



Unreinforced Masonry Buildings Policy Development and Current Status –City of Portland

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Presentation to OSSPAC May 9, 2023

Presentation Outline

- Risk from CSZ
- City of Portland's exposure to these risks
- Overview of City of Portland's efforts to develop policies to mitigate hazards from URM buildings
- The Proposed Policy to reduce URM hazards
- Results of the proposal and current status
- Mitigation efforts by other cities to reduce hazards from vulnerable buildings













Cascadia Subduction Zone

Similar to Turkey and other recent earthquakes in 2011 Christchurch , New Zealand or Tohoku earthquake in Japan, Oregon is vulnerable to a large earthquake as it sits along one of the most well known and widely studied faults in the world today, The Cascadia Subduction Zone(CSZ)

Cascadia Subduction Zone Earthquake

- Cascadia subduction zone earthquakes could produce earthquakes of M7.1-M 9.2. (For reference the earthquake in Turkey that caused so much devastation and destruction was M7.8, at the low end for Cascadia)
- May cause shaking in Portland for up to 4 minutes. Ground motions could exceed 0.3 G

Reference : Dr. Chris Goldfinger

Cascadia Subduction Zone

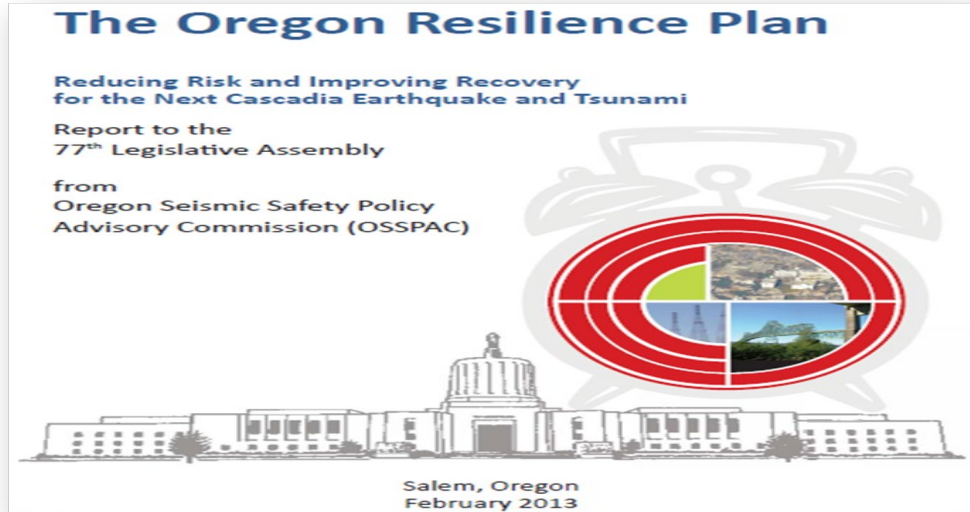
- It is not a question of if we will be impacted by a CSZ earthquake but the question is when?
- Probability of CSZ earthquake is ~ **22-26%** in the next 50 years (2017 *Marine Geology* paper), similar to Japan in 2011. These values are the **minimum**, and do not include the other two poorly known sources, or smaller (< M8) quakes offshore. (Ref. Dr. Chris Goldfinger)
- The last great Cascadia earthquake was 317 years ago, and the average repeat time for M7.5 or greater earthquakes is ~ 240 years

We are overdue for a large Earthquake !!!!!!!

What Will Portland Look Like

- Like in Turkey and other recent earthquakes such as 2011 earthquakes in New Zealand, Portland and other cities in Oregon have a large inventory of older buildings that were built before modern seismic codes were in place
- Buildings not built to Modern Seismic standards have proven to perform very poorly in earthquake after earthquake.
 - Specially vulnerable class on Buildings are Unreinforced Masonry Buildings (URM)

Why URM's ?



Unreinforced Masonry (URM) buildings are generally **the most dangerous** types of buildings in an earthquake, and should not be allowed to remain in service indefinitely unless they are fully upgraded.



URM Performance in PNW Earthquakes

- March 25, 1993 Scotts Mills Earthquake

The Seattle Times
Winner of Nine Pulitzer Prizes

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Thursday, March 25, 1993 - Page updated at 12:00 AM

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Quake Cracks Oregon Capitol -- Temblor Registers 5.4, Causes Minor Injuries

AP: Times Staff

PORTLAND - An earthquake centered in the Cascade foothills east of Silverton rattled northwest Oregon and parts of Western Washington early today, cracking the rotunda of the Oregon Capitol in Salem and causing minor injuries.

The quake, focused about 12 miles deep and about 30 miles southeast of Portland, registered 5.4 on the Richter scale of ground motion at 5:34 a.m. and lasted about 45 seconds.

"It felt like I was on a boat going down rapids. It woke me right up," said Bill Holder, a cook at Rod's Lafayette Restaurant in Lafayette, near the epicenter.

The original wing of the state Capitol in Salem was closed after serious cracks were found in the rotunda, House Speaker Larry Campbell said. A newer wing remained open. Engineers were considering removing the gold-plated pioneer statue on top of the Capitol.

Two people came to the emergency room at Salem Hospital with minor cuts from falling glass.

In Molalla, 27 miles southeast of Portland, two walls at the high school partially collapsed. Bricks and a chimney fell from the school, which was built in 1925.

Brick planters and windows also were broken at some homes and businesses in the town of 3,800, and goods were knocked off grocery store shelves.



