In the chat, please share your name, organization, your role or title, and something you enjoyed over the most recent holidays.
Outline

Brief refresher from previous meetings
Non-ductile concrete buildings
  • Characteristics
  • Retrofitting

Overview of Southern California ordinances
What buildings to include in (or exempt from) SF’s program
What level of retrofit to require
Refresher from previous meetings
Tilt-up buildings (focus of previous meeting)

* We use “tilt-up” in this presentation as shorthand for the engineering term **Rigid-Wall Flexible-Diaphragm** buildings.
Non-ductile concrete buildings (focus for today)
Overview of Feedback from the previous meeting: Tilt-ups

<table>
<thead>
<tr>
<th>Should some tilt-up buildings be retrofitted to a higher standard?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group leaned toward one single retrofit standard, because a building's use can change over time. But the group was not universally against having different retrofit standards or scopes. Important uses identified:</td>
</tr>
<tr>
<td>• Buildings important to disaster response and recovery</td>
</tr>
<tr>
<td>• Grocery stores and food banks</td>
</tr>
<tr>
<td>• Infrastructure (cell towers, BART, ambulance)</td>
</tr>
<tr>
<td>• Medical (pharmacies and medical clinics)</td>
</tr>
<tr>
<td>• Buildings with high occupancy</td>
</tr>
</tbody>
</table>
Refresher: **Building Information Reporting**

1. **Ordinance enacted**
   - Submit form
     - Exempt buildings are finished. Non-exempt buildings are assigned to a Schedule Category.

2. Building information reporting
   - Submit seismic evaluation or “intent to retrofit”
     - Buildings for which evaluation demonstrates compliance are finished (pending review and approval by DBI). Other buildings proceed to retrofit.

3. Seismic evaluation
   - Permit application for retrofit

4. Retrofit design
   - Complete retrofit construction
Refresher: **Building Information Reporting**

**Objectives:**
- Determine "In" vs. Exempt
- Assign to Schedule Categories
- Improve the City's database
- Begin engagement with an engineer

**About the form:**
- Requires an engineer (PE or SE) to complete.
- Engineering cost to complete the form is on the order of $275-$2,500 (tilt-up), $475-$3,200 (concrete).
- No calculations are required.
Overview of Feedback from the previous meeting: Building Information Reporting Form

<table>
<thead>
<tr>
<th>What is a reasonable timeline for owners to complete?</th>
<th>How should we determine schedule categories?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3 years</td>
<td>Group gravitated towards strategies connected to risk rather than randomized:</td>
</tr>
<tr>
<td></td>
<td>Ideas raised:</td>
</tr>
<tr>
<td></td>
<td>• By soil class</td>
</tr>
<tr>
<td></td>
<td>• By life safety</td>
</tr>
<tr>
<td></td>
<td>• By year of construction</td>
</tr>
<tr>
<td></td>
<td>• By occupancy</td>
</tr>
</tbody>
</table>
What we are looking for your feedback on today

<table>
<thead>
<tr>
<th></th>
<th>Tilt-up</th>
<th>Non-Ductile Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>What buildings are “in” vs exempt?</td>
<td></td>
<td>★</td>
</tr>
<tr>
<td>What level of retrofit?</td>
<td></td>
<td>★</td>
</tr>
<tr>
<td>What is the timeline?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How will we determine schedule categories?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How will we incentivize action?</td>
<td></td>
<td>★</td>
</tr>
</tbody>
</table>
Characteristics of non-ductile concrete Buildings
<table>
<thead>
<tr>
<th>Building types</th>
<th><strong>Tilt-up (RWFD)</strong></th>
<th><strong>Non-ductile concrete</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Key vulnerabilities</td>
<td>Roof-to-wall connections</td>
<td>Numerous: Column shear, punching shear, story mechanism, wall shear…</td>
</tr>
<tr>
<td>Average cost to retrofit</td>
<td>$ Tens per sf</td>
<td>$ Hundreds per sf</td>
</tr>
<tr>
<td>Access to do retrofit work</td>
<td>Typically good</td>
<td>Typically poor</td>
</tr>
<tr>
<td>Retrofit while occupied</td>
<td>Typically yes</td>
<td>Typically no</td>
</tr>
<tr>
<td>Typical uses in SF</td>
<td>Industrial, retail, grocery</td>
<td>Residential, office, public</td>
</tr>
<tr>
<td>Number in SF</td>
<td>700?</td>
<td>4000?</td>
</tr>
<tr>
<td>Average floor area</td>
<td>50,000 sf</td>
<td></td>
</tr>
<tr>
<td>Ease to identify</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Variability of performance</td>
<td>Moderate</td>
<td>High</td>
</tr>
</tbody>
</table>
Ductile concrete structures

