

DEPARTMENT OF ENERGY, LABOR, AND ECONOMIC GROWTH

DIRECTOR'S OFFICE

CONSTRUCTION SAFETY STANDARDS

Filed with the Secretary of State on May 14, 2010  
These rules take effect 14 days after filing with the Secretary of State

(By authority conferred on the director of the department of energy, labor, and economic growth by sections 19 and 21 of 1974 PA 154, and Executive Reorganization Order Nos. 1996-2, 2003-18, and 2008-4, MCL 408.1019, 408.1021, 445.2001, 445.2011, and 445.2025)

R 408.40201, R 408.40202, R 408.40203, R 408.40204, R 408.40205, R 408.40206, R 408.40207, R 408.40208, R 408.40209, and R 408.40210 of the Michigan Administrative Code are amended and R 408.40211, R 408.40212, and R 408.40213 are added to the Michigan Administrative Code as follows:

PART 2. MASONRY WALL BRACING

R 408.40201 Scope.

Rule 201. ~~This part~~ **These rules** pertain to the temporary bracing of unsupported masonry walls **exposed to wind** during construction ~~which are exposed to wind forces.~~

R 408.40202 ~~Applicability.~~ **Availability of referenced documents.**

~~Rule 202. This part is designed to ensure a safe work environment for all personnel on the construction site through the use of temporary bracing of unsupported masonry walls. The requirements of this part are as follows:~~

- ~~(a) Identifying masonry walls requiring temporary bracing (R 408.40204(1)).~~
- ~~(b) Proposing an acceptable temporary bracing system (R 408.40207).~~
- ~~(c) Vacating the collapse area during winds of 35 mph or more (R 408.40204(9) and R 408.40205).~~
- ~~(d) Standard sign requirements for collapse areas (R 408.40208), which are all designed to prevent onsite injury. While winds of more than 35 mph may cause collapse of walls braced in accordance with this part, compliance with all of the other provisions of this same part will ensure that no one will be within the collapse area.~~

**Rule 202. (1) The following Michigan occupational safety and health standards are referenced in these rules and shall be considered part of the requirements of these rules to the extent prescribed in each reference. Up to 5 copies of these standards may be obtained at no charge from the Michigan Department of Energy, Labor and Economic Growth, MIOSHA Standards Section, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan, 48909-8143 or via the internet at website: [www.michigan.gov/mioshastandards](http://www.michigan.gov/mioshastandards). For quantities greater than 5, the cost, as of the time of adoption of these rules, is 4 cents per page.**

- (a) Construction safety standard part 1 general rules, R 408.40101 to R 408.40134.**
- (b) Construction safety standard part 22 signals, signs, tags, and barricades, R 408.42201 to R 408.42243.**

**(2) The following standards are referenced in these rules and shall be considered part of the requirements of these rules to the extent prescribed in each such reference. They are available from Mason Contractors Association of America, 33 South Roselle Road, Schaumburg, Illinois 60193, telephone number: 1-800-536-2225 or via the internet at website: [www.masoncontractors.org](http://www.masoncontractors.org); at a cost as of the time of adoption of these rules, as stated in this subrule:**

- (a) Standard practice for bracing masonry walls under construction, chapters 5 and 6 and their commentaries, July 2001 as referenced in R 408.40211(2)(b) as it relates to wall bracing design. Cost: \$50.00.**

February 3, 2010

(b) Masonry wallbracing design handbook, March 2003. Cost: \$65.00.

(c) The standards referenced in subrule 2(a) and (b) of this rule are also available for inspection at the Department of Energy, Labor and Economic Growth, MIOSHA Standards Section, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan, 48909-8143.

(d) Copies of the standards referenced in subrule (2)(a) and (b) of this rule may be obtained from the publisher or may also be obtained from the Department of Energy, Labor and Economic Growth, MIOSHA Standards Section, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan, 48909-8143, at the cost charged in subrule (2)(a) and (b), of this rule, plus \$20.00 for shipping and handling.

R 408.40203 Definitions; C to U.

Rule 203. (1) **“Base” means the supporting surface that the masonry wall is laid upon.**

(1) ~~“Cavity wall” means a masonry wall with a continuous insulated or uninsulated air space of 2 to 4 1/2 inches between wythes that are connected with rigid metal ties.~~

(2) ~~“Collapse area” means that area which is within the height of the wall, plus 4 feet, measured at right angles to the wall on both sides.~~

(2) **“Competent person” means a person who is trained, experienced, and capable of identifying existing or potential hazards in surroundings, or under working conditions, that are hazardous or dangerous to an employee and who has the authority and knowledge to take prompt corrective measures to eliminate the hazards.**

(3) ~~“Composite wall” means a bonded masonry wall with 2 or more wythes of different masonry units.~~