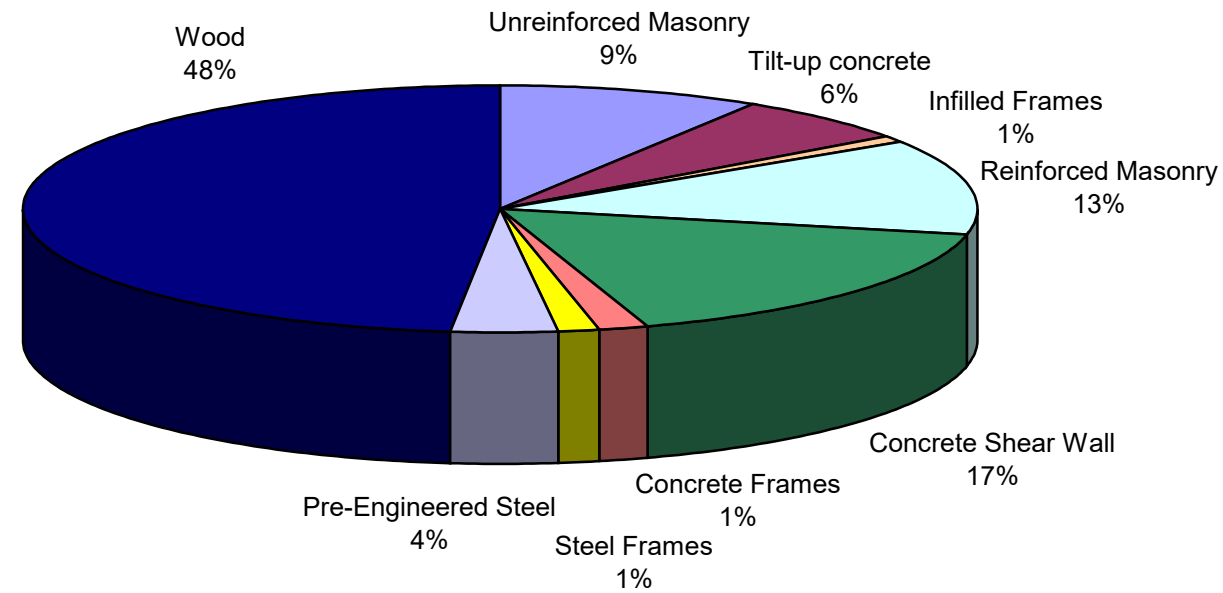


Will cities in Oregon Look like this?



Summary of Building Stock

Inventory



- About 1,850 URM buildings (9% of building stock)
- About 7,200 residential units
- About 40 URM buildings City-owned

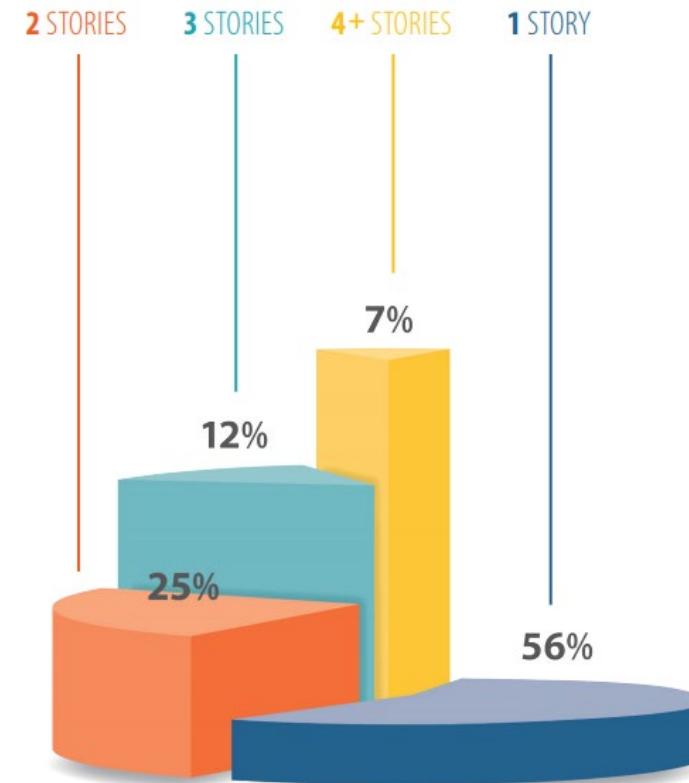
URM Buildings by Use



Commercial	81%
Multifamily	1%
Schools and community centers	3%
Other	1%

- Average age 89 years
- About 567 historic buildings
- More than half single-story

URM Buildings by Height



URM Seismic Retrofit and Database Update Project

- Recognizing hazards posed by Unreinforced masonry Buildings, City Council directed staff in December 2014 to develop policy proposals to reduce Portland's risk from URM buildings.
- The effort was led by Portland Bureau of Emergency Management, Bureau of Development Services, and Prosper Portland.

Current Code Requirements

- Governing Code is Title 24.85
- Title 24.85 provisions only require seismic retrofits when an owner makes a voluntary alteration or upgrade to the property, like when there is a change of use to a more hazardous classification, an increase in occupancy, or an alteration to the building that exceeds specific cost thresholds.
- These are called “passive” triggers

Retrofit Progress Under Current Code

Inventory

- Parapets braced and roof tied to walls when 50% + of roof replaced.
- Retrofits to higher standard only in major renovation or change of use.

