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**FEATURE**

**130 CONTROLLING LEAD EXPOSURE IN A STUDIO ENVIRONMENT** - Fred Shea  
*interviewed by Richard L. Hoover* - how a Massachusetts restoration studio's approach  
develops an environmentally sound work space.

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## One Studio's Efforts...

# Controlling Lead Exposure in a Studio Environment

*An Interview  
by Richard L. Hoover*

**W**here are the areas of greatest potential lead exposure in a stained glass studio? What can be done to protect the crafts-person, studio employees, owners, their families and the environment from lead contamination? And what can be done to make an existing stained glass studio safer? Today, these questions, echo through the stained glass craft.

Fred Shea, owner of Our Glass in Hampden, MA, asked himself those questions and others about possible lead contamination in the mid-1980s; and as a result, he has gradually re-designed and built a remarkably, low-lead studio environment for himself and his 12 employees.

The mainstay and lion's share of Shea's business is re-leading and restoring stained glass church windows.

He long ago recognized that stained glass restoration embodies the potential for lead contamination. Restoration practices, frequently involve removing existing, sometimes oxidized, leaded windows from lead-bearing glazing putties; removing old leads and cement compounds; re-painting missing or broken panes with colors containing lead; then re-leading with new materials. All of these necessary functions place the restoration artisan in almost constant, close contact with solid lead and air-borne lead dust in one form or another.

Although safety procedures, practices and equipment abound throughout his 5,700 square foot studio operation, Shea is the first to caution against complacency. "One thing I would like to emphasize is that I am not a scientist, and I am not extremely well versed in lead contamination. What I have done is try to act on the

information I have been given, or gathered, or found out about. What we have done is not the exact solution to things. I don't think we have that yet. I think we are working toward good solutions, and we've got a good start. I'm sure other people will find other good methods to deal with these things in other ways, and I'm sure many of them will be quite effective too. I don't



*FRED SHEA—owner of Our Glass,  
Hampden, MA*

want anyone who reads this article to take what we've done as gospel. It's just what we've done to get up and running with regards to dealing with the problems of lead exposure that we have become aware of."

**Richard L. Hoover:** *How did you become interested in taking the kinds of precautions and steps that you've taken regarding lead abatement.*

**Fred Shea:** About 4 years ago, we realized that there was a need to be

concerned with lead exposure in the workplace. We had been aware of it to some degree prior to that as it pertains to the personal hygiene of the worker. We knew about not eating or drinking or smoking in the workplace, and that our hands should be clean whenever we leave work for any reason or to go and eat lunch. We also knew that lunch should be eaten outside the workplace. But other than that, we weren't aware, at that time, of areas of exposure other than through ingestion.

Most of what we have since learned was the result of a common sense approach. I'd hear about something, somebody would say "there could be a problem with this or that." I'd make a couple of calls and see if it was a factual comment. If it was true, I'd suggest that maybe we ought to think about doing something to correct the situation. It might take a month or two months or six months to implement, but eventually we would do something about it.

I think I have been lucky because I've had good employees to work with. They have always been willing to rise to the occasion, and address the situation with a grin and a "let's see how it goes" attitude. I've been lucky in that sense.

**RLH:** *Did you become aware of a problem because you or a worker became sick?*

**FS:** No, we hadn't had any problems, but we were aware from information contained in supplier's MSDS sheets, [Manufacturers Safety Data Sheet] with warnings about lead ingestion.

We were aware, even before that, that lead is toxic in high quantities, and that you have to be careful not to ingest any.



**RLH:** Are blood lead levels of you and your workers monitored regularly?

**FS:** We do blood lead level testing about every three or four months, about three times a year. That will continue, and we'll try in our own way, to see if people's numbers continue to go down, which they have done over the past two years.

**RLH:** And the company pays for the monitoring?

**FS:** Yes, we pay for blood lead testing. As a matter of fact, we pay for everything that is involved in the lead abatement program as it relates to the employees.

**RLH:** What areas of potential hazard have you learned about over the past four years?

**FS:** We weren't really aware of the danger of inspiration, where you inhale lead dust. So when we became aware of that, we started thinking of where are the exposures? Where are we going to get lead dust and aspiration of lead dust?

Since we are primarily a restoration studio, we figured that it would be pretty much limited to the lead oxide, or black powder on the surface of the old lead. We decided to take precautions when we are handling the old windows and taking them apart. We took great care in reaching the point where we had the old lead came out of the windows. We then properly disposed of the old lead came. We didn't leave it around in the shop.

The more we thought about that, the more questions we asked. We found out that there are various areas of lead exposure.

**RLH:** What other areas did you discover?

**FS:** The next area that we became aware of was the possibility of lead exposure during the waterproofing process. We found that there may be a small amount of lead dust introduced into the whiting, or plaster of paris, as

a result of scrubbing the windows after the cementing process.

