A Consumer Guide to Asbestos

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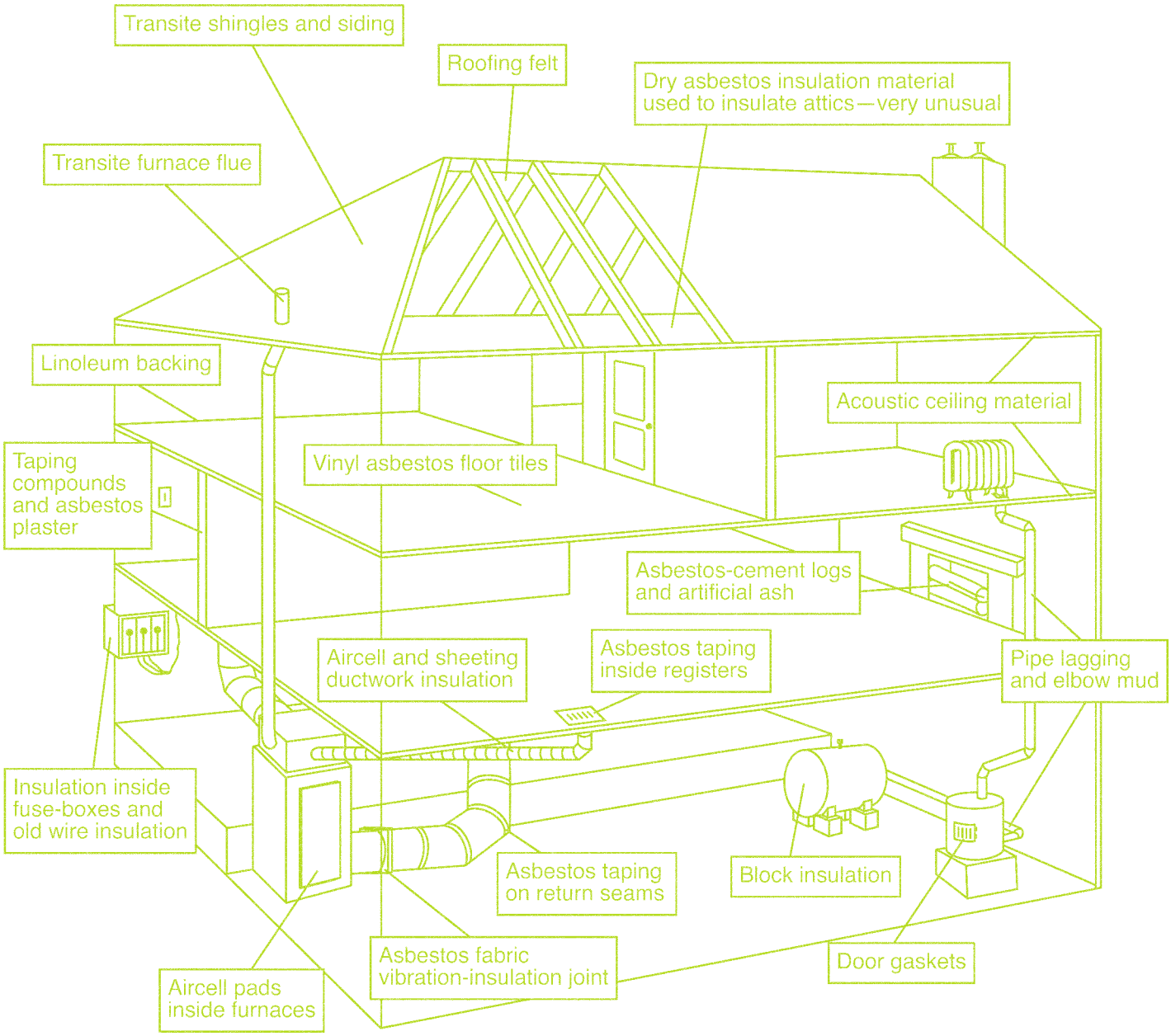
Serving California Since 1929

CSLB

CONTRACTORS STATE LICENSE BOARD



DISCLAIMER

This publication is meant to be instructional, to provide information to assist the consumer in dealing with asbestos. The information in this publication is believed to be accurate at the time of its publication. The Contractors State License Board, the Department of Consumer Affairs and the State of California assume no responsibility for any damage that arises from any action that is based on information found in this publication. Questions regarding civil law and the civil courts system should be addressed to an attorney.

For information about the Contractors State License Board, call toll-free
1 (800) 321-CSLB (2752)
www.cslb.ca.gov

Asbestos

Introduction

The California Contractors State License Board (CSLB) licenses and regulates all contractors who are qualified to do asbestos work in buildings. Additionally, the California Division of Occupational Safety and Health (Cal/OSHA) has responsibility to register all contractors who perform asbestos abatement work and test and certify all asbestos abatement consultants.

California law prohibits any person from advertising for the removal of asbestos unless certified for that work. The law also requires that the contractor's license number and the Cal/OSHA registration number be included in that advertising. This booklet provides information for consumers to help identify asbestos in buildings and the precautions needed to prevent harmful exposure to asbestos when planning for and undertaking its removal. It also describes the steps you should take when contracting with a company to remove asbestos.

The protections and procedures discussed later in this booklet will protect your health. Equally important, the protections are required by law.

Warning to Do-it-Yourselfers

Many consumers prefer to do their own home-improvement jobs, realizing the rewards of planning and completing the jobs themselves and saving the expenses associated with hiring a licensed contractor. While asbestos abatement or removal does not require an asbestos certification if the total area involved is less than 100 square feet, this does not necessarily mean that the job is any easier or less risky to perform. In fact, Cal/OSHA regulates the handling of any asbestos material, regardless of the setting. Further, regulations and stringent transportation and disposal requirements are in effect for any asbestos-related work, even small amounts removed by a homeowner. For this reason, this booklet includes some of the same information about asbestos handling that licensed contractors are required to know. While the booklet may appear to some readers to be complicated and technical, the information is provided to give you an adequate basis upon which to make decisions and take actions that are necessary to ensure your safety and health when handling asbestos.

Much of the information provided here is about the specialized skills and equipment required for the services of a registered and certified asbestos abatement contractor. To remove or render harmless all asbestos requires accurate information, correct procedures, and special equipment. If you decide to hire a licensed contractor, make sure the contractor has all the appropriate tools, training, and licensing and certification necessary to comply with the law and to protect you from unnecessary exposure to asbestos fibers.

You can remove asbestos yourself. But, keep in mind that if you do not adequately protect yourself, the job could prove more costly in the long run, with respect to health, disability and death, than any amount of money saved in the short run!

For additional information about dealing with contractors, contact the CSLB and request a free copy of "What You Should Know Before You Hire a Contractor." The CSLB also publishes "A Contractor's Guide to Asbestos With Open Book Examination," another excellent resource for additional information about laws and regulations affecting work with asbestos. (See page 12 for contact information.)

What is asbestos?

Asbestos is a naturally occurring mineral fiber that has been used extensively in construction and many other industries. Nearly every building contains asbestos in some form. It has been widely used because of its special properties. For example, asbestos is very resistant to destruction by heat or chemicals, and its fibers are extremely durable. These characteristics led to its use in wall insulation; paint; sprayed- or troweled-on surfacing materials; ceiling and flooring materials; pipe, boiler, and duct insulations; cement filler; and a variety of other products. However, you, the consumer, should know about the dangers of asbestos.

Asbestos and Health

Why should I be concerned about asbestos?

Several types of disease can result from exposure to asbestos. In fact, inhalation of asbestos fibers can be deadly. Even short-term exposure to asbestos can be harmful. For example, family members of asbestos workers have contracted disease from exposure to asbestos fibers on the workers' clothing. Authorities believe there is no safe level of exposure, although the higher the exposure to asbestos, the higher the risk of disease.

How does exposure to asbestos occur?

Asbestos that may be crumbled by hand pressure is called "friable" asbestos. Material containing friable asbestos is hazardous because asbestos fibers are easily released into the air by impact and deterioration.

Some asbestos is bound with other materials in products such as roofing shingles or vinyl-asbestos floor tiles. In these products, asbestos fiber is not released so easily. However, fibers in bound asbestos may be released when the material is cut, drilled, scraped, or sanded or when it is badly deteriorated.

Exposure to asbestos occurs when asbestos fibers of various sizes are released into the air and are inhaled. The smaller fibers can remain in the air for long periods of time. These fibers are so small that they are only visible with a microscope. In fact, it takes 600 asbestos fibers bundled together to equal the thickness of a human hair. Some of the large fibers may lodge in the nose, but the smaller ones travel through the upper airways and become embedded in the lungs. The body has no effective mechanism for removing these fibers.

How will asbestos affect my health?

Exposure to asbestos may cause several types of serious diseases, including the following:

• Asbestosis

Asbestosis occurs when asbestos fibers become lodged in the lungs, irritating the lung tissues and inflaming the small air tubes and sacs in the lungs. As the inflammation heals, permanent scar tissue (called fibrosis) remains. The scarring will cause shortness of breath, which grows worse over time, even after exposure ceases. Eventually, it may be impossible for the victim to inhale enough air, and heart failure may result.

What we know about the relationship between exposure to asbestos and asbestosis has been obtained from studies of people who were heavily exposed. Usually, asbestosis is found in people who have been exposed to asbestos over a long period of time. The disease is much less likely to occur if proper precautions such as those described in this booklet are taken.

There is no cure for asbestosis.

• Lung cancer

Lung cancer is five times more common in people exposed to asbestos than in individuals who have not been exposed. Early symptoms are coughing, chest pains, and coughing up blood. Smoking greatly increases the risk of developing lung cancer from exposure to asbestos. A smoker who is heavily exposed to asbestos is 30 to 90 times more likely to develop lung cancer than a nonsmoker. However, as with asbestosis, proper precautions can help to reduce the risk of contracting asbestos-related lung cancer. There is usually no cure for this disease, but if the cancer is detected early, it may be surgically treated.

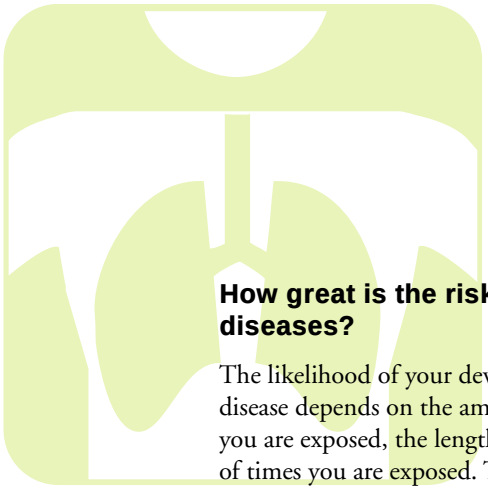
• Mesothelioma

Mesothelioma is an extremely rare and deadly form of cancer that is almost always caused by exposure to asbestos. It is truly an "asbestos cancer"—and may result from relatively light exposure to asbestos.

This cancer occurs in the lining of the chest and abdomen. Early symptoms are shortness of breath or pain in the chest or abdomen. Mesothelioma would be expected to occur in only one out of 100,000 people not exposed to asbestos, but one study found that ten of the 124 deaths of asbestos insulation workers were caused by mesothelioma. There is no cure for this disease, and most of the victims die within the first year of diagnosis.

• Other cancers

Exposure to asbestos is also thought to result in cancers of the esophagus, stomach, colon, rectum, and gastrointestinal tract. These diseases may be caused by the victim swallowing some of the longer asbestos fibers that have been caught in the upper air passages. The fibers are then carried to the throat in mucus.



How great is the risk of developing these diseases?

The likelihood of your developing asbestos-related disease depends on the amount of asbestos to which you are exposed, the length of time, and the number of times you are exposed. The greater the total exposure, the greater the chance you will become ill. However, many experts believe that there is no definite safe exposure level. Some workers who had done shipyard work with asbestos for only a few weeks during World War II developed asbestos-related disease in the 1960s. Workers in the construction, renovation, and demolition trades who encounter asbestos on the job are among the higher risk groups. The best way to protect your health or the health of your family is to limit exposure as much as possible.

Usually disease will not show up for 15 to 40 years after exposure. That means that people exposed today will not know for a considerable time whether they are disease victims.

Are there any medical tests to determine whether exposure to asbestos has been harmful?

Anyone frequently exposed to asbestos on the job should have regular medical exams. The worker should discuss his or her work history with a doctor, and the exam should include a complete medical history, a chest X-ray, a lung function test, and a stool sample. If you believe your work brings you into contact with asbestos, even though most damage from asbestos-releated disease may not show up for many years, you should see a doctor regularly to determine whether you have signs of asbestos-related disease and to discuss ways to better protect yourself.

For more information concerning the health hazards of asbestos, contact the American Lung Association. (See the Resources for Asbestos Information on page 12.)

Where does exposure to asbestos occur?

Exposure to asbestos can occur in a number of construction- and home improvement-related operations. Even if a homeowner or contractor is working with less than 100 square feet of surface area of asbestos-containing material, exposure may occur. For example:

- When remodeling a home, if you cut a small ceiling section to add a stairway, room addition, or a porch, you may disturb sprayed-on asbestos insulation;
- While replacing plumbing pipes during a minor renovation, you may be exposed to deteriorated, asbestos-containing pipe covering;
- When cutting through asbestos shingle siding to insulate a wall, you may be exposed to insulation fibers.

Regardless of the size of the job, check first to determine if asbestos fibers are in the air. Certified asbestos consultants are available to help identify the presence of asbestos and the precautions needed to protect yourself. Their services, including a sample collection and analysis, should cost around $200.

Remember, unless it is explicitly labeled, no one can tell just by looking whether asbestos is present in the material you encounter. If it is, you, your family, and any workers involved in the job must be protected.

The protections and procedures discussed later in this booklet will protect your health. Equally important, the protections are required by law.

Where can asbestos be found in my home?

There are many areas in the home in which asbestos has been used as a building product. The following list can offer some guidance to help identify potential asbestos risks in the home.

Vinyl floor tiles and vinyl sheet flooring

Asbestos has been added to some vinyl tiles to strengthen them. It is also present in the backing on some vinyl sheet flooring and in the adhesives used to place the flooring. While in most instances the asbestos is bound into the vinyl or backing, fibers can be released if the tiles are sanded or seriously damaged, if the backing on the sheet flooring is dry-scraped or sanded, or if the tiles are severely worn or cut to fit into place.

When replacement or repair becomes necessary, follow the guidelines provided on page 9 of this booklet. The tiles should be handled as little as possible. Avoid sanding or otherwise damaging them. A safe and recommended alternative is to place new flooring material directly over the old tiles or sheet.

Patching compounds and textured paints

In 1977, the Consumer Product Safety Commission banned patching compounds that contain asbestos. Some wall and ceiling joints may be patched with asbestos-containing material manufactured before 1977. If the material is in good condition, it is best to leave it alone. Sanding and scraping will release asbestos fibers. If it is in poor condition, or if the wall or ceiling needs to be removed or repaired, follow the guidelines on page 9.

Some textured paint sold before 1978 contained asbestos. As with patching compounds, textured paint is best left alone if undamaged. Sanding or cutting a textured paint surface that may contain asbestos should be avoided.

Ceilings

Many buildings built or remodeled between 1945 and 1978 may contain a crumbly, asbestos-containing material that has been either sprayed or troweled onto the ceiling or walls. If the material is in good condition, it is best to leave it alone. If the material appears damaged, you may have it tested to see if it contains asbestos. If it does, you can then have it repaired or removed.

If possible, contact the builder or contractor who applied the ceiling coating to determine whether asbestos-containing material was used. This may be difficult to do in older homes. If you discover that it contains asbestos and you decide that it is necessary to remove it, follow the guidelines on page 9. As with other similar tasks dealing with removal of asbestos, a trained, certified, and registered asbestos abatement and removal contractor is the professional best equipped to do the job.

Stove insulation

Asbestos-containing cement sheets, millboard, and paper have been used frequently in homes with wood-burning stoves. These asbestos-containing materials are used as thermal insulation to protect the floor and walls around the stoves. Cement sheets may have a label indicating that they contain asbestos.

The cement sheet material probably will not release asbestos fibers unless scraped. This sheet material may be coated with a high-temperature paint, which will help seal any asbestos into the material.

Asbestos paper or millboard are also used for this type of thermal insulation. If these materials have been placed where they are subject to wear, there is an increased possibility that asbestos fibers may be released. Damage or misuse of the insulating material by sanding, drilling, or sawing will also release asbestos fibers.

Furnace insulation

Oil, coal, or wood furnaces with asbestos-containing insulation and cement may be found in some older homes. Updating the system to oil, gas, or electricity can result in removal or damage to the old insulation.

If the insulation on or around your furnace is in good condition, it is best to leave it alone. If the insulation is in poor condition, or pieces are breaking off, you may want to consider having it repaired or removed. First find out if the insulation contains asbestos (see page 8); if it does, then follow the guidelines on page 9.

Door gaskets

Some door gaskets in furnaces, ovens, and wood and coal stoves may contain asbestos. The asbestos-containing door gaskets on wood and coal-burning stoves are subject to wear and can release asbestos fibers under normal use conditions. Handle the asbestos-containing material as little as possible, following the guidelines on page 9.

Pipe insulation

Hot water and steam pipes in some older homes may be covered with an asbestos-containing material primarily for reducing heat loss and for protecting nearby surfaces from the hot pipes. Pipes may also be wrapped in an asbestos "blanket" or asbestos paper tape. Asbestos-containing insulation has also been used on furnace ducts. Most asbestos pipe insulation in homes is preformed to fit around various diameter pipes. This type of asbestos-containing material was manufactured from 1920 to 1972.

If you have damaged insulation around pipes or boilers, the best current recommendation is to leave the insulation in place and repair the protective covering. In many circumstances, this is the best way to minimize potential exposure to asbestos. For example, small holes in pipe covering may be filled with caulking or spackling and then covered with fire-resistant fiberglass cloth or scrim cloth pipe wrap. (These materials may not be readily available at most hardware stores.) If the damaged area is easily accessible and does not involve a substantial amount of exposure, you may use heat resistant duct tape to carefully seal in the damaged area.

Wall and ceiling insulation

Homes constructed between 1930 and 1950 may contain insulation made with asbestos. Insulation that contains asbestos may be found inside the walls or ceiling, "sandwiched" between plaster walls, as well as blown-in or loose-fill insulation. Renovation and home improvements may expose and disturb the materials. In cases of major disruption of asbestos-containing material, it is especially important that a trained asbestos contractor be used.

Appliances

Some appliances are, or have been, manufactured with asbestos-containing parts or components. The Consumer Product Safety Commission is making an effort to identify household appliances that could release asbestos fibers during use. The commission has reviewed information on the use of asbestos-containing parts in toasters, popcorn poppers, boilers, slow cookers, dishwashers, refrigerators, ovens, ranges, clothes dryers, and electric blankets. There has been a general decline in the use of asbestos in these appliances in recent years. When asbestos is used, it is in parts that will probably not result in the release of asbestos fibers during use. It is unlikely that asbestos components in these appliances present a significant health risk from release of asbestos fibers.

Hair dryers with asbestos-containing heat shields are one notable exception. Manufacturers voluntarily recalled such hair dryers in 1979. Laboratory tests of most hair dryers showed that asbestos fibers were released during use. Current production hair dryer models do not contain asbestos heat shields.

If you are concerned about asbestos in an appliance, do not repair it yourself. Instead, have a qualified repair technician repair it.

Roofing, shingles, and siding

Some roofing shingles, siding shingles, and sheets have been manufactured with asbestos, using Portland cement as a binding. Since these products are already in place and outdoors, there is little risk to human health. However, if the siding is worn or damaged, you may spray-paint it to help seal the fibers.

You should avoid disturbing these products if they are already part of your home. Unless roofing must be replaced as a result of normal wear, it is wiser to simply leave it in place.

How will I know asbestos when I see it?

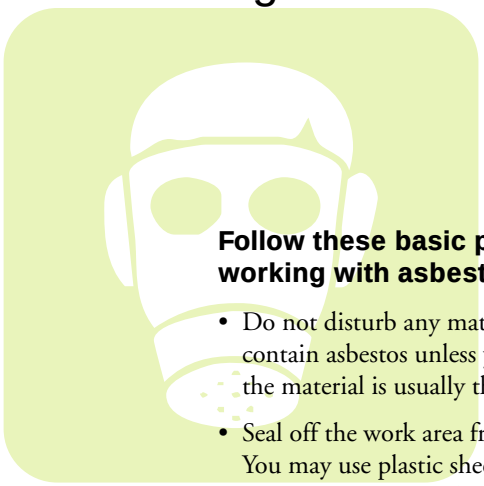
Before you undertake any project in which you suspect the presence of asbestos, you should first try to determine whether the material contains asbestos. Avoid disturbing the material if at all possible. If you cannot determine from a label, the installer, or the manufacturer whether the material contains asbestos, it is best to assume that the product *does* contain asbestos.

People who have frequently worked with asbestos material (such as plumbers, building contractors, and heating contractors) often can make a reasonable preliminary judgment about whether or not a product contains asbestos, based on a visual inspection. However, proper sampling and testing are necessary in order to confirm the presence of asbestos.

In some cases, you may want to have the material analyzed. Such analysis may be desirable if you have a large area of damaged material or if you are preparing a major renovation that will expose material contained behind a wall or other barrier.

More than one sample ought to be used in order to ensure accurate analysis. Use a lab certified to perform asbestos analysis that utilizes "state-of-the-art technology," which may include "polarized light microscopy," (estimated to cost $25-$50 per sample tested) or the more costly, but more sensitive "transmissible electron microscopy" (TEM) (about $265 per test). You should look for a lab that is able to positively identify collected dust samples as asbestos. A list of certified test labs can be obtained from the National Institute for Standards and Technology (see page 12 for additional resource information).

General Guidelines for handling products containing asbestos



Follow these basic precautions for working with asbestos:

- Do not disturb any material you think may contain asbestos unless you have to. Removal of the material is usually the last alternative.
- Seal off the work area from the rest of the building. You may use plastic sheeting and duct tape. Take great care not to track asbestos dust into other areas of the residence.
- Always wear a certified respirator appropriate for the specific asbestos activity. Wear gloves, hats, and other protective clothing. If possible, dispose of all of this equipment immediately after using it (see page 10). If you cannot dispose of your clothing, these work clothes must be washed separately from the family's wash. The person doing the laundry should be informed about proper procedures to prevent the release of asbestos fibers.
- When working with asbestos-containing material, wet it with a hand sprayer. The sprayer should provide a fine mist, and the material should be thoroughly dampened, but not dripping wet. Wet fibers do not float in the air as readily as dry fibers and will be easier to clean up. The addition of a small amount (about a teaspoon to a quart of water) of a low-sudsing dish or laundry detergent will improve the penetration of the water into the material and reduce the amount of water needed.
- If you must drill or cut an asbestos-containing material, do the drilling or cutting outside if possible. Wet the material first (according to instructions above).
- If you must remove the material, avoid breaking it into small pieces. While it is easier to remove and handle small pieces, you are more likely to release asbestos fibers if the material is broken into small pieces. Pipe insulation was usually installed in preformed blocks; remove these in complete pieces.
- Refer to the section dealing with Disposal on page 10 of this booklet to learn how to properly complete the job.

If you think that a material contains asbestos, and you have to handle it, do so very carefully. Special precautions should be taken while removing exposed or damaged asbestos-containing material. If possible, find a contractor trained in safe procedures for handling asbestos (such as a contractor familiar with removal of asbestos ceilings in schools). Always keep the following caution in mind:

CAUTION!

Do not dust, sweep, or vacuum particles suspected of containing asbestos. This will disturb tiny asbestos fibers and may make them airborne. The fibers are so small that they cannot be seen. If you attempt to use a conventional home or shop vacuum cleaner, you are likely to do more harm than good. Asbestos fibers are so small that they can pass through normal vacuum cleaner filters and be propelled back into the air. The dust should be removed by a wet-mopping procedure or by specially-designed "HEPA" vacuum cleaners used by trained asbestos contractors.

Disposal

Unless otherwise provided for in a contract, the asbestos wastes generated by you or a contractor performing abatement and removal work are the property of the building or home owner. It is the legal responsibility of the owner to properly package, transport, and dispose of the wastes without posing any unnecessary risk to public health.

The California Department of Toxic Substances Control has classified friable asbestos waste, which is asbestos that can be reduced to a powder or dust with hand pressure when dry, as a hazardous waste material.

This asbestos waste must be handled and transported in one of the following ways:

- In sealed nonreturnable containers (for example, double plastic bags of 6-mil thickness, cartons, drums, or cans) from which fibers cannot escape. Wastes within the container should be wetted to prevent blowing of fibers in case the container is broken; or
- In closed vehicles (for example, covered drop boxes or canvas-covered truck boxes) if wastes are too bulky to enclose in sealed containers, and provided the wastes are wetted to prevent blowing dust.

Asbestos wastes totaling more than 5 gallons in volume or more than 50 pounds must be transported by a registered hazardous waste hauler to an approved treatment, storage, or disposal facility. Persons generating and transporting less than 5 gallons or 50 pounds of a hazardous waste to a permitted hazardous waste facility are exempt from this requirement upon meeting all of the following conditions pursuant to Section 25163(c) of the Health and Safety Code:

- The hazardous wastes are transported in closed containers and packed in a manner that prevents the containers from tipping, spilling, or breaking during transporting;
- Different hazardous waste materials are not mixed within a container during the transporting;
- If the hazardous waste is extremely hazardous waste or acutely hazardous waste, the extremely hazardous waste or acutely hazardous waste was not generated in the course of any business, and is not more than 2.2 pounds;
- The person transporting the hazardous waste is the producer of that hazardous waste, and the person produces no more than 100 kilograms of hazardous waste in any month; and
- The person transporting the hazardous waste does not accumulate more than a total of 1,000 kilograms of hazardous waste on-site at any one time.

Caution labels are required on containers or drop boxes and must be in conspicuous legible lettering that spells out the following or equivalent warning:

CAUTION!

CONTAINS ASBESTOS FIBERS

AVOID CREATING DUST

BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM

The Department of Transportation does not require you to place cautionary signs on transport vehicles.

Contact your local health department for information about local landfill facilities capable of receiving the asbestos waste.

Cleaning Up

After you finish removing the material, thoroughly clean the area with wet mops, wet rags, or sponges. Repeat the cleaning procedure a second time. Wetting will help to reduce the chance that the fibers get spread around. Again, see that no asbestos material is tracked into other areas. If possible, dispose of the mop heads, rags, and sponges in the trash bags with the removed materials. Otherwise, vigorously flush the mop, rag, or sponge in running water in a sink or basin with a drain. Make sure to completely rinse both the utensil and the basin.

If you are going to have work done by a contractor, discuss these guidelines and other steps to minimize asbestos exposure.

Choosing a contractor to deal with your asbestos

For additional information, contact the Contractors State License Board and request a free copy of "What You Should Know Before You Hire a Contractor."

