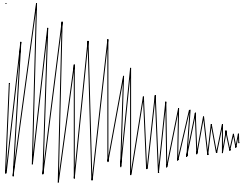
EARTHQUAKES

Employee Preparedness Guide

University of California
San Diego



Introduction

Earthquakes are a fact of life in Southern California. Every year more than 150,000 seismic disturbances occur throughout the state. The size and duration of these temblors vary greatly from microquakes, which are so slight as to be felt only by sophisticated seismological monitors, to major quakes which cause serious damage to our society.

San Diego has been more fortunate than other major California metropolitan areas. We have never suffered the damaging effects of a major earthquake in our 450 year recorded history. However, recent geological and seismological research strongly suggests that we are primed and overdue for a major (7.0) quake. This publication has been developed by Environment, Health and Safety to help you and your family prepare for that event. Recognizing that there is nothing that any of us can do to prevent earthquakes from occurring, there are a number of important actions which should be taken ahead of time to ensure that you will have the best chance of surviving.

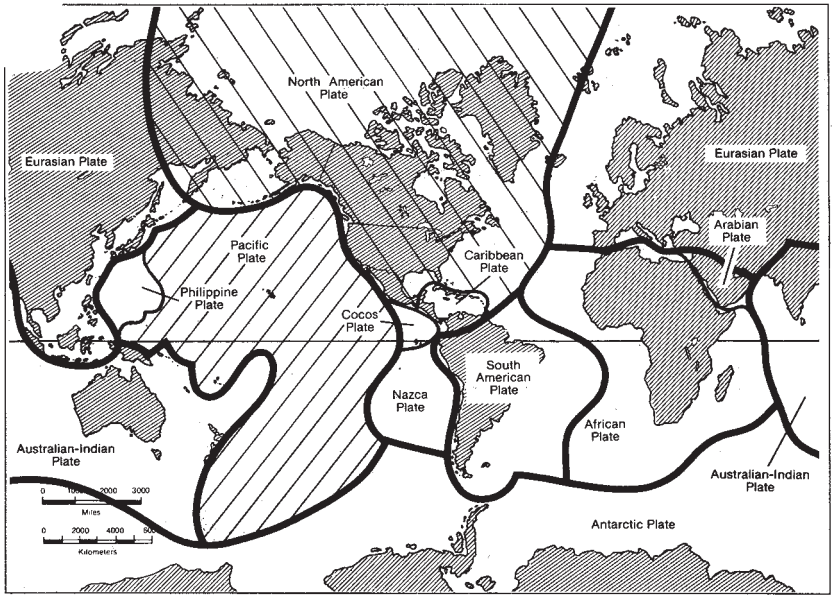
Why Do Earthquakes Occur?

In looking at a cross sectional view of our planet, geologists describe several distinct layers. The center is in a molten state, under tremendous temperature and pressure. Moving outwardly, each layer becomes cooler and more firm until the crustal layer is reached. Although solid in texture, the crust is fractured into unknown numbers of cracks, faults and fissures throughout the world. A fault is considered active if slow creep or periodic movement occurs. This constant movement is the result of energy forces swirling deep within the earth. Large crustal blocks, separated by these faults, are held in place by friction. As the pressure from the core continues to increase over time, a certain threshold is reached in which these frictional forces are overcome resulting in sudden shifting, slippage or readjustment along the fault lines. This movement is what we call an earthquake. The point of origin of the quake is referred to as the focus

or hypocenter. The epicenter is an imaginary reference point located on the surface directly above the focus. Seismologists use the epicenter for determining site locations of quakes for mapping purposes.

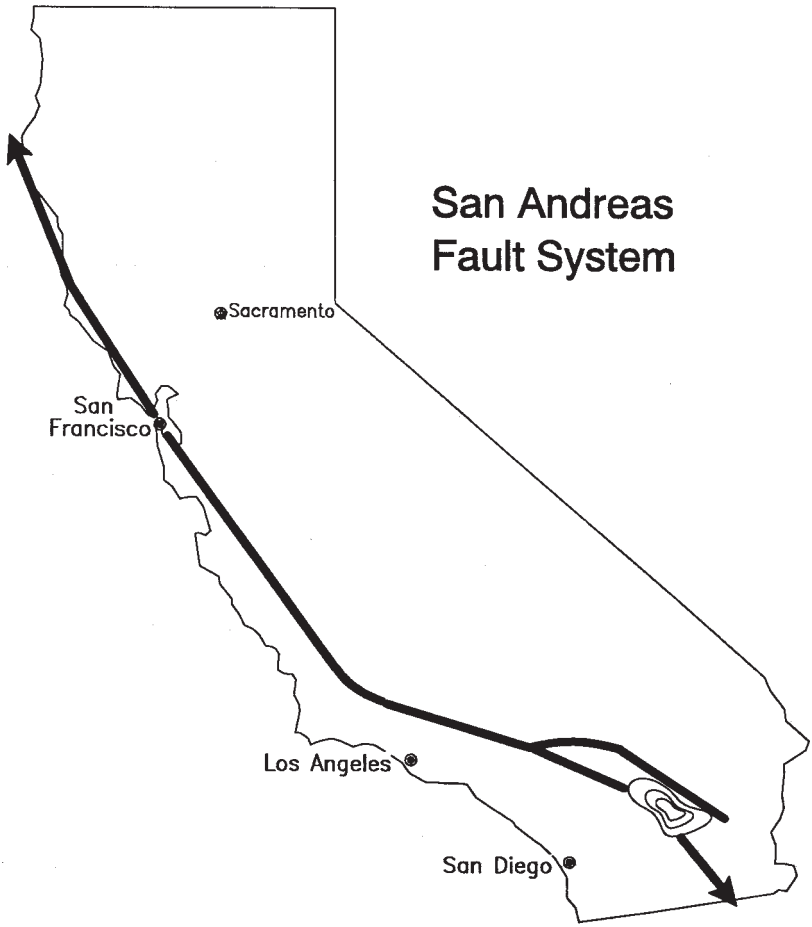
Why So Many Earthquakes In California?

Eighty percent of the earthquakes occurring in the United States happen along the west coast. Why? The theory of plate tectonics, formulated in the 1960's, describes the surface of the Earth being divided into a dozen enormous tectonic plates. Larger than many continents, these plates actually move with respect to one another. The boundaries separating these plates are comprised of fault belts containing numerous fault systems. It is along these belt zones where most of the world's earthquakes and volcanoes occur.