(3) **“Controlling contractor” means a prime contractor, general contractor, construction manager, or any other legal entity that has the overall responsibility for the construction of the project including its planning, quality, and completion.**

(4) **“Initial period” means the period of time, not to exceed 24 hours, during which the masonry wall is being laid above its base or the highest line of bracing and, at the end of which, required bracing is installed.**

(5) **“Intermediate period” means the period of time following the initial period until the masonry wall is connected to the structural elements that provide its final lateral support.**

(4) (6) **“Qualified person” means a person who, by possession of a recognized degree, certificate, professional standing, or by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, or the work, or the project.**

(7) **“Reinforced masonry” means a masonry wall made up of units laid in mortar with steel reinforcement embedded in grout.**

(8) **“Restricted zone” means the area on each side of a masonry wall measured by a horizontal distance equal to the height of the constructed wall plus a minimum of 4 feet, measured at right angles to the wall, and continuing for the length of the wall plus a minimum of 4 feet beyond the ends of the wall.**

(5) ~~“Single wythe hollow masonry” means a masonry wall 1 unit in thickness made up of units with bearing surfaces that are less than 75% solid.~~

(6) ~~“Solid masonry unit” means a masonry unit with bearing surfaces that are 75% or more solid.~~

(9) **“Structural designer of record” means a registered or licensed professional who is responsible for the structural design of the project.**

(10) **“Unreinforced masonry” means a masonry wall made up of units laid in mortar that may contain horizontal joint reinforcement.**

(7) (11) **“Unsupported masonry wall” means a masonry wall that has not obtained its final lateral stability support from design features when required, structural elements, such as, but not limited to, roofs, floors, buttresses, crosswalls, and piers.**

(12) **“Wall bracing system” means a brace consisting of vertical, diagonal, and/or horizontal structural elements which provide support to the unsupported masonry wall.**

(13) **“Wind-measuring device” means an instrument which accurately measures wind speed to  $\pm 2$  miles per hour.**

(14) **“Wind speed” means the velocity of a 3-second gust.**

R 408.40204 Maximum unsupported height tables. **Responsibilities; restricted zone, wall bracing system, and signage.**

Rule 204. (1) The maximum unsupported height of a masonry wall shall not be more than the height shown in tables 2 to 5 of this rule. Unbraced walls exceeding the heights specified in these tables are in imminent danger of collapse.

(2) The exposure to which a wall is subjected for use in tables 2 to 5 shall be determined from table 1, which reads as follows:

TABLE 1  
Exposure Selection

Exposure	Example
A	Center of large cities and very rough hilly terrain.
B	Suburban areas, towns, city outskirts, wooded areas, and rolling terrain.
C	Flat, open country, open flat coastal belts, and grasslands.

(3) Exposure A shall not be used in Michigan.

(4) Table 2 reads as follows:

TABLE 2  
Single Wythe Hollow Masonry

Width of Wall	Minimum Weight psf	Maximum Unsupported Height			
		Exposure-B		Exposure-C	
		(1)	(2)	(1)	(2)
4 in.	25	6 ft.	(2 ft.)*	6 ft.	(1 ft.)*
6 in.	34	6 ft.	(5 ft.)*	6 ft.	(2.5 ft.)*
8 in.	40	7 ft.	(7 ft.)*	6 ft.	(4 ft.)*
10 in.	48	10 ft.	(10 ft.)*	6 ft.	(6 ft.)*
12 in.	56	14 ft.	(14 ft.)*	9 ft.	(9 ft.)*
16 in.	75	24 ft.	(24 ft.)*	16 ft.	(16 ft.)*

\*See subrule (8) of this rule.

(5) Table 3 reads as follows:

TABLE 3  
Solid Brick Walls

Width of Wall	Minimum Weight psf	Maximum Unsupported Height			
		Exposure-B		Exposure-C	
		(1)	(2)	(1)	(2)
4 in.	40	6 ft.	(3 ft.)*	6 ft.	(2 ft.)*
8 in.	80	12 ft.	(12 ft.)*	8 ft.	(8 ft.)*
12 in.	120	20 ft.	(20 ft.)*	19 ft.	(19 ft.)*
16 in.	160	26 ft.	(26 ft.)*	26 ft.	(26 ft.)*

\*See subrule (8) of this rule.

(6) Table 4 reads as follows:

TABLE 4  
Composite Walls — 4-inch Brick and Hollow Block Units (Various Widths)

Width of Wall Total	Brick	Block	Min. Weight psf	Maximum Unsupported Height			
				Exposure-B		Exposure-C	
				(1)	(2)	(1)	(2)
8 in.	4 in.	4 in.	65	9 ft.	(9 ft.)*	6 ft.	(5 ft.)*
10 in.	4 in.	6 in.	74	13 ft.	(13 ft.)*	9 ft.	(9 ft.)*
12 in.	4 in.	8 in.	80	16 ft.	(16 ft.)*	11 ft.	(11 ft.)*
14 in.	4 in.	10 in.	88	19 ft.	(19 ft.)*	14 ft.	(14 ft.)*

16 in.	4 in.	12 in.	96	26 ft.	(26 ft.)*	17 ft.	(17 ft.)*
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\*See subrule (8) of this rule.

