



CONSTRUCTION INDUSTRY INSTITUTE®

LEAN IMPLEMENTATION  
AT THE PROJECT LEVEL

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# **Lean Implementation at the Project Level**

**Prepared by  
Construction Industry Institute  
Lean Construction Implementation at the Project Level Research Team**

**Research Summary 234-1  
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## Executive Summary

In 2004, the Construction Industry Institute (CII) investigated how lean principles could be applied to construction. Building on this work, CII initiated the Lean Implementation at the Project Level Research Team to uncover and understand the secrets of success in applying lean at the project level (specifically, how to manage construction project delivery in a way that enables and encourages the pursuit of lean).

The lean goal is “to deliver projects per agreement, while maximizing value for all stakeholders and minimizing waste.” Continuous improvement is an implied lean goal. Lean, however, cannot be pursued by selectively applying individual tools for quick results. It requires leadership commitment to sustain the processes. In order for subcontractors and suppliers to begin implementing lean, benefits and risks must be equitable to all parties.

Although some successful applications of lean tools and techniques at the project level have been noted, studies have shown such applications are sometimes incorrectly applied, resulting in reverting to enforcement of contract driven traditional project control.

The intent of this research is to provide guidance for an owner, engineer, or constructor firm, and to assist owner organizations, subcontractors, and suppliers in getting started on applying lean techniques.

Prior to starting implementation of lean, however, project delivery systems must have a firm foundation in which to begin building improvements. All companies should start in their own organization and learn by doing, then reach out to engage other stakeholders.

Correctly applied, lean principles result in immediate improvements in project delivery including cost, schedule, quality, and safety performance. To make sustainable gains and truly become a lean enterprise will require a long-term view and full commitment of the organization, extensive learning, and commitment of resources. This research has shown that dramatic results are possible when applied at the project level.



## Introduction

As shown in Figure 1, the productivity of the construction industry lags far behind manufacturing and other industries. The industry has actually experienced declining productivity while others have achieved major gains. It would seem that a fundamental change in business philosophy is required.

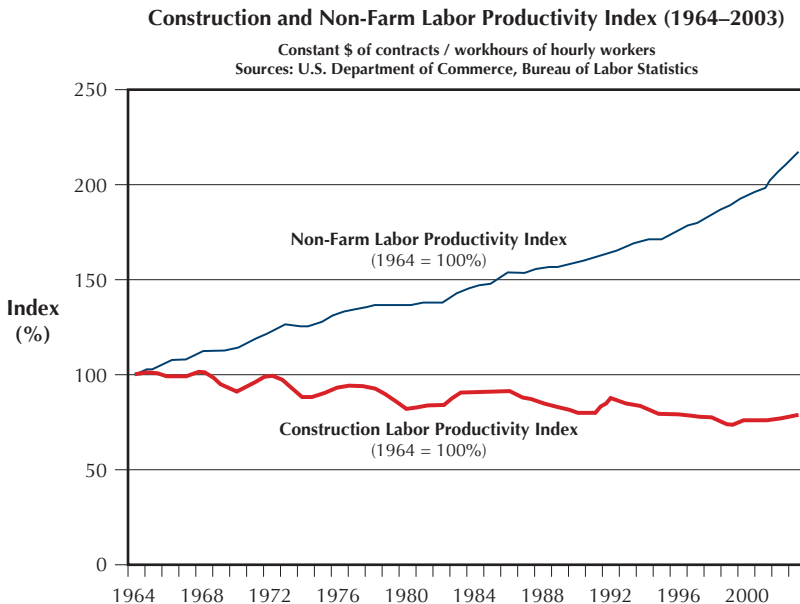


**Figure 1.** Productivity of U.S. Design/Construction vs. All Industries

The application of lean to the construction industry may be harder to see. However, the opportunity to achieve productivity gains can actually be much greater than what is realized on the “plant floor” operations. The goal of this research is to determine how to implement lean at the project level.

In today's business climate, projects are escalating while requiring shorter schedules, have more complex execution models, and deal

with a less skilled work force as well as labor shortages. Additionally, information technology is changing the world, global competitive pressure is increasing, and margins are being reduced. The deficiencies of traditional project management become progressively more apparent as projects become more dynamic, complex, and uncertain.



Although dramatic improvements are possible with the adoption of lean principles, there must be an understanding of what lean is.

Lean is a fundamental business philosophy, one that is most effective when shared throughout the value stream. The lean ideal is “to provide a custom product exactly fit for purpose delivered instantly with no waste.” Forms of waste are shown below.

#### *Forms of Waste*

- Overproduction
- Waiting (*“workers waiting on work”*)
- Unnecessary Transport
- Overprocessing (e.g., inspection)
- Excess Inventory (*“work waiting on workers”*)
- Unnecessary Movement
- Defects and Rework
- Not using employee talent
- Environmental/energy

The lean ideal can be approached but never completely reached, hence the dedication to continuous improvement that is often associated with lean. As a business philosophy, lean is naturally applied at the enterprise level, but can also be applied within business divisions, on projects, or even to specific processes.

Previous CII research identified five lean construction principles for use on projects:

1. Customer focus
2. Culture and people
3. Standardization and stabilization
4. Waste elimination
5. Continuous improvement and built in quality

This research builds on these principles and identifies the methods and tools for implementating them at the project level.