

PLENARY II –DELEGATED DESIGN

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Understanding Design Assist and Design Delegation: Distinctions and Differences

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Advances in technology continue to drive the need for specialized expertise in design, manufacturing, and construction at an accelerated pace each year. Involving others in the design process beside the architect or engineer of record is not a new concept. In fact, as construction processes and project management technology become more sophisticated, no one party may have all the training and experience to design and construct all components of a project. Contractors can lend their experience and knowledge in early programming and design phases through pre-construction services contracts. Compare this advisory involvement during pre-construction to a contractor's undertaking of the entire design liability through a design-build agreement.

The distinction in services has been said to run along a continuum from informal involvement (design assist) to a complete delegation of design and how the constructed design shall perform (delegated design). At the end of the day, the party who takes responsibility for design and construction outcomes may not be as clear as all collaborators had hoped at the outset.

I. THE BASICS OF DESIGN ASSIST AND DELEGATED DESIGN

Design assist describes a process in which the contractor provides design input for a design that is still being developed.¹ design assist is provided at the Schematic Design or the Design Development phase of the project delivery.² The contractor might give suggestions on cost estimating, duration, or constructability, and, often, design assist services are provided before pricing is agreed upon. In using design assist services “[c]ommunication between the design and construction teams is often improved, and coordination activities often happen at an earlier stage when problems can be solved easier . . . Change orders and requests for information are often reduced and constructability issues can be identified early on. Owners often see cost and scheduling benefits as costs can be locked in early and materials can be procured and assembled more quickly.”³ The design professional maintains the discretion to incorporate or reject the contractor's input and suggestions and is not otherwise obligated to use any of the information from the contractor in its final design. In design assist, the contractor's input and “assistance” is typically based on its own personal experience with scheduling, cost estimating, and sequencing construction projects.

It is also an increasingly common practice for design professionals to retain specialty design consultants during the design process to provide specialty designs that are incorporated into the construction documents. In these cases, the architect or engineer of record (“AOR” or “EOR”) are similarly not obligated to integrate these recommendations and retain ultimate responsibility for the design in the construction documents. However, if the designer of record does incorporate them into the construction documents that are signed and sealed for permitting, the designer of record has accepted liability for these elements.

On the other hand, delegated design in its complete sense describes a transfer of design liability through a performance specification from a designer of record to a contractor⁴ in which the contractor assumes responsibility for the design and, if the contractor is not itself a design professional, then the contractor delegates responsibility for that portion of the design by subcontracting to a licensed design professional.⁵ Often, the contractor is delegated design responsibility for materials, proprietary systems, or equipment. Common examples of components delegated to the contractor include curtain wall systems, pre-fabricated joists and trusses, fire protection sprinkler systems, precast concrete components, and steel framing systems. In the case of Universal Orlando's parking structures, the parking consultants developed the design requirements and the performance specification for the contractor to install its proprietary system.

In general terms, the design team, with owner's assistance, is responsible for preparing performance criteria with sufficient detail to describe the character of the work that the contractor will use to achieve the portion of the design delegated to it.⁶ The performance criteria the contractor must satisfy are based on the design professional's construction documents and written technical specifications.⁷

Building systems that are delegated are typically specialty or proprietary components that are often designed and fabricated by the delegated designer. Common delegated design systems include waterproofing and roofing design, curtain wall systems, low voltage mechanical systems, fire sprinklers, and fall protection systems. These systems are usually delegated to other designers either when a building component is a proprietary system, commonly specified based on performance criteria, and/or is delivered by a design-build specialty subcontractor.

In analyzing design assist and delegated design liability, consider the following:

