CHAPTER 7

ABATEMENT METHODS

Instructor's Manual

Instructor's Manual

Learning objectives

In this chapter you will learn about

- replacement
- enclosure
- encapsulation
- paint removal by
  - wet scraping and planing
  - electric heat guns
  - HEPA sanders
  - HEPA needle guns
  - chemical strippers

Instructor's notes

This chapter follows the appropriate work rules you went over in Chapter 6, Setup. The challenge of this chapter is to make it as realistic and practical as possible and, at the same time, integrate work controls and safe work practices. It should be emphasized that in choosing an abatement method, you must always consider the amount of lead dust that will be generated.

Be aware that while in some states methylene chloride is banned for use in residential lead abatement, it is available in hardware store across the country. There are other chemical strippers without methylene chloride that are also readily available.

This section should be taught by someone who has **practical** experience—an individual who has done the work and has seen the outcome of the choices made. Remember, though, that this is an introduction to abatement methods, which are covered in much greater detail in Appendix A (for use with hands-on activities). If you yourself do not have this experience, you may still be able to teach this section with backup assistance from someone who does.

On the next page is a menu of options for teaching Abatement Methods. It is suggested that you allow 60 minutes to teach this chapter.

Training methods

It is recommended that you do A, B, and C

A.	Skit and discussion	10 minutes
B.	Lecture/Slides	30 minutes
C.	Small Groups: Who is at risk and why?	20 minutes

Instructor's Manual

Skit and discussion (10 minutes)

Skit: On the job

Abdul and Ed have been working on a house in an older neighborhood for the last two weeks. Their boss told them that the job should not take more than three weeks.

Abdul: Hey! Slow down buddy. What are you doing dry scraping that trim? You know the specs say no dry scraping.

Ed: Don't worry about it. You can just clean up underneath me as I go. I'll help you clean up once I'm done.

Abdul: Yeah, but dry scraping creates a lot of dust.

Ed: No problem. You're wearing your respirator, right?

Abdul: Respirators will only protect you so much. We're going to have a tougher time doing clean-up. You really need to slow down and cut out the dry scraping.

Ed: And you need to quit talking and start cleaning. If you can't keep up with me, that's your problem, not mine.

Instructor's Manual

Discussion questions

1. **Who is right, Abdul or Ed?**

   Abdul—the specs say no dry scraping. EPA, HUD and state/tribal regulations do not allow dry scraping for large areas of paint removal.

2. **Is there anything wrong with dry scraping if you clean it up immediately?**

   The problem with dry scraping is that it generates a lot of lead dust. The lead dust will fall downwards, but not necessarily immediately. It can also be found as much as six feet away from where it is generated. It sticks to surfaces and is not always visible. For all of these reasons, it's best not to create lead dust because it is so hard to clean up.

3. **Why is Abdul concerned about the dry scraping if he is wearing a respirator?**

   Abdul is right to say that a respirator will protect you only so much. We do not know what kind of respirator he has, so we do not know the protection factor. But, we do know that the more dust generated, the higher the worker exposure.

4. **Do you agree or disagree with the following statements?**

   _____ Abdul should work faster and clean up after Ed.

   _____ Ed should slow down and stop dry scraping.

5. **Why do you think Ed is in such a hurry?**

   Answers can vary. "Maybe, he wants to win over the foreman." "He has plans after work." "His pay depends on getting the job done on schedule." "There a bonus if the job gets done early."

6. **What could the supervisor do to ensure that no dry scraping occurs at the site?**

   Possible answers: "Outline the abatement methods to be used for each surface ahead of time." "Provide enough wet misters and water sprayers." "Threaten to discipline anybody who is caught dry scraping." "Educate the work crew that dry scraping will make it harder to do cleanup."

Instructor's Manual

Instructor's Manual

Lecture/Slides

Purpose: To provide information on the advantages and disadvantages of the different lead-based paint abatement methods and identify methods that are prohibited and methods that are not recommended in residential abatement.

Materials: Slide projector, slides

Directions: Make sure you involve the class in the slide presentation. Ask questions of the class to keep them involved.

Try not to read from the supplied notes about each slide. Using your own words will make it more interesting for the class. You can add any personal experience that you may have that is relevant. Notes are supplied for slides that are a part of this training kit. The notes include a copy or description of each slide.

Instructor's Manual

Instructor's Manual

Small groups (20 minutes)

"Who is at risk and why?"

Purpose: To allow trainees to build on the information they've learned so far. It gives an opportunity to assess which work practices cause exposure and who is most at risk. It also serves as a review of control methods, equipment, and blood lead levels.

Materials: Blackboard or flip chart, chalk or markers, and copies of the story and Data Sheet.

Directions:

1. Hand out the story.
2. Have trainees break into groups of three to six people.
3. Let them answer the questions in the small groups.
4. Go over the answers in a large group.
5. Hand out the data sheet and review it.
    a. Review how symptoms do not always indicate how serious blood lead levels are.
    b. Review how chelation treatment may not be a one-time event since blood lead levels can "bounce back" as lead stored in the bones is released.
    c. Point out how susceptible children and fetuses are.

Instructor's Manual

Small group exercise

Instructions:

The following story is a true one. It was taken from the October 1990 issue of the *American Journal of Public Health*. In small groups, read the story and answer the questions together. Have one person write down your answers. Use your manual to look up any information you need.

Mr. and Mrs. A had two children, a five-year old daughter and a 20-month old son. They moved into a Victorian farm house in rural upstate New York in June, 1987.

