

Earthquake Knowledge, Preparedness, and Home Readiness in Oakland

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Introduction

We are students from different public high schools in Oakland, California. We conducted an earthquake knowledge and preparedness study in Oakland as part of our work with the East Bay Academy for Young Scientists (EBAYS) program based at the UC Berkeley Lawrence Hall of Science.

According to a United States Geological Survey (USGS) study conducted in 2008, there is a 63% probability that a 6.7 magnitude (M) or larger earthquake will occur within the next 30 years in the San Francisco Bay Area. Given that Oakland is located near two major faults, the San Andreas Fault and the Hayward Fault (Figure 1), if such an earthquake were to occur our community would be deeply affected. For example, the 1989 Loma Prieta earthquake (M=6.9) caused significant local damage, including bridge and freeway collapse, and destruction of buildings related to several major fires. In our study, we surveyed Oakland residents to gain a better understanding of their earthquake knowledge and preparedness levels. Our hypothesis was that earthquake knowledge would affect emergency preparedness and home readiness among Oakland residents.

Operational Definitions



Figure 1 Bay Area fault locations

Earthquake knowledge: Understanding that the closest fault line to the East Bay is the Hayward fault and that another major earthquake (M=6.7 or higher) is anticipated to occur (Figure 2).

Preparedness: Consists of three-day emergency supplies, and an emergency plan for themselves/ family (Figure 2).

Home readiness: Homes ready for a major earthquake would be retrofitted with bolted foundations, and strapped gas heaters. Additionally, readiness would involve the survey participant knowing the locations of shut off valves for gas, electricity, and water (Figure 2).

Materials and Methods

The survey instrument consisted of 13 questions used to interview 180 random volunteer participants at four locations in Oakland during July 2011 (Figure 2). The survey was created using Pendragon, and then transferred to Palm Treo Smart Phones for interviewing participants.

Survey Locations:

- Life Academy at Foothill and 35th Avenue in East Oakland
- 51st Street and Telegraph Avenue in North Oakland
- Lake Merritt near downtown Oakland
- Fruitvale Bay Area Rapid Transit (BART) station in East Oakland



Image 1 Student conducting a survey

Materials and Methods (continued)

Earthquake Knowledge		Preparedness	
Question	n=	Question	n=
Do you believe that the Bay Area is due for a major earthquake?	179	The doorway is the safest place to be during an earthquake.	165
What fault is the East Bay closest to?	180	Do you have an emergency plan for yourself or for your family?	176
Home Readiness			
Question	n=	Question	n=
Have you inspected your home or living complex for earthquake readiness?	169	Do you have enough emergency supplies for you and your family to survive for at least 3 days without power, gas, or water service?	168
Has your home or living complex been earthquake retrofitted?	171	How reliant are you on disaster responders (government agencies, Red Cross, etc.) to provide assistance within the first few days of a disaster?	169
Which do you know how to turn off in your home or living complex after a quake (gas, electricity, and/or water)?	169		

Figure 2 Survey instrument questions

Results

Survey participants were earthquake knowledgeable.

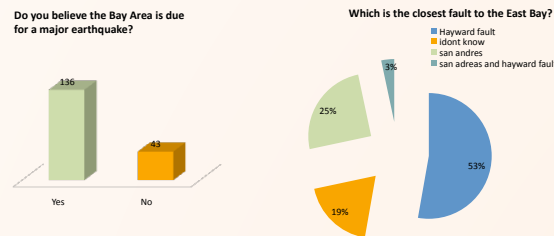


Figure 3 Earthquake knowledge Data

Survey participants were emergency prepared.

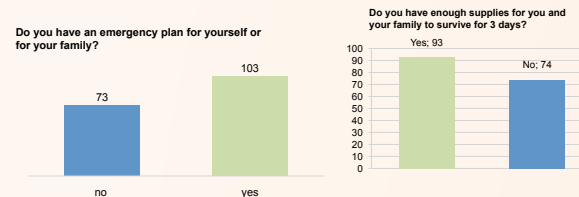


Figure 4 Earthquake Preparedness data

Results (continued)

Survey participants' homes were not earthquake ready.

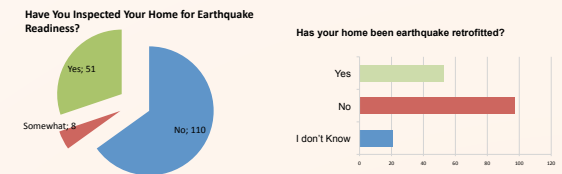


Figure 5 Home readiness data

Conclusion

Our survey results show that survey participants were both earthquake knowledgeable and prepared. Out of the participants, 76% believed that the Bay Area is due for a major earthquake, 53% know the Hayward fault is closest to the East Bay, and over 55% reported an earthquake plan and/or supplies in place. However, participants had a low level of home readiness, with only 35% and 43% reporting homes inspected and retrofitted for earthquake safety.

In future studies, we intend to use public records to determine more precisely the number of homes and buildings in Oakland that have been retrofitted. Using this data we can determine which areas in Oakland need to be targeted for distribution of more information on retrofitting and earthquake safety. We also intend to investigate possible correlations between different demographics (including income and ethnicity) and incidence of retrofitted homes. Lastly, we intend to research pre and post-earthquake preparedness to identify potential hazards in homes as a means of reducing impacts (i.e., fires and damaged structures).

References

- Environment. National Geographic. Bridge to Classroom. <http://www.eduweb.com/portfolio/bridgetoclassroom/engineeringfor.html>
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- KQED (video-recording). Earthquakes: Breaking New Ground <http://science.kqed.org/quest/video/earthquakes-breaking-new-ground/>

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