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What To Do About Lead-Based Paint

New Guidelines Coming Soon

Sharon C. Park

From 1991-94 giant steps have been taken by the Department of Housing and Urban Development (HUD), the National Park Service (NPS), and various non-profit organizations to establish guidelines to assist building owners and managers address the hazards of lead-based paint. Since the 1970s there has been a growing concern regarding the potential for lead poisoning in both young children and maintenance or construction workers who come in contact with deteriorating lead-based paints. New guidelines will be forthcoming from HUD in the fall of 1994 which will help sort out ways to reduce lead hazards without destroying the architectural resources or destroying the financial resources of the owner.

*(**Park**—continued on page 3)*

Disaster Relief

Flooding in nine Midwest states.

The Northridge Earthquake in California.

*(**See report**—page <None>)*

What To Do About Lead-Based Paints

(continued from page 1)

This article is a follow-up to an earlier CRM *article on Lead-Based Paint in Historic Buildings (Vol. 13, No. 1, 1990).*

In 1977, the use of lead as a component of paint for residential housing was banned, but that still left millions of resources that already contained lead-based paint, often in deteriorated condition. A number of urban child lead poisoning cases prompted Congress to pass legislation to protect children. The Lead Poisoning Prevention Act of 1971 (P.L. 91-695, as amended 1987, 1988) charged HUD with developing guidelines for removing lead-based paint when renovations were undertaken on federally- subsidized low-income or Indian housing built prior to 1978. The guidelines which required 100% elimination of lead-based paint proved difficult to implement, there were not enough qualified contractors to execute the work, and the level of paint removal made the projects prohibitively expensive. In addition, there was probably not enough data available at the time the guidelines were generated to establish what constituted a lead-safe house.

More workable guidelines are now in the final stages of review by federal agencies and are part of the Housing and Community Development Act of 1992 (P.L. 102-550) which was signed into law on October 28, 1992. This legislation included Title X, the Residential Lead-Based Paint Hazard Reduction Act of 1992, and calls for HUD to issue new guidelines to assist residential property owners to reduce the hazards of lead without necessarily eliminating all the paint, particularly for well maintained properties. The significance of this legislation and its forthcoming guidelines (due out fall 1994), is that it allows an owner or manager of a property to establish a priority to address hazard reduction through a range of treatments from managing paint in place to selectively removing only deteriorating paint. By combining short-term treatments with long-term solutions, the owner can plan for the needed financial expenditures.

Title X expands the responsibility of providing lead-safe housing to all federal agencies that own, insure, or federally assist housing units. Owners of these properties are required to undertake a risk assessment, to identify where lead-based paint is located prior to disposing of a property, and in some cases, to undertake a paint removal or stabilization project to provide a lead-safe unit. The requirements of Title X affecting federal agencies go into effect beginning in 1995 (see sidebar, page 4).

Any mechanical scraping or paint removal with a heat gun will require the operator to wear, at a minimum, a half-face respirator fitted with High Efficiency Particulate Air (HEPA) cartridge filters. This worker is fully suited and wearing a full-face respirator because extensive paint removal is under way.

The forthcoming HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* provides a range of treatment options for residential buildings and even includes a chapter specifically for historic structures written by the NPS. The intent of the *Guidelines* is to encourage building owners over time to remove lead-based paint, and to deal with the most hazardous conditions first. The greatest advantage for historic buildings is that there are enough options for stabilizing existing painted surfaces to avoid total paint stripping which is often disastrous to both the historic painted finish and to the substrate to which it is attached. The chart on page 7 shows the wide range of treatments that can be implemented once the residential property has been evaluated to determine active lead threats to residents. This process is known as the risk assessment and is a critical planning step. The forthcoming *Guidelines* stresses the importance of eliminating lead-laden dust from the residential environment and from the construction site. Residential safety and worker safety go hand in hand. While many residential properties are in very poor condition with obvious peeling paint that needs to be addressed, many homes in relatively good condition can become hazardous environments for some children. Many children have suffered unnecessary contact with lead-laden dust by having renovation projects take place in the home while the family is in residence, or they have come into contact with their parents who are in the construction or maintenance field and have brought dirt and dust home on their workclothes.