A current list of contractors certified pursuant to Section 7058.5 to engage in asbestos-related work registered pursuant to Section 6501.5 of the Labor Code may be obtained by sending a self-addressed mailing label to the Contractors State License Board, P.O. Box 26000, Sacramento, CA 95826.

Your selection of a contractor to remove, encapsulate or enclose asbestos in your home is a very important decision. You should make this decision only after you do the following:

- Get bids from a minimum of three different qualified and licensed contractors;
- Clearly define the parameters of the project and your expectations to each bidding contractor so that they know how to bid. Beware of any bid that is substantially lower than the other bids—this may be an indication that the contractor takes short cuts at the expense of safety;
- Ask each contractor for references that you can contact to learn about the quality of the contractors' previous work;
- Request a work plan that details procedures and project schedules. This helps determine whether the contractor you are considering fully understands and can handle the project. Obtain a written commitment for full-time, on-site project supervision and make sure the project supervisor's training certification document is included in bid documents;
- Select a contractor who has a comprehensive employee training program.

Call the Contractors State License Board to:

- Make sure the contractor you are considering has a valid, current contractor's license and certificate for asbestos abatement work;
- Make certain that the contractor has a current and valid license bond.

Call Cal/OSHA to:

- Make sure the contractor has current registration (or an approved exemption) as an asbestos abatement contractor.

Insurance and Bonding

Your contractor should have general liability as well as asbestos-specific policies; since this is the most important coverage, make sure there are no exclusions.

Establish whether your contractor has "occurrence-type" insurance, rather than "claims-made" insurance. "Occurrence" coverage begins when the policy is instituted by the contractor and provides that claims may be filed against an asbestos contractor for damages for an indefinite period of time after the exposure occurred. Although more difficult to obtain, this insurance provides maximum protection long after an individual's exposure to insure against future claims.

With a "claims-made" insurance policy, the contractor is only covered for claims filed during the period for which the policy is in force. If the contractor changes insurance companies or ceases doing business as an asbestos abatement contractor, under the terms of a claims-made policy, you may have nowhere to turn for insurance compensation for damages arising out of an exposure to asbestos caused by your contractor.

A performance and completion bond is an equally important selection criterion. The funds guaranteed by this kind of bond provide for the satisfactory completion of the project or cash settlement up to the limit of the value of the bond, even if the contractor's insurance is canceled or if the contractor fails to perform on the contract. Be sure that specific details and coverages are included in the bid package.

Documentation

Demand that the contractor provide the following documentation:

- Copies of required notification materials for the Environmental Protection Agency (EPA) and California Occupational Safety and Health Administration (Cal/OSHA);
- Job site log-in sheets;
- Monitoring reports for air and personnel;
- Accident reports;
- Hauling and disposal information and permits as required;
- Final air monitoring report.

Experts agree that the proper selection of an asbestos abatement contractor can take a lot of effort and time on the part of the consumer. However, the complex nature of asbestos treatment, and the dire effects that can occur if it is mishandled make the contractor selection process all the more important. The effort you put into a thorough screening and evaluation to choose the right contractor is probably the most important task you will undertake to make sure your asbestos abatement project is successful.

Resources for Asbestos Information

Abatement Certification

California Contractors State License Board (CSLB)
www.cslb.ca.gov ..... 800-321-CSLB or 916-255-3900
California Division of Occupational Safety and Health (Cal/OSHA)
www.dir.ca.gov 916-574-2993

Accreditation for abatement work

In schools

Environmental Protection Agency (EPA) Regional Asbestos Coordinator
www.epa.ca.gov/asbestos 415-744-1122

In schools—demolition and renovation work

National Emission Standards for Hazardous Air Pollutants
(NESHAPS) 415-744-1145

In public buildings/labs

NESHAPS 415-744-1145

Air and toxics

Environmental Protection Agency (EPA) Public Information Center
www.epa.gov/region9 415-744-1500

Air monitoring

National Institute for Occupational Safety and Health (NIOSH)
www.cdc.gov/niosh 800-356-4674
EPA Public Information Center 415-744-1500

Commercial and public buildings

Cal/OSHA Consultation Service 800-963-9424
EPA Regional Asbestos Coordinator 415-744-1122

Demolition/renovation

Contact your local Pollution Control District for information regarding the National Emission Standards. For additional help contact:
NESHAPS 415-744-1145

Disposal procedures and sites

NESHAPS 415-744-1145
Department of Toxic Substances Control
Generator ID Information 800-618-6942
Regional Duty Officer 800-728-6942
Water Resources Control Board
www.swrcb.ca.gov 916-657-2390

EPA requirements and the National Emission Standards for Hazardous Air Pollutants (NESHAPS)

EPA Public Information Center 415-744-1500
NESHAPS 415-744-1145

Health risks and disease

For the nearest Lung Association office consult your telephone directory or call:
American Lung Association
www.lungusa.org 800-LUNG-USA (5864-872)

Laboratories that analyze samples

American Industrial Hygiene Association
www.aiha.org 703-849-8888
National Institute of Standards and Technology (NIST) 301-975-4016

Land disposal fee and tax

Board of Equalization (BOE) taxpayer number
www.boe.ca.gov 800-400-7115

Local air quality agency

See your local phone directory—listed under “Air Quality” or “Air Pollution Control.”

Overexposure to asbestos (to report)

Contact the local district office of Cal/OSHA listed in your telephone directory.

Products containing asbestos

Contact the local district office of Cal/OSHA listed in your telephone directory.

Protective clothing, respirators, and respiratory protection requirements

Contact the local district office of Cal/OSHA listed in your telephone directory.

Registration of work involving asbestos

Division of Occupational Safety and Health (DOSH)
Asbestos Contractor Registration Unit 415-703-5191
DOSH Occupational Carcinogens Control Unit
www.dir.ca.gov/DOSH 415-703-5167

Sealants for encapsulation

EPA Regional Asbestos Coordinator 415-744-1122

Standards

Cal/OSHA
www.dir.ca.gov/occupational_safety.html 916-574-2993
Federal OSHA
www.osha.gov 202-693-1999

Suspected asbestos problem

Contact the local district office of Cal/OSHA listed in your telephone directory. For additonal assistance, contact:
EPA Public Information Center 415-744-1500

Temporary worksites

Contact the local district office of Cal/OSHA listed in your telephone directory.

Training and continuing education (EPA-required)

EPA Public Information Center 415-744-1500
CSLB ..... 800-321-CSLB (2752) or 916-255-3900

Waste manifests and identification numbers

For information about manifests and identification numbers, to issue temporary or emergency ID numbers, or to obtain an application, contact:
Department of Toxic Substances Control ... 800-698-6942 or 916-324-1781

Work practices

Cal/OSHA
www.dir.ca.gov/occupational_safety.html 916-574-2993
Federal OSHA
www.osha.gov 202-693-1999

Work/workforce safety

National Institute for Occupational Safety and Health 800-356-4674

Additional consumer information

U.S. Consumer Products Safety Commission (CPSC)
www.cpsc.gov 800-638-2772

CHAPTER VI

MOLD

What are molds?

Molds are simple, microscopic organisms, present virtually everywhere, indoors and outdoors. Molds, along with mushrooms and yeasts, are fungi and are needed to break down dead material and recycle nutrients in the environment. For molds to grow and reproduce, they need only a food source – any organic material, such as leaves, wood, paper, or dirt— and moisture. Because molds grow by digesting the organic material, they gradually destroy whatever they grow on. Sometimes, new molds grow on old mold colonies. Mold growth on surfaces can often be seen in the form of discoloration, frequently green, gray, brown, or black but also white and other colors. Molds release countless tiny, lightweight spores, which travel through the air.

How am I exposed to indoor molds?

Everyone is exposed to some mold on a daily basis without evident harm. It is common to find mold spores in the air inside homes, and most of the airborne spores found indoors come from outdoor sources. Mold spores primarily cause health problems when they are present in large numbers and people inhale many of them. This occurs primarily when there is active mold growth within home, office or school where people live or work. People can also be exposed to mold by touching contaminated materials and by eating contaminated foods. Molds will grow and multiply whenever conditions are right—sufficient moisture is available and organic material is present. The following are common sources of indoor moisture that may lead to mold problems:

- Flooding
- Leaky roofs
- Sprinkler spray hitting the house
- Plumbing leaks
- Overflow from sinks or sewers
- Damp basement or crawl space
- Steam from shower or cooking
- Humidifiers
- Wet clothes drying indoors or clothes dryers exhausting indoors

Warping floors and discoloration of walls and ceilings can be indications of moisture problems. Condensation on windows or walls is also an important indication, **but it can sometimes be caused by an indoor combustion problem!** Have fuel-burning appliances routinely inspected by your local utility or a professional heating contractor.

Should I be concerned about mold in my home?

Yes, if indoor mold contamination is extensive, it can cause very high and persistent airborne spore exposures. Persons exposed to high spore levels can become sensitized and develop allergies to the mold or other health problems. Mold growth can damage your furnishings, such as carpets, sofas and cabinets. Clothes and shoes in damp closets can become soiled. In time, unchecked mold growth can cause serious damage to the structural elements in your home.

What symptoms are commonly seen with mold exposure?

Molds produce health effects through inflammation, allergy, or infection. Allergic reactions (often referred to as hay fever) are most common following mold exposure. Typical symptoms that mold-exposed persons report (alone or in combination) include:

- Respiratory problems, such as wheezing, difficulty breathing, and shortness of breath
- Nasal and sinus congestion
- Eye irritation (burning, watery, or reddened eyes)
- Dry, hacking cough
- Nose or throat irritation
- Skin rashes or irritation

Headaches, memory problems, mood swings, nosebleeds, body aches and pains, and fevers are occasionally reported in mold cases, but their cause is not understood.

How much mold can make me sick?

For some people, a relatively small number of mold spores can trigger an asthma attack or lead to other health problems. For other persons, symptoms may occur only when exposure levels are much higher. Nonetheless, indoor mold growth is unsanitary and undesirable. Basically, if you can see or smell mold inside your home, take steps to identify and eliminate the excess moisture and to cleanup and remove the mold.

Are some molds more hazardous than others?

Allergic persons vary in their sensitivities to mold, both as to the amount and the types to which they react. In addition to their allergic properties, certain types of molds, such as Stachybotris chartarum, may produce compounds that have toxic properties, which are called mycotoxins. Mycotoxins are not always produced, and whether a mold produces mycotoxins while growing in a building depends on what the mold is growing on, conditions such as temperature, pH, humidity or other unknown factors. When mycotoxins are present, they occur in both living and dead mold spores and may be present in materials that have become contaminated with molds. While Stachybotrys is growing, a wet slime layer covers its spores, preventing them from becoming airborne. However, when the mold dies and dries up, air currents or physical handling can cause spores to become airborne.

At present there is no environmental test to determine whether Stachybotrys growth found in buildings is producing toxins. There is also no blood or urine test that can establish if an individual has been exposed to Stachybotrys chartarum spores or its toxins.

How can I tell if I have mold in my house?

You may suspect that you have mold if you see discolored patches or cottony or speckled growth on walls or furniture or if you smell an earthy or musty odor. You also may suspect mold contamination if mold-allergic individuals experience some of the symptoms listed above when in the house. Evidence of past or ongoing water damage should also trigger more thorough inspection. You may find mold growth underneath water-damaged surfaces or behind walls, floors or ceilings.

Should I test my home for mold?

The California Department of Health Services does not recommend testing as a first step to determine if you have a mold problem. Reliable air sampling for mold can be expensive and requires expertise and equipment that is not available to the general public. Owners of individual private homes and apartments generally will need to pay a contractor to carry out such sampling, because insurance companies and public health agencies seldom provide this service. Mold inspection and cleanup is usually considered a housekeeping task that is the responsibility of homeowner or landlord, as are roof and plumbing repairs, house cleaning, and yard maintenance.

Another reason the health department does not recommend testing for mold contamination is that there are few available standards for judging what is an acceptable quantity of mold. In all locations, there is some level of airborne mold outdoors. If sampling is carried out in a home, an outdoor air sample also must be collected at the same time as the indoor samples, to provide a baseline measurement. Because individual susceptibility varies so greatly, sampling is at best a general guide.

The simplest way to deal with a suspicion of mold contamination is, if you can see or smell mold, you likely have a problem and should take the steps outlined below. Mold growth is likely to recur unless the source of moisture that is allowing mold to grow is removed and the contaminated area is cleaned.

Assessing the Size of a Mold Contamination Problem

There will be a significant difference in the approach used for a small mold problem – total area affected is less than 10 ft^2 – and a large contamination problem – more than 100 ft^2. In the case of a relatively small area, the homeowner using personal protective equipment can handle the cleanup. However, for much larger areas, choose an experienced, professional contractor. For medium cases, the type of containment and personal protection equipment to be used will be a matter of judgment.

General Cleanup Procedures

- Identify and eliminate sources of moisture
- Identify and assess the magnitude and area of mold contamination
- Clean and dry moldy areas – use containment of affected areas
- Bag and dispose of all material that may have moldy residues, such as rags, paper, leaves, and debris.

Clean up should begin after the moisture source is fixed and excess water has been removed. Wear gloves when handling moldy materials. **Spores are more easily released when moldy materials dry out, so it is advisable to remove moldy items as soon as possible.** Detailed cleanup procedures are available in the California Department of Health Services Indoor Air Quality Section fact sheet entitled, “Mold in My Home: What Do I Do?” It is available on the Internet at www.dhs-iaq.org or by calling the (510) 540-2476.

How can I prevent indoor mold problems in my home?

Inspect your home regularly for the indications and sources of indoor moisture and mold. Take steps to eliminate sources of water as quickly as possible. If a leak or flooding occurs, it is essential to act quickly:

- Stop the source of leak or flooding.
- Remove excess water with mops or wet vacuum.
- Move wet items to a dry, well ventilated area. Move rugs and pull up wet carpet as soon as possible.
- Open closet and cabinet doors and move furniture away from walls to increase circulation.
- Run portable fans to increase air circulation. Do NOT use the home's central blower if flooding has occurred in it or in any of the ducts. Do NOT use fans if mold may have already started to grow — more than 48 hours since flooding.
- Run dehumidifiers and window air conditioners to lower humidity.
- Do NOT turn up the heat or use heaters in confined areas, as higher temperatures increase the rate of mold growth.
- If water has soaked inside the walls, it may be necessary to open wall cavities, remove baseboards, and/or pry open wall paneling.

Publications

- ***Mold in My Home: What Do I Do?***

  This document is available on the Internet, or at no cost from:

  California Department of Health Services
  Indoor Air Quality Section
  2151 Berkeley Way (EHLB)
  Berkeley, CA 94704
  Telephone: (510) 622-4500
  Web: www.dhs-iaq.ca.gov

- ***Health Effects of Toxin-Producing Molds in California***
- ***Stachybotrys chartarum (atra) — a mold that may be found in water-damaged homes***
- ***Fungi and Indoor Air Quality***
- ***Misinterpretation of Stachybotrys Serology***

  These documents are available on the Internet, or at no cost from:

  California Department of Health Services
  Environmental Health Investigation Branch
  2151 Berkeley Way (EHLB)
  Berkeley, CA 94704
  Telephone: (510) 622-4500
  Web: www.dhs.ca.gov/ehib/

- ***General Information Molds, Toxic Molds, and Indoor Air Quality***

  This document is available on the Internet at www.cal-iaq.org/MOLD

- ***Biological Pollutants in Your Home***

This document is available at no cost from:

U.S. Environmental Protection Agency
IAQ Information Clearinghouse
Telephone: (800) 438-4318
Web: www.epa.gov

- ***Repairing Your Flooded Home***

This publication is available on the Internet or at no cost from:

American Red Cross
8928 Volunteer Lane
Sacramento, CA 95826
Telephone: (916) 368-3131
Web: www.redcross.org

Assistance

For local assistance, contact your county or city Department of Health, Housing, or Environmental Health.

Receipt for C.A.R. Publication

Instructions: Receipt to be used in conjunction with the C.A.R. combined Environmental Hazards and Homeowners Guide to Earthquake Safety. Make sure the Mold Chapter is inserted in the combined booklet.

To Whom It May Concern: I have received a copy of the Mold Chapter as well as the full "Environmental Hazards: A Guide for Homeowners, Buyers, Landlords and Tenants," which includes the federal Lead booklet and the "Homeowners Guide to Earthquake Safety."

Property Address:_____

Date_____ Time_____ _____ _____
(signature) (printed name)

Date_____ Time_____ _____ _____
(signature) (printed name)

NOTE: For applicable transactions, it is also necessary to complete C.A.R. Standard form FLD-14 (Lead-based paint and lead-based paint Hazards Addendum, Disclosure and Acknowledgement).

Receipt for C.A.R. Publication

Instructions: Receipt to be used in conjunction with the C.A.R. Environmental Hazards booklet only.
Make sure the Mold Chapter is inserted in the hazards booklet.

To Whom It May Concern: I have received a copy of the Mold Chapter as well as the full "Environmental Hazards: A Guide for Homeowners, Buyers, Landlords and Tenants," which includes the federal Lead booklet.

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NOTE: For applicable transactions, it is also necessary to complete C.A.R. Standard form FLD-14 (Lead-based paint and lead-based paint Hazards Addendum, Disclosure and Acknowledgement).

ENVIRONMENTAL HAZARDS: A GUIDE FOR HOMEOWNERS, BUYERS, LANDLORDS AND TENANTS

Pete Wilson
Governor

This independent research report was originally developed by M. B. Gilbert Associates, under contract with the California Department of Real Estate in cooperation with the California Department of Health Services. The 1997 edition was prepared by the California Environmental Protection Agency, Department of Toxic Substances Control, in cooperation with the U.S. Environmental Protection Agency and the California Department of Real Estate, and meets all State and Federal guidelines and lead disclosure requirements pursuant to the Residential Lead-Based Paint Hazard Reduction Act of 1992. The 1997 edition incorporates the Federal "Protect Your Family from Lead" pamphlet. This booklet is offered for information purposes only, not as a reflection of the position of the administration of the State of California.

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ENVIRONMENTAL HAZARDS: A GUIDE FOR HOMEOWNERS, BUYERS, LANDLORDS AND TENANTS

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

1997

PREFACE

The California Departments of Real Estate and Health Services originally prepared this booklet in response to the California legislative mandate (Chapter 969, Statutes of 1989, AB 983, Bane) to inform the homeowner and prospective homeowner about environmental hazards located on and affecting residential property. The original booklet was prepared by M.B. Gilbert Associates of Long Beach, California under contract with the Department of Real Estate.

The 1995 edition was prepared by the California Department of Toxic Substances Control, in cooperation with the California Department of Health Services' Childhood Lead Poisoning Prevention Program, Radon Program, and Division of Drinking Water and Environmental Management, in response to a 1994 legislative mandate (Chapter 264, Statutes of 1994, AB 2753, Sher). The 1994 legislation also requires this booklet to consolidate the California disclosure requirements (Ch. 969, Statutes of 1989) and the federal disclosure requirements (The Residential Lead-Based Paint Hazard Reduction Act of 1992). The 1997 edition, prepared by the California Environmental Protection Agency, Department of Toxic Substances Control, in cooperation with the U.S. Environmental Protection Agency and the California Department of Real Estate, incorporates the Federal "Protect Your Family from Lead" pamphlet.

The information contained in this booklet is an overview of environmental hazards which may be found on residential property and which may affect residential real estate. This booklet should be used only for general guidance. Although the disclosure of known hazards is required by law, an environmental survey may be conducted to obtain further information. Homeowners, tenants and prospective homeowners may wish to obtain other literature for additional information on hazards of concern.

Disposal of hazardous wastes is an issue of concern to us all. In the interest of reducing the use of and proper disposal of household hazardous wastes, a section on their storage and disposal is included. Sources of additional information and a list of government agencies are provided should the reader need further information.

INTRODUCTION

This publication is designed to provide information about some environmental hazards which may be found on or in residential property. In California, sellers are required to disclose the presence of any known environmental hazard. A statement that the homeowner is unaware of environmental hazards is not a guarantee that the property is free of such hazards. It is in the homeowner's and prospective homeowner's interest to know what hazards are common, where they are found, and how they might be mitigated. Development of a consumer booklet on environmental hazards located on and affecting residential property was originally mandated by the California legislature in 1989 (AB 983). Subsequent legislation in 1994 (AB 2753) mandated the 1995 edition. It is hoped that this booklet will provide homeowners and prospective homeowners with the information needed to make an informed decision about environmental hazards which may be present on a property.

This publication is not meant to be all-inclusive. It deals only with environmental hazards which frequently affect residential property. Additional information is available from the sources cited at the end of each chapter and in Appendix A. Because of the contribution of household hazardous wastes to the problem of hazardous waste disposal, a section on household hazardous products is included. In discussing the health impacts, lifetime exposure to low levels is emphasized because the resident is more likely to encounter this type of exposure than exposure to high levels of hazards for a short time.

Pursuant to AB 983, if this environmental hazards booklet is made available to homeowners or prospective homeowners, real estate licensees and home sellers are not required to provide additional information on such hazards. However, delivery of this publication to homeowners or prospective homeowners does not relieve home sellers and real estate licensees of the responsibility to disclose the existence of environmental hazards when such hazards are known to them.

The material is presented with the understanding that the publisher is not engaged in offering legal or other professional advice. If legal or other expert assistance is required, the services of a skilled professional should be obtained.

ASBESTOS

What is asbestos?

Asbestos is a generic term which describes a group of diverse, naturally occurring, fibrous minerals. These minerals occur as bundles of strong, flexible fibers which are chemically inert, do not burn, and have good insulating properties.

Where is asbestos found in the home?

Asbestos has been used in many products found in the home to provide insulation, strength, and fire protection. In 1989, the U.S. Environmental Protection Agency (U.S. EPA) announced a phased ban of asbestos products to be completed by 1996. The most common items in the home which may contain asbestos are:

- *vinyl flooring;*
- *duct wrapping on heating and air conditioning systems;*
- *insulation on hot water pipes and boilers, especially in homes built from 1920 to 1972;*
- *some roofing, shingles, and siding;*
- *ceiling and wall insulation in some homes built or remodeled between 1945 and 1978, and;*
- *in sheetrock taping compounds and some ceiling materials.*

Asbestos which has been sprayed on ceilings often has a spongy, "cottage cheese" appearance with irregular soft surfaces. Asbestos troweled on walls has a textured, firm appearance. Information on the asbestos content of home products can be provided by the manufacturers. Qualified inspectors can be hired to identify asbestos in the home.

How is asbestos harmful?

Intact or sealed (painted or taped over) asbestos is not harmful unless it becomes friable. Friable means the material can be easily crushed or pulverized to a powder by hand pressure. Friable materials have a higher potential to release fibers. Asbestos fibers that are released into the air and inhaled can accumulate in the lungs and pose a health risk. This risk can be divided into two general categories: 1) risk of asbestosis; and 2) increased risk of cancer. Most persons diagnosed with asbestosis have been exposed to asbestos in the work place. Therefore, this booklet focuses on the increased risk of cancer associated with asbestos exposure.

The U.S. EPA classifies asbestos as a known human carcinogen. If asbestos fibers are inhaled, the likelihood of contracting lung cancer or mesothelioma (cancer of the lining of the chest or abdomen) increases. As more asbestos is inhaled, the risk of developing cancer further increases. Smokers who are exposed to high levels of asbestos have a much greater risk of developing lung cancer than non-smokers exposed to the same level. Symptoms of cancer may not develop until 10-40 years after the first exposure.

Is there a safe level of asbestos?

In theory, inhalation of one fiber of asbestos can increase the risk of developing cancer. However, from a practical standpoint this statement is misleading since breathing ambient air in an urban area results in the inhalation of about 20,000 asbestos fibers per day. As a result of this exposure to asbestos in ambient air for a lifetime, it is estimated that 3-30 cases of lung cancer and 4-24 cases of mesothelioma will occur for every one million Americans. Those cancer cases are in addition to the numerous lung cancer cases due to other causes, particularly smoking. Obviously, inhalation of additional asbestos fibers increases the risk of developing lung cancer and unnecessary exposure should be avoided.

How can asbestos content in materials be determined?

When asbestos is suspected to be present in building materials, it is important to have the materials tested by a qualified laboratory. Visual inspection alone is not enough to identify the presence of asbestos. However, such testing may not be warranted if the material is in good condition, in which case it is best to leave it in place. If the material is damaged, or will be disturbed during normal household activities or remodeling, it should be tested. A list of asbestos consultants certified by the California Department of Industrial Relations Division of Occupational Safety and Health (Cal/OSHA), for doing asbestos related work may be obtained by calling **(916) 574-2993**. A list of asbestos contractors registered with Cal/OSHA for doing asbestos related work may be obtained by calling **(415) 972-8589**.

How should the homeowner repair or remove asbestos?

Repair or removal of asbestos by the homeowner may be unwise if the damage is severe, since it may result in unnecessary exposure to airborne fibers. However, small repairs of pipe or duct insulation can be made with paint or duct tape. Other materials such as sprayed-on acoustical ceilings are not easily repaired by the homeowner. In cases where planned remodeling projects are expected to damage asbestos-containing materials, it is wise to hire a qualified contractor to remove the material. The homeowner should use the following guidelines in choosing a qualified contractor:

- *Check to see if the contractor is licensed by the California Contractors State License Board and registered with the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA) for doing asbestos work.*
- *Be aware that some contractors may remove material in an unsafe manner and still charge a substantial fee.*

  Require references from the contractor and check them to see if the contractors work has been satisfactory.

  Require the contractor to specify his or her safety procedures in writing.

The homeowner may expect to pay three times as much for the removal than if asbestos were not present. For a small job, the cost may be more than three times the normal cost, since it is expensive for a contractor to set up all the necessary safety equipment. Consider hiring a certified asbestos consultant (contact Cal/OSHA for a list at **(916) 574-2993)** to review safety procedures and oversee the performance of the contractor.

Does the law require mitigation?

Asbestos mitigation is at the discretion of the homeowner. Even if the material contains asbestos, the home owner may choose to leave it alone or if necessary repair it.

MORE INFORMATION?

Hotlines:

For information concerning the identification and abatement of asbestos hazards in the home, and on the asbestos content of certain consumer products, contact the

Consumer Product Safety Commission, Washington D.C. at:
Telephone: **(800) 638-2772, extension #300**

For technical assistance and information about the Toxic Substances Control Act (TSCA); regulations and programs administered under TSCA, including asbestos, lead-based paint and PCB's; and information on EPA's 33/60 voluntary pollution prevention program, contact the

Toxic Substances Control Act Assistance Information Service (T.A.I.S.), Washington D.C. at:
Telephone: **(202) 554-1404**
Fax: **(202) 554-5603**
E-mail address: **tsca-hotline@epamail.epa.gov**

Also supplies a variety of documents, including Federal Register notices.