We used a dust mask for the cementing process, initially because no one wanted to breathe plaster of paris. We then decided to somehow isolate that process from the general work area.

That was one of the first steps that we took to segregate any type of work involving lead from the general studio area. We made a small cement room in which we did all the waterproofing. We hooked up a fan and blew the dust outside the room, and kept it separate so that all the plaster of paris dust didn't accumulate throughout the shop as it had previously. We were aware that it might contain some lead.

**RLH:** Is your work all restoration?

**FS:** Until recently, we did restoration work exclusively, but in the last year, we have become more involved in doing new work. Most of these jobs result from inquiries for a new design. We hired an additional employee, a trained artist skilled in designing new windows, who is also skilled in doing the painting necessary for new windows.

**RLH:** What lead exposures have you found to be associated with new work?

**FS:** We have found that new work has some exposures too, but they don't seem to be as great as with restoration because we're working with the fresh lead came which isn't covered with oxide. In that respect fabricating new windows seems to be much cleaner, with the exception of the paint or stains, which in their powder form or in the form of dust, as a result of scrubbing mats or matting, you introduce lead and heavy metal-bearing dust in the air.

**RLH:** How do you deal with that potential exposure?

**FS:** We've limited that exposure by creating a room that's segregated from the general work area. We've created a room strictly for painting. We also do most of our painting on horizontal



**CONTROLLING DUST**—during the cementing process is a vital part of studio lead abatement.



**AIR FILTRATION**—is a critical component in developing and maintaining a quality studio environment.



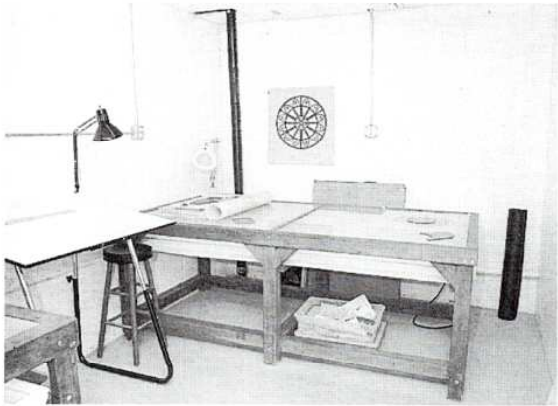
**A PLACE FOR EVERYTHING**—is facilitated behind closed cabinet doors and in individual containers.

light tables. We've set that area up so that it's wet-cleaned every day with a sponge and a bucket of water. All the work surfaces are cleaned. The employees wear an apron and a dust mask and hat or a bonnet.

Also, all the items we use in the painting room, have specific storage

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**CLEANLINESS IS ACHIEVED**—in the paint room by meticulous attention to wet cleaning of horizontal, artificially lit painting easels.



**LOTS OF STORAGE**—keeps work surfaces clean and free of extraneous materials.

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areas. The paints, for instance, are stored in plastic containers with snap-on lids. They are then stored in a closed cabinet. The palettes are also cleaned on a regular basis and stored in cabinets. Different media are stored in leak-proof containers and in a special section in a cabinet. All the palettes, if they have paint on them to be used the next day, are stored in a little pie-safe type of cabinet, so that when they dry, they are not just laying around in open areas where the dust can waft up off of them and into the air. We feel as though this has considerably limited the exposure to the dust, and therefore, the lead and other heavy metals that may be in the paints.

Another item that we plan to install in the paint room, as part of our ongoing lead abatement program, is an air purification unit similar to the one we

have in the cement room.

We may go even further, to the point of attaching a mechanical arm to that unit, and having the mechanical arm set right in front of the matted pieces that are being scrubbed or highlighted. This will draw the dust right into the machine. We've found that most matts mixed with gum arabic and water tend to be fairly heavy, and on a horizontal table, they fall to the table surface.

Matts that are applied with an alcohol or vinegar solution, tend to be pretty light and dusty, so our painter has been working, whenever possible, with gum arabic and water applied matts.

That, combined with the clean-up after the work is done, wet cleaning the glass tabletops and the surrounding areas seems to really control the dust in there.

**RLH:** *Let's take a window that is to undergo restoration from the point where it exists in the church, through the restoration process. At each step along the way please explain not only how that window is being treated, but how lead abatement figures into the process.*

**FS:** After taking a survey of condition, preparing documentation and actually executing a contract to do the work, we remove the window. Now, during removal, there is exposure to lead.

We have been aware that oxides on the lead came were a cause for concern. What we weren't aware of until recently, was the amount of lead in the cement or waterproofing and in the old sash putty.