Flexural yielding of reinforcement in tension and compression

Source: Professor Jose Restrepo UCSD
Ductile: Flexure-governed wall
Non-ductile concrete structures

Sudden strength loss
Concentration in one or two stories
E-Defense shake table, Japan
Non-ductile: Column shear

Western Honshu Japan, 2007
Non-ductile: Weak-pier story mechanism
Non-ductile: Weak-story moment frame
Non-ductile: Slab punching shear
Christchurch, 2010-2011

- NZS4203 (1976) 2500-year motion
- Mean of 4 CBD records
- EQ1:CBGS (NS64E)
- EQ2:CHHC (S89W)
- EQ3:REHS (S88E)
- EQ4:CCCC (N89W)

Spectra Acceleration / \( S_a (g \text{ ms}^{-2}) \)

Period (sec)
Retrofitting Concrete Buildings
Column wrapping
Elliptical column jackets

UC Berkeley Eshleman Hall

Rutherford + Chekene
Strengthening concrete walls
Challenges of retrofitting concrete buildings

- Often requires vacating the building.
- Construction can be loud and dusty (drilling for rebar dowels, roughening existing concrete).
- Adding or thickening concrete walls often affects architectural layout, floor area, windows, or exterior appearance.
- Work area is sometimes throughout the building (e.g. strengthening all columns).
Clarifying Questions?

5 minutes
Southern California ordinances
Southern California Non-Ductile Concrete Ordinances

2015 LOS ANGELES

ARTICLE 1, DIVISION 95
MANDATORY EARTHQUAKE HAZARD REDUCTION IN EXISTING NON-DUCTILE CONCRETE BUILDINGS

SEC. 95.9501. PURPOSE.
The purpose of this Article is to promote the public welfare and safety by reducing the risk of death or injury that may result from the effects of earthquakes on existing concrete buildings. Non-ductile concrete buildings are typically vulnerable in seismic events due to deficiencies in the lateral force resisting system (beams, columns and joints) that lead to an increase in shear and gravity loads when the building is subjected to earthquake-induced lateral displacements. This Article establishes minimum standards to mitigate hazards from these structural deficiencies. Adherence to these minimum standards will improve the performance of these buildings during earthquakes and reduce, but not necessarily prevent, the loss of life, injury or earthquake-related damage. Effective July 1, 1977.

SEC. 95.9502. SCOPE.
The provisions of this Article shall apply to any existing concrete building built pursuant to a permit application for a new building that was submitted before January 1, 1977, or, if no permit can be located, the structure is determined by the Department to have been built under building code standards enacted before January 1, 1977.

SEC. 95.9503. DEFINITIONS.
The following words and phrases, whenever used in this Article, shall be construed as defined in this Section. Words and phrases not defined here shall be construed as defined in Division 2 of the Code.

2017 SANTA MONICA

Ductile Concrete Buildings

8.05.010 Purpose.
The purpose of this Article is to promote the public welfare and safety by reducing the risk of death or injury that may result from the effects of earthquakes on existing concrete buildings. Ductile concrete buildings are typically vulnerable in seismic events due to deficiencies in the lateral force resisting system (beams, columns and joints) that lead to an increase in shear and gravity loads when the building is subjected to earthquake-induced lateral displacements. This Article establishes minimum standards to mitigate hazards from these structural deficiencies. Adherence to these minimum standards will improve the performance of these buildings during earthquakes and reduce, but not necessarily prevent, the loss of life, injury or earthquake-related damage.

2017 WEST HOLLYWOOD

AN ORDINANCE OF THE CITY OF WEST HOLLYWOOD ESTABLISHING SEISMIC STRENGTHENING REQUIREMENTS FOR TWO CATEGORIES OF EXISTING BUILDINGS IN THE CITY AND AMENDING TITLES 13 AND 9 OF THE WEST HOLLYWOOD MUNICIPAL CODE.

The City Council of the City of West Hollywood does hereby ordain as follows:

Section 1. A new Chapter 13.36 is added to Title 13 of the West Hollywood Municipal Code to read as follows:

Chapter 13.36 Mandatory Seismic Strengthening Provisions for Non-Ductile Concrete Structures.

