industry leaders in LEAN Project Delivery to discuss their experiences and lessons learned with CURT members. Some presenters were not CURT members since key early adopters of LEAN Project Delivery come from the healthcare industry, and CURT membership does not have significant representation from healthcare. However, since many CURT members come from other industries, the presenters from healthcare adjusted their presentations so they would cater to a more general audience.

As a whole, the workshop presentations provided powerful testimonials to CURT members about how AEC industry practice is changing with respect to how:

- ▲ Owners, Designers, and Contractors would pursue, ask for, and participate in LEAN Project Delivery
- ▲ Owners, Designers, and Contractors are fundamentally changing the way they interact in terms of design development, supply chain management, and construction coordination
- ▲ Through relational contracting with the use of an Integrated Form of Agreement (IFOA), Owners, Designers, and Contractors are aligning themselves better to achieve integrated project delivery
- ▲ Companies have been using Value Stream Mapping (VSM) to identify how to increase value generation and eliminate waste on AEC projects

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- ▲ All project participants need to increase their reliability in meeting commitments and balance workflow if they wish to achieve LEAN Project Delivery
 - ▲ AEC projects can use different tools and techniques (e.g., BIM, Modularization, and Last Planner System™) as enablers of LEAN project delivery
 - ▲ There is a need for LEAN Project Delivery since construction labor productivity has been steadily declining in comparison to other industries (e.g., manufacturing) and Owners continue to experience poor project performance in terms of schedule, budget, and quality

Presentations combined with question and answer sessions helped attendees understand there was no silver bullet to implementing LEAN project delivery. Rather, the presenters explained how LEAN concepts and principles can be used to guide the planning and execution of design and construction processes so AEC projects can be managed as a production system. Thus, by increasing member awareness of LEAN project delivery, the workshop set the stage for CURT to proceed on the LEAN journey at an accelerated pace..

5. Post-Workshop Activities

After the April 2007 workshop, *the Voice* magazine highlighted the workshop and LEAN project delivery in the cover story of its Summer 2007 issue. Then, on July 18, 2007, the task force made a special presentation at the 15th Annual Conference of the International Group for Lean Construction (IGLC-15) in East Lansing, MI, to share CURT's LEAN Journey and to thank LEAN Construction researchers for:

- ▲ Challenging current thinking
- ▲ Discovering a LEAN path for practitioners
- ▲ Providing LEAN education to practitioners and students
- ▲ Creating new approaches for collaboration between Owners and the AEC industry

Future activities of the task force include:

- ▲ Distributing videos that convey the primary presentations of the 2007 workshop
- ▲ Organizing plenary and breakout sessions pertaining to LEAN project delivery for future CURT national conferences
- ▲ Making a recommendation to the CURT Executive Committee on the path forward
- ▲ Continuing to interface with the CURT membership on the potential benefits of LEAN project delivery as well as the different methods to achieve LEAN project delivery

6. Call to Action

The combined efforts of the task force (e.g., the development of CURT member workshops, plenary and breakout sessions at CURT national conferences, and articles in *the Voice* magazine) serve as a call to action to CURT members to begin their LEAN journey if they wish to improve the performance of their AEC projects in terms of schedule, budget, and quality. Owners, Designers, Contractors, and Researchers must collaborate to define a new operating system for managing projects. In doing so, they can better align their personal objectives with overall project objectives to achieve LEAN project delivery. The following sections discuss in greater detail how Owners, Designers, Contractors, and Researchers can help each other work towards LEAN project delivery.

