

# Current Practices and Processes for Paint Stripping in Professional Furniture Refinishing

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## The Roll of Stripping in a Commercial Operation

The roll of stripping in a commercial service operation has changed markedly in the past decade. At the end of the 1970s and into the beginning of the 1980s, many so-called "strip shops" existed. Their function was purely utilitarian; they stripped old layers of paint and varnish from furniture brought to them by hobbyists and treasure hunters. Pieces came into the shops from the auction block, the attic, the basement, or the barn loft.

A happy convergence of events drove this "antique" hunting passion: Celebration of the Bicentennial, national turmoil, the back-to-the-earth movement, and no-budget baby-boomers setting up housekeeping and being willing to use second-hand furniture. At the same time, a chrome-and-plastic throwaway attitude in the new furniture markets created a demand for familiar and solid furnishings at reasonable prices.

Thus, initially probably 90 percent of the strip shop business was just stripping. Customers would take the cleaned pieces home and apply the stain and varnish coats themselves. As the novelty wore off, and as the appeal of the "homemade" refinishing look faded in a more affluent period, furniture stripping shops began to hear requests for more complete services.

Today, the market has changed to the point that the percentages of work have nearly reversed themselves, with almost 95 percent of the furniture entering a shop for the full treatment. Only about 5 percent is there just to be stripped clean and made ready for the customer who will do the final finishing work.

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## New Products for Stripping

Just as the mix of activity has changed during the past decade, so has the profile of the furniture items being brought into the shops for service. Earlier, solid wood items like oak chairs and tables, maple Shaker stands, and the massive, solid walnut and mahogany Victorian furniture made up the bulk of the work. Currently, interest is focused more on the delicate veneers and inlaid pieces showing the Art Deco influence of the 1920s. The smaller, more highly styled pieces are quite popular.

The condition of the objects has also changed. Where once no item was considered for refinishing if it needed much repair at all, it is now not uncommon to restore furniture that has been severely broken and damaged. Where once only solid wooden articles were refinished, now multiple materials, like leather inlays, metal and ivory boules, and exotic matched veneers are common.

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## Processes Typical in Commercial Shops

### *Types of Equipment*

Essentially two processes are used to remove undesired coats of old finish in all shops: chemical removal and mechanical removal. Nearly all professional furniture stripping operations maximize the use of chemical removal methods. Mechanical elimination of finish from furniture has not thus far proven to be both effective and nondestructive to the fine wood substrate.

Within the bounds of the chemical process, there are three common methods of applying the various solutions: (1) by hand (typically with a brush); (2) through a pumping system (typically with a hose and brush); or (3) by immersion (in vats).

It is interesting to note that it has been the delivery device—the brush, the pump, or the vat—that has received the greatest attention in the marketplace. Salespersons make extravagant claims for the type of equipment they are selling. Actually, the chemical the device delivers is the important element. Until very recently, this fact has received almost no attention. The brush doesn't strip, nor does the pump or the vat: the chemical, not the delivery device, determines the success of the process.

Efficiency dictates that commercial furniture shops use either vats or pumps to deliver stripping chemicals to the work surfaces. Pumping systems are the most commonly found among the shops by a large margin of four to one over vat systems.

Pumping systems are very inexpensive to make: a motor, a pump, a length of hose, and a brush are all that are needed to devise a functional system. Commercially assembled pumping systems are superior in design and easily shipped. Pumping systems also require almost no experience or training to be used successfully.

Immersion vat systems are also simple technology, but they are much more expensive and cumbersome to make. Costs of keeping vats charged with chemicals are higher than in any other system. Many refinements have been accomplished over the years to make commercially designed vat systems superior to home-made units, but vats are the most expensive pieces of equipment to transport. Immersion vat systems also require the most training and experience to be used to their full advantage.

### *Types and Quantities of Chemicals*

Until the early 1970s, benzene was the solvent used to strip chemicals. It is both flammable and toxic. After its health safety risks became known, benzene was replaced as a stripper by methylene chloride products. Nonflammable, infinitely safer than benzene, and quite effective, these compounds have been used successfully ever since.

Methylene chloride, by itself, is not the best paint remover. It must be spiked with activating agents to produce the most powerful results. Acids, alkalies, amines, and phenols are used for this purpose. Wetting agents also help reduce the

surface tension and hence further improve the penetration. Thus, the explosion of different removers on today's market—each claiming to be better than the rest.

Methylene chloride is also usually the single most expensive component in the remover formulas, often by a factor of four to one. Thus, there is a tremendous incentive to make the product cheaper by adding less expensive diluent components like alcohols, toluene, xylene, acetone, simple mineral spirits, or even water. Usually this not only reduces the efficacy of the product but also, depending upon the compound used, adds health or flammability hazards—or both.

Brushing applicators and pumping system users are usually limited to solvent removers. Immersion vat operators may use water-based strippers in addition to, or in place of, solvent applications. Vat operators historically have used hot water and lye. The combination is cheap, effective, and has been recommended in furniture refinishing guides. Despite these facts, lye will, unfortunately, damage furniture. Lye will attack anything organic, including wood, glue, and veneer. Nevertheless, it continues to be used in some shops.

Far superior water-based stripping compounds have been available on the market for many years. These complex alkaline compounds effectively remove many of the older finishes that solvent removers like methylene chloride find troublesome.

### *Quantities of Solvent Removers Used*

Most people engaged in removing solvents use pumping systems, and this process uses the largest quantity of solvent removers. Many of these operators use in excess of twelve 55-gallon drums of product each year. By its very nature, the pumping process creates the greatest surface area exposure and hence has the highest evaporation rate (and operator exposure) in the industry.

