



## **EMERGENCY PREPARATION**

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**EB1728**

**This bulletin is a planning guide for residents who want to know how to minimize earthquake damage to their homes. Following the practices and procedures in this manual does not guarantee individual safety or the ability of a housing structure to endure an earthquake.**

### **YOUR BIG STEP**

Having your hands on this bulletin shows you are interested in surviving a major earthquake. Please take a moment to look around and think where the safest place in your building would be. If you were outside, where would you want to be? If you read no further than this paragraph you have taken the first big step toward minimizing injury during an earthquake. Because tremors give no warning, this time will be well spent if you ever find yourself in the midst of such a disaster. This bulletin provides some of the basic steps to prepare for an earthquake in your area.

### **GETTING READY**

#### **EVERY FAMILY NEEDS A SURVIVAL BOX**

Keep a durable box on hand containing essential supplies for use during a time when no

public services (roads, power, natural gas, water, telephones, emergency medical services and police) will be available.

The Red Cross offers excellent classes in first aid and survival skills. When you prepare, the Red Cross suggests that you plan for a week. Some good items for the box include:



- First aid kit
- Medicine that your family uses
- Flashlight and portable radio with enough batteries of the correct size for a complete change.
- Matches and candles
- Duct tape
- Paper towels, toilet paper, and garbage bags
- Canned goods, can opener, and dried foods
- Any food items necessary for someone on a special diet, such as a diabetic
- Bottled or other form of safe drinking water
- Cooking devices such as a camp stove or charcoal burner with plenty of extra fuel.

***Both should be used out of doors.***

## KIT MAINTENANCE AND USE



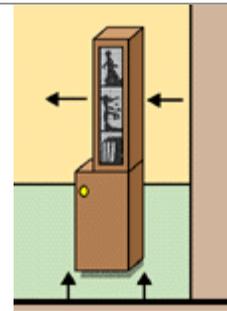
One problem with having a kit such as this would be keeping it in a usable condition. You must replace the food and batteries every year or so. What about snacks for children? Keep matches and candles dry. Observe expiration dates on over-the-counter medicines and rotate supplies as needed.

A hall closet is a good place to store "the box," since most families would take shelter in the hallway during an earthquake.

Using a stove, matches, and candles can be a problem in places where a natural gas leak is possible.

## CHINA CABINET

Some large china cabinets sit on a base. During a tremor, the top unit could slide off the base. Several different types of fasteners are available to keep these together securely. Remember to separate the units before moving them.



## HOT WATER HEATERS



Most water heaters have sections of flexible tubing to make replacement easier. Flexible tubing also helps during an earthquake when movement occurs. Some older installations may not have flexible lines. Consider installing flexible lines if you replace the water heater. Add strapping material to help hold the water heater upright. This reduces the chance of a hot water heater falling over.

## WATER SHUTOFF VALVE

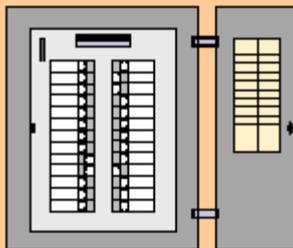
This valve often is located in the basement of the house or in a first floor closet. You should know where to find the shutoff valve in case a water leak occurs. It may be a good idea to determine if water is leaking from the hot or cold water line. If the hot water line is leaking, turn off only the hot water. The hot water valve usually is located above the water heater. If you can stop the hot water this way, water to toilets and sinks will still be available.

The valve may be difficult to turn off, so use a towel over the valve or wear a glove.

In some cases, you may have to run a screwdriver through the handle spokes to start the valve stem turning down to its seat.



## ELECTRICAL DISCONNECT

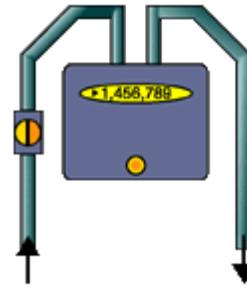


Know where the main electrical power circuit breaker or fuse box is located for the house. Keep the area clear in front of this electrical panel.

## NATURAL GAS SHUTOFF

The main shutoff valve for natural gas is always located outside near the gas meter. Keep a wrench handy in the garage or garden shed, to turn off the natural gas in an emergency.

