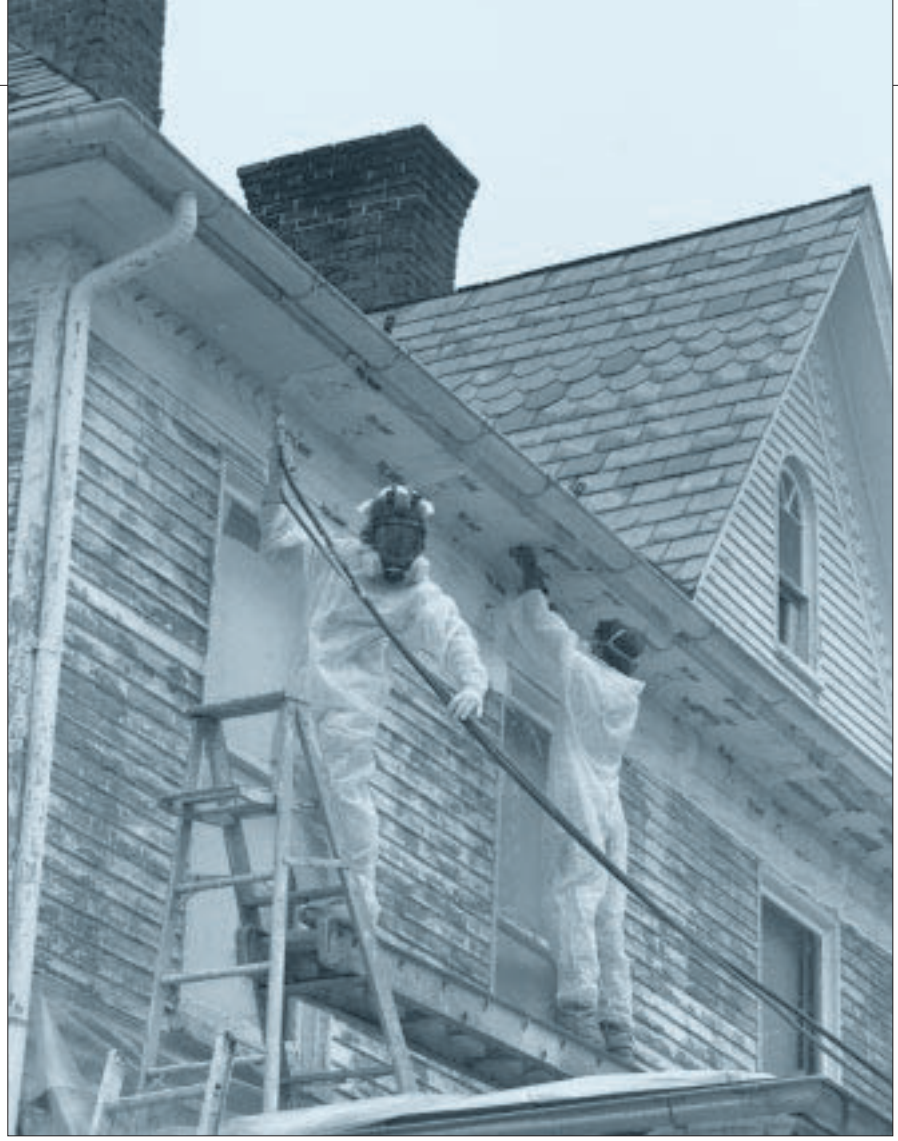

NEIL SANDLER/NIBS

Using a stripper with a paper cover, remodelers safely strip lead paint. The lead-laden residue adheres to the paper after the stripper has softened the paint.

Remodelers' Guide to Lead Paint

by Eileen Franko

Lead paint has garnered lots of media attention in recent years, and there are valid reasons for the concern. Not only can lead poison children, but it can also poison adults — namely, your crew and your clients. Common symptoms of lead poisoning include loss of appetite, stomach cramps, nausea, constipation, decreased sex drive, difficulty sleeping, moodiness, headache, joint and muscle aches, even anemia. Sound like the end of a rough day at work? If it's due to exposure to lead, a good night's sleep won't cure it.

