

WHITE PAPER / **LEAN PRINCIPLES FOR PROJECT DELIVERY**

ELIMINATING WASTE CREATES REAL-WORLD BENEFITS FOR PROJECT COSTS AND OUTCOMES

By Mike Glenn

Every construction project involves multiple players. Whether it's the engineers, contractor, consultants or various subcontractors, all these team members should be working toward the same goal for the client. Applying lean principles to project delivery can help get there.



In many traditional project delivery approaches, the key players on a project are often working in silos, focused only on their individual responsibilities and contractual obligations. In some cases, this process can inadvertently create misalignment among the delivery partners, leading to waste and unnecessary steps in the project's development as each entity tries to independently meet its contractual commitments and internal profitability goals.

When the players work together from the beginning of a project, however, a team approach is created that incorporates the skills of each member, allowing owners to benefit from a more efficient process that can be more accurately tailored to address the unique elements of any given project.

Integrated design-build offers some built-in opportunities for collaboration, and the addition of lean principles takes advantage of those opportunities to create a strategy that purposefully builds a culture of trust, collaboration and alignment, thus allowing teams to target and eliminate waste, ultimately reducing unnecessary steps in the process and cutting project costs.

APPLYING LEAN PRINCIPLES TO TRADITIONAL DESIGN METHODS

Traditional construction projects are sometimes approached sequentially, with each entity completing its responsibility before the next aspect of a project begins. This structure can provide little opportunity for interaction between entities and — in many cases — each is operating under a separate contract. These contracts can unfortunately be written in a way that disincentivizes one group from working with another.

Without a complete picture of the entire project and what needs to be accomplished, each entity may be making different assumptions or creating gaps, overlaps or miscommunications that can lead to change orders.

By applying lean principles to project delivery, the focus is shifted to integrating the team so that all stakeholders work together to achieve a common goal. This collaboration occurs early within a project and allows individual team members to bring their skills, experience and, importantly, their innovation and ideas to the table

to identify potential areas of waste or more efficient ways of completing a project from the very beginning.

In a best-case scenario, all major team members even sign the same contract, further increasing the investment each has in the project and the team's success. This fundamental adjustment to traditional construction models can provide significant benefits to the owner.

ADDED VALUE FOR THE OWNER

Lean principles applied to project delivery put a greater focus on the owner and what aspects of delivering a project are important to success from an owner's point of view.

Cost and schedule are important aspects of any project, but they don't always fully capture all the owner's measures of success for a project. One of the first team exercises in a project using lean ideologies is a collaborative design and scoping workshop that puts the owner's needs — or conditions of satisfaction — at the forefront of the discussion.

During this process, team members consider deeper questions, such as what the business case is for a given project, what the owner is ultimately trying to achieve or what aspects they need to consider critical for success. This more thorough understanding of a project's success is then used throughout the process as a benchmark, helping to guide all future project decisions. In this way, improving cost or schedule while also still meeting the conditions of success becomes a win-win decision for all involved.

Establishing a high degree of common understanding about what will be built and why it's being built reduces risks by eliminating integration errors and scope gaps. Consider sports: To compete at a championship level, coaches set out the goal for the team, creating a common understanding of what is to be achieved, each player's role in achieving the goal and, importantly, how only by working together can the team — the entire team — achieve its common goal. Similarly, clearly defined conditions of success for a project can be used as a backdrop. Lean principles allow the team to shift from focusing solely on "what" is being built to exploring "how" the project should be designed and constructed to meet the owner's needs.

Once team members share a clear understanding of what they are trying to achieve, they can begin to constructively challenge what is being done, consider the project's scope and discuss how the outcome can be achieved in a more efficient and effective way by bringing their own unique perspectives and capabilities to the table.

IDENTIFYING WASTE

In addition to creating a team culture of trust, innovation and alignment, the central purpose of focusing on lean principles in project delivery is to identify and eliminate project waste to create a more efficient and customized solution.

