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# A Year After South Napa Earthquake, Damage Proves Widespread and Costly

*Ninety-one percent of respondents in CEA research experienced some kind of damage*

**SACRAMENTO, Calif., August 24, 2015** – The California Earthquake Authority (CEA) today announced preliminary findings of research on how the 6.0-magnitude earthquake that struck Napa one year ago today affected single-family homes. Although a 6.0 magnitude earthquake is not considered a major earthquake, the damage was widespread and has proved costly to homeowners.

In the first phase of a CEA research project on the quake's impact, 633 residents of the city of Napa completed an online survey to document how their houses performed in the earthquake. Key findings include:

- Ninety-one percent of respondents experienced some kind of damage at their house that led to potential safety hazards.
- Forty-seven percent said their house needed repairs that took over a week to complete, including 20 percent who said important repairs were still not finished as of six months later.
- Ninety-four percent of respondents experienced some kind of utility disruption at their house, and for 12 percent it lasted more than four days.
- Thirty-seven percent said the total cost of the event for their household was over $5,000, including 13 percent who had costs over $25,000.
- Only 12 percent of houses surveyed were retrofitted.
- Retrofits were more common in older (pre-1950) houses and in houses with cripple walls greater than four feet (chest height).

"Reliable information on how houses and other residential structures performed during an earthquake is rare," said CEA Chief Mitigation Officer Janiele Maffei, who is a structural engineer. "Most research to date has focused on the seismic safety of public and commercial buildings. The Napa quake gave us an opportunity to study the resistance of houses to seismic shaking and insight into the types of seismic retrofits completed and their effectiveness."

## Damage Reported

Homeowners reported a variety of damage from the Napa quake. Some examples of safety hazards included falling objects (78%), toppled furniture (52%), and broken windows (10%).

More serious and costly damage included chimney damage (28%) and large wall cracks both outside and inside (11% and 22%), which generally indicate structural (not just superficial) damage. In the most severe cases, someone was injured (7%) or the house could not be fully re-occupied (a building inspection resulted in a yellow or red tag, 15%).

[See Figure 1: Types of Serious Damage Described by Surveyed City of Napa Homeowners]

**Pre-1950 Houses Were More Negatively Affected Than Newer Houses**

While the earthquake impacted houses built in various eras and with varying structural features and materials, older houses (built pre-1950) experienced more severe types of damage. Twenty-three percent of houses surveyed were built pre-1950.

Year of construction was the most common factor associated with an increased time until services were restored, more time to complete necessary repairs, and a more significant financial impact of the event on the household.

Specifically, pre-1950 houses were significantly more likely to:

- Be yellow- or red-tagged[1]—1 in 4 for pre-1950 compared to 1 in 10 for 1950 and newer construction.
- Experience a higher financial impact from the event—1 out of 4 owners of pre-1950 houses said total repairs exceeded $25,000.

[See Figures 2, 3a and 3b below]

**Homeowners Make Tough Decisions on How to Pay for Repairs**

Fewer than 10 percent of Napa-area residents had earthquake insurance, and survey respondents shared stories about their struggles, tough decisions and long timelines involved in fixing their damage. Some spent money out of savings, refinanced, or took on a new loan. Others who had houses for sale or in escrow were forced to suspend moving forward. Many were surprised by the small dollar-amount of government grants they received, sometimes under $1,000.

Twenty-one percent believed their homeowners insurance covers earthquake-related damage, which is true only if an additional earthquake policy is in place. This contrasts with the fact that only eight percent of respondents said they have an earthquake insurance policy.

"Too many Californians are unaware that their homeowners insurance policy doesn't cover earthquake damage, or they simply believe that an earthquake will never impact them personally," said CEA Chief Executive Officer Glenn Pomeroy. "While we paid about $3 million in claims to hundreds of CEA policyholders in the Napa region, there were far too many people we were not able to help because they didn't have an earthquake insurance policy."

[1] A "red-tagged" structure has been severely damaged to the degree that the structure is too dangerous to inhabit. Similarly, a structure is "yellow-tagged" if it has been moderately damaged to the degree that its habitability is limited. Tagging is performed by government building officials, or, occasionally during disasters, by engineers deputized by the building official.

## Few Houses Were Retrofitted

Wood-framed houses without adequate bolting and bracing[2] are prone to sliding or toppling off their foundation during an earthquake.