How Big a Hazard?

Lead used to be added to paint to make the pigments brighter and more durable. By 1978, dangerous lead levels were banned from paints, furniture, and toys by the Consumer Product Safety Commission. (This ban specifies concentrations of .06% of lead by weight or higher, so paint, toys, and furniture aren't always completely lead free.) But because vendors were allowed to sell existing paint inventories, any work performed on houses built prior to 1980 has the potential for exposing workers to lead. In fact, 75% of the housing built before 1980 still contains some lead-based paint,

Take precautions to avoid exposing your crew and your clients to lead poisoning on the job

Contractors and the Law

Title X, Residential Lead-Based Paint Hazard Reduction Act of 1992, pertains to virtually every type of construction, including residential remodeling. Several government agencies — the Environmental Protection Agency (EPA), Housing and Urban Development (HUD), Health and Human Services (HHS), Occupational Safety and Health Administration (OSHA), and others — are responsible for gathering information and enforcing the provisions of Title X.

OSHA requirements. Section 1031 of Title X directs OSHA to issue safety standards to address lead hazards for construction. OSHA's rule, published in May 1993, sets requirements for contractors to assess exposures to lead, provide respiratory protection and protective work clothes, install work-site facilities for cleanup and clothes changing, provide safety training, and pay for periodic blood testing. For a copy of the OSHA standard, *Lead in Construction*, contact the Government Printing Office (202/219-4667) or your local OSHA office.

Occupant awareness. Title X also requires remodeling contractors to provide the owner and occupant with printed information about lead paint before starting work on any house or apartment built prior to 1978. The EPA, HUD, and HHS shared the responsibility for writing and distributing a pamphlet, which includes information about the health risks of exposure to lead, the risks of renovation, methods to evaluate and reduce lead-based paint hazards, and a discussion about the effectiveness of these methods. You can obtain a copy of this pamphlet and a copy of the proposed rule by contacting the National Lead Information Clearinghouse (800/424-5323).

Disclosure. One of the provisions of Title X includes mandatory disclosure in all real estate transactions. If you know about any lead hazard on the premises, you will be required to disclose this knowledge before selling, leasing, or renting the property. If you do not know, you must allow the buyer time to find out before closing the deal. While no requirements to correct a problem will be placed upon the property owner, this is a hotly contested law, pitting the real estate industry against lending institutions that handle mortgages. Therefore, it's not surprising that specific provisions have not yet been issued (the rule is supposed to go into effect this month). For more information on this rule, contact the National Lead Information Clearinghouse at the phone number printed above.

Before beginning work on a house or apartment built prior to 1978, a remodeler must provide the owner and occupants with printed information that addresses the lead paint hazard

Certification. Another seriously debated issue concerns contractor certification. Under Title X, the EPA will issue a federal certification program that will go into effect in 1997, except where a state has instituted its own program. Anyone *abating* lead from a building will have to be certified under the program; at this point, the EPA is still leaning towards exempting anyone *remodeling* buildings.

But there is mounting evidence that remodeling activities have a greater affect on child lead poisonings than was previously assumed. In New York state, for example, recent data has revealed that almost 10% of children with elevated blood lead levels were poisoned by some type of remodeling work. In some cases the work was performed by homeowners; in others, by professional contractors.

Such data underscores the fact that everyone must take precautions during any remodeling project to avoid contaminating the environment.

and the older a house is, the more likely it is to have lead: 80% of the housing built between 1940 and 1959 contains lead paint, and 90% of housing built before 1940 contains lead paint. Older homes are also more likely to have been remodeled, and to continue to need remodeling. This all adds up to a significant risk for remodeling contractors, their crews, and the homeowners.

