AIA Best Practices:
Blurred boundaries: Design assist and delegated design

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Summary

Design-assist is a preconstruction advisory role most appropriate with design-build, construction-manager-at-risk, and other integrated delivery methods, and is becoming increasingly common for many building systems. Used correctly, it can provide valuable information to the design team, but it does not change the architect's responsibility for the content of the contract documents.

Design-assist is sometimes confused with delegated design, which is a construction-phase engagement that is part of the contract for construction and assigns responsibility for the engineering of a system to the contractor. Delegated design uses a subcontractor's or fabricator's expertise in a particular system, component, or assembly to yield efficiencies in the engineering and final product. With delegated design, the engineers of record for specific systems are engaged by subcontractors, who thus take on the risk for performance of the systems.

Design-assist and delegated design are complementary but can be used independently of each other. Used together, they can yield significant benefits to all parties on a construction project. Design-assist and delegated design share a risk related to owners' perceptions: Because owners must pay their designers as well as design-assist and delegated design subcontractors, either directly or through construction managers or contractors, they can believe they are paying twice for the same service, and that designers are using the two processes to shirk their responsibilities and reduce their liability. This paper demonstrates that this belief is mistaken.

Introduction

Design-assist is becoming increasingly more common across building systems, such as building enclosures and mechanical, electrical, and plumbing systems. But how does design-assist affect design professionals? Does it change our professional responsibilities or our liability? Does it affect our ability to control the design intent? Do we draw (or model) more or less?

Design professionals also commonly specify delegated design responsibilities for building enclosure systems and assemblies. What amount of responsibility does delegated design transfer to a contractor or subcontractor? And how does that relate to design-assist work?

This paper will examine how design-assist and delegated design services are contracted and delivered; their effects on design professionals' responsibility, liability, and delivery; and how they can be used together or separately.

Design-assist

What is design-assist?

Design-assist is a preconstruction contractual arrangement between a trade subcontractor and either a construction manager or owner in which the subcontractor advises the design team on the detailing, constructability, and cost of systems related to its trade. The intent of design-assist is to use subcontractor expertise to help the designers arrive at solutions that meet projects' cost and schedule goals. Design-assist contracts are usually for preconstruction only, though it is typically assumed that the design-assist subcontractor will also perform the work, helping to ensure that the cost and schedule targets are met. This being the case, design-assist is feasible only in design-build or construction-manager-at-risk delivery methods, where there is contractor continuity from design to construction. The design-assist process does not include any contractual relationship between members of the design team and the design-assist subcontractor. The owner-architect agreement may contain language obligating the design team to participate in a design-assist process, and even in the absence of such language, collaboration between the design team and design-assist entities will be expected. Alternatively, with design-build, the design team and the design-assist entities may have separate contracts with the contractor. However, in neither case is there a contractual obligation between design team and design-assist entity.

Design-assist can begin at any design phase, though it's most effective when the project's design has been developed to a point where the design-assist entity can evaluate its trade specialty for cost, constructability, and schedule impact. In many cases, design-assist activities will begin partway through the design development phase. In most cases, the design-assist entity is contracted for a lump sum based on the anticipated construction cost of the relevant building systems.

In the simplest terms, the design-assist process consists of a series of design-phase meetings between the design team and the design-assist entity where system costs, scope, and details are discussed, and the project team agrees to cost- and schedule-conscious solutions. Ideally, the preconstruction collaboration between trade experts and design professionals will yield documents that describe a constructible system that meets the project's budget and schedule. In this scenario, the design team is spared redesign efforts due to budget overruns or details that are not easily constructible, and the subcontractor's knowledge of the project greatly reduces the effort required to bid the project and the risk of an inaccurate bid.

How does design-assist affect the architect's work?

First, it's critical to understand that design-assist is an advisory service and does not change the architect's contractual and legal obligations as the design professional of record. Because all content of the contract documents remains the responsibility of the architect or engineer of record, incorporation of information from the design-assist entity into the final contract documents is at the discretion of the design professionals. If the design-assist entity suggests incorporation of a detail, system, or component that the design professional does not believe meets the owner's needs or the health, safety, and welfare of the public, it is that professional's responsibility to reject it. Alternatively, if the design professional incorporates a

detail, system, or component suggested by the design-assist entity and it fails as a result of a design error, responsibility for that failure resides wholly with the design professional. Even though it may have been suggested, and ultimately built, by the design-assist entity, the architect or engineer of record bears the legal and contractual responsibility for performance, service life, and safety.