California exists along the fault zone separating two of these tectonic plates - the Pacific and North American. This fault belt

consists of 42 major fault systems identified throughout the state. Most of these larger faults run in a northwest to southeasterly direction. The largest fault within this zone is the infamous San Andreas. More than 800 miles in length and 10 miles deep, it reaches from the Salton Sea in the Borrego desert to the northern coastal zone of the state. It is along the San Andreas fault and its main tributaries where most of the larger earthquakes have occurred historically in California.



This recurring seismic activity is the result of the two plates sliding past one another at a rate of about two inches per year. Currently, the most active section of the San Andreas fault is the segment

lying between the Salton Sea and Palm Springs. Seismological measurements indicate that a significant amount of strain along this section has been building for a long time. There is a high statistical probability (60%) that a major earthquake will occur along this section in the next 25 years. San Diego will certainly experience damage from this quake when it occurs.

How Big Can They Get?

When pressure creates sudden slippage along a fault line, sharp movements or adjustments occur resulting in an earthquake. This movement may last only a brief moment or much longer. Powerful seismic shock waves are given off as a result. These waves radiate outwardly much like waves in a pond after a pebble has been tossed. Travelling at 15,000 miles per hour, seismic waves can cause dramatic damage for many miles in all directions.

Magnitude vs. Intensity

The size of an earthquake is measured on two scales - magnitude and intensity. *Magnitude* describes the amount of energy released at the quake's point of origin. It is measured using a seismograph which is anchored directly into solid bedrock. There are approximately three hundred seismographs placed strategically throughout southern California, all of which electronically report to a single computer in Pasadena. The readings from the seismographs are expressed on the Richter Scale. This special logarithmic scale contains no true lower or upper limits, however most recordings are expressed as a number between 0 and 10. As one moves up the scale, each whole number reflects a tenfold increase in size of the quake which actually releases 32 times more energy. Thus, an earthquake registering 6.0 is 100 times larger (10x10) than a 4.0 temblor, but approximately 900 times more powerful (32x32)! A rating of 4, 5 or 6 is considered as "moderate"; 7 and above as "major"; 8 or greater as "catastrophic."

Fortunately, most of the earthquakes occurring historically in San Diego range from .5 to an occasional 5.0. Other areas of the west coast have experienced much stronger disturbances -

Loma Prieta (1989 = 7.2)
San Francisco (1906 = 8.2)
Alaska (1964 = 9.1)

The *intensity* of the quake is a function of the amount and duration of the seismic waves or vibrations which strike an area. Typically, two types of waves are generated - primary ("P") waves and shear ("S") waves. Primary waves move more quickly through the crustal layer, arriving first in the impacted area with a sharp thud or blast-like shock sensation. A few seconds later, the slower shear waves arrive creating a swaying or rolling motion.

The shaking tends to quickly build to a maximum plateau and hold for a period of time. The amount of damage sustained is proportional to the severity and duration of the strongest shaking. The larger the disturbance, the stronger the seismic waves which continue for longer periods. The intensity of the shaking is greatest at the point of origin, but diminishes as the waves travel away from the focus.

The intensity factor of the earthquake is expressed on the Modified Mercalli Scale. This system is used to categorize the size of the quake based upon observable local damage.

The following table compares several seismic experiences occurring elsewhere in North America with disturbances centered in San Diego county -

Locations	Richter Scale	Duration
* San Diego (historically)	.5 to 4	1-3 seconds
* 1989 Loma Prieta	7.2	13 seconds
* 1985 Mexico City	8.5	60 seconds
* 1964 Alaska	9.1	4-7 minutes

Beyond the intensity of the shaking, other factors also figure importantly in determining the amount of damage and injuries which may be sustained in any given area. They include -

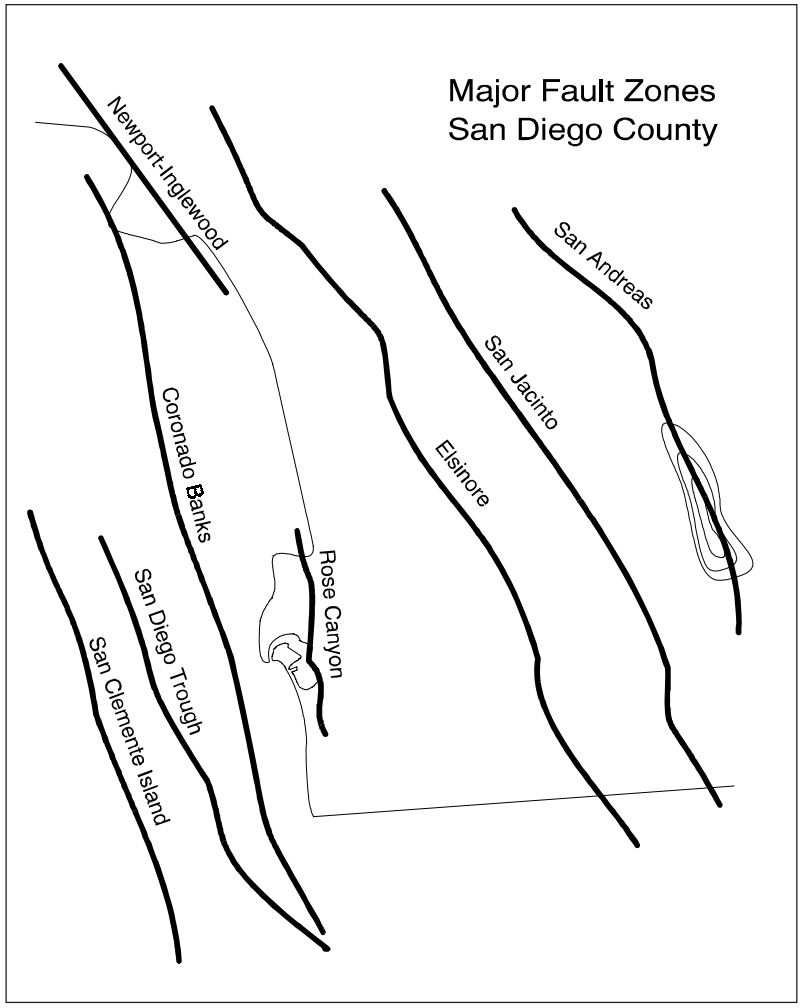
* magnitude of the quake
* nature of the slippage or movement along the fault
* depth of the quake below the surface
* distance from the epicenter
* type of soil and rock layers transmitting the energy
* types of buildings including design, age and materials

San Diego Area Faults

As was mentioned earlier, the most active section of the San Andreas fault lies 120 miles to the northeast of San Diego. Additionally, there are other larger faults existing in our county. Both the Elsinore and San Jacinto faults parallel the Laguna Mountains, running from Mexico through Julian, Temecula and Riverside. Many of our historical quakes have also been centered in deep oceanic trenches found fairly close to our shoreline.

