Mitigating in the Real World: Tackling URM\textemdash}s in Portland, Seattle, and Salt Lake City

Panelists:
- Jonna Papaefthimiou \textendash\ Portland Bureau of Emergency Management
- Nancy Devine \textendash\ Department of Construction and Inspections, City of Seattle
- Audrey Pierce \textendash\ Fix the Bricks, Salt Lake City Emergency Management

Moderators:
- Anna Lang, Zylient & Anne Hulsey, Stanford
Panel Discussion

• Framing the problem of URMs in each city

• Discussion Targets:
  1. Perception of Seismic Risk
  2. Communication of Risk to the Public & the Role of Media
  3. Mandatory vs. Voluntary Retrofits
  4. Financing Options

• Lessons Learned & Concluding Remarks
Portland, Oregon URM Retrofit Policy

Jonna Papaeftimiou, AICP
Planning, Policy, and Communications Manager
Portland Bureau of Emergency Management
Buildings and Seismic Risk

- About **1,650 URM**s in Portland, **not** counting single-family homes.
- **9%** of commercial building stock
- **7,200** residential units
- Average age is **90 years**
- **567** are designated historic
Buildings and Seismic Risk

URM Buildings by Height

- 2 Stories: 25%
- 3 Stories: 12%
- 4+ Stories: 7%
- 1 Story: 56%

URM Buildings by Use

- Commercial: 1415
- Multifamily: 248
- Schools and community centers: 54
- Other: 14
Current Seismic Codes

• Parapets must be braced and roof tied to walls when > 50% of roof replaced.

• Retrofits of URMs to ASCE 41 criteria for life safety required when:
  • Work meets $ trigger ($41-$54/ SF)
  • Occupancy load increases by > 149
  • > 33% of the building changes to higher hazard class
Current Seismic Codes

• Policy has had limited success:
  • 9% partially upgraded
  • 5% fully upgraded
Policy development

- Tohoku quake
- *New Yorker* article
- Public broadcasting series
- Coverage in local papers

setting the stage
Policy Development

- **Three committees:**
  - Building Performance
  - Finance
  - Policy

- **Recommendations to City Council June 2018**
### Policy Development

<table>
<thead>
<tr>
<th>Proposed Standard</th>
<th>Building Types</th>
<th>Timeline</th>
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<tbody>
<tr>
<td>Immediate Occupancy (ASCE performance standard)</td>
<td>Critical Buildings + essential facilities</td>
<td>10 years</td>
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<tr>
<td>Damage Control (ASCE)</td>
<td>Schools, community centers</td>
<td>10 years – parapets</td>
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<td>20 years – full retrofit</td>
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<tr>
<td>Collapse Risk Reduction (prescriptive standard:</td>
<td>All URM buildings not in 1,2, or 4</td>
<td>10 years – parapets</td>
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<tr>
<td>brace parapets; wall to roof attachments; roof</td>
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<td>15 years – wall to floor</td>
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<td>sheathing)</td>
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<tr>
<td>Parapet bracing only</td>
<td>1 and 2-story buildings with 0-10 occupants.</td>
<td>10 years</td>
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Policy Outcomes

• Authorizing legislation for tax exemption to offset costs (not yet implemented)
• State retrofit grant program, priority to non-profits (never got out of committee)
Policy Outcomes

- Concepts but no cash for local financial supports:
  - Shared appreciation mortgage
  - Subsidized loans
  - Interest-rate buy-downs
Policy Outcomes

• Required tenant notification and building placarding. Implemented - got sued, lost an injunction, withdrew the ordinance.

• Supported required retrofits to public safety buildings, schools, community centers – not implemented.

• Created a new committee – now struggling.
Policy Outcomes

Portland’s Old Brick Buildings Will Kill You
But as the city ponders new safety standards, a group of property owners is fighting back—and winning.
by Rick Vandervert

IN A CITY almost romantically underprepared for seismic doom, 1,600 buildings manage to stand out as especially dicey.

WILLAMETTE WEEK

When the Big One Hits, Hundreds of Portland’s Buildings Could Crumble. Is It Fair to Make Property Owners Prepare?
The story of earthquake preparedness in Portland is a complicated saga of bureaucratic and political failures.

NW Examiner

"Digging deep, Shining a light"

Top-heavy seismic retrofit program may crush small owners

‘Mom and pop’ owners kept off committee advising major upgrades

By Allison Dyer

The city’s seismic upgrade program is losing steam. It was the finish line for a City Council hearing May 10 on proposed mandates on owners of multifamily apartment buildings.

Portland Bureau of Emergency Management, formed a ‘committee of experts’ to help advise the city on seismic upgrades. However, the agenda included only one owner of a small, lower-rent apartment building.

