Lead-Paint Safety, at Home and on the Job

Whether you're remodeling an older home or just living in one, the paint must be treated with respect—especially if young children are involved

BY TOM O'BRIEN

Contain the lead and no one gets hurt. *Disposable plastic drop cloths, duct tape and a pump sprayer ensure that a simple repainting job doesn't contaminate the neighborhood with lead-paint debris.*

"A paint chip the size of your fingernail can contain enough lead to poison a child."

I heard those words two years ago at a lead-paint seminar in Boston, and—even though I've always known that undisturbed lead paint does not pose a threat to children—they freaked me out so much I went home and had my 2-year-old son's blood tested for lead. Fortunately, he was fine, but I haven't looked at the paint in our Victorian the same way since.

From the early 19th century through the 1940s, almost all the premium house paints sold in this country were heavily leaded—so much so that the lead content of some cured paints is as much as 65%. Although the product was not banned by the federal government until 1978, many paint manufacturers began to phase out their use of lead as early as 1950. What this means is that a house built prior to 1978 may or may not have lead-based paint, while a house that was built before 1950 probably is loaded with the stuff.

It's not the chips—it's the dust that makes children sick

The statement that a tiny chip of lead paint can poison a child is technically correct, but misleading. If a child were to swallow that chip, most of it would pass through his or her system without being absorbed. If that chip were ground up into dust, however, say, by a belt sander, and then swallowed, that child could be in serious trouble. "Dust is the principal pathway for the ingestion of lead," says Roy Petre of the Massachusetts Department of Public Health. "The finer the particle, the more readily it's ingested and absorbed across the gastrointestinal wall."

Lead poisoning can affect all ages, but young children are most at risk. According to Eileen Quinn, deputy director of the Alliance to End Childhood Lead Poisoning, "Lead is an extremely dangerous neurological toxin that is most harmful to children under the age of 6 because it interferes with their intellectual development at a time when their brains are developing at warp speed. Anything that interferes with that process affects them for the rest of their lives." The most likely victims of lead poisoning are infants and toddlers simply because they crawl around on the floor and put everything they touch in their mouths.

Having fully developed brains and higher standards of personal hygiene, adults are less susceptible, but not immune, to the harmful effects of lead. The human body is able to flush traces of lead out of the system, but unprotected exposures to airborne lead dust—or worse, the fumes released when a torch is used to remove lead paint—can result in dangerous levels of lead being absorbed into the bloodstream. High lead levels in adults can lead to health problems as diverse as high blood

WHERE YOU'RE LIKELY TO FIND LEAD PAINT

As a rule of thumb, if the house was built before 1950, you can expect to find lead-based paint on the following surfaces:

- ☐ **All the exterior painted surfaces.**
- ☐ **All the interior woodwork.**
- ☐ **Glossy wall surfaces in kitchens and baths. (Lead-based enamel paints were designed to be "scrubbable.")**
- ☐ **Interior closet walls. (Long-lasting lead-based paint enabled these walls to be painted once and forgotten.)**

In general, plaster walls and ceilings in bedrooms, living rooms and dining rooms were not painted with lead-based paint—but you never know what materials a well-meaning homeowner might have used during a do-it-yourself repainting job. *—T. O'B.*

Photo this page: Cece O'Brien

Dust-wipe test tells you if you've got a lead hazard. *Swabbing a designated area on the floor and sending the sample to a testing lab will tell you if the lead paint in your house poses a risk to your children's health.*

INSPECTION AND RISK ASSESSMENT ARE TWO DIFFERENT THINGS

A certified lead-paint inspector can tell you what surfaces in your home are covered with lead-based paint (top photo, facing page), but he or she won't necessarily tell you whether that paint is a hazard to your children. Because the biggest risk to young children is lead dust on the floor, the best way to assess that particular risk is to test the floor. Fortunately, that's easy to do.