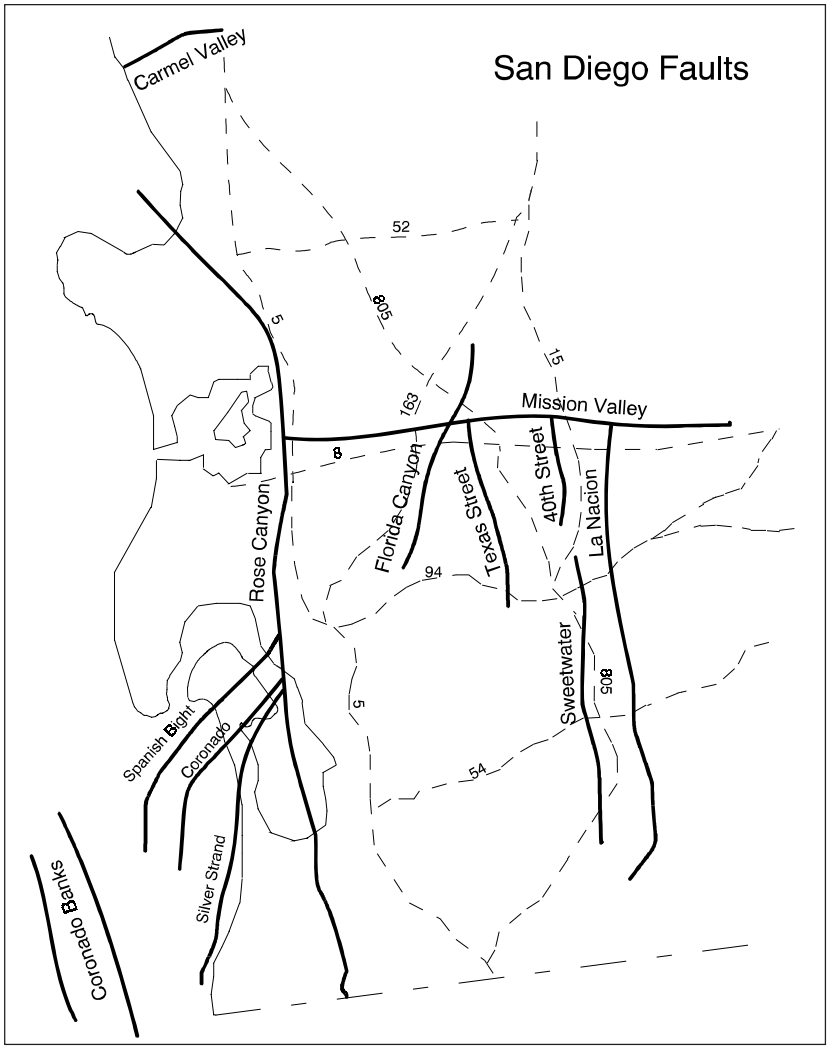
More than twenty-five faults have been identified running through San Diego itself, the largest one being Rose Canyon. Thirty-three miles in length, the Rose Canyon fault system enters our community at La Jolla Shores beach, runs through the eastern edge of Mount Soledad, follows I-5 south past Mission Bay, drops underneath Lindberg Field and San Diego Bay and continues down into Mexico.

The Rose Canyon fault is actively shifting under constant strain. While there has never been a major earthquake along the Rose Canyon fault in our local recorded history, seismologists feel that it is the most likely site for a future rupture. The maximum magnitude projected using current research data estimates a possible 7.2 occurrence. This is certainly strong enough to cause serious damage and numerous injuries on campus. It is for this eventuality that we must plan.



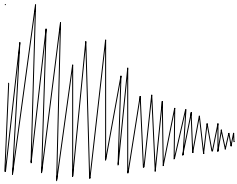
The remainder of this publication deals specifically with various organizational and personal preparedness issues.

Complacency concerning earthquakes is a real problem in San Diego. Many feel that it will never happen here or, if it does, there's nothing that can be done anyway, so why worry? The fact is that the entire state of California has been preparing for a catastrophic earthquake since the mid-1980s. The approach to being well-prepared is taken very seriously by FEMA (Federal Emergency Management Agency), the Governor's Office, county Office of Disaster Preparedness, local communities/their school systems and UCSD. **So must you!**



Simple, low cost measures taken now will greatly reduce your chance of personal injury (and your family, as well). Being well-prepared allows you to cope with the aftermath of a large-scale disaster more easily. You should think in terms of being self-sufficient for 72 hours. It usually takes three days for the community to restore basic services. During this recovery time, services such as police and fire departments will probably be unavailable. Banks, grocery stores, gas stations, etc., will be

closed; hospitals will be saturated with injured people, and so forth. Every aspect of daily life will be greatly impacted. It is imperative that as many of us as possible be able to tend to our own needs and problems during this period. This self-sufficiency will encourage maximum usage of limited resources to help the greatest number of people in the shortest time.



Levels of Preparedness

UCSD's Emergency Operations Plan

UCSD has taken on the challenge of being prepared to quickly react in an organized manner should the campus experience a major earthquake or other large scale disaster. Various service departments such as Environment, Health & Safety (EH&S), Facilities Management Facilities, Design & Construction (FD&C), Telecommunication Services, Student Health, Campus Police, Transportation Services, Residential Life, etc., have co-developed UCSD's Emergency Operations Plan to maximize emergency response capabilities to assist the campus community.

Only a brief summary of the Emergency Operations Plan is provided here. A detailed copy of the campus plan, coupled with specific emergency departmental procedures is available through your Department Safety Coordinator.

Upon activation of the plan by the Chancellor, emergency response teams will perform damage surveys and report their findings to the main Emergency Operations Center (EOC) for evaluation and deployment of critical resources. Key management personnel will coordinate all university recovery activities from this facility.

Additionally, UCSD has joined in an area network that includes the Salk Institute, Scripps Memorial Hospital, V.A. Medical Center, Scripps Clinic. Organizations within the network have

agreed to share available resources to the mutual aid of all members wherever possible.

Our emergency response program has been designed to provide basic recovery services and provisions to assist the campus population following a large-scale disaster. Within the scope of this program, departments and individuals are strongly encouraged to take a proactive approach towards greater self-sufficiency and clearly understand their respective roles and responsibilities within the plan.