Sometimes we'll find sash putty that is actually pink. Red lead was used as a drying agent. Other times white lead, or letharge, was used as a drying agent. When we found this out, we required the site workers to wear dust masks, and also uniforms and rubber gloves.

We also use an electric sash putty

removing tool to take out the perimeter putty. The windows are then removed from the carrier frame, numbered and carefully packed for transport back to the studio.

**RLH:** *Tell me more about this special putty removal tool.*

**FS:** We decided about two years ago that removing putty in the traditional fashion, with a hammer and chisel could damage the sash as well as the window in some cases. Of course, this depends on how old the putty is and whether it's been redone recently. It is also a messy operation.

We started using an electric tool that has a small blade that oscillates at a very high r.p.m. and loosens the putty at the bonding point with the sash, often without crumbling it. It seems to remove the putty in much larger pieces, and cuts it away much closer to the wood.

It's a much more surgical process than slugging away with a hammer and a chisel. It also limits the possibility of damage that can occur from the impact of the hammer. There is practically zero breakage in border or glazing fillet, and we can remove the putty in significantly larger pieces.

**RLH:** *As you are removing a window, do you protect the interior of the church from the putty or the dust that may be generated during the removal of the putty?*

**FS:** Yes, our method consists of using drop cloths and a vacuum cleaner. As debris builds up in the work area, we vacuum it up, then at the end of the removal process, we pick up the drop cloths which contain most of the large debris, and remove them from the site. We then sweep and vacuum the area.

With regards to the dust that occurs during the removal process, it seems that when there is protective overglazing in place, it prevents the air from passing through the opening as we are removing the window. Therefore, in this situation, there is little dust blowing into the church. Recently, we



have become more concerned with removals that have no protective overglazing on the outside of the stained glass. In these cases, a breeze can blow the dust around. We just completed a job in which we installed a polyethylene plastic sheet on the interior of the wood frame during the removal process. I believe this eliminated the possibility of any dust entering the church. It seemed to be a good solution, and we will continue to utilize it in the future.

**RLH:** *After the window has been removed from the opening, what is the next potential exposure area?*

**FS:** The lead and the old waterproofing or cementing in the lead, which obviously is contaminated. The old lead and cementing is disposed of in 55 gallon drums which are picked up by the recycler.

We have always recycled our lead, because we know that it can't be thrown away or disposed of irresponsibly.

**RLH:** *Are there recycling facilities readily available to you?*

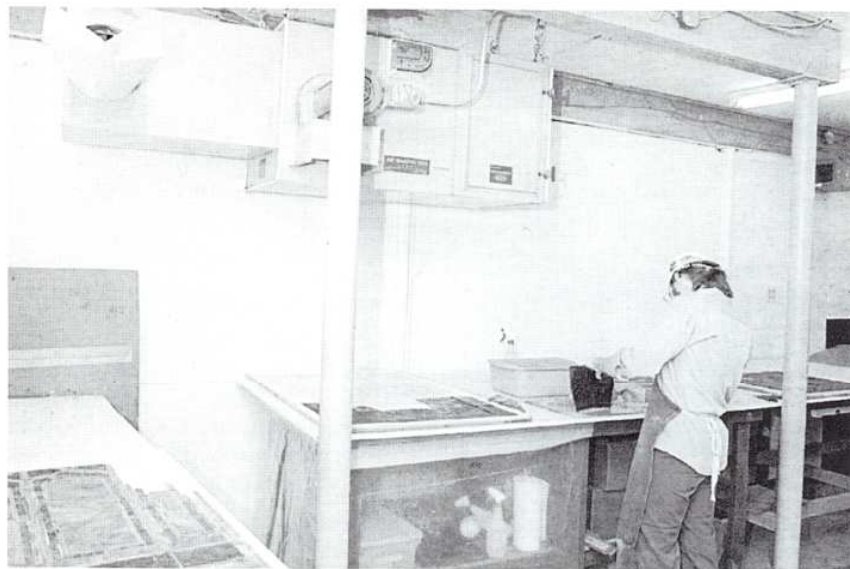
**FS:** Yes, there are several scrap metal dealers who will pick-up the lead.

**RLH:** *Getting back to your studio operation, once a leaded stained glass window has been removed to your studio, what happens next?*

**FS:** It is stored in our 'dirty room,' a name we have given to an area segregated from the glazing area.

Here, we store old windows prior to disassembly. We also perform waterproofing or cementing in this area. Although we call it the 'dirty room,' we take great pains to purify the air, and by isolating the dirtiest operations we perform, to keep the dust and dirt out of the rest of the studio.

This area has an air filtration system that circulates the air through several pleated and box-like filters, and through trays of charcoal flake, then recycles it back into the room. The air is exchanged approximately three to



**DIRTY ROOM DISASSEMBLY**—is done in near proximity to air filtration equipment, on wet-cleanable surfaces with lower table platforms draped to prevent dust infiltration.

four times per minute in this room.