A crew of workers renovated the farm house from August to October. They restored the floor, doorways, and wooden moldings. Two workers used rotary and hand sanders to remover old paint and wallpaper from the floors and walls. They used torches, heat guns, and chemical wood stripper to remove paint from the moldings and door frames.

During part of the renovation, the family was on vacation. Their dogs stayed behind. One of the dogs liked one of the workers and hung out with him a lot. Only partial cleanup had been done before the family got back. The job was not done. Work areas had not been sealed off while the work was performed. Mrs. A helped finish the work by torching some of the moldings in the front yard.

The family tried to stay out of the way until the job was done. This was easy for Mr. A, who worked in New York City and traveled a lot. Mrs. A continued to work out of her office in the house. To make sure the children were safe, they hired a baby-sitter to keep the children outside of the house. The baby-sitter brought her two children. In January, Mrs. A discovered she was eight weeks pregnant.

It was later discovered that the painted surfaces had high levels of lead.

Instructor's Manual

1. Who is at greatest risk of getting lead poisoned?

2. Who has the least risk of getting lead poisoned?

3. How could lead poisoning have been prevented?

4. How could the workers have protected themselves?

5. How do you think they found out the family and workers were getting lead poisoned?

When you finish answering these questions, your instructor will review them with the whole class. Your instructor will also hand out a data sheet that has information about the symptoms that the people in the story experienced and how they responded to chelation treatment.

Instructor's Manual

Small group exercise (answers)

1. **Who is at greatest risk of getting lead poisoned?**

   Answers can vary but should include Mrs. A, her fetus, the A's children and dogs (the baby-sitter's children would also be an acceptable answer). Very low levels of lead exposure can affect a fetus. In addition, Mrs. A was doing torch work without proper protection. The A's children are at risk because there was not complete cleanup before they returned from vacation. The dogs are high-risk because they stayed behind during the entire renovation.

   We don't know about the workers but we can assume they were not adequately protected (especially since this project was done before OSHA issued a lead in construction standard [although the OSHA general duty clause was enforceable during the time of this project]). They used work methods that can cause high exposure to lead.

2. **Who has the least risk of getting lead poisoned?**

   Mr. A is the least likely to have gotten lead poisoned.

3. **How could lead poisoning have been prevented?**

   The contractor should have had the workers use better work practices—that is, no rotary or hand sanders used without HEPA-attachments. The contractor should have had them seal off the work area and setup for any outside work to protect the soil. They should have finished the work and cleaned up before the family returned. The family should not have been allowed back in the house until after the work was finished, including cleanup. (Discuss how in some situations, moving out of the house is not an option for financial reasons. In that case, the setup and sealing off the work areas is even more important.) The dogs should have been kept away from the work area. Mrs. A should not have done any abatement work.

4. **How could the workers have protected themselves?**

   The contractor should have provided training and instructions on appropriate and inappropriate work methods (e.g., sealing off the work area(s) from the rest of the house; using PPE to protect the workers; proper worker decontamination and personal hygiene; not using high heat or burning to remove LBP; not allowing dust and debris to accumulate and possibly get tracked, etc.). The contractor could also have provided all the necessary protective clothing and equipment necessary, a clean break area away from the work area, a decon so workers could clean up when they left the work area and so their street clothes wouldn't get contaminated with lead.

Instructor's Manual

5. **How do you think they found out the family and workers were getting lead poisoned?**

   Many answers could be right, but it turns out that the dog had severe symptoms and the veterinarian took a blood lead sample.

Instructor note

Hand out the Data Sheet on the next page after people work in groups. As you go over the sheet with the class, review the symptoms and health effects of lead poisoning and the purpose of chelation treatment.

Instructor's Manual

Data sheet

Victim	Initial blood lead level	Symptoms	Treatment	Results
Dog 1	51 µg/dL	Shaking and twisting	Chelation	Improved, but died 3 days later of kidney failure.
Dog 2	65+ µg/dL	None	Chelation	Recovered
Mrs. A	45 µg/dL	Tired and weak	Chelation at hospital	Still tired and 2 weeks later found out she was pregnant. Opted for therapeutic abortion.
Daughter (5 yrs. old)	54 µg/dL	Stomach aches	Chelation at hospital	Blood lead level went down to 36 µg/dL. Required 1 more round of chelation.
Son (20 mos. old)	84 µg/dL	Not available	Chelation at hospital	Blood lead level went down to 52 µg/dL. Required 4 more rounds of chelation.
Mr. A	38 µg/dL	One episode of nausea	None	No apparent problems
Babysitter	16 µg/dL	Not available	Not available	Not available
Daughter (2 yrs. old)	65 µg/dL	Not available	Chelation at hospital	Blood lead level went down to 18 µg/dL
Son (3 yrs. old)	55 µg/dL	Not available	Chelation at hospital	Blood lead level went down to 14 µg/dL
Workers	No information	??	??	??

