

## Is Modular a Good Fit for You?

By Taeko-Karyn Takagi and Wally Naylor

Developers, owners, general contractors, and subcontractors all face a similar dilemma. How can fantastic projects be created when they cost so much? Competition for land, difficult entitlements, and rising construction costs remain ongoing challenges facing the mandate to build, particularly housing. Material and equipment scarcities, code and regulation intensifications, and the lack of available skilled labor all contribute to decreased productivity. Inadequate housing and transportation create shortages of local labor while insatiable demand continues to outpace supply, all leading to soaring construction costs.

Shifts in policy and, especially, attitude have created openings for progress and solutions for this dilemma. While many search for a “silver bullet,” others are turning to off-site construction for cost and schedule savings, safety, and quality assurance. Off-site construction can also benefit projects in less obvious ways through reduced impacts to the site and surrounding neighborhoods, and employment of a much wider range of labor than traditional construction. Adapting to new processes required to best utilize off-site construction is challenging, but critical to its successful implementation. The industry has begun to truly adopt this construction means and methods, yet it still experiences growing pains while learning exactly what off-site construction is and how to use it correctly.

Off-site construction exists on a continuum of prefabricated elements including smart products, single trade and multi-trade components, and volumetric modular systems. CLT, electrochromic glass, rebar cages, wall panels, concrete precast, MEP racks, riser assemblies, bathroom pods, and fully equipped and furnished volumetric modules are a few examples used today. Some items, like prefabricated MEPS system components, are already being installed in your project without much involvement beyond the typical general contractor and subcontractor coordination, and do not require owner and architect buy-in. The utilization of BIM has enabled MEPS subcontractors to prefabricate considerable portions of their work using shop labor in a controlled environment, which improves both quality and schedule while generally reducing the overall cost. Some panelized framing systems are implemented

without full team involvement. However, once off-site construction begins to affect the structure of the building, everyone needs to be involved. Everything becomes extremely interconnected, and the overall team needs to integrate and coordinate the volumetric modular construction with the rest of the building. This requires early decision making and commitment to collaborate early in the design process to incorporate the strengths of modular fabrication.

Modular fabrication is ultimately a manufacturing process; construction can finally tap into increased productivity by integrating the advancements of other industries and technology. The fabrication assembly line operates with multiple stations and utilizes shop drawings that are transcribed from traditional plans and details to very specific assembly pieces and connections. This eliminates a considerable amount of time and skill traditionally required for site-built construction and allows for a broad base of labor opportunity. Full volumetric modular is not just building inside of a warehouse but a production line taking full advantage of a controlled safe environment unconstrained by typical site restrictions such as weather, noise, allowable construction times, labor shifts, and premium costs. Factories can control these variables while simultaneously reducing material and labor waste.

The final manufactured product must achieve design-lock very early in the process, which is very different from the traditional site-built iterative process and can have a steep learning curve for the project team if not properly planned. To fully realize the benefits of prefabrication, the full team must adopt the new processes and continually adapt their modes of operation. When fabrication of the volumetric components is complete, there are still a substantial amount of the building components that need to be assembled onsite. The grey area between what is produced and what is left to be assembled and built onsite continues to evolve through adoption, adaptation, lessons learned, and execution.

Selecting a modular fabricator early in the process is essential to a successful project. Limited qualified facilities are currently fabricating on a mass scale, requiring critical early feasibility review. Before modular fabricator engagement, the project team must analyze



production capacity, factory location, shipping logistics, financing, and insurance. Equally important is selecting the architectural, structural engineering, and MEPS members of the team. While more and more firms are gaining experience with modular construction, which is an overall benefit to the industry, selecting an experienced team on your project has real benefits. Different permitting and inspection processes require training and experience with implementation. Selecting a general contractor with modular experience will help “glue” the entire process and team together and minimize the overall risk.

Getting the right “fit” of team members, requesting their early involvement, sharing with them “why” you are choosing modular (is it quality, price, time, or all three?), developing an overall project schedule to incorporate modular into the project, sharing the overall Target Value Design budget, and allowing ample preconstruction funds for the design development process are all factors that need to be considered.

Changes in construction are notoriously slow to be adopted, especially for those looking for a quick fix, a disruptive switch, or complete reinvention of real estate and construction which are some of the oldest and most regulated industries in this country. Adopting new technologies and innovation takes smart retraining and integration of the existing and the new. Teams need continuing education and training to plan for modular construction and a lot sooner than you might anticipate. Done successfully, modular construction can provide real-time and cost savings while eliminating risk and improving productivity in construction. ■



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