Publications:

Asbestos in the Home

This publication is available at no cost from:
American Lung Association
Environmental Health Department
1726 M Street NW #902
Washington, D.C. 20036
(800) LUNG-USA [(800) 586-4872]

The Inside Story – A Guide to Indoor Air Quality

This publication is available at no cost from:
Indoor Air Quality Information Clearinghouse
P.O. Box 37133
Washington, D.C. 20013-7133
Telephone: **(800) 438-4318**
FAX: **(202) 484-1510**
E-mail: iaqinfo@aol.com
Web: www.epa.gov/iaq/

Recommended Work Procedures for Resilient Floor Covers

This publication is available at no cost from:
Resilient Floor Covering Institute
966 Hungerford Drive, Suite 12-B
Rockville, MD 20850
Telephone: **(301) 340-8580**
FAX: **(301) 340-7283**
(A stamped, self-addressed envelope is required.)

List of Certified Asbestos Consultants

This list is available for $8.00 from:
California Department of Industrial Relations
Division of Occupational Safety and Health (Cal/OSHA)
Asbestos Consultant Certification Unit
2211 Park Towne Circle #1
Sacramento, CA 95825
Telephone: **(916) 574-2993**

List of Asbestos Abatement Contractors

This list is available for $25.00 from:
California Department of Industrial Relations Division of Occupational Safety and Health (Cal/OSHA)
45 Fremont Street, Room #1110
San Francisco, CA 94105
Telephone: **(415) 972-8589**

What You Should Know Before You Hire a Contractor

This publication is available at no cost from:
California Contractors State License Board
9835 Goethe Road
P.O. Box 26000
Sacramento, CA 95827
Telephone: **(800) 321-2752**

(To receive publication, leave name and address on message phone.)

Note: Telephone numbers and prices were correct at the date of publication of this booklet.
Telephone numbers and prices are subject to change.

SECTION II

FORMALDEHYDE

What is formaldehyde?

Formaldehyde is a colorless, pungent gas which is soluble in water and most organic solvents. It is used as a raw material in the manufacture of paints, plastics, resins, photographic materials, and in building materials such as fiberboard and some foam insulation. Formaldehyde is found in the outdoor air at levels ranging from about 0.0002 to 0.050 parts per million (ppm). (One ppm can be compared to one cent in ten thousand dollars.)

What levels of formaldehyde are found in the home?

Formaldehyde concentrations inside California residences range from less than 0.01 to almost 0.50 ppm. Concentrations of formaldehyde inside mobile homes are somewhat higher than those found in conventional homes.

What are the sources of formaldehyde in the home?

Formaldehyde is emitted from products in which formaldehyde has been used in their manufacture. These include pressed-wood products, urea-formaldehyde foam used in insulation, and curtain and upholstery textiles treated with formaldehyde resins for crease resistance. Formaldehyde may also be emitted from improperly vented gas stoves and kerosene heaters. Pressed-wood products are probably the most significant source of formaldehyde in the home.

What are pressed-wood products?

Pressed wood products contain resins to bind together wood or wood products such as wood chips. The two most commonly used resins are urea-formaldehyde and phenol-formaldehyde. Pressed-wood products used within the home include:

- *particleboard, used for subflooring, shelving, and in furniture;*
- *hardwood and plywood paneling, used in furniture and as a wall covering;*
- *medium density fiber board, used as cabinet doors, table tops, and shelving; and,*
- *waferboard and softwood plywood, for exterior use and subflooring; both are manufactured using phenol-formaldehyde resins.*

Of these products, medium density fiberboard typically has the highest formaldehyde emission rate.

Why is formaldehyde emitted from these products?

In the production of the resins, not all formaldehyde is bound as urea-formaldehyde or phenol-formaldehyde. Unbound or free formaldehyde can be released later as a gas from pressed-wood. Formaldehyde emissions are highest from new products and decrease as the product ages. Emissions ordinarily decrease to undetectable levels over time. If properly manufactured, pressed-wood products which incorporate phenol-formaldehyde resins do not release significant amounts of formaldehyde. Urea-formaldehyde resins have higher emission rates than phenol-formaldehyde resins.

In which homes is urea-formaldehyde foam a source of formaldehyde?

Urea-formaldehyde foam insulation (UFFI) was installed in the wall cavities of some homes during the 1970's and has been used in the manufacture of mobile homes. The Consumer Product Safety Commission banned the use of UFFI in homes and schools in 1982. Although this ban has been removed by a Federal Court for procedural reasons, UFFI is not currently being installed in homes in California because of the insulation standards of the California Energy Commission. Implementation of these standards effectively prohibited the use of UFFI in homes in California after 1982. Formaldehyde emissions from UFFI decline with time. Thus, in homes where UFFI was installed prior to 1982, formaldehyde concentrations are generally comparable to those in homes without UFFI.

How is formaldehyde harmful?

The U.S. EPA classifies formaldehyde as a probable carcinogen. This means that there is sufficient data from animal studies, and limited data from human studies, to conclude that formaldehyde is likely to cause cancer in humans. Regulation of carcinogens is based on the assumption that any exposure to a carcinogen carries with it a finite risk of developing cancer. This assumption has not been proven scientifically, but was adopted as conservative regulatory policy to protect the health of the general public. As a consequence, risk is assumed to vary directly with exposure: as exposure decreases, risk decreases as well.

How can formaldehyde be detected and measured?

Levels of formaldehyde can be measured by chemical analysis of air samples. The usefulness of air monitoring for a short time, for example over 24 hours, is limited because levels of formaldehyde change with temperature, humidity, and ventilation, and decline as the products age. A useful indicator of the presence of indoor formaldehyde is knowledge of the formaldehyde content of products. This information can be obtained from the manufacturer.

Is there a safe level of formaldehyde?

Most persons experience eye and throat irritation when exposed to formaldehyde at levels above 0.1 ppm. Because people differ in their sensitivity to toxic effects, it is difficult to precisely define a concentration of formaldehyde that would be harmless to all people under all circumstances. Levels in the outside air may be considered as the safest and lowest levels which can practicably be achieved in the home.

What can be done to reduce indoor formaldehyde levels?

Immediate measures include opening windows to increase ventilation and reducing the number of new pressed-wood products in a home. Where possible, replace pressed-wood products with products made from solid wood or non-wood materials. Formaldehyde emissions increase with increasing humidity and temperature. Therefore, reducing the temperature and humidity in the home will reduce formaldehyde levels. Where the source of formaldehyde is wood paneling or subflooring, these measures may not be adequate. In this case, removal of paneling and subflooring may be necessary. Local trade organizations and builder's associations may be helpful in finding a contractor to do this work. Where UFFI is the source of formaldehyde, removal has been shown to be ineffective because the wood frame support continues to emit formaldehyde absorbed from UFFI.

MORE INFORMATION?

Publications:

The Inside Story – A Guide to Indoor Air Quality

An Update on Formaldehyde

These publications are available at no cost from:
Indoor Air Quality Information Clearinghouse
P.O. Box 37133
Washington, D.C. 20013-7133
Telephone: **(800) 438-4318**
FAX: **(202) 484-1510**
E-mail: iaqinfo@aol.com
Web: www.epa.gov/iaq/

A Consumers Guide to Manufactured Housing

Manufactured Housing for Families

These publications are available at no cost from:
California Department of Housing and Community Development
Division of Administration
P.O. Box 31
Sacramento, CA 95812-0031
Telephone: **(916) 445-3338**

Exposure to Formaldehyde From Indoor Air (ARB-RD-90-01)

Formaldehyde in the Home – Indoor Air Quality Guideline #1

Final Report on the Identification of Formaldehyde as a Toxic Air Contaminant

These publications are available at no cost from:
California Air Resources Board
Research Division
Indoor Exposure Assessment Division
2020 L Street
Sacramento, CA 95814
Telephone: **(916) 323-1528**
(For first two publications listed)
Telephone: **(916) 322-7072**
(For third publication listed)

Note: Telephone numbers and prices were correct at the date of publication of this booklet.
Telephone numbers and prices are subject to change.

RADON

What is radon?

Radon is a naturally-occurring radioactive gas which is formed from radioactive decay of radium and uranium. Since radon cannot be seen, tasted, or smelled, special instruments are necessary for its detection. The unit of measurement for radon is picocuries per liter of air (pCi/L)

Where is radon found?

Radon is typically present in rocks containing uranium such as certain granites and shales. The amount of radon that can enter soils and ground water depends on the concentrations of uranium in the underlying rock. Radon can also be found in the air at very low concentrations. In California, outdoor levels of radon range from 0.1 to 0.5 pCi/L. Radon gas can also enter and concentrate in homes and buildings. In the United States, the average level indoors is 1.3 pCi/L, but radon levels have been found to range from 0.25 to over 3,000 pCi/L. Surveys in California indicate that elevated annual average radon levels are uncommon, and will occur in about 1 percent of homes. The CDHS conducts studies to identify the geographic areas of potential concern.

How is radon harmful?

The U.S. EPA classifies radon as a known human carcinogen. Long-term exposure to high levels of radon may increase a person's risk of lung cancer. It is believed that tobacco smokers who are exposed to high radon levels account for a large percentage of the lung cancer deaths believed to be associated with radon exposure in the United States. Therefore, the risk is substantially less for non-smokers.

Exposure to radon does not result in any immediate symptoms. For example, it does not result in acute respiratory effects such as colds or allergies. Any cancer resulting from inhaling radon is not likely to arise for at least 20-30 years after exposure begins and both the level of exposure and duration of exposure are factors which determine the risk of developing lung cancer.

How does radon enter the home?

The main source of radon is the soil from which radon gas enters the home through cracks and openings in concrete slabs, crawl spaces, floor drains, sumps, and the many tiny pores in hollow-wall concrete blocks. When the pressure within a home is lowered, more radon can be drawn from the soil and enter the home. Indoor air pressure may be lower during colder months when heated air rises from the floor level to the ceiling (or second story) level in the house. Indoor pressure may also be lowered in tightly sealed houses through use of exhaust fans such as those in many kitchens and bathrooms.

If radon is present in tap water, it can be released when water is used indoors, such as by showering, washing dishes, or washing clothes. Water as a source of radon is of most concern when water is obtained directly from a well that draws water from a source exposed to uranium and radium. Most of the radon in water obtained from a surface source, such as a reservoir or well water stored in an open tank, has been released before it reaches the home. Building materials are not a significant source of radon except where they incorporate rocks rich in radium or uranium. The use of these rocks (typically granite and shales) in construction of homes in California is rare.

Where are the highest levels of radon in the home?

Generally, the living area closest to the soil surface has the highest level of radon. Upper stories have lower levels of radon. Consequently, radon is rarely a concern in high rise apartment buildings, other than at ground level.

Do adjacent houses have similar levels of radon?

Because of the variability of the uranium content of soil and differences in house construction and use, it cannot be assumed that houses in the same neighborhood have the same radon levels. In order to determine radon levels in any particular house, measurements must be made.

Is there a safe level of radon?

Although there is consensus that the greater the exposure to radon the greater the risk of developing lung cancer, there is insufficient data to define a radon level which is harmless. Both the length of time during which radon is inhaled and the level of radon in the air are important in determining the risk of developing lung cancer. It is also believed that smoking may be a large contributing factor to lung disease associated with radon exposure.

How can radon levels be measured?

The level of radon in a house can be measured by several types of passive radon detectors. Passive detectors are devices left in place for a period of time that require no ongoing activity or power. To obtain accurate results, the homeowner

should carefully follow the manufacturer's instructions. Although short-term measurements of radon levels are more convenient, health risk can be more accurately determined from measurements made over a year.

Where can radon detectors be obtained?

The CDHS publishes a list of those companies which it has determined are proficient in the analysis of the measurement devices used to measure radon. Those companies that do business in California are listed in the "California List of Certified Radon Measurement Laboratories", which may be obtained by calling the CDHS Radon Program Hotline at **(800) 745-7236**.

What actions are required to reduce indoor radon levels?

The U.S. EPA and CDHS recommend that homeowners should attempt to reduce radon levels in any home that has an annual average level of radon over 4 pCi/L. The mitigation method chosen will depend on the construction of the house, extent of radon reduction required, and cost. After installing a mitigation system, it is recommended that radon levels be monitored at regular intervals to verify that the mitigation remains effective.

A qualified contractor should install the radon mitigation system unless the homeowner fully understands the principles of the mitigation system. The State of California does issue a certification for radon mitigation. A list of contractors who meet the requirements of the California Radon Contractors' Proficiency (RCP) Program is available as the "California List of Radon Mitigation Contractors" from the CDHS Radon Program Hotline at **(800) 745-7236**.

When should water be tested for radon?

When indoor levels of radon exceed 4 pCi/L, homeowners should consider a water test. If the water comes from a water system, information about the source of the water and any radon tests done on it can be obtained from the water company which supplies the water. For more information or assistance in interpreting test results, contact the CDHS Division of Drinking Water and Environmental Management (see Appendix A).

If the water comes from a private well, the radon concentration may be measured by analyzing a water sample at a laboratory certified to test for radon in water. Homeowners should consult the CDHS radon program manager at **(916) 324-2208** for guidance on the type of water analysis appropriate to the area and well type. It must be emphasized that the method of sample collection is critical. To obtain a list of certified laboratories, call the CDHS at **(800) 745-7236**.

How can levels of radon in water be reduced?

Radon levels in water can be reduced by 99 percent by installation of a GAC (granular activated carbon unit) on the water line entering the house. (GAC units should be certified by the CDHS.) As radon accumulates in the GAC unit, the unit becomes radioactive as the radon decays. Thus, GAC units installed to remove radon in household water must be shielded or located in areas remote from the house to protect occupants from radiation. The GAC filters also require special handling during replacement and disposal. Aeration may also be used to remove radon from water. This technique may be more costly but avoids the problem of radiation build up. Information regarding removal of radon from water may be obtained from the CDHS Radon Program Hotline at **(800) 745-7236**.

Selection of the proper water treatment technology depends primarily upon its removal efficiency (other contaminants in the water may adversely affect this), safety, initial costs, and operating and maintenance costs. Therefore, professional guidance is strongly advised.

Does the law require mitigation?

Mitigation of radon is not required by law and is at the discretion of the homeowner.

MORE INFORMATION?

Hotlines:

For informational publications on radon; for information on how to purchase a radon detector (California List of Certified Radon Measurement Laboratories); for information on how to have someone test your home (California List of Certified Radon Testing and Consulting Specialists); for information on how to fix your home (California List of Certified Radon Contractors), call the

CDHS Radon Program Hotline at:
Telephone: **(800) 745-7236**.

For specific assistance, call

J. David Quinton,
CDHS Radon Program Manager at:
Telephone: **(916) 324-2208**

Publications:

Radon in California

A Citizen's Guide to Radon

Homebuyers and Sellers Guide to Radon

How to Reduce Radon Levels in your Home

Model Standards for Radon in New Residential Buildings

These publications are available at no cost from:
California Department of Health Services
Environmental Management Branch
Radon Program
601 N. 7th Street
P.O. Box 942732
Sacramento, CA 94234-7320
Telephone: **(800) 745-7236**

The Inside Story A Guide to Indoor Air Quality

This publication is available at no cost from:
Indoor Air Quality Information Clearinghouse
P.O. Box 37133
Washington, D.C. 20013-7133
Telephone: **(800) 438-4318**
FAX: **(202) 484-1510**
E-mail: iaqinfo@aol.com
Web: www.epa.gov/iaq/

The Radon Reference Manual (PB-88196654)

This publication is available for $35.00 (plus $4.00 handling) from:
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Telephone: **(800) 553-6847**
FAX: **(703) 321-8547**
E-mail address: orders@ntif.federal.gov
Web: www.htis.gov

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SECTION IV

HAZARDOUS WASTES

What are hazardous wastes?

Hazardous waste means a waste which has the potential to harm human health or the environment. The characteristics which make a waste hazardous are that it may be toxic, corrosive, ignitable, or reactive. Hazardous waste is generated by many different industries such as oil and gas, petrochemical, electronics, and smaller businesses such as dry cleaners and print shops. Over 20 million tons of hazardous wastes are generated in California every year.

Following the generation of hazardous waste, most of it is treated or disposed of at the facility. The remainder is shipped by truck to off-site facilities for treatment, storage, or disposal into a special type of landfill designed only for hazardous waste. Hazardous waste which is not properly managed may escape into the environment and contaminate soil, ground or surface water, and pollute the air. These hazardous waste releases can occur through leaking underground storage tanks or drums, poorly contained landfills or ponds, hazardous waste spills, or illegal dumping directly on land.

What is California doing to locate and clean up hazardous waste sites?

The U.S. EPA has targeted about 1,000 sites nationwide for federal cleanup, with almost 80 identified in California. The federal "Superfund" law authorized U.S. EPA to supervise cleanup of the sites proposed under the Superfund program. California is investigating and overseeing the cleanup of hundreds of other sites under a state Superfund which is implemented by the California Department of Toxic Substances Control (DTSC). DTSC works jointly with U.S. EPA and other state agencies, such as the California Regional Water Quality Control Boards and local health departments, to effectively manage hazardous waste problems. The primary purpose of site cleanup and mitigation activities at hazardous waste sites is to reduce or eliminate the risks the sites pose to public health or the environment.

How can the prospective homowner determine whether a home is affected by a hazardous waste site?

State law requires certain written disclosures to be made to prospective homeowners of real property. Under state law, a seller is required to disclose whether he or she is aware that the property has any environmental hazards such as asbestos, formaldehyde, radon, lead-based paint, fuel or chemical storage tanks, and/or contaminated soil or water. Additional information on real estate disclosure is described in the booklet "Disclosures in Real Property Transactions" available from the California Department of Real Estate (see publications).

A prospective homeowner may also obtain information about hazardous waste sites in the vicinity of a home. There are several sources of information on the status and location of hazardous waste sites in California. The California Environmental Protection Agency (Cal EPA) Hazardous Material Data Management Program maintains the "Hazardous Waste and Substances Sites List", popularly known as the "Cortese" list (see Publications). This list consolidates most of the lists of hazardous waste problem sites in California, including hazardous waste sites, contaminated wells, leaking underground storage tanks, and sanitary landfills from which there is a known migration of hazardous waste. The purpose of this list is to inform local agencies of these hazardous sites identified by the state. State law requires an applicant for a development project to consult the list and to submit a signed statement indicating whether the project is listed.

DTSC maintains a list of state and federal hazardous waste sites which are currently scheduled for mitigation called "The List of Active Sites". The DTSC database of potential hazardous waste sites (Cal-Sites) contains information about 5,100 suspected and confirmed sites. A portion of these sites have been classified as needing no further action. All of the active sites on the Cortese list are reported pursuant to Govt. Code Section 65962.5. The addresses of many federal, state, and local agencies that manage hazardous waste programs are listed in Appendix A.

In addition to the information contained in this booklet, a homeowner or prospective homeowner may hire a registered environmental assessor to further investigate a known environmental hazard at a property. To obtain a list of registered environmental assessors, contact Cal-EPA, Office of Environmental Health Hazard Assessment (OEHHA), Registered Environmental Assessors Program at **(916) 324-6881**.

MORE INFORMATION?

Hotlines:

For information on the federal Superfund program and the National Priorities List (NPL), contact the

U.S. EPA RCRA Superfund and EPCRA hotline at:
Telephone: **(800) 424-9346**

Publications:

Disclosures in Real Property Transactions

This publication is available for $2.00 plus tax from:
California Department of Real Estate
Book orders
Box 187006
Sacramento, CA 95818-7006

(Mail orders only; a self-addressed envelope is required.)

Hazardous Waste and Substances Sites List ("Cortese" List)

This list is available for $50.00 from (below):

List of Leaking Underground Storage Tanks

This list is available for $75.00 from:
California Department of Toxic Substances Control
Office of Environmental Information Management (OEIM)
400 P Street, 4th Floor
Sacramento, CA 95814
Telephone: **(916) 445-6532**

California Department of Toxic Substances Control CalSites Database

This database is available for purchase by the public on CD-ROM (PC version only) and in hard copy. The CD-ROM files are in ASCII or dBASE fixed file format and no software is included to run the database. (The database needs to be imported into either Microsoft ACCESS or EXCEL or dBASE software.) The CD-Rom is sold on a quarterly basis only, i.e. January, April, July and October. Interested parties must contact the CalSites Help Desk two weeks prior to the quarterly development date to reserve a copy. The database contains detailed site information, including site name, address, status, identification number and background information. Hard copy documents include the entire database by zip code with site name, address, and site status only (zip list), special data inquiries (ad hoc reports), short summary reports (sites listed by county, city or zip code), summary site file data (profile reports), and site lists, (Annual Workplan, Backlog and Voluntary Cleanup Program).
California Department of Toxic Substances Control
Site Mitigation Program
CalSites HelpDesk – MS HQ 29
P.O. Box 806
Sacramento, CA 95812-0806
Telephone: **(916) 323-3700**
FAX: **(916) 323-3400**

HAZARDOUS WASTE

List of Registered Environmental Assessor

If hiring a Registered Environmental Assessor, this list is available at no cost. If using as a mailing list, this list is available in diskette form for $6.25, and as a hard-copy printout for $35.00 from:
California Environmental Protection Agency
Office of Environmental Health Hazard Assessment
Registered Environmental Assessor Program
301 Capital Mall – 2nd Floor
Sacramento, CA 95814
Telephone: **(916) 324-6881**

The Toxics Directory: References and Resources on the Health Effects of Toxic Substances

This publication is available for $9.90 from:
California Department of General Services
Documents and Publications
4675 Watt Avenue
P.O. Box 1015
North Highlands, CA 95660
(Send written request with your name and street address. Check should be made out to Procurement Publications).

A Home Buyer's Guide to Environmental Hazards

This publication is available at no cost from:
United States Environmental Protection Agency – Region 10
Public Information Center
1200 6th Ave.
Seattle, Washington 98101
(206) 553-1200

Ensuring Safe Drinking Water (600M91012)

This publication is available at no cost from:
U.S. Environmental Protection Agency
Public Information Center
401 M Street, SW
Washington, D.C. 20468
Telephone: **(800) 490-9198**

Consumer's Guide to California Drinking Water

This publication is available for $4.00 (plus 5% shipping charge, plus tax) from:
Local Government Commission
1414 K Street, Suite #250
Sacramento, CA 95814
Telephone: **(916) 448-1198 x307**
FAX: **(916) 448-8246**

Is Your Drinking Water Safe? (PB94-203387)

This publication is available for $19.50 plus $4.00 shipping from:
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Telephone: **(800) 553-6847**
FAX: **(703) 321-8547**
E-mail address: orders@ntif.federal.gov
Web: www.htis.gov

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SECTION V

HOUSEHOLD HAZARDOUS WASTES

What is household hazardous waste?

Although generation of hazardous wastes is associated with industrial processes, each year Californians discard tons of hazardous wastes in trash cans or down the drain. To determine whether a product is hazardous, ask these questions.

- *Is it poisonous when ingested, touched, or inhaled?*
- *Does it ignite easily?*
- *Is it corrosive?*
- *Could it explode if it is improperly stored, spilled, or mixed with other products?*

If the answer is "yes" to any question, then the product is hazardous. Generally, information about a product's hazardous properties can be found on the container label. The words "caustic", "flammable", "toxic", and "ignitable" indicate that the product is hazardous. Some products are hazardous in more than one way. For example, bleach is poisonous, and when mixed with ammonia-based cleaners releases hydrazine, a poisonous gas. Other examples of household products which are hazardous are listed below. In many cases, non-hazardous materials can be used instead.

Examples of household hazardous products are:

- *cleaning products: ammonia, drain cleaners, rug cleaners, oven cleaners, metal polishes, and bleaches;*
- *garden supplies: weed and insect killers, rat poison, fertilizer, charcoal lighters, kerosene, and gasoline;*
- *automotive supplies: antifreeze, motor oil, gasoline, batteries and brake fluid, and*
- *paint supplies: paint, varnish, paint removers, glues, and waxes.*

How should hazardous household products be stored?

Safe storage of hazardous products requires a cool, dry and secure location. Places to store hazardous products include locked cupboards, locked drawers, or a high shelf out of the reach of children and pets. To prevent spillage during an earthquake, shelves should be firmly secured to the wall and have a restraining bar along the side. The following guidelines will help in the proper storage of household hazardous products.

- *Sort the products into hazardous waste categories (i.e., poisonous, flammable, corrosive, and reactive) and store them as separate categories. For example, flammable products such as charcoal lighter and waste oil should be stored apart from corrosive products such as drain cleaner and acid batteries. It is important to store reactive products in separate locations. Thus, bleach and ammonia-based cleaner should be stored in separate cupboards so that, if a spill does occur, mixing and release of poisonous gas is avoided.*
- *Poisonous products should always be stored apart from other products.*
- *Where possible, products should be stored in the original container. Household hazardous products should not be transferred to a previously used container, in order to avoid reaction with incompatible products.*
- *Labels should be legible and securely affixed to the container.*
- *Containers should be tightly sealed and regularly inspected for deterioration. Where rust or leaking is observed, the deteriorating container should be placed inside a larger container and clearly labeled.*

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What is the best way to dispose of household hazardous waste?

The best way to dispose of household hazardous wastes is to sort them into categories according to their hazardous properties and take them to the community household hazardous waste collection center. Unused supplies of hazardous products should not be disposed of by pouring them down the drain. In California, it is illegal to dispose of used oil and paints by pouring them down the drain, including the storm drain, onto land, or by burning. Waste motor oil, oil filters, anti-freeze and used batteries can be recycled and should be taken to a recycling center. Information on the recycling of specific products can be obtained from the California Integrated Waste Management Board (CIWMB) Recycling Hotline at **(800) 553-2962**.

Household hazardous waste collection programs are established in many communities in California. For information on household hazardous waste events in your area, call the CIWMB Recycling Hotline (or your local environmental health department listed in Appendix A). For more general information on hazardous waste, contact the California Department of Toxic Substances Control **(916) 324-1826**. Guidelines on developing a similar program are presented in the publication "Recommendations for Developing Household Hazardous Waste Collection Facilities". This publication can be obtained from CIWMB.

MORE INFORMATION?

Hotlines:

For information on household hazardous waste and used oil collection and recycling centers, buy recycled information, the 3 R's (Reduce, Reuse and Recycle), as well as other environmental tips and events, contact the
California Environmental Hotline at:
Telephone: **1-800-CLEANUP (1-800-253-2687)**
Web Site: **www.1800cleanup.org**

For information on recycling and collection centers and referrals for county and city agencies, call the
California Integrated Waste Management Board Recycling Hotline at:
Telephone: **1-800-553-2962**

To report hazardous waste violations, call the
California Department of Toxic Substances Control Waste Alert Hotline at:
Telephone: **1-800-69TOXIC (1-800-698-6942)**

For general information on hazardous waste, call the
California Department of Toxic Substances Control (Sacramento Headquarters) at:
Telephone: **1-916-324-1826**

Publications:

Household Hazardous Waste Wheel
The above publication is available at a cost of $3.95 from:
Environmental Hazards Management Institute
10 New Market Road
P.O. Box 932
Durham, NH 03824
Telephone: **1-603-868-1496**

HOUSEHOLD HAZARDOUS WASTE

LEAD

How is lead harmful?