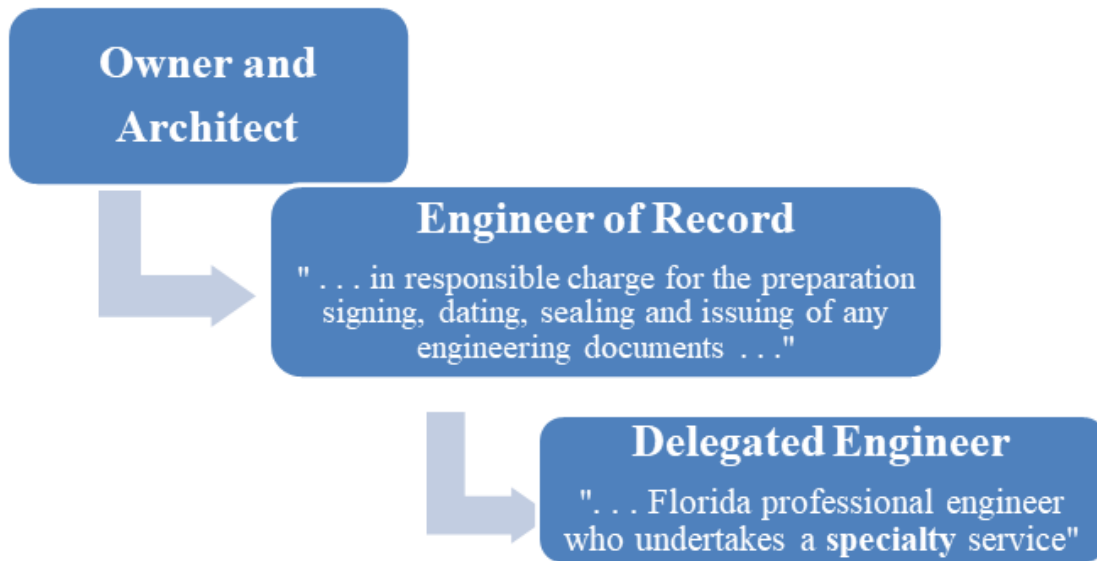
- ✓ Who is providing the design assist – the owner's consultant or the contractor or construction manager?
- ✓ What is the scope of the design assist consultant's or the contractor's input during the design or pre-construction phase?
- ✓ Is the contractor advising the designer of record to improve design to allow the contractor to perform its means, methods, techniques, and sequences more easily and cost effectively?
- ✓ At what stage of the design and construction is the owner's consultant or the contractor providing design expertise - before or after construction documents are completed?

II. THE PRACTICE OF DELEGATING DESIGN IN FLORIDA

A. Roles and Responsibilities

Florida engineers are governed by Chapter 471, *Florida Statutes*, and the *Florida Administrative Code* ("Code"). Chapter 61G15-30, *Florida Administrative Code*, outlines the rules applicable to all engineers, including rules surrounding the delegation of engineering design

services. Similarly, Florida architects are governed by Chapter 481, *Florida Statutes*, and Chapter 61G1, *Florida Administrative Code* (“Code”) as to the rules of architectural supervision.



i. Owner and Architect

The owner and architect are responsible for providing the contractor with specific performance criteria which set forth the expected operational requirements of a component or installation in a building. In other words, the owner or architect tells the contractor or the subcontractor what the final product must be able to do and leaves it to the contractor to determine the best materials, products, and execution to meet or exceed the desired functionality. For example, a performance specification may be used in the installation of a flagpole. The specification would provide the required height of the pole (60 feet), the loading criteria for the pole, such as wind speed it must withstand (90 mph), the color of the pole, the hoisting mechanism (manual versus powered), and so forth. It would be up to the contractor to provide a pole that meets or exceeds those requirements.

It’s important to distinguish between performance specifications and prescriptive technical specifications. Prescriptive specifications, which the owner or designer of record impliedly warrants feasibility and constructability, convey the requirement of a particular portion of a project through a detailed explanation of the materials that the contractor must use, the means of installing those materials, and quality control and/or testing methodology to ensure conformance with the specifications.⁸ In contrast, performance specifications do not include such implied warranties since the burden is on the contractor to provide a feasible and constructible solution that meets the functional requirements of the project.

One Florida court distinguished the two and noted: “[a] contract provision calling for the quality of the product to be the equivalent of a specific manufactured product is a performance specification involving no implied warranty, unlike a design specification, which “set[s] forth in

precise detail the materials to be employed and the manner in which the work [is] to be performed.”⁹

While performance specifications give freedom to a contractor to deliver a solution the meets the functional requirements defined by the owner or the design professional, these solutions may or may not require the contractor to retain a licensed design professional. In other words, the distinguishing characteristic of a delegated design project is when portions of the project are developed and described by construction documents that are sealed and produced by a licensed professional that is not the AOR or EOR.

Requirements for delegated design vary from state to state, and in many cases are performed based on a standard of care that is expected in a given state. The State of Florida is fairly unique in that the Florida Board of Professional Engineering and Chapter 615G15, *Florida Administrative Code*, provides definitions of the different design roles and general responsibilities when delegating design responsibility.

ii. Prime Professional

The prime professional is the licensed design professional, or corporation, engaged by the client to perform “planning design, coordination, arrangement, and permitting for the project and construction observations in connection with any engineering project.”¹⁰ The prime professional may be either a licensed architect or engineer and must retain and coordinate the services of other professionals as needed to achieve the project.¹¹ The prime professional may also be the AOR or EOR on the same project.

iii. Engineer of Record

The EOR is defined as a professional engineer who is in responsible charge for the preparation, signing, dating, sealing and issuing of any engineering document(s) for any engineering service or creative work.¹² The EOR is responsible for designing the portions of work included in their contract and define the performance or design criteria for building components that are required for the project that relate to their discipline or will impact the performance of their design. For example, a structural engineer of record would design the steel framing for a building, but may only provide performance criteria for the precast wall panels that attach to their framing such as wind loading, deflection limits, and assumed panel thicknesses.

