Social Response to the 1994 Northridge California Earthquake

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Final Report

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Introduction

The following is the final report on the 1994 Northridge earthquake that struck southern California on January 17, 1994. Immediately following the occurrence of the quake, this researcher was sent to the stricken area. That allowed for the collection of perishable data on occurrences surrounding the immediate aftermath of the event. This research was supported by the National Science Foundation by funds administered by the Natural Hazards Research and Applications Information Center, housed at the University of Colorado in Boulder, Colorado.

The quake measured 6.8 on the Richter scale. It came as a surprise to many, based on the epicenter. Seismologists have now determined that the rupture occurred nine miles underground on an unknown thrust fault (Newsweek, 1994. p. 34). The location of the epicenter has been determined to have been in the Northridge area of the Los Angeles basin. Northridge is a town in the San Fernando Valley, which lies several miles north of the City and County of Los Angles. The epicenter has given this earthquake its name, namely The Northridge Earthquake.

The location of the epicenter makes this earthquake unique with important lessons to be learned. The importance stems from the fact that the affected area is inhabited by approximately nine million people. Thus the potential for high numbers of injuries and fatalities was great. An earthquake this magnitude is the first with an epicenter in such a densely populated area of the United States. The 1989 Loma Prieta earthquake, in

contrast, did affect the nine million people in the San Francisco Bay Area, but the epicenter of that event was located in a very rural mountainous area called Loma Prieta in the area around Santa Cruz, California.

Given the potential for high destruction, be it property, or life, the Northridge earthquake deserves attention. Sections will include: lifelines/infrastructure, immediate public response, level of citizen preparedness, the recovery, and conclusions.

This final report presents findings from three days of fieldwork. Days include the day of the earthquake, and two subsequent days in the stricken area. The immediacy of access to the field allowed this researcher to interview respondents as the events unfolded including experiencing the many after shocks that occurred.

The Event

The earthquake struck on January 17, 1994 at 4:31 a.m. in the morning. This was the positive news about the earthquake. Positive in that the early morning hour was one of the few times that a city the size of Los Angeles rests. The City and County of Los Angeles is currently home to over three million people. The surrounding suburbs contributes another four million, bringing the metropolitan population to well over nine million people. In terms of area, the Los Angeles basin comprises over 452 square miles.

Another event "conspired" on the day of the earthquake to help residents of the City of Angles. January 17th, the day of

the quake, was an official holiday. The vast majority of metropolitan area residents had Monday free to celebrate Martin Luther King Day. This holiday translated into freeways that were much emptier than on a usual computing day. Many area residents were out of the area enjoying the three day holiday. This helped in the initial response by emergency crews. Traffic jams resulted Monday evening as concerned families attempted to reunite with their relatives from outside the city.

One final aspect helped the area deal with immediate problems it faced in the days following the earthquake. That final factor was the weather. Normal weather patterns in Los Angeles during the month of January are characterized by rain. January was drier than others in the past. Skies were blue and temperatures were in the 70s. The weather had a profound impact on how residents dealt with the numerous after shocks that occurred.

Large numbers of city residents slept outside. Sleeping outside is not a new phenomena following an earthquake. Similar stories have been told immediately following the Loma Prieta earthquake (Bolin and Stanford, 1990. p. 101). Those sleeping outside following the Northridge earthquake numbered in the thousands. One could not drive down any street in the Northridge section of town, and not find tents staked out on lawns, in parks, and anywhere else residents could find room. It is as if mother nature conspired with residents to make their initial misery more bearable.

Methodology

Given the quick response of this researcher entering the field, a qualitative methodology was employed. The researcher was in the area the day of the earthquake. Respondents were selected based on availability. Once a respondent wase located, a structured interview was administered to that person. This type of data collection allows for immediate data to be collected, but does not allow this study to be generalized beyond the population interviewed.

Given the size of the affected area three sub-locations were chosen as representative of the region. Interviews were completed in downtown Los Angles, Northridge, and in Pasadena. Downtown Los Angles was selected for several reasons including: 1) much of the emergency was directed from the City and County building in their Emergency Operations Center (EOC), 2) Los Angles forms the core of the area, and 3) much of the infrastructure e.g., I-10 damaged occurred within the City and County of Los Angeles.