Departmental Preparedness

Departments must develop internal Emergency Action Plans which address the following areas:

- Listing of emergency telephone numbers
- Building evacuation
- Fire Safety
- Use of fire extinguishers
- Hazardous material spills
- Earthquake response

Recommended guidelines for each of these topics have been developed by EH&S and are available on BLINK at http://blink.ucsd.edu/go/emergencyprep.

Additionally, flip-chart wall posters entitled "Emergency Response" are posted on departmental bulletin boards and laboratories. The posters should be placed in easily accessible areas within each department for periodic review by faculty, staff and students. It is also recommended that all departmental personnel be knowledgeable in basic first-aid and CPR techniques.

Emergency Supply Kits Are Available

Departments are also strongly encouraged to consider the purchase of emergency supplies (prepackaged food, water and first aid supplies) for their personnel. Such materials are avail-

able through Marketplace, UCSD Bookstore and off-campus vendors in both single and multi-person quantities.

Individual kits provide both packaged food and water, as well as various medical supplies, flashlight, blanket and batteries. The multi-person kits also contain rope, matches, whistle, needles, scissors, dust masks, radio, wire saw, waste bags, playing cards, gloves, tissue and pry bar.

Check with both Marketplace and UCSD Bookstore for current availability and prices. EH&S can also direct you to several other vendors who offer a full line of personal preparedness items. The items available through the on-campus sources can be purchased by personal check, as well as departmental index number.

Individual Preparedness

The importance of individual preparedness cannot be overemphasized. EH&S strongly recommends each member of the university community carefully consider obtaining the following items:

At Work

Several packets of water, food bars, small first aid kit, flashlight, extra prescription medications, spare pair of
eyeglasses, small portable radio with extra batteries and sturdy, closed-toed shoes. Store these items in your desk or near your work station for easy access. Also store a copy of your department's emergency procedures including instructions for building evacuation and recovery task responsibilities.

In Your Car

Several days supply of food bars, water, first aid kit, flashlight, emergency space blanket, warm jacket, flares, good pair of walking shoes. Store in the car's trunk.

At Home

Develop a family earthquake plan. The following information should be included:

Responsible members of the family should know where to reunite after the quake, if separated.

Choose an out-of-state friend or relative that family members can call to report on their safety and whereabouts. You may not be able to make a local call home, but might be able to place a long distance call. All family calls should report to the same out-of-state person.

Recognize both the safe (under tables, desks or against inside walls) and dangerous areas in each room of the house. Stay away from large glass windows and doors (glass may burst explosively under strain), heavy mirrors, tall furniture, fireplaces and hanging objects.

Adults should learn basic first aid and CPR techniques. Classes are available in many locations throughout San Diego including Red Cross, local medical care facilities, and UCSD (contact Staff Education, 534-4890). The cost for the classes is nominal.

Every household should be equipped with several ABC-type dry chemical fire extinguishers. This type can be used safely on any type of burning material.

Store a sturdy pair of shoes, gloves and flashlight with fresh batteries under your bed to be available in the middle of the night. DO NOT USE CANDLES as the first source of light because of possible gas leaks.

Every child should carry an ID card with them at all times including their name, address, home and emergency phone numbers, as well as parents' names and any special instructions.

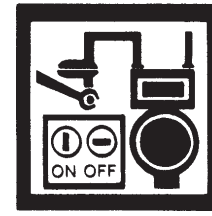
Review your school's disaster program. Be familiar with how long your school will keep your children and where they will be moved

to if the school is damaged and you are unable to pick them up immediately.

Responsible members of the family should know how to shut off the main gas, water and electricity sources. The gas should only turned be turned off if lines are definitely leaking. (Relighting the gas pilot should be left to utility personnel).

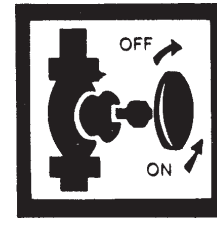
GAS VALVE

The primary gas shutoff valve is located on the main gas line found near your home's utility meter. A special slotted shutoff tool or another type of wrench is needed to turn the valve 90 degrees to stop the flow of gas.



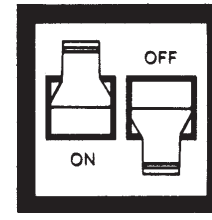
WATER VALVE

The main shutoff water valve is typically located near the street inside of the water meter box which the city reads periodically. Turn the handle or shutoff valve clockwise to stop all water flow.



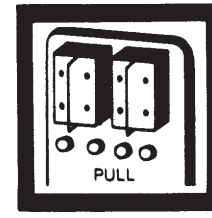
CIRCUIT BREAKER PANEL

The circuit breaker panel is normally located near the garage or some other area of your home. Inside the panel box will be a switch labeled "Main." Clicking this switch to the off position will shut down all electrical current in the house.



FUSE PANEL

Older residences may have a fuse panel, rather than a circuit breaker system. Locate the main fuse and pull it out or unscrew it to stop electrical flow.



Check chimneys, roofs, walls and foundations for stability. Make sure your house is bolted onto its foundation.

Secure the water heater and other large appliances to prevent excessive movement which could damage utility lines (tie-down diagrams are included in the last section of this publication dealing with anchoring non-structural hazards).

Secure tall, top-heavy furniture such as bookcases, china cabinets or wall units. Secure hanging plants, mirrors and heavy picture frames (especially over beds).
Put safety latches on all cabinet doors to prevent opening during shaking. Child-proof latches hold securely, yet are easily opened for routine entry.

Keep flammable or hazardous liquids such as paints, pest sprays, gasoline, cleaning products, etc., in latched cabinets or on lowest shelves away from pilot lights.

Store enough food, water and emergency supplies to provide your family adequate resources for at least 72 hours. These supplies are available in commercial kits, as discussed previously, or you can create your own kit using the following "shopping list" of recommended items.

Food

Special survival bars can be safely stored for five years. Unopened canned goods remain safe for one year. Include a minimum of three cans of food per person per day. Items like canned stews, hearty soups, sardines and tuna work well. Dried foods such as nuts, raisins, powdered milk are compact and easy to store.

Select foods that your family enjoys and will meet special diet restrictions or infant needs. Rotate food items continuously to keep stored items fresh. Don't forget about pets.

Multivitamins and dietary supplements

Water

Each person in your family will need from one-half to one gallon of water per day. Water should be stored in sealed plastic containers and kept in cool, dark locations. Date each container and change water every three months. Commercial products are now available which will extend the shelf life of stored water for years.