This room also has a central vacuum system that is used to vacuum any debris from the cementing and disassembly process. We have installed a five gallon wet sump filter in-line between the end of the vacuum hose and the central vacuum unit. This seems to collect all the debris in the water, and allows mostly clean air to continue on through the central vacuum unit, which then exhausts to the outside of the building. This system eliminates the problems that we encountered in the past with a standard shop vacuum. The problem with a standard shop vacuum is that it exhausts some of the dust that you are vacuuming up, back out into the shop air.

Once the in-studio condition reports and photo documentation of the window is done, a rubbing is taken. The window is now ready for cleaning.

**RLH:** *Prior to cleaning, do you test the window for its suitability for wet cleaning?*

**FS:** At this point, we test the window and determine if there are sensitive paints, cold enamels, improperly fired stains, or other unstable conditions which might be accelerated by the cleaning process. If we find that the window is in stable condition, we then place individual sections of the win-



**RUBBING**—of the leading patterns of windows undergoing restoration, prior to disassembly, is made in the 'dirty room.'

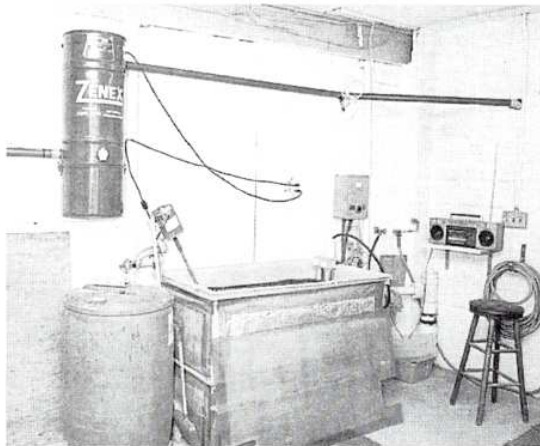
dow vertically in a soaking tank.

The tank is a large, 300 gallon polypropylene tank containing water and a very mild phosphate and alkaline balanced organic detergent. We pH balance the solution in the tank using litmus papers to give us the desired pH neutral balance.

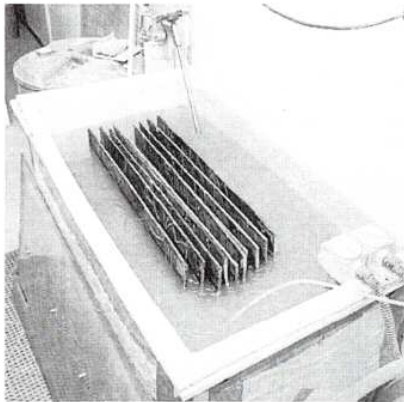
Immersion heaters in the tank bring the temperature of the water up to about 150°F. The panels are immersed for approximately 3 to 8 hours, during which time they are not only cleaned, but more importantly, the water begins to soften the old cementing, or waterproofing, under the lead flanges.

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A SOAKING TANK—softens cement for ease of disassembly and dust control. The cylindrical unit mounted on the wall is the central, exterior vented, vacuum system.



SOAKING PANELS—for several hours with gentle agitation greatly reduces dust during the disassembly process.

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The sections are then removed from the tank and put on the disassembly table. The disassembly is performed completely wet. We use spray bottles to keep the panel wet while we disassemble.

Disassembly involves snipping the lead came at various places, peeling it away from the glass, and wiggling the glass out of the came. After the glass is removed, any cement remaining on the edge is gently removed with a razor scraper. In many cases, the cleaning softens the cement, making scraping unnecessary.

**RLH:** *I see that you have a vent hood over your kiln. Can you tell me something about that?*

**FS:** Certainly. For several years we were not aware that there was a contamination problem from the kiln. Now that we are aware of that, we have installed a ventilation hood over the kiln. The information that we received was that there can be heavy metal fumes, and toxic fumes from the evaporation of the medium during the firing process.

We have a large Denver Glass Machinery kiln, and we have designed a large, sheet

metal hood for a vent. The hood is about four inches larger than the kiln perimeter, and can be lowered by a pulley system over the kiln during the firing.

At the top of the hood, there is a piece of four inch flexible metal duct attached to a blower fan, which draws the air up through the hood and then exhausts it outside. We believe that this is doing a good job of removing any fumes that may occur during the firing process.

**RLH:** *Did you design this ventilation system yourself?*

**FS:** A local sheet metal manufacturing company designed the hood with some helpful suggestions from us, and an electrical contractor installed and wired up the blower motor. An interesting point here is that we find many of the contractors that we contact from various trades to be quite helpful in solving some of the problems that are unique to the stained glass craft. They seem to find it a very unusual and interesting craft, and therefore tend to be quite interested in helping us solve our problems.