13.36.010 Purpose.
The provisions of this Chapter are intended to promote the public welfare and safety by reducing the risk of death or injury that may result from the effects of earthquakes on existing concrete buildings. The provisions of this Chapter are intended to improve the performance of these buildings during earthquakes and reduce, but not necessarily prevent, the loss of life, injury or earthquake-related damage.

13.36.020 Scope.
The provisions of this Chapter shall apply to any existing concrete building determined by the Building Official to have been built under Building Code standards enacted before the 1976 Uniform Building Code with local amendments.

Exceptions: This Chapter shall not apply to the following structure types:
1. Concrete structures with flexible diaphragms.
2. Single story structures, unless the lateral system contains concrete moment frame elements.
3. Wood structures over concrete podium unless the podium contains a major Deficiency as specified in section 13.36.050.a.
5. Residential common interest developments as that term is defined in the West Hollywood Municipal Code Section 19.90.020, except

An owner of any building within the scope of this Chapter shall demonstrate
Targeted Buildings

- **LA**: Pre-1976 UBC w/ Concrete Gravity System
- **SM**: Pre-1976 UBC w/ Concrete Gravity System
- **WEHO**: Pre-1979 UBC w/ Concrete Lateral System w/ Following Exceptions:
  - Flexible Diaphragms
  - Single Story Concrete Shear Wall Structures
  - Concrete Podium Unless they Contain “Major Deficiencies”
  - Concrete Encased Steel Structures
  - Condominiums

EERI / PEER Historic Overview Presentation by Jack Moehle, UC Berkeley
Mixed Systems

**Generally:** If building is flagged. Full building needs evaluation or retrofit

**LA and SM:** Case-by-case base clarifications

**WEHO:** Building may be excluded if NDC element shear capacity is less than 10% of story shear.
Evaluation / Retrofit Criteria

Los Angeles:
- ASCE 7: 75% Base Shear w/ 100% Drift
- ASCE 41: BPOE Structural Criteria w/ Minimum 75% ASCE 7 Hazard

Santa Monica:
- ASCE 7: 75% Base Shear w/ 100% Drift
- ASCE 41: BPOE Structural Criteria

West Hollywood:
- ASCE 41: Similar BPOE Structural Criteria

<table>
<thead>
<tr>
<th>Table C: Seismic Performance Requirements by Risk Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Category</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>I &amp; II</td>
</tr>
<tr>
<td>III &amp; IV</td>
</tr>
</tbody>
</table>
### Evaluation / Retrofit Criteria

<table>
<thead>
<tr>
<th>PERFORMANCE LEVEL</th>
<th>FULLY FUNCTIONAL</th>
<th>IMMEDIATE OCCUPANCY</th>
<th>LIFE SAFETY</th>
<th>COLLAPSE PREVENTION</th>
<th>COLLAPSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARTHQUAKE HAZARD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSE-1E (FREQUENT)</td>
<td>BSE-1N</td>
<td>BSE-2E</td>
<td>BSE-2N (VERY RARE)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- (LA) RCI/II
- (WE) RCI/II
- (N) RCI/II
### Evaluation / Retrofit Criteria

<table>
<thead>
<tr>
<th>PERFORMANCE LEVEL</th>
<th>FULLY FUNCTIONAL</th>
<th>IMMEDIATE OCCUPANCY</th>
<th>LIFE SAFETY</th>
<th>COLLAPSE PREVENTION</th>
<th>COLLAPSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARTHQUAKE HAZARD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSE-1E (FREQUENT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSE-1N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSE-2E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSE-2N (VERY RARE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- BSE-1E: (FREQUENT)
- BSE-1N
- BSE-2E
- BSE-2N (VERY RARE)

- (LA) RCIV
- (WEHO) RCIV
- (N) RCIV
ASCE 41-13 Approach

TIER 3 Non-Linear Analysis (MONTHS)
- Non-Linear Dynamic Procedure (Time History)
- Non-Linear Static Procedure (Push-Over)

TIER 2 & TIER 3 Linear Analysis (WEEKS)
- Linear Dynamic Procedure (Response Spectra)
- Linear Static Procedure (Hand Calculations)

TIER 1 Checklist (DAYS)
- Check List Evaluation (Quick Hand Checks)