7. How Owners Can Help Designers and Contractors Achieve LEAN Project Delivery

Owners need to personally adopt fundamental cultural and behavioral changes to encourage the AEC industry to begin working towards LEAN project delivery. Specifically, Owners should:

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- ▲ Act as agents of change and demand LEAN techniques and practices that aid their business models – this is akin to the demands made decades ago for better safety practices
 - ▲ Provide incentives for global optimization through the use of relational contracting
 - ▲ Engage in open communication early in projects to foster a collaborative work environment
 - ▲ Restructure their internal corporate work processes to facilitate the LEAN journey
 - ▲ Be willing to invest more resources in front-end planning (i.e., programming, design development, and design coordination) to reap benefits from streamlined project execution (i.e., off-site fabrication and on-site construction)
 - ▲ Adopt alternative metrics to measure and reward the achievement of LEAN concepts and principles (e.g., being reliable in meeting commitments and balancing workflow)
 - ▲ Form strategic alliances with Designers and Contractors that embrace LEAN project delivery
 - ▲ Share positive and negative results with other Owners, Designers, and Contractors to foster research and learning partnerships between AEC companies

8. How Designers and Contractors Can Help Owners Achieve LEAN Project Delivery

Designers and Contractors need to be proactive and take the initiative to change their internal work processes to help Owners begin achieving LEAN project delivery. Specifically, Designers and Contractors should:

- ▲ Develop a competitive edge by using LEAN principles to guide their daily work activities and practices to help

Owners meet, and beat, their on-going schedule and cost constraints

- ▲ Educate design, project management, and construction labor employees in LEAN project delivery to create a knowledgeable work force that can sustain a LEAN culture
- ▲ Identify barriers to workflow reliability and develop strategies for removing these constraints
- ▲ Launch demonstration projects using LEAN tools and techniques that have proven to be effective
- ▲ Standardize products (i.e., project components and interfaces) and processes to reveal new opportunities for eliminating waste and generating additional value for Owners

9. How Owners Can Help Researchers Move the AEC Industry Forward

Owners need to support Researchers in their efforts to uncover new principles and techniques that enable projects to achieve LEAN project delivery. Specifically, Owners should:

- ▲ Involve Researchers earlier in challenging projects to test research ideas and develop innovative, alternative methods for achieving LEAN project delivery
- ▲ Review journal articles and conferences papers that detail the principles and techniques that have proven to be effective in enabling LEAN project delivery and apply them on their projects
- ▲ Explicitly ask that projects be delivered on a LEAN basis – only then will AEC companies request that students be trained in LEAN concepts and principles to create a LEAN-educated work force
- ▲ Include LEAN expertise in employment advertisements

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- ▲ Create new jobs for project “integrators” – i.e., people who manage global optimization for projects by structuring work between project participants for continuous workflow and value generation
 - ▲ Support and participate in LEAN project delivery research in design development, supply chain management, and job site coordination
 - ▲ Communicate both positive and negative project results as lessons learned in public forums so practitioners and researchers can continue to learn from each other

10. How Researchers Can Help Owners Achieve LEAN Project Delivery

Researchers are best positioned to teach LEAN project delivery concepts and principles to future practitioners. If the emerging talent pool enters the work force with a background in LEAN, the AEC industry’s path to LEAN project delivery would certainly accelerate. This would then provide for the “faster, less expensive, and higher quality” projects that Owners expect. Specifically, Researchers should:

- ▲ Become involved in sanctioned research from owner organizations (e.g., CURT and CII)
- ▲ Develop and identify breakthrough management approaches and supporting technologies
- ▲ Develop courses that allow students to develop skills in LEAN creativity, innovation, and global design and supply chain management
- ▲ Interface with and understand the priorities of AEC practitioners in design and supply chains
- ▲ Develop training and education programs that can be shared with and adopted by AEC companies
- ▲ Develop and define metrics to measure and communicate LEAN benefits to Owners

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- ▲ Help Owners review the entire value stream of the AEC industry to look for gaps in process management and identify new opportunities to achieve LEAN project delivery

11. Summary

CURT seeks to introduce LEAN project delivery to projects spanning the diverse range of industries as reflected by its membership (e.g., Petroleum, Consumer Goods, Pharmaceuticals, Power, IT, and AEC Companies). By using CURT conference and workshop sessions as a means to engage its members with early adopters who are practicing LEAN project delivery on a daily basis, CURT is taking steps to help the AEC industry move forward in working towards LEAN project delivery. CURT's LEAN Project Delivery Task Force hopes this continued interaction will lead to more AEC projects that are committed to working towards LEAN project delivery, thus making the title of the April 2007 workshop, "This Changes Everything," a reality.