The utility company must turn the gas back on for you, when it is safe to do so. At that time, an inspector also will check the system. If your house is severely damaged, you might find the valve locked in the off position. This is done to protect you, your house, and possibly your neighbor's house from a serious fire or explosion.



## FOUNDATION ANCHORS



It is very important that the house does not slip off the foundation during an earthquake. During new construction, builders anchor the wood framing through the sill plate of the wall to the foundation. Your city's building code covers this. If the bolts are installed into the foundation but the nuts are not placed on them, the wall may rise over the bolts and come off the foundation if the house pitches during an earthquake.

Sometimes a child will find a wrench exciting and remove the nuts from the anchor bolts in an unlined garage. Check the anchor bolts occasionally, and replace the nuts if necessary. To discourage removal after replacing the nut, beat the end of the bolt with a hammer. Blunting the end of the bolt will make it more difficult to remove the threaded nut.

## HOUSES WITHOUT FOUNDATIONS

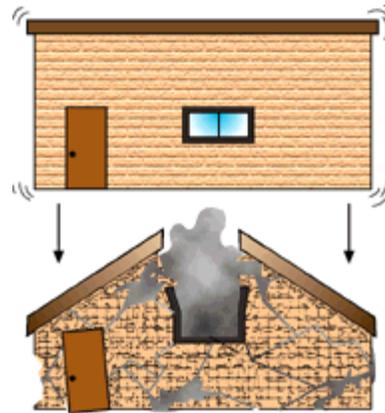
Older houses may not be anchored to the foundations. In fact, some may not even have foundations. This may be one of the things to check, particularly if some extensive remodeling is to be done.

## OLD BRICK HOUSES

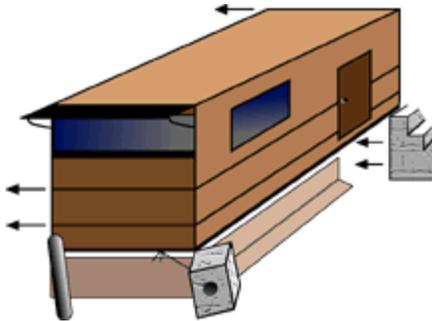
Older brick houses may experience extensive damage during a tremor because no structural reinforcement exists within the walls. If the house shakes violently, the walls will turn into a pile of rubble. Technology is available to reduce the chance of this happening. Communities wanting to preserve their beautiful brick homes can talk to a local civil

engineer about adding support to these older masonry structures.

Earthquakes are a primary cause for homelessness around the world. Earthquakes cause extensive damage to cities that may take years to rebuild.



## MOBILE HOMES



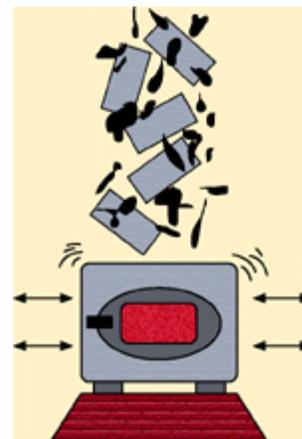
Mobile homes have some unique characteristics that can cause problems for owners in earthquake areas. Since most of the services attached to the mobile home are flexible, the home can move. Anchor your mobile home to keep it from moving off its blocking and piers. Check with your local mobile home supplier for the proper anchors. They may offer some protection.

It is a good idea to leave the tires and wheels on a mobile home. This way, if the home shakes off its piers, it will drop less than it would if the wheels were removed. Less damage might occur, and it will be easier to lift the mobile home back on its piers.

## WOOD STOVES

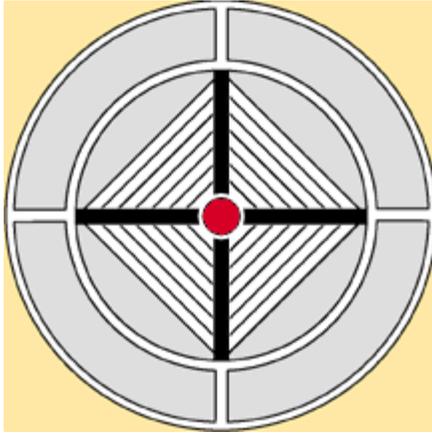
Unfortunately, during a violent earthquake, wood stoves may move and tip over. There is no history of problems encountered when a wood stove moves about. We can only suggest that you anchor a wood stove at the base and attach each section of the pipe exiting from the stove, using metal screws at the joints. Most stoves need clearance from the wall to meet fire code requirements. This means that you cannot band the stove to the wall, as you could a hot water heater.