Northridge was selected because: 1) it is where the epicenter was located, 2) some of the highest rates of overall damage occurred there, and 3) it had the highest level of fatalities. Finally Pasadena was selected for inclusion because: 1) it was outside the major stricken area, 2) it suffered minimal levels of damage and no fatalities, and 3) it was thus used as a baseline for "normal" urban activity, following an earthquake.

Approximately 31 interviews were completed in the three days following the event with some via the telephone. The phone

interviews were done in order to have the input of official spokes people from organizations too involved in the on-going emergency to take time away from their emergency duties to complete an interview. Many interviews included other family members, neighbors, or passers-by, but such interviews were counted as one for the primary person interviewed.

From 31 interviews, approximately 15 were with residents in the three areas noted above. Nine interviews were with police, fire, and military personnel on duty in various locations during the on-going emergency. Two interviews were with personnel working in the county EOCs, and three miscellaneous interviews included people from state and federal agencies. Two were interviews with non-profit organizations involved in the emergency, most notably the Red Cross.

Lifelines/Infrastructure

Lifelines are an important area of concern in any natural disaster. This holds especially true with an area as large and densely populated as that stricken by the Northridge earthquake. Data were collected and reported on the extent of the disruption caused by the quake.

The Northridge earthquake was similar to other earthquakes here in the US and abroad. After the initial main shock the fire department was in constant fire suppression mode. The bulk of these fires had begun due to gas pipes breaks from the earthquake. Fire departments in the Los Angeles area worked round

the clock in the first days after the quake.

As noted in the methodology section some interviews were completed weeks later due to emergency personnel's engagement in the on-going emergency. The fire department is a typical example. It was impossible to get access to fire department personnel in levels of command in the days following the quake. Fire department personnel were working 12 hour shifts.

As noted above the earthquake occurred at 4:31 a.m. the morning of January 17, 1994. The Los Angeles Fire Department (LAFD) went immediately into their Earthquake Emergency Operational Mode. At 4:35 a.m. or four minutes following the earthquake the Emergency Operations Center was activated. It was officially closed on February 10, 24 days after the earthquake. By 7:00 a.m., that morning the LAFD had responded to over 100 incidents. By 9:45 a.m., all fires in the valley were under control, with no active major structure fires in progress (LAFD, 1994. p. 3). Within the first 24 hours following the earthquake the LAFD had responded to over 2,200 incidents, approximately 2 1/2 times the daily average (LAFD, 1994. p. 3).

The 12 hour shift on and 12 hours off was also mandated for the Los Angeles Police Department. The city seemed full of police immediately following the earthquake. There were many concerns about public order following the earthquake. This concern for public safety is typical after most natural disasters, though research clearly shows that most fears are largely unfounded (Hodler, 1982. p.48). The LAFD did report sporadic looting, but

it did not appear to be widespread (LAFD, 1994. p. 2).

The concern for public safety can only be understood within the local ideographic context of Los Angeles. The city of Los Angeles has experienced high tensions, based on poor race relations in the city. These poor race relations came to boil in the summer of 1991 when South Central Los Angeles erupted in riots. Representatives of Los Angeles, through various media sources, stated categorically, that "South Central" would not happen again in the wake of the earthquake. Thus police presence was everywhere. For example, on a typical day in the City and County of Los Angeles, between 500 and 600 arrests are made by the police department. In the 24 hour time period following the quake, 73 arrests were made (as noted on KFWB Radio AM980). One could argue that the quake itself had an effect, which it must have, but suffice it to say that police presence was everywhere in the city making a criminal's life extremely difficult as a result of the riot history and then earthquake.

Water supply was also interrupted. Immediately following the earthquake, it was reported that three of the city's four aqueducts had been damaged and could not carry any water. Initial estimates reported a total of 3000-4000 breaks throughout the system. There was widespread concern that water might run out in the city. Various city governments got together to devote whatever resources were necessary to get water running again. The Water Department in the City and County of Los Angeles worked round-the-clock to restore water to the city.