ANALYSIS EFFORT

HIGH

TYPICAL RETROFIT COST

LOW
Compliance Paths

**Generally:**
- Previous Retrofits Must be Full Retrofits by Approved Standard or Previous Ordinance

**Los Angeles:**
- ASCE 41 Tier 3
- ASCE 41 Tier 2 and Benchmarking (Not Allowed)

**Santa Monica:**
- ASCE 41 Tier 3
- ASCE 41 Tier 2 and Benchmarking (Silent)

**West Hollywood:**
- ASCE 41 Tier 3
- ASCE 41 Tier 2 and Benchmarking

---

**Table 5.2-1: Retrofit Performance Objectives by Risk Category**

<table>
<thead>
<tr>
<th>Compliance Method</th>
<th>Risk Category</th>
<th>Hazard/Performance Level 1</th>
<th>Hazard/Performance Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1 &amp; Tier 2</td>
<td>I &amp; II</td>
<td>BSE-1E, S-3</td>
<td>Deemed to Comply</td>
</tr>
<tr>
<td></td>
<td>III &amp; IV</td>
<td>BSE-1E, S-2</td>
<td>Deemed to Comply</td>
</tr>
<tr>
<td>Tier 3</td>
<td>I &amp; II</td>
<td>BSE-1E, S-3</td>
<td>BSE-2E, S-5</td>
</tr>
<tr>
<td></td>
<td>III &amp; IV</td>
<td>BSE-1E, S-2</td>
<td>BSE-2E, S-5</td>
</tr>
</tbody>
</table>
Timeline

- **NOTIFICATION**
  - Jurisdiction
    - **Los Angeles**: 1,326 NDC Reported
    - **Santa Monica**: 66 NDC & 80 PN-SMF Reported
    - **West Hollywood**: 55 NDC & 31 PN-SMF & 60 Undefined Reported
- **SCREENING**
  - Submit "Evaluation" or "Screening" Report
    - **Los Angeles**: 3 Years From Notice to the Owner
    - **Santa Monica**: 3 Years From Notice to the Owner
    - **West Hollywood**: 3 Years From Notice to the Owner
- **RETROFIT DESIGN**
  - Submit Retrofit Plans
    - **Los Angeles**: 10 Years From Notice to the Owner
    - **Santa Monica**: 4 Yrs NDC & 12 Yrs PN-SMF From Notice to the Owner
    - **West Hollywood**: 10 Yrs Phase 1 & 20 Yrs Phase 2 From Notice to the Owner
- **RETROFIT CONST.**
  - Obtain Building Permit
    - **Los Angeles**: N/A
    - **Santa Monica**: N/A
    - **West Hollywood**: 7 Yrs Phase 1 & 15 Yrs Phase 2 From Notice to the Owner
  - Complete Construction
    - **Los Angeles**: 25 Years From Notice to the Owner
    - **Santa Monica**: 10 Yrs NDC & 20 Yrs PN-SMF From Notice to the Owner
    - **West Hollywood**: 10 Yrs Phase 1 & 20 Yrs Phase 20 From Notice to the Owner
- **CLOSE OUT**
  - Total Time
    - **Los Angeles**: 25 Years for Total Retrofit
    - **Santa Monica**: 10 Years NDC 20 Years PN-SMF
    - **West Hollywood**: 10 Years Major Deficiencies 20 Years Full Retrofit
### Prioritization

#### SANTA MONICA

<table>
<thead>
<tr>
<th>Building Type Categories</th>
<th>Date Notice Sent</th>
<th>Quantity (Approx.)</th>
<th>Compliance Date - Evaluation Report Due</th>
<th>Compliance Date - Plans Submittal</th>
<th>Compliance Date - Retrofit Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Tilt-Up*</td>
<td>August 14, 2017</td>
<td>30</td>
<td>December 2017</td>
<td>May 2018</td>
<td>August 2020</td>
</tr>
<tr>
<td>URM*</td>
<td>August 28, 2017</td>
<td>100</td>
<td>November 2017</td>
<td>February 2018</td>
<td>August 2019</td>
</tr>
<tr>
<td>Soft Story - &gt;2 Stories and &lt; 16 units</td>
<td>Sept 25, 2017</td>
<td>400</td>
<td>September 2021</td>
<td>September 2022</td>
<td>September 2025</td>
</tr>
<tr>
<td>Soft Story - 16 or more units</td>
<td>October 23, 2017</td>
<td>150</td>
<td>October 2021</td>
<td>October 2022</td>
<td>October 2025</td>
</tr>
<tr>
<td>Non-Ductile Concrete*</td>
<td>October 23, 2017</td>
<td>70</td>
<td>October 2020</td>
<td>April 2022</td>
<td>October 2027</td>
</tr>
<tr>
<td>Steel Moment Frame*</td>
<td>October 23, 2017</td>
<td>80</td>
<td>October 2020</td>
<td>October 2029</td>
<td>October 2037</td>
</tr>
<tr>
<td>Soft Story - 2 Stories, 7 to 15 Units</td>
<td>November 27, 2017</td>
<td>350</td>
<td>November 2021</td>
<td>November 2022</td>
<td>November 2025</td>
</tr>
<tr>
<td>Soft Story - 2 Stories, &lt; 7 Units</td>
<td>February 19, 2018</td>
<td>350</td>
<td>February 2022</td>
<td>February 2023</td>
<td>February 2026</td>
</tr>
<tr>
<td></td>
<td>May 7, 2018</td>
<td>200</td>
<td>May 2022</td>
<td>May 2023</td>
<td>May 2026</td>
</tr>
<tr>
<td></td>
<td>July 30, 2018</td>
<td>250</td>
<td>July 2022</td>
<td>July 2023</td>
<td>July 2026</td>
</tr>
</tbody>
</table>