Delegating design does not insulate the EOR from liability. In Florida, the EOR remains liable for the overall design and has certain responsibilities upon delegating the design. Particularly, Florida Administrative Code 615G15 describes delegated design responsibilities for the structural discipline, and delineates specific responsibilities of the EOR when delegating a designs for a variety of different structural components. Furthermore, pursuant to Florida Administrative Code 61G15-30.005, the EOR must:

- ✓ **communicate** the engineering requirements to the delegated engineer;
- ✓ **review** the delegated engineering documents for compliance with written engineering requirements;

- ✓ **confirm** the delegated engineering documents conform with the intent of the EOR and meet the written criteria, and
- ✓ **confirm** that the effect of the delegated engineer's work on the overall project generally conforms with the intent of the EOR.¹³

While the EOR must review the delegated engineering documents, the EOR is only reviewing for general conformance with the design intent and written requirements and is not expected to double check and verify the delegated engineer's calculations and work.¹⁴ Notably, Florida Administrative Code 61G15 provides specific guidance regarding what should be provided by the EOR and what may or may not be delegated. These requirements vary depending on the building system being designed and are described in Sections 31 through 34 of Florida Administrative Code 615G15.

iv. **Delegated Engineer**

The delegated design engineer is defined as a professional engineer "who undertakes a specialty service and provides services or creative work regarding a portion of an engineering project."¹⁵ The delegated design engineer is responsible for the engineering design of a specific component of the building that they are responsible for, and produces signed and sealed drawings and calculations based on the criteria and specifications provided by the EOR.

The Code imposes significant responsibilities upon the delegated engineer including:





- ✓ **review** the EOR's engineering requirements and authorizations for the delegated engineering document to determine the scope of engineering;
- ✓ **timely contact** the EOR for resolution of conflicts in the written engineering requirements;
- ✓ **forward** the delegated engineering documents to the EOR for review; and
- ✓ **include** the impressed seal and signature of the delegated engineer, drawings introducing the engineering input, calculations, and manual calculations, or an appropriate computer printout substitute, accompanied by sufficient design assumptions and identified input and output information to permit their proper evaluation.¹⁶

v. **Fabricators and Designers**

Other building components such as glue laminated wood frames, fiber reinforced polymer laminates, and cold-formed steel framing are not specifically described by Florida Administrative Code 615G15, but are also commonly delegated since these systems are often designed and assembled by a fabricator or specialty contractor. The specific information required to be provided by the EOR is based on the standard of care for a design professional in a given jurisdiction for a particular type of project.

B. Types of Delegated Design

Design professionals typically delegate design responsibility for discrete specialties. Section 615G15 of the Code specifically indicates the types of building systems that may be delegated with some images for examples:

<p>61G15–31.003. Design of Structures Utilizing Prefabricated Wood</p>  <p>[</p>	<p>61G15–31.004 Design of Cast-in-Place Post-Tensioned Concrete Structural Systems</p> 
<p>61G15–31.005. Design of Structures Utilizing Precast and Prestressed Concrete Components</p> 	<p>61G15–31.006. Design of Structural Systems Utilizing Open Web Steel Joists and Joist Girders</p> 
<p>61G15–31.007. Design of Metal Building System</p>	<p>61G15–31.008. Design of Foundation</p>



61G15-31.009. Design of Structural Steel System



C. Different Project Delivery Methods

A contractor can provide design assistance or be delegated design responsibility under a design-bid-build project delivery method or under a construction manager at risk strategy. Given the size and complexity of certain projects and often compressed schedules, an owner may want to employ the fast-track method, which is best set forth under the predominate method in the current market, i.e., the construction manager at risk strategy. The construction manager at risk (“CMAR”) can provide design assistance early in the design phase under preconstruction services. If the CMAR is extensively involved in the design phase, can that same CMAR then rely upon the *Spearin* doctrine¹ to deflect design liability and not be held accountable for having performed a constructability review? After all, AIA A133-2019, Section 3.1.7, describes the design and construction advice and recommendations that the CMAR shall provide. At least one court, however, has decided that a CMAR may rely upon *Spearin* even though the CMAR had extensive involvement in the design phase. The rationale is that the owner still retains control over the designer’s issuance of the construction documents.²

