



Unreinforced Masonry (URM) Building Seismic Retrofit Project

July 20, 2017 Policy Committee Meeting

Unreinforced Masonry Building Policy Committee Agenda July 20, 2017

- 3:00** Welcome & introductions (*Margaret Mahoney, Chair*)
- 3:05** Review Policy Subcommittee recommendations for Class 2, 3 and 4 URM buildings
- 4:00** Public Comment
- 4:30** Discuss other policy recommendations
- 4:50** Feedback on Policy Committee Report and Next Steps

Changes to Recommendations to Date

- Eliminate requirement for geotechnical investigation and report
- Combine URM Building Classes 3 and 4 (i.e., relax URM Class 3 requirements)
- Revised definition of Unreinforced Masonry Building

Revised Definition

Unreinforced Masonry Building


Unreinforced Masonry Wall Building means a building that contains either

- A. At least one Unreinforced Masonry Bearing Wall, or***
- B. At least one Unreinforced Masonry Wall that participates in the main lateral force-resisting system.***

Exception: A building is exempt from this definition if both of the following are satisfied:

- 1. All existing lateral load-carrying structural elements have a demand-capacity ratio no more than 10 percent greater when neglecting all Unreinforced Masonry Walls than their demand-capacity ratio including all Unreinforced Masonry Walls, and***
- 2. The demand-capacity ratio, determined by neglecting all Unreinforced Masonry Walls, from the Quick Check Procedures for the appropriate Life Safety Structural Checklist of ASCE 41-13 shall not exceed 2.0. The appropriate Life Safety Structural Checklist shall be determined based on the building type neglecting all Unreinforced Masonry Walls.***

Where the building is exempt per Item 1 and 2 above, the deficiencies in all Unreinforced Masonry Walls meeting Items A or B must still be evaluated and retrofitted.

Seismic Risk	Classification	Description	Upgrade Level	Approx. # of Bldgs.
<p>Highest Risk</p>  <p>Lowest Risk</p>	URM Class 1	Critical (Risk Category IV) Structures (e.g., power generating stations serving critical facilities, water facilities, and other public utilities)	Operational for a Basic Safety Earthquake 1N	(10)
	URM Class 2	All school buildings and Risk Category III buildings	Damage Control for a Basic Safety Earthquake 1E	(88) 46- schools 36- churches 6- community centers/theatres
	URM Class 3	All other URMs not categorized as URM Class 1, 2 or 4	Modified Bolts Plus if the building qualifies, otherwise Life Safety for a Basic Safety Earthquake 1E	(1,345)
	URM Class 4	1 and 2-story buildings with 0-10 occupants	Limited Performance (e.g., parapet bracing, roof-to-wall anchors, etc.)	(195)

Modified Bolts Plus Standard

Modified Bolts Plus requires:

- Brace URM parapets, cornices and chimneys
- Anchor URM walls to floors and roofs for out-of-plane loading
- Attach diaphragm to vertical elements to transfer in plane shear
- Out-of-plane URM wall bracing if h/t ratio exceeds that required by ASCE 41-13 Table 11-5

Modified Bolts Plus Standard

Provided a building conforms to, **or is brought up to**, the following minimum requirements:

- The building does not have a “weak story”
- The building has a mortar strength of 30 psi or more for all masonry at an axial stress of 0 psi
- The building has diagonally sheathed or plywood diaphragms at all levels above the base of the building
- The building has or will be provided with a minimum of two lines of vertical elements of the lateral force resisting system parallel to each axis. URM wall piers shall occupy not less than 40% of the wall’s length and have a height to width ratio that does not exceed 2:1 for the wall to be considered as providing a line of resistance.

Timeline for Seismic Upgrades

	STEP 1 ASCE 41 Assessment and cost estimate	STEP 2 Parapet, cornice and chimney bracing; wall-to-roof anchorage for out-of-plane loading	STEP 3 Wall-to-floor anchorage for out-of-plane loading for Class 3 and 4; roof sheathing, roof in-plane shear and roof ties/cross ties for Class 3	STEP 4 Seismic upgrade completed
URM Class 1	3 years	-	-	10 years
URM Class 2	3 years	10 years	-	20 years
URM Class 3	5 years	10 years	20 15 years	Later of 25 years or 10 years after additional incentives have been made available to property owners
URM Class 4	Not Required	10 years	10 15 years	Later of 25 years or 10 years after additional incentives have been made available to property owners