Instructor's Manual

Instructor's Manual

Hands-on exercises

Station 1: Replacement and removal

Preparation

1. Wall with windows
2. Table
3. Tools, equipment, and materials

Tools and equipment

1 hammer
1 saw
8 2x4 boards
1 8-foot x 4-foot sheet plywood
1 box of nails (10D common)
1 box of small finishing nails
1 4-foot-long baseboard molding strip
1 4-foot-long crown molding strip
1 4-foot-long chair rail (optional)
1 wooden window or double-hung door
1 vinyl replacement window
1 roll of duct tape
1 gallon of latex paint
1 quart of trim paint (optional)
1 lead warning sign
1 30-foot sheet of 6-mil poly
2 heat guns
1 tape measure (210 feet)
2 spray bottles with water
2 utility knives
2 multi-head scrapers
2 4-inch 4-way scrapers
2 6-inch 4-way scrapers
4 pairs of gloves (cotton grip)
2 safety goggles
1 ABC fire extinguisher
1 HEPA vacuum
1 box respirator cleaning wipes
1 roll barrier tape (red or yellow)

Instructor's Manual

To construct the hands-on station:

1. To start, you should build a 8-foot x 4-foot 2x4 frame. Cut two feet from the top of the plywood sheet. Cut an opening to the measurements of window to be inserted. If a handsaw is used, the window square should be cut on the side of the plywood. If a circular power saw is used the window may be placed in the center of the plywood.
2. Place cut plywood on 2x4 frame and nail or screw to back of plywood. This will provide support for the window.
3. Place window into frame. To demonstrate replacement of window, do not permanently secure the window. Make a hole in the 2x4 window frame and adjacent hole in the window. Secure with 4" to 10" lag bolt which can be removed and inserted when needed. Add a strip of baseboard molding to the bottom, and a strip of crown molding to the top. A chair rail molding for the center is optional. Small finishing nails should be used so you will not crack molding.

4. Cut two 2x4's into 3 1/2-foot long boards to be nailed or screwed to bottom sides of plywood frame. These are feet and allow the wall to be free standing.
5. Paint wall with two to three coats of latex paint. Trim paint may be used for molding. Other methods of support may be used as desired.

Do not use lead-based painted surfaces during hands-on activities!

Participants need to practice skill on nonhazardous materials.

Hands-on practice

Objectives: By the end of this rotation, trainees will

- suit up with appropriate PPE;
- demonstrate safe use of a heat gun;
- demonstrate use of wet scraping and wet planing;
- demonstrate replacement of windows/door;
- assist in daily clean up.

Directions:

1. Have trainees suit up and fit check their respirators (**only use respirators if trainees have previously had OSHA respirator training**).
2. If the area was not set up in the set up exercise, have trainees set up the area around the station with signs and tape. Have them lay poly on floor by the wall. Make sure there are two layers. Warn trainees that they should cut the poly away from themselves.
3. Have trainees identify areas of impact and friction on the window.
4. Demonstrate how to use a heat gun along with a PAPR.

   Demonstrate the proper use of the PAPR respirator by wearing one for this demonstration. When demonstrating how to use a heat gun, explain to the students that most heat guns have two settings: low (600 degrees) and high (1,100 degrees). Using a heat gun at temperatures above 1,100 degrees is prohibited for work in residential or child-occupied facilities (e.g., child care centers). Some heat guns will turn off automatically if the heat gun gets too hot.

   How effectively the heat gun removes lead paint depends on the substrate. If you have difficulty removing paint from a substrate without using a high setting, consider a different removal method. Emphasize that heat guns must not be used on hollow surfaces. Heat guns should only be used on solid wood.

Instructor's Manual

Always point the heat gun away from you. Emphasize to the students that heat guns can cause serious burns even if used at the lower setting. The immediate treatment for serious burns is to run cold water over the burned skin for at least 15 minutes. Call for emergency help.

Heat guns can cause a smoldering fire and must be used carefully. Always have a fire extinguisher available whenever you use a heat gun.

5. Demonstrate how to wet scrape.

   When demonstrating wet scraping, emphasize that this method is used primarily as a preparation for small areas. Wet scraping takes a lot of time. It is not a cost-effective method for removing paint from large surfaces.

6. Demonstrate how to wet plane.

   Demonstration of wet planing can also be provided. Both wet scraping and wet planing can be used as interim controls, as well as abatement removal.

7. Break the class into three groups. Keep trainees with their buddies. Assign each group to one of the three removal activities. Then rotate the groups. Allow each trainee to practice using the heat gun, wet scraping, and wet planing. Make sure PAPRs are used by all trainees when they use the heat gun. Allow at least 15 minutes for each activity.

   Each trainee must remove paint successfully using both a heat gun and wet scraping. "Successfully" means being able to remove paint as well as keep the substrate in good condition. Remind the participants that removal by these methods is slow and tedious.

8. Demonstrate how to replace building components.

   Have the trainees set up poly on the ground outside as well as inside of the window area. The poly can be taped on the wall area just below the window. Have trainees HEPA vacuum the entire window.

   Wet mist the window before removal. Simulate removal by unscrewing the bolts to dislodge the window.

   Have trainees remove the window place it on poly, and wrap it as large debris. Then have trainees HEPA-vacuum the area where the window was removed. Replacement cannot occur on a job until this cleanup has occurred. This keeps the new window from getting contaminated. Discuss how to replace the new window, including caulking.

   You may consider demonstrating the interim controls which are described in the student manual (Chapter 5). If so, make sure to poly the outside of the window as a part of setup for the interim control. In addition, make a list of the additional equipment you will need for the demonstration.

Instructor's Manual

9. Have the trainees assist in daily cleanup. Wrap large debris, wet mop and HEPA vacuum all surfaces. Check the containment for rips and tears.
10. Initial the check off sheets for each trainee in this rotation.

Instructor's Manual

Station 2: Encapsulation

Preparation

Setup

1. Wall with molding
2. Table
3. Tools, equipment, and materials

Tools and equipment

1 gallon of three different encapsulants, MSDSs for each encapsulants
1 tape measure
1 box of small finishing nails
1 hammer
1 saw
1 box of 10D common nails

(Have at least three types of encapsulants available. Make sure you have MSDSs for all products that are demonstrated.)