This is not intended to paint a bleak picture of the design-assist process; on the contrary, it can be a success for all parties if done well. Design-assist can prevent false starts in the design process by avoiding solutions that don't meet the project's budget or are difficult to construct. Information from the design-assist entity can also help the architect determine what needs to be included in the contract documents, and what's unnecessary. The architect still has to completely document the design intent, but assistance from the design-assist entity can provide useful guidance about what fabricators and installers actually need. However, it should not be assumed that design-assist will necessarily result in significantly less documentation by the design team. The primary potential time savings are in avoiding questions and redesign that might otherwise have occurred during construction.

It should be noted that a conventional project delivery would not include preconstruction meetings with subcontractors, so engagement in design assist adds time and effort by the design team.

Potential benefits of design-assist

Owners benefit the most from the design-assist, since it helps ensure on-time and on-budget projects. By involving trade subcontractors during preconstruction, procurement times for long-lead systems can be shortened. Early involvement of design-assist entities gives them advance knowledge of the systems, details, and components that the design professionals will ultimately include in the contract documents. This advance knowledge allows the subcontractor to begin preparing shop drawings before contract documents are complete, allowing expedited review, fabrication, and delivery of systems.

The design team benefits by getting reliable information on systems that will inform the design and detailing of those systems. This knowledge can reduce the amount of research required by the design team, and help avoid costly or difficult-to-build details.

Contractors also benefit. Design-assist systems are frequently on a project's critical path and streamlining the design, shop drawing production, shop drawing review, and subsequent fabrication can contribute greatly to a contractor's ability to adhere to a project schedule, especially an aggressive one.

Finally, design-assist benefits subcontractors and fabricators. The subcontractor gains insight into how a product or system can meet the project's design intent. This will likely avoid the need for subcontractors to revise and resubmit shop drawings or product data.

Potential risks of design-assist

The design team's most likely risk with design-assist is when owners misunderstand the architect's role in the process. Some owners mistakenly believe that design-assist means that subcontractors are doing the architect's work, leaving the architect with significantly less to do. This can result in an owner's requesting a reduction in the architect's fee.

Owners can also believe that design-assist lessens the architect's liability and responsibility for the content of the contract documents. As discussed above, design-assist does not shift this responsibility from the

architect of record. In fact, design-assist presents at least two additional risks to the architect: (1) the possibility of being pressured into including information in the contract documents created directly by the design-assist subcontractor and thus not under the direct supervision of the architect of record; or (2) design-assist subcontractors may be more interested in meeting budgetary requirements than supporting the design intent. It is the architect's responsibility to ensure that neither of these situations comes to pass.

For design-assist to be efficient, the architect needs to define system performance and aesthetic criteria before the design-assist subcontractor is engaged. Because design-assist frequently begins early in a project's design (usually design development, but sometimes as early as schematic design), the architect may have to determine those criteria earlier than normal. This isn't necessarily a risk, but it does need to be understood to maximize the benefit of design-assist.

Design-assist case study

For a clinical laboratory in New York City, the owner and construction manager engaged a design-assist subcontractor to participate in the design of the multistory, unitized curtain wall system on the building's main façade. Diagonal, exterior fins (Fig. 1) were critical to the design expression and for providing the solar shading needed for the building to meet the owner's energy performance goals.

FIG. 1: RENDERING OF MAIN BUILDING FAÇADE SHOWING CURTAIN WALL DESIGN CONCEPT.

The design team's initial concept was for rectangular curtain wall units composed of 2 trapezoidal insulated glass units (IGUs) divided by a diagonal mullion with an external fin.