Problem with current requirements

Limited success. Since 1994

109 *demolished* URM buildings (6%)

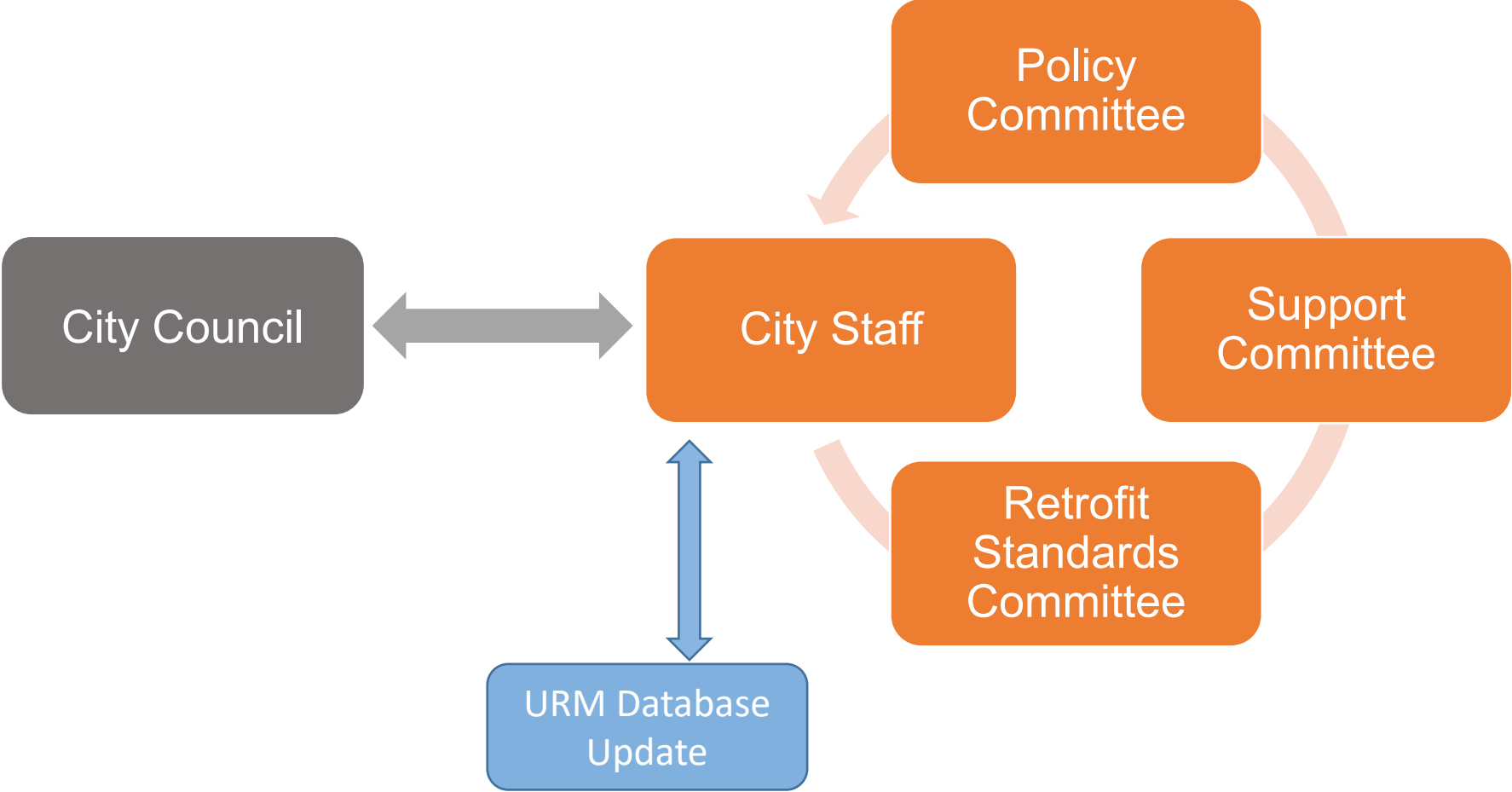
89 *fully upgraded* URM buildings (5%)

129 *partially upgraded* URM buildings (7.5%)

Conclusion:

- It is estimated that in the twenty years since the adoption of Title 24.85, less than 20% of the existing inventory of URM buildings have either been upgraded or demolished.
- This rate would need to quadruple to meet the Oregon Resilience Plan goal of retrofitting vulnerable buildings within 50 years.