Lead is a common environmental toxin that was used extensively in consumer products, such as paint and gasoline. Much of that lead remains in the California environment where people may become exposed. Children are commonly exposed to lead through normal hand-to-mouth behavior, which occurs as they explore their environment. When children crawl or play on the floor, put toys in their mouths, or suck on their fingers, they may ingest lead dust. This kind of daily, frequent exposure can result in lead poisoning. Some children eat paint chips, which can cause severe poisoning with irreversible health effects, including brain damage, mental retardation, convulsions, and even death. As lead poisoning can go undetected, it may result in behavior problems, reduced intelligence, anemia, and serious liver or kidney damage. Children under the age of six are particularly susceptible to lead poisoning.

Lead is also harmful to adults. Lead poisoning can cause reproductive problems (in both men and women), high blood pressure, digestive problems, nerve disorders, memory and concentration problems, and muscle and joint pain. Adult lead poisoning is most often the result of occupational exposure, or exposure following unsafe home renovation.

How can I protect my family from lead poisoning?

The most important step you can take to protect your children is to have them tested for lead poisoning. A simple blood test can measure levels of lead in the blood. All children age 5 and under should be tested. Family members who might have high levels of lead should also be tested.

Your doctor or health center can conduct this test. The test is covered by health insurance plans. Children from families with modest incomes can be tested at no cost through CHDP – the Child Health and Disability Prevention Program. The test is part of well-child checkups.

Poisoning is the result of contact with lead. The "treatment" begins with identifying the source of lead, and then removing or isolating it. Medical management depends on many factors, including the severity and duration of exposure. Adults and children with lead poisoning need regular testing to monitor levels of lead in the body.

Where is lead found in the home?

Many houses and apartments built before 1978 have paint that contains lead. In 1978, the Consumer Product Safety Commission banned paint containing high levels of lead for residential use. If your home or apartment was built before 1978, you should assume it has lead paint.

Lead-based paint that is peeling, chipping, chalking, or cracking is a hazard and needs immediate attention. Lead-based paint may also pose a hazard on surfaces children can chew, or in areas with heavy wear. These areas include windows and window sills, doors and door frames, stairs, railings, banisters, porches, and fences. When painted surfaces bump or rub together they generate lead dust. Likewise, dry-scraping, sanding, or heating lead paint during repainting or remodeling also creates huge amounts of poisonous lead dust. This lead dust can poison your family.

Soil can become contaminated with lead from deteriorating exterior paint, and from leaded gasoline emissions. Lead in soil can be a hazard to children who play in bare soil. It can also contaminate the home when people bring soil into the house on their shoes.

Other Sources: Lead can be found in jobs such as battery repair or recycling, radiator repair, painting or remodeling, lead smelting, etc. Lead from the workplace poses a hazard for workers' families. Workers can bring lead into their homes on their work clothes, shoes, and bodies without knowing it. Some hobbies use lead. These include ceramics, stained glass, fishing weights, and bullet casting or firing. Lead can leech into food cooked, stored, or served in certain imported dishes or handmade pottery. Lead can be found in some home remedies such as Arzacon, Greta, Pay-loo-ah, Surma, Khali, and Kandu. These traditional medicines are very dangerous, and often contain large amounts of lead. Lead can be present in drinking water of older homes that have plumbing with lead or lead solder.

How can I check my home for lead hazards?

To inspect your home for lead hazards, hire an individual or contractor who has been certified by the California Department of Health Services (CDHS). A CDHS-certified Inspector/Assessor will determine the lead content of every painted surface in your home and identify any sources of serious lead exposure (such as peeling paint and lead dust). The assessment should outline the actions to take to address these hazards.

A CDHS-certified Inspector/Assessor may use a variety of methods to assess lead hazards in your home. These include visual inspection of paint condition, laboratory tests of paint samples, surface dust tests, and/or a portable x-ray lead testing (fluorescence) machine.

You may have seen home lead test kits in your local hardware store. Recent studies suggest, however, that they are not always accurate. To protect your family's safety, do not rely on these kits. They are not always dependable.

How can I reduce lead hazards safely?

If your house has lead hazards, you can take action to reduce your family's risk. First and foremost, if you have young children, be sure they are tested for lead. This is particularly important if you have recently renovated or remodeled your home.

Second, keep your home as clean and dust-free as possible. Clean floors, window frames, window sills and other surfaces weekly. Use a mop and regular detergent for cleaning. Use paper towels to clean windows and window wells.

Wash children's hands often, especially before meals and bed time. Keep play areas clean. Wash bottles, pacifiers, toys, and stuffed animals regularly. Feed your children nutritious meals with foods high in iron and calcium. Give children regular meals and snacks. Children with full stomachs and nutritious diets tend to absorb less lead.

How can I significantly reduce lead hazards?

In addition to dust control and good nutrition, you can **temporarily** reduce lead hazards by repairing damaged painted surfaces and planting grass to cover soil with high lead levels. These actions are not permanent solutions and need ongoing attention.

To **permanently** remove lead hazards, you should hire a lead "abatement" contractor. Abatement methods include removing, sealing or enclosing lead-based paint with special materials. Simply painting over lead-based paint with regular paint is not enough.

To permanently remove lead hazards, hire an individual or contractor who has been certified by the CDHS. CDHS-certified individuals have the proper training to do this work safely. They have the proper equipment to clean up thoroughly. They will employ trained and certified workers. They will also follow strict safety rules set by the state and federal government. These safety measure will protect you and your family from lead hazards.

What are my responsibilities if I am selling, renting, or remodeling a home built before 1978?

If you are planning to buy, rent, or renovate a home built before 1978, federal law requires sellers, landlords, and remodelers to disclose certain information prior to finalizing contracts.

Landlords must:

1) Disclose known information on lead-based paint hazards; and,
2) Give you a lead hazard pamphlet before leases take effect. Leases will also include a federal form about lead-based paint.

Sellers must:

1) Disclose known information on lead-based paint hazards; and,
2) Give you a lead hazard pamphlet before selling a house. Sales contracts will also include a federal form about lead-based paint. Buyers will have up to 10 days to check for lead hazards.

Renovators must:

1) Give you a lead hazard pamphlet before starting to work.

If you want more information on these requirements call the National Lead Information Clearinghouse at **(800) 424-LEAD [(800) 424-5323]**.

What precautions should I take when remodeling my home?

Before you begin any remodeling or renovations that will disturb painted surfaces (such as scraping or sanding paint, or tearing out walls) test the area for lead-based paint first. To fully protect your family from unsafe renovation hazards, hire a CDHS-Certified individual or contractor.

Never use a dry scraper, belt-sander, propane torch, or heat gun to remove lead-based paint. These actions create large amounts of poisonous lead dust and fumes. This lead dust can remain in your home long after the work is done, and can make your family very sick. It is important to move your family (especially children and pregnant women) out of your home until the work is completed, and the area has been properly cleaned.

You can find out about other safety measures by calling **(800) 424-LEAD [(800) 424-5323]**. Ask for the brochure "Reducing Lead Hazards when Remodeling Your Home" This brochure explains what to do before, during, and after renovations.

What is the source of lead in water?

The source of lead in water is most likely to be lead in water pipes, lead solder used on copper pipes, and some brass plumbing fixtures. Lead pipes are generally found only in homes built before 1930. The use of lead-based solder in plumbing applications in homes and buildings was banned in 1988. However, many homes built prior to 1988 may contain plumbing systems that use lead solder. The levels of lead in water from these homes are likely to be highest during the first five years after construction. After five years there can be sufficient mineral deposit, except where the water is soft, to form a coating inside the pipe; this coating prevents the lead from dissolving.

How can lead levels in water be determined?

If lead contamination in drinking water is suspected, samples of water may be submitted to a laboratory certified by the CDHS. (For a list of certified laboratories, see Publications.) Consult with the laboratory on the proper procedures for sample taking.

Information on the corrosivity of household water, which may result in lead being leached from household plumbing, may be obtained from the water utility serving your area.

What level of lead is considered safe in drinking water?

Historically, the standard for lead in drinking water was based on the level of lead in the source water being used by the water utility. This standard was 50 parts per billion. It was very rare for this level to be exceeded in source water since lead is only infrequently a contaminant in nature. A much more common source of lead in drinking water is the result of the lead being leached from household plumbing. Based on this fact, the U.S. EPA promulgated the federal Lead and Copper Rule which became effective on January 1, 1992. Unlike any other federal drinking water standard, this rule applies to the quality of water as it comes from the household tap rather than the quality of the water at the source. Public water systems are to take corrective action to control corrosion when it results in increases in lead (or copper) in the tap water due to the lead being leached from the household plumbing. The water system is to take such action when the concentration of lead in a first draw tap sample (collected after the water has stood unused for at least 6 hours) exceeds 15 parts per billion in a specified percentage of the homes designated as being most susceptible to corrosion of lead from household plumbing.

How can levels of lead in water be reduced?

Lead levels can be reduced by removing lead piping or lead solder, by installing a home treatment system certified by the CDHS, or regularly flushing each tap before consuming the water. Another alternative for homeowners is to purchase bottled water. Home treatment methods that are effective in removing some or all lead in water include distillation and reverse osmosis. The cost for a home treatment system varies depending on the type of system and whether the system is designed for a single tap or the entire house. A more detailed discussion of home treatment systems is presented in, "Consumers Guide to California Drinking Water" (see Publications).

Where there are elevated lead levels in water, homeowners who choose not to install a treatment system or use bottled drinking water should flush each tap before the water is consumed. Water which has been standing in the water pipes for more than six hours should be flushed from the tap until the temperature changes and then about fifteen seconds more. Because lead is more soluble in hot water, the homeowner should not drink or prepare food using hot water from the tap. The flushed water should be saved and used for non consumptive purposes such as washing clothes or watering plants.

MORE INFORMATION?

Hotlines:

For more information on lead in drinking water and federal regulations about lead in drinking water, contact the

U.S. EPA Safe Drinking Water Hotline in Washington, D.C. at:
Telephone: **(800) 426-4791**

For more information on how to protect children from lead poisoning contact

The National Lead Information Center at:
Telephone: **(800) Lead-FYI [(800) 532-3394]**

For other information on lead hazards, call

The National Lead Information Center's clearinghouse at:
Telephone: **(800) 424-LEAD [(800) 424-5323]**

To request information on lead in consumer products, or to report an unsafe consumer product or a product-related injury, contact the

Consumer Product Safety Commission at:
Telephone: **(800) 638-2772**

To request local lists of CDHS-certified inspectors or abatement workers contact the

CDHS Childhood Lead Poisoning Prevention Branch at:
Telephone: **(800) 597-LEAD [(800) 597-5323]**

To request a list of local county health department lead programs, or a list of certified labs, contact

CDHS Childhood Lead Poisoning Prevention Branch at:
Telephone: **(510) 450-2424**

Publications:

List of Certified Laboratories to Perform Hazardous Waste Analysis

This list is available at no cost from:
California Department of Health Services
Environmental Laboratory Accreditation Program
2151 Berkeley Way, Annex 2
Berkeley, CA 94704
Telephone: **(510) 540-2800**

Guidelines for the Evaluation and Control of Lead Based Paint Hazards in Housing

This publication is available for $45.00 from:
Department of Housing and Urban Development (HUD)
Information Services
HUD User
P.O. Box 6091
Rockville, MD 20849
Telephone: **(800) 245-2691**
Web: www.huduser.org

Manual for the Identification and Abatement of Environmental Lead Hazards

This publication is available at no cost from:
The National Maternal and Child Health Clearinghouse
2070 Chain Bridge Road, #450
Vienna, Virginia 22182

Lead in your Drinking Water

This publication is available at no cost from:
U.S. Environmental Protection Agency
Public Information Center
401 M. Street, SW
Washington, D.C. 20460
Telephone: **(202) 260-2080**

The Inside Story – A Guide to Indoor Air Quality

This publication is available at no cost from:
Indoor Air Quality Information Clearinghouse
P.O. Box 37133
Washington, D.C. 20013-7133
Telephone: **(800) 438-4318**
FAX: **(202) 484-1510**
E-mail: iaqinfo@aol.com
Web: www.epa.gov/iaq/

Consumers Guide to California Drinking Water

This publication is available for $4.00 (plus 5% shipping charge, plus tax) from:
Local Government Commission
1414 K Street, Suite #250
Sacramento, CA 95814
Telephone: **(916) 448-1198 x307**
FAX: **(916) 448-8246**

Lead Poisoning Prevention Wheel

This publication is available for $2.95 from:
Environmental Hazards Management Institute
10 New Market Road
P.O. Box 932
Durham, NH 03824
Telephone: **(603) 868-1496**

Note: Telephone numbers and prices were correct at the date of publication of this booklet.
Telephone numbers and prices are subject to change.

APPENDIX A

LIST OF FEDERAL AND STATE AGENCIES

FEDERAL AGENCIES

U.S. Department of Housing and Urban Development (HUD)
Office of Lead Based Paint Abatement and Poisoning Prevention
451 7th Street, Room B133, SW
Washington, D.C. 20410
Telephone: (202) 755-1785

HUD helps people build and maintain communities of opportunity.

U.S. Environmental Protection Agency (U.S. EPA)
Public Information Center
401 M Street, SW
Washington, D.C. 20460
Telephone: (202) 260-2080

U.S. EPA is a regulatory agency responsible for implementing Federal laws designed to protect the environment. These laws protect our air, water, and land from past and future environmental hazards.

U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, CA 94105
Telephone: (415) 744-1500

The U.S. EPA San Francisco Regional Office (Region 9) is responsible for implementing environmental programs within the states of California, Arizona, Nevada, Hawaii and the Pacific Islands.

STATE AGENCIES

California Air Resources Board
Research Division
Indoor Exposure Assessment Section
2020 L Street
Sacramento, CA 95814
Telephone: (916) 323-1528

The Research Division allocates funds for research on air pollution and provides consumer publications on air pollution.

California Contractor's State License Board
9835 Goethe Road
P.O. Box 26000
Sacramento, CA 95827
Telephone: (800) 321-2752

This board is responsible for licensing of contractors, including asbestos abatement.

California Department of Health Services
Environmental Health Laboratory Branch
Division of Environmental and Occupational Disease Control (DEODC)
2151 Berkeley Way
Berkeley, CA 94704
Telephone: (510) 540-2469

This laboratory provides analytical services for the California Air Resources Board, the California Department of Health Services and the California Department of Toxic Substances Control. It also carries out research on methods of measuring air pollutants. The analytical services are not available to the public.

California Department of Industrial Relations
Division of Occupational Safety and Health (Cal/OSHA)

-Asbestos Consultant Certification Unit
2211 Park Towne Circle, #1
Sacramento, CA 95825
Telephone: (916) 574-2993

-Asbestos Contractors Registration Unit
45 Fremont Street, Room #1100
San Francisco, CA 94105
Telephone: (415) 972-8589

Cal/OSHA is the state equivalent to the Federal Occupational Safety and Health Administration (OSHA) and regulates protection of workers.

California Department of Health Services
Childhood Lead Poisoning Prevention Program
5801 Christie Avenue, Suite 600
Emeryville, CA 94608
Telephone: (510) 450-2453
FAX: (510) 450-2442

This unit provides information on lead toxicity and treatment of lead toxicity in children. It also provides information on sources of lead in the environment to the Public Health Department.

California Department of Health Services
Environmental Lab Accreditation Program
1625 Shattuk Avenue
Berkeley, CA 94709
Telephone: (510) 540-2800

This section of CDHS certifies laboratories which analyze environmental pollutants. Information about test procedures can be obtained from this office.

California Department of Health Services
Environmental Management Branch
Radon Program
601 North 7th Street
Sacramento, CA 94234-7320
Telephone: (800) 745-7236

Publications on radon can be obtained from this branch.

California Departments of Health Services and Industrial Relations
Hazard Evaluation System and Information Service (HESIS)
2151 Berkeley Way, Annex 11
Berkeley, CA 94704
Telephone: (510) 540-3014

This unit assesses the risks of toxic substances in the workplace and gives information about safe exposure levels, health effects, engineering controls, personal protective equipment, product substitution, and safe work practices. Workplace questions only.

California Department of Health Services
Division of Drinking Water and Environmental Management
Drinking Water Field Operations Branch
Drinking Water Technical Program Branch
Sacramento Headquarters
601 North 7th Street
P.O. Box 942732
Sacramento, CA 94234-7320
Telephone: (916) 323-6111

This division collects and evaluates water quality information on drinking water in California and supervises the activities of all public water systems. It also provides assistance to local health departments, water purveyors, and the general public on issues related to water quality, water supply, and water treatment.

Northern California Section

Sacramento District
8455 Jackson Road, Room 120
Sacramento, CA 95826
Telephone: (916) 229-3126

Lassen District & Shasta District
415 Knollcrest Drive, Suite 110
Redding, CA 96002
Telephone: (916) 224-4800

North Coastal Section

San Francisco District & Monterey District
2151 Berkeley Way, Room 458
Berkeley, CA 94704
Telephone: (510) 540-2158

Santa Rosa District
50 D Street, Suite 205
Santa Rosa, CA 95404-4752
Telephone: (707) 576-2145

Central California Section

Merced District & Visalia District
5545 East Shields Avenue
Fresno, CA 93727
Telephone: (209) 297-3883

San Bernardino District
1836 S. Commercenter Circle, Suite B
San Bernardino, CA 92408
Telephone: (909) 383-4328

Stockton District
31 E. Channel Street, Room 270
Stockton, CA 95202
Telephone: (209) 948-7696

South Coastal Section

Los Angeles District and Metropolitan District
1449 W. Temple Street, Room 202
Los Angeles, CA 90026
Telephone: (213) 580-5723

San Diego District
1350 Front Street, Room 2050
San Diego, CA 92101
Telephone: (619) 525-4159

Santa Ana District
28 Civic Center Plaza, Room 325
Santa Ana, CA 92701
Telephone: (714) 558-4410

Santa Barbara District

530 E. Montecito Street, Room 102
Mailing Address: P.O. Box 4339
Santa Barbara, CA 93103
Telephone: (805) 963-8616

California Department of Toxic Substances Control (DTSC)
Sacramento Headquarters
400 P Street
P.O. Box 806
Sacramento, CA 95812-0806
Telephone: (916) 324-1826

DTSC issues permits for treatment, storage, and disposal of hazardous wastes, inspects facilities for compliance, maintains a Superfund list and has a site clean-up program.

Northern California Regional Offices

Sacramento Office
10151 Croydon Way, Suite 3
Sacramento, CA 95827
Telephone: (916) 255-3618

Clovis Office
1515 Tollhouse Road
Clovis, CA 93612
Telephone: (209) 297-3901

Berkeley Office
700 Heinz Avenue, Suite #200
Berkeley, CA 94710
Telephone: (510) 540-3739

Southern California Regional Offices

Glendale Office
1011 North Grandview Avenue
Glendale, CA 91201
Telephone: (818) 551-2830

Long Beach Office
245 West Broadway, Suite 350
Long Beach, CA 90802
Telephone: (562) 590-4968

California Department of Housing and Community Development
Division of Administration – Manufactured Housing
P.O. Box 31
Sacramento, CA 95812-0031
Telephone: (916) 445-3338

The Division of Administration is involved in the administration of codes and statutes relating to mobile homes. It also allocates grants and loans for low-income housing, house rehabilitation, and disaster relief.

Department of General Services
Documents and Publications
4675 Watt Avenue
North Highlands, CA 95660
Telephone: (916) 574-2200

Documents and publications are sold through this department by the various state agencies.

California Department of Real Estate (DRE)
DRE regulates and licenses real estate agents and brokers in California.

Fresno District Office

Department of Real Estate
2550 Mariposa, Room 3070
Fresno, CA 93721
Telephone: (209) 445-5009

San Francisco District Office

Department of Real Estate
185 Berry Street, Room 3400
San Francisco, CA 94107
Telephone: (415) 904-5925

Los Angeles Executive Office

Department of Real Estate
107 South Broadway
Room 7111 – Subdivisions
Room 8107 – All other divisions
Los Angeles, CA 90012
Telephone: (213) 897-3399

San Diego District Office

Department of Real Estate
1350 Front Street, Room 3064
San Diego, CA 92101
Telephone: (619) 525-4192

Sacramento Principal Office

Department of Real Estate
2201 Broadway
P.O. Box 187000
Sacramento, CA 95818-7000
Telephone: (916) 227-0864

GLOSSARY OF TERMS

AERATION: A technique by which air is introduced into a liquid; bubbles and aerosols are generated and dissolved gases released. For example, water aerated by passage through a shower head will release dissolved radon gas.

ACTIVATED CARBON: A material made from burnt wood which is used to remove organic solutes, such as pesticides, and some inorganic solutes, such as chlorine, from water. Dissolved organic solutes are removed from the water by adsorption onto the activated carbon. The activated carbon must be periodically replaced when it becomes saturated and unable to adsorb any more solute. Activated carbon is not effective in removing heavy metals, such as lead, and salts, which make water hard.

ANNUAL AVERAGE LEVEL: The average of measurements taken at different times over the period of one year or the level measured by a device left in place for a full year.

CARCINOGEN: A substance which causes cancer.

CERTIFIED LABORATORY: A laboratory which has demonstrated that it can meet the federal and state standards for accuracy and precision for a given analytical procedure.

DISTILLATION: As referenced in this booklet, distillation is a technique used to purify water by removal of inorganic contaminants such as salts through heating the solution and condensing the steam. The resultant distilled water has a reduced salt concentration. Distillation is not effective in removing pesticides and volatile organic contaminants such as chloroform and benzene.

EXPOSURE: Contact with an agent through inhalation, ingestion, or touching, For example, exposure to radon is primarily through inhalation; exposure to lead is primarily through ingestion.

FILTRATION: Purification of water by removing undissolved solids or sediment by passing the water through a filter or sieve. Filtration does not remove dissolved salts or organic contaminants.

LEVEL: Another term for concentration; also, the amount of a substance in a given volume of air, liquid or solid.

LITER: Metric unit of volume equivalent to 1.057 quarts of liquid. One gallon is equivalent to about 4 liters.

MILLIGRAM: A unit of weight. There are 1,000 milligrams in one gram and about 28 grams in one ounce.

PARTS PER MILLION: A unit of concentration. For example, air which contains 1 part per million formaldehyde contains 1.2 milligrams formaldehyde in 1 million milliliters air, i.e.1,000 liters, air. Also water which contains 1 part per million lead contains 1 milligram lead in 1 million milligrams water, i.e., 1 kilogram, water. One part per million can be compared to one cent in ten thousand dollars.

PASSIVE DETECTOR: A measuring device which functions without any energy input or ongoing attention from the user. For example, use of a passive radon detector to measure radon requires only that the detector is left in place for a specified time.

PICOCURIE: A unit of amount used in measurement of radioactive substances. For example, five picocuries of radon are five trillionths of a curie and are equivalent to 11 radioactive radon atoms decaying every minute.

RADIOACTIVE: A term used to describe atoms which are unstable and break down or decay to form another kind of atom. For example, radium breaks down to form radon. In the process of decay some high energy particles are emitted. The detection of these particles by special instruments indicates that a substance is radioactive. The high energy particles (alpha and beta particles) and gamma rays are called radiation.

REVERSE OSMOSIS: A technology used to purify water by removing the salts from water. Osmosis involves the diffusion of water from a dilute to a concentrated solution across a semi-permeable membrane which allows only the passage of water. In reverse osmosis, water is forced through a semi-permeable membrane from a concentrated solution to a stream of purified water. For example, in the desalination of sea water, reverse osmosis is used to separate the salts from the water. Reverse osmosis of sea water generates drinking water and a residue of salts.

RISK: In the context of this booklet, risk indicates the chance of developing a disease after exposure to an environmental hazard. Risk depends on the time period for which a person is exposed to a particular hazard and the level of the hazard.

SOFT WATER: Water that does not contain large amounts of dissolved minerals such as salts containing calcium or magnesium.

SOLDER: A metallic compound used to seal joints between pipes. Until recently, most solder contained about 50 percent lead. Lead solder is now banned for plumbing applications.

TOXICITY: The extent to which a material is toxic.

The Homeowner's Guide to Earthquake Safety

EARTHQUAKE SAFETY

Publishing Information

The Homeowner's Guide to Earthquake Safety was written and compiled by the California Seismic Safety Commission. Project coordinator for the Commission was Ed Hensley. Contributing photographers were Bob Eplett, Office of Emergency Services; and James Goodfellow, Brian L. Stoner, L. Thomas Tobin, and Fred Turner of the Seismic Safety Commission. The guide was prepared for publication by the staff of the Publications Division, California Department of Education, 721 Capitol Mall, Sacramento, California (mailing address: P.O. Box 944272, Sacramento, CA 94244-2720). The Seismic Safety Commission's printing of this publication was distributed under the provisions of the Library Distribution Act and *Government Code* Section 11096.

Legislation

This guide has been developed and adopted by the Seismic Safety Commission as required by Assembly Bill 2959, authored by Assemblyman Johan Klehs (Chapter 1499, Statutes of 1990), and Assembly Bill 200, authored by Assemblyman Dominic Cortese (Chapter 699, Statutes of 1991). The same legislation requires that the Seismic Safety Commission make this material freely available for reproduction on the provision that the contents remain intact. However, the Seismic Safety Commission cannot control or guarantee every reproduction.

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California Building Officials

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California Department of Insurance

California Division of Mines and Geology

California Real Estate Inspection Association

Earthquake Engineering Research Institute

Governor's Office of Emergency Services

International Conference of Building Officials

Pacific Bell

San Diego Association of Governments

Southern California Association of Governments

Southern California Association of Residential Retrofit Professions

Southern California Gas Company

Structural Engineers Association of California

Introduction

Recent earthquakes have reminded us that they can be sudden, destructive, and deadly. But they also have proved that preparation saves lives and property. As a current or prospective homeowner, the foundation of your preparation should be to ensure the strength of your home. This booklet is designed to be a good place to begin that strengthening.

There are no guarantees of safety during earthquakes, but both engineering and experience have demonstrated time and again that appropriately constructed or strengthened homes are unlikely to collapse or even be irreparably damaged during earthquakes. The California Seismic Safety Commission advises you to act on the suggestions outlined in this booklet and make yourself, your family, and your home safer. California is earthquake country and always will be; don't just worry about "The Big One"—plan for the next one.

Your Home and the Law

California state law contains several provisions to help protect buyers and sellers in home transactions. In respect to a home's ability to resist earthquakes, the law requires only that sellers tell buyers about known weaknesses.

No matter where you live in California, your home can be shaken by damaging earthquakes. There is no stopping the forces of geology. But there are some things we can do to reduce the risk. For example, the law that requires strapping water heaters so they don't tip over during earthquakes potentially saves the state in emergency response and recovery costs by preventing fires as well as broken gas and water distribution lines.

Building codes evolve continually, incorporating the latest scientific and engineering knowledge into construction practices. Houses built to earlier codes do not necessarily benefit from the latest knowledge. Upgrading all houses to current codes could be too cumbersome and too expensive. Instead, the law or local codes occasionally require some types of upgrading (those that are both effective and economical) when certain older homes are sold.

