

# Lean Design and Construction

## *Driving Productivity Gains and Respect for People*

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**Y**ou don't have to be in this industry long to gain firsthand experience of what ails it. Since the 1960s, we've seen a doubling or better of labor productivity in almost every sector, but not construction. It has remained largely flat or even fallen over the past 50 years. Billions of dollars are lost as 70 % of building projects come in over budget and/or fail to meet schedule. The frustration of trying to be a productive contributor in a broken industry takes a real toll on the workforce as well, with substantial numbers of skilled workers opting out well before their standard retirement age. McKinsey & Company has termed this the "construction productivity imperative." Thankfully, there's a growing chorus of voices offering innovative solutions. Most would agree that technological innovations, such as virtual reality and Building Information Modeling (BIM), have a role to play. But whatever tactical paths we take to enhance productivity, our strategy has to be grounded in a culture of continuous improvement that minimizes waste, delivers enhanced owner value and focuses on making work processes flow. Above all, it should be centered on respect for the people who make this industry run. Only the broad-scale adoption of Lean

thinking and practices will help realize all these goals. As executive director of the Lean Construction Institute, I've seen firsthand through our national membership how transformative this approach can be for projects, individuals, and companies alike.

So what is Lean Design and Construction, and where did it come from? Many point to its roots in the Toyota Way. But construction doesn't much resemble car manufacturing, does it? It took the pioneering efforts of a couple of industry insiders, Glenn Ballard and Greg Howell, to figure out a role for Lean in construction. Their genius was to take manufacturing-based Lean and give it a construction twist. They started with the basic notion of respect for people: really listening to those at the workface who know the most about the job and how to improve performance. They took a structured approach to learning what is crushing productivity, based on regular team retrospectives. They also discussed what causes crews to inadvertently hold one another up and introduced the novel concept of "reliable promising": Really getting the job done on time and with high quality when you've given your word to the team that you will do so.

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But Lean is much more than an approach to de-conflicting on-site activities. It's a comprehensive system that focuses on improving the building process from its earliest planning stages right through final delivery. Teams usually embark on the Lean journey by implementing Last Planner System® (LPS), which includes both milestone planning and the use of "pull planning," a process that gets every organization with a role on the project engaged at the outset in planning backward from each milestone. Basically, every individual project task and handoff is captured on a sticky tag and affixed in reverse chronological order on a wall. This fosters some pretty dynamic planning sessions, with everyone from the designer to the GC to the trades negotiating with one another to identify timing and process improvements that will expedite work flow. The result is a road map for project performance that everyone consults regularly to guide ongoing execution. It also is highly flexible, forming the basis for dealing with inevitable delays as they occur, and working as a team to keep things on schedule when changes happen.

Lean thinking doesn't stop there, however. The LPS also prescribes look-ahead planning, in which teams review and make work ready looking out 4 to 6 weeks, and weekly work planning, in which they make promises to one another that generate the metrics that are monitored and measured to derive the percent of planned tasks completed (PPC) based on the weekly plans. Finally, Last Planner promotes a continuing process of learning

and improving by analyzing PPC variances and developing specific countermeasures that boost productivity by taking constraints out of everyone's way.

At its core, Lean serves to directly counteract the unique organizational and cultural barriers that plague construction productivity. It eliminates information "silos" right from the start, bringing together members of each trade in the early stages of a project and encouraging them to collaborate — really collaborate. This leads to sounder design decisions and better information flow from the designers to the constructors all down the line. For instance, if project teams talk and agree early concerning key equipment needs based on the best current solutions, it allows procurement efforts to start much earlier in the process. There are a host of similar examples of better project outcomes that flow from a structured approach to encouraging this kind of collaborative behavior.

In practical terms, what does all this mean for the craft trades? Major gains come from observing and planning each trade's work using Lean tools and thinking. Project team members learn to see waste: to make direct observations that help identify impediments to productivity. These could be things such as supplies piled in the way, materials too far from the install area or inefficient delivery practices. All team members are encouraged to suggest approaches to remove the obstacles. When this is done across every significant project task, you begin to see huge gains in enhanced work flow and quality. For the

trades, Lean processes properly applied can lead to better outcomes in every phase: greatly enhanced safety and job satisfaction, and the elimination of downtime that stems from waiting for a previous crew to finish up before yours can get to work.

Ultimately, Lean harnesses the innate desire of all people to feel proud of contributing to a job well done and winning as a team. Better planning, open communication, and systematic elimination of inefficiencies all add up to a smooth-flowing, less contentious performance process. Many teams begin to experience a brand-new F-word on projects: Fun! For owners and superintendents alike, this means they can move projects forward without spending their days firefighting problems created by failing to think things through as a team. Of course, the real end goal is a much more highly productive design and construction industry in which each of us can take enormous pride.



*Dan Heinemeier is executive director of the Lean Construction Institute, a nonprofit organization that operates as a catalyst to transform the industry through lean project delivery.*