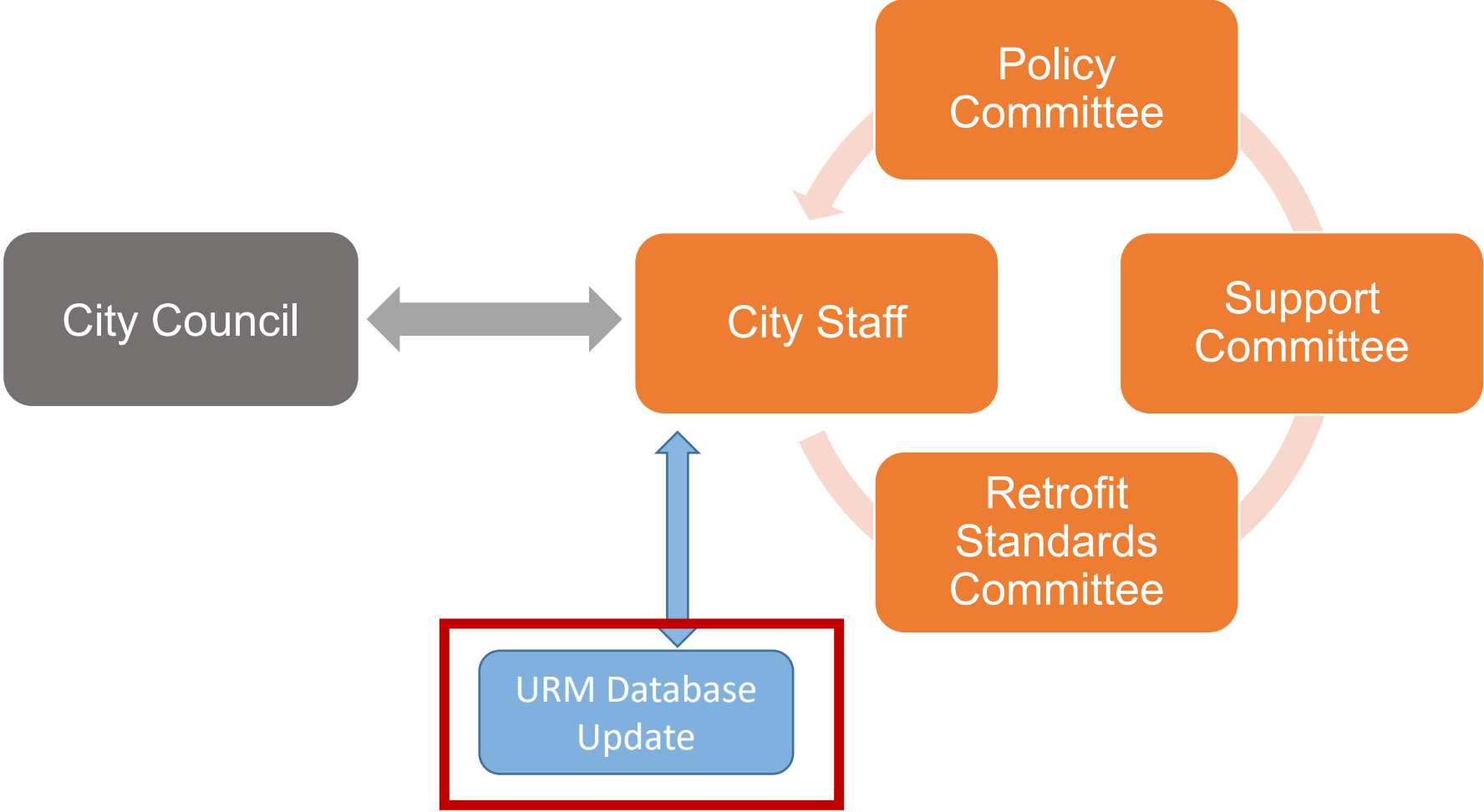
Council Charge



- Broad range of stakeholders and experts including engineers, geologists, developers, building owners and managers, bankers, and representatives of interests such as churches, schools, and affordable housing met from 2014 - 2017
- Worked on consensus basis.
- Subcommittees on affordable housing, non-profits, and historic buildings.
- Outreach to tenants and building owners: open house events, mailings, policy committee meetings.

- 40+ different items in local media
- 20+ community presentations, including:
 - Development Review Advisory Committee
 - Historic Landmarks Commission
 - Building Owners and Managers Association
 - Portland Business Alliance
 - Portland Downtown Neighborhood Association
 - Central Eastside Industrial Council Land Use Committee
 - SE Uplift Land Use Committee
 - Northeast Coalition of Neighbors
 - Pearl District Neighborhood Association
 - Portland Public Schools Board
 - American Institute of Architects
 - League of Women Voters

Council Charge



What is the URM Database?

Data gathered in 1994-1995

Database of all commercial URM buildings in Portland

Based on rapid visual screenings of all buildings in Portland

Data updated in 2014-2016

MAGK01AP NN37 Multnomah County Public A&T System 07/07/95
YAGK12P MAGK12M *** Query Name - Real Property *** QNAME 14:51
Cmd: QNAME Acct Nbr: R025400120 Tax Year: _____

Acct Nbr: R-02540-0120 Mail: _____
Acct Status: _____
Source Name/Address Situs
OWNR1 HUBBARD, EMMA F 5300 SE FOSTER RD
TXPR1 TO HUBBARD, RICHARD L & City: PORTLAND Zip: _____ Seq: 1
TXPR2 YVONNE L Levy Code: 001 Vchr Action: _____
MAIL1 5300 SE FOSTER RD Annex: _____ Division: _____
MAIL2 PORTLAND OR 97206-2938 Appr St: APPR CODE: K

Book/Page: 1801/0458 Year: 85 65
Tax Roll Description Lot Block Ratio Code: 271
Addn: ANABEL 12 1 State Ratio Code: _____
E 40' OF 13 1 Map: 3436
SID: 1S2E07DB 17400

Enter=Query F1=Help F2=Print F3=Exit F4=Situs F6=Prev F9=Next F12=Cancel

CITY OF PORTLAND • BUREAU OF BUILDINGS
RAPID VISUAL SCREENING OF BUILDINGS

Address: 5300 SE Foster
No. of Stories: 2 +BSM +GAR +MEZ
Year Built: 1922
Inspector: 6.5
Total Floor Area: 4544
Building Name: Hubbard's Drapery
Use: _____

OCCUPANCY:
SFR & Duplex Public Assembly
Apt./Condo/Hotel School
Commercial/Restaurant Government Building
Office Emergency Services
Industrial/Warehouse Historic Building

NUMBER OF PERSONS:
0-10 11-30 30-100
100-200 500-5000 5000+

BUILDING TYPE: MODIFIERS: COMMENTS:
Wood Buildings of all types W Non-Struct Falling Haz
Steel moment resisting frame S1 High Rise
Braced steel frames S2 Poor Condition
Light metal buildings S3 Vertical Irregularity
S frame with cast in place shear walls S4 Soft Story
Concrete moment resisting frame C1 Torsion
Concrete shear wall building C2 Plan Irregularity
C or S frame with URM infill C3/S5 Pounding
Tilt-up Buildings PC1 Roof Tank
Precast concrete frame building PC2 Large heavy Cladding
Reinforced masonry/concrete block Short Columns
Unreinforced masonry URM Post Benchmark Year