The two major routes of exposure to lead are inhalation and ingestion. Exposure by inhalation can be caused by any activity that creates dust and fumes — scraping and sanding, for example, or using a heat gun to soften paint. Exposure to fumes can be caused by operations such as torch cutting, burning paint, even smoking.

Unlike children, who are often attracted to the sweet taste of lead paint, adults rarely ingest lead on purpose. Still, it is not uncommon for dust or chips to make their way into food, beverages, and cigarettes, or for workers to forget to wash their hands before eating, drinking, or smoking.

Abatement vs. Remodeling

To control lead hazards, the federal and state governments have instituted several regulations (see "Contractors and the Law," at left). But many remodelers think that lead paint regulations don't apply unless they're purposefully removing lead paint. Remodelers also assume that only "lead abatement" contractors need to be concerned about lead paint hazards.

It's true that abatement contractors are more aware of the need to protect themselves and the residents from exposure to lead. Abatement contractors are also willing and knowledgeable enough to take adequate measures to avoid creating a bigger hazard from their work. But what many renovation contractors and homeowners are less aware of is that *any* activity that disturbs painted surfaces in older homes can create hazardous conditions that might cause lead poisoning.

The work renovators and remodelers perform includes the same activities that lead abatement contractors perform: removing paint; removing and demolishing painted plaster, concrete, and wood surfaces; and covering over, encapsulating, or otherwise enclosing

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Figure 1. *Chemically stripping painted woodwork (left) is a safer alternative than sanding. If you must sand, wet the woodwork to keep dust levels down (right), then repaint with a high-quality oil/alkyd for maximum protection.*

painted materials. The only real difference between an abatement contractor and a remodeler is the purpose each one has for doing the work. Remodelers need to approach their work just as responsibly as abatement contractors do to prevent exposing those around them to lead hazards on site.

Plan Your Work

At the beginning of every remodeling job, it is imperative that you first find out if lead-based paint is present on site (see "Testing for Lead," next). If any lead-based paint is found, then you must take certain steps to protect your crew and your customers.

Keep in mind that the quickest way to spread a lead hazard is to disturb lead-painted surfaces by creating a lot of dust or fumes. Dust and fumes are much harder to contain than large pieces of painted material. When evaluating the scope of the work, consider the options you have to reduce dust and fumes. Rather than sanding down a piece of existing woodwork, for example, you might consider removing or replacing it.

Of course, a contractor doesn't always have absolute control over how a job will be done. If a homeowner has strong preferences or a constrained budget that you'll have to work around, explore alternatives. If the customer wants to keep the woodwork, consider chemical stripping on site (see "Sources of Supply"). Another alternative is to have the components dip-stripped off site. Yet another option is to wet scrape and sand (see Figure 1).

A fourth alternative is to remove the woodwork and scrape or sand it outside where there is more ventilation. When working outdoors, however, take precautions against contaminating the yard, especially if children play in or around the area. Lay down 6-mil poly to collect the dust and chips and to prevent them from spreading through the grass and into neighboring yards. When you pick up the plastic, make a concerted effort to contain the paint chips. Some dust will inevitably escape, either tracked away from the work area or blown into the air. But use common sense: Avoid working if there's a stiff breeze. And don't leave piles of paint chips in the grass, where they will draw kids' attention after you have left the job.

Similarly, if you are removing lead-based paint from the outside of a building by scraping, water blasting, or another method, it's important that you not let stray dust and particles contaminate the ground around the house and neighboring homes. Precautions include covering the ground, and shrouding scaffolding with plastic or tarps to contain the dust and overspray (Figure 2).

Engineering Controls

You may hear lead abatement professionals talk about "engineering controls." This is a fancy way of describing tools and equipment used to control dust and fumes. For example, if the homeowner insists on sanding, use a tool-mounted dust shroud connected to a high-efficiency particulate air (HEPA) vacuum to capture the dust. A HEPA vacuum filter will capture micron-sized particles that contain lead. (For a list of manufacturers offering HEPA vacuums and dust-free tools, send a letter-sized SASE to *JLC*, HEPA, RR 2, Box 146, Richmond, VT 05477.)