Only 12 percent of respondents indicated their house had been retrofitted before the Napa quake, with 9 percent reporting that anchor bolts had been installed. Approximately, eighty percent of those who reported retrofits initiated the work themselves. On the other hand, 21 percent of all homeowners were unsure if their property had been retrofitted at all.

Owners of houses that had not been retrofitted before the event described a variety of reasons why. More than half expressed interest in retrofitting their property but were "confused about what's involved" (39%) or "want to but it's too expensive." (46%).

## Final Report in December

The online survey is the first part in this two-phase research project. Phase Two will include approximately 50 onsite house inspections by trained personnel to inspect the seismic retrofits and interview homeowners for more details.

The full report is expected to be available in December. CEA plans to share the report with officials to improve programs that encourage Californians to retrofit and inform future engineering practices and disaster policies.

## Survey Methodology

An online survey with 52 questions collected data from Napa homeowners. The survey, conducted during February and March 2015, targeted approximately 38,000 single-family dwellings that are both in the 94558 and 94559 ZIP codes™ and within the boundaries of the city of Napa. Homeowners were targeted via door hangers, ads in the Napa Valley Register and other methods. The CEA received 633 qualified responses, with a margin of error of +/- 4 percent.

Sharyl Rabinovici, PhD, a Bay Area-based disaster-mitigation consultant, is conducting the research on behalf of CEA.

## About the California Earthquake Authority

The CEA is a publicly managed, privately funded, not-for-profit organization that provides residential earthquake insurance and works to encourage all Californians to take steps to reduce their risk of earthquake loss.

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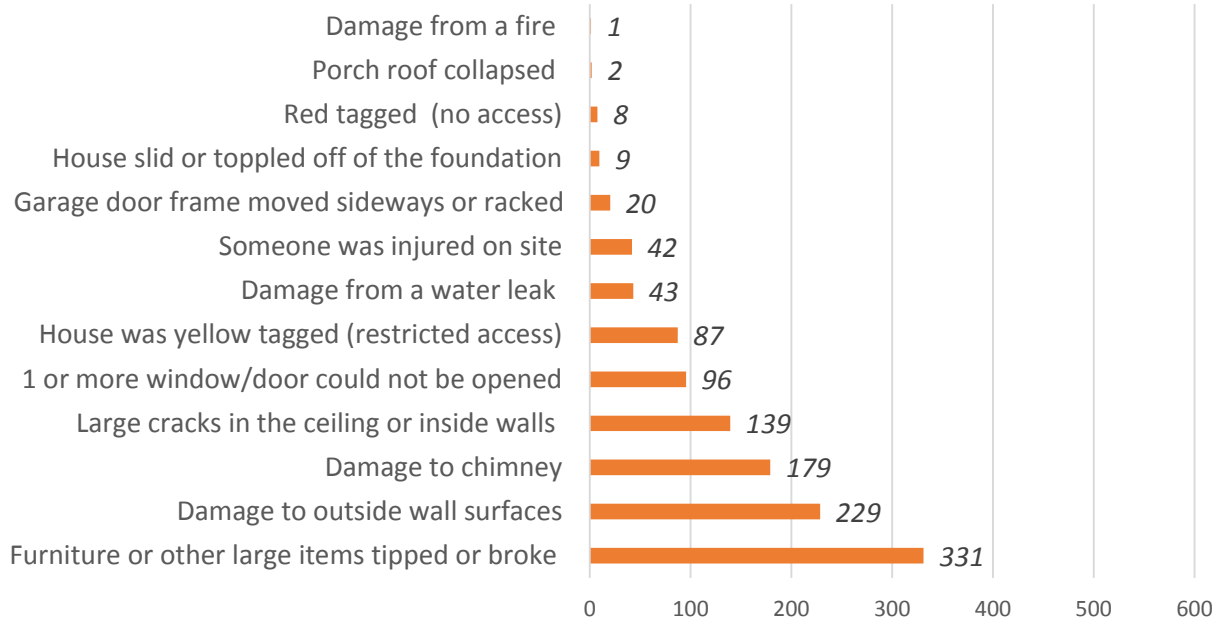
[2] Older houses are often not bolted to their foundations and lack bracing on the wood framed exterior walls enclosing the crawl space. This type of serious damage can be prevented with a proper seismic retrofit of the crawl space, which includes bolting the house to its foundation and bracing the cripple walls.

