EPS20: Earthquakes in your backyard

Be Ready
Earthquake preparedness
How to survive

http://seismo.berkeley.edu/~rallen/BEAR/

Resources
Putting down roots in earthquake country

• Great guides to earthquake safety for anyone
• Overview of the hazards
• Specific steps to reduce your risk

Northern California version
http://pubs.usgs.gov/gip/2005/15/

Southern California version
http://www.earthquakecountry.info/roots/

Both are available on the class website along with today’s lecture notes

http://earthquakes.berkeley.edu/eps20
Resources

Putting down roots in earthquake country

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Both versions contain

The Seven Steps to Earthquake Safety

This is what we will focus on today

Why take actions

...in case the Hayward Temblor scenario wasn’t enough reason

Your life could change unexpectedly in the next quake

Consider...

Where will your friends and family be?

- Friends could be anywhere across campus or away
- Family members may be at work, school etc
- Pets may run away or be scared

After the 2001 magnitude 8.0 Nisqually earthquake, this school in the Puget Sound area of Washington was closed for repair (Earthquake Engineering Research Institute photo).

Pets are not allowed in most emergency shelters. Do you have a plan to feed and care for your animals after an earthquake? (Photos courtesy of Emergency Animal Rescue Service)
Why take actions
...in case the Hayward Temblor scenario wasn’t enough reason

Your life could change unexpectedly in the next quake
Consider...

Will you be able to get home?

- Road damage and closures may restrict your ability to travel by car.
- Public transportation, including buses, Bay Area Rapid Transit (BART), ferries, and airports may experience closures or interruptions in service.
- Commute times may be dramatically increased.

Will you have medical services?

- The 911 emergency system will likely be overloaded.
- Hospitals and other medical facilities may be damaged.
- Emergency rooms and trauma centers may be overwhelmed.
- Assisted living, critical care, and other health services such as dialysis may not be operational.

You may need to look after yourself and your friends and family.
Why take actions
...in case the Hayward Temblor scenario wasn’t enough reason

Your life could change unexpectedly in the next quake
Consider...

Will you be able to stay in your dorm, apartment or home?

- Where you live may have been damaged or destroyed
- Alternative rental housing may be limited or not available

Can you live without the services you rely on?

- Water may be in short supply.
- Natural gas and electric power may be out for days or weeks.
- Garbage and sewage services may be interrupted.
- Telephone, Internet, cell phone, and wireless communications may be overloaded or unavailable.
- Mail service may be disrupted or delayed.
- Gasoline may be in short supply, and rationing may be necessary.
- Bank operations may be disrupted, limiting access to cash, ATMs, or online banking.
- Grocery, drug, and other retail stores may be closed or unable to restock shelves.
The Seven Steps to Earthquake Safety

Your 1st assignment is to take some of these steps

1. Identify potential hazards in your home and begin to fix them.

2. Create a disaster preparedness plan.

3. Prepare disaster kits.

4. Identify your building’s potential weaknesses and begin to fix them.

5. Protect yourself during earthquake shaking—DROP, COVER, AND HOLD ON.

6. After the quake, check for injuries and damage.

7. When safe, continue to follow your disaster preparedness plan.

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Step 1:

**Identify potential hazards** in your room and home and begin to fix them

*Don't be fooled! — Myth number 4*

"QUAKE INJURIES ARE ALL FROM COLLAPSING BUILDINGS."

Many people think that all injuries in earthquakes are caused by collapsing buildings. Actually, most injuries in quakes are from objects that break or fall on people. For example, in the 1994 magnitude 6.7 Northridge earthquake, 55% of quake-related injuries were caused by falling objects, such as televisions, pictures and mirrors, and heavy light fixtures."
Step 1:

**Identify potential hazards** in your room and home and begin to fix them

**Hanging objects**

- Do not hang heavy objects above beds and sofas, only soft objects, such as unframed posters or rugs.
- Hang mirrors, pictures, and other heavy objects on closed picture hooks.

Don’t be fooled!—

**Myth number 4**

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House built to modern earthquake safety standards shaken as in the 1994 Northridge earthquake
Step 1: Identify potential hazards in your room and home and begin to fix them

Hanging objects

- Store heavy items and breakables on lower shelves.
- Secure valuable items in place by using removable putty, museum wax, or quake gel.