One of the most important steps in any renovation job is to seal off the work area to restrict entry and to prevent contamination throughout the entire house. During work operations, the work area should be off-limits to nonessential workers and to visitors, especially children and pregnant women. To segregate the area, use 6-mil poly taped on all edges.

Don't forget to seal hot-air registers, air conditioners, and baseboard convectors. After the work is complete and these hvac systems are put back in service, any lead-laden dust that settled in them could be spewed into the air, poisoning the homeowners and their children.

Before starting a job, remove furniture, carpeting, food, clothing, and toys from the area. If these items can't be removed, cover them with 6-mil poly to keep lead dust from settling on them. Cover floors with poly, taped continuously to the perimeter baseboards or walls. Then lay down hardboard or thin plywood to protect the poly and create a less slippery work surface. Taping the sheets together will prevent this surface from shifting over the poly as you work on it.

Also, provide additional ventilation, such as a window fan blowing outward,

Testing for Lead

Before making any decisions about the costs, scheduling, and scope of a remodeling job, a contractor must find out if there's any lead paint on site. There are three test methods available — X-ray fluorescence, laboratory analysis, and chemical spot tests.

XRF. A portable X-ray fluorescence (XRF) analyzer measures the amount of lead on a painted surface (in milligrams per square centimeter). These machines give instant results, so a large number of surfaces can be sampled in a short time. Also, XRF machines read through many layers of paint without marring or discoloring the surface.

Unfortunately, XRF can't tell you which layer of paint contains lead, and the machines often give inaccurate readings on samples that contain low levels of lead. Dense substrates such as concrete and metal may affect the accuracy of measurements as well. Also, the machine must be held against a flat surface — readings taken from curved, molded, or textured surfaces may be too high or too low, depending on the material and the shape of the surface.

The author uses an XRF machine to test the paint on a door for lead paint. XRF gives instant results and will read through all layers of paint without marring the surface.

Finally, XRF is expensive. The machines themselves cost from $4,000 to $40,000, and because they contain a radioactive source, they require a license to operate. The cost to hire someone to test the house for you is a few hundred dollars, depending on where you live.

AAS. Laboratory analysis — technically known as Atomic Absorption Spectrophotometry (AAS) — is widely regarded as the most accurate test method for lead. AAS results are given as a percentage of lead by weight, and are very precise (anything at 0.5% or higher is considered a hazard).

The accuracy of AAS depends on how well the sample is taken. For a testable sample, you need about a teaspoonful of flakes, or several large chips, from one area. The object is to get all the layers of paint in each chip but none of the underlying substrate. This requires a steady hand with a sharp chisel or utility knife. Put the flakes in a resealable plastic bag labeled with the location of the sample surface (for example, "upper bedroom, north windowsill"), and your name, address, and phone number.

It's important to take a sample from each surface that will be disturbed in the course of work. In the case of a gut remodel, for instance, you would need to take a sample from the floor, baseboards, wall, windowsills, casing, crown molding, and ceiling of each affected room. And don't assume the paint is the same in every room — different-colored paints may have different quantities of lead in them.

Test labs (call the Public Health Department or consult the Yellow Pages under "Laboratories — Testing") typically charge between $30 and $45 per sample. The turnaround time is two to four weeks. If you want faster results, you'll have to pay more. A 48-hour turnaround usually costs double the standard fee; 24-hour turnaround may be four times the original fee.

Spot testing. A third type of test for lead uses chemical test kits, which are available from local paint or hardware stores. These typically include a swab or dropper that allows you to apply a chemical reagent that reacts to lead and changes color if the paint contains approximately 0.5% or more lead by weight. One of two reagents is used — rhodizonate turns pink, sodium sulfide turns gray or black.

This test swab contains rhodizonate, a chemical that reacts with lead and turns pink if the paint contains around 0.5% or more lead by weight.