The Los Angeles school system was also heavily damaged following the main shock and subsequent after shocks. Immediately following the event, it was reported that over 300 public schools in the basin were damaged and could not be used, until major improvements had been made. This left a public with the added burden of not knowing where and when their children might resume attending school. The closing of schools brings many problems. The first and most obvious is that children are not attending and learning.

In addition, school to many children is not only a learning place, but serves important social functions as well. Many children like a routine, and school belongs to that normal routine. The mass closing of schools threw many children out of their routine. This meant that children needed to stay home with other family members for long periods of time. They were not around their usual playmates, and several children interviewed via their parents, expressed great concern over the safety of their class mates; that is, had they survived? This uncertainly about play mates and a normal routine increased the stress and tension already present in many parents.

The real lifelines story in the Northridge earthquake concerned the freeways. Los Angeles is a typical example of American dependence on the automobile. It is a city that is criss-crossed by freeways. It is a city where mass transit takes a back seat to the private automobile. A total of 11 major breaks in the freeway system occurred as a result of the earthquake.

The most damaging break occurred with I-5 bridges collapsing north of the city. The break, in effect, cut off the region to traffic moving either north or south, in or out of the city. The second major break occurred with the collapse of the Santa Monica freeway also named I-10. I-10 is the busiest freeway traveled in America. It carries the bulk of city traffic across town. The closing of the Santa Monica freeway meant that over nine million people needed to take small, crowded secondary streets to cross the city.

The importance of the freeway collapses and closures goes far beyond the apparent frustration of needing more time to get where one is going. There was widespread uneasiness of residents having their freedom of movement taken away by the earthquake. Considerable time was given every night on the news to update people on what was closed and what was open. The time given to the problem far outstripped the actual reality with local cultural dynamics coming into play.

Public Response

Public response forms the core of this quick response report. What did the public do in the immediate aftermath of the earthquake? How did people respond to the main shock and after shocks? What were the information flows immediately following the event? Finally, what were the levels of preparedness and earthquake awareness of citizens?

Immediate Public Response

Thirty years of disaster research gives one a fairly clear vision of what transpires following a major natural disaster such as the Northridge earthquake. As expected, there was the period immediately following the event when victims, and others come together to aid one another. Barton has called this the altruistic community (Barton, 1969. p. 206). This time period is characterized by heroic events and unselfish sacrifice. Northridge was no exception.

There was a clear convergence of people to the stricken area immediately following the event. Those represented included: fire, police, and other emergency personnel. In addition, many of the stricken residents went to neighboring parts of their areas to assist others who, for whatever reason, had experienced more damage than themselves. There was clearly a sense of "altruistic community" in the hours and days following the earthquake.

Overall the best description of residents in the entire area surveyed could be described as fear. Many interviews were completed by long term native Californians. The most often repeated statement was the force with which the earthquake struck. Seismologists are now looking into the event in more detail. Most residents described a violent rolling motion that they claim was different from their past experiences.

After the initial main shock many spoke of leaving the Los Angeles basin and never returning. It is believed that the reasons for these remarks were two-fold. First this was a large

earthquake, and did considerable damage. Current damage estimates are over 30 billion dollars. These will likely go higher. The damage was evident in all areas of the basin. Public structures, infrastructure, and private residences were all affected. Damage was particularly extensive in the Northridge area, which has received extensive media coverage. There were many other unpublished damage pockets. Many of these locations were further north in the mountains surrounding the basin. Names like Granada Hills, Saugus, Piru, and Santa Clarita are just a few of the "unknown" locations that received considerable damage and little attention. They did, however, add to the collective psychological scarring of the region.

The second major reason for the widespread fear on the part of many in southern California can be attributed to disaster overload. Southern California has experienced a number of well publicized natural, and human-caused disasters. Some of these could include: the Rodney King riots in 1991, the fire storms that burned down hundreds of homes in the canyons above the city in 1992, mud slides following the fire storms, and finally the Northridge earthquake. Combined, these events have had a cumulative result of making the public overloaded and tired, in every sense of the word. Thus in the many interviews completed with the public there was a resilience seen in Americans following any disaster, but also a great apprehension of what will come next.