Other supplies include funnels, canteens, extra storage jugs, buckets for catching rain and carrying water, etc. Line buckets with plastic bags to prevent leaking.

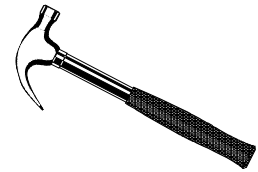
Sanitation

- Soap and liquid detergent - an antibacterial liquid soap, like Betadine, is available in pharmacies.
- Several dozen large plastic trash bags for trash, waste and water protection.
- Several large trash cans - can be used to store emergency items in.
- Shampoo, toothpaste, toothbrushes, deodorant.
- Several rolls of toilet paper and paper toweling.
- Feminine and infant supplies - feminine napkins make excellent compress bandages.
- Household chlorine bleach for water purification.
- Newspaper to wrap garbage and waste.
- Buckets (lined with plastic bags) to serve as a portable toilet. Detached toilet seat.

Tools & Equipment

- Sturdy shoes
- Heavy gloves
- Candles/waterproof matches
- Change of clothing for each member of the family
- Sharp knife or razor blades

- Garden hose for siphoning and fire suppression
- Tent or canvas tarp
- Spare glasses/contacts, cane, hearing aid
- Extra prescription medication
- Flashlight with extra batteries
- Manual can opener
- Pipe/crescent wrench/tools - gas turnoff wrench
- Rope
- Duct or filament tape
- Coleman lantern
- Shovel
- Portable radio with batteries
- Blankets/sleeping bags
- Money - $100 or more in cash. Credit cards and
- ATM machines will not be of any use.
- Broom
- Ax
- Large screw drivers/pry bar
- Plastic sheeting
- Toys for small children
- Bicycle - may be the best means of transportation



Cooking Supplies

- Barbecue or camp stove/fuel
- Charcoal - 50 pounds, starter fluid
- Plastic utensils
- Paper plates, cups, toweling
- Large pots and pans - use double-boiler to cook quickly and save fuel.
- Metal coffee or tea pot
- Two pairs of adjustable channel-lock pliers
- for holding hot items, hot pads for hands

Medical Supplies

- First aid book
- First aid kit, freshly stocked
- Aspirin/non-aspirin
- Personal medications
- Laxative
- Anti-diarrhea medications
- Smelling salts
- Antiseptic solutions - Betadine soap, "wipes"
- Eye wash solution
- Rubbing alcohol
- Petroleum jelly
- Bandages
    - Adhesive bandages, assorted sizes
    - Gauze squares, assorted sizes
    - Rolled gauze
    - Triangular bandages
    - Adhesive tape, 2" wide
    - Eye dressing
- Wooden splints, 18" long
- Scissors
- Tweezers
- Thermometer - oral and rectal
- Medicine dropper
- Safety pins
- Large zip-lock plastic storage bags

Storage of Supplies

Smaller materials and supplies should be bagged in categories and stored inside of sealed plastic or metal trash containers, storage lockers or heavy wooden box. Containers should be stored in cool, dry locations in closets, service porches, tool sheds or garage. If locked away to protect against pilferage, all family members should have access to the keys or combination.

During the Quake...

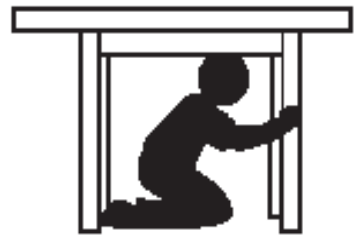
DUCK

Duck or drop down to the floor.

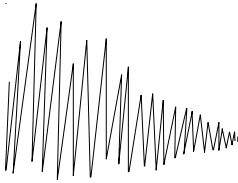
COVER

Take cover under a desk, sturdy table, doorjamb or stairwell. If that is not possible, seek cover against an interior wall, protecting your head and neck with your arms. Hallways are among the safest areas; kitchens and garages are the most dangerous. Avoid areas near large windows, tall furniture and heavy hanging objects.

HOLD



Hold securely on to furniture during the shaking. If the furniture moves, you want to move with it to maintain protection. Remain in that position until the shaking stops. After the shaking subsides, immediately evacuate the building to the nearest designated safe area outside.



Steps to Take...

If you are in a **HIGH-RISE BUILDING**, and you are not near a desk or table, move against an interior wall and protect your head with your arms. Do not use the elevators. Do not be surprised if the fire alarm or sprinkler system activates.

If you are **OUTDOORS**, move to a clear area, away from trees, signs, buildings or downed electrical wires and poles.

If you are on a **SIDEWALK NEAR BUILDINGS**, duck into a doorway to protect yourself from falling bricks, glass, plaster and other debris.

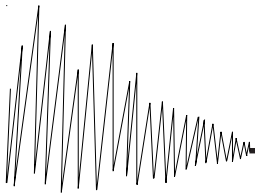
If you are **DRIVING,** pull over to the side of the road and stop. Avoid overpasses, power lines and other hazards. Stay inside the vehicle until the shaking is over.

If you are in a **CROWDED STORE OR OTHER PUBLIC PLACE,** do not rush for exists. Move away from display shelves containing objects that could fall.

If you are in a **WHEELCHAIR**, stay in it. Move to cover, if possible, lock your wheels, and protect your head with your arms.

If you are in the **KITCHEN**, move away from the refrigerator, stove and overhead cupboards.

If you are in a **STADIUM OR THEATER**, stay in your seat and protect your head with your arms. Do not try to leave until the shaking is over. Then exit in a calm and orderly manner.



After the Quake...

Surviving the earthquake itself is only the first step in dealing with potential problems. The recovery period after the quake can also be a very difficult time. As was mentioned earlier, you and your family must be self-sufficient for at least 72 hours. During this time, all public services including police, fire and medical assistance will be absolutely overwhelmed throughout San Diego county. Those individuals capable of being self-sufficient will be able to deal with the aftermath much more effectively. This section provides recommendations for this 72-hour period.

- Remain calm. Organize your thoughts and assess your situation. Refer to your departmental or home earthquake plan depending on your location.

- Check for injured persons. Administer first aid, if trained. Do not move the victim unless he or she is in immediate danger. Make the victim as comfortable as possible. Keep the upper torso covered with jackets or blankets to help retain core body heat. Seek emergency medical help as soon as possible.

- Immediately check for ruptured utilities in the building. Shut off utilities as necessary at their source. Open windows in your home or office if natural gas is detected. **DO NOT** flip any switch, including a light switch, which may spark and ignite the gas!!