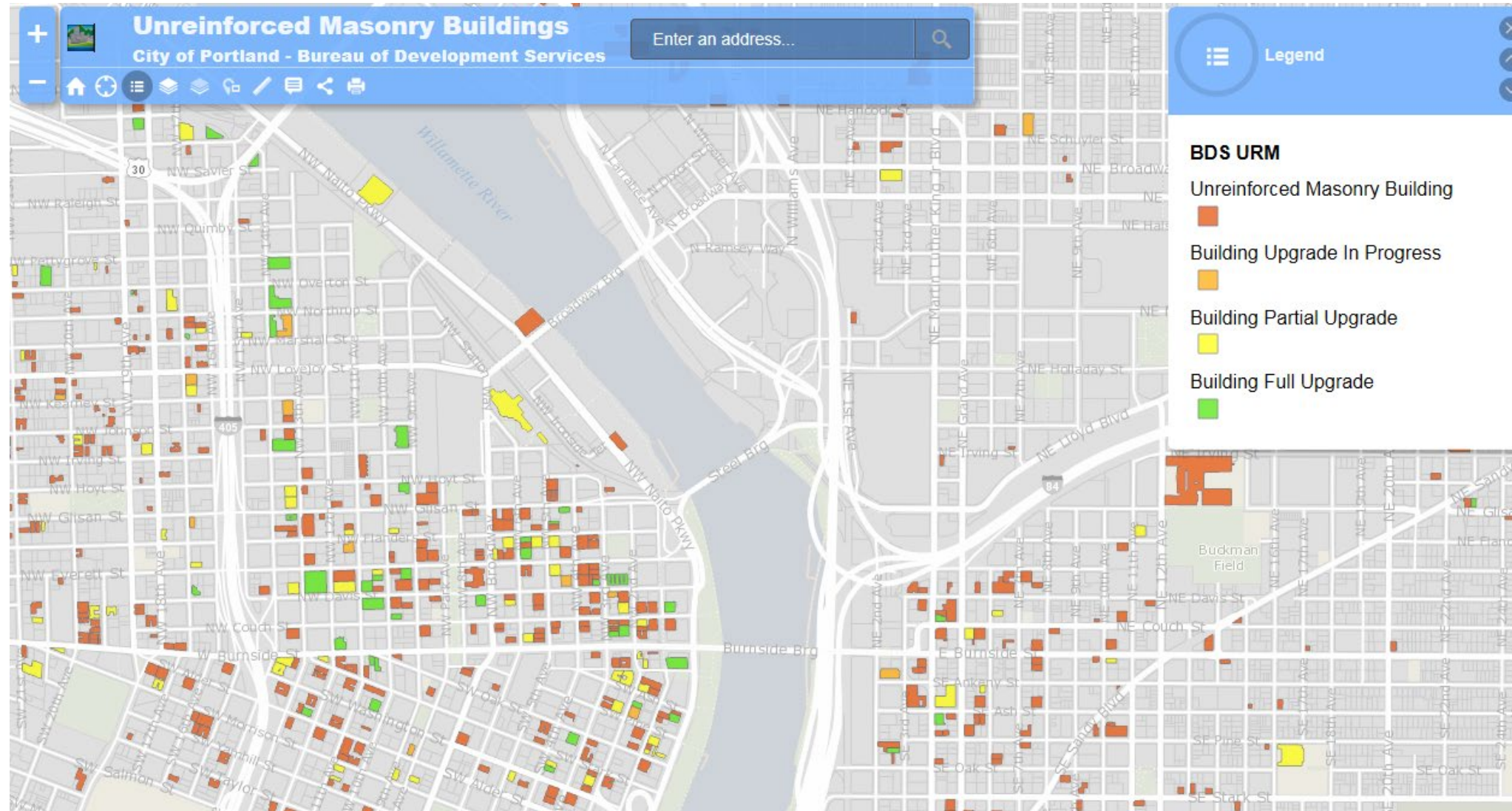
Structural Upgrades and Years: _____
Detailed Evaluation Required: Yes
Data Confidence: *** - estimated, subjective or unreliable data; "UKN" - unknown or unavailable data. Entered

Handwritten notes on form: "cracks all around window openings on S & West sides"