(7) Table 5 reads as follows:

TABLE 5  
Cavity Walls — 4 inch Brick and Hollow Block Units  
(Various Widths)

Wall Section			Maximum Unsupported Height			
Brick + Block		Minimum Weight psf	Exposure B		Exposure C	
			(1)	(2)	(1)	(2)
4 in.	4 in.	65	6 ft.	(2.5 ft.)*	6 ft.	(1.5 ft.)*
4 in.	6 in.	74	6 ft.	(5 ft.)*	6 ft.	(2.5 ft.)*
4 in.	8 in.	80	8 ft.	(8 ft.)*	6 ft.	(4.5 ft.)*
4 in.	10 in.	88	11 ft.	(11 ft.)*	7 ft.	(7 ft.)*
4 in.	12 in.	96	27 ft.	(27 ft.)*	18 ft.	(18 ft.)*

\*See subrule (8) of this rule.

(8) If employees within the collapse area are working from elevations that are lower than the bottom elevator of the wall, the maximum unsupported height of a masonry wall shall be determined from values given in column (2) of tables 2 to 5.

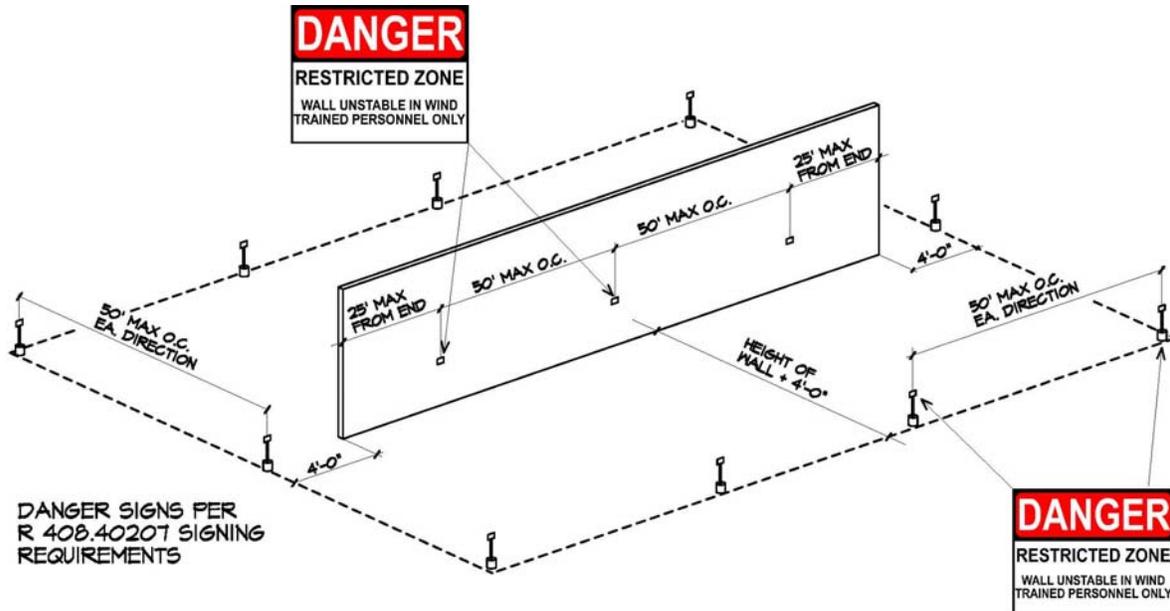
(9) No one shall be permitted within the collapse area of an unbraced or braced wall subjected to winds of more than 35 miles per hour.

**Rule 204. (1) Prior to the start of masonry construction, the mason contractor shall notify in writing the controlling contractor where and when a restricted zone will exist. See figure 1 for a sample restricted zone plan.**

**(2) The mason contractor shall establish the restricted zone and the installation of the wall bracing system and danger signs. After the wall bracing system and danger signs have been installed in accordance with these rules, any person including, but not limited to, a construction manager, subcontractor, general contractor, or owner who alters or removes the wall bracing system or danger signs shall replace them in accordance with these rules.**

**(3) Each employer having workers in the restricted zone shall monitor the wind speed and evacuate employees when the limitations of these rules have been exceeded.**

**FIGURE 1  
RESTRICTED ZONE**



R 408.40205 Wind velocity; determination by qualified person. **Training requirements.**

Rule 205. For the purpose of this part, the wind velocity shall be determined by a qualified person.

