NATIONAL BUREAU OF STANDARDS REPORT

10 658

PROCEDURES FOR LEAD PAINT REMOVAL AND DETOXIFICATION: GUIDELINES AND ATTRIBUTES

U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

NATIONAL BUREAU OF STANDARDS

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[1] Headquarters and Laboratories at Gaithersburg, Maryland, unless otherwise noted; mailing address Washington, D.C. 20234.
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[3] Located at 5285 Port Royal Road, Springfield, Virginia 22151.

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PROCEDURES FOR LEAD PAINT REMOVAL AND DETOXIFICATION: GUIDELINES AND ATTRIBUTES

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ABSTRACT

Methods currently used to control the lead paint poisoning hazard in housing vary in effectiveness from complete elimination of the hazard to a barely minimal effort that presents a high potential for recurrence. A series of guidelines have been drawn up to acquaint municipal planners and other decision makers with the factors that should be considered in implementing a deleading program. Formats are presented to assist in the determination of the source of the hazard, the extent of the hazard, and to put forth those attributes of the various detoxification methods that should be considered when initiating a deleading program.

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I. INTRODUCTION

As a result of increasing concern and a growing awareness, many cities that a few months ago claimed to have no lead poisoning problem are suddenly discovering that they indeed have very serious problems with this childhood affliction.

One solution to the lead paint poisoning problem is very simple; eliminate the sources of lead that children can come in contact with. This could be done very easily within the framework of existing technology, but with the cost of detoxifying a residence ranging from a few hundred dollars up to the thousands of dollars, and with several million dwelling units involved, the costs would be astronomical.

Very few cities are currently engaged in programs to detoxify housing that has been identified as the source of lead paint poisoning. In spite of the small number of programs presently in existence, the methods used vary in effectiveness from complete elimination of the hazard to a barely minimal effort that presents a high potential for recurrence of the problem.

A series of guidelines have been developed in order to acquaint municipal planners and other decision makers with the factors that should be considered when starting up a program to delead housing. It is expected that these guidelines will be of particular value to those cities that have had no experience in dealing with the problem. However, in view of the fact that the detoxification procedures used in some current municipal programs are of very limited effectiveness, they should be of

value to at least some of the cities presently concerned with lead poisoning control.

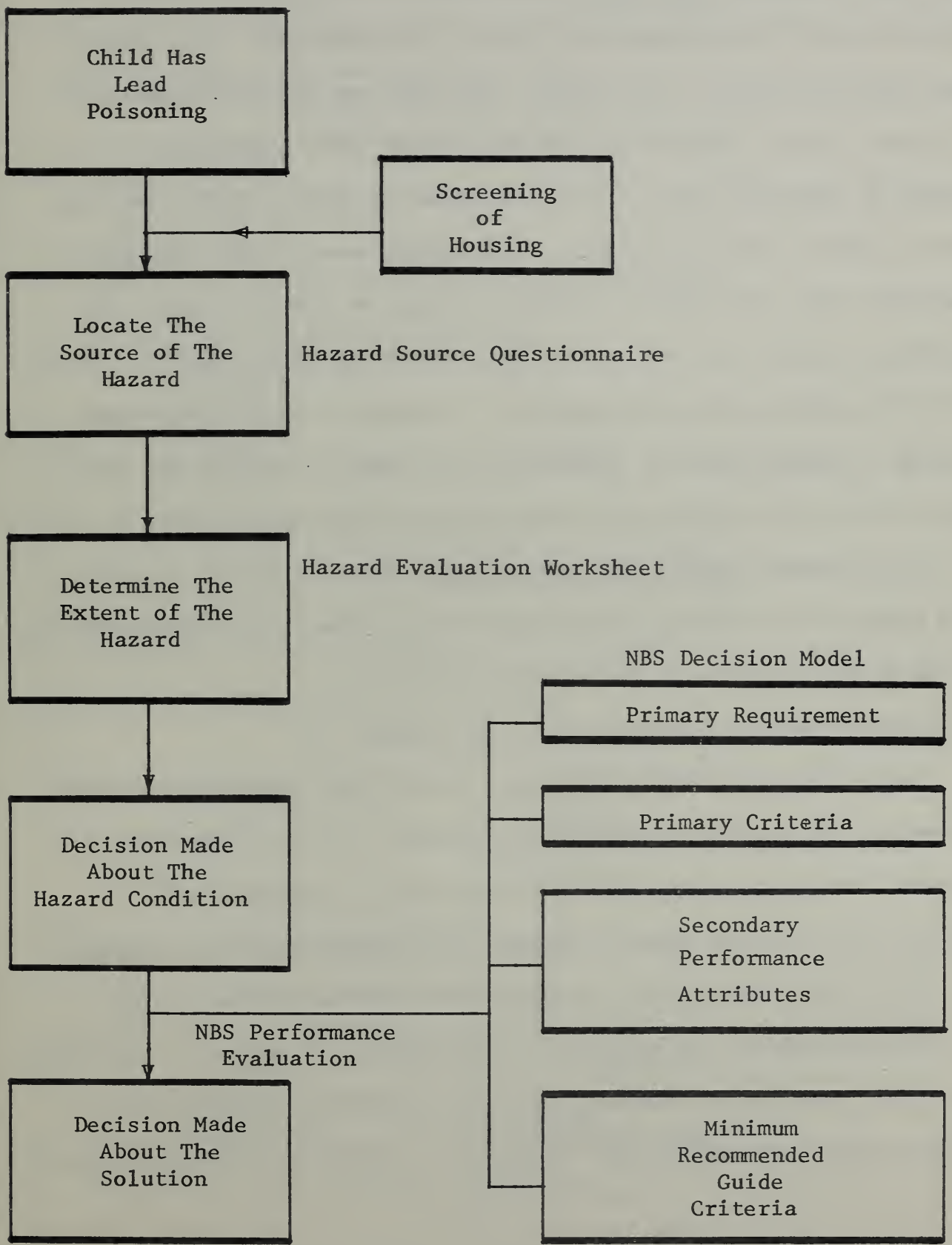
Methodologies are presented, in the form of questionaires and worksheets, to assist responsible authorities to determine the source of the hazard, to determine the extent of the hazard, and to consider the factors that should be evaluated in the process of choosing methods for detoxification. In addition to the primary requirement of elimination of the lead poisoning hazard, the secondary attributes that are a function of the various solutions are presented.

