Building Occupancy Resumption Program

Managing Risk in Earthquake Country

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presented by Zan Turner
Loma Prieta Earthquake 1989
Building Department Post-Earthquake Inspection Priorities

- Critical facilities
- Collapse hazards
- City owned buildings
City Post-disaster Conditions

After an earthquake or other major disaster, a local jurisdiction may suffer from:

- Damage or destruction of facilities
- Lack of access to records and materials
- Loss of personnel
- Failure of communication systems
Mutual Aid Agreements

The California Office of Emergency Services has agreements with these organizations to provide post-earthquake safety evaluation:

- Structural Engineers Association (SEAONC)
- American Society of Civil Engineers (ASCE)
- American Institute of Architects (AIA)
- CALBO (California Building Officials)
- Construction Inspectors Association (CIA)
Mutual Aid Limitations

Mutual aid inspectors are generally sent from other parts of California and may lack:

- Knowledge of local code requirements
- Familiarity with area building types
- Information about specific building conditions
- Awareness of local cultural situations
- Expertise in certain structural systems
- Experience with post-earthquake assessment
- Sufficient numbers to meet widespread needs
ATC 20

In 1989, the ATC 20 post-earthquake building inspection standard was released and a few area inspectors were trained in its procedures. ATC 20 was also used to assess building damage after other disasters including the World Trade Center.
ATC 20 Inspection

After Loma Prieta, local inspectors and Mutual Aid volunteers performed rapid safety assessments of buildings using the ATC 20 procedure, reporting their findings on this inspection form.
Buildings were inspected in accordance with ATC-20 procedures and posted with one of the following placards:

ATC 20 Placards
INSPECTED

LAWFUL OCCUPANCY PERMITTED

This structure has been inspected (as indicated below) and no apparent structural hazard has been found.

☐ Inspected Exterior Only

☐ Inspected Exterior and Interior

Date ________________________

Time ________________________

(Caution: Aftershocks since inspection may increase damage and risk.)

This facility was inspected under emergency conditions for:

__________________________________________________________

(Jurisdiction)

Inspector comments:

________________________________________________________________________

Inspector ID / Agency:

________________________________________________________________________

Facility Name and Address:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
RESTRICTED USE

Caution: This structure has been inspected and found to be damaged as described below:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Date ___________________________

Time ___________________________

(Caution: Aftershocks since inspection may increase damage and risk.)

Entry, occupancy and lawful use are restricted as indicated below:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

This facility was inspected under emergency conditions for:

________________________________________________________________________

(Jurisdiction)

Inspector ID / Agency

________________________________________________________________________

Facility Name and Address:

________________________________________________________________________
________________________________________________________________________

Do Not Remove, Alter or Cover this Placard until Authorized by Governing Authority
UNSAFE
DO NOT ENTER OR OCCUPY
(THIS PLACARD IS NOT A DEMOLITION ORDER)

This structure has been inspected, found to be seriously damaged and is unsafe to occupy, as described below:

Date __________________________
Time __________________________

This facility was inspected under emergency conditions for:

________________________________________
(Jurisdiction)

Do not enter, except as specifically authorized in writing by jurisdiction. Entry may result in death or injury.

Inspector ID / Agency

Facility Name and Address:
Reclassification Process

Buildings posted ‘Restricted’ or ‘Unsafe’:

- Hire engineer to prepare drawings
- Employ contractor for work
- Apply for building permit
- Complete damage repairs
- Obtain required construction inspections
- Submit engineer’s letter to building dept.
- Receive permission to reoccupy building
Reclassification Difficulties

- Reclassification process was slow
- Engineers were busy with other clients or with personal recovery
- Building department was overwhelmed

Average time to engage a structural engineer after the Loma Prieta quake was three weeks
Public/Private Partnership

SF Dept. of Building Inspection
Structural Engineers Association
Building Owners & Managers Assn.
American Institute of Architects
Building owners wanted engineers to certify whether or not buildings were safe to occupy.

Engineers refused to certify safe occupancy based solely on an ATC 20 Rapid Evaluation.
Search for Solutions

- Volunteer inspector approach was replaced with employment of paid engineers
- Life safety system and elevator inspectors were added for applicable buildings
- The program was expanded beyond commercial buildings to include residential properties
- SEAONC Disaster Emergency Services Committee was enlisted to help with submittal review
- Building dept. was committed to support program by deputizing engineers and supplying placards
Building Occupancy Resumption Program

Allows building owners to employ engineers to pre-certify private post-earthquake inspection of their buildings by qualified engineers based upon an approved written inspection plan.
BORP Procedures

- Evaluate building(s)
- Select inspection team
- Develop inspection plan
- Obtain program approval
- Update annually
Owner/Tenant Participation