*Projects with a pending application as of March 13, 2020, or submitted between March 13, 2020 and the expiration of COVID-19 emergency are entitled to a two-year extension to all applicable compliance dates.

#### WEST HOLLYWOOD

### Prioritization Designation

<table>
<thead>
<tr>
<th>Priority</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority I.</td>
<td>Buildings with 8 or more stories</td>
</tr>
<tr>
<td>Priority II.</td>
<td>Buildings with 3 to 7 stories</td>
</tr>
<tr>
<td>Priority III.</td>
<td>Buildings with 2 or less Stories</td>
</tr>
</tbody>
</table>

**NOTE:** LOS ANGELES DOES NOT HAVE A PRIORITY TABLE/SCHEDULE
Evaluation Reports

Los Angeles:
- Confirm Building is In Scope

Santa Monica:
- Confirm Building is In Scope
- or Evaluate Building ok As-Is

West Hollywood:
- Confirm Building is In Scope
- Define Retrofit Scope
Peer Review and/or External Review

- **Los Angeles**
  - All Buildings Internally Reviewed
  - Peer Review Non-Linear Analysis

- **Santa Monica**
  - All Buildings Externally Reviewed
  - Peer Review Requirements Not Clear

- **WEHO**
  - All Buildings Externally Reviewed
  - Peer Review Requirements For Certain Triggers:
    - Non-Linear
    - Alternate Design Criteria
    - Advanced Systems
    - Pounding
    - Etc.
Los Angeles Compliance Status (As of 6/1/22)
Other Efforts

- **San Diego** – SEAOSD Conducted Survey
- **Long Beach** – Currently Conducting Survey
- **Torrance** – Currently Conducting Survey and Developing Draft NDC Ordinance
Questions about Southern California ordinances?

10 minutes
Break

5 minutes
Retrofit ordinances
Two key points for a retrofit ordinance

• What buildings must comply with the program?
• What retrofit level?
Concrete buildings in the program
Concrete buildings included in the program (draft)

- Retrofit or show compliant
- Exempt if: no concrete columns, no discontinuous wall, no perimeter line with less than 40% wall

Year of original construction:
- Older: 1997 UBC
- Newer: 1997 UBC

Stories:
- 1
- 2
- 3

(taller) (older) (newer)
Concrete buildings included in the program (draft)

Concrete buildings included in Los Angeles program

- Retrofit or show compliant
- Exempt

Exempt if: no concrete columns, no discontinuous wall, no perimeter line with less than 40% wall
From Concrete database (work in progress)

Buildings in the Concrete Database by Height and Use Type

- Exempt
- Some exempt
- Retrofit or show compliant

Number of Stories

- Residential
- Non-residential

Buildings in this sample

1 2 3 4 5 6 7 8+ Missing Info
From Concrete database (work in progress)