It is a good idea to have two fire extinguishers in the house. One fire extinguisher may not completely put out the fire in a wood stove. Your local fire department can answer questions as to the correct type of fire extinguisher to have in your



home.

## SMOKE DETECTORS



All dwelling units (houses, apartments, dorm rooms, motels) in the United States should have smoke detectors. For approximately \$10.00, you can purchase a battery operated unit that will get the job done. Check the batteries regularly to see that they are working properly.

Some detectors are wired into the house. However, if the house shakes violently, you cannot see if wiring in the framework of the building has been damaged. Many unforeseen things can happen to a battered house. The circuit breakers should provide protection.

A smoke detector works day and night to monitor the situation and will give considerable peace of mind when you are asleep. The unit is more reliable than a person standing fire guard. If placed near the kitchen it may not be able to tell the difference between smoke from hamburgers or a fire, but the alarm can give a warning that might prevent loss of an entire house.

## KITCHEN CABINETS

Do not store things on top of wall cabinets that could fall on people during an earthquake.

Consider adding latches to secure doors. Also, place heavy items on bottom shelves. Attach tall furniture to the wall with fasteners, which can be found in building supply or hardware stores.



If you choose to keep items on the top of cabinets, consider the following options:

- Make a notched board that will both wedge china items so they cannot move yet not be visible from elsewhere in the room.
- Use plate hangers to mount dishes on the wall. These units can be modified to keep plates from rolling off the top of the cabinet.
- Install a rail to prevent collectibles from rolling off the top of the wall cabinets. You could easily incorporate the rail into the design of the kitchen.

Nothing is certain in this planning, because an earthquake tremor may be

so great that it will take entire houses, as happened in the 1960 Alaskan earthquake.

## CONTACT PERSON

Designate a contact person in another location where all family members can "report in." This can save considerable amounts of anxiety.

## EARTHQUAKE DETECTION IN CHINA

For a long time people in China have thought that animals could sense an imminent earthquake. Some people in the United States also think this is true. Studies are underway in China to determine if animals can warn that an earthquake is about to happen. Results occasionally show up in the popular press.

Whether or not they can sense an earthquake coming, animals do have a natural ability to look out for themselves during a tremor. Pet owners should not take time to pick up their pets during an earthquake, but protect themselves quickly. Animals confined in cages, pens, or stalls need assistance.

## DURING THE QUAKE

The Federal Energy Management Agency (FEMA) says that most people are injured while hurrying to get in or out of a building. A serious earthquake scatters debris and broken glass, so move about only with shoes on. Injuries and deaths occur when people are hit by falling glass and construction material. In San Francisco, decorative cement overhangs on buildings fell. In southeastern Idaho, the wall of a building and power lines fell on people, causing injuries and deaths. The forces involved can toss debris some distance from a building.

The single-story, wood-framed house that meets building codes is probably the safest type of structure because wood structural members absorb shock and yield. In essence, the wood house acts as a shock absorber, while a brick or other type of structure will not.

No matter what form of structure you are in, all sources of information say to crawl under something substantial, such as a heavy table or desk; go to the center hallway of your house, or stand in one of the interior doorways. Because the door may start swinging, stand opposite the side with the hinges. Watch closely so that your hands or feet are not caught in the door. When outside, remember to stay clear of buildings and power lines to prevent being hit.

If you care for school-age children, ask them to demonstrate what to do during an earthquake. They might be able to show you something you did not know. People in high-rise buildings should move away from windows and outside walls. Avoid using elevators, as you would in the case of fire.

## AUTOMOBILES



During an earthquake, your car is one of the very best places to be; provided you're not on a bridge, under a bridge, or near tall structures or power lines that could fall on the car.

Relax, pull over to the side away from obstacles, keep your seat belt fastened and listen for news updates on a local radio station. Because of the car's movement, you may not notice the quake unless the road heaves or cracks in front of you.

When the quake appears to be over, drive with caution, particularly if you need to cross over or under bridges. The highway department will soon be on its way to check them. In the mountains, downed trees and avalanches may present hazards to driving.