- Building owner may initiate involvement
- Tenant may obtain owner approval
- Tenant may include requirement for participation in lease agreements
Building Evaluation

- Consider underlying soil conditions
- Assess building use and occupancy
- Determine age and type of construction
- Obtain construction/remodel drawings
- Employ engineers for inspection plan
Inspection Team

Team members: at least two for each position

- Engineer as lead structural inspector
- Architect for architectural details
- Life/safety system inspector, if applicable
- Elevator inspector, if applicable
Structural Inspector Requirements – SF BORP

- Current CA license as engineer or architect
- Relevant experience with building type/size
- ATC 20 proficiency and readiness
- BORP Inspection Plan familiarity
- Acknowledgement of DBI deputization
- Participation in DBI update seminars
Life Safety System & Elevator Inspectors

- Firm is familiar with the building’s equipment, installation, and operation
- Inspectors are authorized by the building owner
- Inspectors will report findings to the structural inspector
Inspector Authorization/Deputization Form

- Signifies agreement with BORP requirements
- Signed by each emergency inspector
- Accepted by building department
- Displayed for entry to restricted areas
Written Plan

- List of qualified inspectors
- Building description
- Emergency response information
- Inspection plan
- List and location of documents, equipment, and supplies
- Placement of accelerometers, if applicable
Building Description

- Age, number stories, sq. ft., materials
- Estimated current $ valuation (for FEMA)
- Number of main building entrances
- List of building uses (offices, apts., etc.)
- Description of systems – structural, life-safety, fire detection & suppression
- Description/location of falling hazards
- Location/disposition of hazardous material
Emergency Response Information

- Activation trigger
- Access procedures
- Location of equipment and supplies
- Location of Emergency Inspection Plan and on-site drawings
Detailed Inspection Instructions

- Where to look
- What to look for
- How to obtain access to inspection areas
- How to inspect specific structural and non-structural elements
- How to interpret damage
- How/what to inspect following aftershocks
Location of Inspection Supplies

- Emergency inspection plan
- Construction or as-built drawings
- Personal safety equipment
- Inspection equipment
- ATC-20 Detailed Evaluation forms
- Walkie-talkies or other communication
- Official red, yellow, and green placards
Inspection Plan

Simplicity is the key

Minimum standard: ATC 20 Detailed Evaluation

NOTES

⚠️ Check columns in sixth story at these locations.
⚠️ Check these locations for indication of pounding from adjacent building.
⚠️ Check metal curtain walls for any sign of distress.
Approval Process

Verify inspectors
Review plan
Clarify details
Approve plan
Certify building

SF DBI
SEAONC
BOMA
AIA

SEAONC Disaster Emergency Services Committee
BORP Subcommittee
This is to certify that the building at

**100 Barbary Coast**

San Francisco, California

has been accepted into the Department of Building Inspection

Building Occupancy Resumption Program

After declaration of an emergency following an earthquake or other major disaster, this building will be inspected within 8 daylight hours by inspectors approved by the Department of Building Inspection and will be posted with official placards stating the building’s condition in accordance with ATC 20 Postearthquake Detailed Evaluation Procedure

Signed by

[Building Official Signature]  

Approval Date:

(Annual Renewal Required)
Submit one-page form if no changes. Supply additional information for any changes that have been made to the:

- Inspection personnel or contact info
- Building - for renovation or remodeling
- Inspection plan - to reflect changes
Implementation: San Francisco BORP

- Activate within 8 daylight hours of declared emergency
- Contact DBI re shoring/demolition issues
- Notify DPW regarding barricade needs
- Complete Detailed Evaluation & send report to DBI within 72 hours
- Post building(s) green, yellow, or red
- Mitigate non-structural hazards
Jurisdiction Verification

DBI may inspect a building in the Building Occupancy Resumption Program when:

- The building has been red-tagged
- A life-safety hazard has been reported
- Building owners, tenants, agencies, or members of the public have expressed concerns
Cost Factors

- Engineer familiarity
- Building complexity
- Building size
- Drawing availability
- Inspection plan detail

Average BORP plan cost for major SF building: $8,900
Major Cost Benefit

For less than one day’s income from most buildings, many days or weeks of delay can be averted by speedy reoccupancy or rapid initiation of repairs.
Without a plan...

- Loss of productivity and/or revenue
- Displacement of employees/tenants
- Delay in building re-occupancy
- Decline in client confidence
Post-earthquake Deficiencies

- Engineer and contractor availability
- Competitive bidding opportunities
- Material and equipment supplies
- Inspection response
- Approval timing
BORP Guidelines

Written guidelines are available to help in preparing a BORP plan and owner agreement.
BORP on the Internet

- Download the program and other related info from sfgov.org, Building Inspection, Earthquake Preparedness, BORP.