8 2x4 boards
1 sheet 8-foot x 4-foot plywood
1 6-foot baseboard molding
1 6-foot chair rail molding (optional)
1 6-foot crown molding
2 paint rollers
1 paint roller pan
2 disposable paint trays (plastic)
1 gallon of latex paint
1 HEPA vacuum
1 30-inch sheet of 6-mil poly
2 PAPRs**
2 flat 2-inch scrapers
2 spray bottles
2 2-inch paint brushes
2 utility knives
2 4-inch paint brushes
1 roll of duct tape
1 lead warning sign
1 red barrier tape
1 30-inch sheet of 6-mil poly

**PAPRs only to be used if trainees have already had the OSHA training on respirator care and use.

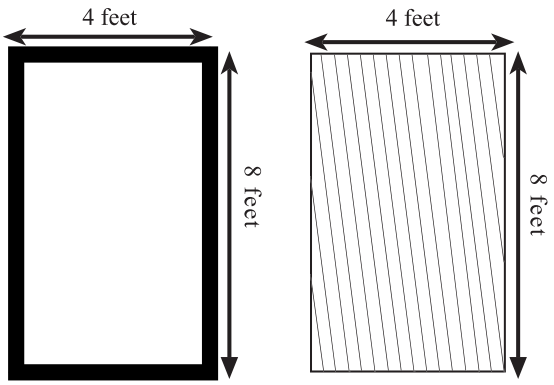
Instructor's Manual

To construct the hands-on station

1. To start, build an 8-foot x 4-foot square frame with 2x4's.

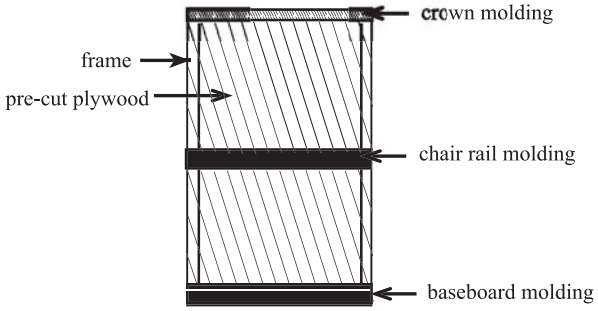
   Use nails and screws to hold the 2x4's together.

   Place a precut 8-foot x 4-foot sheet of plywood to the frame.



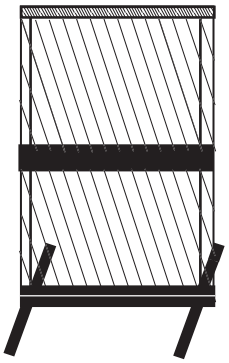
Frame **Pre-cut plywood**

2. Add a strip of baseboard molding to the bottom, a strip of crown molding to the top, and chair rail molding at the center (optional).



Add molding to the "wall"

3. Cut two 3' 1/2" long 2x4's to be nailed or screwed to the bottom sides of the plywood framed wall. These boards will serve as "feet" for the wall to stabilize it and allow it to stand freely. (Other methods of support may be used for the feet.)



Feet will balance the wall

4. Paint the wall with two to three coats of latex paint. You can use trim paint for the molding.

Instructor's Manual

Instructor's Manual

Objectives

By the end of the rotation, trainees will be able to:

- use MSDSs to figure out the proper personal protective equipment needed when using an encapsulant;
- demonstrate how to prepare a surface for encapsulation;
- demonstrate how to do a patch test;
- demonstrate the use of an encapsulant;
- assist in daily cleanup.

Directions

1. Show trainees all the materials that you have set on the table which will be used during this rotation. Have at least three types of encapsulants available. Make sure your state allows you to use the encapsulant materials you have chosen.

   Explain to the students that some encapsulants involve only one step while others are a two-step process. One-step encapsulants have a primer and finish combined and can be hand painted with a brush, or sprayed with a low pressure sprayer onto a lead surface all at once. Two-step encapsulants have two separate coats of paint—a primer, and a finish coat—which must be applied separately. Fiber mesh is also used with encapsulants. It forms a bridging on walls for added support.

2. Review with the class the MSDSs for all the materials. Explain to them that all products with hazardous chemical ingredients must come with an MSDS. They need to read the MSDS of the encapsulant they will be using so they know about the hazards of the product.

   Encourage students to look at the MSDSs when they purchase encapsulants in the future. Tell them to make sure that the one they choose is effective and being used by others. It is also very important that they find out if their state allows the use of encapsulants.

   Have the trainees choose which encapsulant they will use.

   (If they pick an encapsulant that is not as safe as others, have them look at the MSDSs more closely.) Ask them to identify the appropriate personal protective equipment required for the product they choose. Make sure you have the appropriate personal protective equipment available for them. They must know what kind of respirator filter they need (e.g., do they need an organic vapor cartridge as well as a HEPA cartridge?) and any other kind of protection.

3. Have the trainees suit up and fit check their respirators.

4. Have trainees set up the area around the station with barrier tape and warning signs. Have them clean the area. HEPA vacuum to remove the small lead dust particles on and around the surface to be encapsulated.

   Then, have trainees lay out 6-mil poly on the floor below the wall and tape it with duct tape. If the baseboard does not have lead paint, then the poly can be taped to the baseboard. (If it is the trainees' first rotation, have them lay down two layers.) Remind students to always cut the poly away from themselves.