An owner may require that the CMAR contractually disclaim or waive *Spearin* by an acknowledgement that it has performed a constructability review. Until this transaction is tested,

¹ *United States v. Spearin*, 248 U.S. 132 (1918) (doctrine stating that the owner provides an implied warranty of the adequacy of the drawings and specification when it provides them to the contractor for construction)

² *Coghlin Electrical Contractors Inc. v. Gilbane Building Company*, 472 Mass. 549, 551, 36 N.E.3d 505, 507 (2015)

the *Coghlin* case keeps design liability squarely on the designer of record no matter the extent of design involvement the CMAR had.

Even in a design-bid-build strategy, a contractor may undertake some design liability. Routinely, a contractor's means and methods will require it to engage specialty designers to design and erect falsework and scaffolding, retaining walls and shoring for excavation³, and temporary stairs, among others, that must meet safety standards for protect workers. Failure of design in these instances or failure to meet code or industry standards in designing these features can lead to job site injury when not properly performed. Design-Bid-Build, Design Build, and Fast Track with a Construction Manager at Risk as well as Integrated Project Delivery are all project delivery methods where a designer of record could delegate design to a engineered product designer-fabricator.

D. Industry Standards for Delegated Design Projects

The design professional can delegate design responsibility, but the ability to do so is limited in the State of Florida by the Florida Administrative Code, with some guidance by the Florida Building Code. The publications both provide guidance on what information the EOR is required to provide, what can be delegated, and what specific information should be provided in the construction documents for a given building system.

i. Building Codes

Building codes are adopted by each individual jurisdiction, which is usually a municipality. Most jurisdictions adopt model codes and provide their own amendments to the model code. In Florida, the most commonly adopted model code is the International Building Code (IBC). The intent of the IBC is to “establish the minimum requirements to safeguard public health, safety, and general welfare” and applies to construction, alteration, movement, enlargement and replacement of every building structure.

The IBC specifies design requirements for the array of building materials used in construction. However, the requirements for a delegated design varies between the different building materials and the Code ultimately reflects the assorted customs and practices that have developed over decades of construction delivery and various industry organizations that have developed the practices for the different building materials.

For example, the concrete sections of the Code give specific items that a designer must provide, but does not discuss or describe concrete items that are commonly delegated (such as precast concrete) or what information should be provided by the EOR to a delegated design engineer. In contrast, the steel and wood sections of the Code provide specific guidance for delegated designs of steel joists and wood trusses, but is silent on delegation of connection design.

³ Florida's Trench Safety Act, §§ 553.60-553.64, *Fla. Stat.*, requires the contractor to state in the contract if excavation exceeding five (5) feet is required and the cost of its intended safety measures, including but not limited to its design of the shoring and trench safety system to be employed on the project and to require any necessary geotechnical information.

The IBC simply provides the design requirements that must be met and the basic information that must be provided for a design. Other than specific limited examples, it does not describe what information should be provided by the delegator to the delegated professional. However, the IBC incorporates a number of industry standards by reference, such as the AISC Code of Standard Practice for Steel Buildings. These industry standards further define the customs and practices of delegated design for various construction.

ii. Customs and Practices

The customs and practice of delegated design evolved over decades in the construction industry and generally represents the most efficient approach to delivery of a given building component. These trade practices developed among those that have traditionally been involved in the design, purchase, fabrication, and installation of various building components. While these practices differ between the different trades, in general, delegated design follows an overall workflow where:

1. The AOR or EOR develops design documents that describe with sufficient detail to convey the scope, quantity, and complexity of the various building components to be installed. If a component is a delegated design item, the AOR or EOR also must clearly indicate in the design documents enough information to describe the design requirements that a delegated designer will need to complete the design, such as loads and forces to be resisted, allowable materials, and geometry necessary for layout. Further, the AOR or EOR must also indicate what approval documents must be submitted to them for review, comment, and acceptance. In a delegated design these approval documents will usually include sealed shop drawings and/or calculations.
2. The contractor provides the design documents to the various trades on a project (subcontractors), who must review these documents and if the design is delegated, and retain their own licensed design professionals to develop the required approval documents that are to be submitted to the AOR or EOR.
3. The trades provide the approval documents to the contractor, who in turn delivers these documents to the AOR or EOR.
4. The AOR or EOR reviews the approval documents for conformance with its design intent and impact to the overall building. The AOR or EOR will typically markup shop drawings with comments and stamp the approval documents as either (1) revise and resubmit, (2) approved with comments, or (3) approved.
5. The stamped drawings are returned to the contractor. If approved construction moves forward. If approved with comments, the comments are to be addressed but no further submission is expected, and if marked as revise and resubmit, then the trade must make the required revisions and resubmit for approval.