What many organizations have learned and what the guidelines stress is that to protect occupants—particularly the children—the key is **thorough housekeeping and regular maintenance of the buildings.** To protect workers, the key is **responsible work practices that control contact with lead-laden dust and debris.** All residents should be discouraged from sanding painted surfaces or stripping paint as part of home remodeling projects without training in how to do it properly. Young children should not be present. Maintenance employees should be trained in the use of proper personal protective gear and in proper cleanup after the workday to avoid taking lead-laden dust home (see photo above). Worker safety is regulated by the Occupational Safety and Health Administration (OSHA). The amount of worker protection required for different tasks depends on the amount of lead-dust generated by that activity ("Lead Exposure in Construction: Interim Final Rule"; 29 CFR Part 1926).

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Educational brochures are available from a number of public service agencies. The National Park Service has developed several bulletins on safety hazards for NPS employee residents.

While many administrators believe that the controls recommended by HUD and OSHA to reduce the contact with lead-based paint are excessive, the fact that regulations and guidelines now exist means that controls for safety, worker protection, and lead-safe housing must now be implemented. Careful reading of the legislation and guidelines will be necessary to keep property owners from being convinced by overzealous abatement companies that more extensive work is required.

The dilemma for historic buildings is to find reasonable ways to protect both residents and maintenance workers who are involved in their renovation or repainting often within limited budgets and within historic preservation guidelines. Because lead was an ingredient in so many paints manufactured prior to its restricted use in 1977, contact with lead-based paint will be ongoing. The threat of active hazards occurring has been well documented, and so structures should be well maintained and monitored for lead-laden dust, chipping paint, and other lead sources. Most childhood lead poisoning occurs in poorly maintained deteriorating properties. While the Centers for Disease Control in Atlanta estimates that one in six (16.6%) of the children under the age of seven have elevated blood-lead levels, a NPS survey of its own employee residents showed that only approximately 1% of the children in housing had an even slightly elevated blood-lead level and actions were taken to identify the source of the lead and make corrections. This substantiates the theory that reasonably-well-maintained properties are not the cause of most zchildhood lead poisoning.

Controlling the Hazard Without Destroying the Resource

The elimination or control of lead hazards in housing may be achieved through several measures including the following:

- informing and educating housing occupants and managers about the hazards of lead poisoning;
- investigating housing for the presence of lead as part of a risk assessment;
- developing lead-based paint interim controls for properties in relatively good condition; and,
- developing more permanent abatement proposals to remove lead-based paint hazards in more seriously deteriorated properties or properties undergoing rehabilitation.

The goal then is to reduce the hazards of lead, not necessarily to remove all the lead-based paint. Over time, as renovation and replacement naturally occur, much of the lead-based paint will be removed. In the meantime, the way to reduce hazards of lead-based paint, particularly to small children, is to keep painted surfaces in good condition and to reduce lead-laden surface dust that can accumulate in housing. Because children ingest lead-laden dust by hand-to-mouth contact, it is critical that properties housing children under seven years of age be kept very clean and dust free. Interim controls that allow lead to be managed safely are particularly appropriate for historic properties where the historic paint may be significant as documentary evidence of the building.

Title X of the Community Development Act of 1992, part of the Residential Lead-Based Paint Hazard Reduction Act of 1992, includes provisions for identifying, assessing, managing, and controlling the hazards created by the presence of deteriorating lead-based paint. Following is a brief overview of some of those provisions as they relate to federally-owned housing, or housing supported or renovated with federal funds, or even, in some cases, private housing.

Title X Summary

1. All federally-subsidized Public and Indian Housing developments must be inspected for lead-based paint (LBP). All LBP is to be removed or abated in the course of modernization projects or if a child occupying the unit has been identified with an elevated blood-lead level. This appears to follow the earlier requirements as outlined in "Lead-Based Paint: Interim Guidelines for Hazard Identification and Abatement in Public and Indian Housing" (HUD,1990).
2. After January 1, 1995, all pre-1978 residential housing units sold or rehabilitated by any federal agency must undergo lead-based paint hazard evaluation and in some cases undergo hazard abatement.
3. Pre-1978 units receiving project-based federal assistance (including NPS, DOD, HUD Section 8 housing), are subject to HUD regulatory requirements for undertaking a risk assessment and for implementing interim controls to manage lead after January 1, 1995.
4. Housing units which receive more than $5,000 in HUD funds (including CDBG and HOME) must address lead-based paint hazards in the course of remodeling and renovation after January 1, 1995. If more than $25,000 is expended in federal funds, hazard abatement measures instead of temporary interim measures should be implemented. Note that for historic buildings, use the least damaging methods for hazard abatement to avoid having an "adverse effect" on significant historic materials.
5. For privately-owned housing, beginning October 1995, LBP warning and disclosure is required at the time of sale or rental of any pre-1978 housing unit. This includes a 10-day opportunity for home buyers to arrange for a risk assessment or inspection if one has not previously been done.