5. Guide the trainees through surface preparation—be sure to let them do it. Emphasize to students how important surface preparation is. Emphasize to the students that they must follow the manufacturer's instructions on how to prepare the surface they are encapsulating. The wall or surface must be in good condition for an encapsulation to be successful. Encapsulation will not work if the wall is separating from wood or metal lath. It will not work if the surface is damaged.

   To prepare the surface, trainees need to:

   - Lightly wet scrape any loose paint with a 2-inch scraper.
   - Then, wipe down the walls with towels and a bucket of cleaning solution (an all-purpose cleaner or a cleaner made just for lead cleanup). This cleans off any dirt, grease, or anything else that could cause the encapsulant to not stick properly to the surface.

   Emphasize to students that they need to follow the manufacturer's instructions that come with the product.

6. Have the trainees do a "test patch" to see if the encapsulant will work on the given area. The students should measure a small area on the surface to be encapsulated (about 1 square foot for walls; less for smaller areas). One of the students should take a piece of duct tape and place it across the marked area. Apply the encapsulant over the duct tape. Leave a corner of the duct tape uncovered.

   Have the students use the wet film thickness gauge (usually provided with an encapsulant) to determine if they have spread it thickly enough. Students should refer to manufacturer's instructions. Let it dry for the amount of time specified by the manufacturer. Emphasize to students that they need to follow the instructions that come with the product.

   When the encapsulant is dry, try to pull tape away from the wall. (You may need to wait until the next training day.) If it does not pull away from the wall, the test patch is a success and the encapsulant is good for that surface. If the tape does pull away from the wall, or if the test patch bubbles or wrinkles, the test patch fails. Suggest that students try another brand of encapsulant or choose another abatement method for that surface.

Instructor's Manual

7. If the test patch is a success, continue applying the encapsulant to the whole wall surface. Guide the trainees as they apply the encapsulant. Emphasize to students that they need to follow the instructions that come with the product.

   The encapsulant must be evenly applied on the surface. On small jobs, you can often use a brush or roller to apply an encapsulant. For large jobs, sometimes an airless, low-pressure sprayer is used.

   Follow the manufacturer's instructions. Most encapsulants are applied to a thickness of 18 mils (that is, the thickness of three layers of 6-mil poly together). The manufacturer usually will send a tool to measure the thickness of the application (called a wet film thickness gauge). Often two coats are needed, since encapsulants usually shrink once they dry. If you are using a fiber mesh system, be careful to avoid air pockets between the mesh and the surface.

8. Have students go through the steps of daily cleanup.

   The students should wrap all large debris in 6-mil poly and seal with duct tape. (At this station the primary debris will be extra plywood from the enclosure.) Next they should wet mop the floor and bag the small debris in 6-mil poly. All surfaces should be HEPA vacuumed each day as part of daily cleanup. The last step in daily cleanup is to check the poly and repair any tears or rips.

Instructor's Manual

Station 3: Enclosure

This station can be managed along with station two in one rotation time.

Preparation

Setup

1. Training stairs of three to four steps, movable floor with pre-floor and primary floor.
2. Table
3. Tools, equipment, and materials

Tools and equipment

3-foot high staircase
1 30-foot sheet of 6 mil poly
1 sheet of luan plywood
1 sheet of 8-foot x 4-foot plywood
Various samples of rubber tread
1 rubber treading (measured to staircase)
1 saw
1 caulking gun
1 tube caulking
1 210-foot tape measure
2 utility knives
1 roll of duct tape
1 lead warning sign
1 roll of red barrier tape
2 PAPR
HEPA vacuum

To construct the hands-on station

1. For the stairs, either purchase or build a 3-step or 4-step set of stairs. Measure and cut a piece of rubber treading for the tread. Measure and cut a piece of luan plywood for the riser face. Back-caulk the plywood: apply a bead of caulk around the edges and a serpentine bead down the center of the plywood. Allow the caulk to dry. This way you can show the trainees how to back-caulk without permanently placing the plywood to the stairs. Purchase some nonstick glue from a toy store for trainees to use to demonstrate back caulking. Have metal nosing for the stair lip—this will form the final piece of the enclosure.
2. For the floor enclosure, either use a 4' x 4' floor or use a corner in the training area. Have plywood available for the pre-floor covering and a primary floor of either tile or wood. Either measure and cut the pre-floor and primary floor before the hands-on exercise or have the trainees measure and cut as part of the exercise.

Instructor's Manual

Instructor's Manual

Objectives

By the end of this station, trainees will

- list three situations where an enclosure could be used;
- demonstrate appropriate setup;
- demonstrate surface preparation for enclosure;
- define dust tight and why it is important to have the enclosure be dust tight;
- demonstrate appropriate back-caulking;
- enclose a step or piece of floor.

Directions

1. Have trainees suit up and fit check their respirators (**only use respirators if trainees have previously had OSHA respirator training**).
2. Have trainees set up the work area.
3. Have trainees demonstrate surface preparation for areas to be enclosed. Review with the trainees that all the chipping and flaking paint must be removed from the area that will be enclosed. Any "source problems" such as water leaks must be repaired. If the source problem is not addressed or the surface is not adequately prepared, the enclosure will fail. The words "Lead Paint" should be written on the steps, so that if an enclosure fails or is removed the hazard is identified.
4. Demonstrate appropriate enclosure methods for stairs and floor.

