

Building Better with Lean Construction

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Demand for construction is surging in many parts of the world. The construction industry's productivity, however, is not keeping pace. From 1995 through 2024, the productivity gap between manufacturing and construction labor in the European Union widened significantly, approaching 60%. (See Exhibit 1.) Similar trends are playing out in other regions, including the US.

EXHIBIT 1

Productivity in the Construction Industry Has Lagged



Sources: Eurostat; BCG analysis.

¹Real labor productivity per person employed (NACE Rev.2, EU27).

The gap is a key reason that large, multistakeholder projects struggle to cross the finish line, frequently beset by cost overruns and delays.

How can general contractors, along with subcontractors and project owners, unlock meaningful productivity gains? Part of the answer lies in taking a page from the playbook of the manufacturing sector: adopting a lean approach. Lean methodologies, which have revolutionized manufacturing industries, have not yet been widely embraced in construction in many parts of the world.

The lesson from manufacturing is that lean requires a different way of running production. Contractors that adopt lean move away from reactive problem solving toward a system that enables reliable work planning, the systematic elimination of waste, and alignment and coordination among subcontractors—creating a platform on which meaningful productivity and cost savings can be achieved.

Our experience with large construction contractors shows that adopting a lean approach can deliver cost savings of roughly 10% to 15% for many activities or project tasks. Such savings can come through cost reductions (for example, in labor, equipment, and materials) and the avoidance of costs (for example, the elimination of time spent on nonvalue-added tasks), as well as fewer project delays. Leveraging digital and AI tools as part of a lean transformation can amplify the impact, boosting such savings even further.

Construction's Efficiency Crisis

To understand the magnitude of the construction challenge, consider the US. Its labor productivity more than tripled from 1948 through 2023 across almost every sector. A major exception: construction. Productivity in the construction industry has remained stagnant since 1948 and has actually declined since the 1970s, according to a report by the Federal Reserve Bank of Richmond.¹ These productivity challenges are exacerbated by other forces, including rising material costs, larger projects, and increasingly complex contracts that can create added bureaucracy and stifle efficiency.

Lean construction can help narrow the construction productivity gap by taking aim at waste (any activity that does not add value for the end customer) in the process. The sources of waste are often widespread and hidden in plain sight. The most common sources fall into eight core categories, although in practice, most site issues cut across several rather than fitting neatly into one. (See Exhibit 2.)

- **Defects.** Outputs that do not meet required quality standards, necessitating rework or repair
- **Overproduction.** Producing more of an input than necessary, such as excessive prefabrication
- **Waiting.** Idle time caused by delayed approvals, missing materials, or unavailable crews

- **Unused Talent.** Underutilized skilled personnel, often through assignment to manual or administrative tasks
- **Transportation.** Unnecessarily moving materials or tools, often because of a poor site layout or lack of planning
- **Inventory.** Excess raw materials or a work in progress that ties up space and resources
- **Motion.** Inefficient or repetitive movements by workers due to poor workspace organization
- **Extra processing.** Doing more than is required, such as overengineering or redundant approvals

EXHIBIT 2

There Are Eight Primary Categories of Waste in Construction



Source: BCG analysis.

The drivers of waste can strain already thin margins on a project. For example, rework alone often accounts for roughly 4% to 6% of the contract value of many projects, according to insurer Axa XL.² These challenges frequently arise from poor planning, ambiguous processes, or reactive management practices.

Unlocking Value Through Lean

Lean construction brings waste issues to the forefront, clearly linking them to cost and schedule impacts, and enables organizations to address them in a structured and sustainable way.

Critically, a lean approach ensures that construction operations (where value is created) drive the work and decision making. (See Exhibit 3.)

We've seen lean approaches deliver significant benefits on major projects. On a large transportation project in Europe, a general contractor was able to reduce the schedule overrun by two months. On a similar project in Asia, a general contractor identified an issue early in the enabling works (fissure grouting) and used lean tools to identify root causes and update the process for fissure grouting. The lean approach allowed the contractor to avoid significant rework costs while ensuring the project stayed on schedule.

Successfully adopting a lean construction approach requires four distinct actions.

Diagnose. Companies get started by conducting a rapid health check that establishes a clear picture of their current lean maturity and identifies where waste occurs. A third-party lean expert can often help drive this process to ensure an unbiased view.

There are a number of steps to getting a clear picture. Construction project leaders participate in structured interviews to surface what's working, what isn't, and where alignment on lean principles may be missing. Companies also take a close look at site operations to gain insight on the issues raised in interviews and to identify additional challenges. By tracking workflows and task sequencing in real time, teams can pinpoint sources of delay, idle time, and rework and compare observed productivity against what was planned.

Companies also field an anonymous survey of project staff to round out the picture. The survey explores a number of issues, including whether managers encourage end-to-end thinking, where duplication of effort occurs, and whether performance indicators are understood across all levels. And it leaves room for open-ended comments—feedback that may highlight additional opportunities for improvement.

This phase surfaces both the waste that hinders performance and the enablers—capabilities, systems, and leadership behaviors—that must be strengthened to achieve lean excellence. It can also help zero in on actions that would yield quick wins and create real momentum.

Lean champions act as onsite facilitators, helping teams move from reactive firefighting to proactive planning and continuous improvement.