- Use fire extinguishers to control small fires. Water will probably not be available immediately after the quake for fire suppression. Remove the plastic safety band running through the extinguisher's handle. Aim the extinguisher at the base of the flame and squeeze the handle(s). Sweep the nozzle back and forth until the fire is out.

- Beware of weakened buildings which may have suffered structural damage. If home, carefully check the walls, roof, foundation and chimney for cracks. If on campus, evacuate the building immediately and move to an open

area away from all structures. Remain outside until the Regional Emergency Response Team from EH&S, Facilities Management and FD&C has evaluated your building and posted it safe for re-entry.

- Aftershocks will occur following larger quakes which can topple structurally weakened buildings or cause landslides. Be careful where you travel on foot, by bike or car.

- Avoid fallen power lines. Rescuing someone in contact with a live electrical line is extremely dangerous and should only be attempted as a last resort. Use a non-conductive pole like a broom handle to flip the wire away from the trapped person. Use CPR as needed.

- If functioning, use the telephones quickly to report only life-threatening emergencies. Only 20% of residential phones can be used simultaneously before the system overloads. It is important to leave these lines open for those individuals who must receive emergency help as soon as possible.

- Don't drink tap water or use toilets until you know if water and sewer lines are intact.

- Turn on your portable radio for instruction and information from the Emergency Broadcast System. Cooperate with public officials and their requests.

- Do not attempt to drive your car for the first few hours. Roads will be congested, freeway overpasses may be down and streets may be littered with sharp debris. Leave roads open for emergency vehicle usage.

- If you evacuate your home, leave a message for other family members and friends posted as to where you can be found.

Even after the first emergencies are contained, normal life may not return for several days or weeks. It is important to retain a

positive attitude and try to avoid fatigue and depression which may tend set in during this period. Children may be frightened and anxious for a long time - they will need special understanding and reassurance. Professional help may be needed for the entire family to help with relieving psychological stress.

There will be four main problems you may face throughout the recovery period - **water, food, sanitation and shelter**. The remainder of this section will deal with helping you meet those challenges.

Water...

is the most important resource to preserve.

Chances are excellent that city water lines will be ruptured with ground movement, thus making normal supplies of water unavailable. Even so, you can bleed water trapped in the lines in your home by shutting off the main water valve, opening a faucet in the highest and lowest part of the house. Gravity will cause the water to empty out of the plumbing system. This water can be stored in a bathtub or sink for several days.

Many other sources of water can be found at home including bottled water (which is easily stored, but should be rotated regularly to keep fresh); up to 40 gallons held in your hot water heater (important to strap it securely so it doesn't topple and spill its contents); water held in toilet tanks (tank water treated with disinfectant chemicals is not safe to drink); melted ice cubes, and water found in canned foods. Swimming pool water with normal concentrations of chlorine is not safe for consumption without first being processed through a special filter.

Water which may contain dirt or broken glass fragments must be strained through cheesecloth, paper towels or coffee filters before consumption.

Questionable water can be purified by several methods:

(1) Boiling rapidly for 5 to 10 minutes.

(2) Adding commercial purification tablets which release iodine (Halzone, Gloaline or Portable-Aqua) available at drug and sporting goods stores.

(3) Adding liquid chlorine bleach (Clorox, Purex, etc.,) as follows -

If Water Is	Quantity	Then Add
Clear	1 quart	2 drops
Clear	1 gallon	8 drops
Clear	5 gallons	1/2 teaspoon
Cloudy	1 quart	4 drops
Cloudy	1 gallon	16 drops
Cloudy	5 gallons	1 teaspoon

Allow water to stand for 30 minutes.

SPECIAL NOTE - Do not use bleach in which there are active ingredients other than hypochlorite.

Water should be used only for drinking, washing hands, cooking and first aid measures. Until normal water supplies are restored, water should not be used for bathing, plants or washing clothes.

Food

If at home, you will probably have some food on hand at the time of the quake (unless you have teenagers living with you, of course). Consume food supplies in the following order -

First, from the refrigerator
Second, from the freezer
Third, from cans and dry goods

You can keep food fresh in an ice chest for several days by thawing frozen food inside it. Open the ice chest as little as possible. Keep stored in a cool, shaded location covered with blankets.

Food preparation should be as simple as possible. Use absolutely the minimum amount of water. If possible, cook foods directly in cans which require no dishwashing. Paper plates can also be used.

Cooking should be done outside until gas lines have been checked for leaks.

Sanitation

Good sanitation practices are vital to reduce the possible spread of infectious diseases.

Handwashing is absolutely necessary before food preparation and after using emergency toilet facilities. The best handwashing device is a small suspended water bag with a hose and clip to turn water off and on. These are available through camping supply outlets.

Do not use the toilet in your home until you are certain that sewer and water lines are intact. Emergency toilet facilities can be constructed as follows -

- ✔ Dig a latrine about 2 feet long, six inches wide and 2 feet deep. Provide toilet paper, a scoop and powdered chlorine bleach or lime (available in garden stores) in a covered container. After each use of the latrine, sprinkle a small amount of bleach or lime over the waste and cover with a thin layer of soil. When the latrine is filled to within one foot of the top, cover with dirt, pack it down and mark the location. Burial of waste is the safest emergency method for disposal.

- ✔ Use buckets for toilets when a latrine cannot be used. Several covered buckets should be included among your supplies which can serve as temporary toilets. Additionally, heavy gauge plastic bags and powdered chlorine bleach or lime will also be needed.

- ✔ One bucket should be used strictly for holding urine. It

may be periodically emptied into the storm drain openings in the street gutter. Bucket should be kept covered in between use.

- ✓ A separate bucket should be double lined with plastic bags to hold solid waste. After each use, powdered chlorine bleach should be added and the inner bag closed. Bucket should remain closed in between use.

- ✓ Full bags should be clearly marked and stored well away from centers of activity. It is important to dispose of solid waste properly to prevent the possible spread of infectious diseases.

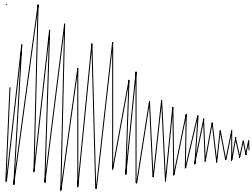
Shelter

Buildings may be structurally damaged, thus unsafe for living in until repairs can be made. Recreational vehicles, tents and tarps can be used for temporary shelter. Heavy plastic (5 mil) sheets can also be draped over a rope between two posts or trees to create an A-frame tent. Plastic can also be used to serve as a ground cover and moisture barrier.

When ordinary people experience extreme situations, many will suffer from stress-related problems. The emotional affects of trying to cope with a major quake may cause long-lasting psychological difficulties which may require patience and professional intervention to resolve.

