Earthquake preparedness

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Earthquake preparedness is a set of measures taken at the individual, organisational and societal level to minimise the effects of an earthquake. Preparedness measures can range from securing heavy objects, structural modifications and storing supplies, to having insurance, an emergency kit, and evacuation plans.[1]

Preparedness measures[edit]

Preparedness can consist of survival measures, preparation that will improve survival in the event of an earthquake, or mitigating measures, that seek to minimise the effect of an earthquake. Common survival measures include storing food and water for an emergency, and educating individuals what to do during an earthquake.[2] Mitigating measures can include firmly securing large items of furniture (such as bookcases and large cabinets), TV and computer screens that may otherwise fall over in an earthquake. Likewise, avoiding storing items above beds or sofas reduces the chance of objects falling on individuals.[1]

Planning for a related tsunami, tsunami preparedness, can also be part of earthquake preparedness.[3]

Building design and retrofitting [edit]

Main article: Seismic retrofit

Building codes in earthquake prone areas may have specific requirements designed to increase new buildings' resistance to earthquakes. Older buildings and homes that are not up to code may be modified to increase their resistance. Modification and earthquake resistant design are also employed in elevated freeways and bridges.

Codes are not designed to make buildings earthquake proof in the sense of them suffering zero damage. The goal of most building designs is to reduce earthquake damage to a building such that it protects the lives of occupants and thus tolerance of some limited damage is accepted and considered a necessary tradeoff. A supplement or precursor to retrofitting can be the implementation of earthquake proof furniture.

Earthquake modification techniques and modern building codes are designed to prevent total destruction of buildings for earthquakes of no greater than 8.5 on the Richter Scale.[4] Although the Richter Scale is referenced, the localized shaking intensity is one of the largest factors to be considered in building resiliency.

Types of preparedness[edit]

The basic theme behind preparedness is to be ready for an earthquake. Preparedness starts with an individual's everyday life and involves items and training that would be useful in an earthquake. Preparedness continues on a continuum from individual preparedness through family preparedness, community preparedness[5] and then business, non-profit and governmental preparedness. Some organisations blend these various levels. Business continuity planning encourages businesses to have a Disaster Recovery Plan. The US FEMA breaks down preparedness generally into a pyramid, with citizens on the foundational bottom, on top of which rests local government, state government and federal government in that order.[6]

Non-perishable food in cabinet

Children may present particular issues and some planning and resources are directly focused on supporting them. The US FEMA has advice noting that "Disasters can leave children feeling frightened, confused, and insecure" whether a child has experienced it first hand, had it happen to a friend or simply seen it on television.[7] People with disabilities or other special needs may have special emergency preparation needs. FEMA's suggestions for people with disabilities include having copies of prescriptions, charging devices for medical devices such as motorized wheel chairs and a week's supply of medication readily available.[8] Preparedness can also cover pets.

Preparedness can also encompass psychological preparedness: resources are designed to support both community members affected by a disaster and the disaster workers serving them.

A multi-hazard approach, where communities are prepared for several hazards, are more resilient than single hazard approaches and have been gaining popularity.[9][10][1]

Long term power outages can cause damage beyond the original disaster that can be mitigated with emergency generators or other power sources to provide an emergency power system.[11] The United States Department of Energy states: "homeowners, business owners, and local leaders may have to take an active role in dealing with energy disruptions on their own."[12] Major institutions like hospitals, military bases and educational institutions often have extensive backup power systems.[13] Preparedness does not stop at home or at school.[14] The United States Department of Health and Human Services addresses specific emergency preparedness issues hospitals may have to respond to, including maintaining a safe temperature, providing adequate electricity for life support systems and even carrying out evacuations under extreme circumstances.[15] FEMA encourages all businesses to have an emergency response plan[16] and the Small Business Administration specifically advises small business owners to also focus emergency preparedness and provides a variety of different worksheets and resources.[17]

Marked gas shuttoff

Given the explosive danger posed by natural gas leaks, Ready.gov states that "It is vital that all household members know how to shut off natural gas" and that property owners must ensure they have any special tools needed for their particular gas connections. Ready.gov also notes that "It is wise to teach all responsible household members where and how to shut off the electricity," cautioning that individual circuits should be shut off before the main circuit. Ready.gov further states that "It is vital that all household members learn how to shut off the water at the main house valve" and cautions that the possibility that rusty valves might require replacement.[18]

Achieving preparedness[edit]

Levels of preparedness generally remain low, despite attempts to increase public awareness.[19]

Various methods exist to promote disaster preparedness, but they are rarely well documented and their efficacy is rarely tested.[20] Hands on training, drills and face-to-face interaction have proven more successful at changing behaviour.[1][21] Digital methods have also been used,[1] including for examples educational videogames.[22]

Preparedness refers to activities we do prior to an earthquake to be ready to respond to and recover from significant ground shaking. When it comes to earthquakes, there are simple things you can do to improve your chances of survival and recovery. Anything you do today will be like making a deposit in your survivability savings account for withdrawal in tough times.

