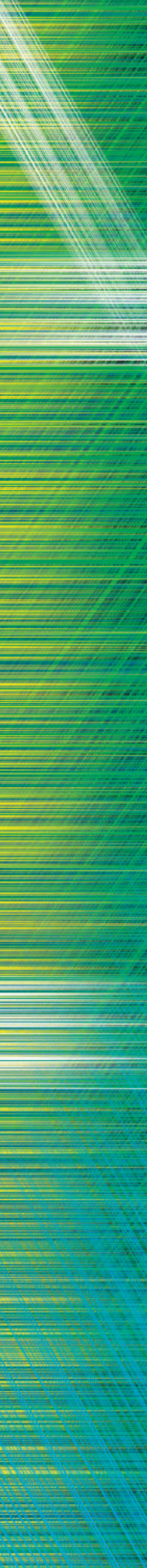


INSIDE JOBS

**CONTRACTORS
INCREASE THEIR USE
OF IN-HOUSE DESIGN
TO BETTER MANAGE
PROJECT DEMANDS**

By Jim Parsons



Long ago, project roles were well defined. Architects and engineers designed, contractors built, and owners wrote the checks. Over many decades, however, the lines defining those roles have blurred, with contractors increasingly handling or overseeing elements of design.

And it's a trend that's accelerating. More than 43% of contractors are gearing up to perform design work in-house, a 5% increase from 2018, with another 25% considering such a move in the near future, according to the "2019 AGC/FMI Risk Management Survey" from Associated General Contractors of America and FMI Corp.

While closely integrated design and construction organizations have long been routine in certain sectors, energy and industrial process work among them, the findings of the AGC/FMI survey reflect an environment increasingly influenced by time, technology and, of course, money. Compressed schedules are now the norm, say many industry leaders, in part because of more design-build. Off-site prefabrication also is a factor, with both GCs and specialty contractors taking advantage of production efficiencies to save on manpower and materials.

Adapting to this restructured landscape has not been universally smooth. Participants in the last two AGC/FMI risk surveys have complained of incomplete design documents, inadequate risk allocation in design-build, insurance and liability concerns, and issues coordinating with design teams.

Individual contractors' approaches for expanding in-house design capabilities run the gamut from adding a handful of specialists as liaisons to developing full in-house design services, either organically or via acquisition (see graph 1, page 19). For example, Joseph Po-

liafico, Flatiron Construction's vice president of safety and insurance, says his company has made a concerted effort to promote earlier and better communication with its design partners by using in-house staff to "look over their shoulder" as a design evolves. "It's the reality of the market now," he adds.

At the other end of the spectrum, Kiewit is among major firms that has significantly expanded in-house design capabilities, as the contractor seeks to apply the integrated design practices of its power business to other markets. Dan Lumma, president of Kiewit's engineering group, says broader in-house engineering capabilities allow the company greater flexibility in adapting to specific problems in projects, especially those with complex requirements.

"We know that it's impractical for us to do 100% of design and construction for every project in every market," Lumma says. "In some, we will do it all and sign off as engineer-of-record. In others, we will work with design partners who understand and share our integrated approach."

Key questions emerge: Is the need for in-house design indicative of growing pains that accompany any industry-wide evolution? Or, are there more deep-seated problems to be addressed? The answer, as many industry leaders point out, depends on the source.

Incomplete Design Documents

Adding in-house design capabilities to augment and finalize design documents might seem, at first glance, a logical move, especially to support best practices in design-build. After all, initial designs are expected to evolve gradually through collaboration among the project team.

Twelve months ago, however, 92% of participants in AGC/FMI's 2018 risk study reported that design

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documents were less complete than in the past.

Their concerns are not limited to specific project delivery systems.

"We're seeing this across the board," says AGC General Counsel Michael Kennedy. "Contractors are having to connect more dots on their own to keep projects moving."

Anecdotal evidence cited by contractors points to several contributing factors, including owner-driven schedules that push design firms to get work done faster.

