Abating Lead-Based Paint

by David E. Jacobs

Despite notable improvements in the past few decades, lead poisoning remains among the top ten epidemics in the country today. Lead-based paints in housing built before 1980 remain the most concentrated and widely dispersed form of lead. Children, as well as those in the home remodeling and construction industries, are at high risk from exposure to this pervasive poison.

Although the use of lead in paints has been outlawed in the United States since 1977, the recent publication of several government reports, such as *Lead-Based Paint: Interim Guidelines for Hazard Identification and Abatement in Public and Indian Housing* (HUD) and *The Nature and Extent of Lead Poisoning in Children in the United States: A Report to Congress* (Agency for Toxic Substances and Disease Registry), have greatly heightened public awareness of this widespread problem.

In addition, a marked increase in court cases upholding tort liability has driven current efforts to abate lead paint in privately owned buildings. Although federal regulations do not apply to privately financed or even Section 8 housing, several recent awards of over $100,000 for lead-related illnesses have prompted concerned building owners and managers to look more closely at the risks in their properties.

Several states, including Massachusetts, Maryland, Pennsylvania, Minnesota, and Connecticut, have implemented state regulations requiring lead paint abatement. In addition, HUD Secretary Jack Kemp has stated that he would like to see recent regulations extended to all housing.

What is the threat?

Lead paint, even if it is intact, poses a threat to the health of all those occupying a property. Although children may be at greatest risk—with potentially irreversible damage to the nervous system, combined with learning disabilities—adults are also affected. Symptoms in adults include high blood pressure, damage to reproductive systems, pain in the joints, and inability to concentrate.

Lead adversely affects nearly every organ system in the body. Yet according to an Environmental Protection Agency (EPA) study conducted in 1986, 52 percent of the country's residential units contain lead-based paint (LBP).

Detecting lead-based paint

Several types of testing procedures are currently used to detect the presence of lead-based paint. The simplest and easiest to perform is a spot chemical test using sodium sulfide. Although this technique is permissible under Massachusetts law, it is not generally considered reliable and is not permitted by HUD.

X-ray fluorescence (XRF) detectors may be used on site to pinpoint the presence of LBP by its characteristic radiation. A similar X-ray technique may be used with non-portable, more accurate equipment in a lab.

The cost of on-site testing can be between $400 and $1,000, depending on the size of the house, but the on-site tests are often highly inaccurate. In part, this is the result of misuse of the portable equipment, which should be partially remedied by new HUD guidelines which specify exactly how the portable XRFs are to be used and what their limitations are.

Laboratory XRF testing is much more accurate and has lower detection limits. It is slightly more costly, ranging from $4 to $10 per sample tested. Every surface in a building with a different painting history needs to be tested separately if accurate readings on LBP are to be achieved.

A fourth method for testing for LBP is atomic absorption testing, which is

also done by analyzing paint samples in a laboratory. Inconclusive XRF test results need to be confirmed by this method. Atomic absorption testing costs between $15 and $40 per sample.

This test is highly accurate, but may be skewed by incorrect sampling methods. Because atomic absorption testing detects the presence of lead by comparing minuscule weight differences between lead and non-lead paints, samples that inadvertently contain some drywall (or other substrate) as well as paint may produce incorrect results. Substrate refers to the wall or surface underneath the paint. Failure to include all layers of paint in the sample can also lead to errors (for example, red lead paint has often been used as a primer on metal surfaces).

Accurate sampling is vital for all types of testing. Woodwork, trim, and even different walls in the same room may all have been painted at different times, using different paints. Thus each must be tested. Because multifamily properties are more likely to have used contract painters, painting histories are more likely to be consistent with each unit. However, care should be taken to test all appropriate surfaces.

While the HUD Guidelines state that there are no peer-reviewed Quality Control/Quality Assurance procedures for lab XRF, the technique shows promise, as inclusion of substrate materials is not a problem. However, one drawback is that it is destructive; repainting and repair of sampled areas is necessary. Further research on this question is now in progress at Georgia Tech.

One way to help control testing costs is to train building personnel in safe methods for taking paint samples for laboratory analysis. When removing paint samples, building personnel must be properly equipped with protective clothing and properly fitted HEPA (high efficiency particulate air) filters. In addition, areas tested must be thoroughly cleaned using HEPA vacuums and phosphate detergent to remove all traces of paint dust. Finally, blood lead levels should be taken in accordance with a medical surveillance program to help ensure that those doing the sampling are not poisoned.

Federal guidelines for public housing units prescribe 0.5 percent by weight, or 1.0 milligrams of lead per square centimeter of surface area, as the threshold for determining whether abatement is needed.

Abatement options

There are three basic techniques for removing LBP: removal (either on- or off-site), encapsulation, and replacement. In most cases, actual abatement work will encompass a combination of all three.

Several techniques may be used to remove paint at the property, including blistering paint off with a heat gun and scraping with chemical paint remover. Grinding of painted surfaces with a HEPA-filtered tool is also permitted.

