



Moving from Offsite Construction to Smarter Project Execution

By Jay Snyder and Sabine Hoover

It's time to rethink offsite construction and align it with your organization's overall project execution strategy.

Prefabrication, modularization, pre-assembly—all different variations of offsite construction—have been around for decades and are making a comeback during an era where low cost, resource efficiency and tight schedules are priorities. So what is all the hype today around these proven business concepts, and why haven't they become standard practice across the entire industry by now? There are several reasons for this, and our article summarizes key challenges and opportunities that owner organizations and project teams face when tackling offsite construction. We also provide fresh insights into some of the organizational dynamics that owners face when making decisions around offsite construction and discuss why it's time for the industry to rethink project execution entirely.

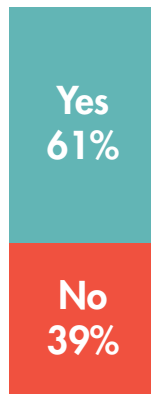
Ripe for Change and Disruption

We've entered a new era: Tight labor markets, emerging and integrated technologies, and increasing project complexity are all driving high levels of coordination, collaboration and project team alignment. Today, we see dozens of innovative companies—on both the owner and design/construction/manufacturing/building product side—reshaping and transforming outdated business models.

According to our latest industry study,¹ owners confirm that today's offsite construction environment is different compared to just three years ago (Exhibit 1). On the contractor side, the average use of prefabrication almost tripled between 2010 and 2016 (Exhibit 2 – see [“Prefabrication: The Changing Face of Engineering and Construction”](#) for more details).

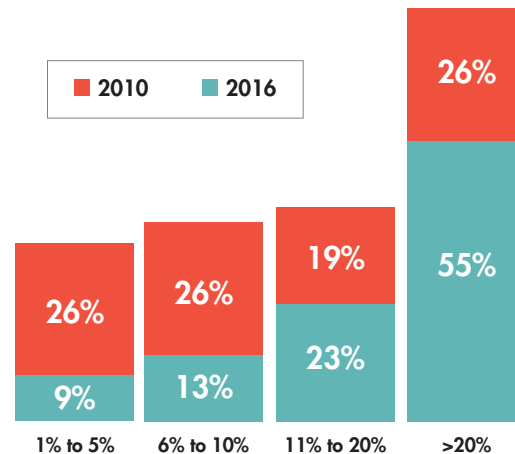
¹ “2017 FMI/CURT/CII Offsite Construction Study.” Release in December 2017.

Exhibit 1. Is today's offsite construction environment different compared to three years ago?



Source: 2017 FMI/CURT/CII Offsite Construction Survey

Exhibit 2. What percentage of your project work is currently accomplished using prefabricated assemblies?



Source: 2017 FMI/BIMForum Prefabrication Survey

Today's industry innovators are learning and adapting new manufacturing and offsite construction techniques to work smarter, faster and safer, and they're turning the entire traditional construction value chain upside down. So why don't we see and hear more about these success stories? Why aren't owners dictating these innovative approaches on all their projects, given the benefits in schedule and risk reduction, for example?

For starters, not all projects lend themselves to offsite construction. Therefore, before jumping into the world of offsite construction, owner organizations must learn industry best practices and start thinking about some key questions, including:

- What type of scope and trades are best-suited for offsite construction?
- How does offsite construction fit into our company strategy and vision?
- How does offsite construction differ from traditional delivery methods? And what are the implications for our standard owner project management processes in planning, design and construction?
- How does offsite construction fit within our overall project execution strategy?
- What new skills and competencies are needed? How do we prepare our workforce to adapt to these changes? What are the cultural implications?

Time to Think Differently

One of the key challenges that many owners face is the lack of awareness and understanding of what it takes to truly maximize offsite construction. Too often, decision-making related to project procurement and delivery occurs at the owner organization's executive level, while project execution occurs at the project management level. In many cases, executives don't understand construction industry pressures, drivers or bottlenecks and what it takes to execute a capital project effectively. In some cases, the owner procurement teams drive cost de-

cisions without understanding the overall project sequence and associated dynamics. As such, offsite construction is often not evaluated in the context of a broader project execution strategy. Consequently, contracts don't allow for early involvement of key stakeholders, such as equipment vendors, fabricators and construction service providers, which further impedes project success.

As one owner participant stated, "Oftentimes, the procurement groups aren't necessarily experts in project execution. They're experts in how to buy pencils for 5 cents cheaper, for example, but they're not necessarily project execution specialists. Therefore, they're really good at suboptimizing each part but not good at optimizing the whole."

Another way of thinking about this issue is to view offsite construction as a delivery method, in the same way owners would select design-bid-build, design-negotiated-build or design-build, for example. The reason being that an early and deliberate decision is needed to incorporate offsite construction, since the planning, design and construction phases of such projects are very different compared to the other three traditional project delivery methods. For example, for offsite construction, project planning must include (but is not limited to):

- Firms available to the owner with expertise in prefabrication that can be considered for the project.
- Offsite resources (e.g., real estate) for fabrication and staging.
- Logistics/shipping and delivery of large prefabricated assemblies to the job site.
- Specific skills and equipment associated with offsite construction tasks.