"It's a problem that's grown worse over the past decade," says Leonard Monfredo, executive vice president, E.M. Duggan Inc., Canton, Mass. He speculates that, in the private sector at least, owners may limit investment in up-front design until project profitability and viability are assured.

As a result, he says, "they minimize the amount of time engineers have to do design."

The reduction in design time comes when architects and engineers are being asked to do more to meet project requirements, such as energy modeling or integrating advanced systems for sustainability compliance.

"Buildings are not getting easier," observes Chris Green, an Eagle, Colo.-based architect and former president of AIA Colorado. Some owners also fail to recognize the inherent intricacies of design. "It may well be that a lot of owners haven't been brought up in design

and construction at all,” he says.

Nor, it seems, were many of the younger, tech-savvy designers who are replacing retiring baby boomers. Stuart Coppedge, a principal with RTA Architects, Colorado Springs, recalls how his experience on summer construction jobs during high school provided valuable preparation for his future career. Now, he says, finding architecture-school graduates with construction experience is increasingly difficult.

“They may not intuitively understand work processes and how materials work,” Coppedge says. “It’s up to a firm’s leadership to train people and help them understand what they’re doing.”

Virtual design and construction technology, often cited as a boon to productivity, can be a double-edged sword as well. “It lets you draw a whole lot, but it doesn’t guarantee good results,” Coppedge says. Though he accepts the industry’s pervasive expectations for right-now results, an accelerated design schedule “doesn’t relieve the architect of the responsibility to do a good job,” he says.

And for some contractors, incomplete designs are not necessarily a negative. Other than with design-bid-build procurement, “it’s unreasonable for contractors to expect architects will meet all needs with a design,” says Doug Maibach, executive vice president, Barton Malow Co. After establishing its own architectural firm in the ‘80s to pursue design-build work, Barton Malow now relies on a 50-person virtual design and construction group that works with outside architects to complete designs.

Maibach calls it a collaboration-driven process to create a buildable model with design intent made clearer so trades can build efficiently and safely. “The further we’re up in the food chain as a de-



DISTRIBUTED DESIGN Contractors’ use of virtual design and construction technology can help expedite development and fabrication of building systems, but application of these tools still requires teamwide collaboration and understanding.

sign-builder, the more efficient we can get with modeling via this approach,” he says.

Indeed, with the advent of design-assist, contractors look to their subs to help fill gaps in specifications. As Greg Gidez, director of design services at Hensel Phelps, asserts, “I don’t need every detail of a curtain wall if I have a curtain-wall manufacturer there to do it.”

Other contractors stress communications. “Our most successful projects are when we share the design burden with engineers,” says Jeff Elwell, E.M. Duggan’s innovation and technology manager.

Eyeing Integrated Design

Because such collaboration is fundamental to design-build and other integrated project-delivery models, it seems hardly coincidental that the AGC/FMI survey found communication and oversight to be the prime motivators for contractors adding in-house design capabilities (see graph 2, p. 19).

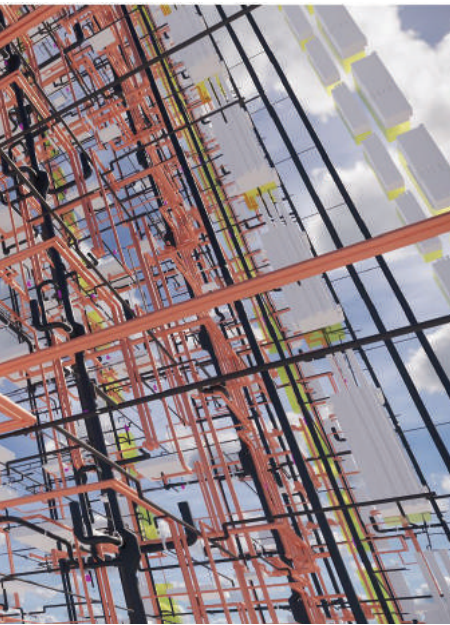
Demand for such teamwork is essential as design-build grows. ENR’s Top 100 DB firms reported total revenue of \$107.15 billion in

2017, up 4% from 2016, and revenue from domestic DB projects grew 9.6%, to \$84.35 billion. A market utilization study conducted by FMI last year projects design-build spending to top \$324 billion in 2021, nearly double 2013’s figure.