Portland property owners who couldn’t get a seat at the table. No “mom and pop” owners—those owning perhaps a single small apartment building—were included on the 13-member committee.

Margaret Mullany, who owned the Pullman Apartments, has been outspoken against the proposed seismic retrofit program.
Policy Outcomes

- Robust media coverage
- Increased public awareness of URM risks
- Public protests against policy
Policy Outcomes

- Equity is an issue; consider history of US cities.
- Engage a broad group of stakeholders.
- Keep talking about public safety.
Policy Outcomes

• Funding is the key

• Prioritize strategically:
  • Schools
  • Subsidized housing
  • Community-serving non-profits
  • Historic structures
  • Public buildings
Portland, Oregon URM Retrofit Policy

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Seattle Department of
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Material in this SDCI presentation to the URM Seismic Resilience Symposium is in the public domain. Information from this presentation may be used and distributed with attribution credit to Seattle Department of Construction and Inspections.
Why Retrofit URMs?

• **Public Safety:** Brick Buildings with URM bearing walls building type most likely to collapse in an earthquake

• **Historic Character:** Preserve historic character of neighborhoods

• **Lessen Damage:** Retrofits help lessen earthquake damage; businesses reopen faster following a smaller earthquake

• **Resilience:** Retrofitting URMs long-standing city interest; part of city’s emergency and resilience planning
Timeline of URM Policy Work in Seattle

- Ordinance 102962: Maintenance Standards (including seismic) for Pioneer Square
- Ordinance 107323: Repeal of seismic retrofit standards
- Cynthia Hoover - ATC 20 Study for Seattle DCLU
- Reid Middleton - URM Seismic Hazards Report prepared for Seattle DPD
- Formation of URM Policy Committee
- URM Policy Committee - Release of Final Recommendations
- Seismic Retrofit Ordinance is passed
- All HIGH risk buildings must be seismically retrofitted
- Ordinance 103125: Update of Standards requiring all masonry to be reinforced
- EQE International - Seismic Hazard Program Summary Report prepared for City of Seattle
- Formation of URM Technical Committee
- URM Technical Committee - Final Report and Proposed Retrofit Standard
- DPD URM Building Survey
- All MEDIUM risk buildings must be seismically retrofitted
- All CRITICAL risk buildings must be seismically retrofitted

*Timeline events reference the department name at the time of the event:
Prior to 1999: Department of Construction and Land Use (DCLU)
1999-2003: Department of Design, Construction and Land Use
2003-2016: Department of Planning and Development (DPD)
2016-Present: Department of Construction and Inspections (SDCI)
Previous Mandatory URM Policy

• Dangerous Buildings Ordinance
  • Response to 1965 Puget Sound Earthquake

• Improv life safety - regulations had unintended consequences
  • 1974 City imposed retrofit standards for Pioneer Square
  • Rescinded 1978 due to the cost of retrofits and building demolition and abandonment
Current City Policy

Seismic upgrades triggered when doing work requiring permit

• Parapets required to be braced with any permit
• Seismic report and retrofit required when doing “substantial alteration”
  • Typical triggers for substantial alteration = increase in occupant load; extending economic life of building; re-occupancy of vacant building
Proactive Policy

*Concept:* URM Policy Development

- Reduce risk of damage using modern, proven, engineering solutions
- Lessen post-earthquake repair
- Retrofit costs less than damage repair
- Reduce vacant and damaged buildings post-EQ
- Help owners perform retrofit

*Outcome:* Life-safety and community benefits realized prior to emergency increasing likelihood of saving lives and supporting economic recovery
Policy Development

• Proposed Technical Seismic Retrofit Standard created
• URM Retrofit Policy Committee
• Outreach to community groups and benefit-cost analysis
• SDCI validated inventory, removed non-URM buildings, added additional buildings
• Policy Committee wrote final report
• National Development Council studied financial options
• Making good progress on program development – direction expected soon from mayor and council
URM Inventory Characteristics

- Government-funded affordable housing
- Low-cost market-rate housing
- Locally-owned, small businesses
- Historically under-represented communities

Challenges
- Displacement
- Communication in world languages
- Mitigation and financial tools
- Make city process accessible to all

March 5-8, 2019
EERI 2019 Annual Meeting
Vancouver, BC, Canada
URM RETROFIT STANDARDS

“Bolts Plus” proposed minimum retrofit standard for URM to improve performance in an earthquake

• Based on what’s been seen to fail in past events
• Might help building survive, not intended to preserve building
• Intended to improve building performance, save lives, reduce injuries

Full ASCE 41 seismic retrofit recommended and encouraged. May be required for certain building occupancies.
Risk Categories and Timelines

- Higher consequences of collapse = higher risk category
- Higher probability of collapse = higher risk category

