

RESOURCES:

- www.nicee.org: website of The National Information Center of Earthquake Engineering (NICEE) hosted at Indian Institute of Technology Kanpur (IITK) is intended to collect and maintain information resources on Earthquake Engineering and make these available to the interested professionals, researchers, academicians and others with a view to mitigate earthquake disasters in India. The host also gives IITK-BMTPC Earthquake Tips.
- www.imd.ernet.in/section/seismo/static/welcome.htm Earthquake Information – India Meteorological Department, India. IMD detect and locate earthquakes and evaluates seismicity in different parts of the country.
- www.bmtpc.org In order to bridge the gap between research and development and large scale application of new building material technologies, the erstwhile Ministry of Urban Development, Government of India, had established the Building Materials And Technology Promotion Council in July 1990.
- www.earthquake.usgs.gov Source for science about the Earth, its natural and living resources, natural hazards, and the environment.
- www.neic.cr.usgs.gov National Earthquake Information Center (NEIC) - World Data Center for Seismology Earthquake information and observation station: The site hosts one of the most comprehensive systems.
- www.quake.wr.usgs.gov Earthquake Reporting Service: U.S. Geological Survey and UC Berkeley service for earthquake reporting. Earthquake basics and educational material; geological and historical information; links to professional and amateur organizations; online access to earthquake data. Current research activities and results in seismology, crystal structure and deformation, geology and borehole physics. for more
- www.asc-india.org Amateur Seismic Centre is a comprehensive website carrying details of state wise seismicity for the country. This also has extensive reports on various past earthquakes with rare photographs and maps.

ANNEXURE I: DOS AND DON'TS

Earthquakes

An earthquake is a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface. This shaking can cause buildings and bridges to collapse; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge, destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill, old waterways, or other unstable soil are most at risk.

BEFORE THE EARTHQUAKE STRIKES

Develop a Family Disaster Plan. If you are at risk from earthquakes:

- **Pick "safe places" in each room of your home.** A safe place could be under a sturdy table or desk or against an interior wall away from windows, bookcases, or tall furniture that could fall on you. The shorter the distance to move to safety, the less likely you will be injured. Injury statistics show that people moving as little as 10 feet during an earthquake's shaking are most likely to be injured. Also pick safe places, in your office, school and other buildings you are frequently in.
- **Practice drop, cover, and hold-on in each safe place.** Drop under a sturdy desk or table and hold on to one leg of the table or desk. Protect your eyes by keeping your head down. Practice these actions so that they become an automatic response. When an earthquake or other disaster occurs, many people hesitate, trying to remember what they are supposed to do. Responding quickly and automatically may help protect you from injury.
- **Practice drop, cover, and hold-on at least twice a year.** Frequent practice will help reinforce safe behavior.
- **Wait in your safe place until the shaking stops, then check to see if you are hurt.** You will be better able to help others if you take care of yourself first, then check the people around you. Move carefully and watch out for things that have fallen or broken, creating hazards. Be ready for additional earthquakes called "aftershocks."
- **Be on the lookout for fires.** Fire is the most common earthquake-related hazard, due to broken gas lines, damaged electrical lines or appliances, and previously contained fires or sparks being released.
- **If you must leave a building after the shaking stops, use the stairs, not the elevator.** Earthquakes can cause fire alarms and fire sprinklers to go off. You will not be certain whether there is a real threat of fire. As a precaution, use the stairs.
- **If you're outside in an earthquake, stay outside. Move away from buildings, trees, streetlights, and power lines. Crouch down and cover your head.** Many injuries occur within 10 feet of the entrance to buildings. Bricks, roofing, and other materials can fall from buildings, injuring persons nearby. Trees, streetlights, and power lines may also fall, causing damage or injury.
- **Inform guests, babysitters, and caregivers of your plan.** Everyone in your home should know what to do if an earthquake occurs. Assure yourself that others will respond properly even if you are not at home during the earthquake.
- **Get training.** Take a first aid class from your local Red Cross chapter. Get training on how to use a fire extinguisher from your local fire department. Keep your training current. Training will help you to keep calm and know what to do when an earthquake occurs.
- **Discuss earthquakes with your family.** Everyone should know what to do in case all family members are not together. Discussing earthquakes ahead of time helps reduce fear and anxiety and lets everyone know how to respond.

- **Talk with your insurance agent.** Different areas have different requirements for earthquake protection. Study locations of active faults, and if you are at risk, consider purchasing earthquake insurance.