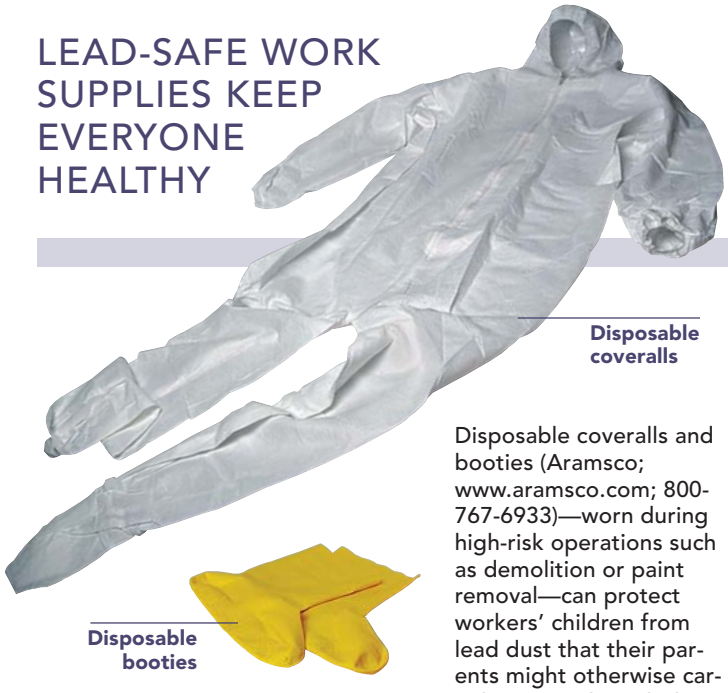
Choose a location where you suspect the paint might have been disturbed (by renovation or by, say, friction at a frequently operated window). Mark a 1-sq. ft. area on the floor (photo above). Swab the entire area from top to bottom using a lanolin-free baby wipe (with a minimum of overlap). Then fold the wipe (dirty side in) and repeat the process. When this is done, drop the wipe into a clean plastic bag and knife to avoid a false-negative result (the top layer of paint is almost never lead-based). If you're willing to spend a few hundred dollars, a certified lead-paint inspector will test all the painted surfaces in your house (photo top left, facing page) and provide you with a written report that documents where the lead paint is, and in what concentrations. This report can be valuable information if you're planning a remodeling project, but it won't necessarily tell you where the health risks are. Most likely, what you'll find out from a lead inspection is that you've got a whole lot of lead in your house.

pressure, fatigue, anemia, headaches, mood changes, memory lapses, digestive disorders, kidney damage and reproductive problems (to locate sources for more information on the health effects of lead exposure, see sidebar, p. 73).

Simple testing can tell you if you've got a lead problem

The only way to know for sure what surfaces are covered with lead paint is to have the paint tested. You can get a home test kit at a hardware store, but you'll have to cut into each painted surface with a

LEAD-SAFE WORK SUPPLIES KEEP EVERYONE HEALTHY



Disposable coveralls and booties (Aramsco; www.aramsco.com; 800-767-6933)—worn during high-risk operations such as demolition or paint removal—can protect workers' children from lead dust that their parents might otherwise carry home on their clothes.

WORKER PROTECTION

Workers who are often exposed to lead dust must wear a properly maintained half-face respirator equipped with HEPA (purple) filter cartridges. Workers who occasionally encounter lead dust can use an N100 disposable respirator (3M Co.; 800-243-4630).

ONLINE CONNECTION

For a video demonstration on how to fit and maintain a respirator, visit our Web site at www.finehomebuilding.com.

X-ray test tells you where the lead is. *The black pointed lines on the view screen of this X-ray device indicate that the plaster walls in this closet are covered with lead-based paint.*

mail it to an accredited testing laboratory (for a list of testing labs, contact the National Lead Information Center; 800-424-5323; www.epa.gov/lead/nlic.htm). If you're willing to spend $20, one of those labs offers a ready-to-use lead-sampling kit that includes supplies for two dust-wipe tests, complete directions and postage-paid mailers (Hometest Inc.; 800-604-1995; www.hometest.com). *—T.O'B.*

Whether you have the paint tested, it's important to remember that lead dust is the problem, not lead paint. Unless there is a child in the house who chews on the woodwork, intact paint surfaces are not a health hazard. Rather than testing for lead paint, Dennis Livingston, a carpenter from Baltimore and the author of *Maintaining a Lead-Safe Home* (sidebar p. 73), recommends testing for lead dust: "For $4.50, you can swab a section of the floor with a type of baby wipe, put it in a baggie, send it off to a lab, and 24 hours later, they'll tell you whether there's any lead dust that you need to worry about." (See sidebar on the facing page for instructions on how to perform a dust-wipe test.)