Some Lean Construction Institute studies have shown that up to 70% of activities performed in the design and construction industry do not add value or, in other words, are considered waste. Based on lean principles, tasks that add value should meet the following criteria:

- The end customer cares about the task or outcome.
- The task changes the shape or form of a product or service.
- The task can be done right the first time.

By taking an integrated project approach, the team can collaborate early on and assess which aspects of the project may be redundant, unnecessary or simply wasteful.

One way to do this is by identifying overlapping functions and components of a project. For instance, five separate quality managers — one from each organization — may not be needed to deliver a successful project. Teams can focus on what is required to complete a function or task and utilize a “best athlete” approach to decide which partner is best able to meet the project need for the entire team.

Another common source of waste is transportation. In many cases, traditional thinking around schedule acceleration leads to expediting delivery of materials and equipment, well ahead of when they are needed in the construction sequence. Stockpiled materials or inventory are then moved from one spot on the site to another, over and over, just to make room for the necessary work to be done. This can often result in wasted motion and time.

Another common cause of waste is waiting. If one person is forced to wait for another member of the team to complete his or her task, it can slow down the overall job. Using lean thinking and processes, teams focus on creating flow between trades that prevents trade stacking and leads to efficient workforce leveling and ultimately faster, and safer, delivery.

Overprocessing and overproduction can also contribute to the waste in a project. For instance, with traditional project delivery engineers may overcommunicate or overproduce in the absence of being able to talk with the construction team to determine what is needed or useful.

One study found that construction teams only used about 30% of what was produced by the engineering team, highlighting a significant opportunity to more strategically think through the documentation and drawings that are created.

By integrating early in the process with those who do the work, it's much easier to identify exactly what information is needed to complete a given task in the most efficient and coordinated way possible.

Another potential category of waste exists in defects, or things that are just simply done incorrectly. Early communication is also critical to identifying and avoiding potential defects, whether they're in design work or construction work. This level of communication also allows team members to catch a mistake or error at the time it occurs, to prevent it from repeating itself and giving the team an opportunity to learn from it or create a better process.

Finally, traditional models can potentially ignore the advantage created by the skills, knowledge and experience each team member may bring to the table. By incorporating more voices into the early planning stages, there are more opportunities to utilize each team member to more clearly identify the most efficient and effective way to complete a task.

REDUCING COSTS

If you can identify and reduce waste from a project, one of the natural outcomes will be a reduction in costs as well.

By shifting the project's focus from "what" to "how," team members can more clearly identify waste by looking closely at aspects such as field labor, materials, equipment, and prefabrication and preassembly or modular on-site fabrications.

The first step in the process is identifying the largest areas of cost for the job, whether they include the field labor, materials or some other component. Next, by taking a team approach early in the project, all the people who actually do the work — construction, trades, vendors and designers — are already at the table working together, sharing and building on each other's ideas to come up with a better way to complete the project, ultimately helping to identify potential waste and opportunities for savings.

Finally, the team can identify strategies that address the greatest sources of waste in a project. With lean principles, scope is a driver of design, not an output. Real waste can be both identified and eliminated by defining value from an owner's perspective, mapping out the steps of a project, establishing a flow that continuously moves products and services, and incorporating opportunities for continuous improvement.

IMPROVING OUTCOMES

Applying lean principles to project delivery can translate to real-world savings for an owner. One study found that cost reductions of 10% or more have been seen when this process is used.

Early collaboration and alignment also allows the team to provide cost certainty in a project much earlier. These costs are also more accurate and have been shown to significantly reduce the number of change orders in a project.

Added efficiency also means significant schedule improvements, sometimes translating to reductions of 30% or more from a project's original schedule. Perhaps most importantly, the participants in the process are more engaged and satisfied, and the final product more directly speaks to the owner's vision and needs.

BIOGRAPHY

MIKE GLENN specializes in customized delivery models, including the application of lean principles to project delivery. In his role at Burns & McDonnell, he leverages his more than 35 years of experience to guide clients in the public and private sectors through their most challenging business objectives and projects, helping them embrace new approaches and technologies to achieve better overall project results.

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