Floor area in the Concrete Database by Height and Use Type

- Exempt
- Some exempt
- Retrofit or show compliant

<table>
<thead>
<tr>
<th>Number of Stories</th>
<th>Exempt</th>
<th>Some exempt</th>
<th>Retrofit or show compliant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5%</td>
<td>10%</td>
<td>85%</td>
</tr>
<tr>
<td>2</td>
<td>15%</td>
<td>20%</td>
<td>65%</td>
</tr>
<tr>
<td>3</td>
<td>20%</td>
<td>30%</td>
<td>50%</td>
</tr>
<tr>
<td>4</td>
<td>25%</td>
<td>40%</td>
<td>40%</td>
</tr>
<tr>
<td>5</td>
<td>30%</td>
<td>50%</td>
<td>30%</td>
</tr>
<tr>
<td>6</td>
<td>35%</td>
<td>60%</td>
<td>25%</td>
</tr>
<tr>
<td>7</td>
<td>40%</td>
<td>70%</td>
<td>20%</td>
</tr>
<tr>
<td>8+</td>
<td>45%</td>
<td>80%</td>
<td>15%</td>
</tr>
</tbody>
</table>

- Residential
- Non-residential
Reasons to include buildings up to 1997 UBC

• Consistency with the “Benchmark Year” in ASCE 41. Prior codes did not adequately address “gravity” framing.
• Post 1980 buildings collapsed in Northridge and New Zealand.
• Not that many added buildings in SF.
From Concrete database (work in progress)

Buildings in the Concrete Database by Year of Construction (greater than 1 story)

- Retrofit or show compliant
- Exempt

Legend:
- Use not specified
- Residential
- Non-residential

Year of Construction:
- Pre 1910
- 1910-1919
- 1920-1929
- 1930-1939
- 1940-1949
- 1950-1959
- 1960-1969
- 1970-1979
- 1980-1992
- Post 1999
- Year not specified
From Concrete database (work in progress)

Floor area in the Concrete Database by Year of Construction (greater than 1 story)

- Retrofit or show compliant
- Use not specified
- Residential
- Non-residential

Square footage in this sample

Year of Construction

- Pre 1910
- 1910-1919
- 1920-1929
- 1930-1939
- 1940-1949
- 1950-1959
- 1960-1969
- 1970-1979
- 1980-1992
- 1992-1999
- Post 1999

Legend:
- Use not specified
- Residential
- Non-residential

Exempt
Discussion
Discussion Questions

What questions or reactions do you have about the City’s draft proposal?

What are we missing with this proposal?

What are the potential blind spots?
Concrete retrofit scope and level
### Example criteria for compliance

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Relative level</th>
<th>Exemption from future ordinances* <em>(Example of potential incentive)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minimum requirement:</strong> Collapse Prevention in 475-year earthquake motions</td>
<td>Approximately <strong>70%</strong> of new building standard</td>
<td>15 years</td>
</tr>
<tr>
<td><strong>Voluntary higher standard:</strong> Collapse Prevention at the BSE-2E level (BSE-2E = 975-year motions in San Francisco.)</td>
<td>Approximately <strong>90%</strong> of new building standard</td>
<td>35 years</td>
</tr>
</tbody>
</table>

* Measured from the operative date of the new SFEBBC chapter created by the ordinance.
# Exemption from future ordinances—prior examples

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Exemption from future ordinances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soft story</td>
<td></td>
</tr>
<tr>
<td>Retrofit structure or show compliant.</td>
<td>15 years</td>
</tr>
<tr>
<td>Private school</td>
<td></td>
</tr>
<tr>
<td>Voluntary retrofit of structural and nonstructural components.</td>
<td>20 years</td>
</tr>
</tbody>
</table>
Discussion
Discussion Questions

What questions or reactions do you have about the City’s draft proposal?

What are we missing with this proposal?

What are the potential blind spots?
Discussion Question (time permitting)

What might incentivize a building owner to retrofit to a higher level (or sooner)?
Wrap Up & Next Steps
| Meeting 4  
February | Meeting 5  
April | Meeting 6  
June | Meeting 7  
August | Meeting 8  
October |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| **Non-ductile and Tilt-up:**  
• What is the timeline? | **Topic to be determined:**  
• (see next slide) | **Non-Ductile:**  
• Share updated program proposal | **Topic to be determined:**  
• (see next slide) | **Final Meeting:**  
• Finalize Recommendations to executive panel |
| **Tilt-up:**  
• Share updated program proposal | | **Non-ductile and Tilt-up:**  
• Share timeline proposal | | |
Follow-up survey: Help us have these important conversations

Let us know on which topics you can offer **resources, case studies** and **expertise**:

- Communications with building owners and tenants
- Financing information and resources for building owners
- Temporary tenant relocation
- Process streamlining (for example, permitting and design review)
- Labor and building trades
- Historic preservation requirements