Proper maintenance keeps lead under control

When I found out how hazardous the lead paint in my house could be to my son, my first reaction was "Get it out of there." Although there are many ways to remove lead paint, none of them is easy, and most of them, if not done correctly, can endanger workers and the house's occupants. (To read about a new paint-removal tool, see "Tools & Materials," p. 114.) Until there's a fast, foolproof paint-removal system, the best way to control most lead-painted surfaces is to make sure the paint stays stuck.

"The presence of lead paint only constitutes a risk when there's been poor maintenance," says Livingston. "If you maintain your house and keep it clean, you don't have a problem." The most important thing you can do to maintain lead-painted surfaces is to prevent moisture problems such as leaks, poor drainage and excess interior humidity, which cause premature paint failure.

No matter how well you maintain exterior painted surfaces, bare soil around the foundation often has a high lead content due to decades of chalking and peeling. To protect children who might play in the yard, plant grass or cover the soil with mulch.

The other important maintenance concerns are friction surfaces where paint can be ground into dust during daily use. Examples of these problem areas include:

- Doors that bind.
- Surfaces that are bumped, such as baseboards and corner boards.
- Lead-painted floors or stair treads.
- Double-hung windows. (If the jambs or the edges of the sash are painted with lead paint, raising and lowering the sash can release lead dust.)

Cleaning up lead dust takes care

If you have toddlers in the house, you can hire a lead-abatement contractor to make friction surfaces safe. Depending on the state you live in, you also can perform low-risk deleading operations yourself. How-

REMOVAL AND CLEANUP TOOLS

Wetting surfaces that need scraping or sanding helps to prevent lead dust from being released. Placing a pump sprayer in a backpack makes sure that the sprayer is always within reach.

Lead dust is so fine that it can pass through the filter of a standard vacuum cleaner. The best way to ensure that none of the dust is blown back into the room is to use a high-filtration vacuum, such as one that's equipped with a HEPA filter (Mastercraft; 800-835-7812; www.mastercraftusa.com).

"Generate the least amount of dust in the smallest space for the shortest time."

Two layers of plastic contain serious lead dust. *Put down two layers of 6-mil poly at the beginning of a big job; use the top layer to envelop and remove the mess after demolition and the second layer to protect finished surfaces until the job is over.*

Working wet prevents lead dust from forming. *A low-tech alternative to containing lead dust is to mist painted surfaces with a spray bottle and to remove paint using sharp scrapers or wet-sanding sponges.*

Dirty deeds done off-site. *Taking removable items such as doors and window sashes to an off-site workshop—or a specially designated on-site "dust room"—makes it possible to perform high-risk lead removal without contaminating the entire job site.*

ever, even friction surfaces cannot pose a threat to children as long as lead-based paint chips and dust are regularly and carefully cleaned up.

Because it's heavy, lead dust doesn't travel far. Most of the dust released by a troublesome double-hung window, for example, settles on the sill or nearby on the floor. The trick is to clean up this small collection of dust without spreading it around. Despite their weight, lead-dust particles are small enough to pass through the filters of a conventional vacuum cleaner. To avoid contaminating an entire room, you should use a vacuum cleaner that's rated for HEPA filtration or do a thorough wet cleaning (sidebar facing page).

Remodeling and repainting are where the dangers lie

Most health experts agree that people who keep their older houses clean and well-maintained are not putting children in danger—unless they're remodeling. The amount of lead dust that might be released by a few sticky windows pales in comparison with what can be liberated by an ignorant kitchen remodeler with a sledgehammer, an oblivious painter with a belt sander or even a naive do-it-yourselfer with a hand scraper.

Since 1999, federal law has required contractors who will be disturbing more than 2 sq. ft. of lead-based paint to provide their clients with a government pamphlet titled *Protect Your Family From Lead in Your Home* (sidebar p. 73). This law was intended to foster a dialogue between homeowners and contractors to encourage lead-safe work practices. Unfortunately, the word hasn't gotten out because very few contractors are distributing these pamphlets (despite being subject to a $25,000 fine if they don't comply with the law).

One exception is Duffy Hoffman, a painting contractor from Pipersville, Pennsylvania. For more than ten years—since a routine blood test revealed that one of his workers had an elevated lead level—Hoffman has followed strict lead-safe work practices to protect his workers as well as his clients. Beyond the humanitarian benefits of such a policy, Hoffman has found that working lead-safe has given him a distinct business advantage: "After I get finished educating a prospective client on the dangers of lead-based paint, that client is not simply going to turn around and take the low bid."