E. Communications in Delegated Design Projects

The contractor uses submittals and shop drawings to communicate with the architect about the way the contractor proposes to conform to the information given and the design concept expressed in the contract documents. AIA-A201, § 3.12.4 defines shop drawings, product data, and submittals as: “drawings, diagrams, schedules and other data specially prepared for the Work by the contractor or a subcontractor, sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.” One commenter noted: “[t]he shop drawing process recognizes that a project architect cannot ‘completely cover the constructive details of all the trades employed upon the work’ or accurately speak ‘the language of the very shop in which the work is to be made.’”¹⁷ Given that shop drawings are prepared by other parties, including the contractor, that expect to perform some work for the project, and not a design professional, AIA-A201 emphasizes that shop drawings and submittals are not contract documents.¹⁸ Although architects and contractors review submittals and shop drawings, their respective reviews are different. Typically, the architect’s review is limited to checking for conformity with the design concept and the architect isn’t approving the contractor’s proposed means and methods or safety procedures it intends to use. Similarly, shop drawings come from the contractor and are “the construction trades’ drawings, diagrams, illustrations, schedules and other data which illustrate some portion of the work or the method by which the contractor intends to comply with the contract documents.”¹⁹

III. CONTRACTING FOR DESIGN ASSISTANCE AND FOR DELEGATED DESIGN

Currently the AIA is underway to develop specific contract provisions for design assist and Design Delegation. However, the contracting language is not available for public review at this time. Until then, we focus on existing language in standard form agreements.

A. Standard Contract Provisions Used for Design Assist Services

Section 3.1.7 of AIA A133-2019, Owner/Construction Manager as Constructor Agreement - Cost of Work Plus Fee with GMP, includes several provisions that reflect the collaborative design assist approach:

§ 3.1.7 As the Architect progresses with the preparation of the Schematic Design, Design Development, and Construction Documents, the Construction Manager shall consult with the Owner and Architect and make recommendations regarding constructability and schedules, for the Architect’s review and Owner’s approval.

§ 3.1.8 The Construction Manager shall provide recommendations and information to the Owner and Architect regarding equipment, materials, services, and temporary Project facilities.

ConsensusDocs 541, Design-Assist Addendum is an addendum to be used in conjunction with the Owner Construction Manager At Risk contract or the Owner Design professional contract, when the project team wishes to use a collaborative approach while the design is still being developed.²⁰ Upon publishing the new standard contract document in September 2018, ConsensusDocs described the addendum as:

The ConsensusDocs 541 Design-Assist Addendum creates a contractual structure to better coordinate design professionals, construction managers, and subcontractors in developing and constructing design documents. The range of services including constructability reviews before design completion; owner’s program review; recommended procurement of materials; prefabrication recommendations; cost estimating; integrated value analysis; design-build packaging; and coordinated milestone scheduling. The document tackles the difficult task of defining the range of design-assist services. Optional design-assist services are identified including life cycle cost analysis; risk analysis; sustainability; and production planning. By gaining the early involvement of builders’ expertise and coordinating those efforts with design teams, greater project cohesion and efficiency is achieved.²¹

B. Standard Contract Provisions Used for Delegating Design

Section 3.12.10.1 of A201-2017, General Conditions for Construction Contract, contemplates delegated design services, and provides: (1) owner and architect will specify “performance and design criteria”; (2) architect will review/approve submittals; (3) contractor’s licensed design professional will submit its design to the architect; and (4) the contractor can rely upon the information provided by architect and vice versa.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering **unless such services are specifically required by the Contract Documents for a portion of the Work** or unless the Contractor needs to provide such services in order to carry out the Contractor’s responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, **the Owner and the Architect will specify all performance and design criteria that such services must satisfy**. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional . . . The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

IV. RISK MANAGEMENT

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The best construction risk management tools are a well-negotiated and drafted contract, effective construction management processes diligently enforced each day during construction, and a complete insurance program. As part of the lawyer's checklist for contracting, we offer the following:

✓ **Can the design liability be delegated to another design professional who is not supervised by the designer of record?** Under Florida's statutory and administrative regulations design can be delegated to another designer who signs and seals the design documents for its specialty component.