Kiewit’s Lumma says it’s critical to control construction costs from the outset, thus preventing surprises in the field. “The key is to be involved and engaged in what’s coming down the pipeline well in advance.” He adds that the acquisition of project management software developer InEight also helps Kiewit align its integrated design and construction processes.

“Breaking a large project into specific packages may mean more engineering hours,” he says, “but in return we get the advantage of lower costs because the overall process moves more quickly. We can also place more engineering focus on specific areas where it’s needed.”

Looming over the proliferation of design-build are growing concerns among contractors about shouldering risks that, in the era of design-bid-build, were more routinely allocated to owners and de-



signers. Under the Spearin doctrine, owners are responsible for the quality of plans supplied to a general contractor, shielding the contractor from liability for defects arising directly from the design (ENR 2/4-11 p. 14).

However, with design-build and other collaborative project delivery approaches that force contractors to be responsible for design quality as well—and how design will be carried out—accommodating those risks has become problematic.

Contractors as a whole would prefer that design liability remain with the design partners. And as the AGC/FMI survey notes, professional liability is among contractors' chief concerns about taking the design of permanent structures in-house (see graph 3, p. 20).

"Whoever takes the risk should be the one best able to handle it, and it should be priced as such," explains Jim Kerns, director of corporate risk management for Parsons. "Establishing price certainty with 30% drawings in design-build introduces a lot of unknowns, and in many cases, owners want contractors to take on all those risks."

Sometimes, exposure to gaps in liability insurance is a concern. Ron Stuff, vice president and general

counsel, Sundt Construction, says when that's the case, "a GC's skill set needs to be better. That's when you need to add some design skills."

Concerns about risk allocation have grown exponentially in recent years as more agencies have applied design-build to larger, more complex and costly efforts. But as AGC's Kennedy asserts, the standard that owners typically require of design-builders doesn't align with the availability of professional liability insurance. "The policies often leave a gap and overlook the fact that many design-related costs will be borne by the contractor," Kennedy says.

Insurers Adapt

Dan Knise, president and CEO of construction specialty brokerage firm Ames & Gough, agrees: "There is some tension in large design-build projects where complexities can lead to a gap in practice coverage." But he says the insurance industry is trying to adapt, adding that existing owner- or contractor-purchased protective professional indemnity insurance policies for specific projects are sufficient to handle them.

Knise says contractors carrying their own professional liability insurance provides them with an added safeguard for any internal design work they may do. He also recommends contractors work with an insurance broker and legal counsel with good design-build expertise, "not just knowledge of the process. If they see problems with a contract's insurance requirements, they should discuss that with the owner," he says.

As with most firms, Sundt reviews contract terms to ensure they line up with insurance coverage. Stuff, the firm's general counsel, reports having seen little pushback from owners when pointing out uninsurable risks. "If an owner

wants to have an honest conversation, then they will usually agree to a change," he says. Should an owner adopt a "take-it-or-leave-it" stance, Stuff says, "then we have to decide if the project is worth taking that extra risk."

Although in-house design capabilities may help contractors mitigate risk issues, at least to some degree, a perceived inability of design-build to fully address risks has led some to ask if the delivery model itself is faulty.

