DesignIntelligence®
Quarterly

THE SEASON OF SPECIALIZATION

PRAGMATIC DESIGN

Q1: RESILIENT SECURITY

The Season of Specialization

Robert Grupe

Industry guru Robert Grupe discusses broadened expertise and challenges in alternative design support methods for consultative design such as design-assist, design-build and delegated design.

Change Is Constant

In life, to survive and flourish, nature demands that we exhibit the ability to be resilient, to adapt to changing environments. This principle is also true in corporate cultures and extends to business strategies. Constant transition also shapes design and construction. At its core, the presence of continual change and the requirement to adapt to it are the give-and-take of evolution. Here's our challenge: in times of increasing uncertainty, how can we pool our intelligence to generate smarter, more confident, more adaptive teams during design — with clear accountability?

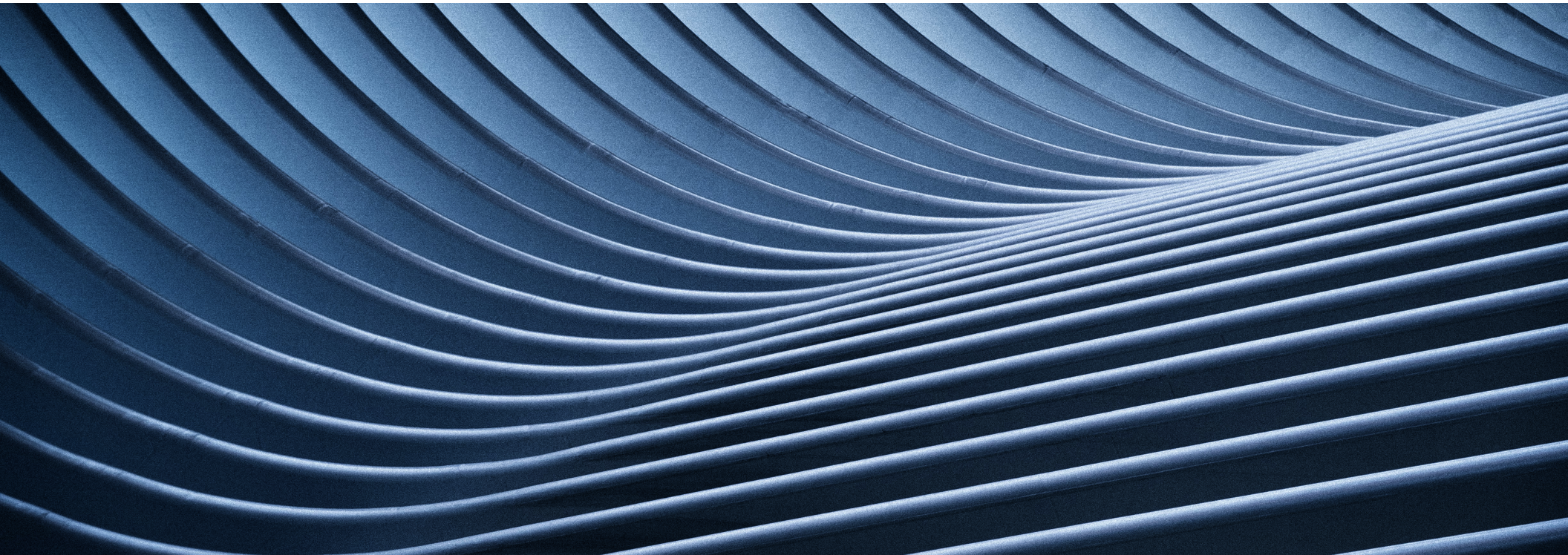
Strong winds of change have battered the traditional design-bid-build project delivery model for years. Pressures to shorten design time while managing liability exposure have led to more integrated models. These new modes have produced an environment where design and construction processes at all tiers — from owners to designers, from contractors to trade contractors and manufacturers — are in constant transition. As a result, the industry at large must be resilient to accommodate and anticipate these powerful external forces for change.

While climate change is on the macro scale, another major force altering the built environment is how we approach increased support during design by technical experts. The transition in

focus here is on the micro level. Broadly, we could call it "design by consultation". In this age of increasing complexity, one driven by building science, building codes and regulations, and building materials innovation, architects are finding it more difficult to stay in front of the associated nuances. Enter the "season of specialization," where designers focus on the overall building design and entrust decisions for (and detailed design of) highly complex technical issues to specialists. These specialists are recognized experts in their individual disciplines. The design, construction and manufacturing industry is increasing emphasis on alternative design support approaches to make our teams collectively smarter and more effective.