Using This Booklet

This booklet describes the most common weaknesses that can cause damage to homes during earthquakes. If your home has any of these weaknesses, it is more likely to be damaged by an earthquake. Specifically, this booklet will:

- Help sellers meet the requirement of state law that seismic weaknesses in a home built before 1960 be disclosed when the home is sold.
- Enable sellers to meet the requirement of state law that this booklet be given to every buyer of a home built before 1960.
- Provide homeowners with basic information about finding and fixing earthquake-related weaknesses in a home.
- Provide general information about earthquakes and direction in finding more information.

Whether buyer or seller, you can be assured of a safer investment and a safer structure by following the guidelines in this booklet.

Filling Out the Disclosure Report

To fulfill the legal requirements for selling a home built before 1960, the seller must give the buyer a completed earthquake hazards disclosure report.

As you complete the disclosure report, answer the questions to the best of your knowledge. If you do not understand a question, refer to the page of the booklet indicated for a description of that weakness. The description will help you identify the weakness and understand how it can be fixed.

If a question on the form describes only part of your house—for example, if part of your house is anchored to the foundation and part is not—answer the question "no," because a portion of the house is not anchored. You are not required to remove siding, drywall, or plaster to answer the questions. You are not required

to hire anyone to inspect your house. You are not required to fix the weaknesses before you sell your home.

Recommendations If You Are Selling

Before you sell your house, the following steps are recommended:

- If you list your house for sale through a real estate broker or agent, give the agent the completed disclosure form when you sign the listing agreement. Your agent can give the booklet and the form to the buyer for you.
- Though you are not required to hire someone to answer the questions on the disclosure form, you may want to get assistance from a home inspector, contractor, architect, or engineer.
- Keep a copy of the form, signed by the buyer, as evidence that you have complied with the earthquake disclosure requirement.

You may find that you will get a better price for your house if you strengthen earthquake weaknesses before you sell.

Recommendations If You Are Buying

Before you agree to buy a house, consider the following recommendations:

- Have a home inspector, contractor, architect, or engineer inspect the house and give you an opinion regarding any earthquake weaknesses and an estimate of costs to strengthen these weaknesses.
- Consider the house's location: Is it in or near an earthquake fault zone or in an area where it might be damaged by a landslide, liquefaction, or a tsunami? You may wish to hire a geotechnical engineer to check the stability of the land under the house.
- Negotiate the cost of strengthening, if required, with the seller. The law does not require either you or the seller to strengthen the home, but if these weaknesses are not fixed, you may find that repair costs after a damaging earthquake amount to more than your equity in the house.

Legal Requirements for Selling Your Home

When you sell a house in California, state law requires that you make certain disclosures to the buyer.

- When you sell your home, state law requires you to disclose earthquake weaknesses such as those described in this booklet (see "Earthquake Weaknesses," beginning on page 3).
- In addition, if your house was built before 1960, you must deliver a copy of this booklet, *The Homeowner's Guide to Earthquake Safety*, to the buyer. Your real estate agent is required to supply you with a copy of this booklet.
- You are required to brace the home's water heater to ensure that it will not fall and that gas and water lines will not break during an earthquake (see page 3).
- If your home is within an earthquake fault zone or in a seismic hazard zone, you are required to disclose this fact to a buyer (see "Geologic Hazards," page 15).

You are not required to hire someone to evaluate your home. You are not required to strengthen your home.

Earthquake Weaknesses

EARTHQUAKE WEAKNESS

Unbraced Water Heaters

The Problem

The water heater is not securely attached to the wall and can topple during an earthquake. If gas or electrical lines are broken as it falls, a fire and water damage may result. This is a common and serious problem but is relatively easy and inexpensive to fix.

How to Identify It

Examine your water heater to see if there are metal straps or braces around it that are screwed into the wall. Make sure the screws go into studs or into concrete and not just into drywall or plaster. Pull on the straps or braces to make sure they are secure and tight.

What Can Be Done

Use metal tubing, heavy metal strapping, and lag screws and washers to secure the water heater to the wall studs (see figure 1). Flexible pipes for the gas and water lines are safer in an earthquake than rigid pipes.

OFFICE OF EMERGENCY SERVICES

The unbraced water heater in this home fell during an earthquake; the resulting fire destroyed the home.

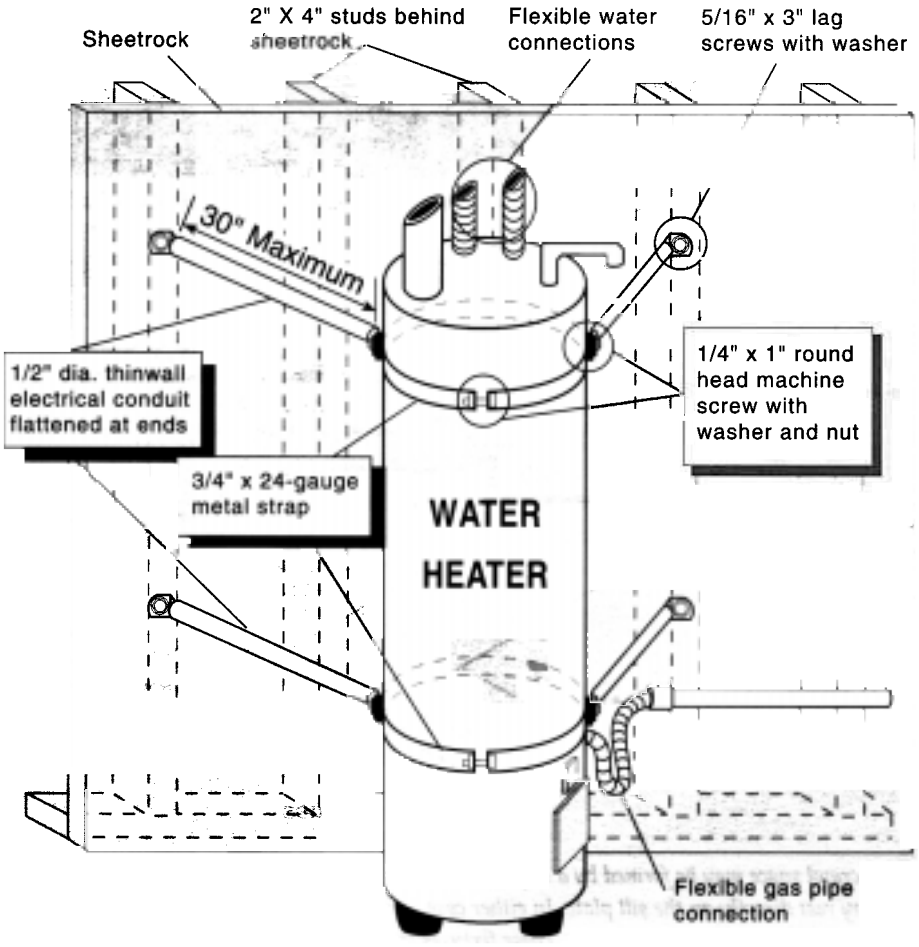


Figure 1—*Water heater bracing.* *You will be able to see the straps and screws if your water heater is braced. Make sure that the screws are firmly anchored to studs or masonry. The illustration shows one method of bracing a water heater. Ask your local building department for details of local requirements, your home's type of construction, plans for recommended bracing procedures, or to answer any questions you have about bracing your water heater (illustration based on Office of Emergency Services detail).*

EARTHQUAKE WEAKNESS

Foundations Not Anchored

The Problem

When an earthquake moves a house from side to side and up and down, the house can move off its foundation if it is not anchored. This can cause a fire from broken gas lines and damage the foundation, floors, walls, windows, and other utility connections as well as the contents of the home. It is very expensive to lift a house up, put it back on its foundation, and repair this damage.

How to Identify It

On a house that is built off the ground, the area between the first floor and the ground is called the crawl space. Look in the crawl space for the heads of anchor bolts that fasten the sill plate—the wooden board that sits directly on top of the foundation—securely to the foundation (see figure 2). You should be able to see the large nuts, washers, and anchor bolts, installed every 4 to 6 feet along the sill plate. Steel plates are sometimes used instead of anchor bolts. These fixtures connect the foundation to the house.

What Can Be Done

If the house is not anchored, drill holes through the sill plate into the foundation and install anchor bolts. If there is not enough room to drill, you can attach steel plates to the exterior to hold the sill plate to the foundation. Detailed specifications for different situations can be found in the *Uniform Code for Building Conservation*, Appendix Chapter 6 (see "References").

This home wasn't bolted and slid off its foundation.

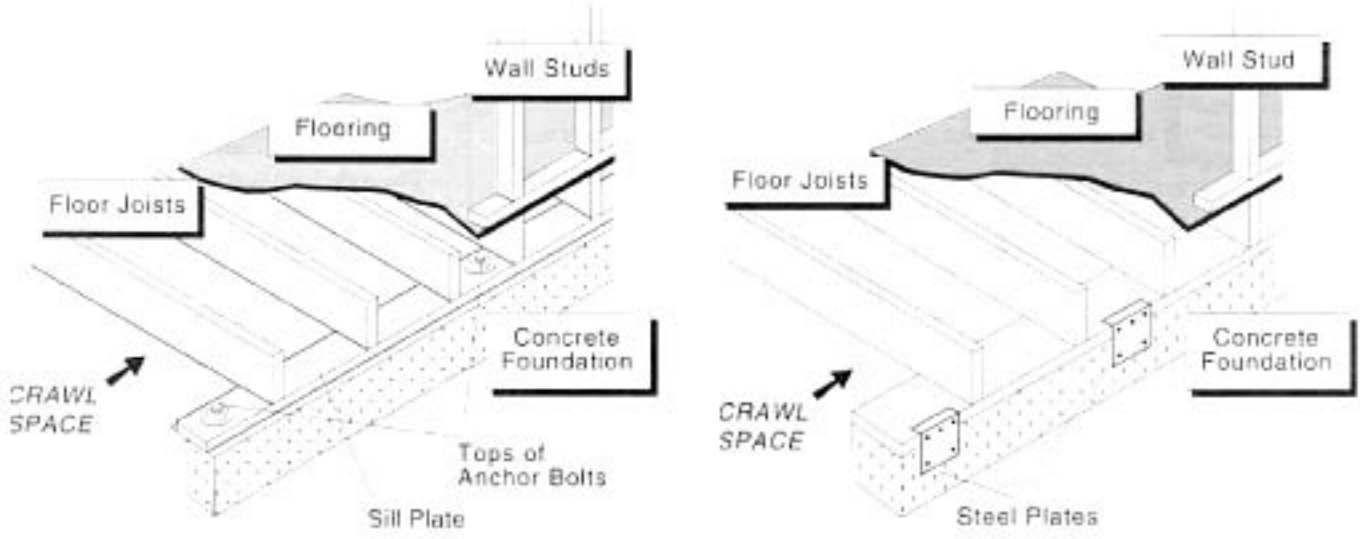


Figure 2—Anchor bolts or steel plates. *A home's crawl space may be formed by a cripple wall between the foundation and the floor joists (as illustrated in figure 3, page 5) or the floor joists may rest directly on the sill plate. In either case, you should be able to see the heads of anchor bolts or steel plates installed every 4 to 6 feet (not necessarily exactly as shown here). These fixtures fasten the sill plate to the foundation.*

EARTHQUAKE WEAKNESS

Weak Cripple Walls

The Problem

Wooden stud walls are sometimes used on top of an exterior foundation to support a house and create a crawl space (see figure 3). These are called cripple walls and they carry the weight of the house. When a house sways from side to side during an earthquake, these walls can collapse if not braced to resist swaying. If the cripple walls fail, the house may fall, causing damage to the foundation, floors, walls, windows, and utility connections as well as to the contents of the home. Such a collapse may also cause a fire as a result of broken gas lines. The damage may be very expensive to repair.

How to Identify It

Go under the house to see if there are any cripple walls and, if so, whether they are braced. If you can see a cripple wall, and there is no plywood or diagonal wood sheathing (see figure 3), the cripple walls are probably inadequately braced or are unbraced. Horizontal or vertical wood siding is not strong enough to brace cripple walls.

What Can Be Done

Plywood (or other wood product allowed by code) can be nailed between the studs. Material specifications and spacing of nails can be found in the *Uniform Code for Building Conservation*, Appendix Chapter 6 (see "References").

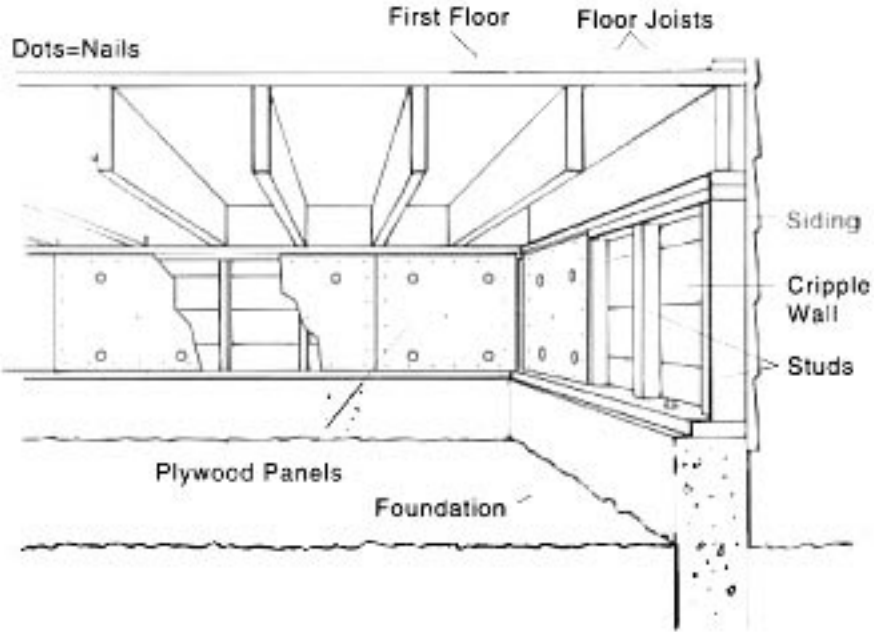
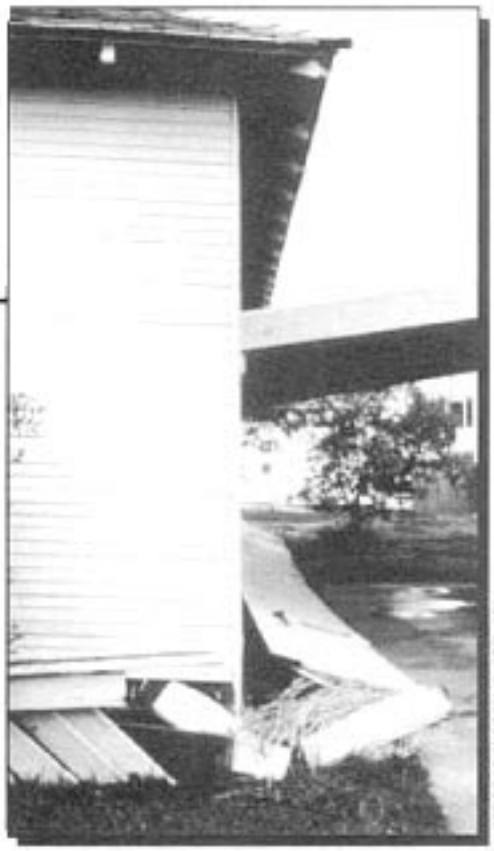


Figure 3—Plywood strengthens weak cripple walls. *If your home has a cripple wall between the foundation and the first floor, and the wall is not braced with plywood sheathing, the house may collapse during an earthquake.*



When this home's cripple wall failed, the building fell to the left, leaving behind on the ground the cripple wall from the side of the house.

EARTHQUAKE WEAKNESS

Pier-and-Post Foundations

The Problem

Pier-and-post foundations are similar to cripple walls. In this type of construction, the outside wall of the house is supported by wood posts resting on unconnected concrete piers. Siding is often nailed to the outside of the posts. If the posts are not braced against swaying, they may fall during an earthquake.

How to Identify It

From underneath the house, if you do not see a continuous foundation under the outside walls of the house, and you see only unconnected concrete piers and wood posts (or just wood posts) supporting the outside walls, your home may be vulnerable (see photos below). Horizontal or vertical wood siding is not strong enough to brace pier-and-post foundations.

What Can Be Done

You may require the advice of an architect or engineer as well as a foundation contractor to fix this problem. It may be possible to make the foundation safer by bracing the posts, but you might be better off to add a new foundation and plywood walls in the crawl space to make sure that the house will not fall off its foundation during an earthquake.

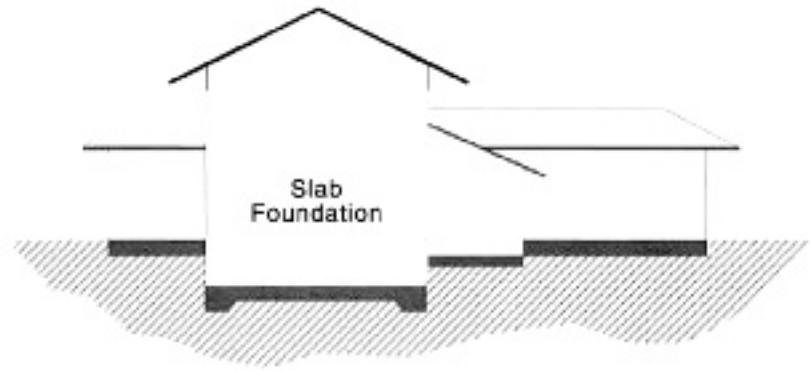


Figure 4—Slab foundations. *If your house was built on a concrete slab, it is probably bolted to its foundation.*

Houses Built on Concrete Slabs

Many homes don't have crawl spaces because they are built directly on concrete slabs. These houses do not have cripple walls, and they generally have foundation anchor bolts that were installed when they were built. If you can't tell whether your house has anchor bolts without removing interior plaster or drywall, which is not required by the disclosure law, you can look to see if the house has an unfinished garage with anchor bolts visible. If they are there, it is an indication that the living area of the house may have them also.

The pier-and-post foundation under this home shifted during a recent earthquake.

EARTHQUAKE WEAKNESS

Unreinforced Masonry Foundations

The Problem

Unreinforced masonry—brick, concrete block, or stone—foundations often cannot resist earthquake shaking. They may break apart, or be too weak to hold anchor bolts. Homes may shift off such foundations during earthquakes, damaging the walls, floors, utility lines, and home contents.

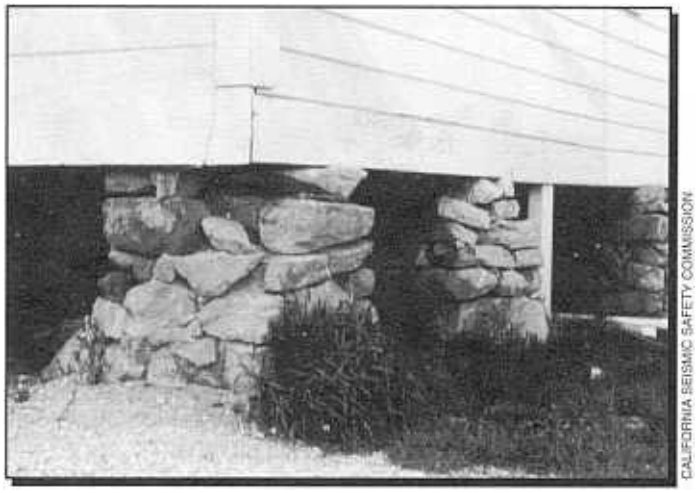
How to Identify It

If your home's foundation is brick or stone and looks like one of the foundations shown in the photos below, it is probably unreinforced. If there is a space filled with grout between the inner and outer faces of a brick foundation (where anchor bolts and reinforcing steel would be installed), it is probably reinforced. Look underneath the house to see what your foundation is made of if the outside of the foundation is covered.

Concrete block foundations should have steel reinforcing bars embedded in grout in the cells of the individual blocks. Check the top of the foundation, at the sill plate, to see if there is concrete in the cells of the blocks. If the cells are hollow, the foundation is probably not reinforced.

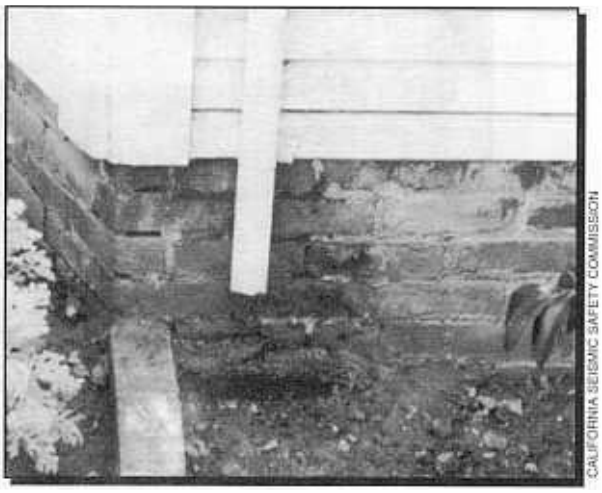
What Can Be Done

Strengthening an unreinforced brick or stone foundation can be expensive. There are a number of ways to approach the problem; you may need the help of an architect or engineer as well as a foundation contractor. Commonly used fixes include jacking the house off the old foundation and replacing all or part of it with a poured concrete foundation.



CALIFORNIA SEISMIC SAFETY COMMISSION

This is an unreinforced stone foundation, a type that typically fails during an earthquake.



CALIFORNIA SEISMIC SAFETY COMMISSION

Note the bricks in an unreinforced masonry foundation.

EARTHQUAKE WEAKNESS

Houses on Tall Walls or Posts

The Problem

If a house is built on the side of a steep hill, it may be set on exposed posts or columns as shown in the illustration below. Sometimes the supports on the downhill side will be hidden behind a tall wall that encloses a large unfinished space similar to but taller than a crawl space underneath the first floor of a typical house built on flat ground (see photo, bottom left). If such posts or walls are not properly braced, they may collapse.

What Can Be Done

Typically, such houses are engineered—meaning that the structure was designed by an architect or engineer, rather than simply built by a contractor according to conventional construction techniques. If a house you own or are considering buying is on tall walls or posts, an architect or engineer should be consulted to determine whether the posts or unbraced walls need strengthening and how to get this work done.

This hillside house was built on an unbraced tall wall that failed.

This photograph shows an interior detail of a home similar to the one at the left, showing substantial damage to a building with an unbraced tall wall.

EARTHQUAKE WEAKNESS

Unreinforced Masonry Walls

The Problem

Houses built of unreinforced masonry—bricks, hollow clay tiles, stone, concrete blocks, or adobe—are very likely to be damaged during strong earthquakes. The mortar holding the masonry together may not be strong enough to resist earthquake forces. These houses cannot flex and then return to their original shapes as do wood-framed houses.

How to Identify It

You can usually see bricks or stone from the outside unless the walls are covered with plaster. If brick walls have "header courses" of bricks turned endways every five or six rows, or if the house was built before 1940, the walls are most likely unreinforced. If you can't tell from the outside, you can take the cover plate off one of the electrical outlet boxes on an outside wall (turn off the power first) and look for brick or other masonry.

If the wall is concrete or concrete block, it is very difficult to determine whether reinforcing steel was added during construction. An experienced testing firm may tell you whether any steel is present. Otherwise, consulting the house's plans, which may be on file with the building department, might be the only way to tell without damaging the wall.

What Can Be Done

This is another problem that requires the services of an architect or engineer. A solution may involve tying the walls to the floor and roof.

The plaster-covered brick walls of this building collapsed during a recent earthquake.

EARTHQUAKE WEAKNESS

Rooms over Garages

The Problem

The large opening of a garage door and the weight of a second-story room built over a garage may mean the walls are too weak to withstand the shaking in a strong earthquake. This is a concern when narrow sections of wall on each side of the opening are not reinforced or braced. Some relatively new homes with this weakness have been damaged in past earthquakes.

How to Identify It

A room above the garage does not necessarily indicate an earthquake weakness. If the garage door opening is in line with the rest of the house (see figure 5), additional bracing around the door may not be needed. Check to see if there are braces or plywood panels around the garage door opening (see figure 6). It may be hard to determine whether strengthening is needed. This is an area where you may need the help of an architect or engineer.

What Can Be Done

Install a steel frame or plywood paneling around the door opening. You should consult an architect or engineer if you have a multistory house built over a garage.

This mountain home was built over a garage, and its walls were not strong enough to withstand an earthquake.

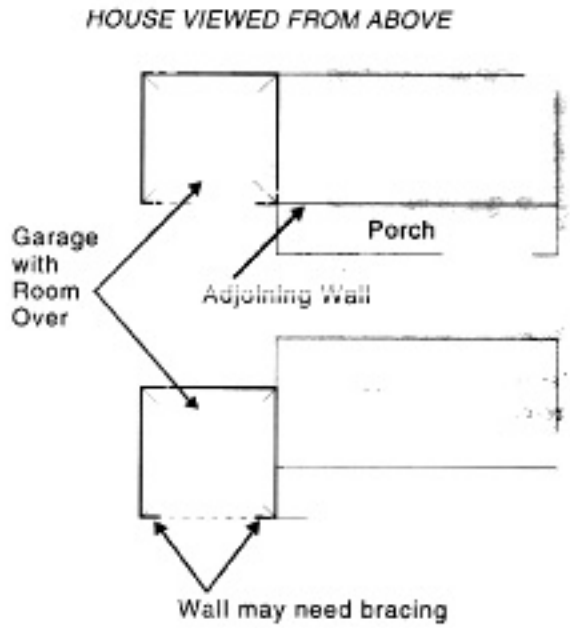


Figure 5—Additional bracing. *If the wall of the main house is in line with the wall containing the door of a garage with a room over it (top figure), the adjoining wall will help brace the garage. If the "in-line" wall consists only of porch supports (bottom figure), the garage may require additional bracing.*

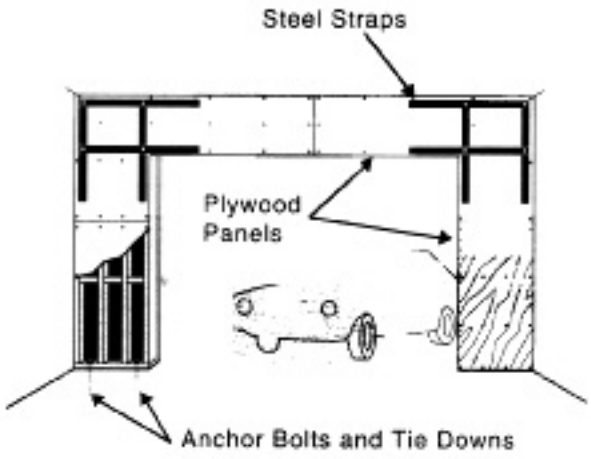


Figure 6—Bracing garage walls. *If your house has a room over the garage, the garage walls may not be strong enough to hold up during an earthquake unless they are braced with plywood panels.*

EARTHQUAKE WEAKNESS

Unreinforced Chimneys

The Problem

Many chimneys are built of unreinforced brick or stone and can collapse or fall over during earthquakes. If the chimney comes apart, the brick or stone may fall, damaging houses and cars and injuring people.