# Figures: Survey Highlights

## Figure 1: Example Types of Damage Described by Surveyed City of Napa Homeowners (N=633)




## Figure 2: Types of Service Disruption Reported by Surveyed City of Napa Homeowners

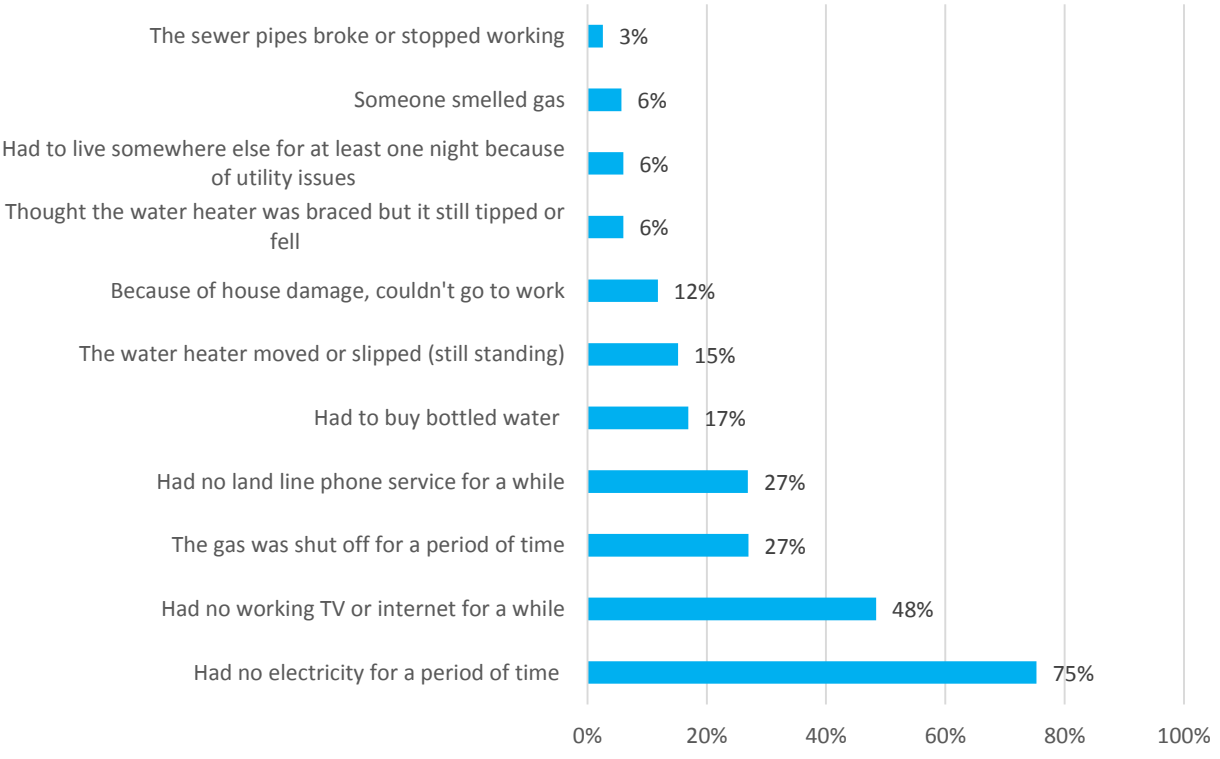


Figure 3a. Relative Degree of Damage as a Percent of Houses of Similar Age

