Dealing With Natural Disasters

Here Comes The Flood (Of Legal Issues)

2019 Annual Meeting | ABA Forum on Construction Law
April 24-27, 2019
The Diplomat Beach Resort | Hollywood, Florida
Plenary 4 – Discussion on Post-Catastrophe Issues

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Overview

- Introduction
- Disaster Recovery Life Cycle
- Earthquake Case Study
Disaster Recovery Life Cycle

The process of bringing a facility or the project that was affected by the damage to the before-the-accident-condition.
Northridge Earthquake – Southern California

- 10-20 seconds of violent shaking at 4:30am on January 17, 1994
- 6.7 magnitude, epicenter in San Fernando Valley
Northridge Earthquake

Route 14 overpass collapses

Route 14 overpass collapsed onto Interstate 5
Northridge Earthquake

California State University, Northridge parking structure

Bullock’s department store collapses in the Northridge Fashion Center
Northridge Earthquake

Building on fire

Gas and water line rupture

AP Photo/Jerome Henkel

AP Photo/Lenny Ignelzi
Northridge Earthquake – Southern California

- State of Emergency is declared
- Red Cross and Salvation Army set up shelters
Northridge Earthquake – Southern California

- A city-wide curfew is declared from dusk to dawn
- Five highways are partially closed
Immediate Response (Phase 2)

- Federal government releases about $283 million in earthquake aid
- Aftershocks – March 20, magnitude 5.3
- Building owners who had a pre-arranged agreement/contract have their buildings inspected by engineers
Logistical Issues

Logistics of Assessing a Site
- Airport closures
- Infrastructure damage
- Shortage of rental cars
- Accommodation close to site
- Communication – phone is spotty, data is not available

Dangerous Conditions
- Aftershocks
- Unstable building
- Landslides
- Mold
- Hoarders
- Gas Leaks
Our Building

- Borax Corporate Headquarters
- 23 km North of the epicenter of the earthquake in Valencia
- Built in 1993
Our Building

- Four story special moment frame resisting steel space frame structure
- Frames are 4 bays wide in north-south direction and 3 bays wide in east-west direction
Steel Moment Resisting Frame
Our Building

- Comparison of Uniform Building Code response spectrum to the peak ground acceleration experienced at site
Initial Evaluation

- Walk perimeter of the building and look for life-safety issues
Initial Evaluation

- Cracking of interior full-height gypboard walls
- A few fallen ceiling tiles
- Limited window breakage
- Toppling of office furniture
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By David P. O’Sullivan
Initial Evaluation

- Weld fracture
Initial Evaluation

- Non-moment beam and girder to column connections inspected
- Damage to shear connection plates and beam or girder webs bent out of plane
Building Evaluation Process

- Methodical on site
- Photographs
  - High resolution
  - Overall photograph and close-up photograph
- Drones
Building Status

- Building has been red tagged
- Building owner has filed a claim
- Insurance carrier engages an engineering team and building consultants to evaluate the extent of earthquake damage and prepare a repair scope to reinstate the building
Can the Building be Repaired? (Phase 3)

- Forensic engineer vs engineer of record
- Developing an agreed repair scope
  - Peer review
- Owner’s decision
- Who pays for the rebuild?
Can the Building be Repaired? (Phase 3)

- Analysis is performed
- Four measures are recommended one month after the earthquake
- Owner understood:
  - Research would result in code changes governing the design of these connections
  - Repair recommendations might or might not meet these future code provisions
  - Additional measures might be required in the future
Building Codes

International Existing Building Code vs California Existing Building Code
Building Codes

- Significant structural damage
- Seismic evaluation
- ADA assessment
- New local ordinance issued after the event
Ordinances Timeline

OSHPD
February 1994

City of Los Angeles
1995

City of Santa Monica
2017

1994-1995
Caltrans

2015
City of Angeles
Scheduling in Chaos

- Understanding the full scope
- Existing structures v. ongoing projects
- Duration estimates
- Target completion
- Coordination
- Delays are inevitable
Scheduling – Scope of Work

- Clear understanding of tasks required to design, procure and construct remedial measures is crucial to successful completion
- Not known until after condition assessment
- Design/Approval process in crisis conditions
- As rebuild proceeds Changes will occur
- Similar to rehabilitation projects
Scheduling – Existing v. Ongoing

- Existing Structure
  - Just dealing with the rebuild scope

- Ongoing Project
  - Rebuild scope needs to be coordinated with base contract scope
  - What was the status of base contract work at time of disaster?
  - What impact does rebuild scope have on project completion?
Scheduling – Duration

- How long will it take? Need to consider...
  - Working in chaotic conditions
  - Quantity of labor may be limited
  - Quality of labor force can vary
  - Productivity will be difficult to estimate
- How much overtime will be employed?
- Turnover in workforce
Scheduling – Target Completion

- Existing Structure
  - Need to get back in business ASAP
- Ongoing Project
  - Was the project on schedule?
  - Has base contract work restarted?
  - What’s the impact of rebuild on project completion?
- Delays are inevitable
Scheduling – Coordination

- Existing Structure
  - Just coordinate with the scope of rebuild
- Ongoing Project
  - Rebuild scope needs to mesh with base contract scope
  - Will rebuild restrict the restart of base contract work
Construction

- Budget
- Permits
- Material Shortages
- Coordination with other work
- Changes will be coming
- Delays
Mitigation Measures (Phase 4)

- What preventative measures could have been taken before the earthquake?
- Examples of Prevention Measures
  - Flood walls
  - Stiffening structural components
  - Window Shutters
Mitigation Measures – Implementation

- Who decides?
  - Owner - stand alone initiative
  - Part of other renovations as required by Code
  - Government funding
Mitigation Measures – Implementation

- Existing Structures
  - Planning to minimize disruption to operations of occupied facilities - phasing
Mitigation Measures – Implementation

- Ongoing Projects
  - Need to consider impacts to base contract work
  - Use existing work force or use separate contractor
  - Can cause delays
Closing Remarks

Advance Notice of Potential Disaster Event

Response to Event

Rebuild from Event

Mitigation Measures

Sudden Unexpected Disaster