   Materials to build enclosures include: aluminum, panelling, filter board, plywood, and dry wall. (These are listed in the student manual on page 7-7.) Rubber treading can be used to enclose stair treads. Thin plywood can be used to enclose the risers.

   Enclosing stairs demonstration

   Have the students measure the width and length of the risers. With the saw, cut 1/4-inch thick luan plywood to the exact measurements of riser. Then, back-caulk the cut piece of plywood with nonstick glue: apply a bead of caulk around the edges and a serpentine bead down the center of the plywood. (For training purposes, instructors may place a piece of luan plywood without caulking into place on riser.)

Let students cut a separate piece of plywood to practice the caulking technique.

Have the students measure the width and length of the treads. A tread pad (or treading) is selected for the type of nose it has. Industrial treads are thicker and stronger and have more durability than other treads. Explain to students the importance of using metal nosing in addition to the nose on a tread pad for additional strength.

Enclosing floors demonstration

Use an 8-foot x 4-foot sheet of plywood, vinyl tiles (non-asbestos), and a strip of shoe molding.

The first stage: a pre-floor is put in place over the lead painted floor with mastic or caulking and nailed secure. Seams of the plywood floor should be caulked as well. This provides an airtight enclosure.

The second stage: new floor materials are installed on top of the plywood pre-floor. Back caulk the vinyl tiles and install them (you should be able to get four squares across).

Then install shoe molding along the perimeter of the floor (i.e., where it would meet the wall) with caulk and small finishing nails. Shoe molding provides an airtight seal around the edges of the floor enclosure. It must be back-caulked and bottom-caulked. It should fit snugly against the enclosed floor and the wall.

5. Have each trainee demonstrate an appropriate enclosure.
6. Have the group finish the rotation with daily cleanup.

   The students should wrap all large debris in 6-mil poly and seal with duct tape. (At this station the primary debris will be extra plywood from the enclosure.) Next they should wet mop the floor and bag the small debris in 6-mil poly. All surfaces should be HEPA vacuumed each day as part of daily clean up. The last step in daily cleanup is to check the poly and repair any tears or rips.

Instructor's Manual

Station 4: Chemical stripping/removal

Preparation

Setup

1. Simulated fireplace mantle
2. Table
3. Tools, equipment, and materials

Tools and equipment

1 tape measure
1 hammer
1 box of nails (common)
1 saw
1 box of finishing nails
4 2x4 boards
10 feet of 4-inch-wide decorative crown molding
3 9-inch x 2-inch boards (6 ft. long)
1 mop
1 case of polyethylene suits
1 case of disposable booties
1 case of disposable suits
1 roll of red (warning) barrier tape
1 75-foot of sheet poly
1 package of litmus paper
1 roll of duct tape
1 gallon of caustic paste paint remover
MSDS for paint remover
1 gallon of neutralizer (if applicable)
MSDS for neutralizer
2 plastic trowel applicators
3 3-inch flat scrapers
2 spray bottles with water
1 box of all-purpose cleaner, MSDS
2 buckets
1 bag of rags
1 lead warning sign
1 HEPA vacuum
6 pair of rubber gloves
4 pairs of goggles
respirators with organic/vapor HEPA filters (enough for all participants)
1 eye wash station

Instructor's Manual

To construct the hands-on station:

1. For shelf: cut a 1-foot-long segment of a 9-inch x 2-inch board.

   For legs: cut two 4-foot-long segments of 9-inch x 2-inch boards.

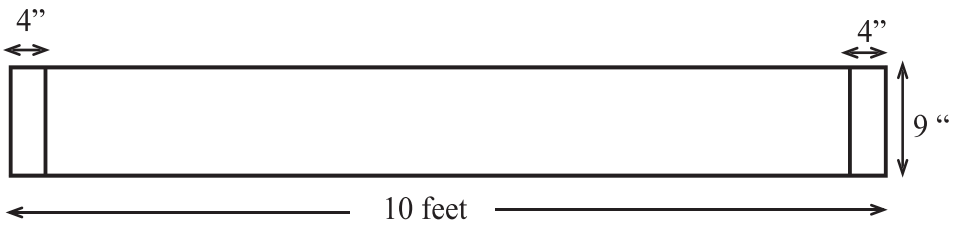
   For feet: cut two 3-foot-long segments of 2x4's.

   For support blocks: cut two 9-inch-long 2x4's.

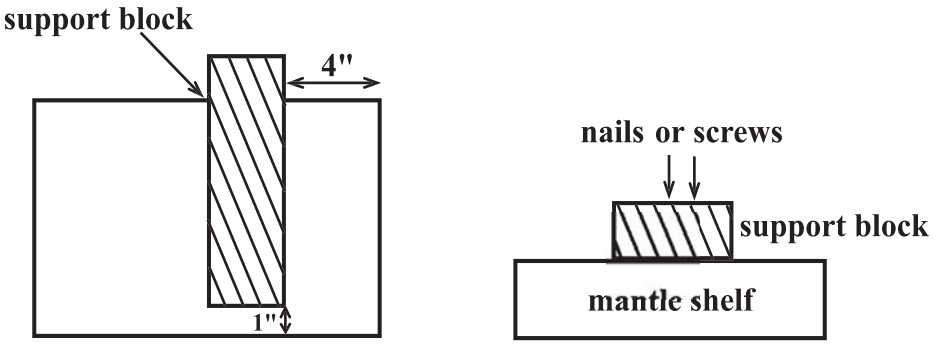
   For support beam (optional): cut a 9-foot, 4-inch-long 2x4.