At a minimum, you should be prepared to be isolated and on your own for at least seven days and nights. There will likely be the loss of utilities after a disaster. It is possible the power will be out, water may be scarce, gas lines may break, phones and cell towers could become inoperable, roads might be impassible, etc. Your only source of news may well be the car radio, assuming your local radio station has a working generator. There might not be medical assistance for days.

To begin preparing your home and family:

- Identify potential hazards in your home and begin to fix them.
- Create a disaster-preparedness plan.
- Create disaster kits.
- Identify your building's potential weaknesses and begin to fix them.
- Protect yourself during earthquake shaking.
- After the quake, check for injuries and damage.
- When safe, continue to follow your disaster-preparedness plan.

PREPARE YOUR WORKPLACE

According to the U.S. Bureau of Labor Statistics, American Time Use Survey, in 2013 the average work day for full time employed Americans (age 25-54 with children) was 8.7 hours. An earthquake could occur anytime in that 8.7 hours. Are you prepared? Preparing your workplace is just as important as preparing your home. There are many ways to improve your safety in the event of an earthquake. Here are just a few suggestions:

- Determine if your workplace is in an area at risk for earthquake.
- Be familiar with your company’s emergency plan.
- Know evacuation routes and locations deemed safe.
- Keep a pack of personal supplies (including walking shoes) that can be grabbed quickly and easily.
- Keep a list of emergency numbers handy

EARTHQUAKE PREPAREDNESS FOR TEACHERS AND SCHOOLS

While earthquakes have occurred throughout history, our knowledge and understanding of preparing for them is much more recent. Through planning and education, we are now in a position to ensure the current and upcoming generations make earthquake preparedness a regular part of their routine. As actions from learning to drop, cover and

hold on, to securing furniture in their homes becomes the norm, students can take this information and teach their families and friends how to be prepared.

As we learn more, our partners are applying that knowledge to assist teachers, parents and schools in the education of students of all ages and abilities by providing lesson plans, curriculum, activities, games, materials, publications and a multitude of other resources.

EARTHQUAKE PREPAREDNESS FOR GOVERNMENT AGENCIES AND TRIBES

The Earthquake and Tsunami Program is responsible for supporting all Alaska governmental agencies and tribes to ensure the protection and safety of the populace in the event of an earthquake. To this end, the Program staff is available to provide guidance and assistance to our partners in the preparation of plans to mitigate and plan for, respond to and recover from earthquakes impacting our State. In addition, many resources and guidance materials are available for review to walk developers through the planning process.

During the preparedness phase of emergency management, and as part of a comprehensive preparedness program, the emergency management community should develop plans and procedures to be implemented during an earthquake. Plans will need to be flexible and all-encompassing enough to recognize not only earthquakes, but all potential risks and exposures for the community, business, government agency, school, or hospital. Planning activities will vary by jurisdiction but should include the following: Communication, Shelters, Evacuation Plans, Resources and Inventory, Emergency Workers, Volunteers, Training, Access and Functional Needs population, Non-Government Organizations, Multi-Agency Coordination.

EARTHQUAKE PREPAREDNESS FOR BUSINESSES AND ORGANIZATIONS

Since earthquakes often strike without warning, it is important to be prepared. Developing an earthquake preparedness plan is one of the most strategic decisions you can make if you are responsible for a business or organization. A workplace should follow accepted earthquake safety guidelines, but have in place a personalized, well-rehearsed plan to help safeguard your organization during an earthquake. Developing, and putting into place, a Disaster Plan will not only protect employees, but will help minimize the financial impact of an earthquake, and help you recover more quickly. To prepare for an earthquake, all businesses should:

- Eliminate potential hazards
- Make a business emergency plan
- Train your employees
- Exercise your emergency plan
- Have medical supplies on hand
- Keep disaster provisions on site

Many organizations play a role in assisting business owners with their disaster planning.

What Should I Do Before, During, And After An Earthquake?

