THE BEAUTY OF BLOCK DESIGN COLLECTIVE

GUIDE FOR DELEGATED DESIGN OF CONCRETE MASONRY

This Guide outlines Delegated Design as an integrated delivery method for components or entire projects using concrete masonry construction, the roles and responsibilities of each entity involved in the design and construction process, items to consider or account for when considering engaging a Delegate Engineer, and best practices and industry recommendations to review when Delegated Design is an appropriate fit for an upcoming project.

1. GENERAL

Definitions

- **General Contractor (GC) or Construction Manager (CM):** The party that has the overall responsibility for providing and/or managing all materials and work for the Construction Project, as specified by the Contract Documents. The GC/CM oversees construction activities, selects and manages subcontractors, procures materials, tracks schedule and budget, implements quality control and safety compliance, resolves issues and discrepancies, and communicates with all stakeholders. In general, the GC is responsible for executing work, and the CM is responsible for overseeing the process and representing the Owner. Not all projects have a CM.
- **Mason Subcontractor (Mason):** The party that has responsibility for constructing the masonry elements in a Construction Project, as specified by the Contract Documents. The Mason performs and oversees construction related to masonry elements.
- **Supplier:** The party that fabricates and supplies masonry units and other related materials, as specified by the Contract Documents.
- **Delegate Engineer:** A Professional Engineer retained by the Mason Contractor to design the masonry elements of a Construction Project, as specified by the Contract Documents. The Delegate Engineer is not the Registered Design Professional in Responsible Charge or Engineer of Record for the Construction Project. Typically, the Delegate Engineer must be licensed in the state where the Construction Project is located
- **Registered Design Professional in Responsible Charge (RDP):** The Architect of Record (AOR) and/or Engineer of Record (EOR) who has the responsibility for preparing the Contract Documents for the Construction Project, including the Specifications and Contract Drawings.
- **Contract Documents:** The documents that define the material and work to be provided by the General Contractor and Mason Contractor for a Construction Project. The Contract Documents define the scope of work and typically include the Registered Design Professional's drawings and specifications.
- **Special Inspection:** Inspections and Testing required by the State Building Codes. The RDP is responsible for identifying the minimum Special Inspection requirements for the project. The Owner is responsible for engaging the services of a qualified special inspector.

What Is Delegated Design?

Delegated Design is a collaborative approach where a Contractor assumes responsibility for designing a specific portion of a Construction Project.

Delegating the design of certain specialty systems to the Contractor (or subcontractor) allows the Contractor to engage Delegate Engineers with the advanced knowledge, skills, and experience to design and detail these systems more efficiently. Although an element of the design may be delegated, the Registered Design Professional in Responsible Charge retains responsibility for the overall design, code compliance, stability and integrity of the completed structure.

1. GENERAL

Use of Delegated Design in the Construction Industry

Delegated Design is widely used in the construction industry for many different structural systems, nonstructural components or entire structures, such as precast wall panels, precast parking garages, prefabricated metal buildings, steel connections, steel joists, cold-form metal framing, wood trusses and others. Delegated Design is well established as a viable workflow, and additional information can be found in two national guidelines for structural engineers: CASE 962-B – National Practice Guidelines for Specialty Engineers prepared by the Coalition of American Structural Engineers (CASE) and AISI S202-20 Code of Standard Practice for Cold-Formed Steel Structural Framing, prepared by the American Iron and Steel Institute (AISI), which describes the delegated workflow for cold-formed metal framing. The American Institute of Architects (AIA) has acknowledged and approved the practice of Delegated Design since 1997, and their standard document A201 "General Conditions Contract for Construction," Section 3.12.10, specifically addresses Delegated Design as follows:

> **§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. 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 cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to Section 3.12.10, the Architect will review, 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. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents."

