



# MODULAR CONSTRUCTION: *The Promise and the Practical Realities*

By: Charles F. Boland, PE

*Modular construction is no longer a fringe trend — it's a strategy increasingly positioned at the center of conversations about construction productivity, labor shortages, and project delivery innovation. But while the concept of assembling fully finished building modules in a factory is appealing, its real-world execution continues to expose a gap between promise and performance.*

For owners, contractors, and designers looking to capitalize on modular's advantages, understanding its practical realities is essential.

## Modular Defined — and Distinguished

In the evolving language of off-site construction, "modular" refers specifically to volumetric modular: three-dimensional units built in a controlled factory environment, typically with finishes and systems in place. Unlike panelized or prefabricated assemblies, volumetric modules are fully enclosed structures — think hotel rooms or apartment pods — ready to be stacked and stitched together onsite.

The approach is bold in its efficiency, but it's also unforgiving in its complexity.

## The Why: Benefits Driving Demand

The business case for modular remains strong:

- **Schedule compression:** Factory fabrication can proceed while sitework and foundations are underway, often shaving months off the timeline.

- **Quality control:** Climate-controlled environments support consistent workmanship and material storage.
- **Sustainability:** Reduced waste, fewer deliveries, and optimized material use are compelling to ESG-minded developers.
- **Urban feasibility:** Less site disruption makes modular especially attractive for infill and high-density environments.

Modular delivery has proven particularly effective in hospitality, student housing, multifamily, and healthcare — sectors that benefit from repetition and tight delivery windows.

## The Catch: Modular Isn't Plug-and-Play

Despite its upside, modular comes with unique challenges:

- **Design finality:** Major decisions must be made earlier in the process. Changes later in construction can be cost-prohibitive or outright impossible.
- **Logistical precision:** Modular success is often a story of millimeters. From shop drawings to shipping constraints, everything must be meticulously coordinated.
- **Jurisdictional friction:** Building codes, inspection protocols, and permit processes vary widely — and not all are modular-friendly.
- **Procurement pitfalls:** Treating the modular manufacturer like a typical subcontractor often leads to integration failures.





Ultimately, modular shifts risk upstream. If the project team isn't aligned from the beginning, delays and cost overruns are almost inevitable.

### Lessons from the Field

Real-world examples highlight a critical truth: **it's typically not the construction that fails — it's the planning.**

A common root cause of problems is incomplete design at the time fabrication begins. Unlike traditional construction, where certain details can be developed progressively, modular requires a **fully resolved design** prior to shop fabrication. Modules are built to tight tolerances and often include finished systems, which means even minor design changes — to finishes, mechanical routing, or structural connections — can lead to major cost and schedule impacts once manufacturing is underway. Without a locked-in design, teams risk rework, wasted factory capacity, and project misalignment that can ripple through procurement, approvals, and installation.

Consider the modular units that arrive before the site is ready, forcing costly storage and schedule disruptions. Or MEP systems that aren't coordinated across factory-built and site-installed portions, resulting in field fixes that undercut modular's intended efficiency. In some high-profile cases, the allure of modular delivery has given way to expensive litigation — not necessarily because the modules were flawed, although that does happen — but because the project wasn't designed or managed with modular in mind.

### Rethinking the Project Lifecycle

To succeed with modular, project teams must rethink traditional workflows. That means:

- Engaging the modular fabricator during **schematic design**, not after permit drawings.
- Ensuring all stakeholders — from engineers to code officials — are brought into early coordination.
- Establishing design-to-production coordination guidelines for effective integration with the modular fabricator's model and development process.
- Developing **clear, modular-specific contracts** that address ownership, transport risk, payment triggers, and quality control standards.

Design-build and integrated project delivery (IPD) models often align best with modular's front-loaded demands, but even traditional contracts can succeed — if adapted with intent.

### The Modular Mindset

Modular is not just a method — it's a mindset. It requires the same rigor as prefabrication, combined with the logistical choreography of manufacturing and the regulatory savvy of development. Those who approach it with that level of respect are seeing modular not as a shortcut, but as a strategic investment in quality, speed, and certainty.

The next wave of modular success will come not from innovation alone, but from execution — rooted in collaboration, discipline, and clear-eyed planning.

*Considering a modular project? Reach out to GREYHAWK for assistance in best practices for avoiding the pitfalls in modular construction or in responding to a troubled project.*



#### About the Author

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