

Delegated Design of Masonry: A Paradigm Shift

2025 Annual Meeting
Oklahoma City
October 16, 2025

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ONE SIZE DOES NOT FIT ALL

30°C
Von links bügeln/ iron inside out!
repasser sur l'envers / 只熨反面

THINGS TO KEEP IN MIND FOR THE NEXT 20 MINUTES!

Keep an open mind; it's the only way new things can get in.

Colleen Hoover

in-er-tia
/ɪˈnɜːʃiə/
noun
1. a tendency to do nothing or to remain unchanged.

par-a-digm shift
/ˈpærəˌdɪm ʃɪft/
noun
a fundamental change in approach or underlying assumptions.

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What is Delegated Design?

DELEGATE: to entrust a task or responsibility to someone else

Delegated Design describes a **form of collaboration** between a design professional and a contractor where the contractor assumes responsibility for an element or portion of the design

It allows contractors to engage **specialized engineers** with advanced knowledge and experience to **design systems more efficiently.**

The **Architect/Engineer** still specifies all required **performance and design criteria** and must review and approve the design.



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Industry Recognition & Standards

- The American Institute of Architects has acknowledged delegated design since 1997. AIA Document A201, Section 3.12.10 specifically addresses this practice, establishing clear guidelines for professional services and design responsibilities.
- National guidelines from the Coalition of American Structural Engineers (CASE 962-B) and American Iron and Steel Institute (AISI S202-20) provide proven frameworks that validate delegated design as standard industry practice.
- 2024 IBC: Section added to address delegated design



1603.1.10 Identification and requirements for the design of systems or components by others. (When the registered design professional delegates portions of the project design for systems or components to others, the following information shall be shown, as applicable:

1. Identification of the system or component to be designed by others.
2. Design criteria applicable to the system or component to be designed by others, including design standards, special loads, serviceability, and other performance criteria.
3. Configurations and dimensions related to the system or component to be designed by others.
4. Identification of limitations, requirements, and constraints for the system or component to be designed by others, including, but not limited to, supports, anchors, and connections.
5. Requirements for the submission of drawings and calculations.

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§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.”

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Industry Adoption of Delegated Design

Delegated Design is widely used in the construction industry for various elements:

- Precast wall panels
- Precast parking garages
- Prefabricated metal buildings
- Steel connections (East Coast)
- Steel joists
- Cold-formed metal framing
- Wood trusses
- Masonry anchors



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Why Delegated Design?

Engineers Don't Know How to *Design* Masonry Well

Masonry is not a core class in most Engineering schools; concrete and steel are the focus. New graduates rarely feel comfortable designing masonry.

Engineers Don't Know How to *Detail* Masonry Well

Proper masonry detailing requires TIME and EXPERIENCE. Coursing, bonding, modularity, and interfaces with other systems require specialized knowledge.



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Why Delegated Design?

We Want More Masonry!

THE PROBLEM:

Masonry is losing foothold because:

- 1) Engineers aren't intimately familiar with design and detailing of masonry systems, thus they avoid it or do it improperly (job never goes masonry)
- 2) Overdesigns lead to elevated costs and perception that masonry is too expensive

THE SOLUTION:

Pursue delegated design and address these issues using a well-established process.

THE GOAL:

Masonry systems regain foothold in the industry. We deliver better buildings.



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Precedent: Cold-Formed Metal Framing

- The cold-formed metal framing industry faced similar challenges:
- Few engineers were taught cold-form design in school
- Few excelled at detailed cold-formed metal framing detailing
- Engineers initially created detailed designs for every component
- Contractors began submitting alternative, more efficient designs with stamped calculations
- The industry evolved to a delegated design model that works better for everyone



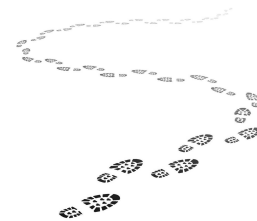
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The Vision: Specialized Expertise for Masonry Systems

Engage Delegate Engineers that:

- Stay current with the latest advancements and Code changes
- Have the experience necessary to detail efficient masonry systems
- Create cost-competitive designs that work well in the field
- **Delegated design puts masonry design and detailing into the hands of those who do it the right way**



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HOW: The Proposed Workflow

Architect Provides Basic Parameters

Wall locations, wall thickness, wall sections, opening locations, etc.

