

EvCC Emergency Management Plan

ANNEX #04 – Post Event Structure Evaluation

1. INTRODUCTION

This Annex will provide a guideline to be used when making building safety evaluations following a major emergency event. These evaluations are made to determine whether damaged, or potentially damaged, buildings are safe for continued use, or if entry should be restricted or prohibited.

While the scope of this guideline deals with post-earthquake structural safety it also considers other hazards such as downed power lines, damaged elevators, hazardous materials spills that might be encountered.

2. SAFETY EVALUATION PROCEDURES

There are three distinct safety-evaluation procedures that will be used by the EvCC emergency response teams:

- A. **Rapid Evaluation** - Short cursory evaluation that typically will take about 30 minutes per building. The purpose of this evaluation is to make a preliminary determination if the building is safe to enter and report the status to Campus Command. This level will be done by the campus Responders (Building Captains & Floor Wardens)
- B. **Detailed Evaluation** – through visual examination of a damaged building. Typically, this may take 1-4 hours. The Campus Building & Facilities personnel will conduct this evaluation.
- C. **Engineering Evaluation** – a thorough evaluation made by a structural engineer to determine the level of damage to a building.

3. BUILDING SAFETY ASSESSMENT PROCEDURE

- A. The first priority following an earthquake or other major event is to life safety. This includes conducting building evacuations, securing hazardous areas, and accounting for all personnel.

EvCC Emergency Management Plan
ANNEX #04 – Post Event Structure Evaluation

- B. It may be necessary to conduct a Rapid Evaluation just prior to, or during, an evacuation to determine safe exit routes and assembly areas.
- C. The Building Captains will safely conduct a “Rapid Evaluation” of their assigned structures and zones at the earliest opportunity.
- D. After conducting the Rapid Evaluation the Building Captain will post the structure as inspected, restricted use, or unsafe.
- E. The Building Captain will provide a written or verbal report to Campus Command using the radio system or a message runner at the earliest opportunity.
- F. The Campus Building Department will conduct a follow-up “Detailed Evaluation” on all structures as time permits.
 - 1. Campus Command will provide the priority for Detailed Evaluations. Generally, these will be the essential structures that have been posted “Inspected” (Green) by the Building Captain and will need be occupied.
 - 2. The lowest priority for a detailed inspection will be the buildings that have been tagged as “unsafe” by the Building Captains during the initial Rapid Evaluation” survey.
 - 3. The Building Department may change a building posting and will have the final decision on the posting level.
- G. The Building Department will make recommendations for structures that will need an Engineering Evaluation.

4. BUILDING SAFETY-EVALUATION POSTINGS

- A. After each Rapid or Detailed evaluation the building or zone will be “Posted” with one of three placards indicating level of use.
- B. The three placards are:
 - 1. **Inspected (GREEN) – Occupancy Permitted**
 - No apparent hazard is found
 - No restrictions on use of the occupancy
 - Repairs may be necessary

EvCC Emergency Management Plan

ANNEX #04 – Post Event Structure Evaluation

2. Restricted Use (Yellow)

- A hazardous condition exists (or is believed to exist) that requires restrictions on the occupancy or use.
- Entry and use are restricted as indicated on the placard

3. Unsafe (Red) – Do not occupy

- Extreme structural or other hazard is present
- May be imminent risk of further damage from collapse from creep or aftershocks
- Unsafe for occupancy or entry except as authorized by the local building department.

5. POSTING AND BARRICADING PROCEDURES

After the safety evaluation of a building has been completed, post the structure with a placard using the following procedures and criteria.

- A. Place the appropriate placard in a clearly visible location near the main entrance.
- B. Place additional placards at all other entrances to a building classified “Restricted Use (Yellow) or Unsafe Use (Red).
- C. There can be only one posting classification per building.
- D. A Restricted Use posting may indicate different restrictions for different parts of a building.
- E. Restrictions must be specified for a RESTRICTED USE (Yellow) placard to be considered complete.
- F. If an area is unsafe and should not be entered, place barricades or string caution tape to designate the unsafe area.
- G. Whenever a building is reinspected, a new placard should be posted to indicate the date and time of reinspection.
- H. Significant aftershocks ordinarily required reinspection of buildings posted INSPECTED (Green) or RESTRICTED USE (Yellow).