**RLH:** *Regarding the air filtration system, can you give me a few particulars?*

**FS:** We have installed a very large air cleaning system in the glazing room. It is designed for a 2,500 square foot. room, and it's installed in a room that is approximately 900 square feet.

It circulates the air through multi-stage pleated filters, and roughly 90 pounds of activated charcoal coconut flake. It exchanges the air in that room about once every 3 to 4 minutes.

The housing for this air filtration equipment is a large metal, 24" by 24" by 60" cabinet that hangs from the ceiling and circulates the air at approximately head height. These units filter the air through several dust filters, pleated filters, and then through activated charcoal flake, and put it back in the air.

In addition to the primary air filtration system, we also run a very small, almost miniature, table fan about six to 10 inches from the soldering iron. We place it so it draws the flux fumes away from the face of the person soldering. It then blows it into the air of the shop where it is filtered by the large air processing unit.

This seems to be quite effective. The employees, have commented that it is a lot more effective, and they can notice a tremendous difference in the quality of the air.

**RLH:** *Is your air handling equipment HEPA (High Efficiency Particulate Appliance) filtration?*

**FS:** No. What we have right now is not HEPA filtration. Although, we are presently considering how we could incorporate HEPA filters into the unit.

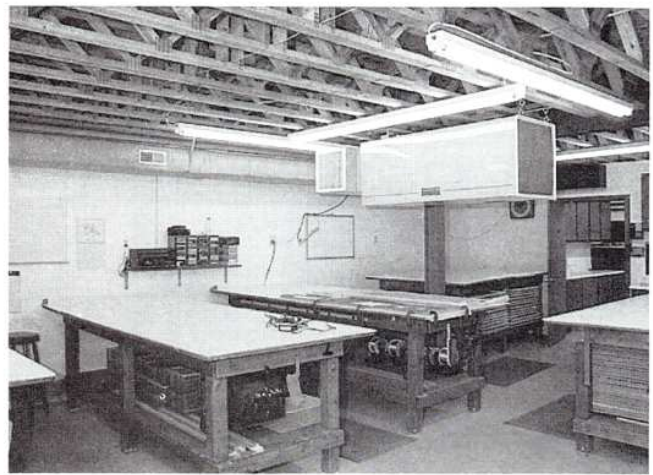
It is a four stage, air filtration unit. Basically, it has an initial fiberglass filter, several different sized pleated and baffle filters and the charcoal flake filter. The final filter, preceding the coconut shell carbon filter, has been tested to be 90 to 95% efficient in filtering particulates down to .5 to .7 micron size. HEPA rated filters remove particulate down to .3 microns I believe.

However, at this point, in the glazing room, where the leading up and the soldering occurs, I don't really know if we need a HEPA filter. We have had air quality testing done in the glazing and soldering area, and they were unable to find any reportable amount of lead in the air. This test was con-





**VENTED KILN**—heavy metal fumes generated during firing are removed from the work area by a hood on a pulley system.



**GLAZING BENCHES**—topped with a painted removable material are wet-cleaned weekly.

ducted by an independent testing lab according to OSHA and federal standards. They believe that there really isn't any lead going into the air as a result of the soldering.

**RLH:** *At what temperatures are you soldering?*

**FS:** We use large soldering irons, approximately 200–250 watts, with a solid state temperature control. We try to bring the temperature of the iron up to the point where the solder is being melted quite sufficiently, but is not anywhere near the actual boiling of lead.

The temperature is cool enough to enable the worker to rest the tip of the iron on the lead joint to preheat it to insure that we get a good solder joint.

**RLH:** *Does your clean air situation hold true in your dirty room?*

**FS:** We have just begun air quality testing in there, and, as a matter of fact, we have just received the test results back. The sample was taken from one employee, who worked disassembling in that room for approximately the day. The company that did the testing reported back to us that we are definitely below any action level as mandated by the federal government. But due to the habits of the individual employee performing the work, and the variety of projects, which may have more or less contamination potential,

we are continuing to monitor and also continually upgrade the air filtration system in there.

It appears to be doing the job, but like anything else, it could also be improved upon, and we are continuing to work on improving it. One of the plans that we have for improving the situation is to put a larger, more efficient air filtration unit in there. We also plan to add duct work to the unit, so that when we need to, we can duct the unit to a mechanical arm with a vacuum attachment.

This would capture the contamination closer to the source, especially when dry disassembly is required. There is no question that dry disassembly will certainly produce the potential for a higher level of exposure than this test conducted on our prevalent wet disassembly method. Again, we only dry disassemble when we encounter sensitive or deteriorated paint.