✓ **Who is responsible for the interface between the performance specification and the delegated design component?** The standard form agreements clarify that the delegated designer is entitled to rely upon the designer of record's performance specification. Peer review for all design assistance and especially for the scope of delegated design is recommended during the design and into the construction phases. The owner may contract with the specialty contractor early in design to assist the designer of record during the design phase in its drafting of the performance specification. Requiring weekly meetings in the contract to urge direct communication between and among the parties is recommended. Owner involvement to ensure that opportunities for critical team members to communicate is highly desirable, especially if the owner has hired consultants for the scope of the specially designed element. The specialty consultant can provide its expertise to make sure that the designer of record has considered all requirements to be achieved for the design and installation of the specialty product. Multiple performance specifications create a higher degree of complexity and the need for diligent coordination for the project to function as intended. The delegated designer has a right to rely on the designer of record to have considered every design requirement necessary for a complete performance specification. The delegated designer, likewise, has a duty to raise inconsistencies to the designer of record to avoid defects and deficiencies between the design and the engineered component.²²

✓ **What is the contractor's standard of care under the contract? What is the design-build subcontractor's standard of care in completing the delegated design under the prime agreement?** Even though the standard of care applicable to the delegated designer is negligence in failing to perform as an ordinary prudent designer providing similar services on a similar project would perform, the delegated designer should carry professional liability insurance that should respond to the loss. The delegated designer should have contractually indemnified the prime contractor for losses sustained as a result of the delegated designer's negligence or failure to perform.

✓ **What insurance should be required of the contractor to whom design is delegated?** The AIA Exhibit A – Insurance and Bonds requires the Contractor to provide professional liability coverage for design risks that it undertakes as follows:

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than _____ Dollars (\$) _____ per claim and _____ Dollars (\$) _____ in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than _____ Dollars (\$) _____ per claim and _____ Dollars (\$) _____ in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than _____ Dollars (\$) _____ per claim and _____ Dollars (\$) _____ in the aggregate.

Most contractors carry commercial general liability (“CGL”) insurance, but those policies typically exclude coverage for design errors and omissions. Likewise, a performance bond surety will reject claims for professional design risks. If the project is large and complex enough and if the professional liability insurance might be exhausted due to other claims against it, the owner may consider getting the designer to procure a project specific policy. Another option available to the owner is the option to purchase Owner Protective Professional Indemnity which is a type of excess insurance policy over the designer’s policy. The OPPI is coverage that is first-party for the owner’s benefit only.

V. CARMEL PERFORMING ARTS CENTER STRUCTURAL FAILURE

Delegated design allows the efficiencies and strengths of the design professional, contractor, trades, and specialty designers to deliver projects that are safe for the public, provide the intended level of service, and that are completed at an acceptable cost and schedule. As with any collaboration, clear, precise communication and understanding the respective roles of the different parties are the cornerstones for success. When either of these cornerstones is not present on a project, scope gaps can occur and exposure to risk is increased.

In 2009, a steel framed performing arts center was under construction in Indiana. The performing arts center was envisioned as a theater with the style of a classic Roman Pantheon, complete with a central domed roof over the 1,600 seat concert hall.



Photos 1. Carmel Performing Arts Center

As construction neared completion, fractures were discovered in multiple columns supporting the domed roof. Construction was halted and the failures were investigated.