A risk assessment of the property is recommended when lead-based paint is present. The paint's location and condition should be recorded and a list of priority risk areas should be identified. Deteriorated paint and friction surfaces on windows and doors should be treated first.

When to Take Action

Action to control lead needs to be taken on a residential property if a child inhabiting the structure has been determined through a blood test (venous puncture) to have an elevated blood-lead level (above 10 micrograms per deciliter). In that case, the house should be fully evaluated, and if determined to be the source of the lead, then the property should be made safe.

The first step then is to undertake a **risk assessment** on each residential property in order to identify any lead hazards and to set priorities for managing or removing deteriorating lead. A risk assessment is an on-site evaluation of a residential property intended to identify where the problems are and how they can be addressed in a cost-effective manner. A risk assessor is generally a licensed professional capable of completing a survey of the property, but some organizations that manage a number of residential properties have developed in-house expertise for undertaking portions of a risk assessment and inspection (see photo top left).

A dust wipe test can identify the active presence of lead. A moist towelette is used to collect dust and then is analyzed in the laboratory. If a property is freshly painted and well maintained and floors have been thoroughly washed and wet vacuumed, a dust wipe test can verify that it is lead-safe.

Lead testing can be done under contract with companies that have special equipment (X-ray Florescence analyzers) or quick on-site screening can be done by trained personnel using test kits. The test kits, that use sodium sulfide or sodium rhodizonate have a tendency to give incorrect results, but they are an easy way to get a sense of how much lead may be actively present in a property. Follow-up accurate tests can be undertaken in a laboratory using paint chip samples that are subjected to Atomic Absorption Spectrometry. The risk assessor incorporates information on testing for lead, and identifies areas most likely to generate lead-laden dust, such as friction surfaces on operable windows and doors or high impact surfaces, such as baseboards or door jambs. All test data should be kept in the building folders in the building manager's office, or where it can be retrieved whenever work is anticipated.

Because the new legislation recommends setting priorities for lead reduction, and does not require full abatement if the hazard can be managed, the first priority is dealing with **active hazards.** Housing units and child daycare centers identified as containing lead-based paint during the risk assessment should be investigated to determine the presence of lead-borne dust which would signify an **active threat** to the residents. The greatest shift over the last few years has come about with using the dust wipe tests to determine if there is an active risk level from lead-laden dust present on the surface of materials (see photo, bottom left). This test needs to be done by a trained technician using a moist towelette which wipes the surface of an area and is then sent to the laboratory for analysis. This wipe test can be used to monitor the effectiveness of interim controls. If peeling paint has been properly removed and the area repainted, then a dust wipe test taken on a yearly basis can verify if the area is staying free from lead dust from this or other sources.

Removing or managing the lead in a building will be necessary if the answer to any of the following questions is "yes":

- Do you have a dust wipe test with lead above the action level?
  > 200 micrograms / sq.ft. for floors
  > 500 micrograms / sq.ft. for window sills
  > 800 micrograms / sq.ft. for window wells
- Are surfaces identified as containing lead-based paint in poor or peeling condition?
- Are there friction surfaces (window sash, jamb, door, or painted floors) causing dust?
- Are there chewable or mouthable surfaces (such as window sills) in a child's bedroom?
- Are the soil and water tests showing lead above allowable limits?

If any of these situations is present, there is a high probability of an active threat or a potential threat that should be controlled or eliminated. In most cases, and

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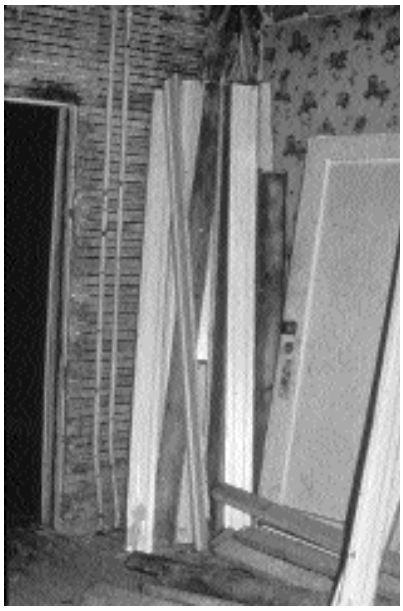
Some residential properties scheduled for full hazard abatement may require a greater level of paint removal or encapsulation than non-residential properties. In this instance, loose deteriorated paint was wet sanded and then the trimwork was painted with several thin layers of a special encapsulant paint coating.