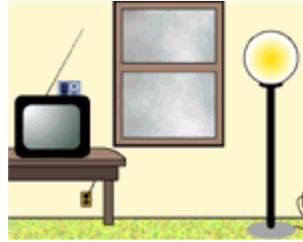
## AFTERSHOCKS AND SENSIBLE CHOICES

When the noise and shaking stop, assess the damage by looking around. Knowing you have been preparing for this earthquake should ease your mind. If you are home at the time of the quake, and depending on its severity consider these options:

- 1)** If the house has been damaged or is burning, decide quickly if you have time and access to turn off the power, natural gas and water before you leave.
- 2)** If the house or apartment looks safe, you may have only books, cupboard contents, pictures, and china on the floor. After the moving and shaking stop, stand quietly and listen for any unusual sounds. Check the refrigerator for items that may have toppled out or spilled. Press the door closed in case the tremor has jarred it enough to open the door seal.
- 3)** Check areas where you store garden products or cleaning supplies with caution, in case any of the containers have shattered or spilled. Vinegar and ammonia can cause caustic fumes if they mix with other cleansers.

## LOOTING

No one wants to think about looting when a disaster strikes. During the last earthquake in the Oakland-San Francisco Bay Area, little looting occurred. When public service agencies are pressed to the limit, you may want to establish some sort of neighborhood watch program with people who live nearby.



## HOW ARE YOU AND YOUR FAMILY?

Never take it for granted that everyone in your family is okay. One family member or a pet may be caught somewhere in the structure and may need help. Seek them out.

## HOW IS YOUR LIVING AREA?

After the shock, you may need only to straighten a few pictures. However, the quake may force you to start making some real changes in your lifestyle. For example, an old brick structure may be on the brink of collapse, a newer wood-framed structure may have slipped off its foundation, or windows could be broken.

## DO YOU SMELL NATURAL GAS?



Our natural gas supplier recommends that if there is a faint smell of gas, it is best to keep the gas service on in the house, making it easier to find a leak. If the odor is strong, shut off service. Once you have shut off the service, your natural gas supplier is the only one who can turn it back on.

## DO YOU SMELL BURNING WIRES?

When a house pitches and shakes in a serious earthquake, wires can be ripped from receptacle boxes or break inside the wall. Chandeliers can fall during the quake. These are all reasons to stay in the house after a quake. Decide whether or not to turn the power off at the main circuit breaker. This is a hard choice, because turning off the electric power



may turn off the heat and hot water supply.

### ARE THERE ANY CRACKED WINDOWS?

If the quake has cracked some windows, tape the cracks with duct tape and leave the glass in place. You may need the glass to keep warm. If you take your window to the repair shop, it might be the 10,000th window in for repairs and the shop could be out of glass. When you have assured yourself that the inside of the house looks safe, then check the outside, observing all of the precautions we have mentioned.

### CONDEMNATION

In a major earthquake, many buildings will be damaged. In this situation inspectors may declare the house you live in uninhabitable and ask you to leave. It will take time to get someone from the building department or their agent to ensure that the building is safe to live in. In the worst case situation, the house might have to be torn down. No one knows in advance how destructive an earthquake can be.

## FURTHER READINGS:

Publications from Federal Emergency Management Agency:

- Safety Tips for Earthquakes. July 1983.
- A Blueprint for Earthquake Survival, Poster #6. September 1984.
- Earthquake Preparedness Information for People with Disabilities. May 1985.
- Preparedness in High-Rise Buildings. June 1985.
- Preparedness for People with Disabilities. June 1985.
- Guidelines for Local Small Businesses in Meeting the Earthquake Threat. September 1985.
- Earthquake Safety Checklist. October 1985.
- An Action Plan for Reducing Earthquake Hazards of Existing Buildings. December 1985.
- Coping with Children's Reactions to Earthquakes and Other Disasters. July 1986.
- Preparedness in Apartments and Mobile Homes. September 1986.
- Family Earthquake Safety Home Hazard Hunt and Drill.

September 1986.

Publications from University of Missouri-Columbia Extension Division:

- Selecting and Using a Fire Extinguisher. February 1987.
- Residential Fire Detection. February 1987.
- Is Your Family Prepared for an Earthquake? October 1990.

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