Photo 2: Ruptured Column Web at Dome Tension Ring Connection

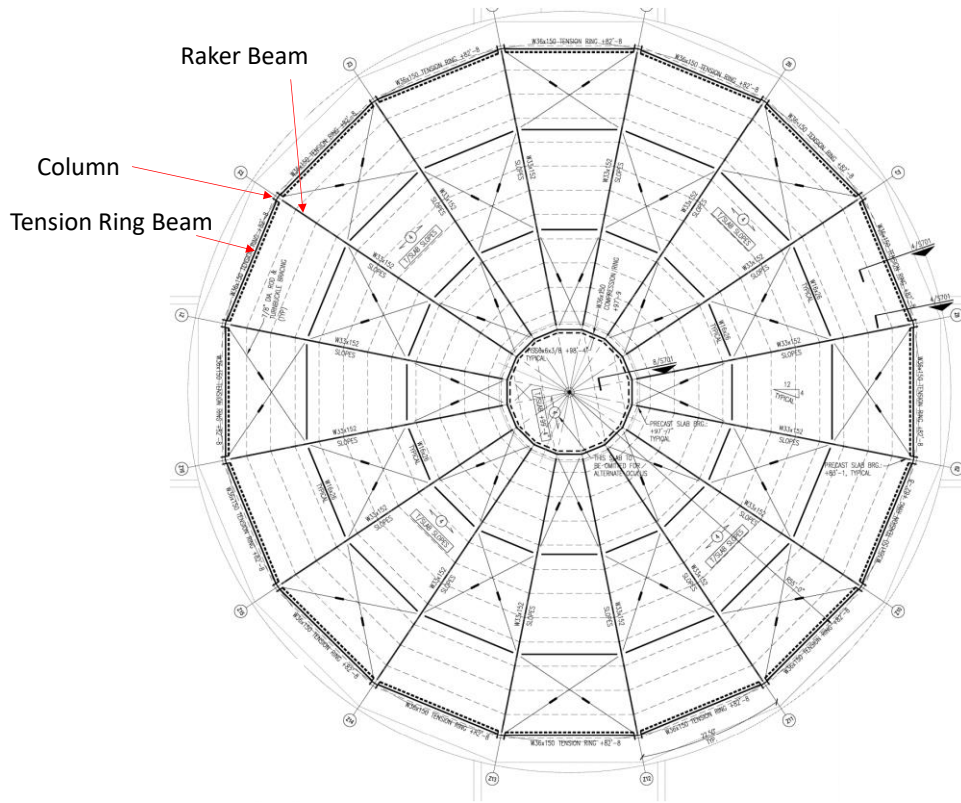


Figure 1: Upper Roof Framing Plan

The structural plan drawings by the EOR call out the sizes and dimensions of the beams, but at the upper roof level information that describes the forces that were to be resisted by the connection raker-column-tension ring connection, as described by the Steel Connection Notes in the Structural General Notes (Figure 3), were notably absent. In addition, the connection section does not show any indication that the column web was to be stiffened. The Steel Connection Notes also indicate that for beam to column connections, simple shear tab connections are allowed.

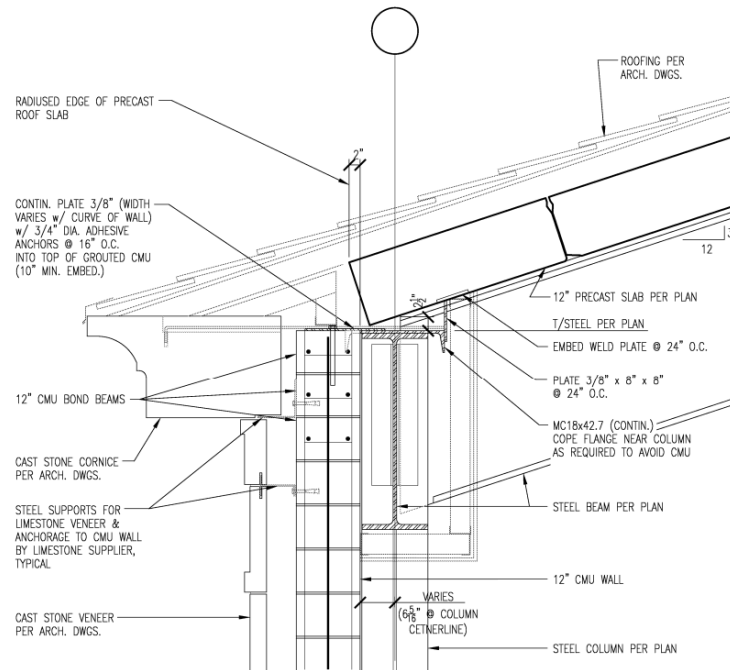


Figure 2: Section at Upper Roof Column-Raker-Tension Ring Connection

Though the mechanics of the failure itself were easily understood by the forensic team, it was not as clear how the decision-making process on the project allowed this critical connection to be improperly detailed, installed, and then loaded to the point of rupture. The EOR maintained that they had provided adequate information in their plans, sections, and connection notes for the fabricator to design in accordance with AISC “Manual of Steel Construction.” After the failures had occurred, the EOR insisted that the stiffener plates that would be expected to have been installed on the column should have been a part of the detailing performed by the fabricator. On the other hand, the fabricator asserted that they were contracted to design simple shear tab connections, and that their responsibility started and ended at the double angle bolted connections between the column and the tension ring and the column and the raker beam. Clearly, a failure to communicate had occurred.

STEEL CONNECTION NOTES

1. Typical beam-to-beam and beam-to-column connections shall be bearing type using A325-N bolts, unless noted otherwise.
2. Shop connections unless otherwise shown, may be either bolted or welded. All field connections shall be bolted unless otherwise shown on the Structural Drawings.
3. Connections shall be designed by the Steel Fabricator to support the reactions shown on the framing plan. Connections not shown shall be designed by the Steel Fabricator in accordance with the AISC "Manual of Steel Construction". Simple span connections shall be designed for one-half the load capacity as given in the AISC "Uniform Load Constants for Beams Laterally Supported" tables.
4. All beam-to-beam connections shall be double angle, unless shown or noted otherwise.
5. All beam-to-column connections shall be at the column centerline, unless noted otherwise. Shear tab connections to tubes are permitted.