Assemble a Disaster Supplies Kit

- *A flashlight and sturdy shoes by each person's bedside.*
- *Disaster Supplies Kit basics*
- *Evacuation Supply Kit.*

PROTECT YOUR PROPERTY

- **Bolt bookcases, china cabinets, and other tall furniture to wall studs. Brace or anchor high or top-heavy objects.** During an earthquake, these items can fall over, causing damage or injury.
- **Secure items that might fall (televisions, books, computers, etc.).** Falling items can cause damage or injury.
- **Install strong latches or bolts on cabinets.** The contents of cabinets can shift during the shaking of an earthquake. Latches will prevent cabinets from flying open and contents from falling out.
- **Move large or heavy objects and fragile items (glass or china) to lower shelves.** There will be less damage and less chance of injury if these items are on lower shelves.
- **Store breakable items such as bottled foods, glass, and china in low, closed cabinets with latches.** Latches will help keep contents of cabinets inside.
- **Store weed killers, pesticides, and flammable products securely in closed cabinets with latches, on bottom shelves.** Chemical products will be less likely to create hazardous situations from lower, confined locations.
- **Hang heavy items, such as pictures and mirrors, away from beds, couches, and anywhere people sit.** Earthquakes can knock things off walls, causing damage or injury.
- **Brace overhead light fixtures.** During earthquakes, overhead light fixtures are the most common items to fall, causing damage or injury.
- **Strap the water heater to wall studs.** The water heater may be your best source of drinkable water following an earthquake. Protect it from damage and leaks.
- **Bolt down any gas appliances.** After an earthquake, broken gas lines frequently create fire hazards.
- **Install flexible pipe fittings to avoid gas or water leaks.** Flexible fittings will be less likely to break.
- **Repair any deep cracks in ceilings or foundations. Get expert advice if there are signs of structural defects.** Earthquakes can turn cracks into ruptures and make smaller problems bigger.
- **Check to see if your house is bolted to its foundation.** Homes bolted to their foundations are less likely to be severely damaged during earthquakes. Homes that are not bolted have been known to slide off their foundations, and many have been destroyed because they are uninhabitable.
- **Consider having your building evaluated by a professional structural design engineer.** Ask about home repair and strengthening tips for exterior features, such as porches, front and back decks, sliding glass doors, canopies, carports, and garage doors. Learn about additional ways you can protect your home. A professional can give you advice on how to reduce potential damage.
- Follow local seismic building standards and safe land use codes that regulate land use along fault lines. Some municipalities, counties, and states have enacted codes and standards to protect property and occupants. Learn about your area's codes before construction.

Media and Community Education Ideas

- Ask your community to develop stronger building codes. Building codes are the public's first line of defense against earthquakes. The codes specify the levels of earthquake forces that structures must be designed to withstand. As ground lessons have been learned about how buildings are damaged in earthquakes, the minimum earthquake requirements specified in building codes have been improved.
- Publish a special section in your local newspaper with emergency information on earthquakes. Localize the information by printing the phone numbers of local emergency services offices, the American Red Cross, and hospitals.
- Conduct a week-long newspaper series on locating hazards in the home and how to fix them.
- Work with local emergency services and Deputy commissioner office to prepare appropriate information for people with mobility impairments about what to do during an earthquake.
- Provide tips on conducting earthquake drills in the home.
- Interview representatives of the gas, electric, and water companies about shutting off utilities.

DURING AN EARTHQUAKE

- **Drop, cover, and hold on!** Move only a few steps to a nearby safe place. It is very dangerous to try to leave a building during an earthquake because objects can fall on you. Many fatalities occur when people run outside of buildings, only to be killed by falling debris from collapsing walls. In U.S. buildings, you are safer to stay where you are.
- **If you are in bed, hold on and stay there, protecting your head with a pillow.** You are less likely to be injured staying where you are. Broken glass on the floor has caused injury to those who have rolled to the floor or tried to get to doorways.
- **If you are outdoors, find a clear spot away from buildings, trees, streetlights, and power lines. Drop to the ground and stay there until the shaking stops.** Injuries can occur from falling trees, street-lights and power lines, or building debris.
- **If you are in a vehicle, pull over to a clear location, stop and stay there with your seatbelt fastened until the shaking has stopped.** Trees, power lines, poles, street signs, and other overhead items may fall during earthquakes. Stopping will help reduce your risk, and a hard-topped vehicle will help protect you from flying or falling objects. Once the shaking has stopped, proceed with caution. Avoid bridges or ramps that might have been damaged by the quake.
- **Stay indoors until the shaking stops and you're sure it's safe to exit.** More injuries happen when people move during the shaking of an earthquake. After the shaking has stopped, if you go outside, move quickly away from the building to prevent injury from falling debris.
- **Stay away from windows and falling objects.** Windows can shatter with such force that you can be injured several feet away.
- **In a high-rise building, expect the fire alarms and sprinklers to go off during a quake.** Earthquakes frequently cause fire alarm and fire sprinkler systems to go off even if there is no fire. Check for and extinguish small fires, and, if exiting, use the stairs.
- **If you are in a coastal area, move to higher ground.** Tsunamis are often created by earthquakes.
- **If you are in a mountainous area or near unstable slopes or cliffs, be alert for falling rocks and other debris that could be loosened by the earthquake.** Landslides commonly happen after earthquakes.