Construction Users Roundtable Publications

The purpose of developing Construction Users Roundtable (CURT) publications is to disseminate recommendations, guidelines, and reports developed by the Construction Users Roundtable. CURT is focused on improving the cost effectiveness of the U.S. construction industry. These publications have been developed from the point of view of owners or users of construction services. Efforts by all segments of the industry, however, are vital if major improvement is to be the result.

This publication is one of a series from committees or study teams addressing a problem area.

Findings and recommendations of The Construction Users Roundtable are included in publication series classified as White Papers (WP), Reports (R), or User Practices (UP). In addition to these classifications, CURT publications are numbered based on the category of the topic:

Category	Number Code
Constructability	011 to 099
Contractor Management	101 to 199
Cost	201 to 299
Interface Management	301 to 399
Workforce/Industrial Relations	401 to 499
Material Control	501 to 599
Purchasing	601 to 699
Quality	701 to 799
Safety	801 to 899
Security	901 to 999
Strategy	1001 to 1009
Work Planning and Scheduling	1101 to 1199
Technology/E-Sourcing	1201 to 1299
Special Projects	2001 to 2099

Examples:

WP-1201: A CURT White Paper on Reverse Auction

R-402: A CURT Report on Tripartite Initiatives

UP-801: A CURT User Practice on Construction Safety in Contractor Prequalification

Available CURT Publications

White Papers

- WP-401 Confronting the Skilled Workforce Shortage
- WP-1003 Construction Strategy: Optimizing the Construction Process
- WP-1201 Guidelines on the Use of Reverse Auction Technology
- WP-1202 Collaboration, Integrated Information and the Project Life Cycle in Building Design, Construction and Operation
- WP-1004A Construction Strategy: CURT's Path Toward LEAN Project Delivery

Reports

- R-402 CURT Tripartite Initiative Executive Summary
- R-402A CURT Tripartite Study on Extended overtime on Construction Projects
- R-402B Reducing Absenteeism Report
- R-402C Tripartite Initiative Report: Eliminating Work Disruptions and Jurisdictional Disputes
- R-405 CURT Tripartite Initiative Report: Project Stakeholder Responsibilities
- R-807 CURT Owner Safety Blueprint

User Practices

- UP-101 Construction Measures: Key Performance Indicators
- UP-201 Construction Project Controls: Cost, Schedule, and Change Management
- UP-403 Construction Labor: Managing the Construction Workforce
- UP-406 Construction Labor: Implementing CURT Workforce Recommendations
- UP-408 Construction Labor: Improving Productivity on Union Projects
- UP-601 Construction Purchasing: Capital Purchasing & Contracting
- UP-701 Construction Quality: Achieving Quality on Capital Projects and Craft Worker Prequalification
- UP-801 Construction Safety: Contractor and Craft Worker Prequalification
- UP-802 Construction Safety: The Owner's Role

- UP-803 Construction Safety: Pre-Bid and Bid Clarification Meetings
- UP-804 Construction Safety: Contract Terms and Conditions

User Practices (cont.)

- UP-805 Construction Safety: Monitoring Performance
- UP-806 Construction Safety: Improving Safety Programs
- UP-1001 Construction Strategy: Selecting Contracting Strategies
- UP-1002 Construction Strategy: Selecting the Right Contractor

Tools

- T-404 Construction Labor: Craft Employee Training Evaluation Tool
- T-808 Construction Safety: Owner Safety Blueprint Assessment Tool

Training Modules

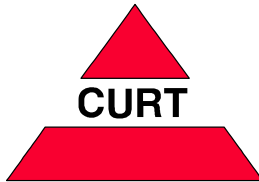
- TM-809 Construction Owners' Safety Blueprint Training Module

Visit the CURT publications website,
http://www.curt.org/14_0_curt_publications.html,
for additional information and pricing.

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4100 Executive Park Drive, Suite 210
Cincinnati, OH 45241-4023
Phone (513) 563-4131
Fax (513) 733-9551
www.CURT.org