**Rule 205. (1) This rule supplements and clarifies construction safety standard part 1 general rules, R 408.40114(2), as it relates to the hazards of masonry walls under construction exposed to wind.**

**(2) An employer shall provide training by a qualified person to each competent person or employee who is involved in installing, altering, repairing, maintaining, or inspecting the wall bracing system and restricted zone. The training shall enable an employee to recognize hazards associated with the work and shall include all of the following topics, as applicable:**

**(a) The nature of hazards involving masonry walls under construction.**

**(b) Instruction in the general use and maintenance of wall bracing systems, signage, and restricted zone requirements as prescribed in these rules.**

**(c) Identifying unsupported masonry walls requiring bracing.**

**(d) The procedures for installing, altering, repairing, inspecting, and maintaining the wall bracing system being used.**

**(e) Proper installation and maintenance of a restricted zone and signage.**

**(f) Procedures for monitoring wind speeds.**

**(g) Procedures for vacating the restricted zone during windy conditions.**

**(h) Inspecting the worksite for overhead and underground utilities and other hazards.**

**(i) Inspecting the worksite for excavations in the restricted zones.**

**(j) Any other pertinent requirements.**

**(3) An employer shall provide training by a qualified person to any employee who enters a restricted zone of a masonry wall under construction. The training shall enable an employee to recognize and understand all of the following:**

**(a) The nature of hazards involving masonry walls under construction.**

**(b) Instruction in the general use and maintenance of wall bracing systems, signage, and restricted zone requirements as prescribed in these rules.**

**(c) Procedures for monitoring wind speeds.**

**(d) Procedures for vacating the restricted zone during windy conditions.**

- (e) The nature of hazards involving electrical lines within the restricted zone.
- (f) The nature of hazards involving excavating within the restricted zone.
- (g) Any other pertinent requirements.
- (4) Additional training is required in each of the following situations:
  - (a) When changes at the worksite present a hazard about which an employee has not been previously trained.
  - (b) When changes in the types of wall bracing systems present a hazard for which an employee has not been previously trained.
- (5) The employer shall verify compliance with this rule by preparing a written certification record. The written certification record shall contain the name or other identity of the employee trained, the date or dates of the training, and the signature of the person who conducted the training or the signature of the employer. If the employer relies on training conducted by another employer or completed prior to the effective date of this rule, the certification record shall indicate the date the employer determined the prior training was adequate rather than the date of actual training. The latest training certification shall be maintained and available during the workshift.

R 408.40206 Wall bracing design. **Restricted zone requirements.**

~~Rule 206. (1) When the height of a masonry wall exceeds the maximum unsupported height as shown in tables 2 to 5 of R 408.40204, the masonry wall shall be braced on both sides upon completion. Crosswalls are acceptable instead of bracing an interior wall if the crosswalls are not spaced more than 20 feet apart. If crosswalls are spaced more than 20 feet apart, wall bracing in accordance with the requirements shall be provided.~~

~~(2) On masonry projects that require temporary bracing, the wall bracing system shall be determined before a masonry wall exceeds the maximum unsupported height limits specified in tables 2 to 5 of R 408.40204.~~

~~(3) The wall bracing system for a masonry wall shall be designed by a qualified person in accordance with acceptable engineering practices or as prescribed in this part and shall be capable of providing stability to the wall for a wind with a velocity of 35 miles per hour.~~

~~(4) If pilasters, buttresses, or other reinforcing is part of the wall design, the unsupported height of walls according to tables 2 to 5 of R 408.40204 may be exceeded by complying with accepted engineering practices. Calculations or plans and specifications shall be available at the jobsite.~~

~~(5) If scaffolding, because of work operations, remains erected on 1 side of the completed wall, the collapse area shall be identified and marked. No one shall be permitted within the collapse area when the wind velocity is more than 35 miles per hour.~~

~~(6) The height of a masonry wall above the intersection of the diagonal support with the vertical plane of the wall shall not be more than the maximum unsupported height as shown in tables 2 thru 5 of R 408.40204.~~

**Rule 206. (1) For walls greater than 8 feet in height, a restricted zone shall be established prior to the start of the construction of the wall. The restricted zone shall meet all of the following requirements (see figure 1):**

**(a) Be equal to the height of the constructed wall plus a minimum of 4 feet and run the entire length of the wall plus a minimum of 4 feet beyond the ends of the wall.**

**(b) Be established on both sides and ends of the wall.**

**(c) Be limited to entry by employees trained in accordance with R 408.40205.**

**(d) Remain in place until the wall has obtained its final lateral support.**

**(e) Be delineated by signing in accordance with R 408.40207.**

**(2) When a restricted zone extends onto or across roadways or other adjacent areas, protection shall be provided as prescribed in construction safety standard part 22 signals, signs, tags, and barricades, R 408.42223 traffic control, or by other methods.**