Open flame burning of LBP is not permitted because high temperatures may produce toxic lead fumes. Electric heat guns must also be kept at lower settings to avoid this problem. Likewise, care must be taken to ensure that chemical strippers do not contain methylene chloride, a cancer-causing substance, and are handled safely. For example, the caustic paste used in some stripper must not contact the skin or eyes. Emergency eyewash and shower stations should always be present if these substances are used.

If building pieces are removed and stripped off site, they may be dipped in chemical strippers. However, those doing the stripping must be notified of the presence of lead and monitored to ensure that adequate cleaning of the wood is done after paint has been removed. HUD is currently engaged in research efforts to estimate the relative cost of each removal technique.

Workers using any of these methods must wear HEPA filters and protective clothing to avoid contact with lead paint dust raised during removal. In addition, abated areas must be repeatedly cleaned with HEPA vacuums and washed with tri-sodium phosphate detergents to remove all traces of dust. While phosphate detergents are now banned for laundry use in many areas, they are usually available in hardware stores for limited use in lead-based paint abatement.

Another option—one which produces less dust, but possibly higher costs—is encapsulation. Painting over lead paint does *not* constitute encapsulation. This technique was found to be ineffective by HUD, as the new paint covering the LBP tended to deteriorate after only a short time, exposing the lead hazard again.

Encapsulation is accomplished by covering all LBP surfaces with wall board, wood, fiberglass, or other rigid, durable barrier systems. The best encapsulants have both good adhesion and cohesion. Ideally, they should be physically fastened to the substrate.

While encapsulation is an effective protection if it is completely sealed, the lead paint is still in the building and must be managed and maintained. This involves inspections at least once a year. In addition, there is the risk of disturbing the paint during some later renovation. However, encapsulation is effective for entire walls and exteriors.

Replacement is the third LBP abatement option. It is the most expensive, but also the simplest and least hazardous. Replacement is almost certainly the best option for windows, doors, balustrades, trim, and other easily replaced components. While replacement generates some lead dust, it is much less severe than removal. And because the lead is gone, it is also superior to encapsulation.

Regardless of the abatement method used, the allowed limit of LBP dust after abatement is 200 micrograms of lead per square foot of surface area on floors. These fine dust particles—each microgram the size of one-millionth of a nickel coin—are often invisible to the naked eye.

Because of these strict limits, cleanup efforts are the most critical part of the any abatement effort. Traditional forms of abatement have been known to result in lead poisoning of residents and workers, due largely to inadequate cleanup measures. Containment of the work area and extensive use of plastic sheeting to protect all surfaces not scheduled for abatement make cleanup much easer and increase the likelihood of passing final clearance testing.

Other LBP abatement considerations

Regardless of the abatement option selected, care must be taken in selecting a removal contractor and in disposing of any waste from the project. Current-

ly, many asbestos abatement contractors are expanding their operations to include LBP abatement. While some of the techniques, such as protective clothing and HEPA vacuums, are similar, experience in asbestos removal is no guarantee that a contractor understands LBP removal.

Nor is there much to assist the building owner or manager in making a choice. Although a few states, such as Massachusetts and Maryland, are considering certification programs for LBP abatement contractors, none currently exist at the national level. And while a few universities, such as Georgia Tech in Atlanta and Tufts in Massachusetts, offer training in this area, only a relatively few contractors have received instruction.

As with any contractor, checking references and business experience remains the best option in making a choice. However, be certain that a low price does not reflect inadequate safety procedures. It is also important to note that the Occupational Safety and Health Administration (OSHA) may bring lead-based paint abatement under general industry regulation. OSHA can also conduct inspections of worker safety procedures.

Owners and managers must also be aware of their post-removal responsibilities for lead-containing debris. Disposal of the materials, including paint chips, mops, water, HEPA filters, and strippers, is regulated by the EPA. While only paint chips and strippers are likely to qualify as hazardous waste, all debris must be tested to determine the proper disposal technique.

In conclusion

While only a few building owners and managers are currently legally bound to remove lead-based paint from their properties, the trend in both legislation and tort liability indicates that this situation is already changing. An even more compelling reason for abatement is the tremendous risk posed by lead paint, especially to children.

Lead paint is much more widespread than asbestos; at least 17 percent of all children in the United States are affected. The insidious loss of learning skills and intelligence means that we are sacrificing one of our most valuable resources—our intellectual abilities. We have successfully controlled lead in gasoline, in food, and in general industry. We must do the same for existing lead-based paint.

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Mr. Jacobs provided comments on drafts of the HUD Lead-Based Paint Guidelines and helped to developed a model training curriculum on lead-based paint for HUD, EPA, and Batelle Institute. He currently directs the nation's largest and longest running training course on lead-based paint detection and abatement. He holds an M.S. degree in technology and science policy from Georgia Tech.