2. Measure and mark off four inches in from each end of the mantle shelf. Then measure and mark off one inch from the front side of the mantle shelf.

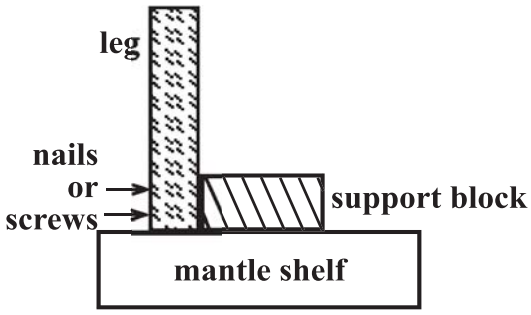
Place the support blocks along the inside of the 4-inch mark and up to the 1-inch mark. Note: The blocks will hang over the back of the shelf by one inch. Using nails



or screws, secure the support blocks to the shelf.

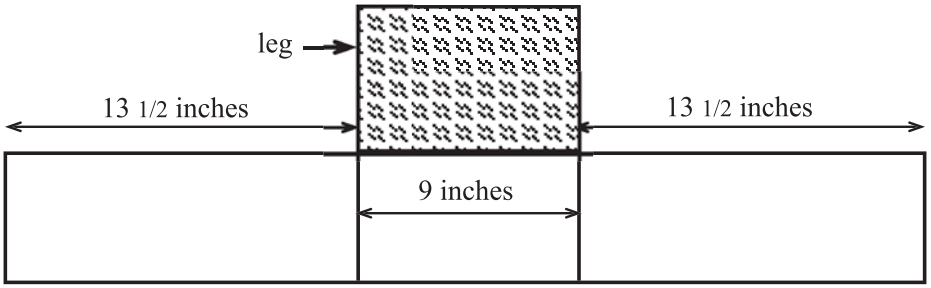


3. Line up the legs against the support blocks and the shelf. Note: The back edge of the legs will hang over the back of the shelf by one inch. Using nails or screws, secure the legs to the support blocks.



Instructor's Manual

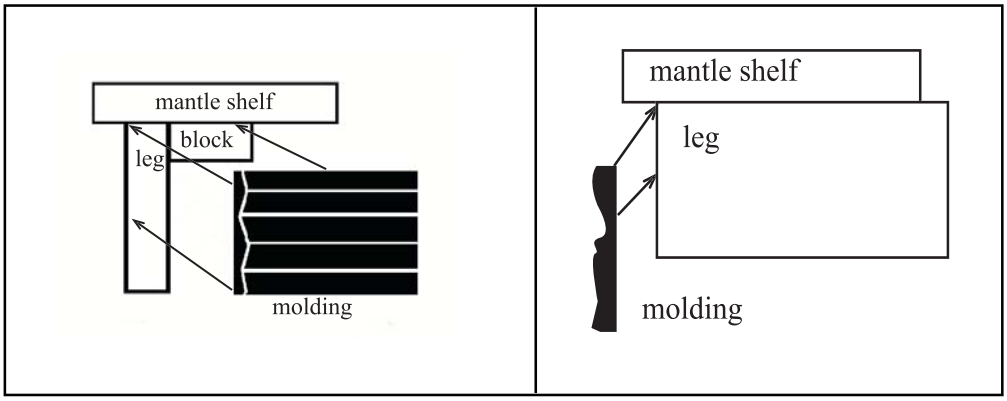
4. Measure and mark off 13 1/2 inches in from each end of the feet. Using these marks, center the feet along the inside of the legs. Using nails or screws, secure the feet to the legs.



5. (Optional) For added leg support, measure to the halfway point of legs and mark with pencil. Line up the 9-foot, 4-inch-long support beam with these marks between the legs. Secure it to both legs with nails or screws. For even more support, cut another 9-foot, 4-inch-long 2x4 and line attach it at the bottom of the leg boards.

6. Cut the decorative molding at a length that matches the distance between the far edge of one leg to the far edge of the other leg (about 9 feet, 8 inches). Place the molding against the front edge of the legs and support blocks, under the mantle shelf (where it hangs over). Secure the molding to the support blocks with finishing nails.

Instructor's Manual



Front view **Side view**

7. Paint the entire mantelpiece with three to four coats of latex paint. Make sure you use at least three different colors of paint on the surface area that you will be using to demonstrate the stripping.

Hands-on practice

Objectives

By the end of this station, trainees will

- list the situations where chemical stripping could be used;
- chose the most appropriate stripper available at the station;
- identify and put on the proper protective gear;
- demonstrate appropriate setup;
- demonstrate application of chemical stripper;
- demonstrate proper removal of the painted surface;
- demonstrate appropriate waste disposal;
- demonstrate daily clean up.

Directions

1. Review the product MSDS.

   Provide at least two types of chemical stripper and their MSDSs. Have the trainees break into two groups. Each group will be responsible for reviewing one of the stripping agents and presenting the pros and cons of using that agent to strip the fireplace. Encourage the trainees to carefully review the product MSDS, especially the sections on ingredients, special precautions, health data, and required protective gear. Have the NIOSH pocket guide available for the class to look at as well. Give the class 10 to 15 minutes to prepare their presentation.

2. Have each group present their product.

   Following the presentations, have the group decide which of the two products they prefer to use and why. Guide the group toward using the safest product.

