Seismic Hazard Mitigation Post 1994 Northridge Earthquake

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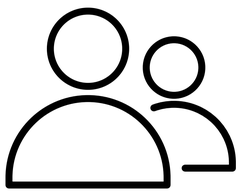
EFFECTIVE MITIGATION REQUIRES PLANNERS TO INTEGRATE RISK-AWARE LAND USE DECISIONS, BUILDING CODE STANDARDS, INFRASTRUCTURE REINFORCEMENTS, AND EMERGENCY PREPAREDNESS INTO LOCAL POLICY FRAMEWORKS.

INTRODUCTION

Southern California is one of the most seismically active regions in the United States, as such the threat of moderate to severe earthquakes and related seismic hazards is embeded in the built environment.

The 1994 Northridge earthquake is one of the most concequential seismic events in California history. On January 17 at 4:17 am a 6.7 magnitude earthquake hit the San Fernando Valley but was felt as far as the Counties of Ventura and Orange. Damages were estimated to be $20-25 billion in proprety damage.



Estimated 55-60 fatalities

Structural failures affected 70-100,000+ buildings

Damaged infrastructure inhibited communication

SIGNIFICANCE

Thankfully, the fatalities caused by the disaster were fiew, though reports suspect that is only due to the time of day it occured. If the earthquake had happened mid day, it is likely that many more casualties would have resulted.

This research examines how local policy and infrastructure failures shaped post-Northridge reforms, including updated buildings codes, mandatory retrofit programs, hazard mitigations planning requirements, and long-term resilience strategies.

Following the Northridge earthquake significant reforms were implemented, and the effectiveness and evolution of these measures remain important to evaluate.

METHODOLOGY

Qualitative Document Analysis

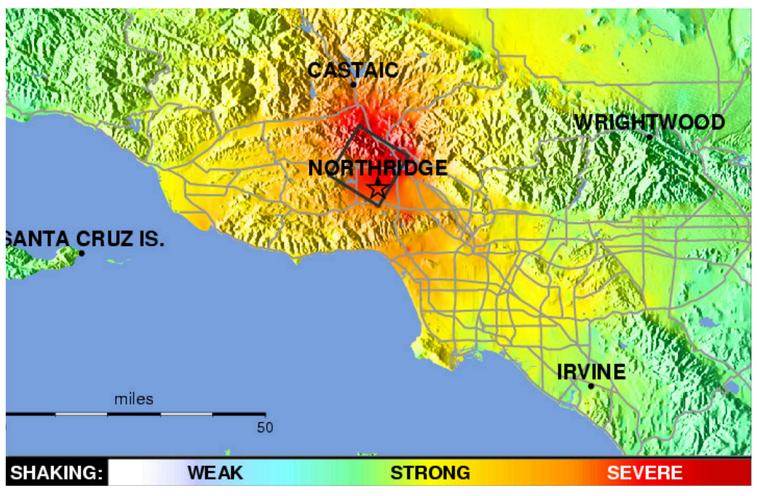
- Review technical reports, building codes, hazard mitigation plans, and government policy documents

Chronological Comparison

- Pre-, post, and current building codes, ordinances, emergency response/ hazard mitigation plans were looked at and compared to each other
- This allows for newer policy and code to be recognized as a direct response to the earthquake's aftermath as well as identify it as a previously overlooked factor

STUDY AREA

Epicenter of the 1994 earthquake and experienced some of the most concentrated damage in the region, though the neighborhood is only one community area of the City of Los Angeles.



ARCHIVAL RESEARCH FINDINGS

Pre-Earthquake

Review of documents show that Los Angeles had been actively thinking of seismic hazards in the community.
The Los Angeles Seismic Safety Plan included;

- Substantial soil, tectonical, and geological reports and identified all fault lines within its jursdiction.
- Proposed updating buildings to meet seismic safety standards throughout the city, implementing seismic safety building regulations, and encourage emergency preparedness

At that time the building standards used cited the Uniform Building Code from 1991 that included;

- A detailed section on Earthquake Design within the Engineering Regulations

Additional emergency preparedness in the City looked like;

- The Community Emergency Response Team (CERT), that was later nationalized through FEMA in 1991.

Post-Earthquake

Various emergency/ urgency ordinances were adopted within the first 6 months in direct response to the disaster;

- Earthquake Disaster Assistance Plan
- Interim seismic safety construction/ design regulations
- Temporary land use permits
- Tenant eviction protections
- Demolition & sewer fee waivers

Within the first 6 months post-disaster, the Building & Sagety Dept. created a task force of inspectors for a city-wide survey;

- Push back from residents stating only minor repairs would be costly only to restore the building to original conditions
- Task force narrowed scope of inspection as a result

Reports detailed that seismic safety construction regulations are just as important as the quality of the actual construction.

Curent Seismic Prevention

Los Angeles now currently deploys an operational Emergency Operations Base Plan and their General Plan includes a Safety Element with seismic considerations.
The Emergency Operations Base Plan particularly discusses;

- Communication and coordination chain in the event of an emergency
- Agency (including surrounding) roles & responsibilities

The Sagety Element highlights;

- An ongoing Emergency Operations Master Plan
- Implementation of a Local hazard Mitigation Plan
- Ongoing seismic retrofiting endevours

The CERT program under the Los Angeles City Fire Department has only expanded seeing;

- Over 57,000 graduates since the program's creation
- Classes for schools, organizations and the work place

LIMITATIONS

The research conducted relied on policy and municipal code documents dating as late as 1994. This report attempts to achieve a holistic review of the Northrdge earthquake, the existing policy at that time, and the development of shortly after. However, recognizing the possibility of missing documents or unread reports due to the age of and documenting processes of the Los Angeles City Clerk's office can impact the findings and the conclusions drawn thereafter.

DISCUSSION

After reviewing the findings a couple key points were noted of Northridge's (i.e. Los Angeles') building safety and hazard mitigation efforts;

- Prior to the earthquake, there was evidence of proposed mitigation strategies, identification of seismic hotspots, and future efforts for emergency planning
- Much of the policy efforts involved providing leeway for residents/ property owners struggling with displacement and rehabilitation of damaged property
- Revisions to the Building Code involved its initial adoption and stricter engineering and inspection guidelines