**RLH:** *I notice that your employees wear uniforms.*

**FS:** Right, the employees wear uniforms, which are changed daily. They also have work shoes, which are left at work at the end of the day. They are not worn home.

We take a lot of precautions, but certainly, improvements can be made. There is a financial consequence and our program must take that into consideration. We have various additional improvements that we are going to

make in the work environment over the next year or two, as they become financially feasible.

**RLH:** *After glazing and soldering the window is inspected, then it's ready for cementing?*

**FS:** Yes. The next step is the cementing process, or waterproofing. The windows are put on a workbench designated for cementing, and the cement is applied. We use an old-fashioned cement which is the consistency of a pudding. It is basically a mixture of linseed oil, turpentine, whiting, plaster of paris, and lampblack or carbon to give it a dark color that also darkens the leads.

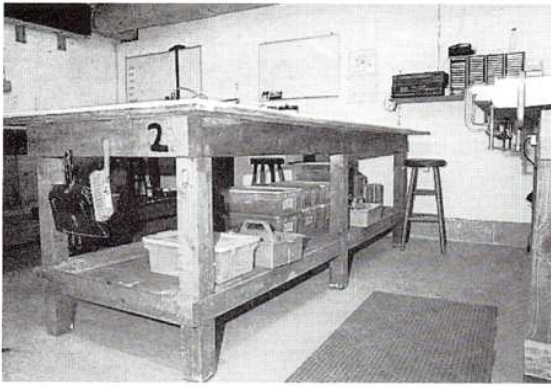
The cement is brushed in under the flange of the lead comes, then the residue is cleaned off by scrubbing whiting or plaster of paris over the window surface.

This creates a good deal of dust, which is removed by the air cleaning unit, and the employees once again wear the full garb—the uniform, work shoes, apron, dust mask, rubber gloves, and hair bonnet—which limits their level of exposure to the dust.

After scrubbing, the residue is vacuumed up by the central vac system. The window is left overnight, and it's turned over the next day and the process is performed again to the other side. After the window is cleaned, it is put in a staging area where it is allowed

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*THE UNDERSIDE*—of the glazing benches are kept neat and orderly by using closed containers for tools and materials. Tools in use are kept in tool totes.



*DISASSEMBLED WINDOWS*—are neatly stored in 'baker's rolling racks'.

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to lie flat for at least 72 hours. This allows the cement to set up and cure.

After this, we do the wire tie installation, a final cleaning and inspection, then a review of the structural support system. T-bars or round horizontal support bars that have been removed are examined, cleaned, and repainted. Any bent ones are replaced. Then we take the window back to the site and reinstall it in its original spot.

**RLH:** *When you reinstall, what kind of putty do you use to replace the old lead bearing putty?*

**FS:** When we reinstall with putty, we use a modern elastic glazing compound, a sash putty.

In some instances, we have switched over to a wood retainer installation system. In a wood frame installation, many times we are able to mill wood retainers that work quite well.

When that's possible, we believe it's aesthetically acceptable and cosmetically attractive, and it may have a greater service life. It certainly is not going to subject anyone to a lot of dust and debris. Even modern putty, which isn't lead-bearing, can be expected to create dust when it's removed in the future. So we use quite a bit of wood moldings in reinstallation when possible.

**RLH:** *You have a remarkably clean operation. How do you keep it that way?*

**FS:** I think there's a lot of communication needed with the employees. First of all to get them to realize and understand the need for a clean environment, then to get them to actively participate in achieving that.

We've been doing this now for the last four years. We try to keep employee awareness quite high, and solicit any suggestions or recommendations our staff may find helpful in improving the studio's lead abatement program.

Basically, we have weekly, monthly, and yearly cleaning programs. The weekly program occurs every Friday. The employees have various duties in cleaning the shop for the last one to two hours of the day. If you take 12 employees, and put them to work for an hour or two cleaning the shop, you'd be amazed how quickly you can clean it, and you'd also be amazed how clean they'll keep it, knowing they have to face clean-up every Friday afternoon.

Mostly, we do wet cleaning, that is, wet mopping, wet sponge and bucket cleaning of all exposed work surfaces. We clean any area that may have dust. To limit the areas that have dust, we have a lot of closed cabinets, counters and cabinet shelves, and very specific locations for all materials items and tools. Tools are kept on the peg board,

or in individual employee tool totes under their benches. Supplies are kept in boxes and closed containers on shelves in cabinets with doors on them. This seems to limit how many items are out and scattered about that can accumulate dust. We haven't gotten to the point of eliminating shelves under workbenches, but all workbench shelves in the dirty room are wrapped with a plastic curtain to prevent dust from settling on them.