Step 1: ASCE–41 Evaluation plus Cost Estimate

1. **Executive summary** for the non-technical reader at the beginning of the evaluation
2. **Scope and Intent:** A summary of the evaluation procedures used, and level of investigation conducted.
3. **Site and Building Data:**
 - General building description, including number of stories and dimensions
 - Building occupancy and use.
 - Determination of URM building Class as defined in URM Retrofit Standards Committee report
 - Structural system description (framing, seismic-force -resisting system, floor and roof diaphragm construction, basement and foundation system)
 - Nonstructural systems description (all nonstructural elements that affect seismic performance of the building or whose failure could cause serious life-threatening injuries to occupants or those near the structure)
 - Common building type
 - Performance level
 - Level of seismicity
 - Soil type

Step 1: ASCE–41 Evaluation plus Cost Estimate

4. **List of assumptions and testing:** material properties, site soil conditions, level of inspections and testing conducted (if done)
5. **Findings:** A list of seismic deficiencies identified
6. **Appendix:**
 - All necessary Checklists (Basic checklist, Structural checklist for different building types, Non-structural checklist)
 - Summary datasheet
 - Building plans
 - Calculations and analysis procedure including demand capacity ratios, quick checks etc.
 - Material test results (if testing was done)
 - Photographs

Step 1: ASCE–41 Evaluation plus Cost Estimate

- 7. Schematic upgrade strategy and cost estimate** to complete Steps 2-4 broken out separately. Cost estimates shall include all costs directly related to structural seismic retrofitting, including, but not limited to, the necessary costs of:
- demolition and restoration of similar architectural finishes
 - electrical systems, plumbing and mechanical systems as necessary for access
 - architectural and engineering fees
 - fees for testing, insurance and project management

Costs associated with abatement of hazardous materials, relocation or loss of rent during seismic retrofitting are to be excluded or provided as a supplement to the cost estimate.

