

## IN ARCHITECTURE, NECESSITY IS THE MOTHER OF INVENTION... AND A CALL TO LEADERSHIP



### Necessity

Construction, as an industry, is under tremendous pressure to innovate. Limited natural, capital, and human resources create a necessity to seek new ways to deliver projects faster, more cost effectively, and smarter than traditional methods. New technologies and contracting systems exist today that were born of these pressures, and early adopters are embracing these to differentiate themselves in the market, as well as deliver true value to their customers. Yet gaps still exist to truly innovate the traditional construction process.

As Architects, we are trained to solve problems that exist in spatial and functional terms for our clients. We use resources that are available to us in the construction industry, such as stone, wood, metal, glass, etc. We conceive of the intended solution, and convey those ideas via drawings to illustrate the intended outcome. How the materials are assembled, however, is strictly the responsibility of the builder. In fact, our contracts specifically limit the responsibility of “means and methods” to the builder and their sub-contractors. Architects observe the assembly of the material and give professional opinion as to the measure to which it meets the intended result.



What if Architects and Contractors could design a building delivery system that could truly innovate the traditional construction process, and tackle the most perplexing project delivery pressures of today's construction market - faster delivery, better use of manpower, reduced project overhead costs, improved quality, and drastically reduced material and energy consumption?

### Invention



In short, they are. Architects and Contractors are taking industry leadership positions to resolve project constraints on behalf of their clients by streamlining construction, using Prefabrication. Prefabrication takes large repeatable building components off the critical path by building them offsite, simultaneous to the building site sequence. The results:

- **Shortened Schedules** - Simultaneous work and reduced jobsite congestion
- **Improved Financial Position** - Increased speed to revenue and reduced financial carrying costs
- **Better Use of Manpower** - Shifting skilled labor to a comfortable controlled work environment
- **Improved Quality** - Manufacturing techniques ensure repeated level of tolerances
- **Reduced Waste** - Components are purchased ready to assemble reducing the energy needed to move, cut, and manage the waste of leftover material

When Prefabrication is employed, the Architect is now contributing great value via significantly improved means and methods. Contractors, on the other hand, recognize the significant value of 3D architectural software to virtually practice the construction process and eliminate interference between factory-built and field-assembled components. Prefabrication is the definition of true collaboration, maximizing every team member's expertise, and improving on the traditional project controls of budget, schedule, and craftsmanship.

## Leadership

So, where do you start? The Architect can relieve project constraints as early as Conceptual Design. Prefabrication works best when the Architect designs with building sequence in mind from project inception. Designing for prefabrication allows the Contractor to select a factory-built or field-assembled delivery system. However, substantial redesign may be necessary during bidding if these early decisions are not taken into consideration:

- **Repeatable Components** - Buildings such as hospitals, hotels, and housing units have repeating building components, such as bathrooms, kitchens, headwalls, and the corresponding mechanical, plumbing, and electrical systems. All are candidates for prefabrication.
- **Quantity of Repeatable Components** - The benefits of Prefabrication escalate when there are 75 or more components to be manufactured. Most hotels, hospitals and housing projects have under leveraged economies of scale.
- **Size** - Prefabricated building components must be able to be transported from the factory to the jobsite. The components must fit in or on a semi-trailer, which is limited to 10-feet in width in most states. Size and configuration are important considerations.
- **Stacking** - Repeatable building components that are located in a stacked configuration increases efficiency of installation and connection to mechanical, electrical, and plumbing systems.
- **Clearance** - Large repeatable components must be delivered to the jobsite, raised to the final floor, moved across the floor into final position, and lowered into place, without interference. The route these components take is an important consideration.

Beyond these simple rules, Architects are free to let their creativity be their guide. Manufacturing techniques employed in factory-built prefabricated components ensure the final product will meet as exacting tolerances as can be imagined. Looking for these simple clues is the first step in relieving cost, schedule, and financial constraints on a project.





## Innovation

Prefabrication must be seen as a process innovation rather than as a product development tool. The Construction Industry in the US has developed around the fundamental belief that buildings are unique structures built to satisfy very local needs of function, space, site conditions, etc. Additionally, Architecture can transcend time and space and create strong emotional responses, inspire users, and meet needs. Ours is a culture that values individuality over a more European preference toward modularity.

Prefabrication is not a new concept. Its application more broadly applied to the construction industry, however, is a very recent trend. Today, an entire new industry is embracing a broad application of Prefabrication to bridge the gap of construction methodology between Architects and Contractors, between the past and the future. A Prefabrication consultant can assist in evaluating appropriateness of Prefabrication, regardless of project complexity. These services are generally provided free of charge, and if successful, would result in a full proposal for engineering services, manufacturing, and installation.

Necessity is the mother of invention in Construction. Whether your project team faces one or more constraints of schedule, financing, quality control, skilled labor shortage, congested siting, or environmental issues, take a leadership position and evaluate the positive impact that Prefabrication can have in resolving these all too common project issues.

## CONTACT

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