A series of guide criteria is in preparation to acquaint engineers with specific minimum performance recommendations for detoxification methods; these recommendations will be included in a supplementary report.

2. LOCATION AND EVALUATION OF THE SOURCE OF THE HAZARD

Since very limited resources are now available to cities for lead paint poisoning control, virtually all of their efforts are devoted to finding and treating children who have dangerously high levels of lead in their bodies. Widespread screening of housing and removal of the hazard from all dwellings containing accessible leaded materials is not financially feasible at the present time, but in view of the nature of the problem and the disease, this approach offers the only way of completely eliminating the problem. The steps that should be followed in dealing with the problem of plumbism are outlined in Figure I, Hazard Elimination Flow Chart.

Figure I. Hazard Elimination Flow Chart



2.1. Location of the Source of the Hazard

Although most cases of plumbism are caused by children eating lead paint obtained from walls and ceilings at home, other sources of leaded material (including those outside the home) have been found to cause lead poisoning. For example: children may eat leaded materials at a baby sitter's home during the day, while their parents are working or they may chew on items not normally thought to be dangerous such as painted toys or pencils. In a recent survey[1/] New York City found that many lead pencils contained dangerous levels of lead; the hazardous material was not in the lead, where one might expect it to be, but in the paint coating the pencils. In another study[2/] tubes containing a leading brand of toothpaste were found to contain 99% lead. Poor children are not the only ones who chew on the above items.

A preliminary Hazard Source Worksheet, shown in Figure II, has been prepared in order to assist inspectors to make a systematic determination of the location of the hazardous material.

2.2. Determination of the Extent of the Hazard

Since the person making decisions about hazard elimination methods may not be the building inspector who actually visits a residence, a standard format has been drawn up to describe the condition of a dwelling unit; this is shown in Figure III, Hazard Evaluation Worksheet.

Using this information, an appropriate solution to each unique set of circumstances can be chosen. For example, if an area is scheduled for urban renewal in the near future or an expressway will be built shortly where the dwelling now stands, it is probable that only temporary

Figure II

HAZARD SOURCE WORKSHEET

For use where lead poisoning victim is known. When housing is being screened to find potential lead poisoning victims, simply fill in name of family.

Date of Inspection: _____

Inspector(s): _____

_____

Location: _____
Street

_____, _____
Apt. # Telephone No.

_____ _____
Name of Victim Name of Parent/Guardian

1. In what places does your child spend most of his/her time?
   - ____ Inside the home
   - ____ Outside the home (Specify, i.e., porch, balcony, fire escape, etc.: _____)
   - ____ Around neighborhood (Specify: _____)
   - ____ Day Care Center
   - ____ At playground
   - ____ At babysitter (Specify: _____)
   - ____ At friends' homes (Specify: _____)
   - ____ Don't Know
   - ____ Other (Specify: _____)

2. a. When your child is at home, what room(s) does he spend the most time in?
   - _____ Living room
   - _____ Dining area
   - _____ Kitchen (If answer yes, proceed to 2b.)
   - _____ Bathroom (If answer yes, proceed to 2c.)
   - _____ Attic area
   - _____ Bedrooms
   - _____ Basement
   - _____ Hall
   - _____ Garage
   - _____ Workshop
   - _____ Don't Know
   - _____ Other

   b. You said that your child spends a good deal of time in the kitchen. Does he like to play around or under the kitchen sink? ____ Yes ____ No

   c. You told me that your child plays a lot in the bathroom. Have you ever seen him/her playing around or under the sink? ____ Yes ____ No

3. a. Have you ever seen your child eating or picking paint from any painted area or object in your house? ____ Yes ____ No (If the answer is Yes, proceed to 3.b.)

   b. What are these areas and objects you are referring to?

Area	Objects
____ Walls	____ Furniture (Specify: _____)
____ Windows and/or window sills	____ Toys
____ Doors and/or door jambs	____ Pencils
____ Railings	____ Play pen
____ Exposed pipes	____ Carriage
____ Radiators	____ Crib
____ Floor	____ Don't Know
____ Don't Know	____ Other (Specify: _____)
____ Other (Specify: _____)	

4. a. Have you ever seen your child eating paint or dirt from any object or area outside of your home? ____ Yes ____ No

   If answer is yes, proceed to 4.b.

   b. Could you show me or tell me where this happened?