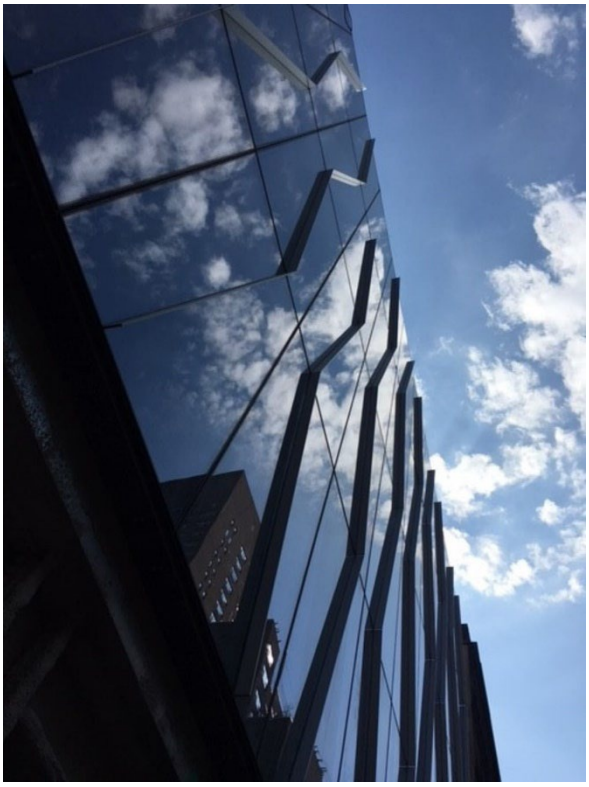
In reviewing the proposed system, the design-assist subcontractor determined that the trapezoidal IGUs were cost-prohibitive and suggested using rectangular units instead. However, the architects felt the diagonal fins and mullions were critical to the project's design and energy performance.

In response, the design-assist subcontractor proposed adhering decorative mullions to the rectangular IGUs' interior and exterior surfaces.

The architect agreed that adhering the interior component would be durable and secure, and would meet the design intent. The adhered exterior fin, on the other hand, significantly altered the curtain wall's appearance, and the architect was not convinced that the exterior application would be durable enough to serve the client's needs. This portion of the proposed solution was rejected.

The architect and design-assist subcontractor discussed several options for the external fins. The solution: adding tabs to the horizontal mullions to support the exterior fins. The fins would thus be mechanically anchored, but without the costly continuous backing mullions and trapezoidal IGUs. This exterior fin solution, along with the adhered decorative interior mullions, met the project requirements for appearance, performance, and durability.

The collaboration between the architect and the design-assist team yielded a solution that met the design intent in a cost-effective way. Because the design-assist effort occurred during the contract documents phase, the design team avoided redesigning the system after award of contract and issuing document revisions to reduce bid costs, while the construction team avoided the need for multiple rounds of shop drawing submissions to understand and achieve the design intent. Everyone—owner, designers, and constructors—considered the process a success.



Delegated design

What is delegated design?

Delegated design is a method of specifying responsibility for the detailed engineering of a system, component, or assembly. While design-assist and delegated design share some common elements, they are not interdependent; each can exist separately and independently.

Responsibility of the delegated design subcontractor

When work is specified to be delegated design, the responsibility for the performance of the system, component, or assembly is transferred to the subcontractor responsible for that scope. A delegated-design specification typically requires proof (e.g., drawings and calculations signed and sealed by a licensed engineer) that the work has been engineered to meet the specified performance requirements.

Architect's responsibility

Delegated design does not absolve architects of all responsibility. They still need to ensure that the application of the system, component or assembly shown in the contract documents is reasonably achievable, and that it can be engineered to meet the aesthetic intent and the specified performance criteria. For example, showing a curtain wall with four-inch-deep, three-story-high unbraced mullions would not be reasonable; the technology does not exist to achieve this design. Additionally, identification of appropriate performance criteria remains the responsibility of the architect or engineer of record. The delegated design subcontractor is responsible to design a system meeting the specified criteria, but if these criteria are inappropriate to the building's design or location, failures that result remain the responsibility of the architect.