In the glazing and soldering areas, the shelves under the workbenches are pretty much just for the tool totes and aluminum angle that we use for squaring up for glazing.

During the course of a weekly cleanup, all these surfaces are wet cleaned with warm water and detergent. The floors are wet mopped. Occasionally, a few areas of the floor can't be wet mopped. So, in those areas, we use a commercial sweeping compound. A mixture of saw dust, sand and paraffin. It mixes with the dirt, and prevents that little cloud of dust from rolling up in front of the broom.

In the dirty room, we wet clean almost everything. Anything that we can't wet clean, we vacuum with the central vac system. In addition to cleaning all exposed surfaces, we also service all of our air filtration equipment on Friday.

That requires disposal of primary fiber filters, and replacement with new fiber filters, and inspection and cleaning of initial pleated filters, and regular weekly inspection of all secondary and third level filters.

We also check our inventories of rubber gloves, dust masks, hair bonnets and so forth. Aprons and shop rags that aren't part of the uniform service, are cleaned here, then put back into service.

**RLH:** *What is your monthly cleaning regimen?*

**FS:** On a monthly basis, we clean areas that accumulate dust, areas that we can't get to easily on a Friday afternoon, such as: areas of the ceiling and



ductwork, tops of cabinets, the top area of the air purification equipment, basically we clean any hard to get to area.

**RLH:** *What does your annual cleaning involve?*

**FS:** Twice a year we strip clean the floors and put on another coat of cement paint. We also change the bench top surfaces, which are painted also. We also repaint the walls where necessary.

Of course, during the normal work year, those bench top surfaces are painted probably three or four times, sometimes more if they need it. They are cleaned before painting, and of course, the painting traps any contaminants that may not have been removed during the normal cleaning.

**RLH:** *What type of material are your benchtops made of.*

**FS:** Homosote. It's a heavily compressed, one half inch thick, cardboard material. It is also used as a bulletin board material, in lieu of cork. It's lightweight, it's inexpensive, and it can be painted over and over again. When it's worn out, it's fairly easy to dispose of. It's not like trying to get rid of a big piece of plywood. This keeps the structural integrity of the workbench, because the actual workbench top, which is plywood, is really never damaged or contaminated.

**RLH:** *It seems as if all the surfaces in your studio are painted, why?*

**FS:** In the shop, in addition to painting and sealing all the floors, so we have an easily moppable and cleanable surface, we have painted everything that can possibly be painted. We have applied a nice white enamel so we can wet clean over and over again. And once a year, we repaint all those areas too.

We've also found that it keeps the shop bright. People are able to see better, and the illumination goes a lot further. It makes a big difference, because

when things are painted white, you can really see when they are getting dirty. That allows us to monitor our cleanliness more closely than we could if things were wood stained or dark colored. Some people might think that it's a bit of an extremist mentality to make everything white and have the shop look like a surgical room, but it helps us monitor the level of cleanliness in the shop and shows if we have missed cleaning something.

**RLH:** *Have you experienced any employee resistance to wearing safety equipment, the uniforms, or maintaining the high level of cleanliness?*

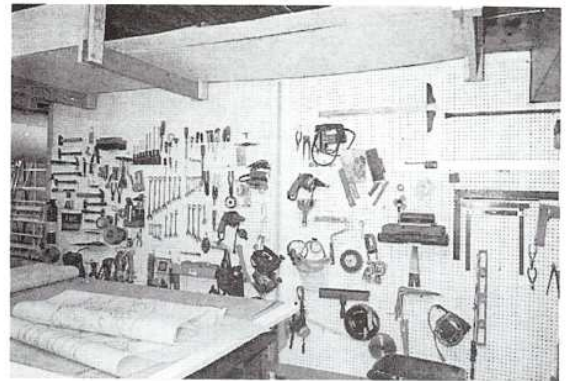
**FS:** A few people voiced their dislike for having to wear uniforms. They said that it didn't allow them to express their individuality. But after a good deal of sincere and serious discussion, they realized it was really for their own benefit and health. The program is not designed to deny people their individuality and self-expression, but rather to protect their health. I think as people thought about it more, if they thought about it in a reasonable frame of mind, they realized that it was necessary.

When we got the uniforms, we found that we had to have areas to put the dirty uniforms and work shoes, as well as an area to keep the clean uniforms and street clothes, and street shoes. We built a separate changing room.

We also have realized the need for showers, especially for people who do site work. In the summer, when people perspire profusely and dirt sticks to the skin, they come back to the studio quite dirty. This is one of the next steps we plan to implement in our lead abatement program—get some showers in place.

We have some difficulties regarding new plumbing in this building. But we're working on it, and hopefully, we'll have something resolved in the next month or two.