Area	Object
____ Front Yard	____ Railings (porch, balcony, etc.)
____ Playground	____ Fire escape
____ Neighbor's Yard	____ Street sign posts and lamp posts
____ Don't Know	____ Exterior wall of dwelling
____ Other (Specify: _____)	____ Fence
	____ Don't know
	____ Other (Specify: _____)

5. a. Has anyone ever told you that they saw your child eating paint or dirt?
   ____ Yes ____ No

   If yes, proceed to 5.b.

   b. Could you tell me what they said and where they saw your child eat the paint (dirt)?

Figure III

HAZARD EVALUATION WORKSHEET

Part 1

Date of Inspection: _____

Inspector(s): _____

_____

Name of Victim: _____

Location: _____ (Street), _____ (Apt. #), _____ (Telephone No.)

Future of Area: ____ Urban Renewal
____ Transportation Changes (i.e., subway, expressway, etc. planned)
____ No Changes Planned
____ Other (Specify: _____)

Description of Home: _____ Brick _____ Frame _____ # Floors _____ # Apts. _____ High-Rise _____ Row _____ Detached _____ Age

General Condition of Building: _____ Sound _____ Deteriorated _____ Dilapidated

(Sound housing has no defects or only slight defects which can be repaired in the course of regular maintenance. Deteriorated housing has defects requiring more extensive repair than could be provided by regular maintenance. Dilapidated housing has critical defects which require extensive repair or rebuilding and renders the housing unsafe.)

Condition of Public Halls: _____ Peeling _____ Paint Flakes on Floor _____ Defective Plaster _____ Samples Taken

Condition of Victim's Apt.: _____ Peeling _____ Paint Flakes on Floor _____ Defective Plaster _____ Teeth Marks on Woodwork

Person Taking Care of Child: _____ Name

_____ Relationship

_____ Address (if different from victim's)

_____ Telephone No. (if different from victim)

Victim is Boarded Out: ____ Yes ____ No
If Yes: ____ Daily ____ Weekly ____ Weekends ____ Nights ____ Intermittently

No. of People Living at this address: _____

Treatment: Board of Health _____ Private Physician _____
Out Patient _____ Hospitalized _____
1st Time Treated _____ Repeater _____ How Long Treated _____ Weeks

To be Filled Out from City Records:
Owner of Building: _____ Name _____ Telephone Number

_____ Address _____ Est. Value of Bldg.

INSTRUCTIONS

1. Fill out Part 1 of the Hazard Evaluation Worksheet.
2. Draw the floor plan to illustrate hazard location. Label the walls alphabetically, always use B for the bathroom and K for the kitchen. Number the walls and windows in each room when you inspect the room. All wall surfaces in the same room that are planar can have the same number. Refer to the sample floor plan if any question arises concerning apartment labeling. Use the room and wall location scheme for door surfaces. Number the windows separately.
3. Identify hazardous surfaces and structural defects in Part 2 using the above numbering scheme. For example if kitchen wall K2 has peeling and/or blistering paint put K2 in the appropriate box. Locate hole number and size, i.e. 5/K2 in the less than 15" diameter box means 5 holes in wall K2 less than 16" diameter.
4. Indicate ceiling height for each room on the floor plan.
5. Under General Comments, the following items should be included:
   a) Causes such as:
      i. exterior water leaks,
      ii. interior water leaks,
      iii. moisture and condensation,
      iv. vandalism,
      v. occupant use,
      vi. aging,
      vii. interior or exterior vibration,
      viii. expansion and contraction, etc.
   b) Recommendations as to whether rehabilitation or repair should be carried out,
   c) Other code violations observed, and,
   d) Other observations reflecting the inspectors opinions.

PART 2

			WALLS		CEILING		WOODWORK			FIXTURES				
			PAINT	PLASTER	PAINT	PLASTER	PAINT	WOOD	SEALANT	RADIATORS	PLUMBING FIXTURES	RAILINGS	CABINETS	OTHER
OBSERVATION	ACCESSIBILITY	LOOSE MATERIAL LYING AROUND												
		BLISTERING AND PEELING												
		CHEWABLE SURFACE CONFIGURATION												
		CHIPPING												
	CRACKING													
	BULGING													
	HOLE DIAMETER & NUMBER	LESS THAN 16"												
		16"-24"												
		OVER 24"												
	SURFACE FLATNESS													
	% SURFACE DETERIORATION													
PHYSICAL	POOR ADHESION (TAPE)													
	POOR ADHESION (MALLET)													
	PLASTER DETERIORATION (NAIL)													
	WOOD SOUNDNESS (NAIL)													
	OTHER													
CHEMICAL	FIELD (SPECIFY)													
	LABORATORY (SPECIFY)													

measures should be taken to remove the source of the hazard. In cases where the walls have good structural integrity, but there is blistering and peeling paint, a reasonable solution would be to remove the loose paint and all paint from chewable surfaces. There would still be a certain potential for recurrence of the problem, but the immediate hazard would be removed, and periodic inspection could be used to prevent the problem from reappearing.

In situations where a great deal of the plaster substrate has poor integrity, i.e., there are holes and bulges, the most rational solution to the problem would be to cover the walls with a suitable material. Another possible solution would be to remove all of the paint from the dwelling unit, but this would probably be a poor choice, since the condition of the walls would most likely violate other housing code regulations. The nature and extent of the deterioration of a residence can be easily determined if the format outlined in the Hazard Evaluation Worksheet is followed.