Potential benefits of delegated design

The most significant benefit of specifying delegated design is that it takes advantage of a subcontractor's or fabricator's expertise, and will usually yield an efficient design. Using curtain wall as an example, the design team could engineer the mullions to meet the project's performance criteria, but would likely over-design them because the designers are not familiar with this kind of systems engineering and would build in overly-conservative safety factors that vendors' engineers would not. Delegated design subcontractors and fabricators, on the other hand, specialize in these systems and can work efficiently. Also, subcontractors and fabricators are more motivated to design the components and materials as economically and with as little waste as possible.

Potential risks of delegated design

Using delegated design without preconstruction design-assist increases the possibility that the delegated design subcontractor will misinterpret the architect's design intent. When this occurs, the delegated design subcontractor can spend time and effort producing submittals that the design team rejects, requiring redesign, reengineering, and resubmittal.

Additionally, there are some jurisdictions that do not allow delegated design. If this is the case, the design team must identify appropriate engineers who know how to design and engineer special systems.

Some delegated design systems usually require permit review once the engineering and documentation is complete, typically well after an initial permit submission and even after the issuance of the building permit. For example, fire protection and fire alarm systems are commonly submitted for permit review directly by the delegated design subcontractor. Since not all jurisdictions are familiar with this approach, this should be discussed with the authorities having jurisdiction long before permit submission to ensure that delegated design doesn't delay the construction start. Another potential risk to delegated design is that the post-bid permit review could lead the authorities to require changes in building systems already bid and awarded. Changes at this stage in the project could result in unforeseen schedule delays or increased costs.

Another risk—for the design team—is that owners may mistakenly believe that specifying delegated design reduces the design team's scope and, as a result, fee. They believe they are paying two entities—the architect and the contractor—for the same services. Similarly, owners may think that architects specify delegated design to shed their design responsibilities. Neither perception is accurate; in fact, it is usually the owner who benefits, in cost and material efficiencies, from delegated design.

A final misperception that owners may have is that delegated design is "new." Architects have been specifying performance-based engineering by subcontractors for decades, but only in the past ten years or so has the process been called "delegated design."

Relationship between design-assist and delegated design

As mentioned earlier, design-assist and delegated design are complementary, but not mutually necessary.

Design-assist is a pre-bid activity while delegated design is post-bid. In many cases the design-assist subcontractor and the delegated design subcontractor are the same entity, but with different contractual and legal obligations. One distinction is that the AIA A201 General Conditions of the Contract for Construction governs most delegated design contracts, but not design-assist contracts. It's the difference between an advisory (design-assist) and an engineer-of-record role (delegated design). When design-assist and delegated design are provided by the same subcontractor, the legal switch from the former to the latter occurs when the subcontractor signs a contract for construction, either with the contractor or directly with the owner.

Advice given by the subcontractor in a design-assist capacity is non-binding and the final content of the contract documents is not the subcontractor's responsibility, while delegated design engineering, fabrication, and installation is. So if the subcontractor gave bad design-assist advice that the architect of record used in preparing the contract documents, and then the same contractor, in a delegated design role, engineered and installed that system in accordance with specified criteria, and the system failed due to the design error, responsibility for the failure would likely rest with the architect of record, who specified the criteria, and not with the design assist/delegated design entity. If, however, the design assist advice provided good criteria and the system failed due to incorrect delegated design engineering, the responsibility would likely rest with the delegated design engineer-of-record.

In the unusual instance where the design-assist subcontractor is not retained as the delegated design subcontractor, many of the benefits of design-assist are lost. The project may suffer because of the loss of knowledge and continuity between the design and construction phases.

Conclusion

Both design-assist and delegated design are useful tools in the design and construction of a project, and can benefit all parties if used thoughtfully and appropriately.

Design-assist uses subcontractor expertise to advise the design team, resulting in cost-effective design and detailing. It also gives the subcontractor insight into the project's design intent and a head start on procurement, both of which can substantially reduce fabrication, delivery, and installation times. The owner gets the most efficient use of the entire design and construction team's time and greater value for construction dollars spent.

Delegated design, when used properly, places the responsibility for engineering specialty systems with the entity best qualified to produce an efficient design: the design team in developing design intent and performance criteria, and the construction team in translating these requirements into an optimized system.

When used together, design-assist and delegated design can make the most efficient use of each team member's expertise and can result in productivity and fiscal gains for all involved.

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