URM Class 3: Step 2

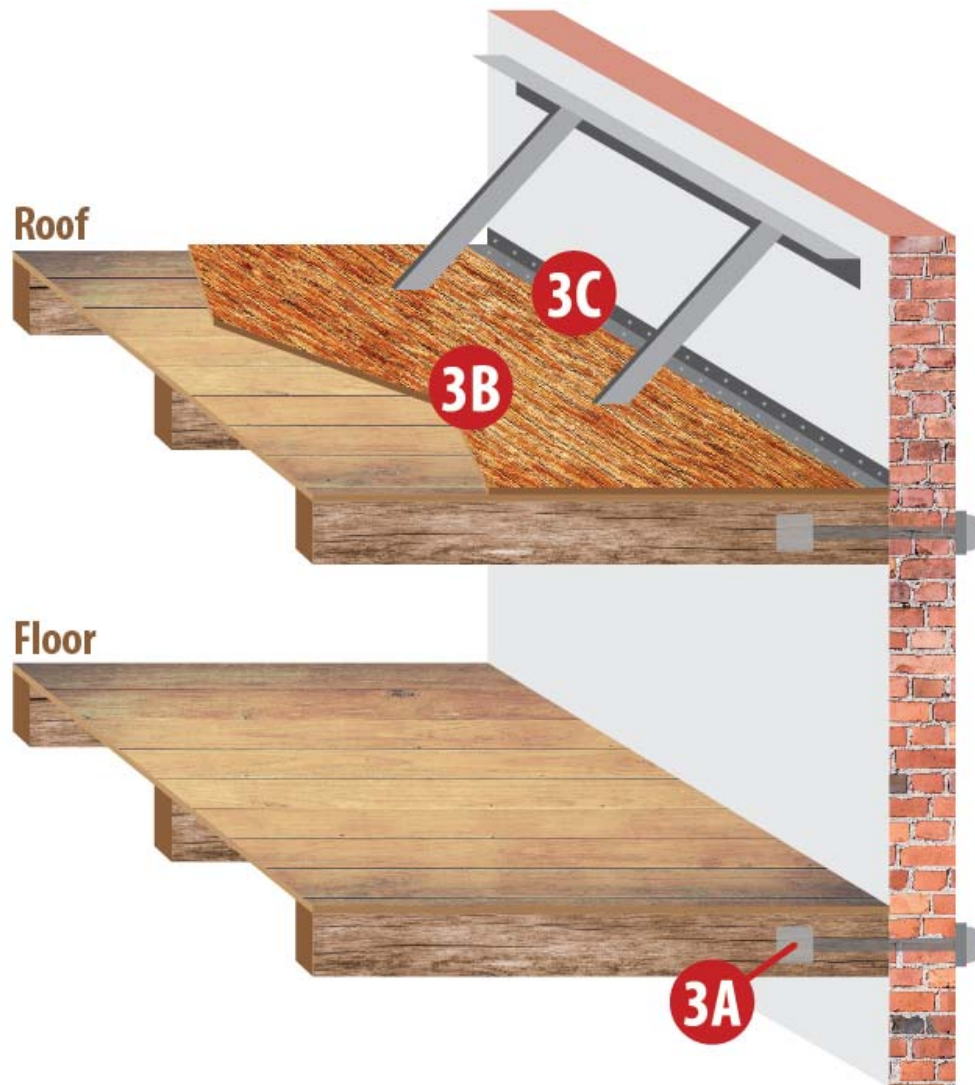


2A – Brace parapets, cornices and chimneys

2B – Attach wall to roof for out-of-plane loading

2C – Deferred Requirement (work may be deferred to Step 3): Roof sheathing, ties/cross ties, in-plane shear attachment

URM Class 3: Step 3



- 3A** – Attach wall to floor for out-of-plane loading
- 3B** – Roof sheathing, ties/cross ties (If work was not completed under Step 2)
- 3C** – Roof in-plane shear attachment (If work was not completed under Step 2)

URM Class 3: Step 4



4A – Out of plane wall bracing

4B – Vertical lateral force-resisting system (e.g., braced frames, shear walls, etc.)

4C – Floor sheathing, in-plane shear, ties/cross ties at floors

4D – Other upgrades required

Recommended Revisions to Title 24.85

- Roof repair or replacement
- Costs of alterations or repair

Title 24.85

Seismic Regulations for URM Buildings

First Trigger

Roof replacement – removal of greater than 50% of total roof area within a ~~5~~ 15 year period requires conformance to ASCE-41 standards for:

- Wall anchorage for both in plane and out of plane forces
- Parapet bracing

Title 24.85

Seismic Regulations for URM Buildings

Second Trigger

When costs associated with building alterations or repair in a ~~two~~ **five** year time period **or fifteen year time period** exceeds costs listed in table below, entire building shall be improved to resist seismic forces to meet ASCE ~~31~~ **41** criteria

Building Description	Cost of Alteration / Repair in a Five year time period	Cost of Alteration / Repair in a Fifteen year time period
Single Story	\$40 per sq.ft.	2x Five year costs
Building two stories or greater	\$30 per sq.ft.	2x Five year costs
Special building hazard: Buildings in relative hazard categories 5 or with vertical or plan irregularities	\$30 per sq.ft.	2x Five year costs

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Review of Policy Recommendations

- Mandatory retrofit based on URM Class
 - Tax-exempt, non-profit entities complete through Step 2 only plus placarding
- Timeline extension for Steps 3 and beyond for affordable housing if owners enter into Preservation & Resiliency Agreement
- URM buildings already fully upgraded to ASCE 31 standards or to OSSC 1993 or later editions shall be exempt from this policy

Review of Policy Recommendations

- Voluntary placarding of retrofitted URM buildings
- Tenant notification
- Public education campaign

Review of Incentives

- Seismic Commercial Property Assessed Clean Energy (C-PACE) Program
- Tax exemption for seismic retrofits
- Central City FAR bonus and transfer
- \$5M Old Town/Chinatown Urban Renewal Area
- Waiver of permit fees and additional upgrade triggers beyond seismic

Review of Incentives

- Federal Rehabilitation Tax Credits
 - 20% historic structures
 - 10% commercial buildings constructed before 1936
- Seismic Rehabilitation Grant Program
 - Schools
- Earthquake ombudsman

Enforcement

Notice of URM building retrofit requirements sent annually and six months prior to deadline.

Penalties:

Step 1 : \$150/month for 1st six months, then \$300/month (up to \$6,000)

Step 2: \$500/month for 1st six months, then \$1,000/month (up to \$12,000). After one year: placarding, tenant notification

Step 3: \$1,000/month for 12 months, then \$2,000/month (up to \$24,000)

Enforcement

Step 4: 1% per year of RMV of property prorated and assessed quarterly

- Fees collected used to support seismic retrofit program
- Waiver of financial penalties if owner meets requirements within six months after deadline

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