Chemical spot tests give instant results, but the reagent only reacts with lead on the surface. So it's important to cut, scrape, or sand the paint to expose all layers.

Spot tests are inexpensive — 50¢ to $5 per test — and the kits have a long shelf life, so you can keep them on hand to use as needed.

Combine tests. You can use chemical test swabs to scope out a job. But if the results show up positive for lead, send the samples to a lab to get accurate, quantitative AAS results before deciding on the level of precaution you should take. Make sure to double check any negative spot-test results to be sure there are no dangerous levels of lead.

If you have room in the budget and need to take many samples over a wide area, or if you are especially concerned about not marring surfaces, use XRF. But if the surfaces you are testing are uneven, or the substrate is questionable, follow the XRF with AAS analysis to accurately nail down the extent of the hazard and the exact layer of paint where the lead is found.

— Eileen Franko and Kevin Sheehan

to depressurize the work area. This will help keep dust from getting blown through the plastic barriers into other parts of the house. The idea here is to get air moving out of the work area; you're not trying to suck up clouds of dust and push them outside.

Figure 2. *When sanding or water blasting a house exterior, shroud the scaffolding with plastic or tarps to contain dust and overspray.*

Clean Up Daily

Give the work area a good cleaning at the end of each day to assure that no dust or paint chips are left behind. Perform another thorough cleaning at the end of the job.

To clean up properly, use a lead-specific cleaning product (Figure 3) and a HEPA vacuum (a vacuum that does not have a HEPA filter may actually put lead dust into the air through the exhaust port). Lead-specific cleaners contain phosphates or EDTA (ethylenediaminetetraacetic acid), both of which bind with lead, so they clean up the hazard better than other cleaners. If the label doesn't list EDTA or phosphates, consult the Material Safety Data Sheet (MSDS), which lists the active contents. (Manufacturers are required to provide an MSDS, and OSHA requires contractors to keep an MSDS for all materials used on site.) TSP (trisodium phosphate) is a widely available cleaner, although it is banned in some states. Many automatic dishwasher detergents also contain phosphates, and can be used if no other cleaning products with phosphates or EDTA are available.

Disposal. All debris should be disposed of properly at the end of a job. Most states have specific guidelines for disposing of lead-laden debris; check with the public health department. Don't just take the lead hazard from inside the job and move it to the outside of the building. If lead-coated materials or dust and debris are left on the curb for pickup, there is nothing to stop children playing in and around the area from becoming poisoned. All lead-covered components — such as painted trim, flooring, and old plaster and lath — should be wrapped in 6-mil poly to keep them from contaminating the area.

Respirators

In addition to working responsibly to protect clients and their neighborhood, you need to take measures to protect yourself and your crew. Again, substituting a less hazardous method or using engineering controls should be the first alternatives you consider. But workers who are continually exposed to the hazard inside the work area need additional protection.

A respirator is the most important personal protective device a worker can wear — but it must be the right respirator. If a worker wears the wrong type of respirator or one that does not fit properly, it is actually worse than not wearing one at all because workers may take unnecessary chances, thinking they are well protected.

HEPA filters. The minimum level of respiratory protection is a half- or full-face HEPA-filtered respirator. As levels of dust and fumes increase, other protective measures, such as air-purifying or continuous-flow respirators, may be needed. Regardless of the manufacturer, you can always recognize HEPA filters by the bright pink cartridges or the bright pink label.

Proper sizing. Before passing out respirators, make sure your workers are examined by a physician to assure that they are capable of wearing a respirator safely. Also insist on buying respirators that are sized to fit each worker. During a recent visit to a neighborhood hardware and paint store, I noticed that all the respirators were a medium size. When questioned, the store owner told me he stocked only medium respirators so they would fit everyone — the old "one size fits all" theory. Each respirator was also packaged in a plastic container, which prospective customers were not allowed to open, so it was impossible to tell if the respirator fit. It's worth buying from a reputable safety supply outlet. Most have demonstrator models you can use to check the fit before you buy.