**(3) If restricted zones cannot be installed or maintained as prescribed by these rules, alternative protective methods shall be provided. Drawings/plans or calculations shall be prepared by a qualified person and available at the jobsite.**

**(4) For multi-story structures the restricted zone shall be determined by a qualified person.**

R 408.40207 Typical wall bracing system. **Signing requirements.**

Rule 207. (1) A typical wall brace may consist of 4 essential parts as follows:

- (a) A 16-foot, 2-inch by 10-inch vertical upright.
- (b) A 16-foot, 2-inch by 10-inch diagonal strut.
- (c) A 2-inch by 4-inch stiffener.
- (d) A deadman.

(2) The angle of intersection of the 16-foot, 2-inch by 10-inch diagonal strut and the ground should be between 35 degrees and 45 degrees and the diagonal strut should not intersect the vertical brace below the midpoint of the masonry wall.

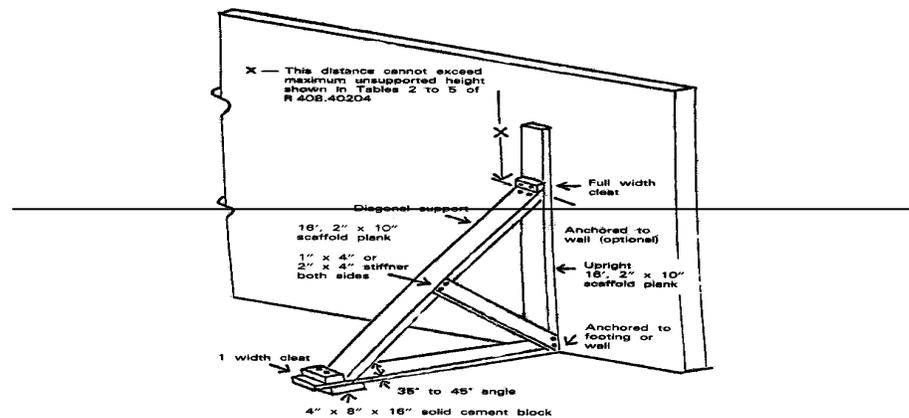
(3) When using this typical wall brace, the total wall bracing system shall be designed in accordance with the provisions of this rule and R 408.40206.

(4) Other materials and designs may be used in the construction of a wall bracing system if the design requirements of this rule and R 408.40206 are met.

(5) The following figure is an example of a typical wall brace.

FIGURE 1

Typical Wall Brace for Masonry Wall



(6) The maximum spacing for typical exterior wall bracing shall not be more than 20 feet. Table 6 specifies typical exterior wall bracing requirements and reads as follows:

TABLE 6

Typical Exterior Wall

8 inch wall .....	18 feet maximum height
12 inch wall .....	22 feet maximum height

Rule 207. (1) Each unsupported masonry wall that is more than 8 feet in height shall be posted with a danger sign on each end and each side at intervals of not more than 50 feet as shown in figure 1.

(2) The restricted zone shall be delineated by signs at each corner and spaced at intervals of not more than 50 feet along the perimeter.

(3) The danger signs shall be maintained in readily visible, unobstructed locations and in a legible condition until the masonry wall has obtained its final lateral support.

(4) A danger sign shall comply with construction safety standard part 22 signals, signs, tags, and barricades, R 408.42201 to R 408.42243, and state:

**RESTRICTED ZONE  
WALL UNSTABLE IN WIND  
TRAINED PERSONNEL ONLY**

(5) An illustration of a danger sign which complies with subrule (4) of this rule is shown in figure 2.

(6) All signs must be removed after the walls have obtained their final lateral support.

**FIGURE 2  
DANGER SIGN**



R 408.40208 Signing. **Wind speed; determination by competent person.**

Rule 208. (1) Each unsupported masonry wall that is more than 6 feet in height, braced or unbraced, and 50 feet or less in length shall be posted with a danger sign on each side of the wall.

(2) Each unsupported masonry wall that is more than 6 feet in height, braced or unbraced, and more than 50 feet in length, shall be posted with danger signs at each end of the wall and at intervals of not more than 100 feet along each side of the wall.

(3) When scaffolding is in place along an unsupported masonry wall, the posting requirements of subrule (1) or (2) of this rule are only required for the unscaffolded portions of the wall.

(4) The danger sign shall be placed in a conspicuous location either on the wall or anywhere within the collapse area.

(5) The danger signs shall be maintained in place and in a legible condition until the masonry wall is permanently supported.

(6) A danger sign as required by subrule (1) or (2) of this rule shall comply with all of the following requirements:

(a) Be 10 inches in height by 14 inches wide.