In some cases involving residences, it may be necessary to remove paint from friction, impact and chewable surfaces. In this case, easily removable trimwork has been prepared for transport to a chemical company for offsite stripping. Great care was taken to protect the woodwork from damage so that it could be reinstalled after the paint removal.

especially for historic buildings, each resource should be evaluated and a program developed that protects residents as well as the workers who will come into contact with lead-based paint.

Treatments for Historic Buildings

Because historic paint finishes and the architectural features they coat may be important to our cultural heritage, these surfaces should not be disturbed without considering the impact on the historic resource. Because paint removal or the replacement or alteration of historic materials can be very damaging to historic buildings, there must be a balance between controlling the health hazard and preserving the historic resource. The least invasive treatment should be considered first for historic buildings. This will be different in each situation depending on the type of paint, its condition, and the significance of the material to which the paint is adhered. Generally removing deteriorated paint to a sound substrate so that a new paint system can be applied will involve wet sanding, chemical stripping, or low level heat stripping, or a combination of all three methods (see cover photo). In some residential situations, using special encapsulant coatings may be necessary to seal residual lead-based paint in place, particularly on projecting or chewable surfaces (see photo, top left). In other situations, features such as shutters, doors, and some trimwork can be removed for off-site stripping of paint before they are reinstalled (see photo, bottom left). Many of the treatments recommended for removing lead-based paint in nonhistoric properties, such as permanently removing decorative trimwork or gutting interiors, will not be acceptable for historic structures.

For federal undertakings, the State Historic Preservation Office (SHPO) should be consulted for Section 106 compliance review if work is planned on historic properties. *The Secretary of the Interior's Standards for the Treatment of Historic Properties* should be met and all work evaluated accordingly. Historic buildings owned

Controlling Lead-based Paint in Historic Buildings

Appropriate treatments to consider after a risk assessment has been performed:

Managing the paint in place: undertake appropriate surface preparation through wet sanding, tri-sodium phosphate (TSP or equal) and water washdown, and repaint with lead-free primers and paint.

In-place paint removal: use chemicals or low heat or power sanding with attached HEPA filtering to remove lead-based paint. Repaint with regular good quality primer and lead-free alkyd or latex top coats. Remove only deteriorated paint or those on chewable surfaces such as window sills.

Off-site paint removal: use chemical stripping or dip tanks for elements easily removed from buildings, such as doors, windows, shutters, and some trim pieces. Repaint with regular good quality primer and lead-free alkyd or latex top coats after reinstallation. Be advised that many elements do not survive removal, stripping, and reinstallation.

Encapsulant coatings: use specialized paint coatings to encase tightly adhering existing lead-based paint, such as on flat wall surfaces and some simple trim work, particularly at chewable surfaces. Use several thin coats of encapsulant coatings instead of one thick layer in order to preserve the crisp detail of the historic elements. Drywall cladding may be an appropriate use of rigid encapsulants for non-decorated surfaces, such as ceilings or plain walls in less significant areas (kitchens, bathrooms).

Selective replacement of deteriorated items: use in-kind matching replacements of windows, baseboards, trim and other deteriorated features, if necessary. Replacing shoe moldings at baseboards or window sash stop trim pieces can be an easy way to eliminate friction or impact surfaces without much loss to the historic resource.

Inappropriate treatments:

Open flame or high heat removal of painted elements (fire hazard to building and will vaporize lead in excess of 1000°F).

Gutting or removing significant historic materials (irretrievable loss of decorative roof brackets, trimwork).

Replacing significant features with non-matching elements (inappropriate appearance if improperly designed, such as insulated vinyl windows).

Using rigid encapsulants over significant elements (loss of historic character through use of vinyl or aluminum siding on exteriors, or use of drywall to box out historic fireplaces or to cover over painted wainscotting).

by the NPS that are scheduled for hazard abatement should have their work plans reviewed by the regional historical architects prior to implementation to ensure that historic materials are adequately protected. If paint is to be removed, a scientific record of the paint and its chronology should be part of the work plan. Samples of the original paint chips should be kept in the park for future documentation or interpretive purposes. If deteriorated windows are to be replaced, new units should match all of the features of the historic windows, including sash configuration, muntin size and profiles, and materials.