How to Identify It

Determining whether a chimney is susceptible to earthquakes is not easy. Tall, slender chimneys are most vulnerable to collapse. If the mortar between the brick or stone crumbles when you pick at it with a screwdriver, the chimney may be a hazard. Inspect the attic and floor spaces for the metal ties that should be holding the chimney to the house.

What Can Be Done

You can replace the chimney, or nail plywood panels above the ceiling, in the house's attic or under the shingles when you reroof, to prevent the brick or stone from falling into the house. Metal straps can be installed to tie the chimney to the house. Metal flues can replace the upper chimney if the mortar is good. Don't locate patios, children's play areas, or parking spaces near a questionable chimney. Tell your family members to get away from chimneys and fireplaces during earthquakes.

This unreinforced chimney fell during a recent earthquake.

Other Concerns

No Foundation

The Problem

Some older houses were built on wood beams laid directly on the ground, without foundations. These houses may move during earthquakes, causing structural damage and breaking utility lines.

How to Identify It

Look under the house. If you see no concrete or masonry around the outside walls, the house may lack a foundation.

What Can Be Done

You may need to add a foundation to make the house earthquake resistant. Just as when strengthening or replacing an unreinforced masonry foundation, you will require the advice of an architect, engineer, or foundation contractor.

Old Concrete Foundation

The Problem

Some older concrete foundations were made with sands or aggregates that interacted chemically over time and the concrete eventually crumbled and became too soft to withstand earthquake forces.

How to Identify It

Inspect the foundation for large cracks in the concrete, concrete crumbling off the foundation, or concrete crumbling when you pick at it with a screwdriver.

What Can Be Done

You may need to replace some of the foundation. You should consult a foundation contractor or an engineer.

Home Design

The Problem

The design and construction features of some homes make them vulnerable to earthquake damage, especially if these homes are not properly planned and built. Homes at risk are those with irregular shapes, large windows (which can break in earthquakes and scatter shards of glass), more than two stories, irregular walls, or porches and overhangs.

How to Identify It

Many homes with these features are strong enough to withstand earthquakes, and it is difficult to tell whether such homes need strengthening. If you have doubts about one or more of these features in your home, or in a home you are planning to buy, you should consult an architect or engineer for an assessment.

What Can Be Done

A professional can advise you on how to identify and fix earthquake weaknesses if necessary. Large windows can be made safer by applying plastic film to them.

Getting the Work Done

For your family's safety and financial security, you should strengthen your home to resist earthquakes. This booklet can help you decide which projects to tackle first. If your home has an unanchored water heater, an unbolted foundation, or an unbraced cripple wall, fixing these weaknesses will give you the most protection in return for money spent.

If you are a do-it-yourselfer, you may be able to do the simpler strengthening projects. Your local building department can provide guidelines for the project, and a contractor may charge only a nominal fee, if any, to provide the advice you may need to plan the work.

You will need building permits for the projects suggested in this booklet. The projects described are intended only to give you an idea of what needs to be done; they are not "how-to" instructions. There are many publications that go into detail about how to do these strengthening projects; see "References," page 24. You should review one or two of these publications to get a better idea of what your architect, engineer, or contractor is doing, even if you don't plan to do the work yourself.

In addition to assessing the earthquake weaknesses of your house, these professionals can estimate the costs of correcting the weaknesses and prepare the plans and specifications you will need to get a building permit. An architect or engineer can design the earthquake strengthening project and then advise you about selecting a contractor.

When obtaining help, make sure the professionals have experience in residential earthquake strengthening and the appropriate state licenses. Check references carefully. Call former customers to make sure you are contracting with reliable people, and ask for examples of previous jobs similar to yours. Talk to two or three professionals and be sure to compare their experience, ideas, and fees. Select someone you can talk to, someone who can explain what is to be done in terms that you can understand.

You should get several bids for construction work. Remember, though, that the low bid may not be the best choice. Opinions on the best way to do the job may vary.

Be sure to keep the plans, permits, and other paperwork related to your strengthening project to show future buyers.

If your home has been designated as "historical," you will be required to comply with the *California Historical Building Code.* Your local building department can help you determine how this affects the methods and materials you use.

Money Matters

Repairing earthquake damage to a home can be very expensive. Typically, it costs less to correct earthquake weaknesses than to repair earthquake damage. After an earthquake, you may have lodging costs in addition to repair costs if you can't live in your home until the damage is repaired.

Strengthen or Repair?

Table 1 on page 14 shows the typical range of costs to strengthen a home. The low end of the range includes the approximate costs of simple jobs for materials only, assuming you do the work. The upper end is for jobs done by professionals. Costs vary from job to job; ask your architect, engineer, or contractor to explain how the cost of your job is estimated.

The costs provided are for an average-sized house on a level lot. Your costs may vary. The table also gives you some idea of the risks of leaving the work undone. Usually it is far cheaper and safer to strengthen your home before the earthquake than to fix it afterward.

Table 1—Comparison of Costs: Preventing Vs Repairing Earthquake Damage

Earthquake Strengthening Project	*Cost of Project*	*Cost to Repair Unstrengthened House After Earthquake*	*See Page*
Bracing water heaters	$25 – 200	$200 – Total*	3
Anchoring foundations	250 – 5,000	25,000 – Total*	4
Bracing cripple walls	500 – 2,500	25,000 – Total*	5
Strengthening foundations	15,000 – 50,000	15,000 – Total*	6, 7
Bracing tall walls or posts	1,000 – 25,000	1,000 – Total*	8
Bracing garages with rooms above	200 – 25,000	1,000 – Total*	10
Bracing or replacing chimneys	2,000 – 12,000	1,000 – 15,000	11

*Total—full cost of home, which may be completely destroyed by this failure.

Earthquake Insurance

Earthquake coverage can add a considerable amount to your homeowner's insurance premium, depending on your location, the size and type of your house, and other factors. These coverages can carry deductibles of 5 to 15 percent or more of the house's replacement value. A 15 percent deductible means an earthquake must do more than $30,000 worth of damage to a $200,000 house before the insurance company pays for any damage; you must pay the first $30,000 worth of repairs.

The California Earthquake Authority and all other insurers are required to provide discounts on earthquake insurance premiums for older homes that have been strengthened to resist earthquake damage. For more information, contact your insurance agent.

You will need a building permit for seismic retrofits whether you do the work yourself or hire a contractor. The *Uniform Code for Building Conservation*, Appendix Chapter 6 contains the current best guidelines for strengthening older homes to resist earthquake damage. Most municipal building departments will allow you to review a copy of this code at their plan-check counters.

Property Tax Exclusion

The state provides a property tax exclusion to encourage homeowners to undertake earthquake strengthening projects. If you make an addition such as a swimming pool or a new den to your home, your property tax bill will increase. But a strengthening project to help your home resist earthquakes will not add to your property taxes. You must file a claim form with your county assessor to receive the exclusion. The work must also be approved as appropriate seismic strengthening by your local building department.

Geologic Hazards

California and earthquakes—it's a natural connection. California is partly on one tectonic plate and partly on another. In fact, at the far northern edge of the state, three plates collide just offshore. Our state is the product of geologic forces that have created an unstable landmass. There's no avoiding it—that's where we live; that's where we build our homes (see figure 7).

Your home can be damaged by the direct effects of an earthquake (changes in the nearby ground, such as strong shaking, rupture, landslide, or liquefaction) or by indirect effects (for example, tsunamis or dam failures). All these hazards are possible, but are more likely to affect certain areas (see figure 8) and certain types of homes. To supplement the basic information about possible problems within homes earlier in this book, the following section:

- Describes briefly the basic geological or geology-related hazards
- Introduces the government mapping programs that propose to define which areas are susceptible to those hazards

Ground Shaking—Ground shaking causes 99 percent of the earthquake damage to California homes. Geologists believe that areas near large active faults (see figure 9) are more likely to be shaken than areas in the rest of the state. All the precautions and preparations

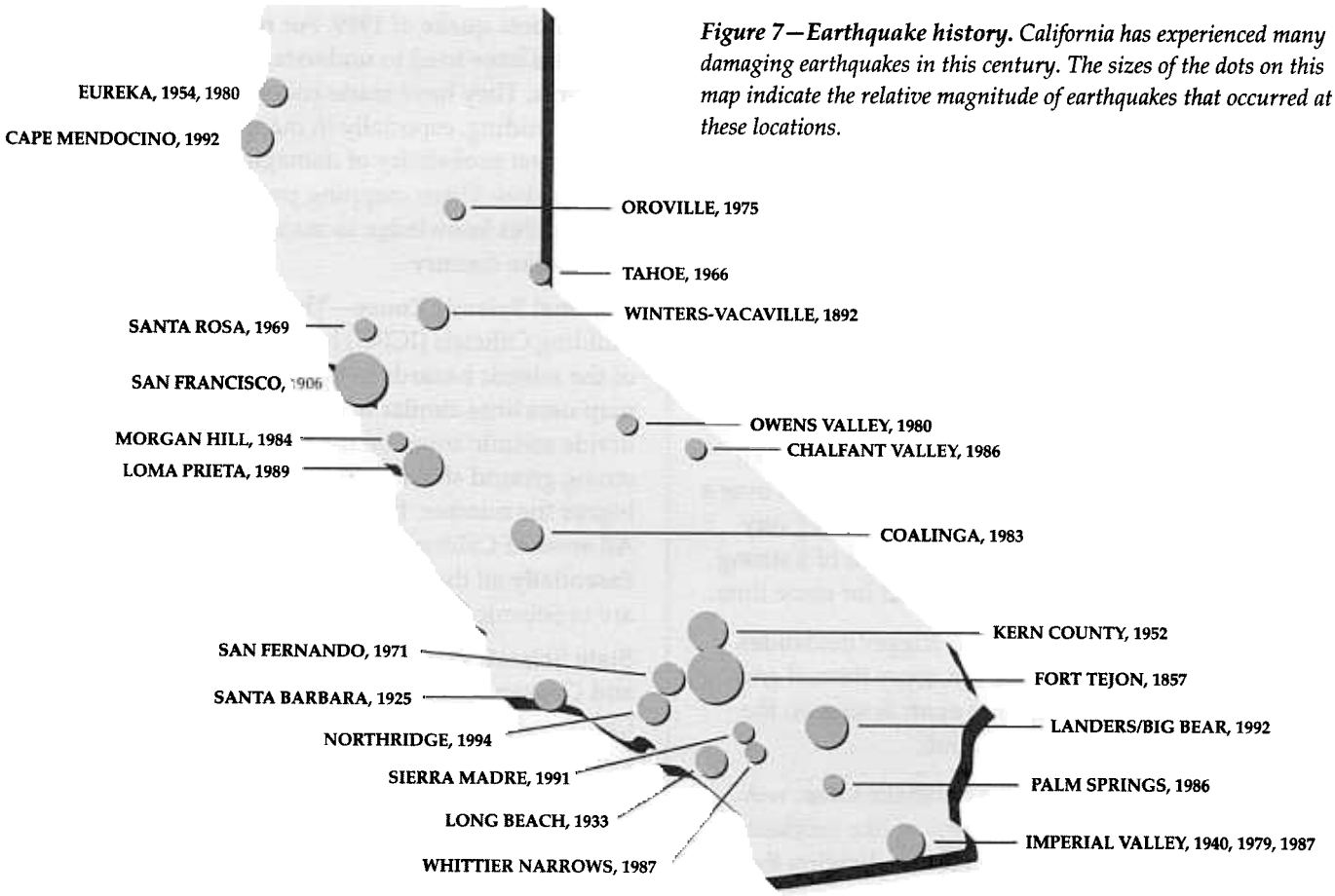


Figure 7—Earthquake history. *California has experienced many damaging earthquakes in this century. The sizes of the dots on this map indicate the relative magnitude of earthquakes that occurred at these locations.*

Figure 8—Seismic zones in California. All of California is in seimic zone 3 or 4 on U.S. Geological Survey maps. There are four zones; the higher the number the higher the earthquake danger. Stronger standards for buildings in zones 3 and 4 have been adopted in the Uniform Building Code.

described so far prepare a house to resist strong shaking and are, therefore, the ones likely to be the most effective and economical means to help prevent damage to your home.

Fault Rupture—Fault rupture is an actual crack or breaking of the ground along a fault during an earthquake. A house built over an active fault can be torn apart if the ground ruptures. If the house is built over a "creeping" fault—one that moves in a series of very small earthquakes rather than as the result of a strong shock—the damage may not be noticed for some time.

Landslide—Earthquakes can also trigger landslides. The shaking of an earthquake can cause the soil and rock to slide off a slope, ripping apart homes on the slope and crushing homes downhill.

Liquefaction—When earthquakes shake loose, wet, sandy soil, the soil can become almost like quicksand, losing its ability to support structures, allowing the foundation of a house, for example, to sink, break apart, or tilt.

Tsunami—A tsunami is a large sea wave caused by an earthquake. Tsunami damage is rare in California; however, the wave can come from a great distance and can cause considerable damage if it hits low-lying areas along the shore. For example, ten people were killed when the tsunami caused by the 1964 Alaskan earthquake hit Crescent City in northern California.

Dam Failure—Earthquake damage to a dam can cause a flood. A dam above the San Fernando Valley was damaged in the 1971 earthquake; if it had failed, it might have flooded the homes below, causing many deaths and injuries. Dam failure is unlikely; California has one of the world's most rigorous systems for building and inspecting dams.

Earthquake Hazard Mapping

The state has endured several well-known, damaging earthquakes just in the decade starting with the Loma Prieta quake of 1989. For more than a century, scientists have tried to understand how the land below us works. They have made enormous progress in understanding, especially in mapping areas that have the highest probability of damaging effects from earthquakes. Three mapping programs are applying some of this knowledge to make Californians safer in earthquake country.

National Seismic Zones—The International Council of Building Officials (ICBO) has designed a general map of the seismic hazards in the U.S. (see figure 8). The map uses lines similar to topographic contour lines to divide seismic zones on the basis of the likelihood of strong ground shaking. There are four zones. The higher the number, the higher the earthquake danger. All areas of California fall into either zone 3 or 4. Essentially all the most populous areas of California are in Seismic Hazard Zone 4.

State Seismic Zones—The California Division of Mines and Geology, part of the California Department of Conservation, works closely with the U.S. Geological Survey (USGS) by sharing seismic and geologic data. Because of its California orientation, the CDMG maps our state hazards in detail. Two of CDMG's mapping programs are of direct significance to homeowners:

1. *Earthquake Fault Zone Maps*—showing active faults and defining zones surrounding the fault that require special geotechnical studies before certain types of buildings can be constructed
2. *Seismic Hazard Zone Maps*—showing the areas of the state where landslides and liquefaction are most likely to occur and require investigation before some types of buildings can be constructed

Earthquake Fault Zones

The Alquist-Priolo Earthquake Fault Zone maps (see figure 9) show known active earthquake faults and identify a 1,000-foot-wide zone with the fault line at the center. State law requires that the information from these maps be incorporated into local general plans. Your local planning department should be able to show you the Alquist-Priolo maps for your area. The resource list at the end of this booklet also tells how to contact the Division of Mines and Geology.

Seismic Hazard Zones

The Seismic Hazards Mapping Act went into effect on April 1, 1991. Currently, this mapping program focuses on two hazards: liquefaction and landslides (see figure 10). The Seismic Hazards Mapping Program is patterned after the Alquist-Priolo Earthquake Fault Zoning Act (which addresses surface fault-rupture). In both programs:

- The state geologist delineates certain seismic hazards zones.
- Cities and counties establish regulations governing development within the zones.
- The State Mining and Geology Board provides additional regulations, policies, and criteria to

Figure 9—Earthquake fault zone map. *This sample map shows the Hayward Fault as it runs through downtown San Pablo. The map provides an example of an Alquist-Priolo Earthquake Fault Zone that borders active fault traces in California.*

Figure 10—Seismic hazard zone map. *This area near Simi Valley is shown on a map produced in accordance with the Seismic Hazards Mapping Act. The map designates zones that have the potential for liquefaction (dotted pattern) or landslide (crosshatch pattern).*

guide cities and counties in implementing the law.

- Sellers of real property within a hazard zone must disclose that the property lies within such a zone at the time of sale.

The Seismic Hazards Mapping Act and related regulations establish a statewide minimum standard for construction that should reduce the chances that a building will collapse so completely that it kills its occupants. Saving lives is the first priority; however, that does not mean that the building will still be usable after the quake.

The first seismic hazard zone maps were released in April, 1997. The requirements of the mapping act become effective for a location when the map for that location is released. The zones defined by the maps are at greatest potential risk when a major earthquake occurs during or shortly after a heavy rainfall that helps saturate potential liquefaction and landslide areas.

The law directs cities and counties to "take into account the information provided in available seismic hazard maps" when they adopt or revise the public safety portions of their general plans and any land-use planning or permitting ordinances.

What Does It Mean for You?

Table 2, below, shows the major types of geological vulnerabilities. It shows the underlying geologic conditions, the mapping program that covers such conditions, and the source of those maps.

The fault zone and seismic hazard zone maps are based on known geologic data; they do not cover all possible hazards or faults. For example, the fault that moved and caused the Northridge earthquake of 1994 was previously unmapped. However, it occurred in an area known to contain that type of fault; thus the potential for that kind of earthquake in that general location was well known.

Also keep in mind that, should an earthquake occur, effects of the types of potential hazards shown in the table will not happen in isolation. Strong shaking can trigger both landsliding and liquefaction. Some soil types that are susceptible to liquefaction (such as land fill and sedimentary soils) can actually amplify an earthquake's shock waves, making the local shaking even stronger.

Table 2—Identifying Earthquake Effects That May Damage Your Home

Effect	*Information Useful in Identifying Effect*	*Map Creator*	*Local Access to Maps*
Strong shaking	National zone maps; state fault and earthquake-shaking-potential maps	ICBO	See page 16, figure 8 for actual map
Fault rupture	Alquist-Priolo Earthquake Fault Zone maps	CDMG	Local planning department
Landslide	Seismic Hazard Zone maps*	CDMG	Local planning department
Liquefaction	Seismic Hazard Zone maps*	CDMG	

ICBO—International Conference of Building Officials
CDMG—California Division of Mines and Geology
* When available (first maps were released in late spring, 1997; others will be released as finished)
For updated information and the latest WWW links, visit the Seismic Safety Commission Web site at www.seismic.ca.gov

What to Do Before, During, and After an Earthquake

Use the following information to reduce risks to yourself, your family, and your home. These lists are only highlights of the actions you should take; refer to the organizations and publications in "Resource Organizations" and "References," pages 22–25, for more details.

Gather Emergency Supplies

Be sure you have these basic supplies on hand:

1. Fire extinguisher.
2. Adequate supplies of medications that you or family members are taking.
3. Crescent and pipe wrenches to turn off gas and water supplies.
4. First-aid kit and handbook.
5. Flashlights with extra bulbs and batteries.
6. Portable radio with extra batteries.
7. Water for each family member for at least three days (allow at least one gallon per person per day) and purification tablets or chlorine bleach to purify drinking water from other sources.
8. Canned and packaged foods, enough for several days, and a mechanical can opener. Don't forget extra pet food.
9. Camp stove or barbecue to cook on outdoors. (Store fuel out of the reach of children.)
10. Waterproof, heavy-duty plastic bags for waste disposal.

Plan Ahead

1. Make sure each member of your family knows what to do no matter where they are when earthquakes occur.
   - Establish a meeting place where you can all reunite afterward.
   - Find out about the earthquake plan developed by your children's school or day care.
   - Remember that since transportation may be disrupted, you may have to stay at your workplace for a day or two following a major earthquake. Keep some emergency supplies—food, liquids, and comfortable shoes, for example—at work.
2. Know where your gas, electric, and water main shutoffs are and how to turn them off if there is a leak or electrical short; if in doubt, ask your utility companies. Make sure that all the older members of your family can shut off the utilities.

Plan Ahead (continued)

3. Locate your nearest fire and police stations and emergency medical facility. Remember that you probably won't be able to telephone for help after an earthquake.
4. Talk to your neighbors—how could they help you, or you help them, after an earthquake?
5. Take a Red Cross first aid and cardiopulmonary resuscitation (CPR) training course.

What To Do During an Earthquake

1. If you are indoors—stay there! Get under a desk or table and hang on to it, or move into a hallway or get against an inside wall. Stay clear of windows, fireplaces, and heavy furniture or appliances. Get out of the kitchen, which is a dangerous place in earthquakes since it's full of things that can fall on you. Don't run downstairs or rush outside while the building is shaking or while there is danger of falling and hurting yourself or being hit by falling glass or debris.
2. If you are outside—get into the open, away from buildings, power lines, chimneys, and anything else that might fall on you.
3. If you are driving—stop, but carefully. Move your car as far out of traffic as possible. Do not stop on or under a bridge or overpass or under trees, light posts, power lines, or signs. Stay inside your car until the shaking stops. When you resume driving, watch for breaks in the pavement, fallen rocks, and bumps in the road at bridge approaches.
4. If you are in a mountainous area—watch out for falling rock, landslides, trees, and other debris that could be loosened by quakes.

Do Not . . .

- **Do not** eat or drink anything from open containers near shattered glass.
- **Do not** turn the gas on again if you turned it off; let the gas company do it.
- **Do not** use matches, lighters, camp stoves or barbecues, electrical equipment—including telephones—or appliances until you are sure there are no gas leaks. They may create sparks that could ignite leaking gas and cause an explosion and fire.
- **Do not** use your telephone, except for a medical or fire emergency. You could tie up lines needed for emergency response. If the phone doesn't work, send someone for help.
- **Do not** expect firefighters, police, or paramedics to help you. They may not be available.

What To Do After an Earthquake

Wear sturdy shoes to avoid injury from broken glass and debris. Expect aftershocks.

1. **Check for injuries:**
   - If a person is bleeding, put direct pressure on the wound. Use clean gauze or cloth, if available.
   - If a person is not breathing, administer rescue breathing. The front pages of many telephone books contain instructions on how to do it along with detailed instructions on other first-aid measures.
   - Do not attempt to move seriously injured persons unless they are in immediate danger of further injury.
   - Cover injured persons with blankets to keep them warm.
   - Seek medical help for serious injuries.

2. **Check for hazards:**
   - *Fire or fire hazards.* Put out fires in your home or neighborhood immediately. Call for help, but don't wait for the fire department.
   - *Gas leaks.* Shut off the main gas valve only if you suspect a leak because of broken pipes or the odor of natural gas. Don't turn it back on yourself—wait for the gas company to check for leaks.
   - *Damaged electrical wiring.* Shut off power at the control box if there is any damage to your house wiring.
   - *Downed or damaged utility lines.* Do not touch downed power lines or any objects in contact with them.
   - *Spills.* Clean up any spilled medicines, drugs, or other potentially harmful materials such as bleach, lye, and gasoline or other petroleum products.
   - *Downed or damaged chimneys.* Approach chimneys with caution. They may be weakened and could topple during aftershocks. Don't use a fireplace with a damaged chimney—it could start a fire or let poisonous gases into your house.
   - *Fallen items.* Beware of items tumbling off shelves when you open the doors of closets and cupboards.

3. **Check your food and water supplies:**
   - If power is off, plan meals to use up foods that will spoil quickly, or frozen foods. If you keep the door closed, food in your freezer should be good for at least a couple of days.
   - Don't light your kitchen stove if you suspect a gas leak.
   - Use barbecues or camp stoves, outdoors only, for emergency cooking.
   - If your water is off, you can drink supplies from water heaters, melted ice cubes, or canned vegetables. Try to avoid drinking water from swimming pools or, especially, spas—it may have too many chemicals in it to be safe.

Resource Organizations

Some of the organizations listed below have information to help you strengthen your home against earthquakes and help you and your family prepare a personal earthquake response plan. Other resources that can help you may be available in your community; check your local telephone directory.

Home Safety Information

Office of Emergency Services
Information and Public Affairs
2800 Meadowview Road
Sacramento, CA 95832
Telephone: [916] 262-1843
[916] 262-1841 (Voice/TDD)

Earthquake Programs of the Office of Emergency Services

Coastal Region
1300 Clay Street, Suite 400
Oakland, CA 94612
Telephone: [510] 286-0895

Inland Region Northern Office
2395 N. Bechellie Lane
Redding, CA 96002
Telephone: [916] 224-4835

Inland Region Southern Office
2550 Mariposa Mall, Room 13-181
Fresno, CA 93721
Telephone: [209] 445-5672

Southern Region Main Office
11200 Lexington Drive
Los Alamitos CA 90720
Telephone: [562] 795-2900

Southern Region San Diego Office
1350 Front Street, Suite 2041
San Diego, CA 92101
Telephone: [619] 525-4287

Southern Region Santa Barbara Office
117 West Micheltorena, Suite D
Santa Barbara, CA 93101
Telephone: [805] 568-1207

Structural Safety Information

American Institute of Architects
Local chapters have referral lists of architects; consult telephone directory listing for "American Institute of Architects."

American Society of Home Inspectors
Telephone: [800] 821-6046

Referral list of inspectors.

Building Education Center
812 Page Street
Berkeley, CA 94710
Telephone: [510] 525-7610

California Real Estate Inspection Association
4370 La Jolla Village Dr., Suite 400
San Diego, CA 92122
Telephone: [800] 848-7342 (information)
Telephone: [800] 388-8443 (referrals)

Call for pamphlet describing house inspection services offered by members and referrals to qualified members.

Consulting Engineers and Land Surveyors of California
Telephone: [916] 441-7991

A referral list for engineers is available.

Los Angeles Basin Chapter, International Council of Building Officials
900 South Fremont Avenue
Alhambra, CA 91803
Telephone: [818] 458-3187

Sources for Geologic Information

Association of Bay Area Governments
P.O. Box 2050
Oakland, CA 94604
Telephone: [510] 464-7900
http://www.abag.ca.gov

A consortium of local governments in the San Francisco Bay Area, offering a variety of information, including lists of local resources.

California Academy of Sciences
Golden Gate Park
San Francisco, CA 94118
Telephone: [415] 750-7145

The academy offers earthquake-related displays and lectures.

Division of Mines and Geology
California Department of Conservation
801 K Street
Sacramento, CA 95814
Telephone: [916] 445-5716
http://www.consrv.ca.gov/dmg/

The division is the state agency responsible for geological research, mapping, and policy. It provides maps and other information to the general public.

Southern California Earthquake Center
University of Southern California
Telephone: [213] 740-1560
http://www/scec.org

United States Geological Survey
Earth Science Information Center
345 Middlefield Road
Menlo Park, CA 94025
Telephone: [415] 329-4390

This is the federal agency responsible for geological research, mapping, and policy. It provides maps and other information to the general public.