What to Do Before an Earthquake

- Repair deep plaster cracks in ceilings and foundations. Get expert advice if there are signs of structural defects.
- Anchor overhead lighting fixtures to the ceiling.
- Follow BIS codes relevant to your area for building standards
- Fasten shelves securely to walls.
- Place large or heavy objects on lower shelves.
- Store breakable items such as bottled foods, glass, and china in low, closed cabinets with latches.
- Hang heavy items such as pictures and mirrors away from beds, settees, and anywhere that people sit.
- Brace overhead light and fan fixtures.
- Repair defective electrical wiring and leaky gas connections. These are potential fire risks.
- Secure water heaters, LPG cylinders etc., by strapping them to the walls or bolting to the floor.

- Store weed killers, pesticides, and flammable products securely in closed cabinets with latches and on bottom shelves.
- Identify safe places indoors and outdoors.
    - Under strong dining table, bed
    - Against an inside wall
    - Away from where glass could shatter around windows, mirrors, pictures, or where heavy bookcases or other heavy furniture could fall over
    - In the open, away from buildings, trees, telephone and electrical lines, flyovers and bridges
- Know emergency telephone numbers (such as those of doctors, hospitals, the police, etc)
- Educate yourself and family members

- Matrix of IEC material for earthquake Safety and Preparedness.
- Awareness Generation Resources for Earthquake Disaster Management.
- Disaster(Earthquake) Resistant Construction Practice
- Techno Legal Regime for Safe Construction Practice (Model Amendment in Town & Country Planning Legislations, Regulation for Land Use Zoning and Building Byelaws for Structural Safety)
- Past Programmes/Projects, Resource Materials on Earthquake Risk Management.

Have a disaster emergency kit ready

- Battery operated torch with extra batteries
- Battery operated radio
- First aid kit and manual
- Emergency food (dry items) and water (packed and sealed)
- Candles and matches in a waterproof container
- Knife
- Chlorine tablets or powdered water purifiers
- Can opener.
- Essential medicines
- Cash and credit cards
- Thick ropes and cords
- Sturdy shoes

Develop an emergency communication plan

- In case family members are separated from one another during an earthquake (a real possibility during the day when adults are at work and children are at school), develop a plan for reuniting after the disaster.
- Ask an out-of-state relative or friend to serve as the 'family contact' after the disaster; it is often easier to call long distance. Make sure everyone in the family knows the name, address, and phone number of the contact person.

Help your community get ready

- 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 and hospitals.
- Conduct week-long series on locating hazards in the home.
- Work with local emergency services and officials to prepare special reports for people with mobility impairment on 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.
- Work together in your community to apply your knowledge to building codes, retrofitting programmes, hazard hunts, and neighborhood and family emergency plans.

What to Do During an Earthquake

Stay as safe as possible during an earthquake. Be aware that some earthquakes are actually foreshocks and a larger earthquake might occur. Minimize your movements to a few steps that reach a nearby safe place and stay indoors until the shaking has stopped and you are sure exiting is safe.

If indoors

- DROP to the ground; take COVER by getting under a sturdy table or other piece of furniture; and HOLD ON until the shaking stops. If there is no a table or desk near you, cover your face and head with your arms and crouch in an inside corner of the building.
- Protect yourself by staying under the lintel of an inner door, in the corner of a room, under a table or even under a bed.
- Stay away from glass, windows, outside doors and walls, and anything that could fall, (such as lighting fixtures or furniture).
- Stay in bed if you are there when the earthquake strikes. Hold on and protect your head with a pillow, unless you are under a heavy light fixture that could fall. In that case, move to the nearest safe place.
- Use a doorway for shelter only if it is in close proximity to you and if you know it is a strongly supported, load bearing doorway.
- Stay inside until the shaking stops and it is safe to go outside. Research has shown that most injuries occur when people inside buildings attempt to move to a different location inside the building or try to leave.
- Be aware that the electricity may go out or the sprinkler systems or fire alarms may turn on.

If outdoors

- Do not move from where you are. However, move away from buildings, trees, streetlights, and utility wires.
- If you are in open space, stay there until the shaking stops. The greatest danger exists directly outside buildings; at exits; and alongside exterior walls. Most earthquake-related casualties result from collapsing walls, flying glass, and falling objects.

If in a moving vehicle

- Stop as quickly as safety permits and stay in the vehicle. Avoid stopping near or under buildings, trees, overpasses, and utility wires.
- Proceed cautiously once the earthquake has stopped. Avoid roads, bridges, or ramps that might have been damaged by the earthquake.

If trapped under debris

- Do not light a match.
- Do not move about or kick up dust.
- Cover your mouth with a handkerchief or clothing.
- Tap on a pipe or wall so rescuers can locate you. Use a whistle if one is available. Shout only as a last resort. Shouting can cause you to inhale dangerous amounts of dust.