Another exceptional aspect about the Northridge earthquake

was that it struck a late 20th century diverse multi-racial/multi-cultural region. Los Angeles is composed of a wide variety of people of different color and ethnic backgrounds. This phenomenon came into play in Los Angeles, and is perhaps one of the valuable lessons to be learned for the future. Northridge was one of the hardest hit areas in the region. California, however, does have building codes that are designed to prevent or to mitigate losses in such an event. Northridge has hundreds of apartment buildings. It was one of these typical three story buildings that collapsed and caused 16 deaths at the Northridge Meadows apartment complex (Newsweek, 1994. p. 31).

Many of the apartment buildings in the area failed. The area was inundated with U-Haul trucks immediately following the earthquake by residents attempting to move their possessions out, before it was "Red Tagged", i.e., deemed unsafe by the Building Department. Many inhabitants in these apartment complexes could be characterized as coming from lower Socioeconomic backgrounds. Many come from different racial/ethnic backgrounds, primarily Hispanic.

Many in the Hispanic communities first reaction was to leave their buildings, and to remain outside. As night approached, they resolved in large numbers, not to reenter the buildings. Thousands remained outside for days and even weeks following the earthquake. This proved to be a logistical nightmare to many emergency workers and aid organizations. They needed to go to parks, playgrounds, and other public places to locate victims of

the earthquake.

In addition to the locating problem, there was also a language barrier. Many in this community are first generation immigrants. Los Angeles also has a sizable illegal population. Estimates range as high as one million illegal immigrants in California. Common to both groups is the lack of English at a level of understanding for warnings to the public. Completing government paperwork for reimbursement of losses is even more problematic. One of the major lessons learned from the Northridge earthquake is that this is a diverse region.

Much has been written on the aspect of rumors following a disaster event (Scanlon, 1977. p. 125). These rumors can deal with more events i.e., after shocks or with perhaps number of fatalities, or rumors of help or lack thereof. This notion of rumors occurred after the Northridge earthquake, but in many languages and cultures. The warning process became a three dimensional problem with culture, language, and race. This compounded the problem of those in government. It was their task to put out good reliable information to the public, to quench rumors. That task became a multi-faceted effort, given the diverse populations for whom the message was targeted. Further research needs to be done in the area to reflect the current realities of many American cities.

Level of Citizens Preparedness

The Northridge earthquake surprisingly came as a surprise to many. Surprising because California is "earthquake country". Past research has consistently shown that there is a phenomena called earthquake "culture" in parts of California (Mileti and Hutton, 1987, Fitzpatrick and O'Brien, 1992). Residents of southern California routinely joke and make fun of the "Big One". (The big one being an anticipated 8.0 Richter or greater magnitude earthquake).

When smaller earthquakes happen in southern California there is immediate widespread speculation that this will be the prelude to the "Big One". Given this earthquake culture coupled with constant reminders, i.e., small earthquakes always happening in the area, one would logically conclude that a population subjected to such earthquake dynamics would have learned their lessons and would show high levels of preparedness.

From the majority of interviews completed in this mini-study, from all print media investigated and all of the mass media digested in the time period possible, just the opposite is true. Those residents interviewed and probably many others in the Los Angeles basin were wholly unprepared for this 6.8 R earthquake, let alone the "Big One".

Emergency managers and others whose responsibility it is to protect the public, have been warning this population for years, if not decades, to be prepared. There are free films available, public speakers from several city and county agencies on the

topic and the month of April is devoted in California to earthquake awareness. Californians do not lack resources or available material on the topic.

The first crisis occurred over water. As noted in the lifelines section, three of Los Angeles' four aqueducts were damaged. Thus water service was cut off to large parts of the city. This was initially a minor problem on day one, but as the time grew, so did the impatience of the public. Many demands came from the public that the National Guard bring in water immediately. Why----few residents had followed the basic advice to have a three day water supply on hand in such an emergency. Of all interviews completed, only two reported having stored any drinking water. The most often given answer as to why not was the belief that either the city's water supply would not be affected in an earthquake or that the respondent didn't feel it necessary since an occurrence was highly unlikely. Clearly residents in the Los Angeles basin are risk adverse. They live in an earthquake culture, but cling on to the belief that it will not affect them.