In parallel, companies nominate a small team of lean champions who can act as onsite facilitators and problem solvers. These champions are trained through workshops and online modules, as well as hands-on exercises involving real issues from the construction site. Their role

is to help teams move from reactive firefighting to proactive planning and continuous improvement.

Execute. Once the diagnosis is complete, attention turns to execution. The goal of this phase is to turn the lean approach from a concept into a set of daily habits embedded in project delivery.

Senior leaders play an important role here. Beyond clearly messaging the value-creation potential of a lean initiative, they should take concrete steps to drive progress. For example, senior leaders can spearhead the adoption of a collaborative process known as the last planner system (LPS) to bring discipline and transparency to weekly work planning. By giving frontline supervisors, site engineers, and subcontractors shared visibility into upcoming tasks, the system ensures that everyone has the right information at the right time and commits to deliver on their specific work plan. Regular feedback loops allow the planning to evolve with site conditions, improving reliability and coordination.

In practice, adopting this system not only means planning work clearly each week but also looking six weeks ahead to identify constraints before they disrupt site progress and tracking whether activities are completed as promised. Supervisors, site engineers, and subcontractors should also consistently use visual tools such as planning boards and site layout plans. They make ownership of defined site areas and scopes of work and related progress clearly visible to the team and surface issues early. Together, these practices help teams move from reactive problem solving to proactively managing risks and dependencies.

To sustain progress, companies can create a lean center of excellence (CoE). The CoE manages the overall program, tracks initiatives, and monitors outcomes. It meets regularly to review progress and resolve issues quickly, acting as the bridge between the senior leaders and the project teams. (See Exhibit 4.)

Scale. With lean principles established at the project level, the next phase focuses on amplifying the impact across the broader organization. The CoE takes on an expanded role—codifying solutions, spreading best practices, and ensuring consistency across teams, projects, and, if applicable, regions.

At this stage, lean champions lead regular *kaizen* sessions in order to sustain continuous, incremental improvement. These structured workshops tackle site-specific challenges, such as crane scheduling, materials flow, and logistics coordination. Combined with feedback cycles and look-ahead reviews that anticipate upcoming constraints, they keep improvement continuous and grounded in the realities of project delivery.

Scaling a lean approach works best when sites progress through clear maturity tiers, each with a minimum set of practices and KPIs. This progression allows teams to build capabilities step by step, rather than deploying all tools at once.

As lean capabilities mature, the program extends beyond the construction site. Corporate functions such as procurement, business development, and human resources are brought into

the fold, reinforcing end-to-end alignment and improving both the savings generated by the lean approach and overall company performance.

Embed. The final phase ensures that a lean approach becomes not just a system of methods but also a durable element of the culture. Sustained change depends on creating routines that continually reinforce targeted behaviors.

Lessons from the initial pilot projects are documented and refined into a repeatable playbook. The playbook shows project teams across the organization how different lean tools can be used onsite, with practical examples of their application. These include the use of LPS to ensure collaborative planning and weekly execution as well as visual management and coordination approaches, such as *Obeya* rooms and value stream mapping that make bottlenecks and nonvalue-added activities visible. The playbook also offers problem-solving approaches, such as root-cause analysis and fishbone diagrams, that help diagnose issues and prioritize the most critical actions. The aim is to turn learning into institutional knowledge that can be rapidly applied elsewhere.

At the same time, lean champions, and eventually the CoE, conduct structured training and knowledge-sharing programs. These can drive the adoption of lean practices at scale—ensuring that teams across different projects and disciplines approach their work with a common mindset and toolkit.

During this stage, companies ensure that progress is visible through dashboards and risk trackers that monitor performance, highlight emerging issues early, and support timely decision making. Crucially, lean principles should be integrated into performance reviews, incentive systems, and leadership routines. This alignment ensures that lean is not an initiative to be managed but a capability that defines how the organization plans, executes, and learns—project after project.

During the embedding phase—as well as earlier steps in the process—technology is a crucial enabler of success. (See “From Hard Hats to Smart Data.”)

— From Hard Hats to Smart Data

The right AI and digital solutions can enhance a lean approach along the full project life cycle, helping to support the development of process discipline, clear roles, and daily routines that drive predictable performance.

At the design stage, for example, AI can be used to analyze large data sets of engineering drawings to spot both overdesign and compliance gaps. With insight on where the specifications exceed requirements, companies can reduce capex. And they can conduct automated data-driven reviews to simultaneously improve design quality and compliance.

Digital solutions can also enhance risk management by using generative AI to extract risk information from unstructured sources, including project risk registers and reports (even in PDF format), build comprehensive risk databases trained on historical data, and generate actionable insights for ongoing and future projects.

Such solutions can augment lean's core strengths by enhancing transparency, foresight, and disciplined execution.

In the end, lean construction isn't just about doing more with less—it's about reimagining how companies build. By embedding collaboration, driving continuous improvement, and incentivizing new behaviors, companies can deliver smarter, faster, and more sustainable outcomes. The future of construction belongs to those ready to build lean.

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1 “Five Decades of Decline: U.S. Construction Sector Productivity,” Federal Reserve Bank of Richmond, August 2025.

2 “Critical Construction Risk Topics: Rework Costs Time and Money,” Axa XL, May 16, 2022.