This section discusses certain behavior patterns which tend to manifest themselves among individuals involved in major earthquakes. Possessing foreknowledge of what to expect may help to provide a sense of greater control.

When our normal world is suddenly thrust into a large quake with its loud roar, cracking buildings and undulating ground, the human body instinctively reacts in a "fight or flight" manner. The extreme activity causes a rush of adrenaline to flow during the shaking. Your body is prepared to help you flee, fight or cope with the perceived danger.



Psychological Stress

During the quake, many people will be terrorized and feel completely helpless. Others will seem perfectly calm, as though watching the phenomenon distantly on television. Probably nothing you've ever done in your life will adequately prepare you for the reality of dealing with the sights, sounds and smells that will impact your senses. There will be thick dust from fallen walls and cracked streets everywhere. There may be the smell of escaping natural gas from broken gas lines, of sewage or oil. Noise and confusion will permeate the atmosphere. People may be seriously injured or killed. You may not be able to locate members of your family for hours or even days.

When sensory images such as these are experienced under high emotional stress, theytend to become deeply imbedded into your memory. The trauma may retrigger other disaster experiences encountered in car accidents, wars, etc. There may be a time-warp feeling. It may be difficult to separate the present from the past for a period of time. These feelings tend to resolve themselves over time, but often require the help of professional counselors who can offer crisis debriefing sessions.

The primary emotional issue for most of us will be the care and safety of dependents at home. This is especially true if we are unable to return home immediately or communicate with them quickly. The following suggestions are offered to help reduce some of this anxiety.

- ✓ See that all members understand your family's earthquake plan.
- ✓ Advise everyone of the likelihood of aftershocks which may be as strong as the original quake and occur for days.
- ✓ Arrange with a neighbor, who remains at home during the day, to check on dependents in your residence until you are able to return home.

- ✓ Check with your child's school to make sure that the children will be taken care of until parents arrive.

Earthquakes are traumatic for all of us, but they are especially frightening to children who may have to leave their homes and all that is familiar to them. A child usually does not understand such events and may feel anxious, confused and scared. Parents can help their children manage this stress better in the following ways.

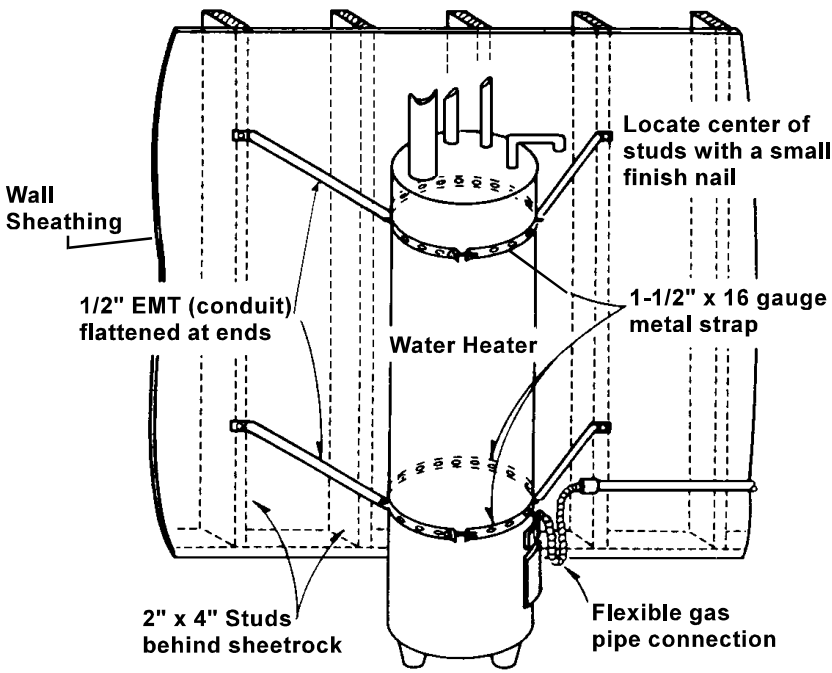
- ✓ Keep your family together. This provides immediate reassurance to your child; fears of being abandoned and unprotected are alleviated.
- ✓ Reassure children by words, as well as actions.
- ✓ Encourage your children to talk about their feelings and ü perceptions of the disaster.
- ✓ Include the children in all family activities during the recovery process such as cleaning up debris, etc.

Reducing the Hazards

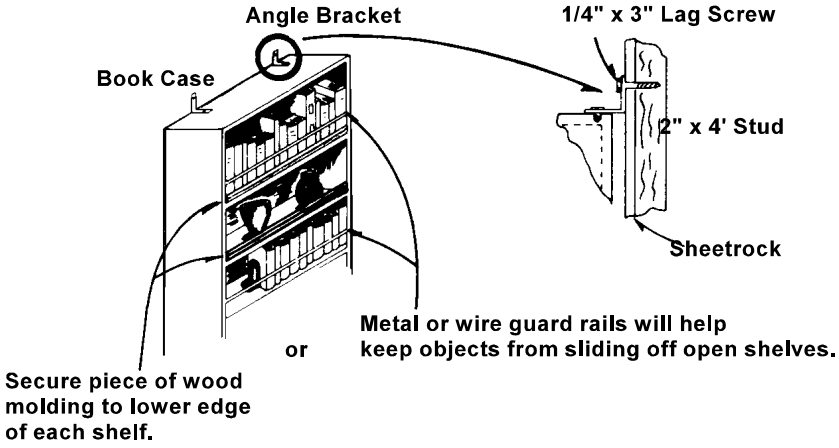
This portion deals with anchoring non-structural hazards found in our everyday environment. These objects are typically top-heavy, "creep" off surfaces onto the floor, or swing wildly into nearby windows or walls. These unsecured objects are serious falling hazards which represent a substantial risk to you. Using these low-cost techniques to secure all potential hazards will greatly reduce the possibility of injury. These same measures can be applied at work, home, laboratory, schoolroom, daycare center, church, etc.