Food also quickly became a problem. Most food stores in the Northridge area were closed. In addition, and apparently crippling, most fast food restaurants were also damaged and/or closed. Residents in the area must have had few provisions for this eventually. One public service that radio provided was to announce restaurants that were open. This enabled those without food to get a meal. Naturally the Red Cross was quick in responding with emergency food kitchens, which were well attended

once in operation.

Earthquake insurance is another factor that comes to mind in looking at preparedness and belief in future earthquake events. It was widely reported in both print and mass media that fewer than twenty-five percent of homeowners had any type of earthquake insurance. It does, however, beg the question why do so few residents in a known seismic active area carry any protection for their personal property? Again one can conclude that this is a risk adverse population. A population that routinely jokes about the "Big One", but does little or anything to protect itself from possible damage, be it financial or otherwise.

Conclusions

This final section will draw conclusions, based on the description above. The Northridge earthquake was an expensive event by any standard. Sixty-one persons lost their lives as a result of the earthquake. The majority, 57, occurred in the City and County of Los Angeles. In addition, current damage figures are being set at around 30 billion dollars. This number is sure to rise until the region is whole again.

There are many lessons to be learned from the event. Some of these are new lessons, many have been repeated after each such event, with lessons not being learned and internalized. The first lesson is that earthquakes happen, and the public can prepare itself for such events. Public outreach is necessary at all levels of the population, government, and the private sector. The

theory of risk communication is being used by an ever widening group of officials, whose task it is to protect the public. Following an event like the Northridge earthquake, it bears repeating again. The public needs a steady flow of information to encourage them into action.

American cities are becoming more racially and ethnically diverse as we proceed into the 21st century. This fact must be recognized by emergency managers. Organizations need to have personnel available who can communicate with major groups in society. Barring this happening, these groups in society will take on an increasingly disproportionate amount of the risk. This will occur since their decisions will be based on inaccurate or lack of information. This demographic fact must also be recognized by the lead agency in disasters, namely the federal Emergency Management Agency (FEMA).

FEMA is in the position of having regional offices. These local offices must be tasked with knowing the population breakdowns of their regions and ultimately being able to deal with those populations, when the need arises. The cry was loud and long following the Northridge earthquake that FEMA personnel taking applications needed to be bi-lingual. FEMA should address an official policy on this topic, before they are forced to in future events.

The mass media played a pivotal role following the Northridge earthquake. They did repeat after shock warnings with great regularity. They devoted countless hours to the event.

Government leaders, and emergency managers need to keep the lines of communication open to news organizations. When the need arises, they will be in a position of knowing the news personnel. That relationship can be used to inform the public on the latest news they need for taking protective actions.

Insurance is another area that needs reappraisal. Much of the loss from the earthquake is, by default, the responsibility of the federal government. One main reason for this is that the vast majority of homeowners have elected not to carry earthquake insurance. Homeowners have, in effect, shifted their risk to the federal government. Perhaps this too should be reevaluated. One possible solution is to designate regions where earthquake insurance is mandatory. Thus the private sector could also take part in the reconstruction phase.

The purchase of insurance might also be considered by the public sector. Historically government has been self-insured. Very often this was done to save short-term costs to the tax payers. Northridge might be an event to rethink this policy. Los Angeles now is in the position of rebuilding 300 public schools, and many other public buildings. What will the total cost be? The same question remains also for the state government. The California State University Northridge campus experienced over 350 million dollars in damage. Almost the entire campus must now be rebuilt. Might it have been better to spread that risk also to the private sector? Schools are only one part of many buildings and other facilities lost by the many governments that comprise

the Los Angeles basin. Now the region will be paying higher taxes, possibly passing new earthquake related bond issues, and other measures of tax collection to rebuild. Could part of that burden have been shifted by having had some form of private earthquake insurance? These and other questions remain.

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