- Critical-risk (Less than 100 buildings)
  - Schools
  - Critical facilities
  - 7 years to comply

- High-risk (Less than 200 buildings)
  - 4 or more stories and poor soil
  - Building with more than 100 occupants in one space
  - 10 years to comply

- Medium risk
  - All other URM buildings
  - 13 years to comply

Number of Buildings in Each Risk Category

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<tr>
<th>Risk Category</th>
<th>Number of Buildings</th>
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Non-governmental Facilitator

• Policy Committee recommends permit facilitation
• Non-profit group could be owners’ first stop
  • Experts at navigating the steps of the permit process
  • Experts at available financing models
  • Provide culturally sensitive information
  • Ability to maintain list of engineers and contractors
Transfer of Development Potential

- Two Seattle neighborhood up-zones include TDR/TDP with some URMs sending sites for TDR/TDP

- Challenges:
  - Rebuilding potential after event
  - Program management
  - Where to allow denser development
NDC Report Findings

• Retrofit estimated cost $32 to $95 per square foot – $1.3B City-wide
• Retrofit doesn’t add economic value
• No expected insurance premium decrease
• Tax incentives work for some (not non-profits)
• Strategy needs to include public, private, and non-profit sources
• Modifications needed to local, state, federal incentives
• TDR programs need tweaking
• [http://www.seattle.gov/Documents/Departments/SDCI/Codes/ChangesToCodes/UnreinforcedMasonry/FundingURM Retrofit.pdf](http://www.seattle.gov/Documents/Departments/SDCI/Codes/ChangesToCodes/UnreinforcedMasonry/FundingURM Retrofit.pdf)
URMs in Washington State—2019

Department of Commerce
URMs in Washington State—2019

Study Parameters

• Utilized existing databases of buildings
  • WISAARD database from the State Department of Archeology and Historic Preservation
  • City of Seattle Confirmed URM List
  • County assessors' records

• Created database and online map tool

• Developed process for verification and validation

• Final Report on Department of Commerce website
Results of Statewide Inventory

• About 4500 URMs

• Identified
  • Building by building verification
  • City of Seattle list
  • Port Townsend validated during inventory

• Suspected
  • Characteristics from data suggest URM
  • Need for extensive verification
Salt Lake City

Audrey Pierce
Emergency Manager for Salt Lake City
Fix the Bricks Program Manager
Program purpose

• Prevent collapse to reduce number of death and injuries during the expected 7.0 earthquake by seismically retrofitting unreinforced masonry homes in the salt lake city boundaries

• Achieved by completing top life safety priority details = roof to wall attachments and chimney bracing
Salt Lake City
Unreinforced Masonry Buildings:
31,892 residential URM
462 multi-unit URM

Building Damage Estimate for 7.0 Earthquake

Salt Lake City Boundary
Fault Lines
## Human Impacts

### Casualties

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<tr>
<td>Life Threatening Injuries</td>
<td>7,400 - 9,300</td>
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<tr>
<td>Fatalities</td>
<td>2,000 - 2,500</td>
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### Shelter Needs

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<tr>
<td>Displaced Households</td>
<td>84,400</td>
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<tr>
<td>Individuals Seeking Temporary Shelter</td>
<td>52,700</td>
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How did it start

- Steering committee
- Educational outreach
- Idea pitched from tornado shelter
- Mayors press conference
- Program implementation
Pre-Disaster Mitigation Grant

- **1st year (2016)**
  - $600,000
  - 50 houses

- **2nd Year (2017)**
  - 2 Million
  - 100 houses plus alternates

- **3rd Year (2018)**
  - 4 Million
  - 230 houses plus alternates

- **4th Year (2019)**
  - Pending but will be similar to 3rd year
Fix the Bricks Timeline

SLC App Pre-award cost
- Homeowner Applications + Initial Review- Add to queue, Review against county data, Site visit

SLC App to State
- Previous Year’s construction

State App to FEMA
- Complete grant requirements- House drawings, Historical/BCA, Mapping (historical & flood), Budget

FEMA Award to State
- Homeowner Meetings and Bid requests

State award to the City
- Budget Openings and Cost Center
- Bid Approvals
- Contract Signing including W-9, PEID and Income verification

Possible award modifications to be able to spend remaining funding
- Continued Construction
- Homeowner Reimbursement

City Reimbursement from State and End of Period of Performance
- State Closeout

Construction

FEMA
State
Salt Lake City
Homeowners & SLC
Homeowners
Contractors
Contractor, Homeowner, SLC
Challenges

• Funding and capabilities
• Timelines
• Administration priorities
• Expansion
Panel Discussion
Perception of Seismic Risk
Communication of Risk to the Public & the Role of Media
Mandatory vs. Voluntary Retrofits
Financing Options
Lessons Learned & Concluding Remarks