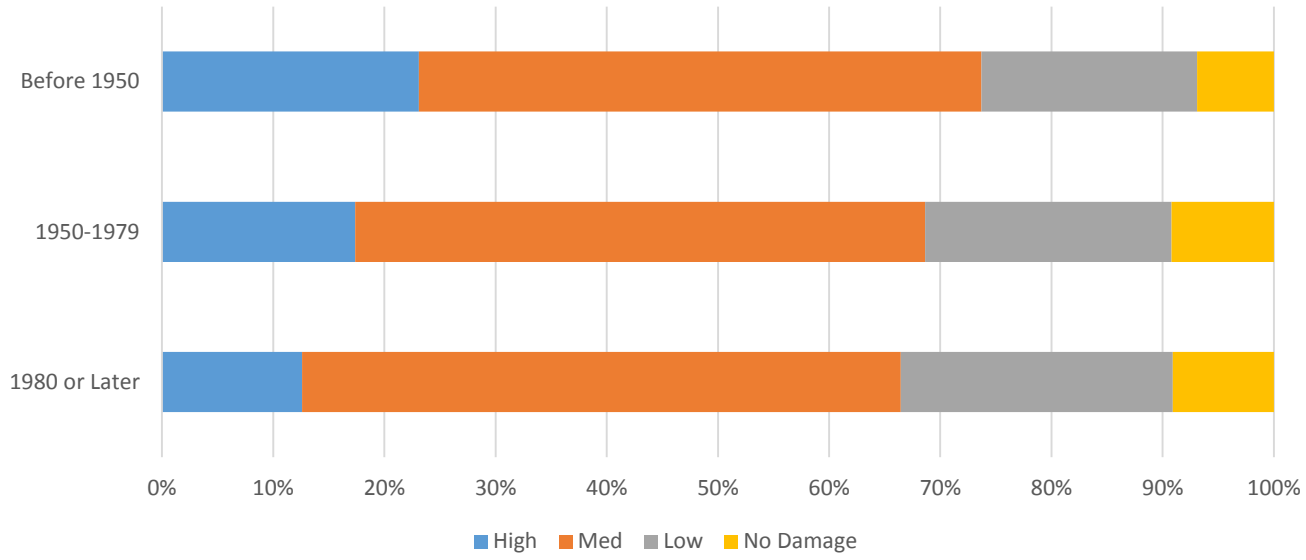



Figure 3b. Degree of Reported Damage by Age of House

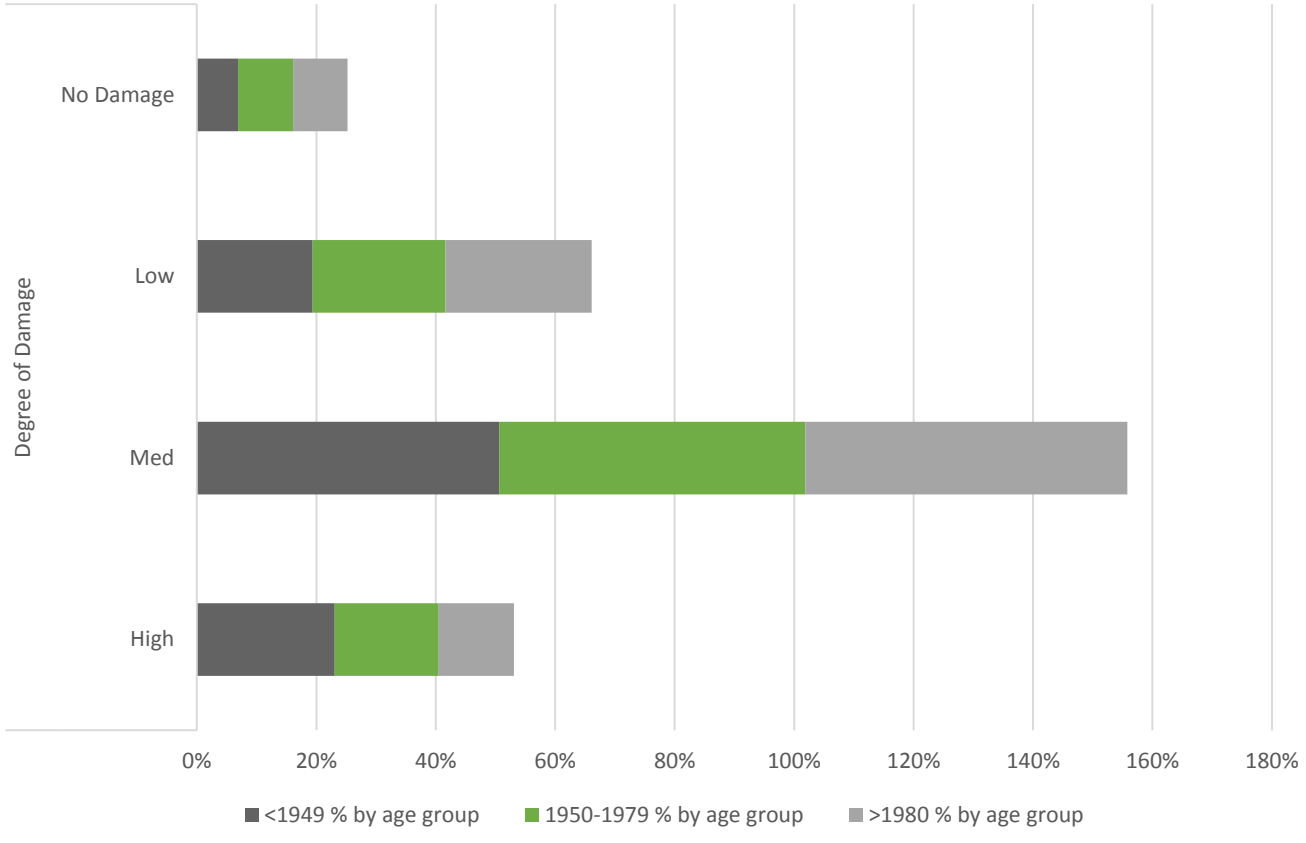