Objects on open shelves and tabletops

Don’t be fooled—Myth number 4

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Furniture and home electronics

- Secure furniture to the wall to keep it from falling using flexible-mount fasteners, or nylon straps. Secure top corners of tall furniture into a wall stud, not just to the drywall.
- Secure heavy items, such as TVs, stereos, computers, and microwave ovens with flexible nylon straps.
Step 1: **Identify potential hazards** in your room and home and begin to fix them

**Water and gas pipes**
- Brace water heaters and other gas appliances. (See the Homeowner’s Guide to Earthquake Safety, 2005 edition [http://www.seismic.ca.gov/ hog.htm](http://www.seismic.ca.gov/hog.htm) [English and Spanish].)
- Replace rigid gas connections to water heaters, and other gas appliances with flexible (corrugated) stainless-steel gas connectors.

Step 2: **Create a disaster preparedness plan**

**Plan where to meet after a disaster.**
**Choose two places:**
- A safe place to meet near your home after the shaking stops.
- A place outside your neighborhood, in case you have to evacuate your neighborhood or cannot return home.

**After determining these meeting places:**
- Identify safe spots in your home to go to when shaking starts. Determine the best escape routes from your home and from each room. Also, determine the two best escape routes out of your neighborhood/community.
- Designate a neighbor or local friend’s house as a safe place for your children to meet if you are away from home.
- Install smoke alarms and test them monthly.
- Ask an out-of-town friend to be your family’s disaster contact. After a disaster, all family members should call this person and tell them where they are.
Step 2: Create a **disaster preparedness plan**

**Learn lifesaving actions:**

- Learn First aid and CPR (cardiopulmonary resuscitation) by taking a class from the Red Cross.
- Know where the fire extinguisher is located.
- Learn how and when to turn off utilities such as electricity, water, and gas (see page 20).
- Check with your fire department to see if there is a Community Emergency Response Team (CERT) in your area. See [http://www.citizencorps.gov/cert](http://www.citizencorps.gov/cert).

**Stay informed:**

- Learn the disaster plan at your workplace, your child’s school or daycare center, or other places where your family spends time.
- Give family members an “Emergency Contact Card” to carry with them. Be sure to include an out-of-town contact, important contact phone numbers, and your meeting locations.
- Practice your plan twice a year; conduct drills to practice “DROP, COVER, AND HOLD ON” (see page 18) and how to evacuate your home. Drive your planned evacuation route. Update phone numbers and disaster supplies and review your plan with everyone twice a year.
- Identify where you could live after an earthquake if your home is damaged and is not safe to live in.
Step 3: Prepare disaster kits

Household Disaster Kit

- Basic services (electrical, water, gas etc) may be disrupted for several days.
- Emergency responders will be overwhelmed.
- Your household needs to be self sufficient for at least 3 to 5 days.

- Drinking water (minimum one gallon per person per day).
- First aid supplies, medications, and essential hygiene items, such as soap, toothpaste, and toilet paper.
- Emergency lighting—light sticks and (or) a working flashlight with extra batteries and light bulbs (hand-powered flashlights are also available).
- A hand-cranked or battery-operated radio (and spare batteries).
- Canned and packaged foods and cooking utensils, including a manual can opener.
- Items to protect you from the elements, such as warm clothing, sturdy shoes, extra socks, blankets, and perhaps even a tent.
- Heavy-duty plastic bags for waste and to serve other uses, such as tarps and rain ponchos.
- Work gloves and protective goggles.
- Pet food and pet restraints.
- Copies of vital documents, such as insurance policies and personal identification.

store in an accessible waterproof container

Step 3: Prepare disaster kits

Personal Disaster “Go” Kits

- Medications, a list of prescriptions, copies of medical insurance cards, doctors’ names and contact information.
- Medical consent forms for dependents.
- First aid kit and first aid handbook.
- Spare eyeglasses, personal hygiene supplies, and sturdy shoes.
- Bottled water.
- Whistle (to alert rescuers to your location).
- Emergency cash.
- Personal identification.
- List of emergency contact phone numbers.
- Snack foods high in calories.
- Emergency lighting—light sticks and (or) a working flashlight with extra batteries and light bulbs (hand-powered flashlights are also available).
- For kids comfort items, such as games, crayons, writing materials, and teddy bears.

Your family may be sleeping when the next strong quake hits the Bay Area. After the shaking stops, the lights may be out and broken glass and other dangerous debris may litter the floor, making it unsafe to walk barefoot. Keep a flashlight and a pair of sturdy shoes secured to or within reach of everyone’s bed. A good way to do this is to use a drawstring bag (if) to a bedpost at the head of the bed for each occupant.
Step 4:
Identify your building’s potential weaknesses and begin to fix them

Score more than 13 points?
Then have an engineer, architect or contractor evaluate it.

If you live in a condominium or apartment...