EvCC Emergency Management Plan
ANNEX #04 – Post Event Structure Evaluation

6. RAPID EVALUATION METHOD

- A. The objective of a Rapid Evaluation is to quickly inspect and evaluate buildings in a damaged area.
 - 1. The intent of this method is to quickly find serious damage and conserve limited personnel resources in the immediate post event period.
 - 2. The inspections are generally limited and brief.
 - 3. Inspectors are to look for readily observable, gross kinds of structural damage and other hazards that threaten building safety.
- B. The evaluation is performed using the criteria detailed in Table #1 of this Annex.
- C. Table #2 identifies a guideline for determining the level of posting.
- D. Most of the Rapid Evaluations are primarily exterior inspections. When done as part of a Rapid Evaluation, interior inspections are typically short duration and limited scope.
- E. Inspectors must not enter obviously unsafe buildings.
- F. Significant aftershocks ordinarily required reinspection of buildings posted INSPECTED (Green) or RESTRICTED USE (Yellow).

7. SAFETY CONSIDERATIONS

- A. Following a severe seismic disturbance a building can become so damaged that there is significant damage from collapse or falling debris.
- B. Aftershocks can cause additional safety concerns.
- C. Always conduct evaluations in teams of at least two
- D. Wear a hard hat for safety and identification.
- E. Survey the building exterior completely before entering
- F. Enter a building only if it deemed safe to do so
- G. Avoid all areas where a hazard material release is suspected
- H. Be alert for falling hazards
- I. Avoid power lines and buildings under them
- J. In case of gas, avoid the area.
- K. Do not shut off gas or electric.

EvCC Emergency Management Plan

ANNEX #04 – Post Event Structure Evaluation

TABLE #1 – Rapid Evaluation Procedure

Step 1: Survey the Building from the Outside	
A. Try to determine the structural system (i.e., the skeleton) of the building.	Structural systems are wood studs with plywood sheathing, brick masonry walls, concrete block masonry walls, concrete walls, concrete posts and beams, steel posts and beams, and steel posts and beams with diagonal steel braces.
B. Examine all accessible sides of the structure for damage	Pay particular attention to buildings with the irregular shapes noted in Figures 1 and 2 on the following pages. Damage to the structural system will typically show through nonstructural finishes. For example, cracks in stucco or plaster finishes are assumed to be equal in size to the cracks in the structural system hidden in the finish. Typical visible damages are as follows:
C. Look for indicators of excessive horizontal movement in exterior walls which may result in a building being out-of-plumb.	Two typical indicators are broken glass in windows and jammed doors, but a building can move without breaking windows or jamming doors and still be out-of-plumb. Standing 20 to 30 feet from the corner of the building, look along all four edges of the building, checking for locations where the building is leaning. An offset from the top to the bottom of a wall, beyond what may have existed prior to the earthquake, of 1" or more may indicate severe structural damage.
D. Examine exterior nonstructural elements.	This would include features such as brick veneer, exterior cladding, overhangs, canopies, parapets, signs and ornamentation, for damage before evacuating or re-entering the building. Exterior cladding could be metal panels or precast concrete panels.
E. Look for new fractures in the foundation or exposed lower walls of the building.	
Step 2: Examine the Surrounding Site for Geotechnical Hazards	
<p><i>Geotechnical hazards are conditions which affect the supporting soils around and under buildings. Geotechnical hazards may be off-campus. The school should be contacted for any geotechnical hazard information related to the campus. If geotechnical hazards are known to exist, this information should be added to the school's emergency preparedness plan so inspectors will know to look for these conditions.</i></p>	
A. Look for cracks, bulged ground and vertical ground movements in the area.	
B. Examine hillside areas, above and below the site, for landslide displacement or debris encroaching onto the site.	Remember that geotechnical hazards can extend over an area of several buildings or sites.
C. When geotechnical hazards are suspected, a detailed evaluation must be made by a geotechnical engineer or geologist before a decision can be made about reoccupying the building.	