(b) Have the word "DANGER" in white characters which are 2 1/6 inches high and which appear within a red oval which is 4 1/8 inches high by 11 7/8 inches long and which is in the top 1/2 of the sign.

(c) Have the lower 1/2 of the sign state, "This Unsupported Wall is Unstable in Windy Conditions."

(7) An illustration of a danger sign which complies with the requirements of subrule (6) of this rule is shown in the following figure:

FIGURE 2



**Rule 208. Wind speeds shall be determined by a competent person in the vicinity of the masonry wall exposed to wind and shall be monitored during the initial and intermediate periods. A wind-measuring device shall be used to determine wind speeds.**

R 408.40209 Inspection. **Initial period requirements.**

Rule 209. An unsupported masonry wall, including the wall bracing system, shall be inspected for damage by a qualified person after each windstorm if the wind velocity was more than 35 miles per hour. If any movement of the wall or other physical damage, including damage to the wall bracing

system, is found, only those persons repairing the wall or wall bracing system shall be permitted to work within the collapse area until repairs have been made.

**Rule 209. (1) Unbraced masonry walls shall not exceed the maximum height as shown in table 1 during the initial period.**

**(2) No one shall be within the restricted zone of a masonry wall subjected to winds exceeding 20 miles per hour during the initial period.**

**(3) At the end of the initial period, the wall shall be braced on both sides if it exceeds the unbraced wall heights as shown in table 2.**

R 408.40210 Wall bracing system; responsibility for installation; responsibility for replacing system and danger signs. **Intermediate period requirements.**

**Rule 210.** The masonry contractor shall be responsible for the initial installation of the wall bracing system. After a wall bracing system and danger signs have been installed in accordance with the provisions of this part, any party, including a subcontractor, general contractor, or owner, who alters or removes the bracing system or danger signs shall be responsible for replacing the bracing system and danger signs in accordance with the provisions of this part.

**Rule 210. (1) When the height of an unbraced masonry wall exceeds the maximum height as shown in table 2 during the intermediate period, the masonry wall shall be braced on both sides.**

**(2) No one shall be within the restricted zone of a masonry wall subjected to winds exceeding 35 miles per hour during the intermediate period.**

**(3) When bracing cannot be installed because of work operations, no one shall be permitted within the restricted zone when the wind is more than 20 miles per hour during the intermediate period as shown in table 3.**

**TABLE 1  
INITIAL PERIOD (LESS THAN 24 HOURS)  
Maximum Unbraced Height of Unreinforced Masonry  
Above its Base or Highest Line of Bracing for Resisting 20 mph Wind**

Nominal Thickness	Unit Weight of Masonry		
	Light Weight <sup>(1)</sup> (<105 pcf)	Medium Weight <sup>(2)</sup> (105 to <125 pcf)	Normal Weight <sup>(3)</sup> (≥125 pcf)
	Maximum Height	Maximum Height	Maximum Height
4"	8'-0"	8'-0"	8'-0"
6"	8'-0"	8'-0"	8'-0"
8"	9'-4"	10'-0"	12'-0"
10"	13'-4"	14'-8"	17'-4"
12"	18'-0"	20'-0"	24'-0"

**TABLE 2<sup>(5)</sup>  
INTERMEDIATE PERIOD (GREATER THAN 24 HOURS)  
Maximum Unbraced Height of Unreinforced Masonry  
Above its Base or Highest Line of Bracing for Resisting 35 mph Wind**

Nominal Thickness	Unit Weight of Masonry			Unbonded Masonry <sup>(4)</sup>
	Light Weight <sup>(1)</sup> (<105 pcf)	Medium Weight <sup>(2)</sup> (105 to <125 pcf)	Normal Weight <sup>(3)</sup> (≥125 pcf)	
	Maximum Height	Maximum Height	Maximum Height	
4"	8'-0"	8'-0"	8'-0"	8'-0"
6"	8'-0"	8'-0"	8'-0"	8'-0"
8"	8'-0"	8'-0"	8'-0"	8'-0"
10"	8'-0"	8'-0"	8'-8"	8'-0"
12"	9'-4"	10'-0"	10'-8"	8'-0"

**TABLE 3<sup>(5)</sup>**  
**INTERMEDIATE PERIOD (GREATER THAN 24 HOURS)**  
**Maximum Unbraced Height of Unreinforced Masonry**  
**Above its Base or Highest Line of Bracing for Resisting 20 mph Wind**

Nominal Thickness	Unit Weight of Masonry			Unbonded Masonry <sup>(4)</sup>
	Light Weight <sup>(1)</sup> (<105 pcf)	Medium Weight <sup>(2)</sup> (105 to <125 pcf)	Normal Weight <sup>(3)</sup> (≥125 pcf)	
	Maximum Height	Maximum Height	Maximum Height	Maximum Height
4"	8'-0"	8'-0"	8'-0"	8'-0"
6"	9'-4"	10'-0"	10'-8"	8'-0"
8"	14'-8"	15'-4"	16'-8"	9'-4"
10"	18'-8"	20'-0"	22'-0"	13'-4"
12"	23'-4"	25'-4"	28'-0"	18'-0"

<sup>(1)</sup> Light Weight Units at 95 pounds per cubic foot (pcf) unit weight.

