Case Study: City of Berkeley Soft Story Program

Presented by: Dan Lambert, Project Manager

100th Anniversary Earthquake Conference
Commemorating the 1906 San Francisco Earthquake
Effective Local Government Programs in Earthquake Mitigation
Six steps to a soft story mitigation program

- Learning lessons from Unreinforced Masonry Building Program
- Creating an Inventory of Potentially Hazardous Soft Story Buildings
- Assessing the hazard
- Developing the program
- Implementing Phase 1
- Developing Phase 2
Learning lessons from URM Building Program

- Public outreach is crucial, but an earthquake helps
- Quality survey makes a difference
- Requiring engineering reports is important
- Case management is necessary
- Property information
Creating an Inventory

- Sidewalk survey
- Database
- Case files
Creating an Inventory: survey form

# OF STORIES 4  TALL STORY N
MIXED USE (Y/N) N  PARK’G LOWER LEVEL (Y/N) Y
PRIMARY USE P  2NDARY USE ___
TYPE BLDG FRAME WC2  BLDG SHAPE REG

SUSPECTED # RES UNITS 12  SIDES OBSERVED 3

CAUSE OF CONCERN:

OPEN ST. FRONT 1-SIDE ______ 2+ SIDES ________

OPEN PARK’G GAR. 1-SIDE X 2+ SIDES _______

PICTURE: #27 LOOKING UNDER BLDG AT REAR (SOUTH)
WALL FRONT (NORTH) WALL HAS CONSIDERABLE
LEAKAGE OF CONCRETE WALL. REAR WALL IS 100% OPEN

TYPE BUILDING FRAME
W - WOOD BUILDINGS
C1 - CONCRETE MOMENT FRAME
C2 - CONCRETE SHEAR WALL
C3 - CONCRETE W/URM
PC2 - PRE CAST CONC
RM - REINFORCED MASONRY
URM - UN-URM
T - UNCERTAIN/UNDEFINED

USE CODES
SAME AS 94 UBC

BLDG SHAPE
REGULAR- REG
IRREGULAR- IRR

C:\WIP\SYDATA1.FRM\May 30, 1996\REO
Creating an Inventory:

data sheet
Creating an Inventory:

- case files
- Survey and data entry forms
- Photographs
- And many more documents to come
Creating an Inventory
Assessing the hazard: Berkeley housing facts

- 46,875 housing units in Berkeley (2000 Census)
  - 45% - Single-family homes
  - 21% - small apartment buildings (two to four units)
  - 33% - larger apartment buildings (five or more units)

- Approximately 25,000 rental units

- 13,000 units may be made uninhabitable after a major earthquake on the northern segment of the Hayward fault
Assessing the hazard: The walk-about

- Project team
- Selection of 150 Sample properties from 400 buildings
- Detailed research on each building
- Development of four prototypes and survey forms
- Teams of licensed structural engineers and Cal engineering students (EERI)
- Sidewalk inspection of 150 buildings
- Interpretation of data
Assessing the hazard: Interpretation of data

- 400 buildings in Berkeley with 5 or more residential units
- 5,000 units
- Very vulnerable in an earthquake
Assessing the hazard: Interpretation of data

- 36% of the buildings sampled have residential units on the soft story ground floor.

- Units in 15% of the buildings recommended for retrofit estimated to need to be vacated during the work.

- Only 2% of the buildings would be expected to lose parking spaces as part of the recommended retrofit.
Assessing the hazard: Interpretation of data

**Soft Story Seismic Vulnerability by Building**

- Number of Buildings

<table>
<thead>
<tr>
<th>Vulnerability</th>
<th>Number of Buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe</td>
<td>67</td>
</tr>
<tr>
<td>Considerable</td>
<td>112</td>
</tr>
<tr>
<td>Moderate</td>
<td>193</td>
</tr>
<tr>
<td>Minor</td>
<td>19</td>
</tr>
</tbody>
</table>
Developing the program: Two-phase approach