1. GENERAL

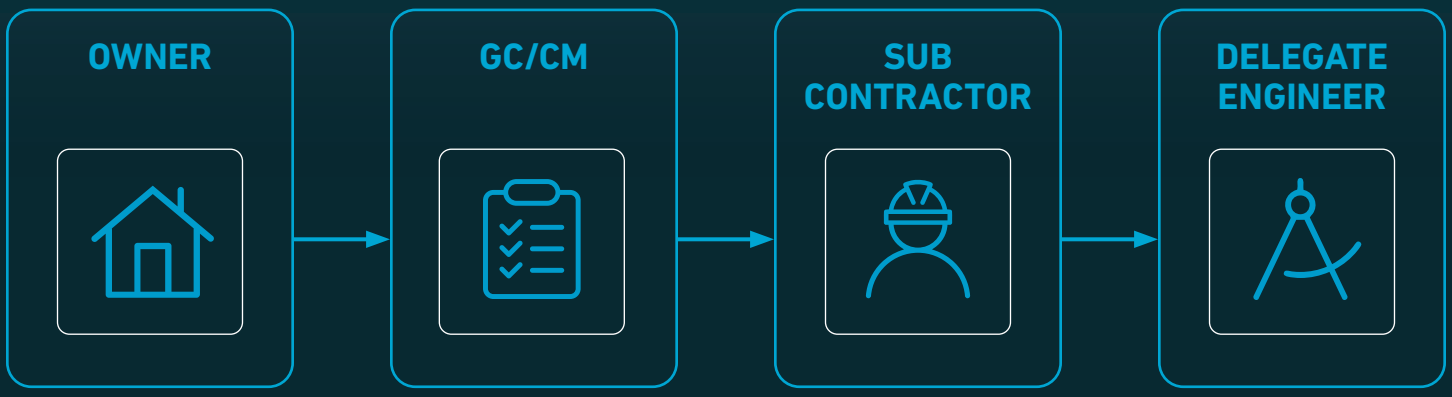
Advantages of Delegated Design

Delegated Design is becoming more prolific across the construction industry because it:

- Facilitates coordination between the Delegate Engineer, Subcontractor and material Supplier.
- Brings design and cost efficiencies to the work by using specialized designers familiar with the materials and systems they are designing.
- Streamlines decision-making when Delegate Engineers and Subcontractors are a coordinated team.
- Allows for faster execution and fewer work stoppages because each Delegate Team has clearly defined roles and responsibilities.
- Minimizes disconnects between design and installation.

1. GENERAL

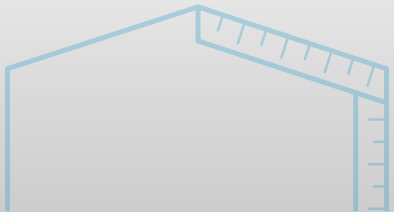
Responsibility, Liability and Insurance



On most projects, the Engineer of Record (EOR) and Delegate Engineer will have Professional Liability insurance for their portion(s) of the design. The EOR is ultimately liable for the complete building design, and the Delegate Engineer is liable for the design of the masonry elements, with each responsible for signing and sealing the designs and related work prepared under their care. Despite that, if there is a claim related to a Delegated Design, it would flow through the contract obligations. Typically, the Owner would bring suit against the General Contractor/Construction Manager, which would flow through the impacted subcontractor(s) and ultimately to the Delegate Engineer. For this reason, most General Contractors are now carrying Professional Liability insurance to protect against design-related claims for the various Delegated Design elements required today for most building projects.

Specific to masonry construction, most Mason Subcontractors are already taking on a certain amount of Delegated Design liability, whether they realize it or not, because they are responsible for the design of temporary shoring and/or scaffolding systems. Delegated Design is also commonly used for the design of veneer/stone anchorage, which masons often perform through Delegate Engineers. Mason Subcontractors should evaluate their individual risks and determine whether to obtain a Professional Liability policy to protect against design-related claims associated with Delegated Design of masonry.

2. HOW IT COULD WORK ON A MASONRY PROJECT



Responsibilities in a Delegated Design Process on a Typical Concrete Masonry Project

No two projects are identical, but the following outlines how Delegated Design would typically be implemented on a concrete masonry project and how roles and responsibilities might shift under the delegated delivery model.