2.3. Commentary on Worksheets

A word of caution must be expressed in regard to the use of the worksheets. They are designed as guidelines for gathering accurate information on questions of interest to a housing inspector (not necessarily in the order presented here). However, it cannot be emphasized too strongly that the reliability of the information gathered will be greatly dependent upon the way in which the questions are asked. For example, if the inspector is too blunt or too cavalier in asking these questions, the respondents may become offended and give false information.

Thus, it would be highly advisable for any city planning to use these or other worksheets to hold an appropriate training course, for those personnel involved, on the proper way to gather the information.

3. HAZARD TREATMENT

3.1. Implementation Decisions

Although many factors are involved in deciding whether or not a residence will be deleaded, the one basic factor that overrides all others is the balance between the cost of deleading and the cost of losing a dwelling unit from the housing stock.

If the building is structurally unsound, and/or there are many housing code violations, the cost of deleading and restoring the building to an acceptable level of occupancy may make abandonment by the owner a quite likely choice. The landlord, quite naturally, will only do something about the problem if he can expect a reasonable return on his investment. If the landlord refuses to alleviate the hazardous conditions, the proper authorities have to decide if the cost of losing a dwelling outweighs the costs involved in rendering the unit suitable for habitation.

Courses of action that may be followed include:

a. Making low cost loans available to make it advantageous for the landlord to do the work.

b. Doing the work and trying to collect the cost back from the landlord.

c. Taking control of the property and restoring it.

d. Abandoning the dwelling unit if restoration costs are unreasonably high.

Factors that should be considered in making the "go-no go" decision include interactions between:

a. The nature and extent of the hazard.

b. The degree of removal of the hazard desired.

c. Detoxification methods available, and

d. Secondary attributes gained by the solutions available.

Available funds, and anticipated benefits, will most likely determine the nature and extent of the work that will be done.

3.2. Detoxification Guidelines

Many trade-offs are necessary in the selection of lead hazard elimination methods and the extent to which they are applied.

As previously stated, one performance requirement that should be considered above all others, in making a decision about deleading, is that the method used should reduce or eliminate the exposure of susceptible children to lead poisoning.

There are two basic technological procedures that can be used to eliminate the hazard.

a. Removal of all hazardous material, and

b. Covering up of all of the hazardous material to render it inaccessible.

Only complete application of one of the above methods will render a residence completely lead-free.

If deleading is less than complete, potential recurrence of the problem via accessibility of the residual leaded material should be considered. The various accessibility configurations defined in Figure

IV, Decision Model - Part I, should be considered when determining the extent to which leaded material will be made inaccessible.

Figures IV and V, Decision Model - Part I and Part II, respectively, present the options that should be considered in hazard elimination and serve as an index to more detailed matrices that show the relationships that exist between currently available detoxification methods and the attributes gained from their implementation.

Both deleading techniques and other factors that should be considered in conjunction with deleading, are listed in the following matrices:

Figure VI: Matrix I. Removal Methods

Figure VII: Matrix II. Surface Repair Methods

Figure VIII: Matrix III. Cover Up - Unfinished Membrane Material

Figure IX: Matrix IV. Cover Up - Unfinished Rigid Material

Figure X: Matrix V. Cover Up - Prefinished Rigid Material, and

Figure XI: Matrix VI. Surface Finish Methods

The same basic formats can be used to evaluate innovative techniques for deleading, if and when they become available.

3.3. Attributes of Detoxification Methods

Once again, the primary attribute required of every detoxification method is that it render the hazardous material inaccessible. Success in complying with this requirement is dependent both on the method of hazard removal and the extent to which it is implemented.

The many secondary properties that are inherent parts of specific deleading procedures should be considered very carefully when selecting