6-mil plastic and duct tape are the keys to containing lead dust

Whether you're a remodeler, a painting contractor or a do-it-yourselfer, you must have a plan for controlling lead dust before you start working, no matter how small the job. "Generate the least amount of dust in the smallest space for the shortest time" is the mantra that is followed by John Leeke, a restoration specialist from Portland, Maine. One option for controlling lead dust is to use power tools that have well-designed dust-collection systems (photo p. 72). Leeke tries to prevent the generation of lead dust by working wet: misting down painted surfaces with a spray bottle of water before any scraping, sanding or disassembling (center photo, facing page). When he's working in an occupied home, Leeke envelops even a small job, such as removing a window sash, in a temporary plastic tent.

For larger remodeling jobs, especially when demolition is required, lead-safe contractors totally isolate the work environment from the living space. The basic procedure involves shutting down the heating system (if possible) and sealing floor registers with plastic sheeting and duct tape. Next, the floor is covered with two layers of 6-mil plastic—the top layer is wrapped up and discarded after all the demolition work is done—and each layer is secured to the baseboards with duct tape (top photo, facing page).

Before demolition begins, all the doorways that are between the work area and the occupied portions of the house are sealed off; they remain sealed for the duration of the job. If there is not a separate entrance to the work area, workers go in and out through a window, no matter how high that window might be. "For access to upper-floor jobs, we typically put up staging, with a set of stairs built into it, that will stay up for the duration of the job," says Michael Touzjian, production manager for F. H. Perry Builder, a Boston-area remodeling firm. For a recent job on historic Beacon Hill, Touzjian's staging ran from the sidewalk all the way to the fourth floor.

Workers need more than paper masks when lead dust starts flying

The basic piece of safety equipment for workers who are exposed to lead dust is a properly fitted half-face respirator equipped with purple HEPA filters (photo bottom right, p. 68). Tradespeople who spend large amounts of time exposed to lead dust must be trained properly in how to fit-test and maintain a respirator.

Do-it-yourselfers and other workers who confront lead dust only occasionally cannot depend on a cheap paper mask, but they do have an alternative to a full-fledged respirator. An N100 series disposable respirator (3M Co.; 800-243-4630), which costs about $8, looks and feels like a basic paper dust mask (photo bottom right, p. 68), but it meets the same filtration standards as a half-face respirator with HEPA filters.

To protect themselves from ingesting lead dust, workers should wash their hands thoroughly before eating, drinking or smoking. To ensure that their own children are not exposed to lead dust, they should change out of their work clothes before they leave the job site and wash them separately from other clothes. An even better strategy is to in-

CLEANING UP LEAD DUST

The standard wet-cleaning method practiced by abatement professionals, lead-safe remodelers and savvy homeowners is a three-container cleanup: The first container is a spray bottle filled with household detergent; the second is an empty (squeeze-out) bucket; the third is a rinse bucket filled with clean, hot water. It's a good practice to follow at the end of a remodel as well as during regular cleaning.

1 Spray some detergent on a small area and scrub vigorously with a rag or a mop.

2 Squeeze out the rag into the empty bucket.

3 Dip the rag into the rinse bucket and squeeze out again.

EXTERIOR LEAD PAINT ALSO MUST BE CONTAINED

You might expect the lead paint that's on the outside of a house to present less of a health threat than what's on the inside. On a windy day, however, one well-meaning painter armed with a belt sander can contaminate the entire neighborhood—as well as the interior of the house if a window is left open. Before beginning an exterior repainting job, or any other renovation work that involves disturbing lead paint, it's important to have a strategy for containing as much of the dust as possible.

Short of tenting the whole house, physical containment is not a viable option for exterior work. Fortunately, most of the indoor lead-control strategies work just as well outdoors. If all the paint has to come off, most lead-safe painting contractors use paint-removal tools that feature well-designed dust-collection systems (see "Removing Exterior Paint," *FHB* #148, pp. 78-83). Although these tools may contain 95% of the dust, they won't get it all, so personal protection equipment is mandatory. To recover the lead that gets away, 6-mil plastic (or disposable drop cloths) should be taped to the foundation and spread out to a distance of at least 10 ft. from the house (photo above).

For a typical repainting job, most of the contractors I interviewed use hand scrapers to remove loose paint, but they try to work wet as much as possible, using backpack-mounted pump sprayers (photo bottom left, p. 69) to mist down a small surface area before they start scraping. After they're finished scraping, the workers feather the edges of the intact paint using a vacuum-attached random-orbit sander (photo above).