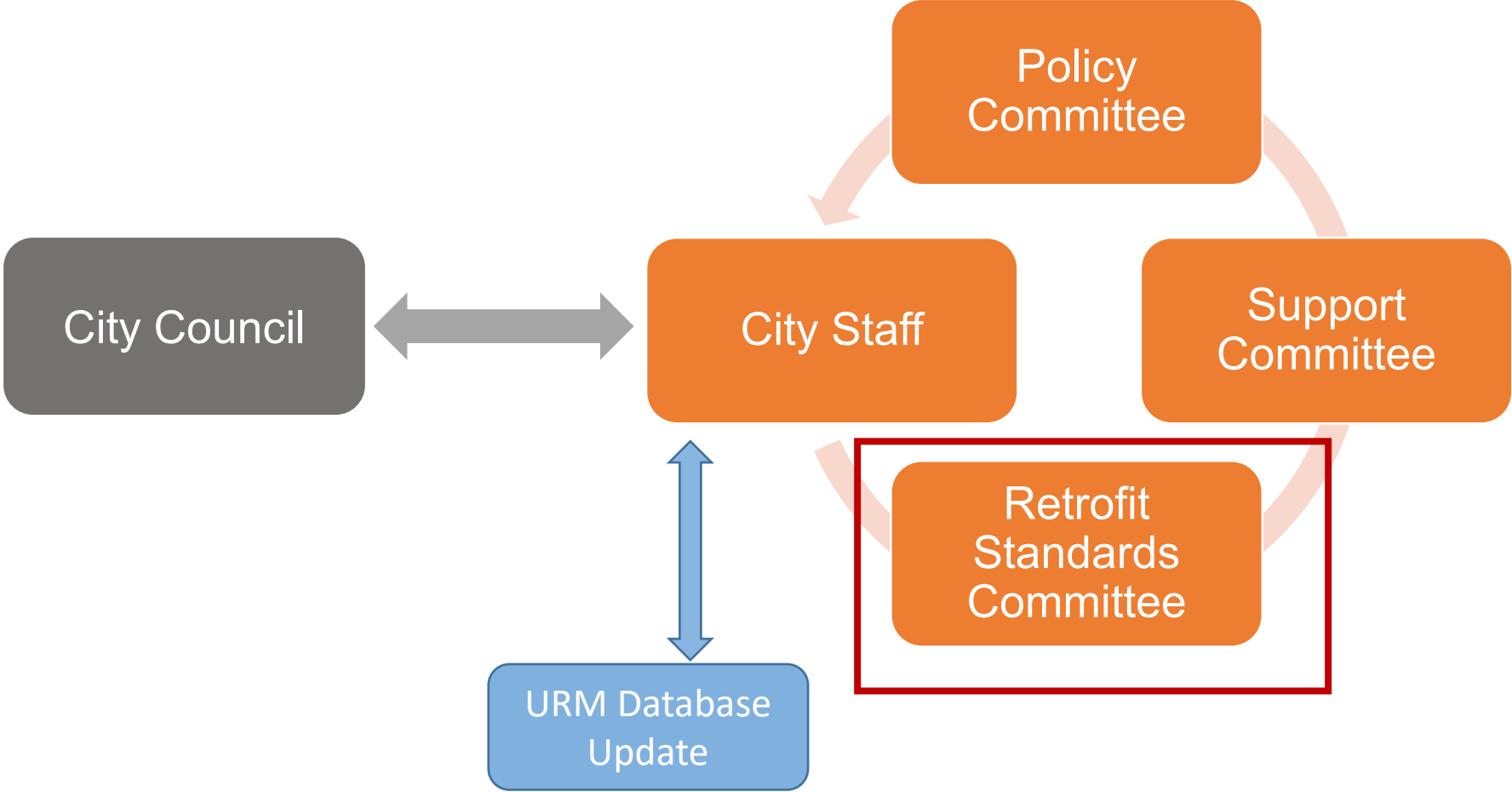


URM Building Map

Inventory



Council Charge



California Example

1986 : Senate Bill 547 Required local Governments in California's Highest seismic Zones to :

- Complete an inventory of URM buildings
- Establish loss reduction programs by 1990
- Report on progress to the California Seismic Safety Commission

Law recommended but not required that loss reduction programs include **mandatory strengthening** ordinances

Voluntary Strengthening and Notification Only also met the requirements of the law

Mandatory strengthening programs generally required comprehensive upgrading for in-plane and out-of-plane seismic demands

Voluntary strengthening programs typically require seismic evaluations and encourage comprehensive upgrading

Notification-only programs typically included only a letter from the local authority having jurisdiction to building owners, stating that their building appears to be of URM construction and is potentially a seismic risk [

California Example

Table 10: California URM mitigation statistics by programme type (from [27]).

Programme Type	# (%) Jurisdictions	# (%) URMs	% URM Retrofitted	% URM Demolished	% URM Mitigated
Mandatory Strengthening	134 (47%)	19,043 (73%)	70%	17%	87%
Voluntary Strengthening	39 (14%)	1,269 (5%)	16%	8%	24%
Notification-only	46 (16%)	1,487 (6%)	7%	6%	13%
Other	41 (14%)	3,737 (14%)	15%	11%	26%
No Programme	23 (8%)	409 (2%)	4%	27%	31%
Total	283	25,945	55%	15%	70%

Building Classification

Seismic Risk	Classification	Description	Upgrade Level	Approx. # of Bldgs.
Highest Risk	URM Class 1	Critical buildings (Risk category ¹ IV buildings, power generating stations serving critical facilities, water facilities, and other public utilities)	Structure will remain Operational after a Design Level Earthquake	(10)
	URM Class 2	A. All school buildings and B. Risk category ¹ III buildings	Between Life Safety and Operational performance level for a Design Level Earthquake	(88) 46- schools 36- churches 6- community centers/theatres
	URM Class 3	A. Buildings ≥ 4 stories or B. Buildings with ≥ 300 occupants or C. Residential buildings with ≥ 100 units	Life Safety performance level under Design Level Earthquake	(221) Buildings ≥ 4 stories or Buildings ≥ 300 occupants
	URM Class 4 3	All other URM's not categorized as URM Class 1, 2, 3 , or 5 4	Modified Bolts Plus if the building qualifies otherwise Life Safety under Design Level Earthquake	(1136) (1345)
Lowest Risk	URM Class 5 4	1 and 2-story buildings with 0-10 occupants	Parapet bracing, wall tie in and wall bracing	(195) 1 and 2-story buildings with 0-10 occupants