Managing or removing lead-based paint involves hazardous material and safety precaution must be considered. Scheduling of any work beyond the interim controls should be coordinated with other rehabilitation plans, and generally should be carried out when the housing unit is unoccupied. Worker areas should be monitored to ensure that the lead-dust levels are managed and the appropriate worker personal protective equipment is worn. Comply with the proper procedures for handling and disposal of toxic waste materials.

Conclusion

Recent federal legislation and new guidelines support the reasonable control of lead-based paint hazards after evaluating the residential property through a risk assessment. Options for handling the hazard are based on the condition of the property, the active presence of lead, and combining lead reduction with forthcoming renovation projects. By including selective removal of painted elements, such as windows which have friction surfaces, or as elements deteriorate, such as kitchen cabinets, lead will naturally be reduced over time.

Controlling lead hazards in historic buildings is a balancing act between interim controls and more permanent hazard abatement treatments. While from a health standpoint removing all lead-based paint during a renovation might appear to be desirable, this approach has been found to generate too much lead dust, which in many cases has resulted in increasing the blood-lead levels of resident children or workers. It is also so damaging to building materials that it is rarely appropriate for historic buildings.

If a building's historic character is embodied in its materials and their craftsmanship, then to damage these elements, or worse, their removal, should be avoided. As described in this article, there are ways to sensitively remove hazards without damaging the historic materials within a building. By understanding the legislative requirements for lead and by knowing what is historic about a property, decisions can be made on retaining as much historic material as possible. Historic preservation need not be a stumbling block to providing a lead-safe housing unit or worker safety.

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MANAGING OR REMOVING LEAD-BASED PAINT IN HISTORIC BUILDINGS

Interim solutions include a combination of the following:

General maintenance	Dust control	Paint stabilization	Soil control	Education
Repair deteriorated materials; Control leaks; Maintain exterior roofs, siding, etc. to keep moisture out of building; Undertake periodic inspection with annual dust wipe tests; Perform emergency repairs quickly if lead-based paint is exposed.	Wet mop floors; Wet dust window sills and window wells; Washdown painted surfaces with high phosphate cleaners (tri-sodium phosphate or equal); Wet broom sweep porches and steps; Clean carpets with special HEPA vacuum or remove if contaminated.	Wet sand loose paint and repaint; Selectively remove paint from friction & chewable surfaces (sills) and repaint; Consider spackling window wells or using jamb and well liners for clean, friction-free surfaces; Keep topcoats of paint in good condition	Add bark mulch. sod or topsoil to areas with high lead levels; Discourage children from playing in these areas by providing sandbox or other safe areas; Do not plant vegetable garden in areas with lead in soil Be careful that pets do not track contaminated soil inside house	Notify tenants and workers as to the source, locution and condition of lead-based paint; Building owner should make repairs to areas containing exposed lead-based paint as quickly as possible. Notify tenants to avoid home remodeling projects which will generate lead dust

Hazard abatement removes the hazard, not necessarily all the paint and includes:

Paint removal;	Replace deteriorated elements;	Paint encapsulation;	Soil control;	Compliance:
Remove deteriorated paint or paint on friction, chewable, or impact surface to sound layer, repaint; Consider using the gentlest means possible remove paint to avoid damage to substrate: wet sanding, low level heat guns, chemical strippers, or HEPA sanding. Send easily removable items (shutters, doors) off-site for paint stripping, reinstall and repaint;	Remove deteriorated painted elements such as windows, doors, and trimwork and replace with new elements that match the historic in appearance, materials, and detailing. replace non-significant elements of a friction surface (parting bead of windows, shoe molding, etc.) with new elements	Remove flaking paint and repaint lead-based paint surfaces with special encapsulant coatings if required in residences - Use several thin layers instead of one thick layer; Seal lead-based painted surfaces behind rigid encapsulants, such as drywall or vinyl wall coatings for non-significant surfaces;(bathrooms, kitchen ceilings, etc.)	Remove contaminated soil to a depth of 3'-6' and replace with new soil and appropriate planting material or paving. Concentration areas within 3' of house that may be the most contaminated	Be aware of all federal, state and local laws regarding lead-based paint and/or worker safety. Dispose of all hazardous waste according to applicable laws.

This chart indicates the wide variety of treatments that can be used to control or eliminate lead-based paint within a property. For historic buildings, the least invasive treatments should be used to solve problems identified during a risk assessment. The total abatement of all surfaces is not recommended for historic buildings as it damages historic materials and destroys the evidence of early paint colors and layering. Chart prepared by Sharon C. Park, AIA; National Park Service, Preservation Assistance Division, Washington, DC.