**RLH:** *What has all this cost you?*



**TOOL BOARD**—for hand tool storage keeps tools organized and handy, yet out of the way.



**MATERIALS BINS**—individual containers kept inside larger closed storage bins keep materials organized and the work area clean.



**THE CHANGING ROOM**—separate from the work area provides a clean storage area for company uniforms and employees' street clothes.

**FS:** If I were to sit down and figure it all out, it would probably be more than I think it is, and it would be really shocking. The way I've tried to address

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this is to set up a program, listing step by step what we are going to do. As we have a little extra operating capital in the business, we just take a bite out of it and do the next thing on the list.

It is expensive. At different times you can spend \$3,000 here and \$1,000 there, and another \$700 here or \$500 there. My feeling is that since I've become aware of the potential hazards, it's a question of conscience. I strongly feel that no one should knowingly allow people who work for them to become sick or ill.

Another element that has always been on my mind, is that most of the people who work for me are acquaintances, friends or relatives, so I suppose in one sense, that's created an even greater level of concern. Also, for many, many years, I worked in the shop and came to realize that a clean work environment can mean a lot to someone's health, even in small ways; such as, sinus problems, headaches or burning eyes.

I feel as though it's the old story, "You can pay me now or pay me later." I can work at it now and implement these changes in stages, and take small financial hits here and there, or, when it becomes mandated, go to our banker and borrow \$40 thousand to achieve instant compliance.

**RLH:** *You mention \$40 thousand. Do you think that's probably what you've invested?*

**FS:** I think that over the last four years, that's close. I have not totalled it up. I suppose I should, but I think it's better to look forward rather than backward, it tends to be less discouraging.

**RLH:** *You have made a significant investment in health and safety equipment, clean work practices and testing. You must take that into account in your pricing. There are some studios that have not done as you have, they have not made that investment. Do you find it difficult to compete with studios who have not made that investment?*

**FS:** Some yes, some no. It's difficult

to give a brief assessment of that, because each situation regarding each competitor is quite different.

In many cases it does make it difficult. It is usually most difficult with the smaller studios that have a great deal less overhead to begin with. With regards to larger studios, it's not quite as great an issue, because a large studio has a considerable amount of overhead and operating expenses anyway. With the small studios, people who operate out of a 500 or 1,000 square foot facility with two or three employees, it's tough, and we do lose a considerable amount of work to them.

**RLH:** *Is that discouraging?*

**FS:** Sometimes, but I feel as though that shouldn't stop me if I'm committed to it, and I want to do it.

But it does definitely affect competitive pricing, and that weighs heavily on my mind. I don't see an alternative to it. Sooner or later, everyone is going to have to do it. I'd like to see if I can clean up my operation now, and still survive. It may take two or three years to see whether or not lead abatement becomes something that is required of everyone. If it turns out that it isn't, then I've spent a lot of money that some people might consider foolishly spent. On the other hand, morally, I think I've done the right thing. As I've become more aware of the exposures and hazards, I've tried to react as responsibly as I could within my financial means. So, I think that is something we have to wait and see and look at in retrospect.

**RLH:** *Your social conscience is laudable. Do you capitalize on that with your clients by apprising them of your lead abatement program?*

**FS:** That's an interesting point. I don't think I have done that yet. I don't know how much of an issue it will become in the future. I suppose it will depend on how elevated public awareness of this whole lead issue, work environment and safety matters becomes.

As to whether or not it will become a

marketing or sales tactic, at this point it isn't for me. I suspect in the future, it may become that for many people. I don't know, we'll have to see what happens.

**RLH:** *You have obviously put a lot of thought, time, effort and money into lead abatement.*

**FS:** What I've done is what I, as one person, have thought to be the best that I could do in view of my circumstances. Everybody's circumstances vary and I don't think it's fair to judge other people unless you have seen what their circumstances are.

**RLH:** *If you now had the opportunity to build a new studio building from the ground up, what design features would you include to address the issue of lead abatement?*

**FS:** The floor plan would be laid out to completely isolate certain work areas from others. I think I would have them on totally separate HVAC systems, with filtration built right into the HVAC systems, somewhat more elaborate than the hanging units that we have. I would probably try to design certain types of work surfaces, wall surfaces and floor surfaces that are really easy to wet clean. I would have extreme segregation of work areas. I think that might be one big step in the right direction.

**RLH:** *Thank you for your generosity in opening up your studio to this scrutiny. I hope that we have answered some readers' questions about what one studio has done in this thorny arena, and perhaps given those who may be designing new studio buildings some food for thought. Thank you for your honesty and openness.*

**FS:** Have them give me a call. I'll give them my two cents worth, but I'm sure there's a lot more in addition to what we've done that they'll need to find out about. There are a few basic things we've figured out that seem to work, and some that don't; perhaps we could save them those mistakes. Ω