Timelines for Seismic Upgrades

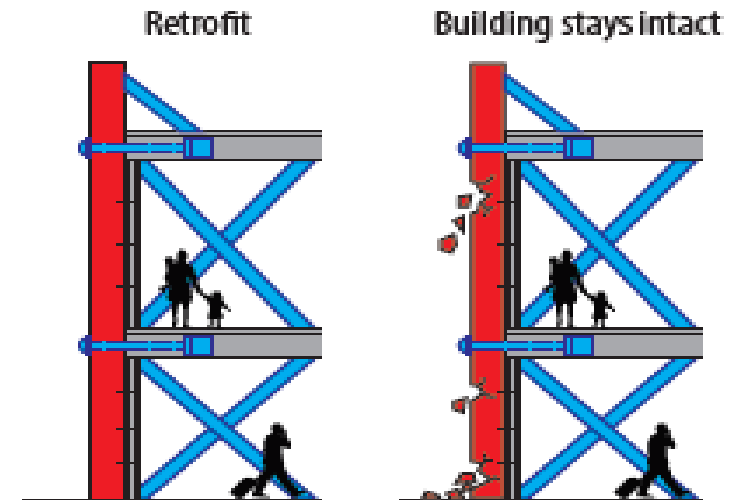
Policy
Committee

	STEP 1 ASCE 41 Assessment ² and Geotechnical Report³	STEP 2 Parapet, cornice and chimney bracing and wall to roof attachment ^{4,5}	STEP 3 All bearing and exterior wall to floor attachments and out-of- plane wall strengthening ^{4,5}	STEP 4 Seismic upgrade completed ⁴
URM Class 1	3 years	-	-	10 years
URM Class 2	3 years	10 years	-	20 years
URM Class 3	5 years	10 years	20 years	25 years with up to an additional 5 years with demonstrable hardship
URM Class 4	Not Required	10 years	10 years	-

Class 1 and Class 2 Buildings Will Last

Proposed
Standard

- **Class 1 critical buildings with immediate occupancy:**
 - 10 years to complete all steps
- **Class 2 schools and community centers with damage control**
 - 10 years for parapets
 - 20 years for full retrofit

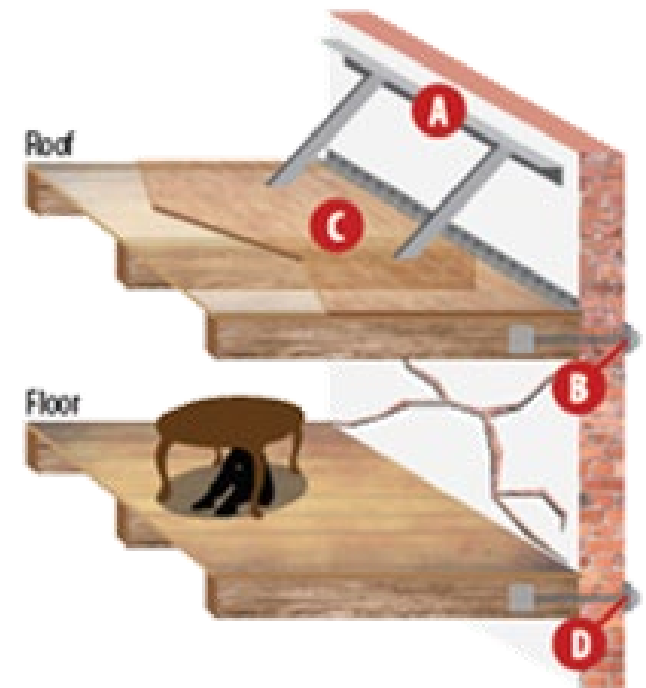


Class 3 Collapse Risk Reduced

Proposed
Standard

Collapse risk reduction for 85% of buildings

- **10 Years** for parapet bracing, wall to roof attachment, roof sheathing
- **15 Years** for wall to floor attachment



Minimal retrofits for small buildings

Proposed
Standard

- URM buildings with less than ten occupants brace parapets and tie roof (current code).
 - Ten years to complete.



Support for URM Building Owners

Proposed
Support

- Seismic C-PACE – Authorized and implemented
- Property Tax Exemption (SB 311) – Authorized
- State historic tax credit – Introduced, failed, try again
- State seismic tax credit – in exploration
- Capital pool to provide financial assistance – in exploration
- City staff as advocates at BDS and Prosper Portland

Resolution Passed By Council June 13th,2018

Next Steps

Return to Council within a year with:

- **Building code** to implement mandatory seismic retrofit program:
 - URM Class 1: Critical buildings to immediate occupancy in 10 years
 - URM Class 2: Schools and community centers(Except On-profits) to damage control in 20 years
 - Directs City Office of Management and Finance and the Budget office to develop within one year a financial plan to retrofit all City owned Class 1 and Class2 URM buildings

For **URM Class 3 and 4** buildings (85% of URM building stock) :

- Directs city staff to convene a committee of URM owners, tenants, subject matter experts and members of the finance, insurance and actuarial sectors to develop financial options and pair them with standards and timelines for a mandatory retrofit program and report back to council within one year of the first meeting of the group.
- Directs Staff to convene a working group comprising of non-profits, including religious non-profits to develop standards, financial options and timelines for a mandatory retrofit program report back to council within one year

Placarding ordinance

- All Public Buildings to be Placarded By January 1, 2019
- All other Buildings Placarded by November 1, 2020
- ***Notify renters in the Rental application if a URM is not retrofitted to Collapse Prevention.*** (Information will drive the market to greater retrofits.)