Fit check. Every time a worker puts on a respirator, he or she must also perform a "fit check." A fit check involves covering the exhalation valve and breathing out, then covering the cartridges and breathing in. In both cases, no air should leak in or out from any part of the respirator.

Also remember that if the respirator is taken off for lunch or break and left lying around, there is a good chance lead dust will settle inside the mask. When the worker puts it back on and breathes in, he or she may inhale dust from inside the respirator. Respirators should be stored in plastic bags, cleaned regularly (use nonalcohol cleaning wipes available

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Figure 3. *Job-site cleanup includes washing down walls and woodwork with a phosphate solution, such as TSP, or a detergent containing EDTA.*

from safety supply houses), and checked for broken or damaged parts.

Habits Count

Next time you have a morning cup of coffee with your crew on site, notice how the plastic lids are neatly folded back to allow dust and chips in the coffee. This is one of the most common ways workers accidentally ingest lead dust and chips. The same holds true for food that is stored or eaten in the work area. Anything that falls onto the food or is on the worker's hands can end up being ingested. Cigarettes can easily become contaminated with lead dust, either from a worker's hands or when stored filter up in a worker's chest pocket.

The best methods to prevent these exposures from ingestion and inhalation is to not eat, drink, smoke, or store any of these items in the work area. Keep them in the truck, preferably in a covered lunch box or cooler. And always wash your hands prior to eating, drinking, or smoking.

Work clothing. Improper handling or laundering of work clothing can expose you and your family to high levels of lead. Change your clothing and shoes before you head home from work, especially if you have young children. Any lead dust on clothes and shoes can come off as you walk in the house. A child crawling on the floor may get this dust on her hands, then put them into her mouth, ingesting the lead.

Launder all work clothing contaminated with lead separately from the rest of the family's laundry. Never shake the clothing prior to washing; this will only create a cloud of dust. You might consider disposable clothing, such as a Tyvek suit, for working on site. If you do use these, be sure to replace them anytime they rip or start to fall apart.

Clean truck policy. It's also important not to take any of the lead home with you in your work vehicle. If you have a dedicated work vehicle, do not give your children rides in this vehicle or let them play in it or with any of your tools. If you do not have a dedicated work vehicle, make sure you change your clothes and shoes prior to getting into your vehicle. At a minimum, wash your hands and face and never let your children play with any of your work equipment.

Employee Blood Tests

Any worker who is exposed to lead should have periodic blood tests to assure that engineering controls and personal protective equipment used on the job are sufficient to keep their exposure to lead at acceptable levels.

OSHA's *Lead in Construction* standard requires blood tests every two months for the first six months of a job involving lead, then every six months thereafter until the end of the job. Based on the varied exposures remodeling contractors and their crews face, it's important to get blood tests as frequently as possible. Use the OSHA requirements as a minimum so that elevated blood lead levels do not go undetected. ■

A former OSHA inspector, Eileen M. Franko, M.S., is a research scientist and industrial hygienist at the New York State Department of Health's Center for Environmental Health in Albany, N.Y.

Sources of Supply

Test Kits

Accu-Test
P.O Box 143
East Weymouth, MA 02189
617/337-5546

Know Lead
2711 Burch Dr.
Charlotte, NC 28269
800/448-5323

LeadCheck Swabs
P.O. Box 1210
Framingham, MA 01701
800/262-5323

The Lead Detective
2143 Commonwealth Ave.
Newton, MA 02166
617/965-5653

Lead Zone
P.O. Box 290480
Davie, FL 33329
800/448-0535

Chemical Strippers

Dumond Chemicals Inc.
1501 Broadway
New York, NY 10036
212/869-6350

Dynacraft Industries
P.O. Box 6175
Freehold, NJ 07728
908/303-8920

Fiberlock Technologies Inc.
630 Putnam Ave.
Cambridge, MA 02139
800/342-3755

Nutec East
511 W. 54th St.
New York, NY 10019
800/274-7650