Figure IV

HAZARD ELIMINATION DECISION MODEL - PART 1

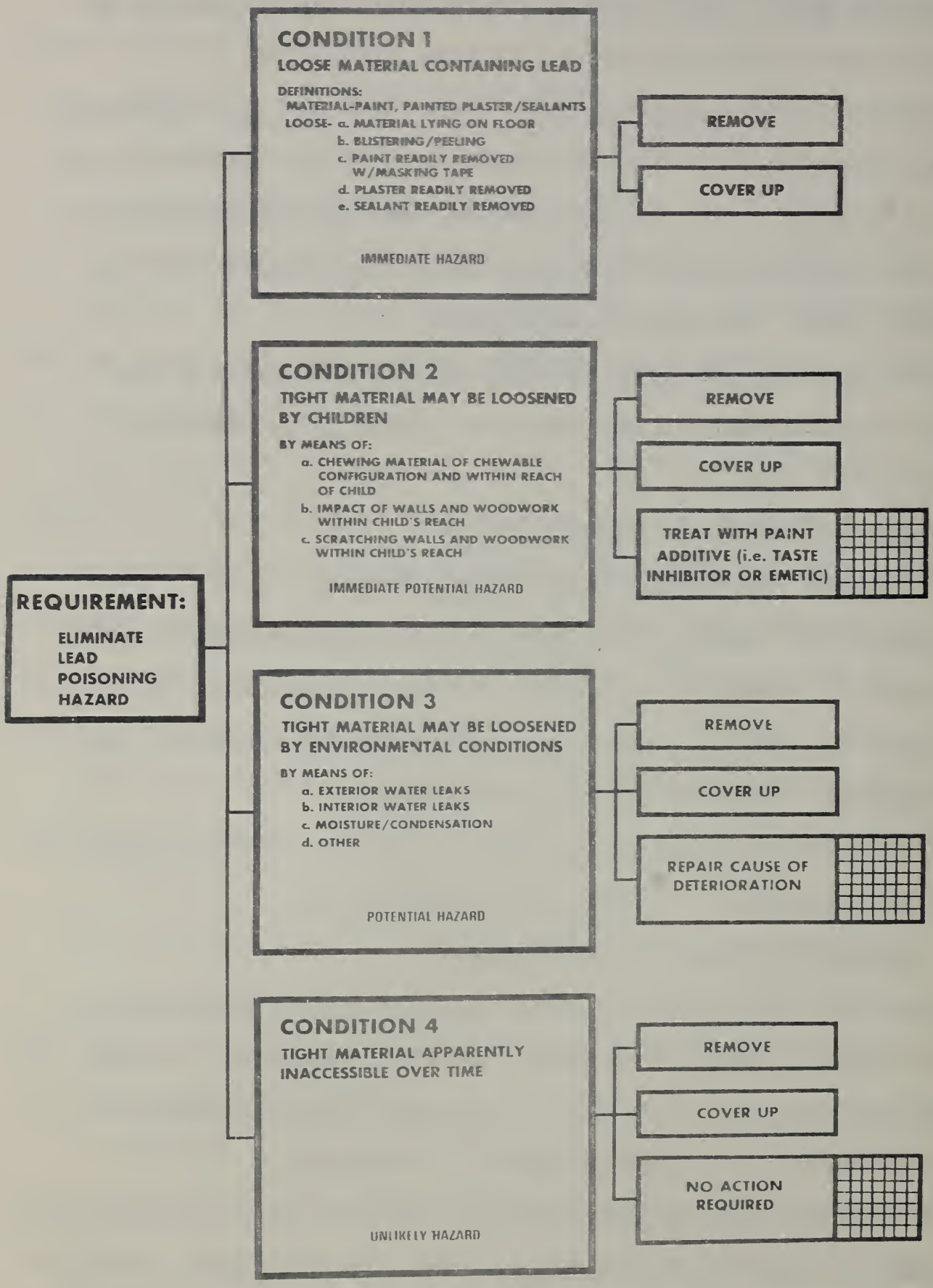


Figure V

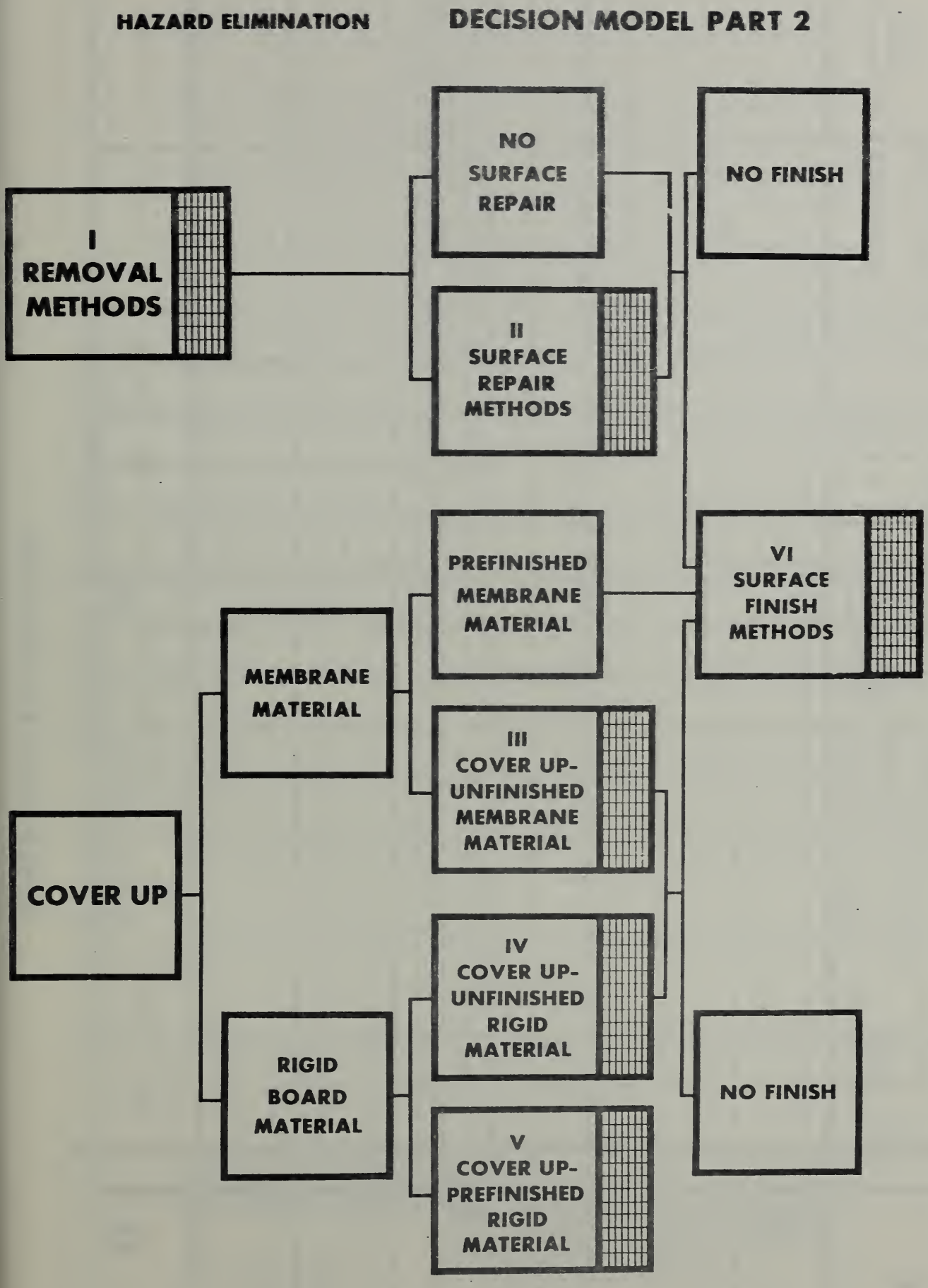

HAZARD ELIMINATION
DECISION MODEL PART 2
I
REMOVAL
METHODS
NO
SURFACE
REPAIR
II
SURFACE
REPAIR
METHODS
NO FINISH
VI
SURFACE
FINISH
METHODS
PREFINISHED
MEMBRANE
MATERIAL
MEMBRANE
MATERIAL
III
COVER UP-
UNFINISHED
MEMBRANE
MATERIAL
COVER UP
IV
COVER UP-
UNFINISHED
RIGID
MATERIAL
RIGID
BOARD
MATERIAL
V
COVER UP-
PREFINISHED
RIGID
MATERIAL
NO FINISH

Figure VI

REMOVAL METHODS

			1 HAZARD INACCESSIBILITY	SUPPORTIVE ATTRIBUTES										INVOLVEMENT		8 DEGREE OF FINISH	9 TIME	IMPLEMENTATION ATTRIBUTES				14 TOTAL COST (SUPPORTIVE & IMPLEMENTATION)
				2 SPECIAL PRECONDITIONS	3 INSTALLATION HEALTH & SAFETY						4 ANCILLARY WORK	5 WASTE DISPOSAL		6 COMMUNITY	7 USER			10 LABOR	11 MATERIAL	12 EQUIPMENT	13 TOTAL COST	
					a OPEN FLAME	b LEAD FUME	c CHEMICAL SOLVENT	d LEAD DUST	e ELECTRIC HAZARD	f GAS HAZARD		a HAZARDOUS	b NON-HAZARDOUS									
A SAND		WALLS	1																			
		CEILING	2																			
		WOODWORK	3																			
		OTHER	4																			
B SCRAPE	x NO SOFTENING	WALLS	1																			
		CEILING	2																			
		WOODWORK	3																			
		OTHER	4																			
	y HEAT LOOSENING	WALLS	1																			
		CEILING	2																			
		WOODWORK	3																			
		OTHER																				
	z CHEMICAL SOFTENING	WALLS	1																			
		CEILING	2																			
		WOODWORK	3																			
		OTHER	4																			
C OTHER (PLASTER & SEALANT REMOVAL)																						