Figure 3c. Degrees of Reported Damage by Age of House

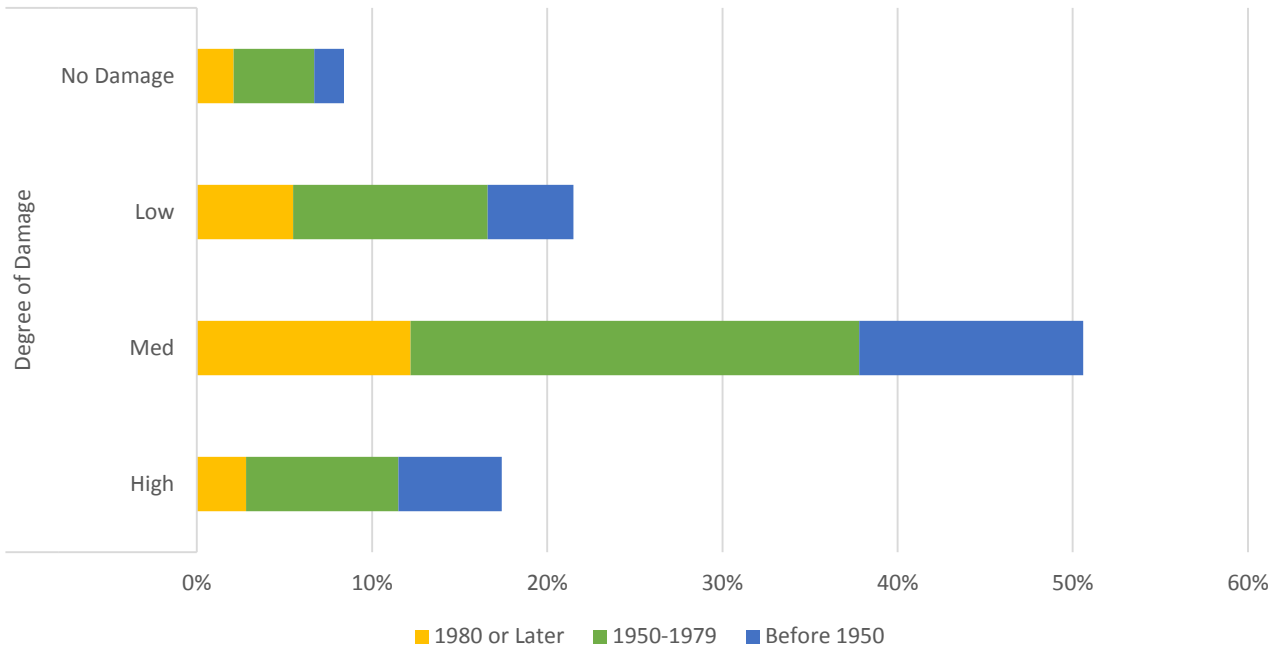
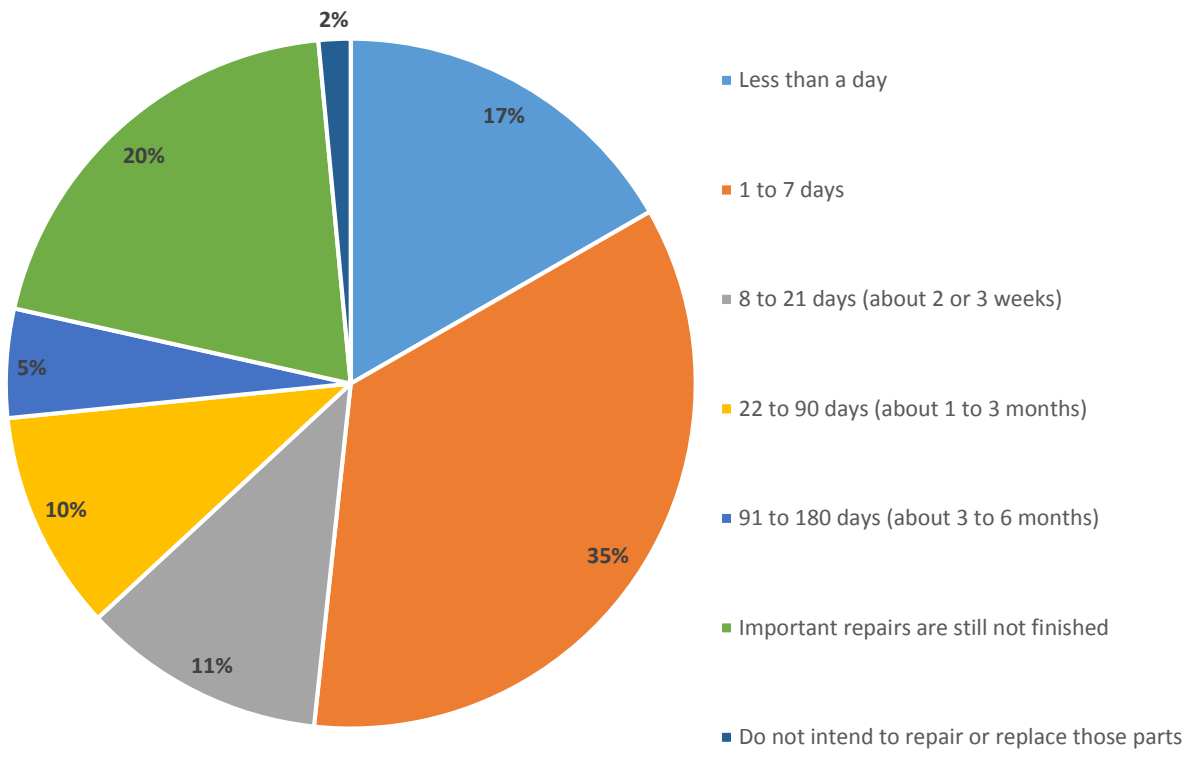
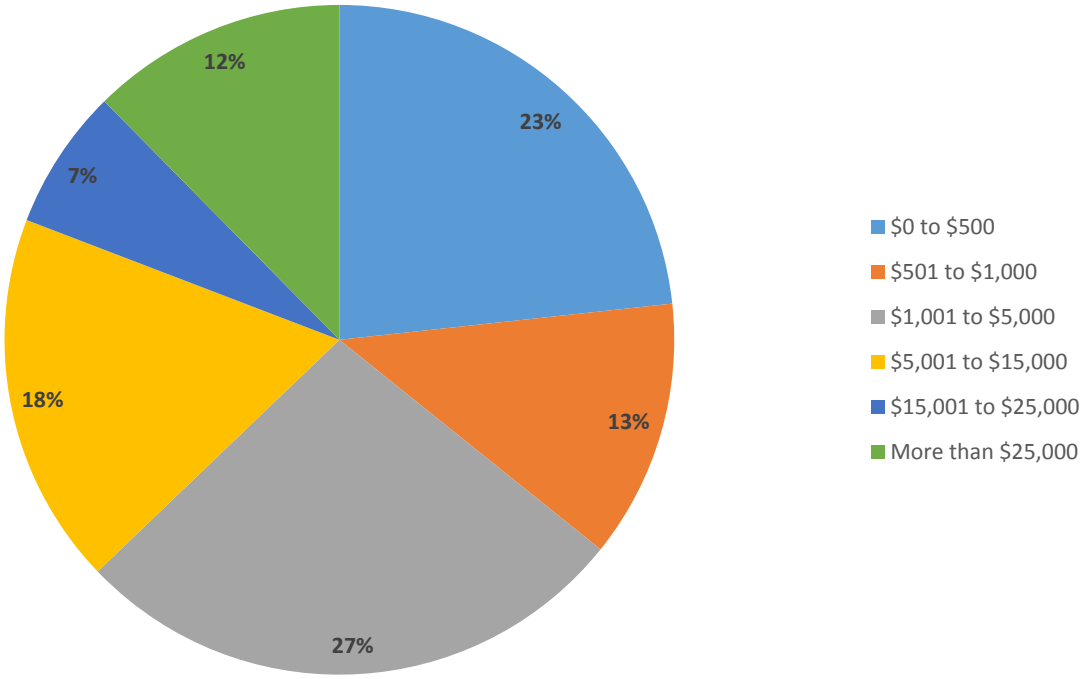