Evolving in parallel with this transition are the model building codes. What were once stand-alone specification documents are fast becoming catalogs for reference standards. These standards are usually written in a consensus environment and contain highly technical and sophisticated regulations that buildings must meet. Building scientists are taking a greater role in regulating codes and, hence, design. Code and standards changes are also occurring faster. For example, one standard referenced in the codes was modified four times in one year.

Competition for survival among building product manufacturers has brought about a new wave of innovation. In this advancing front, new products and systems are commercialized to meet these rapidly changing codes and regulations. How can we keep up? A recent code change introduced a requirement for the rainscreen principle into what was once a mature exterior system, exterior cement plaster. Almost overnight, this code revision triggered product innovation in that system's drainage materials.



The barometer on exterior envelopes has been dropping with attendant changes in design requirements. The emergence of operational energy regulation in the building codes has driven significant change on the design and installation of exterior systems. A related concern is containing a fire to its floor of origin. This has created a tempest of change in wall design. Beyond single-system design, the interconnectivity between adjacent building components must be considered for its impact on fire, acoustic and thermal requirements. Questions of compliance further arise when code-driven system innovation is coupled with the growing demand for off-site construction and prefabrication.

Design by Consultation

A recent initiative by the Steel Framing Industry Association (SFIA) revealed another illustrative example of design by consultation. While alerting architects of a change in how cold-formed steel framing members are referenced in the model building codes, it was learned that what was once termed a steel drywall stud is now thought by designers to require specialists. Yes, the standard interior nonstructural partition used in nonresidential construction has become an example of increasing complexity. As the requirement for fire resistance has waned in certain construction segments, it has been replaced with increased demand for acoustical performance in all segments. In health care, where the design and installation of these partition types has always been highly complex, there is now a trend for even higher degrees of sophistication and regulation. Surprisingly, the next generation of cold-formed steel nonstructural framing, the drywall metal stud — a component that has been in the market for some time — is a proprietary solution. While a fine example of product innovation, it has added to the existing fog of design-responsibility ambiguity.

> While many designers are welcoming and embracing the need for added technical expertise in detailed systems design from their manufacturer and trade teammates, at the same time, they should be careful. Challenges abound.

Delegated Design vs. Design-Build and Design-Assist

Specialized technical knowledge is at the confluence of these kinds of heightened sustainability, resilience and building code requirements. The examples above, while minuscule in the overall design scope, can have serious ramifications if left unheeded. Industry conversations relating to increased complexity have centered on new concepts such as delegated design, design-build and design-assist (or consultative design) as potential solutions for design support.

Delegated Design

Conceptually, delegated design is a significant variant to design-assist and design-build. Its greatest distinction relates to accountability. In delegated design, the design collaboration allows the architect of record to provide the performance requirement for a specific building element. These could be the fire, sound, structural, moisture and sustainability performance requirements and the consultant or contractor is allowed to design the solution that meets these requirements. An example would be a partition that needs to be 25 feet tall, with nonstructural framing, with a one-hour fire resistance rating, all while exceeding an STC-50 acoustical rating. This implies that the final system must also accommodate a certain level of building movement, be structurally stiff enough to support brittle cladding, have the structural capacity to support a handrail and have components meeting specified sustainability attributes. The use of this design process has not been common for interior partitions, but many architects are now rethinking how they approach design solutions and are considering new ways of engaging technical specialists to add value, save time and transfer risk.

Design-Build

In sharp contrast to the other methods discussed, design-build is a project delivery method in which the owner signs one contract with a single organization that will design and construct the system or structure in question. Due to its sole-source accountability, relative clarity of concept and myriad accompanying legal ramifications, we'll save in-depth discussion of this approach for another day.

Design-Assist

In design-assist or consultative project delivery, the contractor provides technical information to the Architect of Record in crafting the project design. In the design-assist scenario, individual contracts between the owner and the architect exist and are repeated between the owner and the contractor. Under this mode, the architect is liable for the overall design, whereas the contractor is liable only for the information they provide. In all cases, the contractor could be the general contractor or the specialty contractor with specific expertise.

Emerging Questions

These transitions in the design-process support and delivery options direct our attention to accountability and the resulting contract and construction documents. They also raise (or should) a host of questions:

- Who maintains the ultimate responsibility? Is it the firm who stamps the architectural drawings or the firm that stamps the structural or shop drawings?
- What about the contractor? Are they responsible for both design and installation within their scope of work?
- How should the architectural specifications clearly communicate this transition?