SURFACE REPAIR METHODS

II

			HAZARD INACCESSIBILITY	SUPPORTIVE ATTRIBUTES				INVOLVEMENT		DEGREE OF FINISH	TIME	IMPLEMENTATION ATTRIBUTES				TOTAL COST (SUPPORTIVE & IMPLEMENTATION)
				SPECIAL PRECONDITIONS	INSTALLATION HEALTH & SAFETY	ANCILLARY WORK	WASTE DISPOSAL	COMMUNITY	USER			LABOR	MATERIAL	EQUIPMENT	TOTAL COST	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	PATCH	1 WALLS														
		2 CEILING														
		3 WOOD-WORK														
		4 OTHER														
B	MAJOR REPAIR	1 WALLS														
		2 CEILING														
		3 WOOD-WORK														
		4 OTHER														
C	REPLACE	x PLASTER 1 WALLS														
		2 CEILING														
		3 WOOD-WORK														
		4 OTHER														
		y RIGID BOARD MATERIALS (SEE COVER UP MATRIX)														

Figure VIII

COVER UP - UNFINISHED MEMBRANE MATERIAL

III		HAZARD INACCESSIBILITY 1	SUPPORTIVE ATTRIBUTES: SPECIAL PRECONDITIONS 2	INSTALLATION HEALTH & SAFETY 3	ANCILLARY WORK 4	WASTE DISPOSAL 5	INVOLVEMENT: COMMUNITY 6	USER 7	DEGREE OF FINISH 8	TIME 9	IMPLEMENTATION ATTRIBUTES: LABOR 10	MATERIAL 11	EQUIPMENT 12	TOTAL COST 13	TOTAL COST (SUPPORTIVE & IMPLEMENTATION) 14
A FABRIC	1 WALLS														
	2 CEILING														
	3 WOOD-WORK														
	4 OTHER														
B PLASTER	1 WALLS														
	2 CEILING														
	3 WOOD-WORK														
	4 OTHER														
C CEMENTITIOUS MATERIAL	1 WALLS														
	2 CEILING														
	3 WOOD-WORK														
	4 OTHER														
D OTHER	1 WALLS														
	2 CEILING														
	3 WOOD-WORK														
	4 OTHER														