EvCC Emergency Management Plan

ANNEX #04 – Post Event Structure Evaluation

<i>Step 3: Inspect the Structural System from Inside the Building</i>	
<i>Has the load-carrying capacity of the structure decreased significantly?</i>	
A. Before entering the building, look to see if anything could fall on you or if the building is in an imminent state of collapse.	DO NOT ENTER OBVIOUSLY UNSAFE BUILDINGS.
B. Ceiling panels may be removed to view the structural system	Any destructive exploration, must be done only when authorized by the Maintenance Department.
C. View stairwells, basements, mechanical rooms and other exposed areas	
D. Examine the vertical load carrying system.	Look for situations in which (1) a post may show signs of damage; (2) the floor or roof beams have begun to pull away from their supports; or (3) the slab or beam system damaged.
E. Examine the lateral load-carrying system.	Any new offset such that the walls at any level are out-of-plumb with the wall below means some structural damage has been sustained. Look for situations in which a diagonal brace has buckled, bowed or cracked, walls have bowed or cracked.
F. Inspect the basement or bottom floors for fractures and uneven settlement.	Basement floors and exterior walls for cracks and bulges.
G. Examine every floor, including basement, roof and penthouse.	Gypsum wallboard (sheetrock) and painted plywood walls show signs of distress if the nail heads show, generally at the edge of the wall. If just a few nail heads show, usually the strength of the wall has not decreased. However, if many nail heads show or the shank of the nail is visible, the strength of the wall has decreased significantly.
<i>Step 4: Inspect for Nonstructural Hazards</i>	
A. Inspect inside the building for damage to nonstructural elements such as ceilings, partitions, light fixtures, roof top tanks and other interior elements.	Damage to these nonstructural elements could either indicate structural damage, or pose a threat to occupants.
<i>Step 5: Inspect for Other Hazards</i>	
A. Inspect elevators	If damage to elevators is suspected, or if the elevators will not operate (seismic switch has been tripped), they should not be restarted without first being inspected by a qualified elevator inspector.
B. Look for spills or leaks in areas of stored chemicals or other hazardous materials.	DO NOT attempt to handle these materials yourself. Restrict building or area use accordingly.
C. Inspect fire protection systems	If there is damage to fire protection and detection equipment, it may be necessary to restrict building use. Notify the local fire department. Look for damage to sprinkler systems, piping and smoke detection components of signal systems.
D. Inspect the stairs and doors.	Check for stability, inspect for jammed doors and obstructions.
<i>Step 6: Determine the Need for Locking or Barricading Buildings and the Priorities for Notification.</i>	

Table #2

**EvCC Emergency Management Plan
ANNEX #04 – Post Event Structure Evaluation**

PRELIMINARY EVALUATION CRITERIA

This table will be used to determine the condition of a building and to give guidance on appropriate action.

<p align="center">“RED”</p> <p align="center">Do Not Occupy Prevent Access</p>	<ol style="list-style-type: none"> 1. Building has collapsed, partially collapsed or moved off its foundation. 2. Building or any story is leaning significantly. 3. Obvious severe damage to primary structural members, severe leaning of walls or other signs of severe distress present. 4. Large cracks in ground, massive ground movement, or slope displacement present which are under, or near, the building and are a hazard to the building.
<p align="center">“YELLOW”</p> <p align="center">With Restrictions Barricade to Prevent Access to the Area</p>	<ol style="list-style-type: none"> 1. Obvious parapet, chimney or other failing hazard present. 2. Other hazard present (e.g., toxic spill, chemical spill, asbestos contamination, broken gas line, fallen power line). 3. Air duct terminals, ductwork, light fixtures lenses or florescent bulbs fallen or dislodged. Broken windows. Overhead mechanical equipment supports or bracing dislodged. 4. Although no damage is yet apparent, areas with overhead elements similar to those indicated above may also fall in an aftershock so they are a possible hazard.