General Contractor (GC) or Construction Manager (CM):

The GC/CM's role is not altered by using a Delegated Design process.

Mason Subcontractor (Mason):

The Mason retains the Delegate Engineer to design the masonry elements to meet the performance criteria, design criteria and design loads specified in the Construction Documents. The cost of the Delegate Engineer services is included in the Mason's bid for the work. The Mason is not responsible for the design of any components or materials other than the masonry elements specified to be delegated. The Mason is responsible for providing coordination details between the masonry and other impacted components within the project, for example, identifying the size and spacing of dowels to the concrete foundation (wall or footing) supporting the masonry construction; however, the Mason is not responsible for the design, materials and workmanship of these concrete components. The Mason is also not responsible for determining the loads imposed onto the masonry elements covered under the Delegated Design. This is the responsibility of the RDP.

When required in the Construction Documents, the Mason is responsible for supplying to the Registered Design Professional in Responsible Charge adequate evidence of compliance with the Contract Drawings, specifications, specified design criteria and specified design loads. This typically includes material certifications, shop drawings and the Delegate Engineer's stamped calculation package.

Supplier:

The Supplier's role is not altered by using a Delegated Design process.

Delegate Engineer:

It is the responsibility of the Delegate Engineer to design the masonry elements to meet the performance criteria, design criteria and design loads specified in the Construction Documents. The Delegate Engineer is responsible only for the structural design of masonry elements. The Delegate Engineer is typically not responsible for the design of steel lintels or the connection of masonry elements to the structure.

The Delegate Engineer must be a licensed engineer in the state where the work will be performed and is responsible for submitting sealed design calculations and shop drawings. The Delegate Engineer's submittal does not imply or constitute an agreement that the Delegate Engineer is acting as the Engineer of Record or Registered Design Professional in Responsible Charge for a Construction Project.

Design calculations include structural design data for the delegated masonry element necessary to show compliance with the Contract Documents. Design loads and load demand on wall elements must be provided by the Engineer of Record. The design calculations will be based on the governing Building Code and TMS

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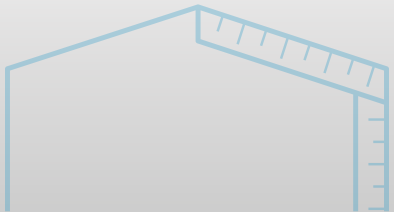

402 Building Code Requirements for Masonry Structures. Design calculations may be manually or computer-generated at the discretion of the Delegate Engineer.

The Delegate Engineer is not responsible for making an independent determination of any local codes or any other requirements not part of the Construction Documents.

The Delegate Engineer is not responsible for the inspection of masonry elements. Typically, the RDP and Special Inspector are responsible for this important function.

Registered Design Professional:
The RDP is responsible for identifying all applicable building codes or other regulations applicable to the Project. It is the responsibility of the RDP to prepare complete specifications including the applicable design criteria, codes, standards, regulations, performance criteria, and all design loads or other requirements that affect the design of the masonry elements. The following information must be supplied to the Mason Contractor by the RDP:

1. The geometric requirements. These generally would include the length, wall height, basis of design wall width (i.e., 8-inch CMU), and size and location of openings.
2. The applicable code or standard that describes the application of load (i.e., State Building Codes or ASCE 7 Minimum Design Loads for Buildings and Other Structures).
3. The applicable design loads, including Dead, Live, Snow, Seismic, and Wind (Out-of-Plane and In-Plane). Unless design loads or conditions are specifically set out in the Construction Documents, the Mason Contractor assumes that no such loads or conditions exist.
4. All coefficients or factors (Exposure, Importance Factor, R-factor, etc.).
5. Location of shear walls.
6. Wall elevations or schedules identifying all gravity and lateral loads on each wall.
7. Site and construction conditions that affect the design criteria.
8. Location of wall openings, movement joints or related details that affect the design of the masonry.
9. All serviceability criteria limiting deflections or drift.
10. Wall support conditions.

The RDP is typically responsible for designing steel lintels and all attachments of masonry elements to the structure, excerpt foundation dowels.