Figure IX

COVER UP - UNFINISHED RIGID MATERIAL

IV			HAZARD INACCESSIBILITY	SUPPORTIVE ATTRIBUTES				INVOLVEMENT		DEGREE OF FINISH	TIME	IMPLEMENTATION ATTRIBUTES				TOTAL COST (SUPPORTIVE & IMPLEMENTATION)
				SPECIAL PRECONDITIONS (SUPPORT REQUIREMENTS)	INSTALLATION HEALTH & SAFETY	ANCILLARY WORK	WASTE DISPOSAL	COMMUNITY	USER			LABOR	MATERIAL	EQUIPMENT	TOTAL COST	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
A GYPSUM BOARD	1	WALLS														
	2	CEILING														
	3	WOOD-WORK														
	4	OTHER														
B PLYWOOD	1	WALLS														
	2	CEILING														
	3	WOOD-WORK														
	4	OTHER														
C HARDBOARD	1	WALLS														
	2	CEILING														
	3	WOOD-WORK														
	4	OTHER														
D METAL	1	WALLS														
	2	CEILING														
	3	WOOD-WORK														
	4	OTHER														
E OTHER	1	WALLS														
	2	CEILING														
	3	WOOD-WORK														
	4	OTHER														

Figure X

COVER UP - PRE-FINISHED RIGID MATERIAL

V		HAZARD (ACCESSIBILITY) 1	SUPPORTIVE ATTRIBUTES: SPECIAL PRECONDITIONS (SUPPORT REQUIREMENTS) 2	SUPPORTIVE ATTRIBUTES: INSTALLATION HEALTH & SAFETY 3	SUPPORTIVE ATTRIBUTES: ANCILLARY WORK 4	SUPPORTIVE ATTRIBUTES: WASTE DISPOSAL 5	INVOLVEMENT: COMMUNITY 6	INVOLVEMENT: USER 7	DEGREE OF FINISH 8	TIME 9	IMPLEMENTATION ATTRIBUTES: LABOR 10	IMPLEMENTATION ATTRIBUTES: MATERIAL 11	IMPLEMENTATION ATTRIBUTES: EQUIPMENT 12	IMPLEMENTATION ATTRIBUTES: TOTAL COST 13	TOTAL COST (SUPPORTIVE & IMPLEMENTATION) 14	IN-USE PERFORMANCE: HEALTH & SAFETY 15	IN-USE PERFORMANCE: DURABILITY & STABILITY 16	IN-USE PERFORMANCE: ACCEPTABILITY 17
A	GYPSUM BOARD 1 PAPERED																	
	GYPSUM BOARD 2 PLASTIC COATED																	
B	PLYWOOD PAINTED																	
	PLYWOOD PLASTIC COATED																	
	PLYWOOD PAPERED																	
C	HARDBOARD 1 PAINTED																	
	HARDBOARD 2 PLASTIC COATED																	
	HARDBOARD 3 PAPERED																	
D	METAL 1 PAINTED																	
	METAL 2 PLASTIC COATED																	
E	REINFORCED PLASTIC																	
F	CEILING BOARD & TILE 1 PAINTED																	
	CEILING BOARD & TILE 2 PLASTIC MEMBRANE																	
G	OTHER																	

Figure XI

SURFACE FINISH METHODS

VI

			HAZARD INACCESSIBILITY 1	SUPPORTIVE ATTRIBUTES: SPECIAL PRECONDITIONS 2	SUPPORTIVE ATTRIBUTES: INSTALLATION HEALTH & SAFETY 3	SUPPORTIVE ATTRIBUTES: ANCILLARY WORK 4	SUPPORTIVE ATTRIBUTES: WASTE DISPOSAL 5	INVOLVEMENT: COMMUNITY 6	INVOLVEMENT: USER 7	DEGREE OF FINISH 8	TIME 9	IMPLEMENTATION ATTRIBUTES: LABOR 10	IMPLEMENTATION ATTRIBUTES: MATERIAL 11	IMPLEMENTATION ATTRIBUTES: EQUIPMENT 12	IMPLEMENTATION ATTRIBUTES: TOTAL COST 13	TOTAL COST (SUPPORTIVE & IMPLEMENTATION) 14	IN-USE PERFORMANCE: HEALTH & SAFETY 15	IN-USE PERFORMANCE: DURABILITY & STABILITY 16	IN-USE PERFORMANCE: ACCEPTABILITY 17
A	PAINT	1	WALLS																
		2	CEILING																
		3	WOOD-WORK																
		4	OTHER																
B	MASONRY CONDITIONER	1	WALLS																
		2	CEILING																
		3	WOOD-WORK																
		4	OTHER																
C	LIQUID COVERING	1	WALLS																
		2	CEILING																
		3	WOOD-WORK																
		4	OTHER																
D	VINYL SHEET	1	WALLS																
		2	CEILING																
		3	WOOD-WORK																
		4	OTHER																
E	WALLPAPER	1	WALLS																
		2	CEILING																
		3	WOOD-WORK																
		4	OTHER																
F	FABRIC	1	WALLS																
		2	CEILING																
		3	WOOD WORK																
		4	OTHER																
G	PLASTER & CEMENTITIOUS MATERIAL	1	WALLS																
		2	CEILING																
		3	WOOD-WORK																
		4	OTHER																
H	OTHER																		

methods to eliminate the plumbism problem. These characteristics include factors such as the health of both the occupant and deleading workers, the potential for recurrence of the problem, the degree of rehabilitation obtained, etc. Cost factors can be assigned to many of these considerations since they involve both time and labor. A more detailed description of the above attributes follows.