URM Code Timeline

September 2018

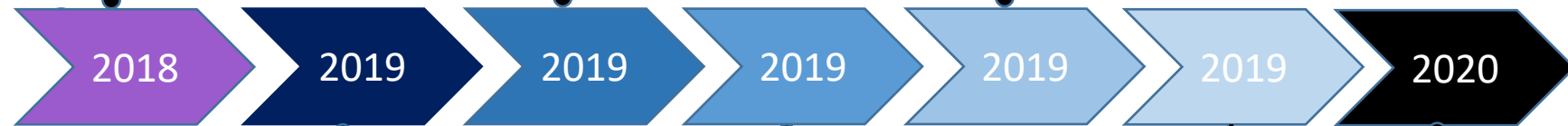
Council adopts Ordinances 189201, 189309, 189399, & 189479 requiring placarding, tenant notification, and amending Code Chapter 24.85

May 30, 2019

Federal judge issues preliminary finding that Placarding and Tenant Notifications Ordinance is illegal

October 2019

Council adopts Resolution 37455, appoints 27 members for the new URM Building Workgroup, and adopts the workgroup's bylaws



March 2019

URM building owners file lawsuit against City ordinance

October 2019

City Council passes Ordinance 189747 repealing the entire ordinance.

December 17, 2019

First URM Building Workgroup Meeting

October, 2020

Work Group Dissolved. URM Database removed from Public domain



Current Status

- Status Quo – ended up where we started
- Portland still operating under existing 1994/2004 rules regarding seismic retrofits
- Rest of the State has no uniform requirements for seismic retrofits
- Infact, it seems like we have moved backwards:
 - Database of URM Buildings in City of Portland was taken down and is not accessible to the Public
 - Provisions for nominal seismic retrofits in the International Existing Building Code (which is adopted as part of the State Building code) were repealed by Building Codes Division as part of the adoption of the OSSC.

Current Status

In the Meantime:

- Several jurisdictions in California have passed several regulations related to vulnerable building retrofits:
 - 1986 : Senate Bill 547 – Unreinforced Masonry Buildings
 - 1994: Senate Bill 1953 Requiring all hospitals to resist earthquakes without posing a threat of loss of life, and to receive seismic upgrading by 2030 so as to be operational after earthquakes, insofar as practical
 - Non Ductile Concrete Retrofit ordinances
 - Wood soft story retrofit ordinances
- City of Seattle has embarked on similar programs and has failed in similar attempts to mandate seismic upgrades for URM buildings twice.
- It is attempting to revive this campaign again.

Recommendations

It is time for Oregon to Act:

- Adopt legislation to mandate the strengthening of all unreinforced masonry bearing buildings including publicly-owned buildings. Voluntary strengthening has not been as effective (See California Example) .
- Because current economic incentives are typically not sufficient to create a market-driven willingness to retrofit, state and local governments should “encourage economic incentives, such as improved mortgage terms, reduced insurance rates, and positive tax benefits for upgrading structural and non-structural elements in buildings.
- Provide support to owners by providing financial assistance through Property tax Exemption, State Seismic tax Credit, State Historic tax Credit, A Capital pool to provide assistance or other support
- Enacting legislation to establish retrofit standards and mitigation programs for other types of vulnerable buildings such as soft-story apartments, tiltups and older concrete frame.
- This needs to be a partnership between State and local jurisdictions

THANK YOU !

QUESTIONS ?



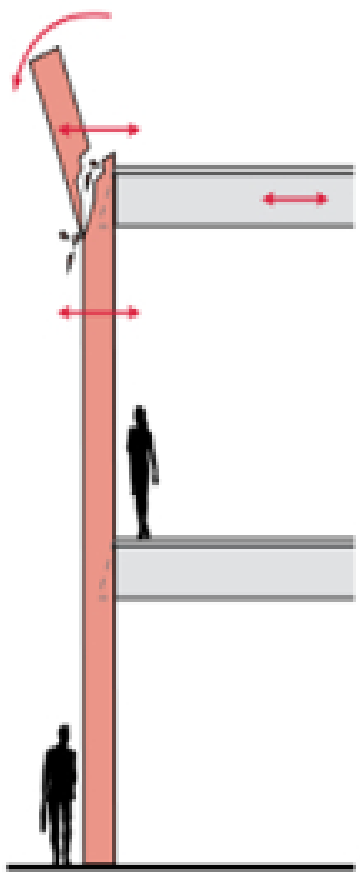


The hazard posed by URM in an earthquake, continues to be substantial to both the occupants of the building and Passerby



Parapets, Cornices, Chimneys and ornamentations are particularly vulnerable

Parapet breaks off (URM)



There is a Cost of Doing Nothing



Kiwi Disposals 611 Colombo St. Chch Before

There is a Cost of Doing Nothing



Kiwi Disposals 611 Colombo St. Chch

After Earthquake

There is a Cost of Doing Nothing



Charlie B's Backpackers' Hotel 268 Madras St. Christchurch URM building. Before Image.

There is a Cost of Doing Nothing



Charlie B's Backpackers' Hotel 268 Madras St. Christchurch URM building.

There is a Cost of Doing Nothing



132 Kilmore St. URM damaged in Sept Earthquake Before 2-22

There is a Cost of Doing Nothing



132 Kilmore St. URM damaged in Sept Earthquake After 2-22

Why Act Now?

- We need to act now to prevent scenes such as in Christchurch and Turkey
- URMs and other vulnerable building types house a variety of critical services & businesses in Cascadia
- Earthquake performance of vulnerable buildings is well-documented
- Not Just Life safety. It also for Resiliency of the community, response and recovery for our community.
- Oregon lags behind other neighbors
- If we don't act now we will have to pay many fold more in the future when the “Big One” strikes



There is a Cost of Doing Nothing



Stonehurst Hotel 241 Gloucester St. Chch Backpackers' Hotel Before Image

Before Earthquake

There is a Cost of Doing Nothing !



After Earthquake

There is a Cost of Doing Nothing



Sucklings 627 Colombo St. Chch Before

There is a Cost of Doing Nothing



Sucklings 627 Colombo St. Chch After