Cities and Counties

Consult your telephone directory under city or county government listings for the office of emergency services or disaster management.

- City or county building and planning department
- City or county government geologist

Sources for Emergency Planning Information

American Red Cross
Consult your telephone directory for the address and phone number of your local chapter.

Federal Emergency Management Agency
Region IX
Presidio of San Francisco
Building 105
San Francisco, CA 94129
Telephone: [415] 923-7175

This agency offers publication lists and referrals to preparedness organizations.

References

Many of the publications in the list that follows—or similar publications—are in your local library's collection or are available through interlibrary loan. Many libraries now lend how-to videos on earthquake safety subjects. Publications without price information can be ordered from bookstores. Neither the State of California nor the Seismic Safety Commission endorses or guarantees the results of any of the procedures described in these publications.

Home Strengthening

Earthquake Hazards and Wood Frame Houses. Center for Environmental Design. 46 pages. (Center for Environmental Design, 390 Wurster Hall, University of California, Berkeley, CA 94720, [510] 642-2896, #CEDR-02-82, $6.50 including postage and handling.)

Earthquake: Home Safe Home. Building Education Center. This 28-minute video program uses animation, computer graphics, onsite demonstrations, and a bus ride to explain how earthquakes can damage your house and what you can do to strengthen it. (Building Education Center, 812 Page Street, Berkeley, CA 94710, [510] 525-7610, $19.95 plus tax, postage, and handling.)

Helfant, David Benaroya. *Earthquake Safe: A Hazard Reduction Manual for Homes.* Seismic retrofitting and technical information is provided in this manual. Fifty-six pages. (Builders Booksource, 1817 Fourth Street, Berkeley, CA 94710, [510] 845-6874, $5.95 plus $3.49 for tax and handling.)

The Home Builder's Guide for Earthquake Design, ATC-4-1. Applied Technology Council. This book offers technical information aimed at engineers and architects. Sixty-three pages. (Applied Technology Council, 555 Twin Dolphin Drive, Suite 550, Redwood City, CA 94065, [415] 595-1542, $17.50 plus tax and postage.)

Introduction to Earthquake Retrofitting. Building Education Center. This is a step-by-step guide to the tools and techniques needed to complete the primary retrofitting projects. 80 pages, illustrated with 60 photos. (Building Education Center, 812 Page Street, Berkeley, CA 94710, [510] 525-7610, $9.95 plus tax, postage, and handling.)

Kimball, Virginia. *Earthquake Ready.* Roundtable, 1988. Advice on preparations for home, office, and school as well as on special care for infants, the elderly, and pets is provided in this book. (Roundtable Publishing, Inc., Santa Monica, CA, $13.95.)

Strengthening Wood Frame Houses for Earthquake Safety. California Office of Emergency Services, Earthquake Progress, Coastal Region. This book covers 15 ways to make houses safer. Thirty-two pages, 16 photos and line drawings. (Association of Bay Area Governments, P.O. Box 2050, Oakland, CA 94604, P90004BAR, $6 plus tax)

Surviving the Big One: How to Prepare for a Major Earthquake. Los Angeles PBS Station KCET. One-hour videotape. Video stores may carry it in their how-to sections. ($19.95 plus tax and $5 for handling; call [800] 343-4727.)

Yanev, Peter. *Peace of Mind in Earthquake Country.* This basic nontechnical reference on earthquake hazards describes geologic, architectural, and structural hazards and recommends techniques to avoid or correct them. 1990, 200 pages. (Chronicle Books, 85 Second Street, San Francisco, CA 94105, [415] 777-7240, $14.95 plus tax, postage, and handling.)

Geologic Hazards

Bolt, Bruce A. *Earthquakes.* The writer describes the origins, impacts, and aftermath of some devastating earthquakes and what has been learned from them to predict earthquakes more accurately, build structures that resist earthquakes better, and plan more effective emergency responses. 272 pages, New York: W. H. Freeman & Co.,1991.

Davis, James, and others. *Fault-Rupture Hazard Zones in California.* California Department of Conservation, Division of Mines and Geology Special Publication 42, 1988 (revised). This publication includes maps pre-

pared in compliance with the Alquist-Priolo Special Studies Zones Act of 1972. An index to special studies zone maps is provided. 24 pages. (California Division of Mines and Geology, Department of Conservation, P.O. Box 2980, Sacramento, CA 95812-2980, [916] 445-5716, $1 including tax, postage, and handling.)

Iacopi, R. *Earthquake Country.* (Menlo Park, Calif.: Lane Publishing Co., 1978, 6th edition.)

Living on the Fault: A Field Guide to the Visible Evidence of the Hayward Fault. Bay Area Regional Earthquake Preparedness Project, 1988, 16 pages. (Available from the Association of Bay Area Governments, P.O. Box 2050, Oakland, CA 94604, [510] 464-7900, P88004BAR, $5 including postage and handling, plus tax.)

Living on The Fault II: A Field Guide to the Visible Evidence of the San Andreas Fault. Bay Area Regional Earthquake Preparedness Project. 1990, 16 pages. (Association of Bay Area Governments, P.O. Box 2050, Oakland, CA 94604, P90003BAR, $5 plus tax.)

Sharp, R. *Field Guide: Geology of Southern California.* (Dubuque, Iowa Kendall/Hunt Publishing Co., 1994, 3rd edition.)

Emergency Planning at Home

Calhoun, Fryar. *Earthquake Survival Guide: Emergency Planning for Family, Home, Workplace, and School.* 1990, 24 pages. (Magnet Press, P.O. Box 3580, Berkeley, CA 94703, [510] 540-0800, $3.15 including tax, postage, and handling. Call for quantity orders.)

Gere, James M., and Haresh C. Shah. *Terra Non Firma: Understanding and Preparing for Earthquakes.* New York: W. H. Freeman, 1984.

Lafferty, Libby. *Earthquake Preparation for Office, Home, Family, and Community.* (Lafferty and Associates, P.O. Box 1026, La Cañada, CA 91012, [818] 952-5483, $5 plus your local tax.)

Lafferty, Libby. *Earthquake Preparedness.* (La Cañada, Calif.: Lafferty & Associates, Inc., 1986.)

Leach, Joel. *Earthquake Prepared.* (Northridge, Calif.: Studio 4 Productions, 1993.)

Safety and Survival in an Earthquake. American Red Cross. 52 pages. (American Red Cross, 2700 Wilshire Blvd., Los Angeles, CA 90057, [213] 739-5289, $3 plus $1 postage and handling.)

Hiring a Home Inspector, Architect, Engineer, or Contractor

A Consumer's Guide to Engineering and Land Surveying Services. Board of Registration, Professional Engineers and Land Surveyors, 2535 Capitol Oaks Dr., Suite 300, Sacramento, CA 95833, [916] 263-2222, free.

Consumer's Guide to Hiring an Architect. California Board of Architectural Examiners, 400 R Street, Suite 4000, Sacramento, CA 95814-6238, [916] 445-3394, free.

What You Should Know Before You Hire a Contractor. Contractors' State License Board, P.O. Box 26000, Sacramento, CA 95826; [916] 255-3900, free.

For additional references check the Seismic Safety Commission Web site for related links at www.seismic.ca.gov

Earthquakes and Homes—What's the Law?

The following list is a quick summary of the major laws governing seismic safety for residences in California along with code sections for looking up details. Full wording of all California codes is available at the following internet address: http://library.ca.gov/gov/official.html#laws (Internet access is available at most local libraries).

Publishing this guide—The Seismic Safety Commission is required to develop, adopt, update, and publish *The Homeowner's Guide to Earthquake Safety* containing information on geologic and seismic hazards, explanations of structural and nonstructural earthquake hazards, and recommendations for mitigating these hazards (*Business and Professions Code,* Section 10149).

Delivering this guide—Sellers of homes built before 1960 must deliver to the buyer, "as soon as practicable before the transfer," a copy of *The Homeowner's Guide to Earthquake Safety* (this booklet) and disclose certain earthquake deficiencies (*Government Code,* Title 2, Division 1, Chapter 13.8). The seller's real estate agent is to provide the seller with a copy of the booklet to give to the buyer (*Government Code,* Section 8897.5).

Water heater bracing—All water heaters are required to be anchored or strapped to resist falling during an earthquake. A seller must certify to a prospective buyer that a home's water heater is braced (*Health and Safety Code,* Section 19211).

Disclosing weaknesses—Sellers of real property must disclose known defects and deficiencies in the property—including earthquake weaknesses and hazards—to prospective purchasers (*Civil Code,* Section 1102 et seq.).

Earthquake faults—The Alquist-Priolo Earthquake Fault Zoning Act prohibits building for human occupancy astride active faults. Sellers of existing residences must disclose to potential buyers that the property is located in a designated fault zone (*Public Resources Code,* Section 2621 et seq.).

Landslide and liquefaction—The Seismic Hazards Mapping Act requires the state to prepare maps of the zones in California most susceptible to landsliding and liquefaction hazards during earthquakes. Sellers must disclose to buyers whether the property is in such a zone after the map for that area has been issued officially (*Public Resources Code,* Section 2690 et seq.).

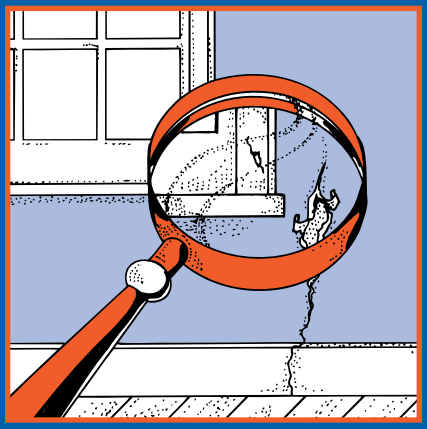
Tax exclusion—Until July of the year 2000, California law allows homeowners to strengthen their homes with approved seismic strengthening techniques and to be excluded from reappraisal requirements that usually raise the property value and the tax owed (*Revenue and Tax Code,* Section 74.5).

Simple Steps To Protect Your Family From Lead Hazards

If you think your home has high levels of lead:

- Get your young children tested for lead, even if they seem healthy.
- Wash children's hands, bottles, pacifiers, and toys often.
- Make sure children eat healthy, low-fat foods.
- Get your home checked for lead hazards.
- Regularly clean floors, window sills, and other surfaces.
- Wipe soil off shoes before entering house.
- Talk to your landlord about fixing surfaces with peeling or chipping paint.
- Take precautions to avoid exposure to lead dust when remodeling or renovating (call 1-800-424-LEAD for guidelines).
- Don't use a belt-sander, propane torch, high temperature heat gun, scraper, or sandpaper on painted surfaces that may contain lead.
- Don't try to remove lead-based paint yourself.

Recycled/Recyclable
Printed with vegetable oil based inks on recycled paper (minimum 50% postconsumer) process chlorine free.



Protect Your Family From Lead In Your Home

United States Environmental Protection Agency

United States Consumer Product Safety Commission

United States Department of Housing and Urban Development

Are You Planning To Buy, Rent, or Renovate a Home Built Before 1978?

Many houses and apartments built before 1978 have paint that contains high levels of lead (called lead-based paint). Lead from paint, chips, and dust can pose serious health hazards if not taken care of properly.

OWNERS, BUYERS, and RENTERS are encouraged to check for lead (see page 6) before renting, buying or renovating pre-1978 housing.

Federal law requires that individuals receive certain information before renting, buying, or renovating pre-1978 housing:

LANDLORDS have to disclose known information on lead-based paint and lead-based paint hazards before leases take effect. Leases must include a disclosure about lead-based paint.

SELLERS have to disclose known information on lead-based paint and lead-based paint hazards before selling a house. Sales contracts must include a disclosure about lead-based paint. Buyers have up to 10 days to check for lead.

RENOVATORS disturbing more than 2 square feet of painted surfaces have to give you this pamphlet before starting work.

IMPORTANT!

Lead From Paint, Dust, and Soil Can Be Dangerous If Not Managed Properly

FACT: Lead exposure can harm young children and babies even before they are born.

FACT: Even children who seem healthy can have high levels of lead in their bodies.

FACT: People can get lead in their bodies by breathing or swallowing lead dust, or by eating soil or paint chips containing lead.

FACT: People have many options for reducing lead hazards. In most cases, lead-based paint that is in good condition is not a hazard.

FACT: Removing lead-based paint improperly can increase the danger to your family.

If you think your home might have lead hazards, read this pamphlet to learn some simple steps to protect your family.

Lead Gets in the Body in Many Ways

Childhood lead poisoning remains a major environmental health problem in the U.S.

Even children who appear healthy can have dangerous levels of lead in their bodies.

People can get lead in their body if they:

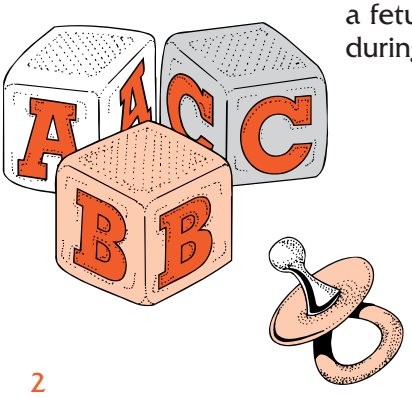
- Breathe in lead dust (especially during renovations that disturb painted surfaces).
- Put their hands or other objects covered with lead dust in their mouths.
- Eat paint chips or soil that contains lead.

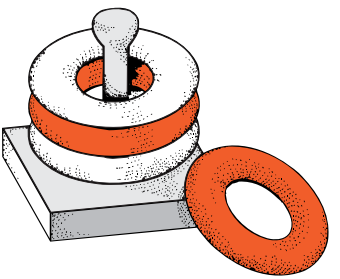
Lead is even more dangerous to children under the age of 6:

- At this age children's brains and nervous systems are more sensitive to the damaging effects of lead.
- Children's growing bodies absorb more lead.
- Babies and young children often put their hands and other objects in their mouths. These objects can have lead dust on them.

Lead is also dangerous to women of childbearing age:

- Women with a high lead level in their system prior to pregnancy would expose a fetus to lead through the placenta during fetal development.





Lead's Effects

It is important to know that even exposure to low levels of lead can severely harm children.

In children, lead can cause:

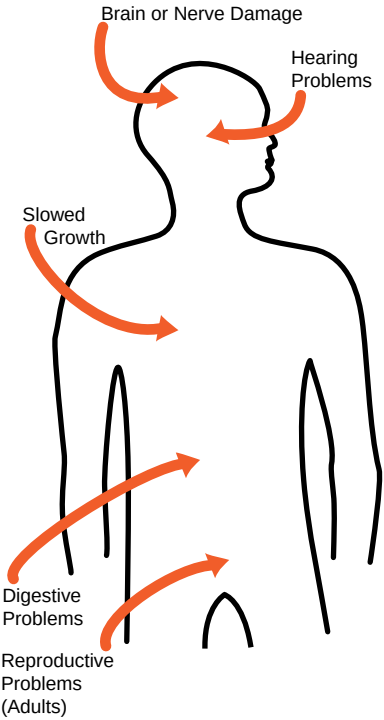
- Nervous system and kidney damage.
- Learning disabilities, attention deficit disorder, and decreased intelligence.
- Speech, language, and behavior problems.
- Poor muscle coordination.
- Decreased muscle and bone growth.
- Hearing damage.

While low-lead exposure is most common, exposure to high levels of lead can have devastating effects on children, including seizures, unconsciousness, and, in some cases, death.

Although children are especially susceptible to lead exposure, lead can be dangerous for adults too.

In adults, lead can cause:

- Increased chance of illness during pregnancy.
- Harm to a fetus, including brain damage or death.
- Fertility problems (in men and women).
- High blood pressure.
- Digestive problems.
- Nerve disorders.
- Memory and concentration problems.
- Muscle and joint pain.



Lead affects the body in many ways.

Where Lead-Based Paint Is Found

In general, the older your home, the more likely it has lead-based paint.

Many homes built before 1978 have lead-based paint. The federal government banned lead-based paint from housing in 1978. Some states stopped its use even earlier. Lead can be found:

- In homes in the city, country, or suburbs.
- In apartments, single-family homes, and both private and public housing.
- Inside and outside of the house.
- In soil around a home. (Soil can pick up lead from exterior paint or other sources such as past use of leaded gas in cars.)

Checking Your Family for Lead

Get your children and home tested if you think your home has high levels of lead.

To reduce your child's exposure to lead, get your child checked, have your home tested (especially if your home has paint in poor condition and was built before 1978), and fix any hazards you may have. Children's blood lead levels tend to increase rapidly from 6 to 12 months of age, and tend to peak at 18 to 24 months of age.

Consult your doctor for advice on testing your children. A simple blood test can detect high levels of lead. Blood tests are usually recommended for:

- Children at ages 1 and 2.
- Children or other family members who have been exposed to high levels of lead.
- Children who should be tested under your state or local health screening plan.

Your doctor can explain what the test results mean and if more testing will be needed.

Identifying Lead Hazards

Lead-based paint is usually not a hazard if it is in good condition, and it is not on an impact or friction surface, like a window. It is defined by the federal government as paint with lead levels greater than or equal to 1.0 milligram per square centimeter, or more than 0.5% by weight.

Deteriorating lead-based paint (peeling, chipping, chalking, cracking or damaged) is a hazard and needs immediate attention. It may also be a hazard when found on surfaces that children can chew or that get a lot of wear-and-tear, such as:

- Windows and window sills.
- Doors and door frames.
- Stairs, railings, banisters, and porches.

Lead from paint chips, which you can see, and lead dust, which you can't always see, can both be serious hazards.

Lead dust can form when lead-based paint is scraped, sanded, or heated. Dust also forms when painted surfaces bump or rub together. Lead chips and dust can get on surfaces and objects that people touch. Settled lead dust can re-enter the air when people vacuum, sweep, or walk through it. The following two federal standards have been set for lead hazards in dust:

- 40 micrograms per square foot ($\mu g/ft^2$) and higher for floors, including carpeted floors.
- 250 $\mu g/ft^2$ and higher for interior window sills.

Lead in soil can be a hazard when children play in bare soil or when people bring soil into the house on their shoes. The following two federal standards have been set for lead hazards in residential soil:

- 400 parts per million (ppm) and higher in play areas of bare soil.
- 1,200 ppm (average) and higher in bare soil in the remainder of the yard.

The only way to find out if paint, dust and soil lead hazards exist is to test for them. The next page describes the most common methods used.

Checking Your Home for Lead

Just knowing that a home has lead-based paint may not tell you if there is a hazard.

You can get your home tested for lead in several different ways:

- A paint **inspection** tells you whether your home has lead-based paint and where it is located. It won't tell you whether or not your home currently has lead hazards.
- A **risk assessment** tells you if your home currently has any lead hazards from lead in paint, dust, or soil. It also tells you what actions to take to address any hazards.
- A combination risk assessment and inspection tells you if your home has any lead hazards and if your home has any lead-based paint, and where the lead-based paint is located.

Hire a trained and certified testing professional who will use a range of reliable methods when testing your home.

- Visual inspection of paint condition and location.
- A portable x-ray fluorescence (XRF) machine.
- Lab tests of paint, dust, and soil samples.

There are state and federal programs in place to ensure that testing is done safely, reliably, and effectively. Contact your state or local agency (see bottom of page 11) for more information, or call **1-800-424-LEAD (5323)** for a list of contacts in your area.

Home test kits for lead are available, but may not always be accurate. Consumers should not rely on these kits before doing renovations or to assure safety.

What You Can Do Now To Protect Your Family

If you suspect that your house has lead hazards, you can take some immediate steps to reduce your family's risk:

- **If you rent, notify your landlord of peeling or chipping paint.**
- **Clean up paint chips immediately.**
- **Clean floors, window frames, window sills, and other surfaces weekly**. Use a mop or sponge with warm water and a general all-purpose cleaner or a cleaner made specifically for lead. REMEMBER: NEVER MIX AMMONIA AND BLEACH PRODUCTS TOGETHER SINCE THEY CAN FORM A DANGEROUS GAS.

- **Thoroughly rinse sponges and mop heads after cleaning dirty or dusty areas**.
- **Wash children's hands often, especially before they eat and before nap time and bed time.**
- **Keep play areas clean.** Wash bottles, pacifiers, toys, and stuffed animals regularly.
- **Keep children from chewing window sills or other painted surfaces.**
- **Clean or remove shoes before entering your home to avoid tracking in lead from soil.**
- **Make sure children eat nutritious, low-fat meals high in iron and calcium,** such as spinach and dairy products. Children with good diets absorb less lead.

Reducing Lead Hazards In The Home

Removing lead improperly can increase the hazard to your family by spreading even more lead dust around the house.

Always use a professional who is trained to remove lead hazards safely.

In addition to day-to-day cleaning and good nutrition:

- You can **temporarily** reduce lead hazards by taking actions such as repairing damaged painted surfaces and planting grass to cover soil with high lead levels. These actions (called "interim controls") are not permanent solutions and will need ongoing attention.
- To **permanently** remove lead hazards, you should hire a certified lead "abatement" contractor. Abatement (or permanent hazard elimination) methods include removing, sealing, or enclosing lead-based paint with special materials. Just painting over the hazard with regular paint is not permanent removal.

Always hire a person with special training for correcting lead problems—someone who knows how to do this work safely and has the proper equipment to clean up thoroughly. Certified contractors will employ qualified workers and follow strict safety rules as set by their state or by the federal government.

Once the work is completed, dust cleanup activities must be repeated until testing indicates that lead dust levels are below the following:

- 40 micrograms per square foot ($\mu g/ft^2$) for floors, including carpeted floors;
- 250 $\mu g/ft^2$ for interior windows sills; and
- 400 $\mu g/ft^2$ for window troughs.

Call your state or local agency (see bottom of page 11) for help in locating certified professionals in your area and to see if financial assistance is available.

Remodeling or Renovating a Home With Lead-Based Paint

Take precautions before your contractor or you begin remodeling or renovating anything that disturbs painted surfaces (such as scraping off paint or tearing out walls):

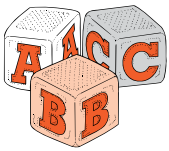
- **Have the area tested for lead-based paint.**
- **Do not use a belt-sander, propane torch, high temperature heat gun, dry scraper, or dry sandpaper** to remove lead-based paint. These actions create large amounts of lead dust and fumes. Lead dust can remain in your home long after the work is done.
- **Temporarily move your family** (especially children and pregnant women) out of the apartment or house until the work is done and the area is properly cleaned. If you can't move your family, at least completely seal off the work area.
- **Follow other safety measures to reduce lead hazards.** You can find out about other safety measures by calling 1-800-424-LEAD. Ask for the brochure "Reducing Lead Hazards When Remodeling Your Home." This brochure explains what to do before, during, and after renovations.

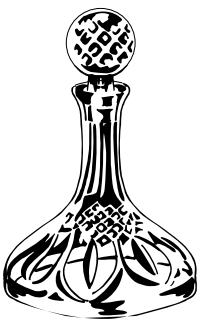
If you have already completed renovations or remodeling that could have released lead-based paint or dust, get your young children tested and follow the steps outlined on page 7 of this brochure.

If not conducted properly, certain types of renovations can release lead from paint and dust into the air.

Other Sources of Lead

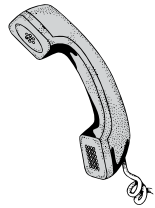
While paint, dust, and soil are the most common sources of lead, other lead sources also exist.





- **Drinking water.** Your home might have plumbing with lead or lead solder. Call your local health department or water supplier to find out about testing your water. You cannot see, smell, or taste lead, and boiling your water will not get rid of lead. If you think your plumbing might have lead in it:
  - Use only cold water for drinking and cooking.
  - Run water for 15 to 30 seconds before drinking it, especially if you have not used your water for a few hours.
- **The job.** If you work with lead, you could bring it home on your hands or clothes. Shower and change clothes before coming home. Launder your work clothes separately from the rest of your family's clothes.
- Old painted **toys** and **furniture.**
- Food and liquids stored in **lead crystal** or **lead-glazed pottery or porcelain.**
- **Lead smelters** or other industries that release lead into the air.
- **Hobbies** that use lead, such as making pottery or stained glass, or refinishing furniture.
- **Folk remedies** that contain lead, such as "greta" and "azarcon" used to treat an upset stomach.

For More Information



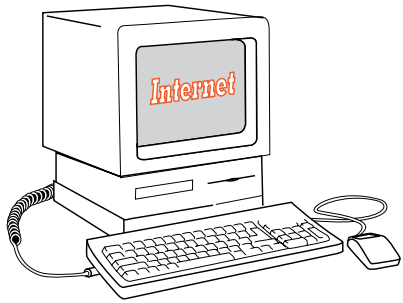
The National Lead Information Center

Call **1-800-424-LEAD (424-5323)** to learn how to protect children from lead poisoning and for other information on lead hazards. To access lead information via the web, visit **www.epa.gov/lead** and **www.hud.gov/offices/lead/.**

EPA's Safe Drinking Water Hotline

Call **1-800-426-4791** for information about lead in drinking water.

Consumer Product Safety Commission (CPSC) Hotline



To request information on lead in consumer products, or to report an unsafe consumer product or a product-related injury call **1-800-638-2772**, or visit CPSC's Web site at: **www.cpsc.gov.**

Health and Environmental Agencies

Some cities, states, and tribes have their own rules for lead-based paint activities. Check with your local agency to see which laws apply to you. Most agencies can also provide information on finding a lead abatement firm in your area, and on possible sources of financial aid for reducing lead hazards. Receive up-to-date address and phone information for your local contacts on the Internet at **www.epa.gov/lead** or contact the National Lead Information Center at **1-800-424-LEAD.**

For the hearing impaired, call the Federal Information Relay Service at **1-800-877-8339** to access any of the phone numbers in this brochure.

EPA Regional Offices

Your Regional EPA Office can provide further information regarding regulations and lead protection programs.

EPA Regional Offices

Region 1 (Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, Vermont)

Regional Lead Contact
U.S. EPA Region 1
Suite 1100 (CPT)
One Congress Street
Boston, MA 02114-2023
1 (888) 372-7341

Region 2 (New Jersey, New York, Puerto Rico, Virgin Islands)

Regional Lead Contact
U.S. EPA Region 2
2890 Woodbridge Avenue
Building 209, Mail Stop 225
Edison, NJ 08837-3679
(732) 321-6671

Region 3 (Delaware, Maryland, Pennsylvania, Virginia, Washington DC, West Virginia)

Regional Lead Contact
U.S. EPA Region 3 (3WC33)
1650 Arch Street
Philadelphia, PA 19103
(215) 814-5000

Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee)

Regional Lead Contact
U.S. EPA Region 4
61 Forsyth Street, SW
Atlanta, GA 30303
(404) 562-8998

Region 5 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)

Regional Lead Contact
U.S. EPA Region 5 (DT-8J)
77 West Jackson Boulevard
Chicago, IL 60604-3666
(312) 886-6003

Region 6 (Arkansas, Louisiana, New Mexico, Oklahoma, Texas)

Regional Lead Contact
U.S. EPA Region 6
1445 Ross Avenue, 12th Floor
Dallas, TX 75202-2733
(214) 665-7577

Region 7 (Iowa, Kansas, Missouri, Nebraska)

Regional Lead Contact
U.S. EPA Region 7
(ARTD-RALI)
901 N. 5th Street
Kansas City, KS 66101
(913) 551-7020

Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming)

Regional Lead Contact
U.S. EPA Region 8
999 18th Street, Suite 500
Denver, CO 80202-2466
(303) 312-6021

Region 9 (Arizona, California, Hawaii, Nevada)

Regional Lead Contact
U.S. Region 9
75 Hawthorne Street
San Francisco, CA 94105
(415) 947-4164

Region 10 (Alaska, Idaho, Oregon, Washington)

Regional Lead Contact
U.S. EPA Region 10
Toxics Section WCM-128
1200 Sixth Avenue
Seattle, WA 98101-1128
(206) 553-1985

CPSC Regional Offices

Your Regional CPSC Office can provide further information regarding regulations and consumer product safety.

