



Research & Development Highlights

92-202 Ted-ruc-i Series

Advice on the Use of Chemical Strippers for Removing Leaded Paint

introduction

The hazards of lead contamination to health, especially children's health, are only now being understood. Lead exposure in the home can occur from a variety of sources, the most significant often being dust from lead-based paint disturbed during renovation procedures. The amount of lead dust created is a function of the type of paint stripping methods used. CMHC Research Division funded this study to examine typical methods of paint removal, with a special focus on chemical strippers, to determine the availability, price, and relative advantages and disadvantages of each.

Project Objectives

The project objectives were to:

- obtain information on the hazards of chemical paint strippers;
- evaluate the performance of strippers currently available, both methylene chloride based strippers and the alternative "safe" strippers;
- specify necessary protective devices, and establish their cost and availability; and
- test ways of providing effective ventilation to rooms where paint stripping is taking place.

Research Program

A literature search investigated the reports of paint stripper hazards and relative effectiveness. A retail outlet survey was conducted to determine the availability and cost of chemical strippers and protective devices. In each case advice was sought on the relative hazards of these products and what

precautions were necessary with respect to protective devices and ventilation requirements.

The second stage of the project consisted of a field test for the effects of ventilation on stripper vapour levels in a room. Three scenarios were tried with a non-hazardous tracer gas. The tracer gas was injected into a room with the windows and doors closed. The concentration was then checked when a window was opened, and again when mechanical ventilation was used.

Findings

The most relevant information obtained is summarized in table 1. The retail outlet survey revealed that non-methylene-chloride based strippers were not widely available, cost up to twice as much as the others, and were generally not recommended by retailers.

Advice on the hazards of chemical strippers, and on safety procedures to take, was inconsistent and often inappropriate. Only one retailer carried material safety data sheets for a chemical stripper.

Protective masks, for use during stripping, ranged in price from \$55.00 to over \$100.00. It is also advised to wear protective eye wear and gloves when doing this type of work. Clothes worn during such procedures should be removed and washed immediately to avoid contaminating the rest of the house with lead dust.

The outcome of the ventilation field tests showed that opening a window could result in a major reduction of contaminant levels. Because this method uses passive ventilation to reduce contaminant levels, the contaminant reduction will be dependent on a number of uncontrollable variables such as wind speed and direction.

The use of a fan in the window caused an even greater reduction from original levels. It is necessary to seal other windows and all furnace registers in the room where the stripping is taking place.

implications for the Housing industry

This project indicates a need for increased public and professional awareness to the hazards and safety measures to be taken when dealing with leaded paint and methods used to remove it. Do-it-yourself renovators are especially likely to have little information on this subject. Judging from the Ottawa survey, it would be unwise to depend on paint or hardware suppliers to provide good information on chemical hazards, protective devices, or advice on ways to minimize exposure to solvents and lead.

*Project Manager: Don Fugler
Research Report: Advice on the Use of Chemical Strippers to Remove Leaded Paint (1992)
Research Consultant: Buchan, Lawton, Parent Ltd.*

A full report on this research project is available from the Canadian Housing Information Centre at the address below.

Housing Research at CMHC

Under Part IX of the National Housing Act- the Government of Canada provides funds to CMHC to conduct research into the social, economic and technical aspects of housing and related fields, and to undertake the publishing and distribution of the results of this research.

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Cette publication est aussi disponible en français.

Table 1
A Comparison of Four Techniques for Removing Leaded Paint
Methylene Chloride "Safer" Chemicals Heat Guns Abrasion