Waterheaters

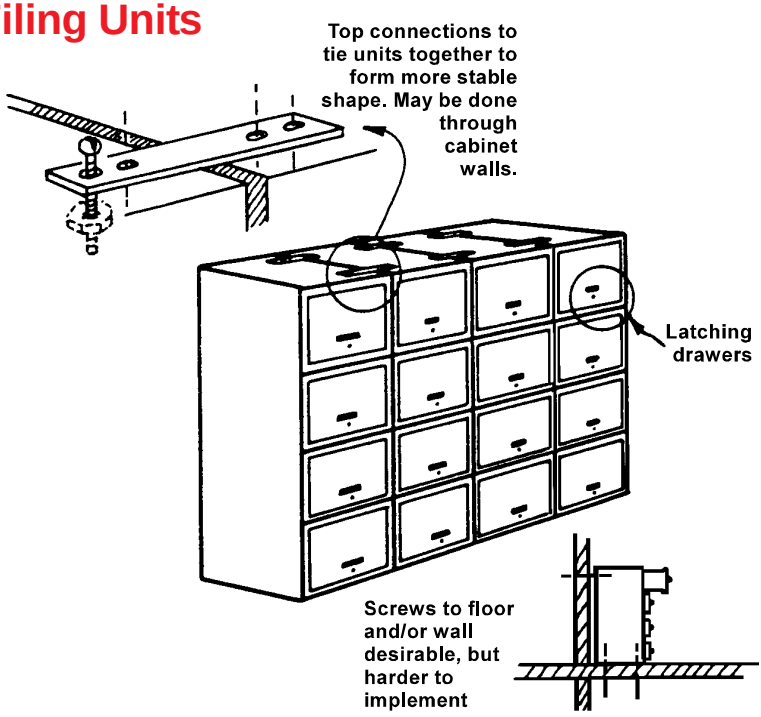
Waterheaters hold up to forty gallons of potential drinking water, are very top-heavy by design, and may be plumbed with a natural gas line which could rupture, resulting in a fire. For these reasons, all waterheaters should be fastened securely to the wall to prevent their collapse.



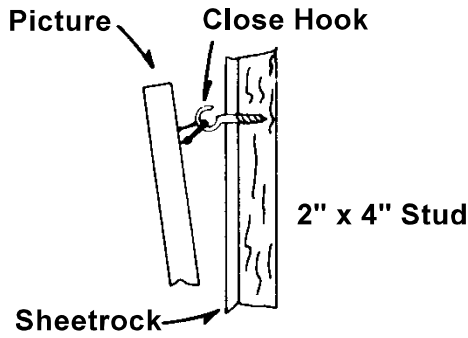
Tall Furniture or Open Shelves



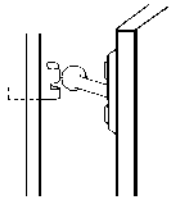
Filing Units



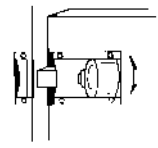
Hanging Pictures



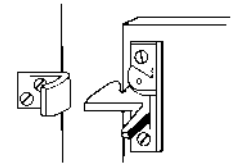
Cabinets



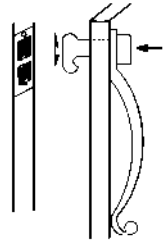
Childproof
(Out of sight, inexpensive, easy to install)



Decorative
(Turn knob to open)



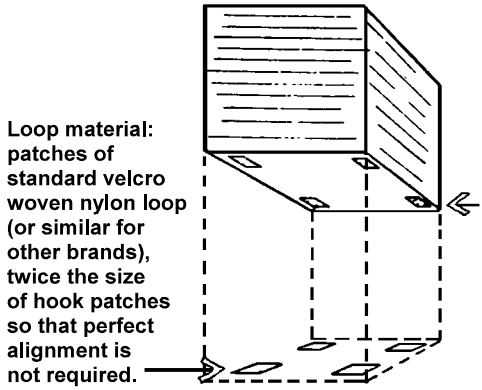
Decorative
(Pull back handle to open)



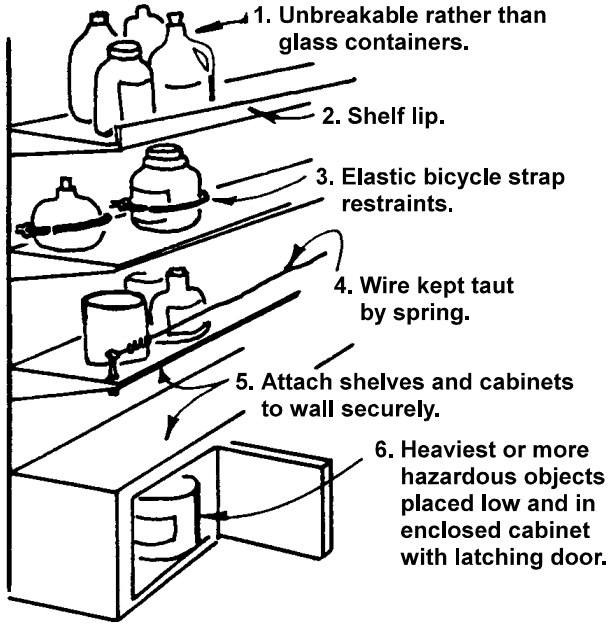
Decorative
(Release button in handle)

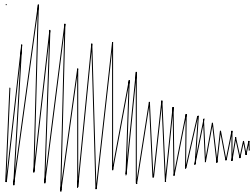
Hook and Eye
(Suitable for garage cabinets)

Computers and Office Items



Hazardous Material Containers





Other Resources

The State of California has become very aggressive in disseminating preparedness information to its residents. Beyond this publication, there are many other sources of information which the reader may pursue. The more informed you are about potential problems, the better you can prepare and react during emergency times.

UCSD Emergency Preparedness Web page
http://blink.ucsd.edu/go/emergencyprep
(858) 534-3660

American Red Cross - San Diego
http://www.sdarc.org/
(619) 542-7400

San Diego County, Office of Emergency Services
http://www.sdcounty.ca.gov/oes/oes_home.html

California Governor's Office of Emergency Services
http://www.oes.ca.gov/

Federal Emergency Management Agency
http://www.fema.gov/

Southern California Earthquake Data Center
http://www.data.scec.org/

Southern California Seismic Network (SCSN)
http://www.trinet.org/scsn/scsn.html

National Earthquake Information Center, USGS
http://wwwneic.cr.usgs.gov/

San Diego State University - Geological Sciences
(619) 594-5586

A Child’s View of Earthquake Facts and Feelings
http://pasadena.wr.usgs.gov/ABC/index.html

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Extensive research has been performed in the field of earthquake dynamics. This publication resulted from the review of many different sources of information on the subject. It is an attempt to provide an overview of various aspects of earthquake safety issues. The threat of a large earthquake occurring in San Diego is very real. Please read this publication carefully and refer to other resources listed on the last page. Use the information available to better prepare yourself and your family.

Any comments or questions concerning material presented in this publication should be directed to the UCSD Environment, Health & Safety Office, (858) 534-3660.

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