3. Have the group choose a foreman. Have that person read the directions for application of the product chosen.

4. Have trainees suit up in the proper protective gear and fit check their respirators.

   Make sure that all persons in this hands-on area are wearing eye protection. (This includes the instructor. It is important for the instructor to be appropriately suited up).

5. Have trainees set up the work area.

   Emphasize the need to protect the surfaces and the area surrounding the surface to be stripped. Two layers of poly are needed for the floor area. If there is wall-to-wall carpeting in the training room, you may want to protect the carpet with a subfloor or additional poly.

Instructor's Manual

Talk about carpet removal. If there was wall-to-wall carpeting on an actual abatement job, workers would probably remove it before doing any abatement work. Emphasize that workers need to wear protective clothing and respirators when handling lead-contaminated carpeting. They should wet mist the carpet prior to removing it to reduce the amount of lead dust that gets in the air. Ask the class where you will be kicking up the most dust when removing wall to wall carpet. Ask the class where you might find the largest amount of lead dust on the floor. (Both answers: Close to the walls).

6. Have the trainees apply the stripping agent, with the class foreman directing the activity. Make sure that the foreman is providing the appropriate directions (that is, following the manufacturer's directions).

   If you are using a stripper that requires 12 to 24 hours between application and removal, you will need to apply the stripper the day before the rotation. Apply in small patches of less then 12 inches in length, so that the waste produced is minimized.

7. Have the group select a second foreman to direct the removal of the stripper. Have the trainees remove the paint with the stripper, with the second foreman directing the activity.

   Make sure to discuss waste disposal before removal begins. Hazardous waste may be generated when you use chemical strippers. Make sure that you comply with the local laws for waste disposal with the training waste. Use a strong 5-gallon plastic bucket to collect the removal waste. Have the students set up a funnel with poly to capture any water waste as the area is being cleaned.

   We recommend that only a very small area be removed by each student to minimize the amount of waste produced. Emphasize the need to carefully remove the stripper and paint so as not to damage the surface material.

Instructor's Manual

   It is best to have at least three layers of different colored paint on the surface that will be stripped. This way students can appreciate the need to get off all layers of paint. If all the paint layers do not come off, inform the trainees that on an actual abatement job they would need to reapply the stripper. For training purposes, proceed with the Station so that the entire stripping process is covered.

8. Have the students carefully and thoroughly clean the surface after removing the stripping agent. You will need at least two buckets of water and many rags and one or two brushes. Cleaning is tedious and time consuming. Make sure that all the water waste is collected. Make sure the students have set up a funnel with poly to capture any water waste.

9. Then the surface needs to be neutralized (if applicable). Make sure the area is well ventilated.

   You can move the air flow by using a negative-air machine at this Station.

   Use litmus paper for a visual demonstration of the acid and base neutralization process. Litmus paper can also be used to demonstrate the change in the wash water before and after cleaning the stripped area.

   Have the second foreman read the instructions for the proper method of neutralizing the surface. Have the trainees read the MSDS for the neutralizer to make sure that they are properly protected. Have the trainees apply the neutralizer.

   The neutralizer will have to be left to dry on the surface. This takes six or more hours. This is another day! If the class is back on the next day, you can take them back to this Station and test the surface to see if it is neutral. Most likely it will not be neutral and you will have to pre-wash and neutralize the surface again. Again, return after six hours and test to see if it is neutral. (**If this is only a two-day course based on this EPA worker curriculum, there may not be enough time to complete the neutralization process. Make sure the students understand that this process must be completed before repainting or resealing.**)

   Several steps are always involved in any chemical stripping process and it is a time-consuming process.

10. Readdress the waste disposal issue with the class. All of the requirements stated in Chapter 8 of the student manual can be discussed at this point. Waste disposal is of special concern with chemical stripping. If you are teaching in a state which follows EPA guidance (August 2000) stating that lead abatement waste from *residential structures* is exempt from hazardous waste requirements, then all wastes can be handled as nonhazardous (see Chapter 8, Appendix A). However, some states or localities require concentrated lead wastes, including chemical stripping "sludge" to be tested. Make sure that you make trainees aware of the local, state, tribal, and federal requirements for waste disposal. (Remind the students that their employer and supervisor will be responsible for ensuring that the waste is contained and disposed of properly—See Chapter 8 in the student manual.)

11. Have the group finish the rotation with daily cleanup, if the neutralizer is dry. If the neutralizer is still wet, then have the trainees discuss what would be done for daily clean up. You may choose to keep the second layer of poly down to catch the wet neutralizer.

Instructor's Manual

For more information

These publications have more information on the topics covered in this chapter. You should have a copy of the publications marked with a star (*). You can order copies by calling 1-800-424-LEAD.

*EPA, *Regulatory Status of Waste Generated by Contractors and Residents from Lead-Based Paint Activities Conducted in Households*, Interpretive Memorandum (July 2000).

*EPA, *Lead: Requirement for Lead-Based Paint Activities in Target Housing and Child-occupied Facilities*; 40 CFR Part 745 (August 1996).

*HUD, *Guidance for the Evaluation and Control of Lead-Based Paint Hazards in Housing* (July 1995).

*NIOSH, *Preventing Lead Poisoning in Construction Workers* (April 1992).

*OSHA, *Interim Final Lead in Construction Standard,* 29 CFR 1926.62 (May 1993)

OSHA, *Lead in Construction, OSHA 3142* (1993).

Society for Occupational and Environmental Health, *Protecting Workers and Their Communities from Lead Hazards: A Guide for Protective Work Practices and Effective Worker Training* (1993).

Instructor's Manual