Many condominiums and apartments have parking on the ground floor. These weak or “soft” first stories may lean or collapse in an earthquake.

Some multi-story buildings in the Bay Area can have problems because they were constructed before 1972 of concrete or brick that is inadequately reinforced. Many cities have requirements that these buildings be seismically retrofitted. You are less likely to be killed in a retrofitted building, but you may not be able to reoccupy it after a quake.

The “soft” first story of this apartment building collapsed in the 1984 magnitude 6.7 Northridge earthquake, crushing cars below and severely damaging the floors above. (FEMA photo).
Step 4: Identify your building’s potential weaknesses and begin to fix them

If you live in a condominium or apartment…

As a renter, ask your landlord these questions:

- What measures have been taken to ensure the seismic safety of this building?
- Have water heaters been strapped to the wall studs?
- Can I secure bookshelves and furniture to the walls?

Go to http://quake.abad.ca.gov/fixit/ to take a quiz to see if your apartment building or condominium may need retrofitting. This Web site also has links to information that can help your landlord find appropriate ways to improve the strength of your building.

Step 5: Protect yourself during an earthquake

Don’t be fooled! — Myth number 6

“HEAD FOR THE DOORWAY.”

In the early days of California, many homes were made of adobe bricks with wooden doorframes. After a powerful earthquake, doorframes were sometimes the only parts of these houses still standing. From this came the myth that a doorway is the safest place to be during an earthquake. Today, few people in the Bay Area live in old, un-reinforced adobe houses. In modern houses, doorways may be no stronger than any other part of the house and do little to protect you from falling debris. You are safer under a table, so “DROP, COVER, AND HOLD ON.”

http://earthquakes.berkeley.edu/eps20
Step 5: Protect yourself during an earthquake

“DROP, COVER, AND HOLD ON”
If you are indoors, when you feel strong earthquake shaking, drop to the floor, take cover under a sturdy desk or table, and hold on to it firmly until the shaking stops.

When indoors...
- Do not stand in doorways and do not run outside
- Move away from exterior walls and windows, tall furniture and hanging pictures and mirrors
- If there is no desk or table, drop to the floor next to an interior wall and cover your head with your arms
- If cooking turn off the stove first
- If in bed stay put, cover your head with a pillow
- If in a high-rise, stay away from windows. Do not use the elevator
**Step 5: Protect yourself during an earthquake**

**If you are outdoors...**
- Move away from buildings, power lines and trees.
- Be alert for falling debris.
- If you are at the coast, move to higher ground immediately to avoid a possible tsunami.

**If you are driving...**
- Do not stop on or under overpasses, bridges, or in tunnels.
- Do not stop under or near electrical power lines, light posts, trees or signs.
- Safely pull to the side of the road and set the break.
- Stay in the car until the shaking is over.

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**Step 6: After the quake, check for injuries and damage**

**Check for injuries**
- Check yourself for injury, then help others.
- Protect your mouth and nose from dust.
- First aid procedures: direct pressure to bleeds.
- Do not move someone who is seriously injured unless they are in danger.
- Cover injured people with blankets (to help with shock).

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[Image of collapsed building with caption: Collapsed roof in downtown Paso Robles following the San Simeon earthquake of December 22, 2002. Two people were killed by falling debris when they ran out of the building. (USGS photo)]
Step 6:
After the quake, check for injuries and damage

Check for damage and hazardous conditions...
- Fire – if possible put them out, call for help but don’t wait for it to arrive
- Gas leaks – only turn off the gas if you suspect a leak
- Damaged electrical wiring – shut off main breaker if wiring damages
- Downed power lines – stay away!
- Failing items – beware when opening cabinets
- Spills – clean up when you can, leave home if necessary
- Damaged masonry – stay away, may fall in aftershocks

If your home is seriously damaged...
- Evacuate if the home is structurally unsound or at risk from fire
- Do not evacuate simply because the utilities are out
- If you evacuate tell your neighbor and out-of-town contact

Step 7:
When safe, continue to follow your disaster-preparedness plan

In the days following the earthquake
- Make sure your home is structurally safe to occupy
- Unplug damaged electrical appliances, fixtures etc
- Stay informed – turn on your portable or car radio
- Call your out-of-town contact and let them know your status, then stay off the phone – the lines are needed for emergencies

Start to take action to recover
- The “government” will not save you!
- Relief efforts are intended to help with immediate needs, they will not replace all the things you have lost
- Loans are the most common form of assistance (max $40,000 for a home)
- Grants only for those who do not qualify for loans (avg $15,000, max $26,500)
Use common sense
we know there will be an earthquake, Be Ready