AFTER THE EARTHQUAKE

- **Check yourself for injuries.** Often people tend to others without checking their own injuries. You will be better able to care for others if you are not injured or if you have received first aid for your injuries.

- **Protect yourself from further danger by putting on long pants, a long-sleeved shirt, sturdy shoes, and work gloves.** This will protect you from further injury by broken objects.
- **After you have taken care of yourself, help injured or trapped persons.** If you have it in your area, call 9-1-1, then give first aid when appropriate. Don't try to move seriously injured people unless they are in immediate danger of further injury.
- **Look for and extinguish small fires. Eliminate fire hazards.** Putting out small fires quickly, using available resources, will prevent them from spreading. Fire is the most common hazard following earthquakes. Fires followed the San Francisco earthquake of 1906 for three days, creating more damage than the earthquake.
- **Turn off gas on supply from the cylinder.** Explosions have caused injury and death when homeowners have improperly turned their gas back on by themselves.
- **Switch off all electrical appliances.**
- **Clean up spilled medicines, bleaches, gasoline, or other flammable liquids immediately and carefully.** Avoid the hazard of a chemical emergency.
- **Open closet and cabinet doors cautiously.** Contents may have shifted during the shaking of an earthquake and could fall, creating further damage or injury.
- **Inspect your home for damage. Get everyone out if your home is unsafe.** Aftershocks following earthquakes can cause further damage to unstable buildings. If your home has experienced damage, get out before aftershocks happen.
- **Help neighbors who may require special assistance.** Elderly people and people with disabilities may require additional assistance. People who care for them or who have large families may need additional assistance in emergency situations.
- **Listen to a portable, battery-operated radio (or television) for updated emergency information and instructions.** If the electricity is out, this may be your main source of information. Local radio and local officials provide the most appropriate advice for your particular situation.
- **Expect aftershocks.** Each time you feel one, drop, cover, and hold on! Aftershocks frequently occur minutes, days, weeks, and even months following an earthquake.
- **Watch out for fallen power lines or broken gas lines, and stay out of damaged areas.** Hazards caused by earthquakes are often difficult to see, and you could be easily injured.
- **Stay out of damaged buildings.** If you are away from home, return only when authorities say it is safe. Damaged buildings may be destroyed by aftershocks following the main quake.
- **Use battery-powered lanterns or flashlights to inspect your home.** Kerosene lanterns, torches, candles, and matches may tip over or ignite flammables inside.
- **Inspect the entire length of chimneys carefully for damage.** Unnoticed damage could lead to fire or injury from falling debris during an aftershock. Cracks in chimneys can be the cause of a fire years later.
- **Take pictures of the damage, both to the house and its contents, for insurance claims.**
- **Avoid smoking inside buildings.** Smoking in confined areas can cause fires.
- **When entering buildings, use extreme caution.** Building damage may have occurred where you least expect it. Carefully watch every step you take.
 - **Examine walls, floor, doors, staircases, and windows to make sure that the building is not in danger of collapsing.**
 - **Check for gas leaks.** If you smell gas or hear a blowing or hissing noise, open a window and quickly leave the building. Turn off the gas, using the outside main valve if you can, and call the gas company from a neighbor's home. If you turn off the gas for any reason, it must be turned back on by a professional.
 - **Look for electrical system damage.** If you see sparks or broken or frayed wires, or if you smell burning insulation, turn off the electricity at the main fuse box or circuit breaker. If you

have to step in water to get to the fuse box or circuit breaker, call an electrician first for advice.

- **Check for sewage and water line damage.** If you suspect sewage lines are damaged, avoid using the toilets and call a plumber. If water pipes are damaged, contact the water company and avoid using water from the tap. You can obtain safe water from undamaged water heaters or by melting ice cubes.
- **Watch for loose plaster, drywall, and ceilings that could fall.**
- **Use the telephone only to report life-threatening emergencies.** Telephone lines are frequently overwhelmed in disaster situations. They need to be clear for emergency calls to get through.
- **Watch animals closely. Leash dogs and place them in a fenced yard.** The behavior of pets may change dramatically after an earthquake. Normally quiet and friendly cats and dogs may become aggressive or defensive.