| | Chloride-Based Strippers | Strippers (PeelAway, 3M) | Heat Guns | Abrasion (Macleanchi) |
|---|--|---|---|---|
| Human and Environmental Concerns | methylene chloride fumes contains volatile solvents debris and residues of chemical and stripped paint | debris and residues of chemical and stripped paint | debris and residues of stripped paint possible vaporization of lead at high temperatures | airborne lead dust particles debris and residues of stripped paint |
| Health Effects | solvent vapours pose neurological and respiratory problems may cause cancer contact with chemical may cause skin irritation | vapour may cause respiratory problems contact with chemical may cause skin irritation, severe drying | high heat may vapourize lead burns | inhalation and ingestion of lead dust leading to lead poisoning |
| Protective Measures | use ventilation use organic vapour respirator use polyvinyl gloves use protective eye wear cover arms, legs to avoid contact with stripper cover floor with drop sheet to collect and control debris | use ventilation use rubber gloves use protective eye wear cover arms, legs to avoid contact with stripper cover floor with drop sheet to collect and control debris | special caution with heat near glass use respirators use protective gloves use protective eye wear fire safety precautions (keep water, fire extinguisher at hand) cover floor with drop sheet-collect and control debris | wet down surface use HEPA vac to keep work area clean (vacuum up dust as it is created) use protective gloves use protective eye wear |
| Flammability | methylene chloride is nonflammable but it is usually combined with flammable chemicals to reduce cost | generally nonflammable | heat guns can produce enough heat to ignite paint or wood | nonflammable |
| Time Required & Remove Paint | 30 minutes to a few hours for each layer of paint | 12 to 36 hours but will take off up to 5 layers of paint at one time | a few minutes for each area covered by heat gun will usually take off multiple layers at once | very dependant on thickness and number of layers of paint |
| Availability | at most paint and hardware stores | 3M at more than half paint and hardware stores, no other safe strippers found in Ottawa Peel Away in US and through distributor | at some hardware and home improvement stores | at most hardware, home improvement, and paint stores |

Table I (continued)
A Comparison of Four Techniques for Removing Leaded Paint
"Safer" Chemical Heat Guns Abrasion

| | Chemical-Based Strippers (PeelAway, 3M) | Heat Guns | Abrasion (Mechanical) | |
|----------------------|--|--|---|--|
| Advantages | <p>minimum amount of dust created</p> <p>generally very effective</p> <p>stripper evaporates therefore low waste generation</p> | <p>less toxic chemicals</p> <p>~ ~</p> <p>dust created</p> <p>removes multiple layers of paint</p> <p>debris & removed paint easily disposed of</p> | <p>minimum amount of dust created</p> <p>fast removal of small ~ ~</p> <p>low cost after initial purchase of ~</p> | <p>low cost</p> <p>may be the only feasible method of corners)</p> <p>used as a back-up for all methods</p> |
| Disadvantages | <p>multi-layers of paint may require more than one application for complete removal</p> <p>time delay between application ~ removal</p> <p>may leave a wax residue requiring removal before</p> <p>may attack plastics (shouldn't be a problem with lead)</p> <p>can be messy process</p> <p>use of CH₂Cl₂ can lead to premature aging of condensing furnaces (with water forms HOI)</p> | <p>long time delay between application and removal cost</p> <p>some strippers may leave residue on</p> <p>can be messy process</p> <p>may contain high percentage of water which can damage some woods</p> | <p>high heat (+500C) may vaporize lead in paint, creating a health hazard</p> <p>blowing heat can whip up leaded paint dust into air</p> <p>calibration & sanding usually required after</p> <p>cannot be used on metal</p> <p>care required near glass</p> | <p>high levels of toxic dust created fine dust particles ~11 travel through houses</p> <p>may take numerous clearings with HEPA vacuum to remove leaded dust</p> <p>~bA~ ~</p> <p>easy-to-use wood</p> |
| Cost | <p>may be significant</p> <p>\$20 to \$30/14 litres estimated average coverage: 1.5 m² (one side of a door)</p> | <p>may be significant</p> <p>\$30 to \$50/14 litres estimated average coverage: 1.5 m² (one side of a door)</p> | <p>one time expense (\$30 - \$80), plus electricity</p> | <p>tools relatively inexpensive</p> |
| Observations | <p>abrasion, scraping often integral part of using strippers</p> <p>CH₂Cl₂ banned in California</p> <p>rinse surface with cold water</p> | <p>mechanical abrasion may be necessary</p> <p>NMP formulas require rinsing with ethyl alcohol</p> | <p>heat guns may be the appropriate tool for certain applications</p> <p>lead contaminated surfaces should be washed with phosphate detergent after paint removal</p> | |