- Educated community leaders about hazard
- Established mitigating earthquake hazards as major city goal
- Attempt to secure financial assistance for owners facing mandatory retrofit program failed

Developed concept of two-phase approach:
- Adopt Phase 1 program for individual building assessment
- Use information from Phase 1 to determine need and costs of retrofit for Phase 2
Developing the program:
Elements of Phase 1

- Adopt the list of soft story buildings as an inventory of potentially hazardous buildings
- Provide for appeals
- Adopt technical standards
- Require notification for residents and posting of warning signs
- Require an assessment by a qualified design professional within 2 years
Developing the program: Community Outreach

- Community meeting
- Meeting with representatives of Berkeley Property Owners Association & Black Property Owners Association
- Consultations with:
  - COB Seismic Technical Advisory Group
  - Earthquake Engineering Research Institute
  - COB Disaster Council
  - COB Rent Stabilization Board
  - COB Housing Advisory Commission
  - COB Planning Commission
- Public hearings
Developing the program:
Community Outreach

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A HARD LOOK AT
SOFT STORY BUILDINGS

Thursday, February 24, 2005
7:00–9:00 PM
North Berkeley Senior Center
1901 Hearst Avenue
Corner of MLK, Jr. Way
Contact: Dan Lambert
510-981-7406

Contact us for more information or a presentation to your organization:
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City of Berkeley, Building & Safety Division
2120 Milvia St, Berkeley, CA 94704

Community Forum on Reducing the Risk from
Earthquake Hazards for 5,000 Berkeley Apartments

Mayor Tom Bates invites you to join him at the community forum for:
- Steps you can take today to reduce the risks in your home
- Presentations and answers to your questions from a panel of local and national experts
- More findings of the risk assessment of Berkeley’s buildings
- Proposal for city program to address the problem
- Discussion and refreshments with other concerned citizens, city staff, and professional engineers.

Please refrain from wearing scented products to public meetings. To request a sign language interpreter for the meeting, please contact us with at least 5 working days’ notice to ensure availability. This location is wheelchair accessible.
Developing the program:
Phase 1 Ordinance

- Applies to identified buildings with 5 or more residential units
- Placed on Inventory of Potentially Hazardous Buildings
- 6 months from date of notice to appeal and for designation to become final
- When final, notice recorded & 30 days to provide tenant notification and post warning
Developing the program: Phase 1 Ordinance

- Engineering report due two years from notice date
- Report due date can be accelerated or extended under certain conditions
- Tenants required to cooperate & allow inspections
- 15 year exemption from new potentially hazardous designation
- Violations subject to administrative citation
Developing the program: Technical standards

2003 International Existing Building Code Chapter A4 provides:

- Standard designed to prevent a catastrophic collapse but not prevent all damage
- Most current & highly developed version of nationally recognized standard
- Standard set at less than the Uniform Building Code but still adequate for safety
- Structural checklist & prescriptive guidelines
Implementing Phase 1: Estimated costs

- **For owners:**
  - Engineering reports from $2,000 to $10,000
  - $554 fee for report review

- **For city:**
  - Fee for costs of review of engineering reports
  - $80,000 for administration and case management
Implementing Phase 1: Minimizing costs for owners

- Detailed guidelines and seminars for engineers prepared by consulting expert
- List of engineers attending seminars for owners
- Educational materials and workshops for owners
Implementing Phase 1: Roll-out

- Issuing 20 Notice and Orders per week
- When issued, building added to the City’s Inventory of Potentially Hazardous Buildings
- Additional notice sent at end of 6 month period and recorded with county
Developing Phase 2

- Continue to seek funding
- Identify other feasible incentives
- Outreach to community
- Determine elements & type of retrofit program
- Work with Rent Board on cost pass-through
- Adopt retrofit ordinance
Additional information

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Visit our web site:
http://www.ci.berkeley.ca.us/
buildingandsafety/SoftStory/default.html