<sup>(2)</sup> Medium Weight Units at 105 pounds per cubic foot (pcf) unit weight.

<sup>(3)</sup> Normal Weight Units at 125 pounds per cubic foot (pcf) unit weight.

<sup>(4)</sup> Flashing or other

<sup>(5)</sup> Tables 2 and 3 are based on Type N masonry cement mortar.

#### R 408.40211 Wall bracing design.

Rule 211. (1) A wall bracing system shall be designed by a qualified person and capable of providing stability to the wall for a wind speed of 40 miles per hour.

(2) A wall bracing system shall be installed in accordance with 1 of the following:

(a) A triangle wall bracing system as prescribed in R 408.40212.

(b) A bracing plan that is designed using acceptable engineering practices and the engineering content of the mason contractors association of America, standard practice for bracing masonry walls under construction, chapters 5 and 6 and their commentaries, July 2001 Edition, adopted by reference in R 408.40202. Wall bracing erection drawings/plans or calculations and specifications shall be available at the jobsite. Bracing schemes for walls matching examples specifically outlined in the mason contractors association of America, masonry wallbracing design handbook, March 2003 Edition, adopted by reference in R 408.40202, satisfy these requirements.

#### R 408.40212 Triangle wall bracing system.

Rule 212. (1) A triangle wall bracing system shall consist of all of the following elements assembled as shown in figure 3:

(a) Scaffold grade lumber that is suitable for planking.

(i) A 16-foot, 2-inch by 10-inch vertical brace.

(ii) A 16-foot, 2-inch by 10-inch diagonal brace.

(iii) A 16-foot, 2-inch by 10-inch horizontal brace.

(b) Two nominal 2 x 4 wood stiffeners.

(c) Top wall anchor.

(d) Base of wall or footing anchor.

(e) Bearing block.

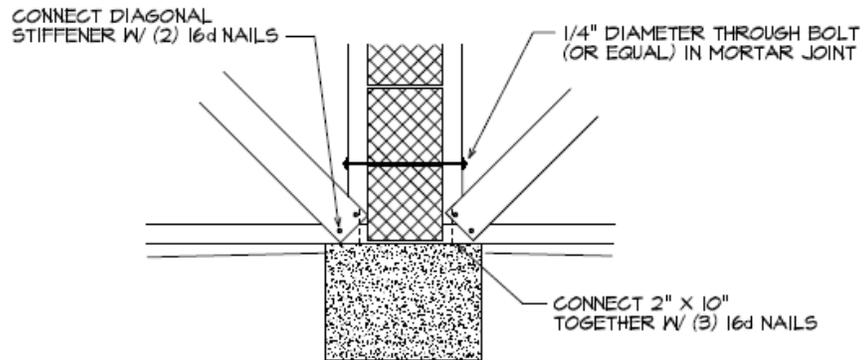
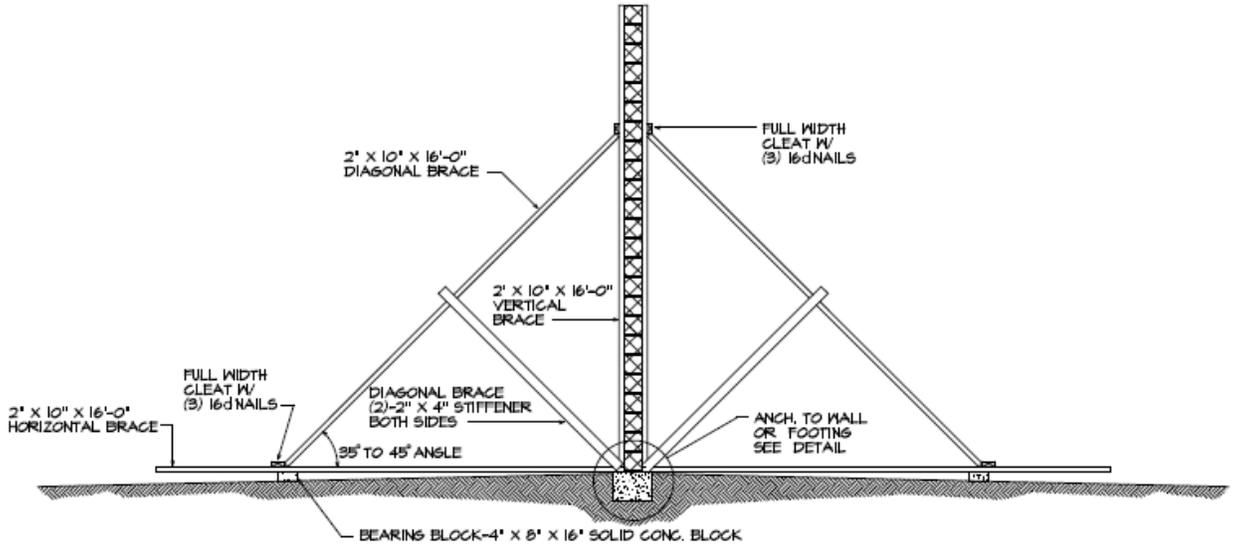
(f) Cleats.