3.3.1. Hazard Inaccessibility

Accessibility to residual leaded material is related to both the degree of hazard elimination and the deleading method used. For example: if only loose leaded material and leaded material from chewable surfaces are removed, then access to leaded material can be gained by (a) loosening of tight material within reach and (b) loosening of tight material by natural causes such as moisture. If a covering is used that can be torn away, then the hazardous material beneath it is accessible.

3.3.2. Special Preconditions

Certain conditions are required before many hazard removal techniques can be implemented. For example: if a facing is to be put up with adhesive, all loose material should be removed from the surface to be covered, and the surface must be free of moisture, oil, dirt, etc. If rigid boards are to be applied, there are certain support requirements for the boards, such as the degree of planarity, support spacings, etc.

3.3.3. Installation Health and Safety

Many of the available hazard removal techniques have health problems associated with them. For example: removing leaded paints by sanding creates a highly toxic fine leaded dust, softening leaded paint with an open flame can give rise to lead fumes in addition to presenting a fire

hazard, cutting various board materials can give rise to a fine dust that can be injurious, etc.

3.3.4. Ancillary Work

Certain deleading procedures may require additional work to be done in conjunction with implementation of the technique. For example: putting up wall board may require the relocation of plumbing, electrical and heating fixtures.

3.3.5. Waste Disposal

Care should be taken to ensure that leaded wastes are disposed of in a manner that will render them inaccessible to children. Other waste materials should be disposed of in a manner such that they do not present a hazard.

3.3.6. Community Involvement

Since limited funds are available for deleading, and cost savings can be realized by utilization of "self-help" labor, certain advantages can be gained by selecting hazard removal methods that lend themselves to the use of semi-skilled and unskilled labor. A secondary fall-out from using this type of labor is the training given in the course of carrying out a community action program. The skills gained can give the people involved a chance to improve their lot in life.

3.3.7. User Involvement

Some deleading techniques will require the relocation of occupants from a residence, because of the hazards involved, while they are being implemented. Other methods require mere dislocation from a room.

3.3.8. Degree of Finish

Many detoxification techniques leave the dwelling in a crude, unfinished state unless further finish work is done, i.e., scraping. Other methods provide a finished surface in the course of carrying out the method; i.e., prefinished panels.

3.3.9. In-Use Performance

In general, consideration of performance properties is only applicable to finished surfaces since individual components, such as gypsum board, were not designed for use without the application of a protective surface coating.

3.3.9.1. Occupant Health and Safety

Attributes to be considered include:

a. Fire Resistance

B. Toxicity

c. Anthropometric Fit

d. Vermin Resistance

e. Mold Growth Resistance

f. Dirt Collection Resistance

3.3.9.2. Durability and Stability

Properties to be taken account of include:

a. Structural Integrity

b. Scratch Resistance

c. Impact Resistance

d. Abrasion Resistance

e. Moisture Resistance

f. Vibration Resistance

g. Color Fastness

h. Aging Resistance

3.3.9.3. Acceptability

Several factors in addition to those which affect health and the structural integrity of a residence should be considered.

a. Washability of the Surface

b. Maintainability of the Surface

c. Acoustic Properties

d. Color

e. Reflectance

f. Attachment Capability

g. Appearance

h. Modifiability

4. PERFORMANCE CRITERIA

Attributes are qualitative descriptors of the nature of performance whereas criteria are the quantitative statements of the levels of performance that are to be achieved.

Criteria for the evaluation of lead paint poisoning elimination methods are being established on the basis of current technical knowledge to assist municipalities in decision making. The criteria will be structured so that present methods as well as innovative methods can be judged as to their merits for the particular problem that is confronted.

The criteria are being indexed in the format of a matrix that relates attributes to affected elements. The affected elements include both vertical and horizontal surfaces, vertical and horizontal assemblies, and fixtures that include windows, doors, railings, cabinets and other

affected elements. The attributes considered are structural integrity, installation health and safety, occupant health and safety, waste disposal, ancillary work, degree of finish and durability and stability.

The structure of each method evaluation is as follows:

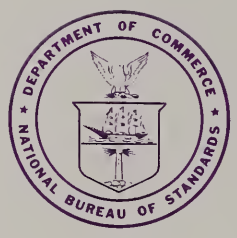
1. Requirement - a description of what performance is expected.
2. Criterion - the actual "numbers" that would satisfy the requirement.
3. Test - a statement of those standard test methods or a description of an adequate test that can be used to verify the "numbers" stated in the criterion.
4. Commentary - a statement of the rationale used for establishing the criterion that satisfies the requirement.

These criteria, which are intended to acquaint engineers with the specific minimum performance recommendations that apply to detoxification methods, will be included in a supplementary report.

Factors such as user involvement, community involvement and cost, are not resultant effects of the implementation of the hazard elimination method chosen, and, therefore, will not be considered.

5. FOOTNOTES

1. "Paint Pencil Problems," The Washington Post, September 21, 1971, p. B2.
2. "Toothpaste Tube Warning," The Washington Post, September 16, 1971, p. C7.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