Pressure washing is not recommended for lead-paint surfaces because it throws paint chips all over the place and creates a huge amount of contaminated water. Most of the contractors I interviewed use a sponge and a bucket to scrub wall surfaces prior to painting.

—T. O'B.

Capture lead dust at the source. *When you must use power tools that generate lead dust, choose tools that have well-designed dust-containment systems, such as this vacuum-attached random-orbit sander (Festool USA; 888-337-8600; www.festool-usa.com).*

vest in a box of disposable coveralls and shoe covers (photos bottom left, p. 68) and throw out the used ones at the end of each day.

Do all the dirty work first

Once a renovation job is isolated and the workers are protected, the best policy for everyone involved is to get the hazardous parts of the job done as quickly as possible. "Do all your dirty work first," advises Livingston. "Then you clean the place immaculately, and you can put the respirators and the suits behind you."

Getting all the dirty work taken care of at the start of a job takes planning and coordination among the trades. Livingston's painters know they have to visit the job twice, once for the prep and again for the painting. To make sure they get all their demolition work done up front, Livingston cautions all his subs: "Every time you punch a hole you haven't told me about beforehand, it's going to cost you $40 for me to have a carpenter put up plastic and clean up after you."

During the dirty-work stage, Leeke removes items that need repair—lead-painted windows or doors, for example—and relocates them to a separate "dust room," where he can perform repairs without contaminating the job site (bottom photo, p. 70). The dust room is set up, isolated and then cleaned exactly the same way as the job site is handled.

Test for lead before the plastic comes down

The most important part of a remodeling project that disturbs lead paint is making sure all the dust is cleaned up—safely. You should thoroughly vacuum every horizontal surface. Then, carefully fold the plastic floor covering and enclose it in a 6-mil, contractor-grade trash bag (most states allow solid lead waste to be thrown into a Dumpster as long as it's contained in plastic). Thoroughly scrub every surface in the work area using a three-container cleanup process (sidebar p. 71). Once you're satisfied that you could eat off the floor, take a few dust-wipe samples and send them off for testing to verify that the cleanup was successful.

To verify his own test results, Livingston brings in a certified testing service. "You never break the barrier between the demolition area and the living area until you've done dust tests in the work area and you're satisfied that the dust levels are well below the federal guidelines."□

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Photos by the author, except where noted.

TO LEARN MORE ABOUT LEAD SAFETY

Lead-based paint is a complicated issue. The following sources can help homeowners and contractors learn how to manage their lead-based paint problems safely or find a professional to handle problems for them.

GOVERNMENT AND PRIVATE SERVICES

U. S. Department of Housing and Urban Development (HUD) Office of Healthy Homes and Lead Hazard Control; www.hud.gov/lea
In addition to a wealth of information about lead paint, this HUD Web site includes a complete list of lead-safe training programs for homeowners, remodelers and abatement professionals.

HUD Lead Listing; 888-532-3547; www.leadlisting.org
This HUD department is a nationwide clearinghouse that helps to locate lead-paint inspectors, risk assessors and abatement professionals.

Alliance to End Childhood Lead Poisoning; 202-543-1147; www.aeclp.org

National Lead Information Center; 800-424-5323; www.epa.gov/lead/nlic.htm

BOOKS AND PAMPHLETS

***Lead Paint Safety: A Field Guide for Painting, Home Maintenance and Renovation Work*; National Lead Information Center; 800-424-5323. A valuable reference for safe work practices and maintenance of lead-based paint surfaces.**

***Protect Your Family From Lead in Your Home*; Government Printing Office; 202-512-1800; mention GPO stock #055-000-00507-9. Single copies of this pamphlet are free. Bulk copies are available at $26 per pack of 50.**

Buy it in bulk. *Federal law requires contractors who disturb more than 2 sq. ft. of lead paint to provide this pamphlet to their clients. Copies are available in groups of 50 through the Government Printing Office.*

***Maintaining a Lead-Safe Home: A Do-It-Yourself Manual for Homeowners, Property Managers & Contractors* by Dennis Livingston; Community Resources, Baltimore, MD; 800-848-0418. A must-have for parents as well as contractors, this book soberly explains the risks that lead paint poses to children and offers practical solutions.**