- Obtain ATC 20 documents from the Applied Technology Council, 555 Twin Dolphin Drive, Redwood City, CA 94065; 650-595-1542; http://www.atcouncil.org
If there’s no program where you want it…

- Inform building owners
- Urge advocacy of elected officials
- Support building department efforts
- Identify development resources
Jurisdiction Steps

- Adapt BORP for local jurisdiction needs
- Assign staff to administer program
- Recruit local engineers for review committee
- Solicit submittals from building owners
- Review and approve complying submittals
- Supply posting placards & building certificates
- Maintain list of pre-approved buildings
- Review and approve complying renewals
Resources Needed:

- Building Department: Approx. 5% of 1 FTE
  - program development/revision
  - maintenance/renewals
  - meetings/training/orientation
  - certification/official placards

- Structural engineers association
  - program development/revision
  - building-specific inspection plan review

- Building owner and architect organizations
  - program development/revision
Emphasize Benefits

- Assure prompt post-earthquake inspection
- Avoid unnecessary building evacuation
- Inspire employee, tenant, and client confidence
Overcome Resistance

- Infrequency of earthquakes
- Demands of other priorities
- Limitation of funds
- Lack of clear understanding
Alternative Approaches

- Letter of understanding with building owners
- List of engineers assigned for specific buildings
- Building-specific plans submitted to jurisdiction for review and/or file
- Phone calls to report inspection results and get verbal okay to occupy building
| Building Occupancy Resumption Program Approved Buildings - San Francisco |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| 275 Battery St                  | 3 Embarcadero                   | 50 Main St                      | 801 Montgomery St              |
| 301 Battery St                  | 4 Embarcadero                   | 211 Main St                     | 140 New Montgomery             |
| 550 Battery St                  | 188 Embarcadero                 | 365 Main St                     | 200 Paul St, Bldg D            |
| 45 Beale St                     | 2 Folsom St                     | 1 Maritime Plaza                | 200 Paul St, Bldg F            |
| 50 Beale St                     | 611 Folsom St                   | 1 Market St                     | 100 Pine St                    |
| 77 Beale St                     | 666 Folsom St                   | 101 Market St                   | 555 Pine St                    |
| 225 Bush St                     | 2225 Folsom St                  | 215 Market St                   | 2345 Pine St                   |
| 430 Bush St                     | 2270 Folsom St                  | 245 Market St                   | 1 Post St                      |
| 150 California St               | 55 Fourth St                    | 720 Market St                   | 50 Post St                     |
| 201 California St               | 45 Fremont St                   | 740 Market St                   | 251 Post St                    |
| 345 California St               | 50 Fremont St                   | 901 Market St                   | 475 Sansome St                 |
| 580 California St               | 55 Green St                     | 201 Mission St                  | 60 Spear St                    |
| 650 California St               | 1 Harrison St                   | 44 Montgomery St                | 1930 Steiner St                |
| 405 Davis Ct                    | 2180 Harrison St                | 120 Montgomery St               | 121 Steuart St                 |
| 440 Davis Ct                    | 150 Hayes St                    | 220 Montgomery St               | 370 Third St                   |
| 1635 Divisadero St              | 155 Hayes St                    | 235 Montgomery St               | 100 Van Ness Av                |
| 25 Ecker Sq                     | 75 Howard St                    | 400 Montgomery St               | 150 Van Ness Av                |
| 1 Embarcadero                   | 301 Howard St                   | 408 Montgomery St               | 470 West Portal                |
| 2 Embarcadero                   | 155 Jackson St                  | 417 Montgomery St               |                               |
|                                 | 120 Kearny St                   | 600 Montgomery St               |                               |
[Revised 02-09-06]
A survey by the Association of Bay Area Governments shows that these jurisdictions have developed or proposed similar programs:

- City of Berkeley
- City of Concord
- City of Cupertino
- City of Emeryville
- City of Fremont
- City of Mountain View
- City of Oakland
- City of Palo Alto
- City of San Jose
- City of Santa Clara
- Stanford University
- UC Berkeley
BORP in Other States

Cities working to develop building occupancy resumption programs in other states include:

- New York City, NY
- Seattle, WA
- Anchorage, AK
BORP Recognition

- Western States Seismic Policy Council (WSSPC) 1996 *Award for Innovation*
- California Emergency Services Association (CESA) *Silver Award*
- Earthquake Engineering Research Institute (EERI) *Best Practices - Government*
Any Questions
Thanks!

Zan Turner
No. CA Chapter

Earthquake Engineering Research Institute '06