Despite the fact that pumping systems are the most common and least expensive process, they are not the most effective paint removers.

Immersion vat systems often use both water-based alkaline removers and solvents. They currently represent the smaller percentage of market share. However, vat systems are much more efficient in their use of solvent removers. While many pumping systems use in excess of twelve 55-gallon drums per year, few vat operations consume more than four to six 55-gallon drums per year, or about one-third to one-half of the consumption of a

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pumping system operator. The market dilemma from the chemical supplier's point of view should be apparent.

Further, vat system operators using proper techniques and equipment are usually exposed to less remover vapors and use far less remover per item than in any other system. Because of their ability to hold the stripping chemistry in intimate contact with the finish surface without being subject to evaporation, vats are also the most effective delivery vehicles. Vat systems can offer superior performance as well as superior exposure and consumption characteristics.

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## Types of Coatings

As furniture degrades, it is abused. The professional furniture stripper encounters all types of paint and finishes including fine French polish, varnish, interior kitchen enamels, exterior house paints (lead and mozzarella), floor enamels, and marine finishes. Sometimes several finishes are removed from a single piece—for example, John Deere green implement enamel (farm tractor paint) has been found on a marble-topped Victorian walnut table.

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## Special Concerns

All of the ordinary business considerations face a commercial stripping operator: overhead, time, labor, and so forth. But a professional furniture restorer also has some special concerns that control and narrow the selection of equipment, chemistry, and techniques. Hidden below layers of paint is a substrate of unknown description. This may be veneer, solid wood, plastic, or metal. The substrate may be in good shape, or it may be ready to fall into pieces. All too often, a piece that would be considered “junk” becomes much more valuable following restoration.

Like a physician, the professional furniture restorer seeks first to do no harm. A very special concern is care of the wooden skeleton hidden beneath layer-after-layer of grafted skins of paint. It is bad practice to experiment with unknown and untested chemistry at the risk of damaging the unknown substrate.

In addition, the workplace and personal safety must also be carefully considered. It is not worth jeopardizing health and safety for the sake of salvaging an auction find. In addition to the workplace, the broader environmental issues

must also be taken into consideration with safe disposal of wastes and toxics. Handled thoughtfully, no solvent need ever be dumped. By using a properly formulated blend, solvent removers can be continually reclaimed and reused. The paint solids, consisting mostly of gums and resins, can be effectively removed and disposed of dry. It is the same paint that would have been thrown away had the whole furniture piece been discarded. Of course, as a result of the stripping, the paint is collected and concentrated. This should make handling and containment efforts much simpler. Happily, there is as much economic incentive for the commercial operator to reclaim and recycle the solvents as there is environmental rationale.

Reducing air exposure concentrations has not received the attention it deserves. Hopefully, with the passage of the Clean Air Act, this will now change. The many improperly designed, installed, or used pumping systems for stripping represent a tremendous air contamination source for both the operator and the environment. Designing better air handling systems, encouraging more use of vats and “passive” application devices, and developing better evaporation-retarding chemistry will address this problem. Unfortunately, the commercial interests of solvent suppliers mitigate against the aggressive marketing of less dangerous vats, since they can often sell two to three times as much product to pumping system operators than they can to immersion vat users.

A final issue is flammability. Because of methylene chloride's nonflammable quality, fires in commercial shops using a methylene chloride product professionally designed for the purpose have not been common for many years. Previously, when benzene was used, fires were the leading cause of injury. If today's volume of stripping was done with flammable products like acetone, lacquer thinner, benzene, or some of the newly proposed flammable methylene chloride alternatives, this risk would increase enormously.

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## Conclusion

Furniture stripping has become a very safe occupation for both the operator and the work product. More furniture is being restored and reused today than ever before. Thousands of workers are actively involved, including the handicapped in special workshops. Millions of pieces of furniture have been given a new lease on life. Exotic lumber and cabinetry have been preserved for the enjoyment of generations yet to come, and

the strain on forests to constantly produce more wood has been eased.

When accidents have occurred, there have usually been contributing factors such as intentional misuse. Equipment and workplaces can be made even safer and more accident free. Equipment design, chemistry formulation, and worker technique all need to be addressed.

Regardless of the toxicological aspects of methylene chloride, there are no products available to the industry that are as effective, safe, and fire resistant as this substance. It is hoped that, in the zeal to further reduce the very small risks associated with paint removing, more hazardous situations are not inadvertently created.

Several suggestions should be considered to improve safety and health aspects of the paint remover industry. These are:

- Follow the European lead and encourage the use of vat and more passive application systems. Minimize exposure by limiting surface area exposure. Explore alternatives but do not condemn a proven product too quickly: the alternatives may prove to be worse.
- Reduce the all-or-none rhetoric in the methylene chloride battle. A middle-ground compromise may be a much more fruitful approach to the

problem. Instead of a one-step process, a multi-tiered approach should be implemented. Methylene chloride or the alternative solvent removers can be used where they are needed and work best, as appropriate. For example, buttermilk paint strips best under contact with a water-based alkaline material

With this approach, the newer, more solvent-susceptible layers of unwanted finish are removed by immersion in a methylene chloride stripper. Lower layers that do not respond well to this solvent should be removed with one of the alternative strippers. This system not only produces less chemical exposure, it results in a superior work product.

Care should be taken not to encourage well-meaning but unsuspecting people to buy cans of untested products that proclaim on the outside labels, "NO HARMFUL METHYLENE CHLORIDE," when in fact they contain substances that are more dangerous. Citizens, as well as policy makers, want to believe that a magic new technology can solve all problems: unfortunately, not magic, but patience and careful consideration of available options are required to reduce safety and environmental risks in the paint stripping industry.