Engineer of Record (EOR) Provides Structural Parameters

Design loads, lateral loads, deflection criteria, etc. EOR remains responsible for gravity and lateral design of the building.

Mason Engages Delegate Engineer

Hires a qualified masonry designer/detailer as the Delegate Engineer, submits detailed shop drawings and stamped calculation package to the EOR for review.

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HOW: IBC

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Registered Design Professional Responsibilities

Provide Design and Performance Criteria

Include design criteria, codes, standards, regulations, performance criteria, and all design loads affecting masonry elements.

Design Structural Elements

Responsible for overall load path, transfer of forces to/from masonry elements, steel lintels, and attachments of masonry to structure (except foundation dowels).

Prepare Schedule of Special Inspections

Create Schedule of Special Inspections required for masonry elements.

Review and Respond

Review all masonry submittals, the delegate design calculation and shop drawing package, and respond to RFIs related to masonry elements.

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Mason Subcontractor Responsibilities



Retain Delegate Engineer

Include cost in project bid



Provide Coordination

Supply size and spacing of dowels to concrete foundation



Submit Documentation

Supply material certifications, shop drawings, and stamped calculation package

The Mason is **not** responsible for:

- Design of components other than specified masonry elements
- Design, materials, or workmanship of concrete foundation
- Determining loads imposed by masonry elements on building structure

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Implementing Delegated Design: Project Phases

Design Phase (RDP)

Prepare construction drawings and specifications clearly indicating wall locations, openings, movement joints, loads, and performance criteria.

Bid Phase (Mason)

Bid project based on construction documents, including cost of Delegate Engineer. Engage with Delegate Engineer to estimate reinforcing levels and estimate cost of engineering.

Construction Phase (Mason)

Coordinate with Delegate Engineer.
Submit stamped calculation package and shop drawings after design completion.

Construction Phase (RDP)

Respond to RFIs, review calculation package and shop drawings, conduct field observations, and resolve non-conformances.

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Addressing Common Concerns

Liability Issues

Contractors typically hire licensed engineers with professional liability insurance to perform delegated design services.

Bid Process

Engagement with Delegate Engineers needs to start during the Bid process.

Resistance to Change

As with cold-formed metal framing, initial resistance will likely give way as advantages become apparent.

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Liability and Insurance Considerations

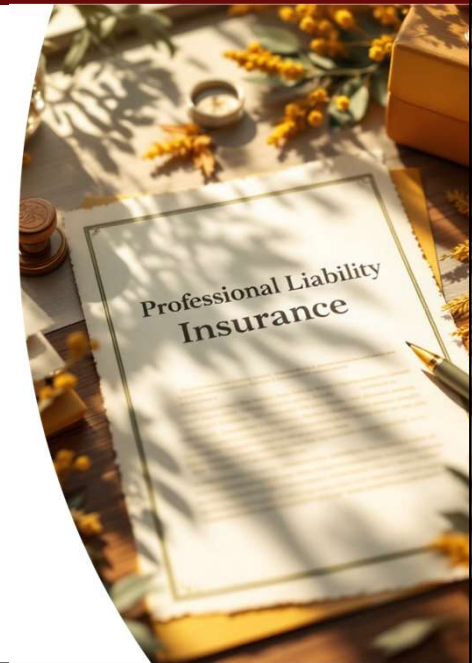
Professional Liability Requirements

- Both EOR and Delegate Engineer must have Professional Liability insurance
- EOR is ultimately liable for complete building design
- Delegate Engineer is liable for masonry elements design
- Claims flow through contract obligations

Risk Management

Most General Contractors now carry Professional Liability insurance to protect against design-related claims for delegated design elements.

Mason subcontractors should evaluate risks and consider obtaining Professional Liability policies to protect against design-related claims.