(2) The angle of intersection of the diagonal brace and the horizontal brace shall be between 35 and 45 degrees. The diagonal brace shall not intersect the vertical brace below the midpoint height of the masonry wall.

(3) The triangle wall bracing system shall be aligned on both sides of the wall when installed.

(4) The maximum horizontal spacing for a triangle wall bracing system shall not exceed the values as shown in table 4 for the corresponding maximum wall heights and as illustrated in figure 4.

**FIGURE 3**  
**Typical Triangle Wall Bracing System**



CONNECTION DETAIL

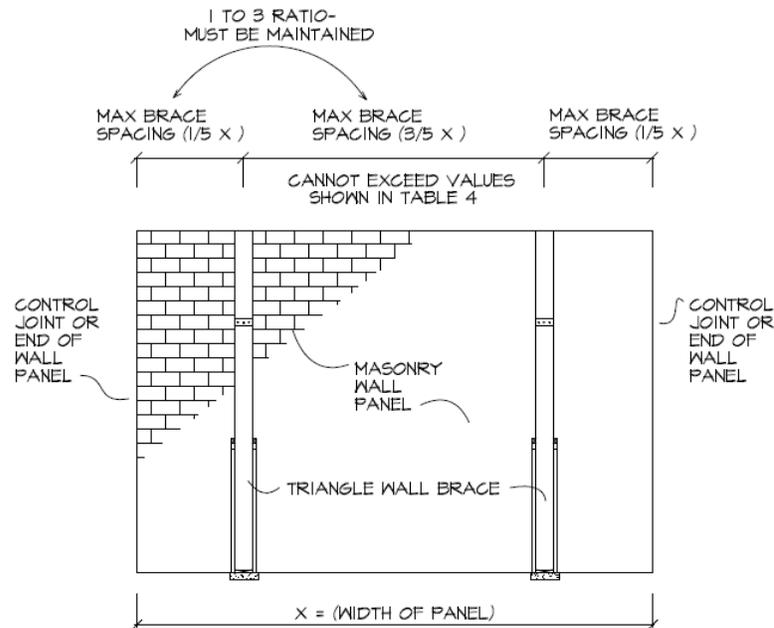
**TABLE 4<sup>(1)</sup>**  
**INTERMEDIATE PERIOD (GREATER THAN 24 HOURS)**  
**Maximum Horizontal Spacing for the Triangle Wall Bracing System for Resisting 40 mph Wind**

Nominal Thickness	Maximum Horizontal Spacing	Maximum Wall Height	Maximum Panel Width <sup>(2)(3)</sup>
4"	9'-1"	16'	16'-0"
6"	13'-6"	16'	24'-0"
8"	17'-11"	16'	32'-0"
10"	20'-10"	16'	38'-0"

<b>12"</b>	<b>23'-6"</b>	<b>16'</b>	<b>42'-8"</b>
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- (1) Table 4 is based on Type N masonry cement mortar.  
 (2) Actual width of panel may not exceed design spacing of control joints or design panel widths. Consult approved permit drawings for specified control joint locations or maximum spacing.  
 (3) Panels shall not include control joints within width of panel.

**FIGURE 4**  
**Maximum Horizontal Spacing for a Triangle Wall Bracing System**



**R 408.40213 Inspections.**

Rule 213. An unsupported masonry wall, including the wall bracing system, shall be inspected for visible defects by a competent person at the beginning of each shift and after any occurrence that could affect the structural integrity of the wall bracing system or the wall.

(a) Any bracing element that is damaged or weakened from any cause shall be immediately repaired or replaced. A competent person shall supervise the repairs.

(b) Any bracing element that is repaired shall have at least the original designed strength for the wall brace system.

(c) If any movement of the wall or physical damage to the wall occurs, the project structural designer of record shall be notified. Repairs to the wall shall be designed by a structural engineer and shall not be done without the approval of the project structural designer of record.

(d) Only those persons repairing the wall or wall bracing system may work within the restricted zone until repairs have been made.