Figure 3: Steel Connection Notes

It is evident that the structural drawings do not show enough information for a fabricator to design the connection. The lateral load from the raker at the column is not shown in the structural drawings. In absence of this information, the delegated engineer was directed by the General Notes to make simple calculations that would only consider gravity loads. Further, the section by the EOR does not show any indication of stiffener plates opposite the raker beam. It can be reasonably said that the structural drawings do not show the complexity of the connections that would ultimately have needed to have been designed by the detailer. In fairness to the EOR, they assumed that the delegated designer would check the various limit conditions for each connection, including web crippling in the column web, but without the lateral force identified and the instructions in the general notes the only guide for the delegated engineer, a gap was present that ultimately led to a local failure in 9 different columns.

Exacerbating this oversight, the details were submitted as part of shop drawings that were reviewed and approved by the EOR. This milestone in the project represented an opportunity to review the connection for conformance with design intent. Though a detailed review of calculations is not expected of an EOR, it is expected that critical, non-routine connections warrant review in the shop drawing approval process. Ultimately, the connection that was provided had an adverse effect on the integrity of the structure, for which the EOR is ultimately responsible.

The case underscores the importance of the drawings being sufficiently complete to define the character of the various building components being delegated. Without this clarity, the delegated engineer is not on alert to provide a complete detail that is holistic in its scope, and immediate risk manifested itself on the project as a result.

¹ American Institute of Architects (AIA) and American Institute of Steel Construction (AISC), *Delegated Design, Design Assist, and Informal Involvement – what does it all mean?*, https://www.aisc.org/contentassets/39480ef2338b4630baeda37f43b8a30f/design-collaboration-paper_aia-aisc_081320.pdf at p.6. This publication is referred to herein as “AIA AISC Delegated Design.”

² AIA AISC Delegated Design at 7.

³ AIA AISC Delegated Design at 7.

⁴ Throughout this paper, the term Contractor is used to refer to general contractors, construction managers, specialty contractors, subcontractors, suppliers, and product manufacturers. Similarly, the term Design professional is used generally to refer to architects, engineers, and other licensed design consultants.

⁵ AIA AISC Delegated Design at 9-10.

⁶ § 17:76.Delegation of duties—Delegation of design responsibility to contractor team—Performance specifications, 5 Bruner & O'Connor Construction Law § 17:76 (referred to herein as “Performance specifications, Bruner & O'Connor Construction Law”).

⁷ AIA AISC Delegated Design at 10.

⁸ § 17:73.10.Design delegation: Rights and responsibilities, 5 Bruner & O'Connor Construction Law § 17:73.10 (herein referred to as “Design delegation, Bruner & O'Connor”).

⁹ *Florida Bd. of Regents v. Mycon Corp.*, 651 So. 2d 149, 153 (Fla. 1st DCA 1995).

¹⁰ Florida Administrative Code 61G15-39.002(2).

¹¹ Florida Administrative Code 61G15-30.007.

¹² Florida Administrative Code 61G15-30.002(1).

¹³ Florida Administrative Code 61G15-30.005.

¹⁴ See Section 3.12.10, AIA-A201-2017.

¹⁵ Florida Administrative Code 61G15-30.002.

¹⁶ Florida Administrative Code 61G15-30.006.

¹⁷ Carl J. Circo, *When Specialty Designs Cause Building Disasters: Responsibility for Shared Architectural and Engineering Services*, 84 Neb. L. Rev. 162, 200 (2005) citing AIA's Handbook of Architectural Practice.

¹⁸ Section 3.12.4, AIA A201-2017.

¹⁹ Bruner and O'Connor on Construction Law § 5:123; Florida Administrative Code 61G15-30.002(8).

²⁰ ConsensusDocs, *ConsensusDocs Guidebook and Sample Responsibility Matrix*, <https://www.consensusdocs.org/wp-content/uploads/2019/05/541-Guidebook-May-2019.pdf>.

²¹ ConsensusDocs, *New Standard Design-Assist Contract Document is First Industry Standard Document to Address Growing Practice*, <https://www.consensusdocs.org/new-standard-design-assist-contract-document-is-first-industry-standard-document-to-address-growing-practice/> (September 28, 2018).

²² AIA A201-2017 Section 3.2.2