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Liability and Insurance Considerations

Masonry Anchors

Masons are engaged in Delegated Design already!

Stone anchors are typically delegated designs.

Masons are already engaged in hiring delegate engineers, submitting delegated design packages, and taking on flow-down liability for those designs.



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Overcoming Inertia: Where to Start



Consensus Among Mason Contractors

Agreement that delegated design is the best path forward for the industry



Communication to Design Professionals

Mason contractors communicate willingness to perform delegated design



Finding Delegate Engineers

Identify qualified engineers through industry connections, The Masonry Society (TMS), and the Block Design Collective

There will be a transition period with some "duplicate effort" as the industry adapts to this new paradigm.

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Getting Started with Delegated Design

Key Implementation Steps

1. Create a Guide
2. Education for Masons, Engineers, Architects.
3. Establish open communication between design teams and local masons
4. Listen and Address Concerns



<https://concretemasonrycheckoff.org/program-name/design-assistance/>

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Delegated Design Guide

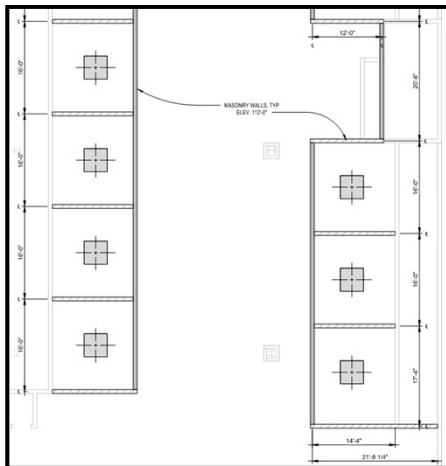
- Definitions
- Responsibility, Liability and Insurance
- Delegated Design Process on a Typical Concrete Masonry Project
- Implementing a Delegated Design for a Project
- Sample Specification Language
- Checklists
- FAQs



CHECKLIST DELEGATED DESIGN OF MASONRY	
1. THE ARCHITECT OF RECORD (AOR) <ul style="list-style-type: none"> □ Develop layout of walls, including elevations, sections, and dimensions of walls □ Determine location of openings □ Coordinate openings for MEP systems □ Provide location of movement joints in coordination with EOR 	2. THE ENGINEER OF RECORD (EOR) <ul style="list-style-type: none"> □ Determine applicable codes and design loads □ Provide grout and bond beam for each wall □ Design supports and attachments of walls to other structural systems □ Define vertical erection sequence requirements □ Determine required width of walls (i.e., 8-inch CMU) □ Identify location of masonry movement joints and over all building joints □ Identify serviceability criteria □ Review shop drawings prepared by Delegate Engineer □ Review construction of masonry elements
3. THE GENERAL CONTRACTOR (GC)/ CONSTRUCTION MANAGER (CM) <ul style="list-style-type: none"> □ Implement structure design intent □ Manage project budget, schedule, and results □ Furnish and coordinate trade material, equipment, and labor □ Manage site access and oversee project team members 	4. THE MASON CONTRACTOR <ul style="list-style-type: none"> □ Engage Delegate Engineer □ Submit calculation package and shop drawings to Registered Design Professional (RDP/DRP) □ Furnish material, equipment, labor for construction of masonry elements
5. THE DELEGATE ENGINEER <ul style="list-style-type: none"> □ Design reinforcing of masonry elements based on loading and serviceability criteria provided by EOR □ Prepare stamped calculations and shop drawings 	



Case Studies



"Two simple phone calls with our project design team and the MIM was able to save the owners over \$100,000 on their project. Being able to reduce the amount of grout and spacing increases our efficiency, speeds up the project, and saved the owner a significant amount of money. A true win for all parties."