Eastern Regional Center
Consumer Product Safety Commission
201 Varick Street, Room 903
New York, NY 10014
(212) 620-4120

Western Regional Center
Consumer Product Safety Commission
1301 Clay Street, Suite 610-N
Oakland, CA 94612
(510) 637-4050

Central Regional Center
Consumer Product Safety Commission
230 South Dearborn Street, Room 2944
Chicago, IL 60604
(312) 353-8260

HUD Lead Office

Please contact HUD's Office of Healthy Homes and Lead Hazard Control for information on lead regulations, outreach efforts, and lead hazard control and research grant programs.

U.S. Department of Housing and Urban Development
Office of Healthy Homes and Lead Hazard Control
451 Seventh Street, SW, P-3206
Washington, DC 20410
(202) 755-1785

U.S. EPA Washington DC 20460
U.S. CPSC Washington DC 20207
U.S. HUD Washington DC 20410

EPA747-K-99-001
June 2003

Renovate Right

Important Lead Hazard Information for Families, Child Care Providers and Schools

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

It's the Law!

Federal law requires that individuals receive certain information before renovating six square feet or more of painted surfaces in a room for interior projects or more than twenty square feet of painted surfaces for exterior projects in housing, child care facilities and schools built before 1978.

- Homeowners and tenants: renovators must give you this pamphlet before starting work.
- Child care facilities, including preschools and kindergarten classrooms, and the families of children under the age of six that attend those facilities: renovators must provide a copy of this pamphlet to child-care facilities and general renovation information to families whose children attend those facilities.

Also, beginning April 2010, federal law will require contractors that disturb lead-based paint in homes, child care facilities and schools, built before 1978 to be certified and follow specific work practices to prevent lead contamination. Therefore beginning in April 2010, ask to see your contractor's certification.

Renovating, Repairing, or Painting?

- Is your home, your building, or the child care facility or school your children attend, being renovated, repaired, or painted?
- Was your home, your building, or the child care facility or school your children under age 6 attend, built before 1978?

If the answer to these questions is YES, there are a few important things you need to know about lead-based paint.

This pamphlet provides basic facts about lead and information about lead safety when work is being done in your home, your building or the childcare facility or school your children attend.

The Facts About Lead

- Lead can affect children's brains and developing nervous systems, causing reduced IQ, learning disabilities, and behavioral problems. Lead is also harmful to adults.
- Lead in dust is the most common way people are exposed to lead. People can also get lead in their bodies from lead in soil or paint chips. Lead dust is often invisible.
- Lead-based paint was used in more than 38 million homes until it was banned for residential use in 1978.
- Projects that disturb lead-based paint can create dust and endanger you and your family. Don't let this happen to you. Follow the practices described in this pamphlet to protect you and your family.

Who Should Read This Pamphlet?

This pamphlet is for you if you:

- Reside in a home built before 1978,
- Own or operate a child care facility, including preschools and kindergarten classrooms, built before 1978, or
- Have a child under six who attends a child care facility built before 1978.

You will learn:

- Basic facts about lead and your health,
- How to choose a contractor, if you are a property owner,
- What tenants, and parents/guardians of a child in a child care facility or school should consider,
- How to prepare for the renovation or repair job,
- What to look for during the job and after the job is done,
- Where to get more information about lead.

This pamphlet is not for:

- **Abatement projects.** Abatement is a set of activities aimed specifically at eliminating lead or lead hazards. EPA has regulations for certification and training of abatement professionals. If your goal is to eliminate lead or lead hazards, contact the National Lead Information Center at **1-800-424-LEAD (5323)** for more information.
- **"Do-it-yourself" projects.** If you plan to do renovation work yourself, this document is a good start, but you will need more information to complete the work safely. Call the National Lead Information Center at **1-800-424-LEAD (5323)** and ask for more information on how to work safely in a home with lead-based paint.
- **Contractor education.** Contractors who want information about working safely with lead should contact the National Lead Information Center at **1-800-424-LEAD (5323)** for information about courses and resources on lead-safe work practices.

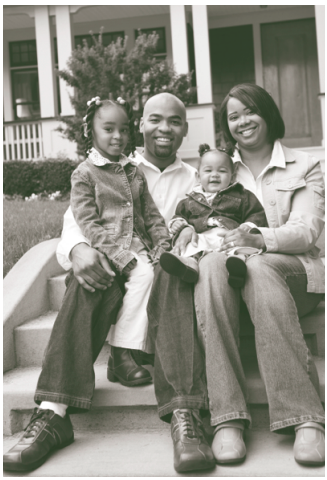
Lead and Your Health

Lead is especially dangerous to children under six years of age.

Lead can affect children's brains and developing nervous systems, causing:

- Reduced IQ and learning disabilities.
- Behavior problems.

Even children who appear healthy can have dangerous levels of lead in their bodies.



Lead is also harmful to adults. In adults, low levels of lead can pose many dangers, including:

- High blood pressure and hypertension.
- Pregnant women exposed to lead can transfer lead to their fetus.

Lead gets into the body when it is swallowed or inhaled.

- People, especially children, can swallow lead dust as they eat, play, and do other normal hand-to-mouth activities.
- People may also breathe in lead dust or fumes if they disturb lead-based paint. People who sand, scrape, burn, brush or blast or otherwise disturb lead-based paint risk unsafe exposure to lead.

What should I do if I am concerned about my family's exposure to lead?

- Call your local health department for advice on reducing and eliminating exposures to lead inside and outside your home, child care facility or school.
- Always use lead-safe work practices when renovation or repair will disturb lead-based paint.
- A blood test is the only way to find out if you or a family member already has lead poisoning. Call your doctor or local health department to arrange for a blood test.

For more information about the health effects of exposure to lead, visit the EPA lead website at www.epa.gov/lead/pubs/leadinfo.htm or call 1-800-424-LEAD (5323).

There are other things you can do to protect your family everyday.

- Regularly clean floors, window sills, and other surfaces.
- Wash children's hands, bottles, pacifiers, and toys often.
- Make sure children eat a healthy, nutritious diet consistent with the USDA's dietary guidelines, that helps protect children from the effects of lead.
- Wipe off shoes before entering house.

Where Does the Lead Come From?

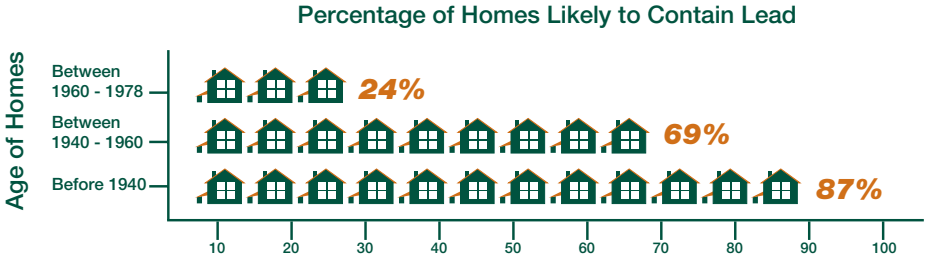
Dust is the main problem. The most common way to get lead in the body is from dust. Lead dust comes from deteriorating lead-based paint and lead-contaminated soil that gets tracked into your home. This dust may accumulate to unsafe levels. Then, normal hand to-mouth activities, like playing and eating (especially in young children), move that dust from surfaces like floors and windowsills into the body.

Home renovation creates dust. Common renovation activities like sanding, cutting, and demolition can create hazardous lead dust and chips.

Proper work practices protect you from the dust. The key to protecting yourself and your family during a renovation, repair or painting job is to use lead-safe work practices such as containing dust inside the work area, using dust-minimizing work methods, and conducting a careful cleanup, as described in this pamphlet.

Other sources of lead. Remember, lead can also come from outside soil, your water, or household items (such as lead-glazed pottery and lead crystal). Contact the National Lead Information Center at **1-800-424-LEAD (5323)** for more information on these sources.

Checking Your Home for Lead-Based Paint



Older homes, child care facilities, and schools are more likely to contain lead-based paint. Homes may be single-family homes or apartments. They may be private, government-assisted, or public housing. Schools are preschools and kindergarten classrooms. They may be urban, suburban, or rural.

You have the following options:

You may decide to assume your home, child care facility, or school contains lead. Especially in older homes and buildings, you may simply want to assume lead-based paint is present and follow the lead-safe work practices described in this brochure during the renovation, repair, or painting job.

You or your contractor may also test for lead using a lead test kit. Test kits must be EPA-approved and are available at hardware stores. They include detailed instructions for their use.

You can hire a certified professional to check for lead-based paint. These professionals are certified risk assessors or inspectors, and can determine if your home has lead or lead hazards.

- A certified inspector or risk assessor can conduct an inspection telling you whether your home, or a portion of your home, has lead-based paint and where it is located. This will tell you the areas in your home where lead-safe work practices are needed.
- A certified risk assessor can conduct a risk assessment telling you if your home currently has any lead hazards from lead in paint, dust, or soil. The risk assessor can also tell you what actions to take to address any hazards.
- For help finding a certified risk assessor or inspector, call the National Lead Information Center at **1-800-424-LEAD (5323).**

For Property Owners

You have the ultimate responsibility for the safety of your family, tenants, or children in your care. This means properly preparing for the renovation and keeping persons out of the work area (see p. 8). It also means ensuring the contractor uses lead-safe work practices.

Beginning April 2010, federal law will require that contractors performing renovation, repair and painting projects that disturb lead-based paint in homes, child care facilities, and schools built before 1978 to be certified and follow specific work practices to prevent lead contamination.

Until contractors are required to be certified, make sure your contractor can explain clearly the details of the job and how the contractor will minimize lead hazards during the work.

- Ask if the contractor is trained to perform lead-safe work practices and to see a copy of their training certificate.
- Ask them what lead-safe methods they will use to set up and perform the job in your home, child care facility or school.
- Ask if the contractor is aware of the lead renovation rules. For example, contractors are required to provide you with a copy of this pamphlet before beginning work. A sample pre-renovation disclosure form is provided at the back of this pamphlet. Contractors may use this form to make documentation of compliance easier.
- Ask for references from at least three recent jobs involving homes built before 1978, and speak to each personally.

Always make sure the contract is clear about how the work will be set up, performed, and cleaned.

- Share the results of any previous lead tests with the contractor.
- Even before contractors are required to be certified you should specify in the contract that they follow the work practices described on pages 9 and 10 of this brochure.
- The contract should specify which parts of your home are part of the work area and specify which lead-safe work practices should be used in those areas. Remember, your contractor should confine dust and debris to the work area and should minimize spreading that dust to other areas of the home.
- The contract should also specify that the contractor clean the work area, verify that it was cleaned adequately, and re-clean it if necessary.

Once these practices are required, if you think a worker is failing to do what they are supposed to do or is doing something that is unsafe, you should:

- Direct the contractor to comply with the contract requirements,
- Call your local health or building department, or
- Call EPA's hotline **1-800-424-LEAD (5323).**

For Tenants, and Families of Children Under Age Six in Child Care Facilities and Schools

You play an important role ensuring the ultimate safety of your family.

This means properly preparing for the renovation and staying out of the work area (see p. 8).

Beginning April 2010, federal law will require that contractors performing renovation, repair and painting projects that disturb lead-based paint in homes, child care facilities and schools built before 1978 that a child under age six visits regularly to be certified and follow specific work practices to prevent lead contamination.

The law will require anyone hired to renovate, repair, or do painting preparation work on a property built before 1978 to follow the steps described on pages 9 and 10 unless the area where the work will be done contains no lead-based paint.

Once these practices are required, if you think a worker is failing to do what they are supposed to do or is doing something that is unsafe, you should:

- Contact your landlord,
- Call your local health or building department, or
- Call EPA's hotline **1-800-424-LEAD (5323).**

If you are concerned about lead hazards left behind after the job is over, you can check the work yourself (see page 10).

If your property receives housing assistance from HUD (or a state or local agency that uses HUD funds), you must follow the more stringent requirements of HUD's Lead-safe Housing Rule and the ones described in this pamphlet.

Preparing for a Renovation

The work areas should not be accessible to occupants while the work occurs. The rooms or areas where work is being done may be blocked off or sealed with plastic sheeting to contain any dust that is generated. The contained area will not be available to you until the work in that room or area is complete, cleaned thoroughly, and the containment has been removed. You will not have access to some areas and should plan accordingly.

You may need:

- Alternative bedroom, bathroom, and kitchen arrangements if work is occurring in those areas of your home.
- A safe place for pets because they, too, can be poisoned by lead and can track lead dust into other areas of the home.
- A separate pathway for the contractor from the work area to the outside, in order to bring materials in and out of the home. Ideally, it should not be through the same entrance that your family uses.
- A place to store your furniture. All furniture and belongings may have to be moved from the work area while the work is done. Items that can't be moved, such as cabinets, should be wrapped in heavy duty plastic.
- To turn off forced-air heating and air conditioning systems while work is done. This prevents dust from spreading through vents from the work area to the rest of your home. Consider how this may affect your living arrangements.

You may even want to move out of your home temporarily while all or parts of the work are being done.

Child care facilities and schools may want to consider alternative accommodations for children and access to necessary facilities.

During the Work

Beginning April 2010, federal law will require contractors that are hired to perform renovation, repair and painting projects in homes, child care facilities, and schools built before 1978 that disturb lead-based paint to be certified and follow specific work practices to prevent lead contamination.

Even before contractors are required to be certified and follow specific work practices, the contractor should follow these three simple procedures, described below:

1. **Contain the work area.** The area should be contained so that dust and debris do not escape from that area. Warning signs should be put up and heavy-duty plastic and tape should be used as appropriate to:
   - Cover the floors and any furniture that cannot be moved.
   - Seal off doors and heating and cooling system vents.

   These will help prevent dust or debris from getting outside the work area.

2. **Minimize dust.** There is no way to eliminate dust, but some methods make less dust than others. For example, using water to mist areas before sanding or scraping; scoring paint before separating components; and prying and pulling apart components instead of breaking them are techniques that generate less dust than alternatives. Some methods generate large amounts of lead-contaminated dust and should not be used. They are:
   - Open flame burning or torching.
   - Sanding, grinding, planing, needle gunning, or blasting with power tools and equipment not equipped with a shroud and HEPA vacuum attachment.
   - Using a heat gun at temperatures greater than 1100°F.

3. **Clean up thoroughly.** The work area should be cleaned up daily to keep it as clean as possible. When all the work is done, the area should be cleaned up using special cleaning methods before taking down any plastic that isolates the work area from the rest of the home. The special cleaning methods should include:
   - Using a HEPA vacuum to clean up dust and debris on all surfaces, followed by
   - Wet mopping with plenty of rinse water.

When the final cleaning is done, look around. There should be no dust, paint chips, or debris in the work area. If you see any dust, paint chips, or debris, the area should be re-cleaned.

For Property Owners: After the Work is Done

When all the work is finished, you will want to know if your home, child care facility, or school has been cleaned up properly. Here are some ways to check.

Even before contractors are required to be certified and follow specific work practices, you should:

Ask about your contractor's final cleanup check. Remember, lead dust is often invisible to the naked eye. It may still be present even if you cannot see it. The contractor should use disposable cleaning cloths to wipe the floor of the work area and compare them to a cleaning verification card to determine if the work area was adequately cleaned.

To order a cleaning verification card and detailed instructions visit the EPA lead website at **www.epa.gov/lead** or contact the National Lead Information Center at **1-800-424-LEAD (5323)** or visit their website at **www.epa.gov/lead/nlic.htm.**

You also may choose to have a lead-dust test. Lead-dust tests are wipe samples sent to a laboratory for analysis.

- You can specify in your contract that a lead-dust test will be done. In this case, make it clear who will do the testing.
- Testing should be done by a lead professional.

If you choose to do the testing, some EPA-recognized lead laboratories will send you a kit that allows you to collect samples and send them back to the lab for analysis.

Contact the National Lead Information Center at **1-800-424-LEAD (5323)** for lists of qualified professionals and EPA-recognized lead labs.

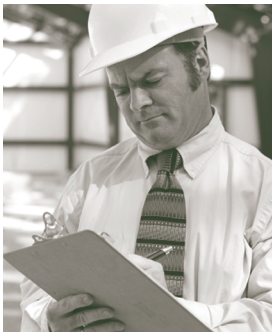
If your home, child care facility, or school fails the dust test, the area should be re-cleaned and tested again.

Where the project is done by contract, it is a good idea to specify in the contract that the contractor is responsible for re-cleaning if the home, child care facility, or school fails the test.

For Additional Information

You may need additional information on how to protect yourself and your children while a job is going on in your home, your building, or childcare facility.

- The **National Lead Information Center** at **1-800-424-LEAD (5323)** or **www.epa.gov/lead/nlic.htm** can tell you how to contact your state, local, and/or tribal programs or get general information about lead poisoning prevention.
  - State and tribal lead poisoning prevention or environmental protection programs can provide information about lead regulations and potential sources of financial aid for reducing lead hazards. If your State or local government has requirements more stringent than those described in this pamphlet, you must follow those requirements.
  - Local building code officials can tell you the regulations that apply to the renovation work that you are planning.
  - State, county, and local health departments can provide information about local programs, including assistance for lead-poisoned children and advice on ways to get your home checked for lead.



- The **National Lead Information Center** can also provide a variety of resource materials, including the following guides to lead-safe work practices. Many of these materials are also available at **www.epa.gov/lead/pubs/brochure.htm.**
  - Lead Paint Safety, a Field Guide for Painting, Home Maintenance, and Renovation Work
  - Protect Your Family from Lead in Your Home
  - Lead in Your Home: A Parent's Reference Guide

For the hearing impaired, call the Federal Information Relay Service at 1-800-877-8339 to access any of the phone numbers in this brochure.

EPA Contacts

EPA Regional Offices

EPA addresses residential lead hazards through several different regulations. EPA requires training and certification for conducting abatement, education about hazards associated with renovations, disclosure about known lead paint and lead hazards in housing, and sets lead-paint hazard standards.

Your Regional EPA Office can provide further information regarding lead safety and lead protection programs at **www.epa.gov/lead.**

Region 1
(Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, Vermont)
Regional Lead Contact
U.S. EPA Region 1
Suite 1100
One Congress Street
Boston, MA 02114-2023
(888) 372-7341

Region 2
(New Jersey, New York, Puerto Rico, Virgin Islands)
Regional Lead Contact
U.S. EPA Region 2
2890 Woodbridge Avenue
Building 205, Mail Stop 225
Edison, NJ 08837-3679
(732) 321-6771

Region 3
(Delaware, Maryland, Pennsylvania, Virginia, Washington, DC, West Virginia)
Regional Lead Contact
U.S. EPA Region 3
1650 Arch Street
Philadelphia, PA 19103-2029
(215) 814-5000

Region 4
(Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee)
Regional Lead Contact
U.S. EPA Region 4
61 Forsyth Street, SW
Atlanta, GA 30303-8960
(404) 562-9900

Region 5
(Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)
Regional Lead Contact
U.S. EPA Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3507
(312) 886-6003

Region 6
(Arkansas, Louisiana, New Mexico, Oklahoma, Texas)
Regional Lead Contact
U.S. EPA Region 6
1445 Ross Avenue,
12th Floor
Dallas, TX 75202-2733
(214) 665-6444

Region 7
(Iowa, Kansas, Missouri, Nebraska)
Regional Lead Contact
U.S. EPA Region 7
901 N. 5th Street
Kansas City, KS 66101
(913) 551-7003

Region 8
(Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming)
Regional Lead Contact
U.S. EPA Region 8
1595 Wynkoop Street
Denver, CO 80202
(303) 312-6312

Region 9
(Arizona, California, Hawaii, Nevada)
Regional Lead Contact
U.S. Region 9
75 Hawthorne Street
San Francisco, CA 94105
(415) 947-8021

Region 10
(Alaska, Idaho, Oregon, Washington)
Regional Lead Contact
U.S. EPA Region 10
1200 Sixth Avenue
Seattle, WA 98101-1128
(206) 553-1200

Other Federal Agencies

CPSC

The Consumer Product Safety Commission (CPSC) protects the public from the unreasonable risk of injury or death from 15,000 types of consumer products under the agency's jurisdiction. CPSC warns the public and private sectors to reduce exposure to lead and increase consumer awareness. Contact CPSC for further information regarding regulations and consumer product safety.

CPSC
4330 East West Highway
Bethesda, MD 20814
Hotline 1-(800) 638-2772
www.cpsc.gov

CDC Childhood Lead Poisoning Prevention Branch

The Centers for Disease Control and Prevention (CDC) assists state and local childhood lead poisoning prevention programs to provide a scientific basis for policy decisions, and to ensure that health issues are addressed in decisions about housing and the environment. Contact CDC Childhood Lead Poisoning Prevention Program for additional materials and links on the topic of lead.

CDC Childhood Lead Poisoning Prevention Branch
4770 Buford Highway, MS F-40
Atlanta, GA 30341
(770) 488-3300
www.cdc.gov/nceh/lead

HUD Office of Healthy Homes and Lead Hazard Control

The Department of Housing and Urban Development (HUD) provides funds to state and local governments to develop cost-effective ways to reduce lead-based paint hazards in America's privately-owned low-income housing. In addition, the office enforces the rule on disclosure of known lead paint and lead hazards in housing, and HUD's lead safety regulations in HUD-assisted housing, provides public outreach and technical assistance, and conducts technical studies to help protect children and their families from health and safety hazards in the home. Contact the HUD Office of Healthy Homes and Lead Hazard Control for information on lead regulations, outreach efforts, and lead hazard control research and outreach grant programs.

U.S. Department of Housing and Urban Development
Office of Healthy Homes
and Lead Hazard Control
451 Seventh Street, SW, Room 8236
Washington, DC 20410-3000
HUD's Lead Regulations Hotline
(202) 402-7698
www.hud.gov/offices/lead/


UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

Current Sample Pre-Renovation Form

Effective until April 2010.

Confirmation of Receipt of Lead Pamphlet

❑ I have received a copy of the pamphlet, *Renovate Right: Important Lead Hazard Information for Families, Child Care Providers and Schools* informing me of the potential risk of the lead hazard exposure from renovation activity to be performed in my dwelling unit. I received this pamphlet before the work began.

Printed name of recipient

Date

Signature of recipient

Self-Certification Option (for tenant-occupied dwellings only) —
If the lead pamphlet was delivered but a tenant signature was not obtainable, you may check the appropriate box below.

❑ **Refusal to sign** — I certify that I have made a good faith effort to deliver the pamphlet, *Renovate Right: Important Lead Hazard Information for Families, Child Care Providers and Schools*, to the rental dwelling unit listed below at the date and time indicated and that the occupant refused to sign the confirmation of receipt. I further certify that I have left a copy of the pamphlet at the unit with the occupant.

❑ **Unavailable for signature** — I certify that I have made a good faith effort to deliver the pamphlet, *Renovate Right: Important Lead Hazard Information for Families, Child Care providers and Schools*, to the rental dwelling unit listed below and that the occupant was unavailable to sign the confirmation of receipt. I further certify that I have left a copy of the pamphlet at the unit by sliding it under the door.

Printed name of person certifying

Attempted delivery
date and time
lead pamphlet delivery

Signature of person certifying lead pamphlet delivery

Unit Address

Note Regarding Mailing Option — As an alternative to delivery in person, you may mail the lead pamphlet to the owner and/or tenant. Pamphlet must be mailed at least 7 days before renovation (Document with a certificate of mailing from the post office).


UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

Future Sample Pre-Renovation Form

This sample form may be used by renovation firms to document compliance with the Federal pre-renovation education and renovation, repair, and painting regulations.

Occupant Confirmation

Pamphlet Receipt

❑ I have received a copy of the lead hazard information pamphlet informing me of the potential risk of the lead hazard exposure from renovation activity to be performed in my dwelling unit. I received this pamphlet before the work began.

Owner-occupant Opt-out Acknowledgment

❑ (A) I confirm that I own and live in this property, that no child under the age of 6 resides here, that no pregnant woman resides here, and that this property is not a child-occupied facility.

Note: A child resides in the primary residence of his or her custodial parents, legal guardians, foster parents, or informal caretaker if the child lives and sleeps most of the time at the caretaker's residence.

Note: A child-occupied facility is a pre-1978 building visited regularly by the same child, under 6 years of age, on at least two different days within any week, for at least 3 hours each day, provided that the visits total at least 60 hours annually.

If Box A is checked, check either Box B or Box C, but not both.

❑ (B) I request that the renovation firm use the lead-safe work practices required by EPA's Renovation, Repair, and Painting Rule; or

❑ (C) I understand that the firm performing the renovation will not be required to use the lead-safe work practices required by EPA's Renovation, Repair, and Painting Rule.

Printed Name of Owner-occupant

Signature of Owner-occupant | Signature Date

Renovator's Self Certification Option (for tenant-occupied dwellings only)

***Instructions to Renovator*:** If the lead hazard information pamphlet was delivered but a tenant signature was not obtainable, you may check the appropriate box below.

❑ **Declined** – I certify that I have made a good faith effort to deliver the lead hazard information pamphlet to the rental dwelling unit listed below at the date and time indicated and that the occupant declined to sign the confirmation of receipt. I further certify that I have left a copy of the pamphlet at the unit with the occupant.

❑ **Unavailable for signature** – I certify that I have made a good faith effort to deliver the lead hazard information pamphlet to the rental dwelling unit listed below and that the occupant was unavailable to sign the confirmation of receipt. I further certify that I have left a copy of the pamphlet at the unit by sliding it under the door or by (fill in how pamphlet was left). _____

Printed Name of Person Certifying Delivery | Attempted Delivery Date

Signature of Person Certifying Lead Pamphlet Delivery

Unit Address

Note Regarding Mailing Option — As an alternative to delivery in person, you may mail the lead hazard information pamphlet to the owner and/or tenant. Pamphlet must be mailed at least seven days before renovation. Mailing must be documented by a certificate of mailing from the post office.

Note: This form is not effective until April 2010.

1-800-424-LEAD (5323)
www.epa.gov/lead

EPA-740-F-08-002
March 2008