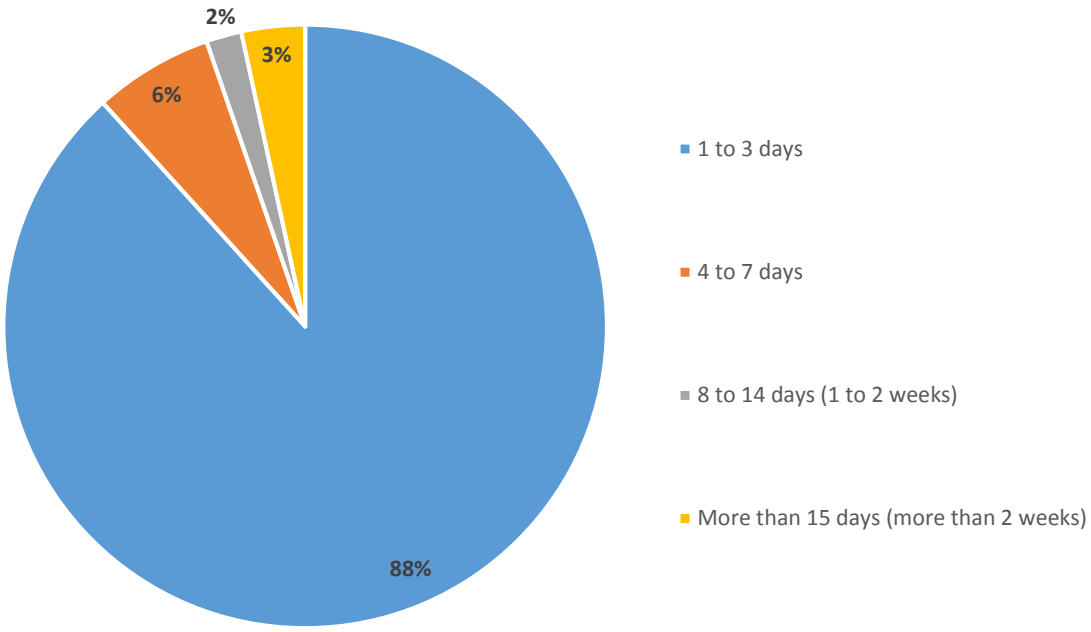

**Figure 4: Time Until Clean-Up and Essential Repairs Done**



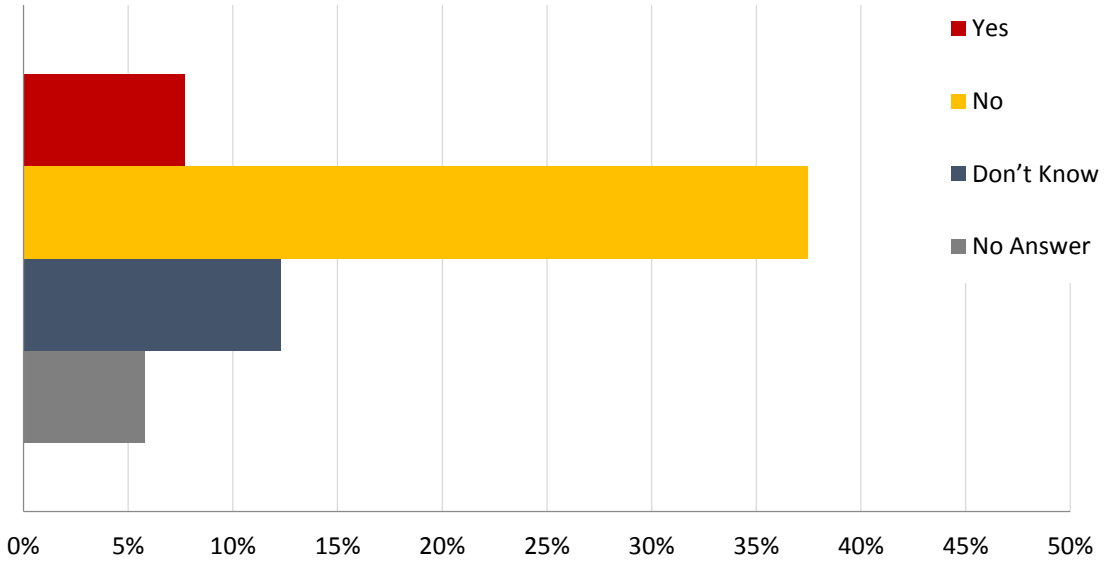
## Figure 5: Estimate of Total Dollar Impact of Event on Household



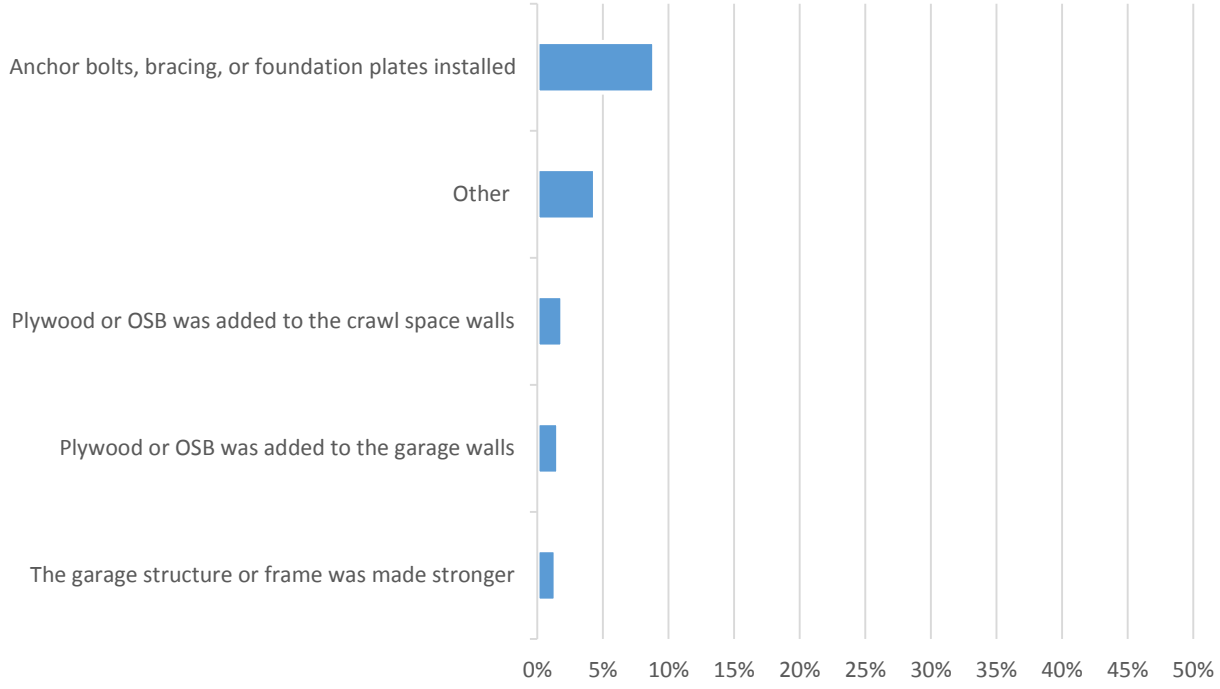

## Figure 6: If Services Were Disrupted, Number of Days Until All Services Were Working Again



## Figure 7: Self-Reported Whether Any Retrofit Work Had Been Done Before the August 24, 2015 Earthquake




## Figure 8: Types of Prior Retrofit Work Reported



## Figure 9. Examples of Actions Homeowners Took After the August 24, 2015 Earthquake