- Integrated Exteriors

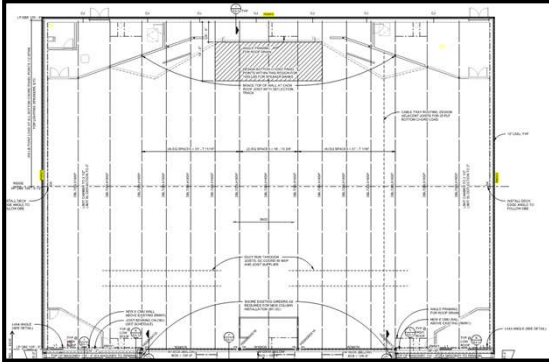
MASONRY REINFORCING

TYPICAL 8" CMU WALL REINFORCING SHALL BE #5 BARS @ 32" O.C. BOTTOM 16" OF MASONRY GROUTED SOLID.

TYPICAL 12" CMU WALL REINFORCING SHALL BE #5 BARS @ 16" O.C. GROUT ALL CORES SOLID FULL HEIGHT.

ALL CMU WALLS: 9 GA LADDER REINFORCING AT 16" O.C. UNLESS NOTED OTHERWISE. PROVIDE #6 BARS AT ALL JAMBS, CORNERS, AND TERMINATIONS. GROUT CORES SOLID WHERE REINFORCING OCCURS. PROVIDE DOWELS TO MATCH. PROVIDE INTERMEDIATE BOND BEAMS AT 12'-0" VERTICAL. SEE TYPICAL DETAILS ON SHEET S2.0.

Case Studies

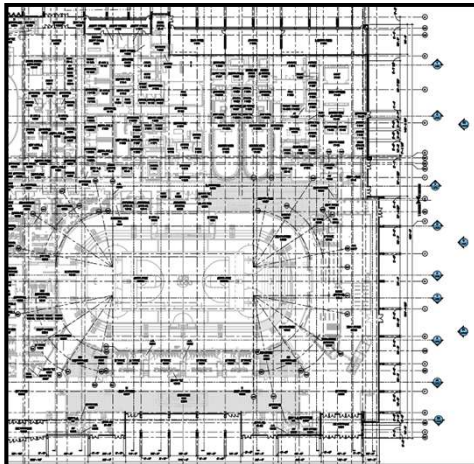


REINFORCED MASONRY WALL SCHEDULE				
MARK	VERTICAL REINFORCING	ADDITIONAL JAMB REINFORCING FOR OPENING SIZE LISTED:		
		4'-0" AND SMALLER	4'-1" THRU 8'-0"	8'-1" THRU 12'-0"
RMW1	#5 @ 40"	(1) #5	(2) #5	(3) #5
RMW2	#5 @ 32"	(1) #5	(2) #5	(3) #5
RMW3	#5 @ 24"	(2) #5	(3) #5	(4) #5

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Case Studies



CMU SHEAR WALL REINFORCING SCHEDULE				
MARK	WALL THICKNESS	VERTICAL BAR SIZE AND SPACING	HORIZONTAL BAR SIZE AND SPACING	REMARKS
MW1	12"	(2) #6 @ 16"		GROUT ALL CELLS
MW2	12"	(2) #6 @ 16"		GROUT ALL CELLS
MW3	12"	(2) #7 @ 16"		GROUT ALL CELLS
MW4	12"	(2) #7 @ 8"		GROUT ALL CELLS
MW5	12"	(2) #8 @ 16"	(2) #5 @ 24" AT L1 ONLY	GROUT ALL CELLS
MW6	12"	(2) #7 @ 16"	(2) #5 @ 24" AT L1 ONLY	GROUT ALL CELLS
MW7	12"	SEE ELEVATION 3/S-450	(2) #5 @ 24" AT L1 ONLY	GROUT ALL CELLS

NOTES:

- TYPICAL HORIZONTAL REINFORCING PER GENERAL NOTES.
- *GROUT ALL CELLS* INDICATES EVERY REINFORCED CELL AND UNREINFORCED CELL.
- REINFORCED CELLS ARE ALWAYS GROUTED.
- SEE 15/S-400 FOR TYPICAL CMU DETAILING.
- FOR WALLS OVER 25', PROVIDE (2) #5 @ 24" OC HORIZONTAL.

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A Call for Paradigm Shift

"The difficult we do immediately,
the impossible takes a little
longer."

- Motto of the US Army Corps of Engineers during WWII



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