

The Problem

If water heaters are not properly braced, they can topple over during an earthquake, causing:

- Broken gas lines and gas leaks
- Fires resulting in major damage to homes
- Broken water lines and flooding

How to Identify

- ✓ Is the water heater freestanding?
- ✓ Are there straps or other types of restraints securing the water heater?
- ✓ Are there straps or restraints bolted to the studs?
- ✓ Are there flexible pipes for water and gas connected to the water heater?

Remember

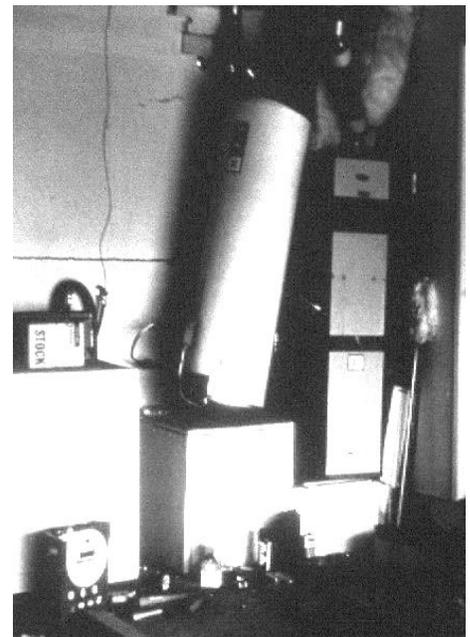
- Replacing a water heater after an earthquake can cost more than \$500.
- Repairing fire damage and flooding damage can cost several thousand dollars, including the entire cost of your home!
- There are many different ways of strapping a water heater. One example is shown on the next page.
- Check with your local Building Department for details of local requirements.
- Know where your main water valve is so that you can shut it off if you have a water leak.
- Know where your main gas valve is so that you can shut it off if you hear or smell a gas leak. (See page 25)

Water heater



Governor's Office of Emergency Services

Figure 7 - The unbraced water heater in this home fell during an earthquake; the resulting fire destroyed the home.



Gina Selvadurai

Figure 8 - This unstrapped water heater tipped over during the 1984 Morgan Hill Earthquake. Fortunately, gas and water lines were not ruptured.

Water heaters must be braced (securely attached) to the studs in a wall.

The Solution

There are many solutions – all relatively inexpensive.

- Purchase and install a strap kit or bracing kit from your local hardware store.

Other options include:

- Have a licensed plumber strap your water heater according to code.
- Use metal tubing or heavy metal strapping and lag screws and washers to secure the water heater to the wall studs.

The gas and water lines should also have flexible pipes. These are safer than rigid pipes during an earthquake.

Be sure to check the straps once a year. They may come loose due to vibrations, or other causes.

How-to Resources

- Your local home improvement store
- Go to www.fema.gov, and under the Earthquake section, search for “Brace Hot Water Heaters” for specific bracing instructions.
- Publication: [Guidelines for Earthquake Bracing of Residential Water Heaters](#). Department of General Services, Division of the State Architect, revised August 11, 2004. Available online at http://www.documents.dgs.ca.gov/dsa/pubs/waterheaterbracing_08-11-04.pdf.

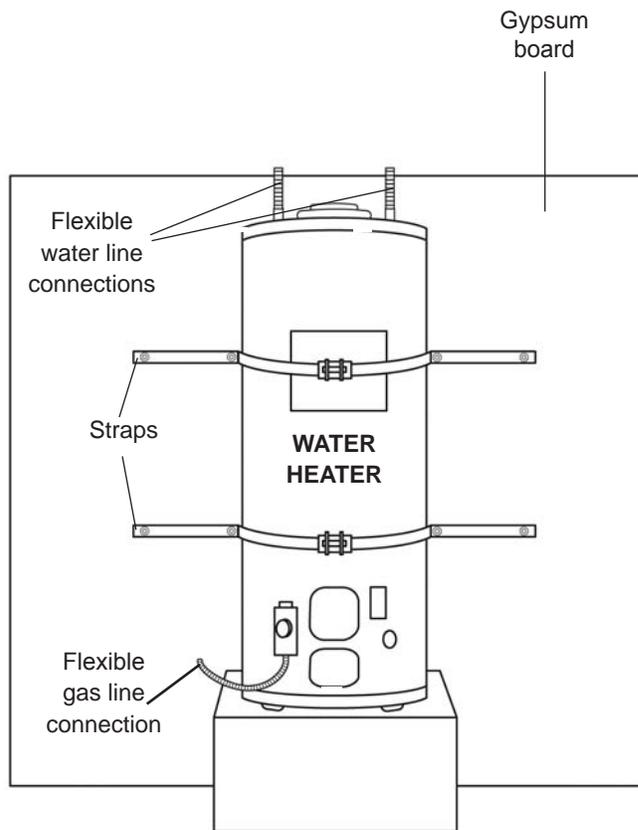


Figure 9 - One method of water heater bracing. Straps and screws visible with water heater in a garage installation.

Comparison of Cost: Preventing vs. Repairing Earthquake Damage

| Project Cost | Cost to Repair After an Earthquake |
|---------------|--|
| \$20 to \$200 | \$500 to total value of home (if completely destroyed) |