While many designers are welcoming and embracing the need for added technical expertise in detailed systems design from their manufacturer and trade teammates, at the same time, they should be careful. Challenges abound.

Systems Effects

One perennial challenge within this framework is the ongoing construction industry fragmentation. The sciences that support traditional component design (e.g., fire, acoustics, structural, moisture migration and aesthetics) are interrelated. As a building component is modified to meet one design requirement, it almost always has an impact on the other systems. These ripple effects are compounded when constructability, sequencing and first and life-cycle costs of the building component are considered.

When executing a design by consultation, the specialist is assumed to be conversant on all aspects of the component. In the examples cited above, if the specialist for the interior application is only focused on structure, who is accountable for the entire design? In the case of exterior envelopes, much attention is focused on water-resistive barriers and air leakage, but what about structural requirements and maintaining fire containment at the floor-exterior wall interface?

Qualifications

The choice of who qualifies as a consultant should not be taken lightly. They should fully understand all aspects of the design and the ramifications of any proposed modifications. Final decisions are best left to the designer of record.

Relying on specialists is nothing new. It has been used for centuries. Our industry has always depended on specialists in highly complex systems, such as vertical people movement,

mechanical, electrical and plumbing systems, fire suppression and many others. What is different now are areas giving rise to emerging sciences, such as sustainability, cases in which product innovation drives change, and new incentives and liabilities for bold collaboration and teaming methods.

Selecting an Approach

All options discussed above are designed to increase certainty and provide resilience for the team. These could include traditional design (with detailed design documents informed by manufacturer or trade partner input and expertise), consultive design, delegated design, design-assist, design-build or performance-based specifications under various forms of project delivery, including traditional design-bid-build, CM-at-risk, integrated project delivery and others.

Regardless of design and delivery approach, the emphasis here is to increase our intelligence — and certainty — and our ability to pivot with market conditions by opening our arms and minds to expand our teams. Careful selection of the right approach depends upon project-specific factors such as:

- Project goals.
- Agreements (owner, designer, trades, etc.).
- Risk allocation.
- Incentives, risk and rewards.
- Schedule, cost and selection bases.

The intent in sharing these methodologies is to leave the door open to all support modes versus endorsing any one of them. As an example, the use of design-assist trade support may mesh well for structural steel application or structural metal stud instances, whereas it may be less suitable or not at all for nonstructural applications, such as interior drywall studs and partitions. In misapplied uses of delegated design, the method may even have negative consequences and add complexities, costs and delays. As always, consideration of and responsibility for selecting the appropriate design approach is context-specific.

I recently attended an Arc US conference event where the topic in our sessions naturally gravitated to delegated design. My personal observation was that many associations should consider endorsing a multitiered approach to delegated-design specifications for nonstructural applications. The first tier would consist of the traditional process using a standard specification. The second (higher) tier could be offered for those projects where the project is unique, and highly complex, by using a performance specification and enlisting the contractor and their team to provide a solution, with the architect providing final approval and coordinating all aspects of the design. Other tiers and variations could be developed as required. In each, the key will be communicating and properly allocating accountability upfront to team members with the capability, capacity and authority to bear it.

> As with hurricanes, only the prepared will survive.

Looking Ahead

What remains to be seen is whether this current phenomenon will simply be a short-term trend or eventually revert to a more traditional approach. There is little doubt: our industry is in a period of rapid evolution. Specialists are being asked to make more fundamental design decisions. Architectural specification writers cognizant of this transition are grappling with the means of accurately articulating this shift in their specifications. Continued leadership and courage by trailblazing practitioners will determine how this trend will travel and where it might settle. Facing continued heavy winds, it's a little like predicting the path of a hurricane, operating amid the larger contexts of weather, geography and fate.

Design by consultation, design-assist, delegated design and design-build will most decidedly vary with local jurisdictions, materials and construction segments.

As with hurricanes, only the prepared will survive.

> Enter the "season of specialization," where designers focus on the overall building design and entrust decisions for (and detailed design of) highly complex technical issues to specialists.

Robert C. Grupe Jr. is the current chair of the Chicago Committee on High Rise Buildings and general manager of architectural services for the Steel Framing Industry. He is a fellow in the Design Futures Council. Previously, he spent over 38 years with United States Gypsum Company in various technical and management positions and has contributed to industry change for decades.