The RDP is responsible for determining the minimum criteria necessary to meet fire-resistance ratings and/or sound transmission class ratings (STC) and energy requirements.

It is the responsibility of the RDP to prepare the Schedule of Special Inspections required for the masonry elements.

The RDP is responsible for reviewing all masonry submittals, including the Delegated Design submission.

The RDP (and Special Inspector) is responsible for observations of masonry elements during construction for general compliance with the submitted shop drawings.

The RDP is responsible for responding to Requests for Information (RFIs) related to masonry elements. If changes are made during construction that affect the design of masonry elements, the RDP shall either revise the design or inform the Delegate Engineer to revise the design assumptions and calculation package.

3. HOW TO IMPLEMENT

Implementing a Delegated Design for a Concrete Masonry Project

Although Delegated Design of other structural elements, like cold-formed steel walls, is common in the AEC industry, Delegated Design of masonry is a new concept. Prior to undertaking a masonry-delegated workflow on your project, there needs to be open communication within the design team and with the Mason Contractors local to the project. For assistance, Concrete Masonry Checkoff has a Block Design Collective and Support Assist program that can facilitate this communication and educate masons on how to retain a Delegate Engineer. They can also provide recommendations for firms that are qualified to perform this role in their State.

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Once the decision has been made to delegate the masonry design, the implementation is very similar to the design delegation of cold-formed metal wall systems.

Registered Design Professional (Design Phase):

The RDP is responsible for preparing the construction drawings and specifications.

The drawings must clearly indicate:

- The location and size of all masonry walls.
- The location and size of all masonry openings.
- The location of all movement joints.
- Details for how the building structure interfaces with the masonry walls.
- The loads applied to each wall system (gravity and lateral).
- Any additional criteria that could affect the wall design, such as fire ratings.

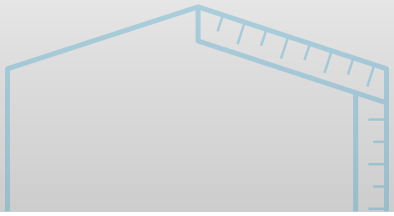
The masonry specification must clearly indicate:

- The required qualifications of the Delegate Engineer.
- The performance criteria for the walls.
- Material requirements.
- Submittal requirements.
- Quality control/assurance/Special Inspection requirements.

Sample language for Delegated Design can be found in Appendix A.

A Division 1 specification must also be included, such as MasterSpec Specification Section 01 35 73 "Delegated Design Procedures."

3. HOW TO IMPLEMENT



Mason Subcontractor (Mason) (Bid Phase):

The Mason is required to bid the Project based on the information contained in the Construction Documents and include the cost of the Delegate Engineer in their bid. Initial communication and engagement with the Delegate Engineer will be required to estimate the level of reinforcing and to establish the fee for design services.

Mason Subcontractor (Mason) (Construction Phase):

If the project is awarded to the Mason, agreements should be put in place between the Mason and General Contractor or Owner, and the Mason and Delegate Engineer.

AIA C404 is the "Standard Form of Agreement Between Contractor and Consultant for Delegated Design Service." This agreement can be used between the Mason and Delegate Engineer. This agreement describes the Delegate Engineer (Consultant) responsibilities.

ARTICLE 2 | CONSULTANT'S RESPONSIBILITIES

§ 2.1 The Consultant shall perform its services consistent with the professional skill and care ordinarily provided by professionals practicing in the same or similar locality under the same or similar circumstances. The Consultant shall perform its services as expeditiously as is consistent with such professional skill and care and the orderly progress of the Project.

§ 2.2 The Consultant shall identify a representative authorized to act on behalf of the Consultant with respect to the Project.

§ 2.3 The Consultant shall be licensed to perform the services described in this Agreement in the jurisdiction where the Project is located, or shall cause such services to be performed by appropriately licensed design professionals.