During the design phase, the offsite construction firm(s) must drive the coordination and production of architectural and engineering drawings. In fact, with a true offsite construction project delivery approach, the construction drawings could conceivably be exclusively produced by the contractor and specialty trades with further coordination and review by the architecture or engineering firm(s). In this scenario, the construction phase also requires considerable ongoing planning and coordination as building assets and systems move through fabrication, shipping and final assembly/connection onsite. You can quickly see how offsite construction can serve as a project delivery method that maximizes the benefits and success of this approach.



Strategic Project Execution Pays Off

As with all important strategic initiatives, the “business of offsite construction” starts at the top, with committed leaders who communicate a clear strategy and strong vision around what the company is trying to achieve (e.g., start with the question: Why are we pursuing offsite construction?). Successful companies typically select an executive-level champion to lead the offsite construction initiative and align all teams with the company’s overall project execution vision and strategy. This approach often requires close collaboration and coordination across different business groups and ultimately helps build a better business.

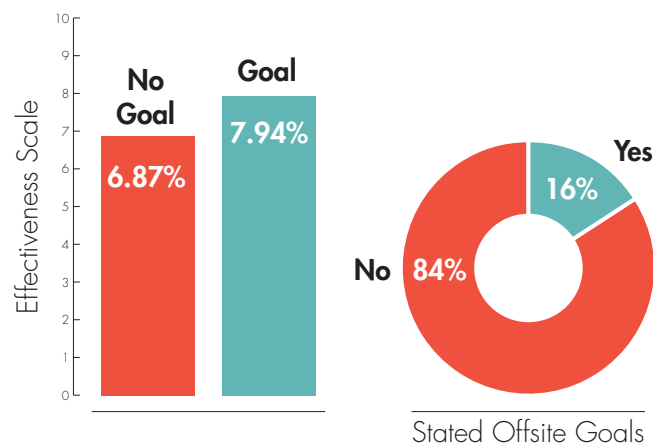
An interesting finding in our owner study confirms the importance of looking at project execution holistically and planning for it strategically. Exhibit 3 shows owner organizations that have formal offsite construction goals perceive such projects to be more effective compared to owners without strategic goals.

In our work with contractors, we often come across situations where a project manager or superintendent experiments with offsite construction on a project-by-project basis. But offsite construction is not something you can just dabble in and expect to see big returns from. It is an entirely different business philosophy that must be a fundamental part of the corporate strategy. Otherwise, it just ends up being a very expensive mistake.

The same goes for owner organizations. Unless offsite construction is fully understood and supported at all levels and an integral part of a corporate project execution strategy, with measurable goals and objectives, it will not be successful.

Atul Khanzode, Ph.D., head of technology and innovation at DPR Construction, confirmed, “The challenge with doing prefab is, it’s not just thinking about prefab. Instead, it’s more about thinking of how your prefab strategy fits within the overall strategy of delivering a project.”

Exhibit 3. Do you have stated offsite construction goals?



Source: 2017 FMI/CURT/CII Offsite Construction Survey

Wanted: A New Era of Collaboration

As with many new concepts (though prefabrication has existed since the '60s), success breeds success. In fact, offsite construction is no different than any other innovation, and therefore it is essential that industry players alter their mindset and get educated on the benefits and dynamics of this proven delivery method. Everyone will need to be open to new approaches to designing, manufacturing, sequencing and putting construction projects in place. Collaboration and partnering skills will be paramount, for example:

- Owners will need to be more educated around the planning, sequencing and pricing of offsite construction and will play a critical role in selecting the right teams.
- Architects will need to embrace the possibilities and constraints of offsite construction, including concepts such as miniaturization, which could apply to megaprojects in the future.
- Engineers will need to become familiar with the manufacturing processes and opportunities associated with various prefabricated components.
- Manufacturers, contractors and specialty trades will need to become involved in project discussions at the outset and well-versed in modeling and designing project components.

If it's planned and managed correctly, offsite construction will improve productivity dramatically in the coming decades. The risks and rewards of this delivery approach must be shared among all parties that contribute to value creation. This will call for better coordination and alignment among owners, designers, fabricators and contractors, and ultimately lead to a more productive and safer industry.



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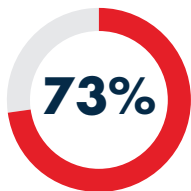
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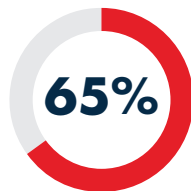
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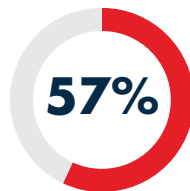
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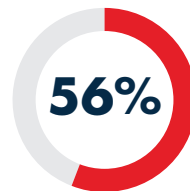
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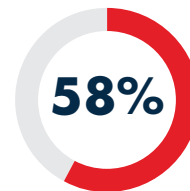
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