"There are questions as to whether contractors are best suited

1. HOW IS YOUR FIRM DEVELOPING IN-HOUSE DESIGN CAPABILITIES?

Hire internal engineer **50%**

Add members to in-house team **45%**

Hire internal architect **42%**

Create a design team **24%**

Place project manager in design office **24%**

Acquire a design firm **18%**

2. WHAT ARE THE TOP REASONS FOR BRINGING DESIGN IN-HOUSE?

Improve communication with design firms **68%**

Facilitate communication with outside firms **66%**

Increase supervision of design firms **61%**

Perform in-house design **47%**

Develop formal expectation for design work **21%**

Sell design services **16%**

SOURCE: 2019 AGC/FMI RISK MANAGEMENT SURVEY

3. WHAT RISKS DO YOU EXPECT WILL INCREASE AS A RESULT OF EXPANDING IN-HOUSE DESIGN CAPABILITIES?

Professional liability **63%**

Cultural differences in organizations **32%**

Relationship strain with design firms **32%**

Insurance coverage gaps **24%**

Lack of expertise **16%**

Other **8%**

SOURCE: 2019 AGC/FMI RISK MANAGEMENT SURVEY

to do design—and if design-build provides the best way for them to manage risk,” says FMI principal and risk management study co-author Ryan Howsam. Design-build may not be “broken” as some contractors claim, he adds, “but it does need to be better understood.”

Lisa Washington, executive director of the Design-Build Institute of America, counters that while design-build is an imperfect process, the model is hardly broken.

“Uncertainties come up in any delivery model, and design-build offers ways to address them,” Washington says. That’s why, she says, contractor-housed designers can enhance team communication and coordination, thus expediting sought-after innovations.

The problem, Washington says, “may be that some people dive into design-build without being educated [about it].”

That includes owners who may find design-build’s price certainty appealing but don’t fully understand their responsibility in achieving it. Evan Caplicki, an attorney who specializes in infrastructure for Los

Angeles-based law firm Nossaman LLP, says owners’ initial forays into design-build often encounter problems. “They run the gamut in terms of legal experience and resources to guide them in what they can and should do,” he says.

Knise agrees, citing several instances of contract-insurance requirements in which decades-old terms and conditions are ill suited to design-build or any other more complex project delivery. “Many owner attorneys are just not up to speed” on design-build or the insurance products that cover it, he says. “They’re doing a disservice to both owner and contractor.”

Comfort Level

Contractors likewise may be less than fully prepared to pursue design-build opportunities. Stephen Mulva, director of the Construction Industry Institute, says firms experienced in integrated design and construction likely will have a greater comfort level in handling such risks. “But if it’s a forced marriage between the designer and contractor, there may be problems,” he adds.

Kerns, Parsons’ corporate risk director, says that while some contractors may never be comfortable with design technology or its risks, they have little choice but to embrace it. “Design-build is here to stay because owners like it,” he says. As such, contractors will increase their level of engineering work while some design firms will augment their expertise in construction practices. “Both ends will approach the middle,” Kerns says.

But while adding or enhancing in-house design may better prepare contractors for the uncertainties in a design-build project, it’s still up to them to be fully versed in the nuances of the delivery model, he says.

Leading more integrated design and construction also demands a cul-

ture of commitment and trust, one that doesn’t develop overnight, according to Kristin Hill, director of educational programs for the Lean Construction Institute. “Having more control doesn’t solve problems by itself and may create more tension with the owner,” she says. “A contractor needs to be a strong leader, and learning that role takes time.”

Contractors also should recognize the unique role that design firms play in design-build. “Contractors can’t treat designers like a traditional sub relationship,” says Flatiron’s Poliafico. “They should be treated like partners.”

Still, he adds, an assertive approach is sometimes necessary to ensure designers understand quantity risks and what’s expected for a 30% design or similar requirement. “We want them to stand behind their work product,” he says.

Hensel Phelps’ Gidez adds that to operate at a high-performance level, contractors must reconsider existing processes and how to do them. “You have to understand your design partners and what design involves,” he says. “Design-build is an iterative process that will spin unless you have the right information.”

Contractors also should expect their in-house design capabilities will need to evolve to keep pace with the changing construction environment. CRB of St. Louis has long performed in-house design to serve a variety of markets. Yet General Counsel Jim Scott says that over last few years the firm made a concerted effort to find a highly collaborative and integrated approach to overcome the “healthy tension” that comes from having differing cultures of designers and constructors under one roof.

“Both groups hold each other to high standards,” he says. “It’s not perfect, but we continue to investigate ways to make it better.” ■