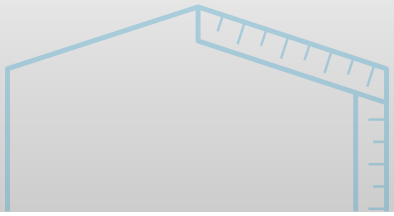
§ 2.4 The Consultant is an independent contractor. The Consultant is responsible for methods and means used in performing its services under this Agreement and is not an employee, agent, or partner of the Contractor. The Contractor shall not be responsible for the acts or omissions of the Consultant.

§ 2.5 The Consultant shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents incorporated in the Prime Contract. The Consultant shall provide prompt written notice to the Contractor if the Consultant becomes aware of any errors, omissions, or inconsistencies in such performance and design criteria.

§ 2.6 The drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared under this Agreement shall be signed and sealed by the Consultant or the appropriately licensed design professional who prepared the submittals.

§ 2.7 If the Contract Documents require certification that the Work has been performed in accordance with the performance and design criteria, the Consultant shall furnish such certification to the Contractor.

3. HOW TO IMPLEMENT



This document will also establish the limits of liability insurance, including Professional Liability insurance, required by the Delegate Engineer.

Once agreements have been executed, the Delegate Engineer will begin their design using the information contained in the Construction Documents. During this process, questions may be raised for the RDP. The Mason would submit these questions using the RFI (Request for Information) process.

Once the design is complete, the Mason would submit the stamped calculation package along with shop drawings.

Registered Design Professional in Responsible Charge (Construction Phase):

The RDP is responsible for responding to RFIs. They are responsible for reviewing the submitted calculation package and shop drawings to ensure that the loads, performance criteria and general design intent comply with the Construction Documents. They are also responsible for field observations of construction, field reports, review of test reports and resolution of non-conformances.

4. SAMPLE SPEC LANGUAGE

SPECIFICATIONS

THE FOLLOWING IS AN EXCEPT FROM MASTER SPEC SECTION 014000 RELATED TO DELEGATED DESIGN

SECTION 014000 - QUALITY REQUIREMENTS

1.1 DELEGATED DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads and other factors used in performing these services.

THE FOLLOWING PROVIDES SAMPLE SPECIFICATION SECTIONS FOR DELEGATED DESIGN TO BE ADDED TO SECTION 042200 - CONCRETE UNIT MASONRY

SECTION 042200 - CONCRETE UNIT MASONRY

1.5 ACTION SUBMITTALS

A. For concrete masonry elements delegated to a Professional Delegate Engineer, include signed and sealed structural analysis to comply with provided design loads, and signed and sealed detailed shop drawings. Professional Delegate Engineer shall be licensed in the state in which the Project is located and responsible for their preparation.

B. Delegated Design Submittal is required for:

1. Masonry partition walls indicated in architectural drawings and not designated in structural drawings.
2. Masonry elements indicated as “design by Delegate Engineer” in structural drawings.

1.7 QUALITY ASSURANCE

A. Delegated Engineering Responsibility: Preparation of Shop Drawings, design calculations and other structural data necessary to prove compliance with the performance criteria.

B. Professional Delegate Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where the project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for design of concrete masonry elements that are similar to those indicated for this project in material, design and extent.

4. SAMPLE SPEC LANGUAGE

1.10 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified Professional Delegate Engineer, as defined in Section 1.7 B and Section 014000 "Quality Requirements," to perform delegated concrete masonry design as indicated.

B. Structural Requirements and Performance: Provide design capable of withstanding design loads within limits and under conditions indicated.

1. Design Loads: As indicated on Drawings.
2. Wall Thickness: Maintain wall thicknesses indicated on Drawings.
3. Minimum Masonry Wall Reinforcing: Provide minimum masonry wall reinforcing to comply with R factor listed for masonry shear wall designs.
4. Deflection Limits: Design beams and lintels to withstand design loads without deflections greater than the following: **[l/600]** of the span.
5. Fire Ratings: Where indicated on drawings, maintain indicated grouting requirements to maintain fire ratings.

Performance criteria provided as an example only. Engineer of Record will edit/provide project-specific requirements.